

UNLEASH<sup>RF</sup>



# RF Manual 17<sup>th</sup> edition

Application and design manual for  
High Performance RF products  
June 2013



# NXP enables you to unleash the performance of next-generation RF and microwave designs

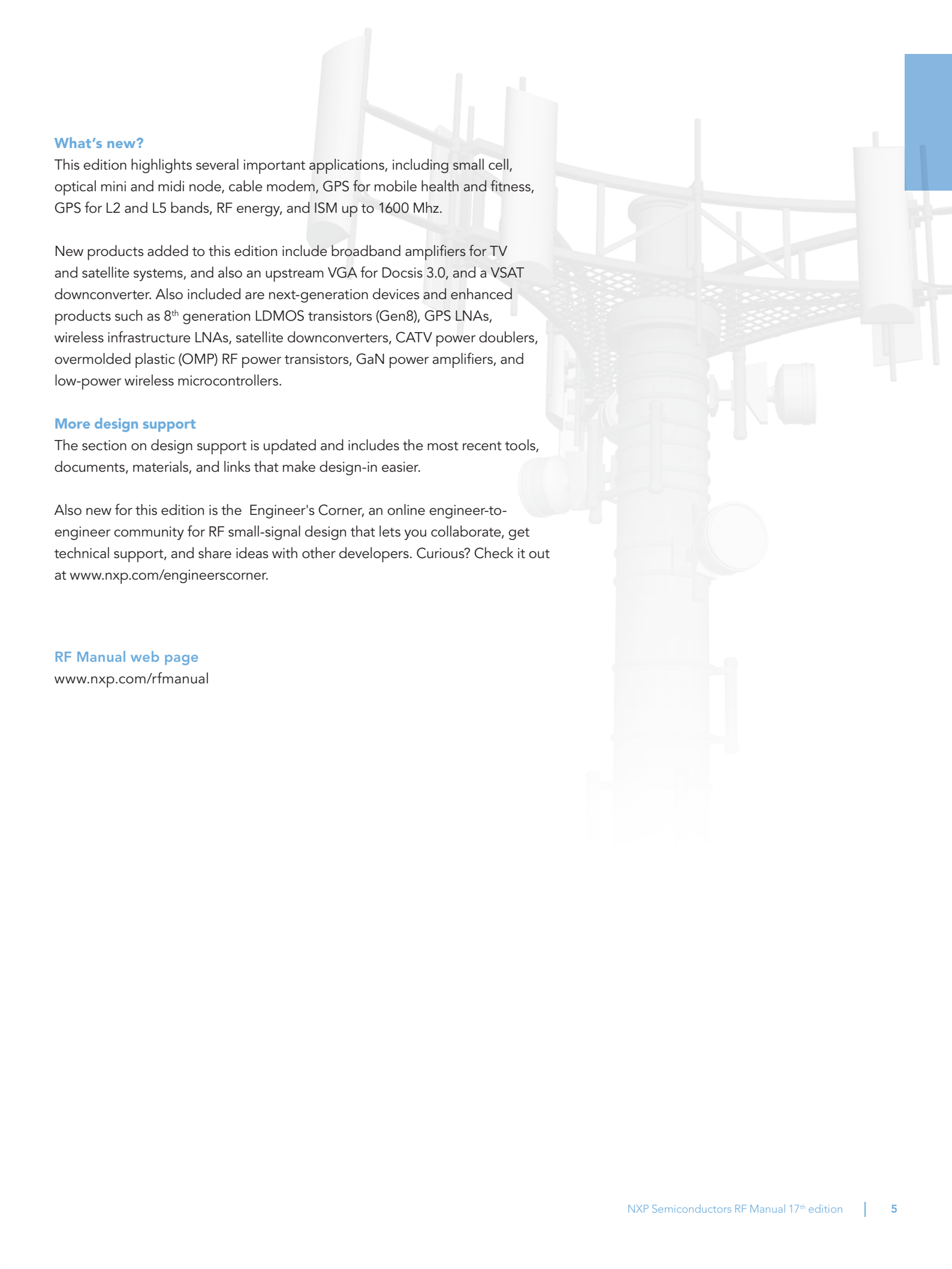
NXP's RF Manual is one of the most important reference tools on the market for today's RF designers. It features our complete range of RF products, from low- to high-power signal conditioning, organized by application and function, and with a focus on design-in support.

When it comes to RF, the first thing on the designer's mind is to meet the specified performance. NXP brings clarity to every aspect of your design challenge, so you can unleash the performance of your RF and microwave designs. NXP delivers a portfolio of high-performance RF technology that lets you differentiate your product – no matter where in the RF world you are. That's why customers trust us with their mission-critical designs. Whether it's LDMOS and GaN for high-power RF applications or Si and SiGe:C BiCMOS for your small-signal needs, we've got you covered. Our broad portfolio of far-reaching technologies gives you the freedom to design with confidence.

Shipping more than four billion RF products annually, NXP is a clear industry leader in High Performance RF. From satellite receivers, cellular base stations, and broadcast transmitters to ISM (industrial, scientific, medical) and aerospace and defense applications, you will find the High Performance RF products that will help you realize a clear advantage in your products, your reputation, and your business.

So if you're looking to improve your RF performance, design a highly efficient signal chain, or break new ground with an innovative ISM application, NXP will help you unleash the performance of your next-generation RF and microwave designs.

## UNLEASH<sup>RF</sup>



### What's new?

This edition highlights several important applications, including small cell, optical mini and midi node, cable modem, GPS for mobile health and fitness, GPS for L2 and L5 bands, RF energy, and ISM up to 1600 Mhz.

New products added to this edition include broadband amplifiers for TV and satellite systems, and also an upstream VGA for Docsis 3.0, and a VSAT downconverter. Also included are next-generation devices and enhanced products such as 8<sup>th</sup> generation LDMOS transistors (Gen8), GPS LNAs, wireless infrastructure LNAs, satellite downconverters, CATV power doublers, overmolded plastic (OMP) RF power transistors, GaN power amplifiers, and low-power wireless microcontrollers.

### More design support

The section on design support is updated and includes the most recent tools, documents, materials, and links that make design-in easier.

Also new for this edition is the Engineer's Corner, an online engineer-to-engineer community for RF small-signal design that lets you collaborate, get technical support, and share ideas with other developers. Curious? Check it out at [www.nxp.com/engineerscorner](http://www.nxp.com/engineerscorner).

### RF Manual web page

[www.nxp.com/rfmanual](http://www.nxp.com/rfmanual)

# Contents

|          |                                                                                                         |           |
|----------|---------------------------------------------------------------------------------------------------------|-----------|
| <b>1</b> | <b>Products by application</b>                                                                          | <b>9</b>  |
| 1.1      | Wireless communication infrastructure                                                                   | 9         |
| 1.1.1    | Base stations (all cellular standards and frequencies)                                                  | 9         |
| 1.1.2    | Repeater                                                                                                | 12        |
| 1.1.3    | Small cells                                                                                             | 13        |
| 1.2      | Broadband communication infrastructure                                                                  | 15        |
| 1.2.1    | Optical mini- and midnode line-up                                                                       | 15        |
| 1.2.2    | CATV optical node with multiple out-ports for Chinese SARFT standard                                    | 16        |
| 1.2.3    | CATV optical node with multiple out-ports for 1 GHz networks                                            | 17        |
| 1.2.4    | CATV electrical (line extenders)                                                                        | 18        |
| 1.3      | TV and satellite                                                                                        | 19        |
| 1.3.1    | Network interface module (NIM) for TV reception                                                         | 19        |
| 1.3.2    | Cable modem based on DOCSIS 3.0                                                                         | 20        |
| 1.3.3    | Satellite outdoor unit, twin low-noise block (LNB) with discrete components                             | 21        |
| 1.3.4    | Satellite outdoor unit, twin low-noise block (LNB) with integrated mixer/oscillator/downconverter       | 22        |
| 1.3.5    | Satellite multi-switch box- 4 x 4 (up to 16 x 16)/DiSEqC/SMATV                                          | 23        |
| 1.3.6    | VSAT with integrated mixer/oscillator/downconverter                                                     | 24        |
| 1.4      | Broadcast                                                                                               | 26        |
| 1.5      | Wireless connectivity                                                                                   | 27        |
| 1.5.1    | GPS for smartphone and tablets: high linearity                                                          | 27        |
| 1.5.2    | GPS L2 and L5 bands                                                                                     | 29        |
| 1.5.3    | Mobile health and fitness: low current                                                                  | 30        |
| 1.5.4    | WLAN: Access points and routers                                                                         | 31        |
| 1.5.5    | FM radio                                                                                                | 32        |
| 1.5.6    | Generic RF front-end                                                                                    | 33        |
| 1.6      | Automotive                                                                                              | 34        |
| 1.6.1    | SDARS and HD radio                                                                                      | 34        |
| 1.6.2    | Remote keyless entry, RF generic front-end with dedicated antenna for reception and transmission        | 35        |
| 1.6.3    | Tire pressure monitoring system                                                                         | 36        |
| 1.6.4    | Car radio receiver (CREST ICs: TEF6860HL, TEF6862HL)                                                    | 37        |
| 1.7      | Industrial, scientific, and medical (ISM)                                                               | 38        |
| 1.7.1    | E-metering, RF generic front-end with a single antenna/ZigBee                                           | 38        |
| 1.7.2    | ISM 1-1600 MHz                                                                                          | 40        |
| 1.7.3    | RF energy                                                                                               | 41        |
| 1.8      | Aerospace and defense                                                                                   | 42        |
| 1.8.1    | Microwave products for L- and S-band radar and avionics applications                                    | 42        |
| <b>2</b> | <b>Technologies</b>                                                                                     | <b>44</b> |
| 2.1      | Looking for a leader in SiGe:C? You just found us!                                                      | 44        |
| 2.2      | Gallium-Nitride (GaN): Gain a clear advantage as NXP takes GaN mainstream                               | 45        |
| 2.3      | Best-in-class LDMOS to drive almost any RF application                                                  | 46        |
| 2.4      | High-performance, small-size packaging enabled by NXP's leadless package platform and WL-CSP technology | 47        |
| <b>3</b> | <b>Products by function</b>                                                                             | <b>48</b> |
| 3.1      | New products                                                                                            | 48        |
| 3.2      | RF diodes                                                                                               | 50        |
| 3.2.1    | Varicap diodes                                                                                          | 50        |
| 3.2.2    | PIN diodes                                                                                              | 51        |
| 3.2.3    | Band-switch diodes                                                                                      | 53        |
| 3.2.4    | Schottky diodes                                                                                         | 53        |
| 3.3      | RF Bipolar transistors                                                                                  | 54        |
| 3.3.1    | Wideband transistors                                                                                    | 54        |
| 3.4      | RF ICs                                                                                                  | 57        |
| 3.4.1    | RF MMIC amplifiers and mixers                                                                           | 57        |
| 3.4.2    | Wireless infrastructure ICs                                                                             | 61        |
| 3.4.3    | Satellite LNB RF ICs                                                                                    | 62        |
| 3.4.4    | VSAT LNB RF ICs                                                                                         | 62        |
| 3.4.5    | Low-noise LO generators for VSAT and general microwave applications                                     | 62        |
| 3.5      | RF MOS transistors                                                                                      | 63        |
| 3.5.1    | JFETs                                                                                                   | 63        |
| 3.5.2    | MOSFETs                                                                                                 | 64        |

|          |                                                           |    |
|----------|-----------------------------------------------------------|----|
| 3.6      | RF modules                                                | 65 |
| 3.6.1    | CATV push-pulls                                           | 65 |
| 3.6.2    | CATV push-pulls 1 GHz                                     | 65 |
| 3.6.3    | CATV power doublers                                       | 66 |
| 3.6.4    | CATV optical receivers                                    | 66 |
| 3.6.5    | CATV reverse hybrids                                      | 66 |
| 3.7      | RF power transistors                                      | 67 |
| 3.7.1    | RF power transistors for base stations                    | 67 |
| 3.7.1.1  | 0.7 – 1.0 GHz line-up                                     | 67 |
| 3.7.1.2  | 1.4 – 1.6 GHz line-up                                     | 68 |
| 3.7.1.3  | 1.8 – 2.0 GHz line-up                                     | 68 |
| 3.7.1.4  | 2.0 – 2.2 GHz line-up                                     | 68 |
| 3.7.1.5  | 2.3 – 2.4 GHz line-up                                     | 69 |
| 3.7.1.6  | 2.5 – 2.7 GHz line-up                                     | 69 |
| 3.7.1.7  | 3.5 – 3.8 GHz line-up                                     | 69 |
| 3.7.1.8  | Power LDMOS Doherty designs                               | 70 |
| 3.7.1.9  | Single Package Asymmetric Doherty (PAD) power transistors | 72 |
| 3.7.1.10 | OMP power transistors                                     | 72 |
| 3.7.1.11 | MMIC power transistors                                    | 73 |
| 3.7.1.12 | Small cell power transistors                              | 73 |
| 3.7.1.13 | High voltage power transistors                            | 73 |
| 3.7.2    | RF power transistors for broadcast/ISM applications       | 74 |
| 3.7.2.1  | 1 – 1600 MHz (UHF/VHF/HF/ISM) LDMOS line-up               | 74 |
| 3.7.2.2  | Power LDMOS transistors UHF 470-860 MHz line-up           | 74 |
| 3.7.2.3  | 2.45 GHz ISM LDMOS transistor line-up                     | 74 |
| 3.7.3    | RF power transistors for aerospace and defense            | 75 |
| 3.7.3.1  | Avionics LDMOS transistors                                | 75 |
| 3.7.3.2  | L-band LDMOS transistors                                  | 75 |
| 3.7.3.3  | S-band LDMOS transistors                                  | 76 |
| 3.7.4    | Gallium Nitride (GaN) RF power amplifiers                 | 76 |
| 3.8      | Wireless microcontroller chipsets and modules             | 76 |

## 4 Design support 77

|       |                                                       |    |
|-------|-------------------------------------------------------|----|
| 4.1   | Knowing NXP's RF portfolio                            | 77 |
| 4.2   | Product selection on NXP.com                          | 77 |
| 4.3   | Product evaluation                                    | 77 |
| 4.4   | Engineers'corner                                      | 78 |
| 4.5   | Additional design-in support                          | 78 |
| 4.6   | Application notes                                     | 78 |
| 4.7   | Simulation models                                     | 80 |
| 4.7.1 | Simulation models for RF power devices                | 80 |
| 4.7.2 | Simulation models for RF bipolar wideband transistors | 82 |
| 4.7.3 | Simulation models for RF MOSFET transistors           | 84 |
| 4.7.4 | Simulation models for RF MMIC amplifiers              | 84 |
| 4.7.5 | Simulation models for RF varicap diodes               | 85 |

## 5 Cross-references & replacements 86

|     |                                                                       |    |
|-----|-----------------------------------------------------------------------|----|
| 5.1 | Cross-references: manufacturer types versus NXP types                 | 86 |
| 5.2 | Cross-references: NXP discontinued types versus NXP replacement types | 92 |

## 6 Packing and packaging information 94

|     |                                                             |    |
|-----|-------------------------------------------------------------|----|
| 6.1 | Packing quantities per package with relevant ordering codes | 94 |
| 6.2 | Marking codes                                               | 98 |

## 7 Abbreviations 100

## 8 Contacts and web links 101

## 9 Product index 102



# 1. Products by application

## 1.1 Wireless communication infrastructure

### 1.1.1 Base stations (all cellular standards and frequencies)

#### RF power transistors for base stations

NXP is the fastest growing supplier of LDMOS transistors for cellular infrastructure, leading the W-CDMA and LTE markets. Our promise is unprecedented performance combined with best-in-class application support and constant innovation. Our design and manufacturing technologies ensure the best PA manufacturing yields in the industry. Our 8<sup>th</sup> generation LDMOS RF transistors offer the best solutions for all cellular frequency bands. With the current industry focus on cost reduction, we complement our product portfolio with OMP and MMIC product families, which combine high performance with low cost.

#### New: Single Package Asymmetric Doherty (PAD) Transistors and MMICs

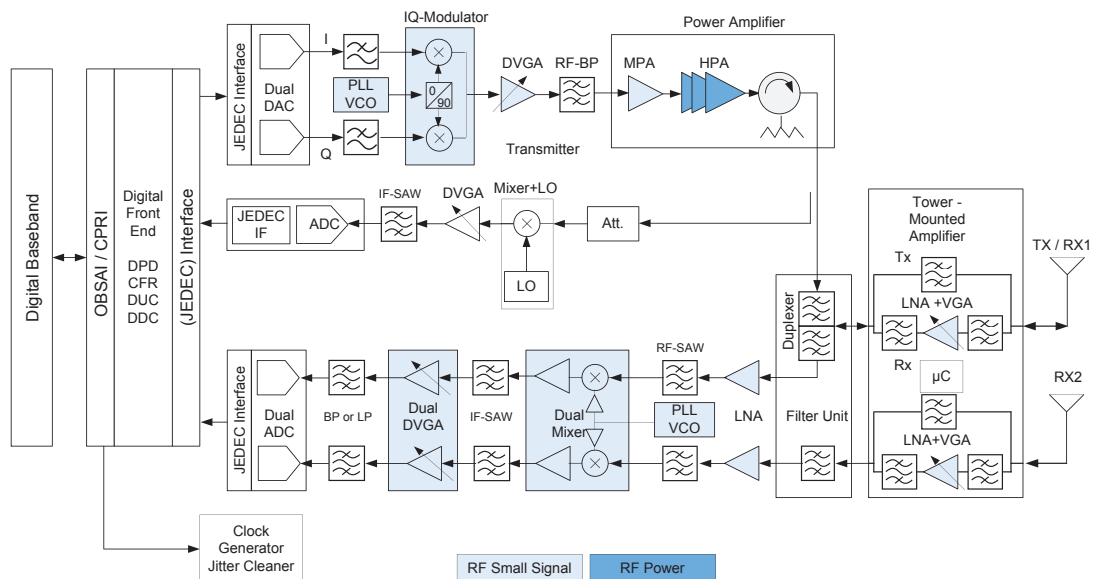
PAD devices offer the highest efficiency, smallest footprint, best cost-effectiveness, and can deliver P1dB power levels up to 460 W. These products are DPD-friendly and show excellent video bandwidth. The wide product portfolio covers frequency bands from 1800 to 2700 MHz and average power levels from 2 to 80 W. Discrete single-stage transistors and asymmetric MMICs are available to suit most applications, from picocells to macrocells.

#### RF components for transmit line-ups and receive chains

As a global leader in RF technology and component design, NXP Semiconductors offers a complete portfolio of RF products, from low- to high-power signal conditioning, that delivers advanced performance and helps simplify your design and the development process. Our solutions range from discretes and amplifiers (LNA, VGA, MPA) to mixers/oscillators.

#### Application diagram

The block diagram shows base station transmit (upper part, Tx) and receive (lower part, Rx) functions, and includes the Tx feedback function (middle part, Tx feedback).



#### Product highlight: MMIC BLM7G22S-60PBG



MMICs have two main applications: drivers in macro base station power amplifiers (generally in class AB), and final stages in small cells (generally in Doherty configuration). For Doherty applications, asymmetric MMICs are preferred as they increase the efficiency in backoff. As drivers, symmetric MMICs are often preferred, for more linearity. We are pleased to offer both configurations thanks to a flexible architecture that enables quick sampling of different variants.

BLM7G22S-60PBG is a dual path 2-stage power MMIC. This device is perfectly suited as general-purpose driver in the frequency range from 2100 to 2200 MHz.

## Recommended products

| Function | Product            | $f_{\min}$ (MHz) | $f_{\max}$ (MHz) | P1dB (W) | Package   | Type              |
|----------|--------------------|------------------|------------------|----------|-----------|-------------------|
| HPA      | Driver             | 700              | 2200             | 5        | SOT1179   | BLP7G22-05        |
|          |                    | 700              | 2200             | 10       | SOT1179   | BLP7G22-10        |
|          |                    | 3400             | 3600             | 10       | SOT975    | BLF6G38-10(G)     |
|          | Driver/final       | 700              | 1000             | 45       | SOT1223/4 | BLP8G10S-45P(G)   |
|          |                    | 1800             | 2200             | 60       | SOT1223/4 | BLP8G22S-60P(G)*  |
|          |                    | 2500             | 2700             | 40       | SOT1121   | BLF6G27L(S)-40P   |
|          |                    | 3400             | 3800             | 50       | SOT502    | BLF6G38(LS)-50    |
|          |                    | 700              | 900              | 140      | SOT1223   | BLP7G07S-140P     |
|          | Final              | 700              | 1000             | 160      | SOT467    | BLF6H10L(S)-160   |
|          |                    | 700              | 1000             | 300      | SOT1247   | BLF8G10LS-300PV*  |
|          |                    | 820              | 960              | 270      | SOT502    | BLF8G10LS-270     |
|          |                    | 900              | 1000             | 140      | SOT1223/4 | BLP7G09S-140P(G)* |
|          |                    | 920              | 960              | 160      | SOT502    | BLF8G10L(S)-160   |
|          |                    | 925              | 960              | 160      | SOT1244   | BLF8G10LS-160V    |
|          |                    | 1427             | 2170             | 90       | SOT1121   | BLF7G20L(S)-90P   |
|          |                    | 1800             | 2025             | 160      | SOT1223   | BLP8G21S-160PV    |
|          |                    | 1800             | 1990             | 170      | SOT1120   | BLF8G19LS-170BV   |
|          |                    | 1800             | 2000             | 200      | SOT1120   | BLF8G20LS-200V    |
|          |                    | 1800             | 1900             | 260      | SOT539    | BLF8G20LS-260A    |
|          |                    | 2000             | 2200             | 140      | SOT502    | BLF8G22LS-140     |
|          |                    | 2000             | 2200             | 160      | SOT1120   | BLF8G22LS-160BV   |
|          |                    | 2110             | 2170             | 220      | SOT502    | BLF8G22LS-220     |
|          |                    | 2110             | 2170             | 270      | SOT502    | BLF8G22LS-270     |
|          |                    | 2110             | 2170             | 310      | SOT1110   | BLF8G22LS-310AV*  |
|          |                    | 2300             | 2700             | 75       | SOT1121   | BLF7G27L(S)-75P   |
|          |                    | 2300             | 2400             | 100      | SOT502    | BLF7G24L(S)-100   |
|          |                    | 2300             | 2400             | 140      | SOT502    | BLF7G24L(S)-140   |
|          |                    | 2300             | 2400             | 160      | SOT539    | BLF7G24L(S)-160P  |
|          |                    | 2300             | 2400             | 200      | SOT539    | BLF8G24L(S)-200P  |
|          |                    | 2500             | 2700             | 100      | SOT502    | BLF7G27L(S)-100   |
|          |                    | 2500             | 2700             | 100      | SOT1244   | BLF8G27LS-100V    |
|          |                    | 2500             | 2700             | 100      | SOT1121   | BLF8G27LS-100P    |
|          |                    | 2500             | 2700             | 140      | SOT502    | BLF7G27L(S)-140   |
|          |                    | 2500             | 2700             | 160      | SOT1275   | BLC8G27LS-160AV*  |
|          |                    | 2600             | 2700             | 140      | SOT1244   | BLF8G27LS-140V    |
|          |                    | 3400             | 3600             | 100      | SOT502    | BLF6G38(LS)-100   |
|          | Integrated Doherty | 2010             | 2025             | 50       | SOT1130   | BLD6G21L(S)-50    |
|          |                    | 2110             | 2170             | 50       | SOT1130   | BLD6G22L(S)-50    |
|          | MMIC               | 2000             | 2200             | 60       | SOT1212   | BLM7G22S-60PB(G)  |

\* Check status in section 3.1, as this type is not yet released for mass production

## Doherty amplifier technology for state-of-the art wireless infrastructure

In order to achieve the highest efficiencies currently possible, NXP combines its latest generations of LDMOS technology with the Doherty concept. We offer the world's first fully integrated Doherty transistor but also reference designs for very efficient, high power, discrete 2- and 3-way Doherty amplifiers.

The world's first fully integrated Doherty transistor looks like an ordinary class-AB transistor but contains a splitter, main and peak devices, delay lines, and a combiner integrated inside the package. With the ease of design of an ordinary class AB transistor, it also provides significant space and cost savings. It is ideally suited for space-constrained applications like small-cell base stations and antenna arrays.

### Product highlight

#### 3-way Doherty BLF8G22LS-160BV



The 3-way Doherty design based on three BLF8G22LS-160BV devices achieves 48% efficiency at 49 dBm (80 W) average output power and 15.0 dB gain with a 2 carrier W-CDMA signal. It has a peak power capability (P3dB) of 57 dBm (500 W) at 28 V supply voltage. This design covers the W-CDMA standard for band one (2.11 - 2.17 GHz) operation and is tailored to very high peak power and volume manufacturing with high yields without tuning. Additional features are enhanced video bandwidth and an auto-biasing function.



| Function            | Product  |           | Package | Type   |
|---------------------|----------|-----------|---------|--------|
| Discrete attenuator | RF diode | PIN diode | SOT753  | BAP64Q |
|                     |          |           | SOT753  | BAP70Q |
|                     |          |           | Various | BAP64* |

| Function                     | Product       |                   | Package | Type       |
|------------------------------|---------------|-------------------|---------|------------|
| LNA<br>(low noise amplifier) | RF transistor | SiGe:C transistor | SOT343F | BFU725F/N1 |
|                              |               |                   |         | BFU690F    |
|                              |               |                   |         | BFU730F    |
|                              |               |                   |         | BFU760F    |
|                              | MMIC          | SiGe:C MMIC       | SOT650  | BGU790F    |
|                              |               |                   |         | BGU7051    |
|                              |               |                   |         | BGU7052    |
|                              |               |                   | SOT1327 | BGU7053    |
|                              |               |                   |         | BGU8051    |
|                              |               |                   |         | BGU8052    |
| LNA + bypass + VGA           | MMIC          | SiGe:C MMIC       | SOT1301 | BGU8053    |
|                              |               |                   |         | BGU7060    |
|                              |               |                   |         | BGU7061    |
|                              |               |                   |         | BGU7062    |

| Function                                | Product | Gain range | Package | Type    |
|-----------------------------------------|---------|------------|---------|---------|
| Single VGA<br>(variable-gain amplifier) | MMIC    | 30 dB      | SOT617  | BGA7210 |
|                                         |         | 18.5 dB    |         | BGA7204 |

| Function                           | Product | Gain range | Package | Type    |
|------------------------------------|---------|------------|---------|---------|
| Dual VGA (variable-gain amplifier) | MMIC    | 24 dB      | SOT617  | BGA7350 |
|                                    |         | 28 dB      |         | BGA7351 |

| Function                        | Product | P <sub>L</sub> (1dB) @ 940 MHz | Package | Type    |
|---------------------------------|---------|--------------------------------|---------|---------|
| MPA<br>(medium power amplifier) | MMIC    | 24 dBm                         | SOT89   | BGA7024 |
|                                 |         | 28 dBm                         |         | BGA7027 |
|                                 |         | 25 dBm                         | SOT908  | BGA7124 |
|                                 |         | 28 dBm                         |         | BGA7127 |
|                                 |         | 30 dBm                         |         | BGA7130 |

| Function   | Product | Frequency     | Package | Type    |
|------------|---------|---------------|---------|---------|
| Dual mixer | MMIC    | 0.7 - 1.2 GHz | SOT1092 | BGX7220 |
|            |         | 1.7 - 2.7 GHz |         | BGX7221 |

| Function     | Product | Output power | Package | Type    |
|--------------|---------|--------------|---------|---------|
| IQ modulator | MMIC    | 0 dBm        | SOT616  | BGX7100 |
|              |         | 4 dBm        |         | BGX7101 |

\* SOD523, SOD323, SOT23, and SOT323

### Product highlight: BGU706x integrated multi-stage base station LNAs with lowest NF



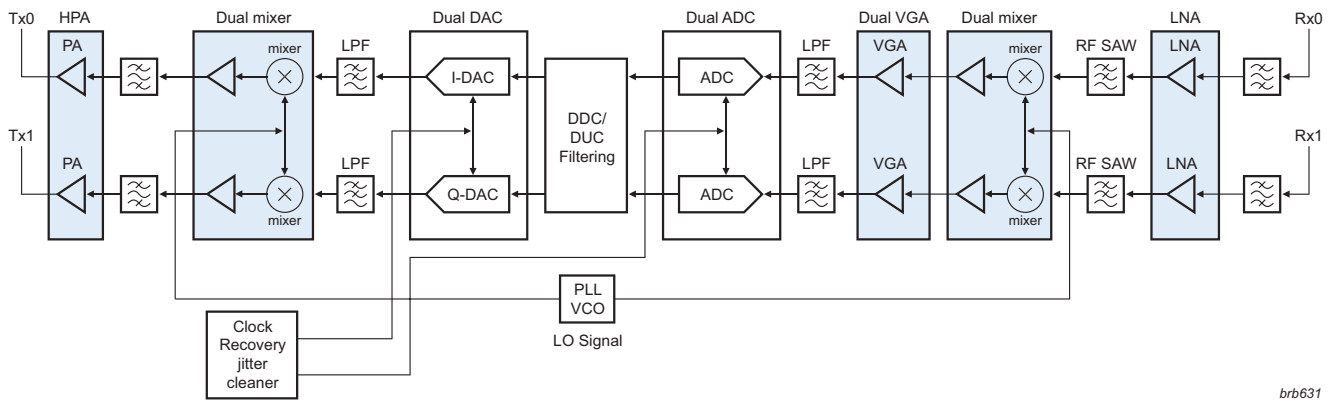
By integrating a bypass LNA, an analog VGA, and second LNA in one design, these SiGe:C BiCMOS LNAs (BGU706x) deliver the industry's lowest noise figure of 0.9 dB for a receive chain in silicon, while saving up to 80% in component count. Additionally, the analog gain control up to 35 dB, RF input power overdrive of 10 - 15 dBm and high linearity (09 dBm IP3I at maximum gain) make them very suitable in small cell sizes.

### Product highlight: BGU805X base station LNAs with ultra low-noise

These three monolithic SiGe:C BiCMOS LNAs are designed to support high-performance communications systems from 900 up to 5000 MHz. Key enablers of maintaining sensitivity, even in adverse signal conditions, are high linearity (37dB OIP3), ultra low noise figures (e.g. 0.4 dB) and wideband S11<20 dB behavior. These ultra-low amplifiers enable 2G/3G/4G macro and micro base station performance at unsurpassed value.

## 1.1.2 Repeater

### Application diagram



brb631

### Recommended products

| Function | Product            | $f_{min}$ (MHz) | $f_{max}$ (MHz) | P1dB (W) | Package   | Type             |
|----------|--------------------|-----------------|-----------------|----------|-----------|------------------|
| HPA      | Driver             | 700             | 2200            | 10       | SOT1179   | BLP7G22-10       |
|          |                    | 2300            | 2700            | 10       | SOT975    | BLF6G27-10(G)    |
|          | Driver/final       | 700             | 1000            | 45       | SOT1223/4 | BLP8G10S-45P(G)  |
|          |                    | 1450            | 1550            | 40       | SOT1135   | BLF6G15L(S)-40RN |
|          |                    | 1800            | 2000            | 45       | SOT608    | BLF6G20(S)-45    |
|          |                    | 1800            | 2200            | 60       | SOT1223/4 | BLP8G22S-60P(G)* |
|          |                    | 2110            | 2170            | 40       | SOT1121   | BLF6G22L(S)-40P  |
|          |                    | 2500            | 2700            | 40       | SOT1121   | BLF6G27L(S)-40P  |
|          |                    | 3400            | 3800            | 50       | SOT502    | BLF6G38(LS)-50   |
|          | Integrated Doherty | 2010            | 2025            | 50       | SOT1130   | BLD6G21L(S)-50   |
|          |                    | 2110            | 2170            | 50       | SOT1130   | BLD6G22L(S)-50   |

| Function                        | Product | $P_{L(f_{dB})}$ @ 940 MHz | Package | Type    | Function   | Product | Frequency range | Package | Type    |
|---------------------------------|---------|---------------------------|---------|---------|------------|---------|-----------------|---------|---------|
| MPA<br>(medium power amplifier) | MMIC    | 24 dBm                    | SOT89   | BGA7024 | Dual mixer | MMIC    | 1.7 - 2.7 GHz   | SOT1092 | BGX7220 |
|                                 |         | 28 dBm                    |         | BGA7027 |            |         | 0.7 - 1.2 GHz   |         | BGX7221 |

| Function                                                                            | Product | Gain range | Package | Type    | Function | Product        | Package | Type    |         |         |
|-------------------------------------------------------------------------------------|---------|------------|---------|---------|----------|----------------|---------|---------|---------|---------|
| Dual VGA<br>(variable-gain amplifier)                                               | MMIC    | 24 dB      | SOT617  | BGA7350 | LNA      | SiGe:C<br>MMIC | SOT650  | BGU7051 |         |         |
|                                                                                     |         | 28 dB      |         | BGA7351 |          |                |         | BGU7052 |         |         |
|                                                                                     |         |            |         | BGA7352 |          |                |         | BGU7053 |         |         |
| * Check status in section 3.1, as this type is not yet released for mass production |         |            |         |         |          |                |         |         | SOT1327 | BGU8051 |
|                                                                                     |         |            |         |         |          |                |         |         |         | BGU8052 |
|                                                                                     |         |            |         |         |          |                |         |         |         | BGU8053 |
|                                                                                     |         |            |         |         |          |                |         |         |         | BGU7060 |
|                                                                                     |         |            |         |         |          |                |         |         |         | BGU7061 |
|                                                                                     |         |            |         |         |          |                |         |         |         | BGU7062 |
|                                                                                     |         |            |         |         |          |                |         |         |         | BGU7063 |

\* Check status in section 3.1, as this type is not yet released for mass production

### Product highlight: BGX7221 MMIC dual down-mixer

The BGX7221 combines a pair of high-performance, high-linearity down-mixers for use in receivers that have a common local oscillator used with, for example, main and diversity paths. The device covers frequency bands from 1700 to 2700 MHz with an extremely flat behavior.



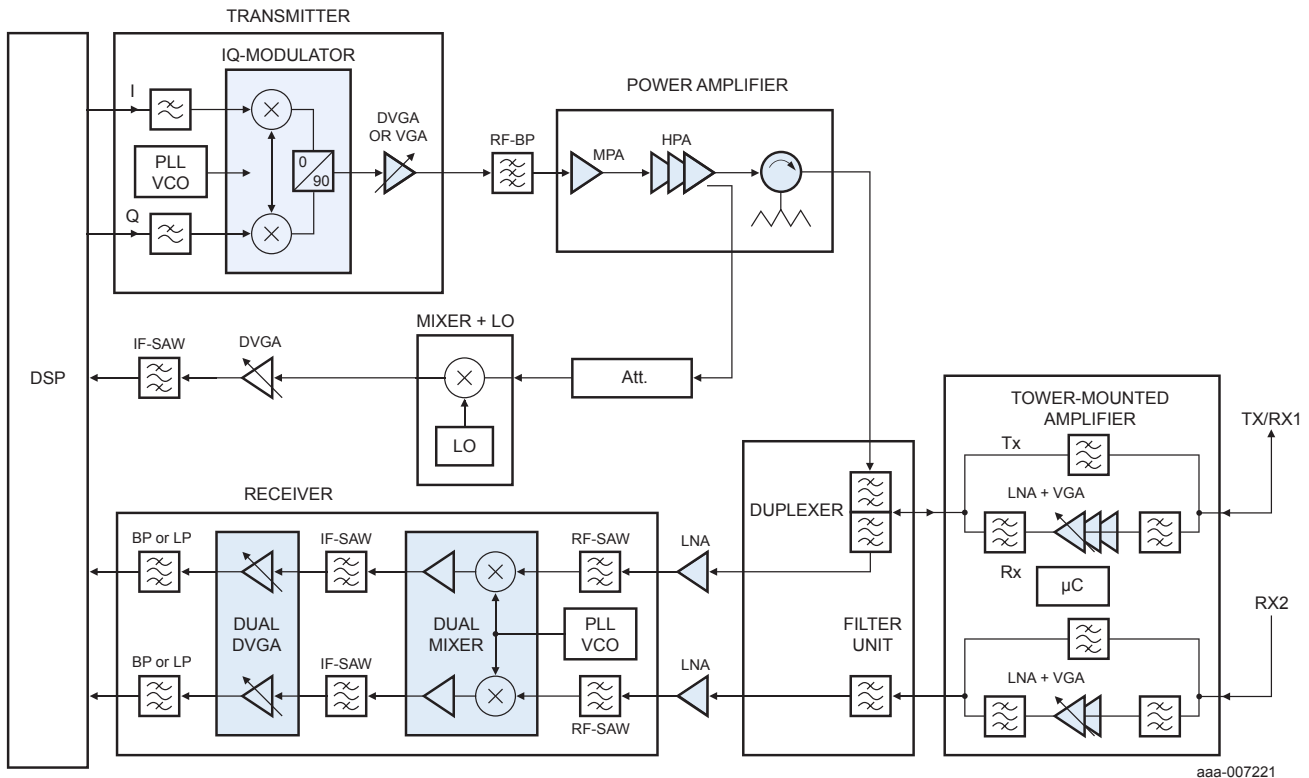
### Features

- ▶ 8.5 dB conversion gain over all bands
- ▶ 13 dBm input, 1 dB compression point
- ▶ 25.5 dBm input third-order intercept point
- ▶ 10 dB (typ) small-signal noise figure
- ▶ Integrated active biasing
- ▶ Single +5 V supply operation
- ▶ Power-down per mixer with hardware control pins
- ▶ Low bias current in power-down mode
- ▶ Matched 50  $\Omega$  single-ended RF and LO input impedances
- ▶ ESD protection at all pins

### 1.1.3 Small cells

With the explosion of cellular data usage and the limited number of sites available for new macro base stations, operators have to find new ways of offering high data rates and excellent quality of service. One of the options is to complement the macro network with small cells, known as picocells (1 to 2 W average) and microcells (5 to 20 W average). NXP offers and develops several types of solutions to the small cell PAs designer, optimized for performance, integration or cost.

#### Application diagram



#### Product highlight: BLP7G22-10 power transistor



The BLP7G22-10 is a 10 W plastic LDMOS power transistor for base station applications. This cost effective wideband device with an ultra small footprint covers all base station frequencies from 700 to 2700 MHz. It operates in a supply range from 12 to 30 V.

#### Features

- ▶ High efficiency
- ▶ Excellent ruggedness
- ▶ Designed for broadband operation
- ▶ Excellent thermal stability
- ▶ High power gain
- ▶ Integrated ESD protection
- ▶ Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

## Recommended products

| Function                                |                                    | Product     | Output power                |                        | Package           | Type      |                       |
|-----------------------------------------|------------------------------------|-------------|-----------------------------|------------------------|-------------------|-----------|-----------------------|
| IQ modulator                            |                                    | MMIC        | 0 dBm                       |                        | SOT616            | BGX7100   |                       |
|                                         |                                    |             | 4 dBm                       |                        |                   | BGX7101   |                       |
| Function                                |                                    | Product     | Gain range                  |                        | Package           | Type      |                       |
| Single VGA<br>(variable-gain amplifier) |                                    | MMIC        | 30 dB                       |                        | SOT617            | BGA7210   |                       |
|                                         |                                    |             | 18.5 dB                     |                        |                   | BGA7204   |                       |
| Function                                |                                    | Product     | P <sub>1 dB</sub> @ 940 MHz |                        | Package           | Type      |                       |
| MPA<br>(medium power amplifier)         |                                    | MMIC        | 24 dBm                      |                        | SOT89             | BGA7024   |                       |
|                                         |                                    |             | 28 dBm                      |                        |                   | BGA7027   |                       |
| Function                                | Product                            |             | f <sub>min</sub> (MHz)      | f <sub>max</sub> (MHz) | P1dB (W)          | Package   | Type                  |
| HPA                                     | Final 1-2 W                        |             | 700                         | 2200                   | 5                 | SOT1179   | BLP7G22-05            |
|                                         |                                    |             | 700                         | 2200                   | 10                | SOT1179   | BLP7G22-10            |
|                                         | Dual-Stage Final 1-2 W             |             | 1800                        | 2200                   | 12@24V,<br>20@28V | SOT1212   | BLM7G1822S-12/20PB(G) |
|                                         | Final 1-2 W                        |             | 700                         | 2200                   | 10                | SOT538    | BLF6G21-10(G)         |
|                                         |                                    |             | 2300                        | 2700                   | 10                | SOT975    | BLF6G27-10(G)         |
|                                         |                                    |             | 3400                        | 3600                   | 10                | SOT975    | BLF6G38-10(G)         |
|                                         | Final 5-12 W                       |             | 700                         | 1000                   | 45                | SOT1223/4 | BLP8G10S-45P(G)       |
|                                         |                                    |             | 1800                        | 2200                   | 60                | SOT1223/4 | BLP8G22S-60P(G)*      |
|                                         |                                    |             | 2500                        | 2700                   | 60                | SOT1121   | BLF6G27L(S)-40P       |
|                                         |                                    |             | 3400                        | 3800                   | 50                | SOT502    | BLF6G38(LS)-50        |
|                                         | ID Final 5-12 W                    |             | 2010                        | 2025                   | 50                | SOT1130   | BLD6G21L(S)-50        |
|                                         |                                    |             | 2110                        | 2170                   | 50                | SOT1130   | BLD6G22L(S)-50        |
|                                         | Dual-Stage Final 5-12 W            |             | 1800                        | 2200                   | 40                | SOT1211   | BLM7G1822S-40PB(G)*   |
|                                         |                                    |             | 2000                        | 2200                   | 60                | SOT1212   | BLM7G22S-60PB(G)      |
|                                         | Dual-Stage Asymmetric Final 5-12 W |             | 1800                        | 2200                   | 50                | SOT1212   | BLM7G1822S-50AB(G)*   |
|                                         |                                    |             | 1800                        | 2200                   | 80                | SOT1212   | BLM7G1822S-80AB(G)*   |
| Function                                |                                    | Product     |                             | Package                |                   | Type      |                       |
| LNA                                     |                                    | SiGe:C MMIC |                             | SOT650                 |                   | BGU7051   |                       |
|                                         |                                    |             |                             |                        |                   | BGU7052   |                       |
|                                         |                                    |             |                             | SOT1327                |                   | BGU7053   |                       |
|                                         |                                    |             |                             |                        |                   | BGU8051   |                       |
| LNA + bypass + VGA                      |                                    | SiGe:C      |                             | SOT1301                |                   | BGU8052   |                       |
|                                         |                                    |             |                             |                        |                   | BGU8053   |                       |
|                                         |                                    |             |                             |                        |                   | BGU7060   |                       |
|                                         |                                    |             |                             |                        |                   | BGU7061   |                       |
|                                         |                                    |             |                             |                        |                   | BGU7062   |                       |
|                                         |                                    |             |                             |                        |                   | BGU7063   |                       |
| Function                                |                                    | Product     | Frequency range             |                        | Package           | Type      |                       |
| Dual mixer                              |                                    | MMIC        | 1.7 - 2.7 GHz               |                        | SOT1092           | BGX7220   |                       |
|                                         |                                    |             | 0.7 - 1.2 GHz               |                        |                   | BGX7221   |                       |
| Function                                |                                    | Product     | Gain range                  |                        | Package           | Type      |                       |
| Dual VGA<br>(variable-gain amplifier)   |                                    | MMIC        | 24 dB                       |                        | SOT617            | BGA7350   |                       |
|                                         |                                    |             | 28 dB                       |                        |                   | BGA7351   |                       |
|                                         |                                    |             |                             |                        |                   | BGA7352   |                       |

\* Check status in section 3.1, as this type is not yet released for mass production

### Product highlight: Digital VGAs BGA7204 and BGA7210



These 6-bit digital VGAs offer high linearity (35 dBm @ 2.2-2.8 GHz) and high output power (23 dBm @ 2.2-2.8 GHz) across a large bandwidth without external matching. Smart routing with no connection crosses simplifies design and decreases footprint by 25%. The unique power-save mode can effectively reduce the current consumption in TDD systems up to 45%. The BGA7210 adds flexible current distribution across its two amplifiers, depending on the attenuation state, to save current.

### Features

- Internally matched for 50  $\Omega$ 
  - BGA7204 = 0.4 to 2.75 GHz
  - BGA7210 = 0.7 to 3.8 GHz
- High maximum power gain
  - BGA7204 = 18.5 dB
  - BGA7210 = 30 dB
- Attenuation range of 31.5 dB, 0.5 dB step size (6 bit)
- Fast switching power-save mode (power-down pin)
- Simple control interfaces (SPI)
- ESD protection on all pins (HBM 4 kV; CDM 2 kV)

## 1.2 Broadband communication infrastructure

### Highly efficient line-up of 1 GHz GaAs modules for sustainable CATV networks

NXP high-gain power doublers CGD104xHi and push-pulls CGY104x are designed for 1 GHz “sustainable networks”. These high-performance GaAs devices enable extended bandwidth and higher data rates. They deliver increased network capacity and make way for high-end services like HDTV, VoIP, and digital simulcasting.

### Connecting people, protecting your network: NXP's CATV C-family for the Chinese SARFT standard

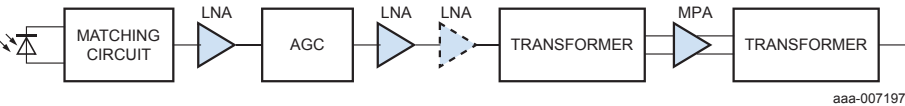
Specially designed for the Chinese Hybrid Fiber Coax (HFC) infrastructure, NXP's CATV C-family offers a total solution for cable TV networks. It is both flexible enough for connecting rural communities as part of China's "Connecting to Every Village" program and powerful enough for upgrading major cities from analog to high-end digital services. All C-type devices are compliant with the Chinese State Administration for Radio, Film and Television (SARFT) standard, and cover most HFC applications from 550 MHz to 1 GHz.

#### C-family application information

| NXP C-family by application |         |         |         |         |                     |                    |                                     |
|-----------------------------|---------|---------|---------|---------|---------------------|--------------------|-------------------------------------|
| Application                 | BGY588C | BGE788C | CGY888C | BGD712C | BGO807C<br>BGO807CE | CGD942C<br>CGD944C | CGD982HCi<br>CGD985HCi<br>CGD987HCi |
| Optical node                |         |         |         | •       | •                   | •                  | •                                   |
| Optical receiver            |         |         |         | •       | •                   | •                  | •                                   |
| Distribution amplifier      |         |         | •       | •       |                     | •                  | •                                   |
| Line-extender amplifier     |         |         | •       | •       |                     | •                  | •                                   |
| Terminating amplifier       | •       | •       | •       |         |                     |                    |                                     |

#### 1.2.1 Optical mini- and midinode line-up

##### Application diagram



#### Recommended products

| Function | Product | Frequency range MHz | Gain (dB) | NF (dB) | Package | Type    |
|----------|---------|---------------------|-----------|---------|---------|---------|
| LNA/MPA  | MMIC    | 40 - 1006           | 12        | 3.1     | SOT89   | BGA3012 |
|          |         |                     | 15        | 2.5     |         | BGA3015 |
|          |         |                     | 18        | 2.2     |         | BGA3018 |

#### Product highlight: BGA3012, BGA3015, BGA3018

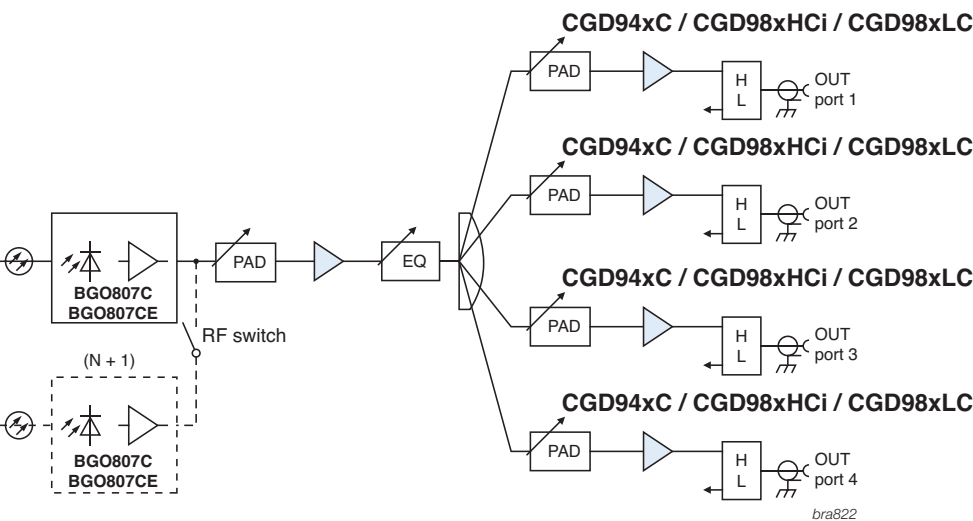


The BGA3012, BGA3015 and BGA3018 are extreme-broadband amplifiers that deliver 12, 15, and 18 dB of gain from 40 to 1006 MHz, while providing outstanding linearity performance. These amplifiers can also be used as a return path amplifier from 5 to 300 MHz, or in a combined TV and Satellite system from 40 to 2600 MHz. At the low end of the frequency band, these amplifiers outperform competitors'

GaAs devices in noise figure performance by 5 dB and in input power rating by more than 20 dB, while offering a superior ESD rating of 2 kV and a larger supply voltage operating range of 8 to 5 V. These amplifiers are very well suited for various broadband TV distribution system applications, such as FFTH, home gateways and set-top boxes.

1.2.2 CATV optical node with multiple out-ports for Chinese SARFT standard

Application diagram



Recommended products

| Function            | Product               | Frequency | Package | Type     |
|---------------------|-----------------------|-----------|---------|----------|
| RF forward receiver | Forward path receiver | 870 MHz   | SOT115  | BGO807C  |
|                     |                       |           | SOT115  | BGO807CE |

| Function         | Product    | Frequency | Gain (dB)   | Type    |
|------------------|------------|-----------|-------------|---------|
| RF pre-amplifier | Push-pulls | 870 MHz   | 18 - 19     | BGY885A |
|                  |            |           | 21 - 22     | BGY887  |
|                  |            |           | 34.5 - 36.5 | CGY888C |

| Function           | Product        | Frequency | Gain (dB)   | Type      |
|--------------------|----------------|-----------|-------------|-----------|
| RF power amplifier | Power doublers | 870 MHz   | 22 - 24     | CGD942C   |
|                    |                |           | 24 - 26     | CGD944C   |
|                    |                | 1003 MHz  | 22 - 24     | CGD982HCi |
|                    |                |           | 23.5 - 25.5 | CGD985HCi |
|                    |                |           | 26 - 28     | CGD987HCi |
|                    |                |           | 22 - 24     | CGD982LC  |
|                    |                |           | 24 - 26     | CGD9825LC |



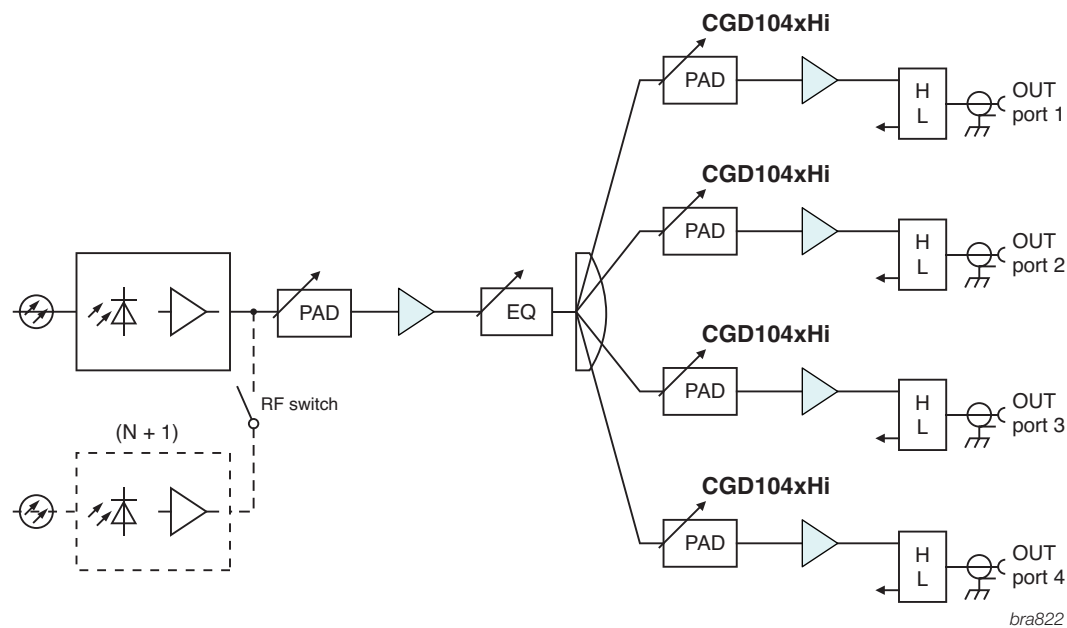
Product highlight:  
CGD982LC, CGD985LC, CGD1042L CATV power doublers

The market is asking for more environmental products. These power doubler modules use 17% less power consumption than the original products (365 mA). These 1 GHz power doublers are ideal for use in line extenders and trunk amplifiers.

- Features
- ▶ Gain compensation over temperature
  - ▶ Excellent linearity
  - ▶ Rugged construction
  - ▶ Optimized for PAL D loading
  - ▶ Unconditionally stable
  - ▶ Superior levels of ESD protection
  - ▶ Extremely low noise
  - ▶ Adjustable supply current
  - ▶ Excellent return loss properties
  - ▶ Compliant to Directive 2002/95/EC, regarding RoHs

1.2.3 CATV optical node with multiple out-ports for 1 GHz networks

Application diagram



Recommended products

| Function            | Product               | Frequency | Package | Type     |
|---------------------|-----------------------|-----------|---------|----------|
| RF forward receiver | Forward path receiver | 870 MHz   | SOT115  | BGO807C  |
|                     |                       |           | SOT115  | BGO807CE |

| Function         | Product    | Frequency | Gain (dB) | Type    |
|------------------|------------|-----------|-----------|---------|
| RF pre-amplifier | Push-pulls | 1 GHz     | 23 - 24.5 | CGY1043 |
|                  |            |           | 27 - 28.5 | CGY1047 |
|                  |            |           | 32 - 34   | CGY1032 |

| Function           | Product        | Frequency | Gain (dB)   | Type      |
|--------------------|----------------|-----------|-------------|-----------|
| RF power amplifier | Power doublers | 1 GHz     | 22 - 23.5   | CGD1042Hi |
|                    |                |           | 23.5 - 25.5 | CGD1044Hi |
|                    |                |           | 26.5 - 28   | CGD1046Hi |



Product highlight:  
CGD104xH(i) power doublers and CGY104x push-pulls

The NXP power doublers CGD104xH and CGD104xHi are ideal for use in line extenders and trunk amplifiers. They support fiber deep-optical-node applications (N+0/1/2), delivering the highest output power on the market today. The GaAs HFET die process delivers high gain, excellent CTB and CSO ratings, and lower current.

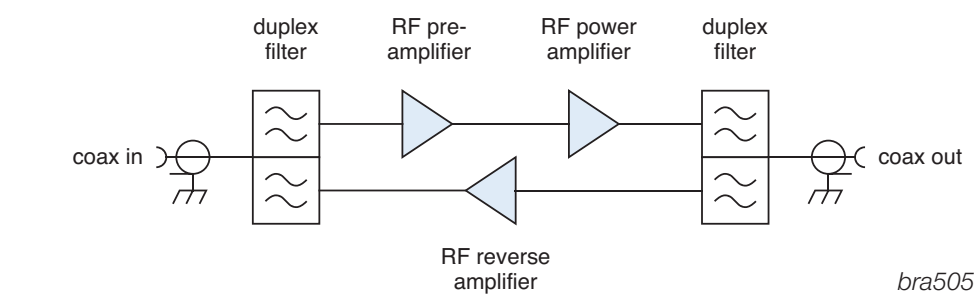
The new NXP CGY104x push-pull family is the first line-up on the market to combine very low noise, best-in-class distortion parameters, and low, “carbon footprint” capabilities.

It delivers the best performance for the lowest power consumption, so it reduces OPEX and CO<sub>2</sub> emissions.

All of NXP’s 1 GHz solutions are designed for durability and offer superior ruggedness, an extended temperature range, high-power overstress capabilities, and extremely high ESD levels. As a result, they also reduce the cost of ownership.

Products  
by application

Application diagram



Recommended products

| Function             | Product         | Frequency   | Gain (dB)   | Type     |
|----------------------|-----------------|-------------|-------------|----------|
| RF pre-amplifier     | Push-pulls      | 550 MHz     | 33.5 - 35.5 | BGY588C  |
|                      |                 |             | 33.2 - 35.2 | BGE788C  |
|                      |                 | 750 MHz     | 18 - 19     | BGY785A  |
|                      |                 |             | 21 - 22     | BGY787   |
|                      |                 | 870 MHz     | 18 - 19     | BGY885A  |
|                      |                 |             | 21 - 22     | BGY887   |
|                      |                 |             | 33.5 - 34.5 | BGY888   |
|                      |                 |             | 34.5 - 36.5 | CGY888C  |
|                      |                 | 1003 MHz    | 18 - 19     | BGY1085A |
|                      |                 |             | 21 - 22.5   | CGY1041  |
|                      |                 |             | 23 - 24.5   | CGY1043  |
|                      |                 |             | 27 - 28.5   | CGY1047  |
| RF reverse amplifier | Reverse hybrids | 5 - 75 MHz  | 29.2 - 30.8 | BGY68    |
|                      |                 | 5 - 120 MHz | 24.5 - 25.5 | BGY66B   |
|                      |                 | 5 - 200 MHz | 23.5 - 24.5 | BGY67A   |

All available in SOT115 package

| Function           | Product        | Frequency | Gain (dB)   | Type      |
|--------------------|----------------|-----------|-------------|-----------|
| RF power amplifier | Power doublers | 750 MHz   | 18.2 - 18.8 | BGD712    |
|                    |                |           | 18.2 - 18.8 | BGD712C   |
|                    |                |           | 20 - 20.6   | BGD714    |
|                    |                | 870 MHz   | 18.2 - 18.8 | BGD812    |
|                    |                |           | 19.7 - 20.3 | BGD814    |
|                    |                |           | 22 - 23     | CGD942C   |
|                    |                |           | 24 - 26     | CGD944C   |
|                    |                | 1003 MHz  | 22 - 24     | CGD1042H  |
|                    |                |           | 24 - 26     | CGD1044H  |
|                    |                |           | 19.5 - 22   | CGD1040Hi |
|                    |                |           | 22 - 23.5   | CGD1042Hi |
|                    |                |           | 23.5 - 25.5 | CGD1044Hi |
|                    |                |           | 26 - 28     | CGD1046Hi |
|                    |                |           | 22 - 24     | CGD982HCi |
|                    |                |           | 23.5 - 25.5 | CGD985HCi |
|                    |                |           | 26 - 28     | CGD987HCi |
|                    |                |           | 22 - 24     | CGD982LC  |
|                    |                |           | 24 - 26     | CGD9825LC |
|                    |                |           | 22 - 24     | CGD1042L  |

Product highlight:  
CGD1046Hi



Capable of supporting high output power, the CGD1046Hi is primarily designed for use in fiber deep-optical-node applications (N+1/2/3). This 1 GHz hybrid amplifier solution offers an extended temperature range, high-power overstress capabilities in case of surges, and high ESD levels. The result is a low cost of ownership, with durability and superior ruggedness.

Features

- ▶ High output power
- ▶ High power gain for power doublers
- ▶ Extremely low noise
- ▶ Dark Green products
- ▶ GaAs HFET dies for high-end applications
- ▶ Rugged construction
- ▶ Superior levels of ESD protection
- ▶ Integrated ringwave protection
- ▶ Optimized for digital channel loading
- ▶ Temperature-compensated gain response
- ▶ Optimized heat management
- ▶ Excellent temperature resistance



1.3 TV and satellite

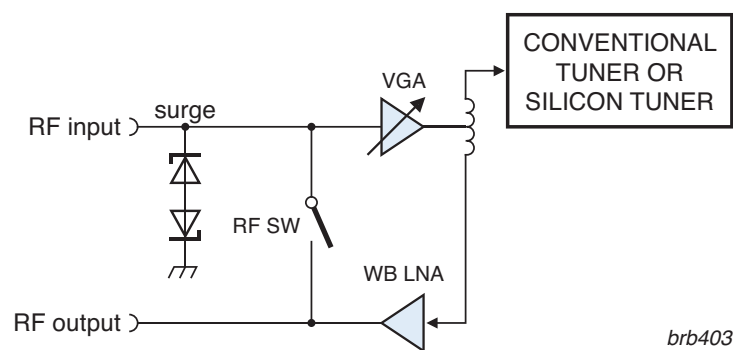
1.3.1 Network interface module (NIM) for TV reception

Make a high-performance active splitter in a NIM tuner with the BGU703x/BGU704x

Today's TV tuners require complicated signal handling and benefit from flexibility in design. The front-end of a TV signal receiver is no longer just a tuned receiver, but has evolved into an RF network interface module (NIM) with tuned demodulators, active splitters, and remodulators. The active splitter requires an LNA with excellent linearity. NXP has developed two new series of LNA/VGA MMICs (BGU703x/BGU704x), designed especially for high linearity (P3O of 29 dBm) in low-noise applications such as an active splitter in a NIM tuner. The BGU703x family operates at a supply voltage of 5 V and is intended for use with normal can tuners. The BGU704x family operates at 3.3 V and works seamlessly with our Si tuner ICs, which also operate at 3.3 V.

Products  
by application

Application diagram



Recommended products

| Function | Product | V <sub>cc</sub> (V) | Gain (db) | Package | Type    |
|----------|---------|---------------------|-----------|---------|---------|
| LNA      | MMIC    | 5                   | 10        | SOT363  | BGU7031 |
|          |         | 5                   | 10        | SOT363  | BGU7032 |
|          |         | -2                  | -2        |         |         |
|          |         | 5                   | 10        | SOT363  | BGU7033 |
|          |         | 5                   | 5         |         |         |
|          |         | -2                  | -2        |         |         |
|          |         | 3.3                 | 10        | SOT363  | BGU7041 |
|          |         | 3.3                 | 10        | SOT363  | BGU7042 |
|          |         | -2                  | -2        |         |         |
|          |         | 3.3                 | 14        | SOT363  | BGU7044 |
|          |         | 3.3                 | 14        | SOT363  | BGU7045 |
|          |         | -2                  | -2        |         |         |

Recommended products

| Function                  | Product |                            | Package | Type     |
|---------------------------|---------|----------------------------|---------|----------|
| RF Switch /<br>PLT switch | MOSFET  | 5 V silicon RF<br>switch   | SOT23   | BF1107   |
|                           |         |                            | SOT143B | BF1108   |
|                           |         |                            | SOT143R | BF1108R  |
|                           |         |                            | SOT343  | BF1108W  |
|                           |         |                            | SOT343R | BF1108WR |
|                           |         | 3.3 V silicon<br>RF switch | SOT143B | BF1118   |
|                           |         |                            | SOT143R | BF1118R  |
|                           |         |                            | SOT343  | BF1118W  |
|                           |         |                            | SOT343R | BF1118WR |
|                           |         |                            |         |          |

Product highlight:  
BGU703x and BGU704x LNAs for TVs/STBs

Designed for high linearity and low noise, these 3.3 and 5 V wideband LNAs support multi-tuner applications in TVs, DVR/ PVRs, and STBs operating between 40 MHz and 1 GHz. A unique programmable gain with bypass mode compensates for tuner switch signal loss (important in multi-tuner systems), and improves overall system performance by 7 to 10 dB.

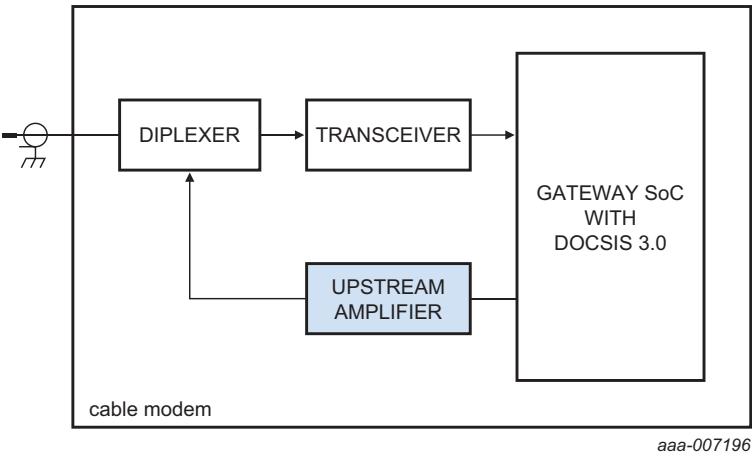


Features

- ▶ Flat gain between 40 MHz and 1 GHz
- ▶ Output power at 1 dB gain compression ( $P_{L(1\text{ dB})}$ ) ranging from 9 to 14 dBm
- ▶ Noise figure as low as 2.8 dB
- ▶ High linearity with an OIP3 of 29 dBm
- ▶ 75  $\Omega$  input and output impedance
- ▶ Power-down during bypass mode
- ▶ ESD protection >2 kV HBM, >1.5 kV CDM on all pins

1.3.2 Cable modem based on DOCSIS 3.0

Application diagram



Recommended products

| Function                    | Product | Package | Type    |
|-----------------------------|---------|---------|---------|
| Upstream VGA for DOCSIS 3.0 | MMIC    | SOT662  | BGA3031 |

Product highlight:  
BGA3031

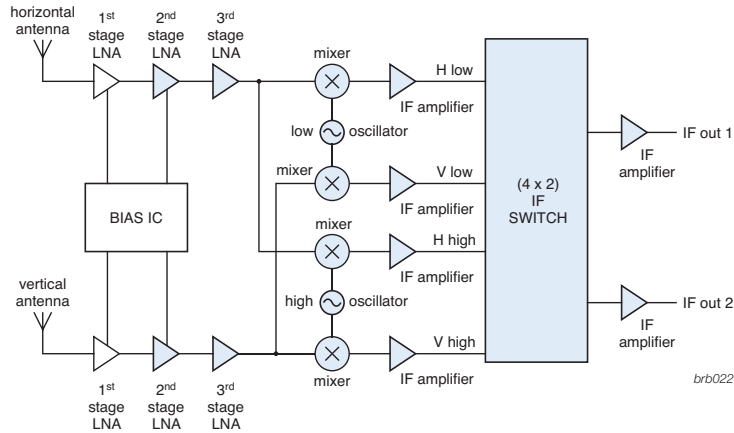


The BGA3031 MMIC is an upstream amplifier meeting the Data Over Cable Service Interface Specifications (DOCSIS 3.0) operating from 5 to 85 MHz. It is designed for cable modem, CATV set top box and VOIP modem applications.

BGA3031 provides a 58 dB gain control range in 1 dB increments with high incremental accuracy. At maximum gain setting, it delivers 34 dB of voltage gain and superior linear performance. It supports high output voltage levels up to 67 dBmV with low distortion and output noise levels. It is housed in a 20-pin leadless HVQFN package (5 x 5 mm).

### 1.3.3 Satellite outdoor unit, twin low-noise block (LNB) with discrete components

#### Application diagram



#### Recommended products

| Function                                      | Product       |                   | Package | Type    |
|-----------------------------------------------|---------------|-------------------|---------|---------|
| 2 <sup>nd</sup> and 3 <sup>rd</sup> stage LNA | RF transistor | SiGe:C transistor | SOT343F | BFU710F |
|                                               |               |                   |         | BFU730F |

| Function   | Product               |                     | Package | Type    |
|------------|-----------------------|---------------------|---------|---------|
| Oscillator | RF bipolar transistor | Wideband transistor | SOT343  | BFG424W |
|            |                       |                     | SOT343F | BFG424F |
|            | RF transistor         | SiGe:C transistor   | SOT343F | BFU660F |
|            |                       |                     |         | BFU710F |

| Function  | Product  |           | Package | Type     |
|-----------|----------|-----------|---------|----------|
| IF switch | RF diode | PIN diode | Various | BAP64*   |
|           |          |           | Various | BAP51*   |
|           |          |           | Various | BAP1321* |
|           |          |           | Various | BAP50*   |
|           |          |           | Various | BAP63*   |

| Function                           | Product               |                     | Package | Type    |
|------------------------------------|-----------------------|---------------------|---------|---------|
| 1 <sup>st</sup> stage IF amplifier | MMIC                  | IF gain block       | SOT363  | BGA2800 |
|                                    |                       |                     | SOT363  | BGA2801 |
|                                    |                       |                     | SOT363  | BGA2802 |
|                                    |                       |                     | SOT363  | BGA2803 |
|                                    |                       |                     | SOT363  | BGA2815 |
|                                    |                       |                     | SOT363  | BGA2850 |
|                                    |                       |                     | SOT363  | BGA2851 |
|                                    |                       |                     | SOT363  | BGA2866 |
|                                    | RF bipolar transistor | Wideband transistor | SOT343  | BFG424W |
|                                    |                       |                     | SOT343F | BFG424F |

\* Also available in ultra-small leadless package SOD882D

| Function                  | Product               |                     | Package | Type    |
|---------------------------|-----------------------|---------------------|---------|---------|
| Output stage IF amplifier | MMIC                  | IF gain block       | SOT363  | BGA2800 |
|                           |                       |                     | SOT363  | BGA2801 |
|                           |                       |                     | SOT363  | BGA2815 |
|                           |                       |                     | SOT363  | BGA2816 |
|                           |                       |                     | SOT363  | BGA2818 |
|                           |                       |                     | SOT363  | BGA2865 |
|                           |                       |                     | SOT363  | BGA2866 |
|                           |                       |                     | SOT363  | BGA2867 |
|                           | RF bipolar transistor | Wideband transistor | SOT363  | BGA2870 |
|                           |                       |                     | SOT363  | BGA2874 |
| 2 <sup>nd</sup> stage LNA | RF transistor         | SiGe:C              | SOT343F | BFG325  |
|                           |                       |                     |         | BGM1014 |

| Function | Product       |                   | Package | Type    |
|----------|---------------|-------------------|---------|---------|
| Mixer    | RF transistor | SiGe:C transistor | SOT343F | BFU710F |
|          |               |                   |         | BFU730F |

#### Product highlight: BGA28xx-family of IF gain blocks

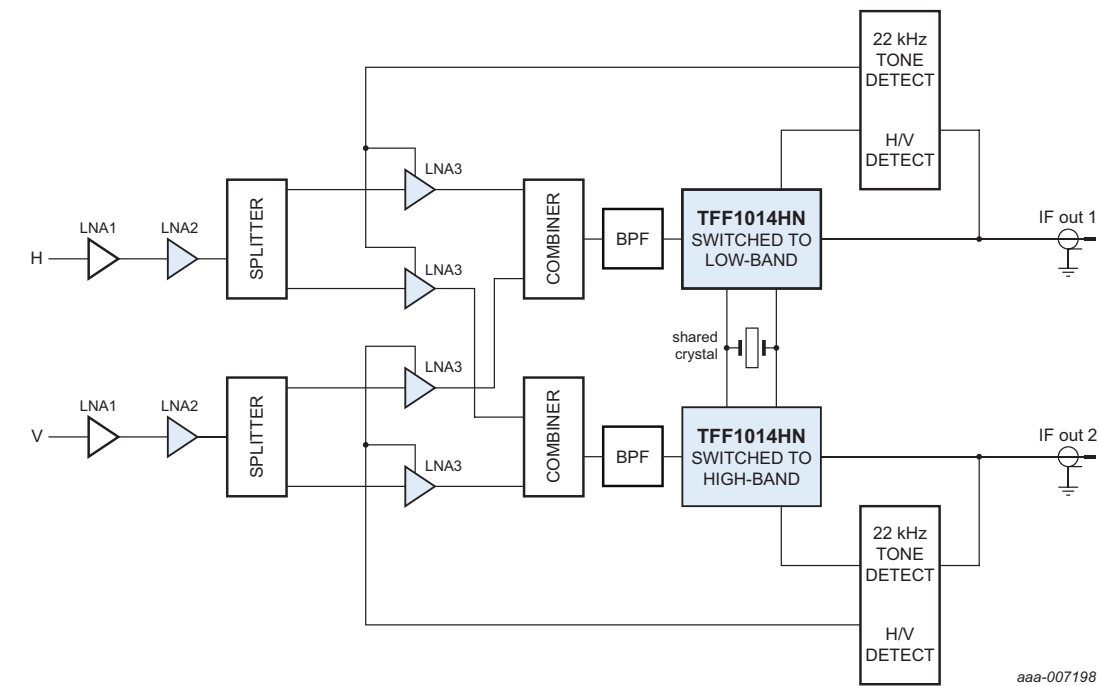


The BGA28xx IF gain blocks are silicon Monolithic Microwave Integrated Circuit (MMIC) wideband amplifiers with internal matching circuitry in a 6-pin SOT363 plastic SMD package.

#### Features

- ▶ No output inductor necessary when used at the output stage
- ▶ Internally matched to 50  $\Omega$
- ▶ Reverse isolation > 30 dB up to 2 GHz
- ▶ Good linearity with low second- and third-order products
- ▶ Unconditionally stable ( $K > 1$ )

Application diagram



Recommended products

| Function                                      | Product       |                   | Package | Type      |
|-----------------------------------------------|---------------|-------------------|---------|-----------|
| 2 <sup>nd</sup> and 3 <sup>rd</sup> stage LNA | RF transistor | SiGe:C transistor | SOT343F | BFU710F   |
|                                               |               |                   |         | BFU730F   |
|                                               |               |                   |         |           |
| Function                                      | Product       |                   | Package | Type      |
| Mixer/oscillator/downconverter                | RF IC         |                   | SOT763  | TFF1012HN |
|                                               |               |                   |         | TFF1013HN |
|                                               |               |                   |         | TFF1014HN |

Product highlight:  
TFF101xHN Industry's  
lowest-power integrated Ku-band downconverters

These Universal DVB-S compliant Ku-band downconverters consume about 50% less current (52 mA) than other integrated solutions. They are fully integrated (PLL synthesizer/mixer/IF gain block) and RF tested – which results in significantly decreased manufacturing time. Stability of the local oscillator is guaranteed, which improves overall system reliability over temperature and time, and eliminates the need for manual alignment in production.

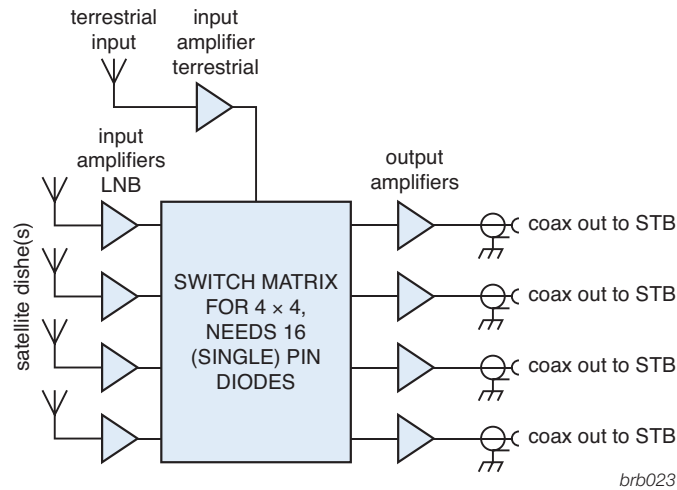


Features

- ▶ Ultra-low current consumption ( $I_{CC} = 52 \text{ mA}$ )
- ▶ Low phase noise ( $1.5^\circ \text{ RMS typ}$ )
- ▶ Integration bandwidth from 10 kHz to 13 MHz
- ▶ Small PCB footprint
  - DHVQFN16 package ( $2.5 \times 3.5 \times 0.85 \text{ mm}$ )
  - Only seven external components
  - No inductors necessary

### 1.3.5 Satellite multi-switch box - 4 x 4 (up to 16 x 16)/DiSEqC/SMATV

#### Application diagram



#### Recommended products

| Function                    | Product |                                        | Package | Type    |
|-----------------------------|---------|----------------------------------------|---------|---------|
| Input amplifier terrestrial | MMIC    | General-purpose medium power amplifier | SOT89   | BGA6289 |
|                             |         |                                        |         | BGA6489 |
|                             |         |                                        |         | BGA6589 |
|                             |         |                                        |         | BGA7024 |
|                             |         |                                        |         | BGA3012 |
|                             |         |                                        |         | BGA3015 |
|                             |         |                                        |         | BGA3018 |
|                             |         |                                        | SOT908  | BGA7124 |

| Function            | Product               |                           | Package | Type       |
|---------------------|-----------------------|---------------------------|---------|------------|
| Input amplifier LNB | MMIC                  | General-purpose amplifier | SOT363  | BGA2771    |
|                     |                       |                           | SOT363  | BGA2866    |
|                     |                       |                           | SOT363  | BGA2867    |
|                     |                       |                           | SOT363  | BGA2818    |
|                     |                       |                           | SOT343  | BFG325     |
|                     | RF bipolar transistor | Wideband transistor       | SOT343  | BFG425W    |
|                     |                       |                           | SOT143  | BFG520     |
|                     |                       |                           | SOT143  | BFG540     |
|                     |                       |                           | SOT343F | BFU660F    |
|                     |                       |                           |         | BFU725F/N1 |
|                     |                       |                           |         | BFU730F    |

| Function      | Product       |                   | Package | Type       |
|---------------|---------------|-------------------|---------|------------|
| Switch matrix | RF diode      | PIN diode         | Various | BAP50*     |
|               |               |                   |         | BAP51*     |
|               |               |                   |         | BAP63*     |
|               |               |                   |         | BAP64*     |
|               |               |                   |         | BAP70*     |
|               |               |                   |         | BAP1321*   |
|               |               |                   |         | BFU725F/N1 |
|               | RF transistor | SiGe:C transistor | SOT343F | BFU730F    |
|               |               |                   |         |            |
|               |               |                   |         |            |

\* Also available in ultra-small leadless package SOD882D



#### Product highlight:

##### BFU730F NPN wideband silicon germanium RF transistor

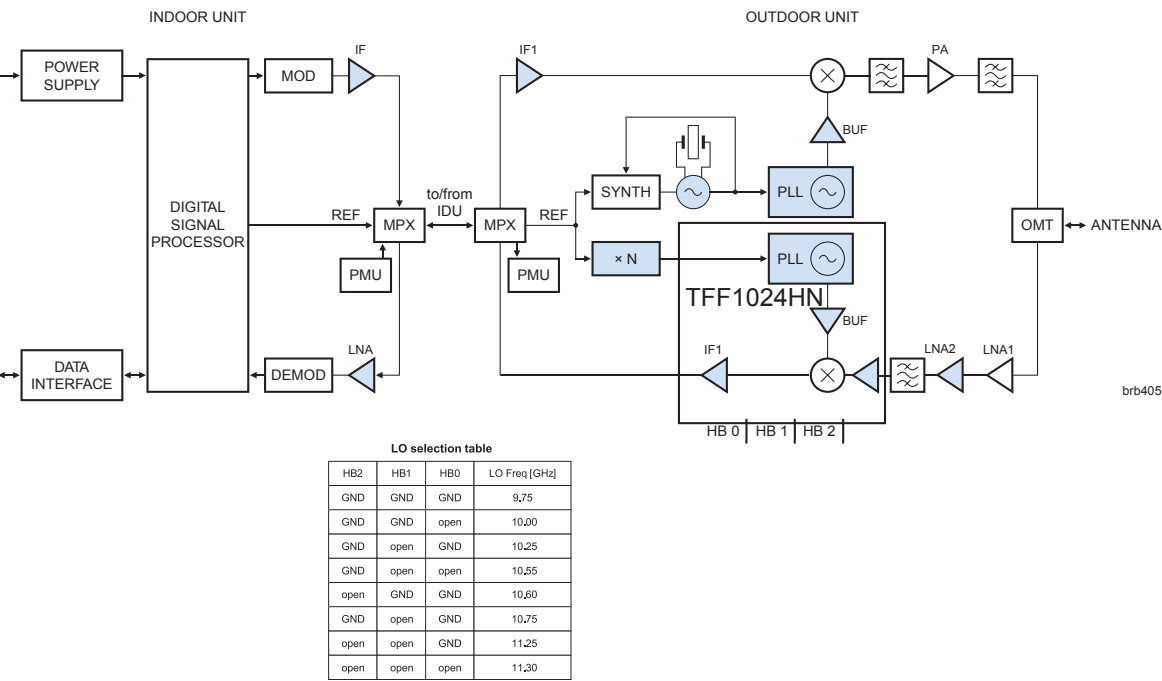
The BGU730F is part of the family of 6<sup>th</sup> (Si) and 7<sup>th</sup> (SiGe:C) generation RF transistors and can be used to perform nearly any RF function. These next-generation wideband transistors offer the best RF noise figure versus gain performance, drawing the lowest current. This performance allows for better signal reception at low power and enables RF receivers to operate more robustly in noisy environments.

#### Features

- ▶ Operates at 2.3 GHz
- ▶ High maximum power gain (Gp) of 17.6 dB
- ▶ Noise figure (NF) of 0.8 dB
- ▶ Input 1dB gain compression ( $P_{1dB}$ ) of -15 dBm
- ▶ Input third order intercept point  $IP3_1$  of +4.7 dBm

1.3.6 VSAT with integrated mixer/oscillator/downconverter

Application diagram



Recommended products

Indoor unit

| Function | Product       |                   | Package | Type       |
|----------|---------------|-------------------|---------|------------|
| IF       | MMIC          | IF gain block     | SOT363  | BGA2714    |
|          |               |                   |         | BGA2748    |
|          |               |                   |         | BGA2771    |
|          |               |                   |         | BGA2800    |
|          |               |                   |         | BGA2801    |
|          |               |                   |         | BGA2815    |
|          |               |                   |         | BGA2816    |
|          |               |                   |         | BGM1012    |
| Function | Product       |                   | Package | Type       |
| LNA      | RF transistor | SiGe:C transistor | SOT343F | BFU710F    |
|          |               |                   |         | BFU725F/N1 |
|          |               |                   |         | BFU730F    |

Product highlight:

TFF1024HN downconverter with PLL/VCO for VSAT

This VSAT Ku-band downconverter consumes about 35% less current (60 mA) than other integrated solutions. It's fully integrated (PLL synthesizer/mixer/IF gain block) and RF tested – which results in significantly decreased manufacturing time. Unlike mechanical components like DROs, the PLL-based TFF1024HN guarantees stable performance over lifetime and temperature, enabling high Quality of Service for end-users. This downconverter operates at eight of the most-used Ku sub-bands using only one crystal.

Features

- Switched LO frequency:
  - Eight selectable frequencies from 9.75 to 11.30 GHz
  - More LO frequencies obtainable with different X-tal values
- Ultra-low current consumption ( $I_{CC} = 60\text{ mA}$ )
- Low phase noise (1.0° RMS typ)
  - 10 kHz - 13 MHz integration bandwidth
- Flat gain over frequency (< 2 dBpp)
- High linearity of > 16 dBm IP3o
- High P1dBo > 6 dBm

## Recommended products

### Outdoor unit

| Function | Product |               | Package | Type    |
|----------|---------|---------------|---------|---------|
| IF       | MMIC    | IF gain block | SOT363  | BGA2800 |
|          |         |               |         | BGA2801 |
|          |         |               |         | BGA2815 |
|          |         |               |         | BGA2816 |
|          |         |               |         | BGA2850 |
|          |         |               |         | BGA2865 |
|          |         |               |         | BGA2866 |
|          |         |               |         | BGM1014 |
|          |         |               |         | BGM1013 |
|          |         |               |         | BGM1012 |
|          |         |               |         | BGA2714 |

| Function | Product       |                   | Package | Type       |
|----------|---------------|-------------------|---------|------------|
| LNA2     | RF transistor | SiGe:C transistor | SOT343F | BFU610F    |
|          |               |                   |         | BFU630F    |
|          |               |                   |         | BFU660F    |
|          |               |                   |         | BFU690F    |
|          |               |                   |         | BFU710F    |
|          |               |                   |         | BFU725F/N1 |
|          |               |                   |         | BFU730F    |
|          |               |                   |         | BFU760F    |
|          |               |                   |         | BFU790F    |
|          | MMIC          | SiGe:C MMIC       | SOT891  | BGU7003    |

| Function | Product |           | Package | Type      |
|----------|---------|-----------|---------|-----------|
| PLL      | RF IC   | SiGe:C IC | SOT616  | TFF1003HN |
|          |         |           | SOT763  | TFF1007HN |
|          |         |           |         | TFF1024HN |

| Function   | Product       |                     | Package | Type       |
|------------|---------------|---------------------|---------|------------|
| Oscillator | RF transistor | Wideband transistor | SOT343R | BFG424W    |
|            |               | SiGe:C transistor   | SOT343F | BFG425W    |
|            |               |                     |         | BFU610F    |
|            |               |                     |         | BFU630F    |
|            |               |                     |         | BFU660F    |
|            |               |                     |         | BFU690F    |
|            |               |                     |         | BFU710F    |
|            |               |                     |         | BFU725F/N1 |
|            |               |                     |         | BFU730F    |
|            |               |                     |         | BFU760F    |
|            |               |                     |         | BFU790F    |

| Function | Product       |                   | Package | Type       |
|----------|---------------|-------------------|---------|------------|
| Buffer   | RF transistor | SiGe:C transistor | SOT343F | BFU610F    |
|          |               |                   |         | BFU630F    |
|          |               |                   |         | BFU660F    |
|          |               |                   |         | BFU690F    |
|          |               |                   |         | BFU710F    |
|          |               |                   |         | BFU725F/N1 |
|          |               |                   |         | BFU730F    |
|          |               |                   |         | BFU760F    |
|          |               |                   |         | BFU790F    |

\* 8 different types with LO ranges: 7-15 GHz, see 3.4.4

#### Product highlight:

#### TFF1007HN low phase noise

#### LO generator for VSAT applications

The TFF1007HN is a Ku-band frequency generator intended for low phase noise local-oscillator (LO) circuits for Ku-band VSAT transmitters and transceivers. The specified phase noise complies with IESS-308 from Intelsat.



#### Features

- ▶ Divider settings: 64
- ▶ Input signal 230.46 to 234.38 MHz
- ▶ Internally stabilized voltage references for loop filter and output power level
- ▶ LO generator with VCO range: 14.75 to 15 GHz
- ▶ Output level -4 dBm minimum
- ▶ Phase noise compliant with IESS-308 (Intelsat)
- ▶ Third- or fourth-order PLL

1.4 Broadcast

LDMOS solutions from the industry leader for all segments of the broadcast market

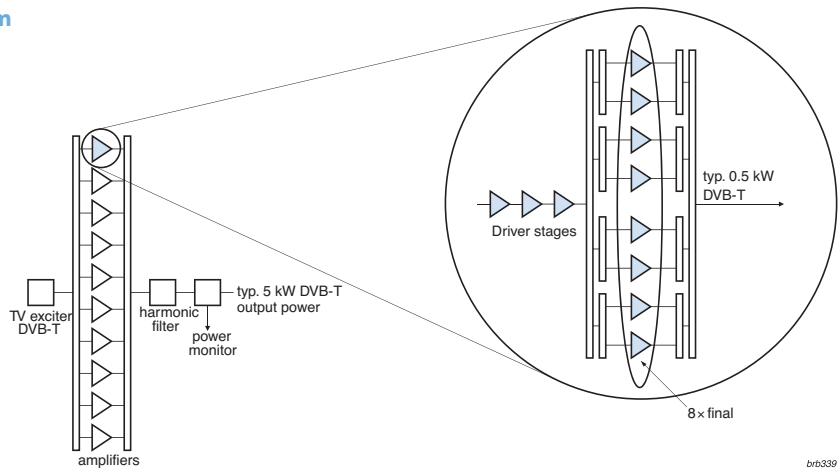
UWB Doherty for UHF-TV

The UHF TV market is taking a step in a new direction with the adoption of ultra-wideband (UWB) Doherty amplifiers using NXP’s existing benchmark LDMOS transistors. With the need to deliver Greener (ie lower energy consumption) systems matched with the ability to broadcast ever-richer content, incremental improvements soon run out. There comes a time when a step-change is needed in approach, and for the UHF market that means UWB Doherty. Previously, NXP has led the way in the mass-adoption of narrowband LDMOS Doherty amplifiers for the base station market, and now is the time to take a new direction with a range of UWB Doherty solutions to cover the 470 to 860 MHz band used for UHF transmitters.

VHF, FM, and analog TV markets

NXP’s commitment to the broadcast market is second to none. We enabled the market to transition to and then reaped the benefits of LDMOS based solutions, and that will continue for many years into the future. As well as supporting our legacy products through the customer product life-cycles, we will enhance our offering with a full range of XR products suited for broadcast, and will introduce a range of OMP (over-molded plastic) parts for the lower power, more cost-sensitive markets.

Application diagram



Recommended

| Function | Product | f <sub>min</sub> (MHz) | f <sub>max</sub> (MHz) | P1dB (W) | Package   | Type         |
|----------|---------|------------------------|------------------------|----------|-----------|--------------|
| HPA      | Driver  | 10                     | 500                    | 20       | SOT467C   | BLF571       |
|          |         | 1                      | 1400                   | 35       | SOT467C   | BLF642       |
|          |         | 1                      | 1000                   | 100      | SOT467    | BLF871(S)    |
|          | Final   | 1                      | 1000                   | 140      | SOT467    | BLF881(S)    |
|          |         | 1                      | 1500                   | 160      | SOT1223-1 | BLP15M7160P* |
|          |         | 1                      | 1500                   | 200      | SOT1121   | BLF647P(S)   |
|          |         | 470                    | 860                    | 350      | SOT1121   | BLF884P(S)   |
|          |         | 470                    | 860                    | 500      | SOT539    | BLF879P(S)   |
|          |         | 470                    | 860                    | 600      | SOT539    | BLF888A(S)   |
|          |         | 470                    | 860                    | 650      | SOT539    | BLF888B(S)   |
|          |         | 10                     | 128                    | 1200     | SOT539A   | BLF178P      |

\* Check status in section 3.1, as this type is not yet released for mass production

Product highlight:  
BLF647P(S) power transistor



A 200 W push-pull LDMOS transistor in a thermally enhanced ceramic package for broadband applications. The BLF647P(S) is unmatched, making it suitable for operation in applications from 1 to 1500 MHz, achieving 70% efficiency and 18 dB gain from a 32 V supply.

Features

- ▶ Designed for broadband operation (1 to 1500 MHz)
- ▶ Excellent efficiency and reliability
- ▶ Low thermal resistance and excellent thermal stability
- ▶ Excellent ruggedness
- ▶ Available in eared (bolt-down) and earless (surface-mount) versions

Applications

- ▶ Analog and digital TV transmitters



# 1.5 Wireless connectivity

## 1.5.1 GPS for smartphone and tablets: high linearity

BGU700x/800x low-noise amplifiers (LNAs) are designed to improve the linearity, noise figure, and reception of GPS signals, including GloNass and Compass, while offering the smallest footprint in the market. As the industry's first GPS LNAs to dynamically suppress strong cellular, Bluetooth, and WLAN transmit signals, the NXP BGU700x/800x family offers the best reception for weak GPS signals, delivering an improvement of 10 dB or better IP3 under -40 to -20 dBm jamming conditions, while the noise figure remains below 1 dB. Requiring only two external components, the BGU700x/800x LNAs save up to 70% in PCB size and 10% in component cost.

GPS is a standard feature in a wide range of consumer products, from personal navigation devices to digital video cameras, watches, electric cars, and more. GPS signal power levels are weak and below the noise floor at -155 dBm. In many of these products, especially smartphones and tablets, strong transmitters such as Bluetooth, WLAN, and cellular can drive the GPS LNA into compression. When the GPS LNA is in compression, it has lower gain, which causes poor GPS reception; it also generates inter-modulation products and harmonics from the transmitter signals, capable of overpowering weak signals and leading to loss of GPS reception.

BGU700x/BGU800x series use adaptive biasing to immediately detect any output power from jammers, and compensate by temporarily increasing the current. As a result, optimal GPS signal reception is maintained for as long as possible. Each device in the BGU700x/BGU800x series requires only one input matching inductor and one supply decoupling capacitor to complete the design. This creates a very compact design and lowers the bill of materials.

### Features

- ▶ Low noise figure of 0.60 dB
- ▶ System optimized gain from 16 to 19 dB
- ▶ Low 3.1 mA supply current
- ▶ High out-of-band IP3 of 9 dBm
- ▶ Requires only one input matching inductor and one supply decoupling capacitor
- ▶ AEC-Q100 qualified (BGU7004, BGU7008) for highest reliability in harsh conditions
- ▶ World's smallest 6-bump Wafer Level Chip Scale Package (WLCSP) 0.65 x 0.44 x 0.2 mm
- ▶ Small 6-pin leadless package 1.1 x 0.9 x 0.5 mm

| Footprint on PCB              |             |           |           |              |              |              |
|-------------------------------|-------------|-----------|-----------|--------------|--------------|--------------|
|                               | NXP         | NXP       | NXP       | Competitor A | Competitor B | Competitor C |
| Package (mm)                  | 0.65 x 0.44 | 1.1 x 0.9 | 1.1 x 0.9 | 1.1 x 0.7    | 1.26 x 0.86  | 1.13 x 1.1   |
| Number of external components | 2           | 2         | 2         | 3            | 6            | 9            |
| Footprint (mm²)               | 3.02        | 3.95      | 3.95      | 4.88         | 8.85         | 12.66        |



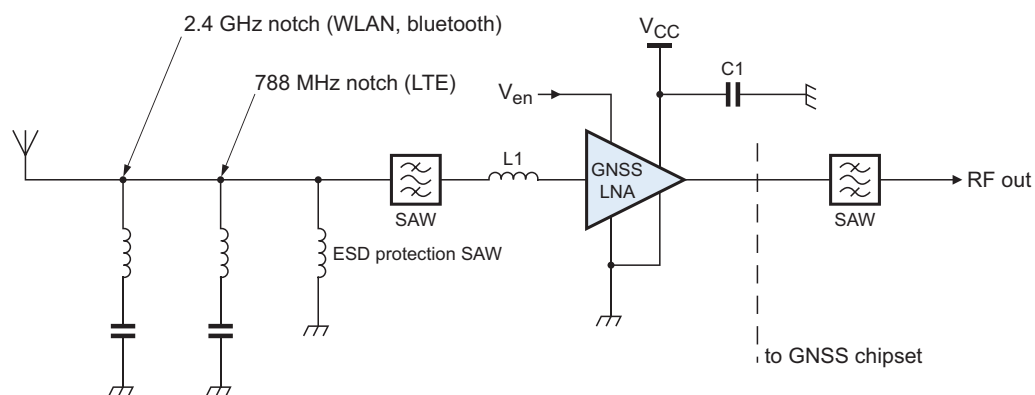
### Product highlight: BGU7008 AEC-Q100 qualified LNA for GNSS receiver applications

The BGU7008 adapts itself to the changing environment resulting from co-habitation of different radio systems in modern cellular handsets. It has been designed for low power consumption and optimal performance when jamming signals from co-existing cellular transmitters are present. At low jamming power levels it delivers 18.5 dB gain at a noise figure of 0.85 dB. The BGU7008 requires only one external matching inductor and one external decoupling capacitor.

### Features

- ▶ AEC-Q100 qualified
- ▶ Covers full GNSS L1 band, from 1559 to 1610 MHz
- ▶ Noise figure = 0.85 dB
- ▶ Gain 18.5 dB
- ▶ High 1 dB compression point of -12 dBm
- ▶ High out of band IP3i of 4 dBm
- ▶ Supply voltage 1.5 to 2.85 V
- ▶ Power down mode current consumption < 1 uA
- ▶ Optimized performance at low supply current of 4.8 mA
- ▶ Integrated temperature stabilized bias for easy design

## Application diagram



aaa-007041

## Recommended products

| Function | Product |             | Package | Type    |
|----------|---------|-------------|---------|---------|
| LNA      | MMIC    | SiGe:C MMIC | SOT886  | BGU7004 |
|          |         |             |         | BGU7005 |
|          |         |             |         | BGU7007 |
|          |         |             |         | BGU7008 |
|          |         |             | SOT1230 | BGU8009 |
|          |         |             |         | BGU8011 |
|          |         |             | WL-CSP  | BGU8006 |

For automotive applications, BGU7004 and BGU7008 have been qualified against AECQ100 and operate in even the harshest environments, such as the car body.

### Product highlight: BGU8011 SiGe:C LNA MMIC for GPS, GLONASS, and Galileo



The BGU8011 is a low-noise amplifier (LNA) for GNSS receiver applications in a plastic leadless 6-pin extremely-small SOT1230 package. It requires only one external matching inductor and one external decoupling capacitor.

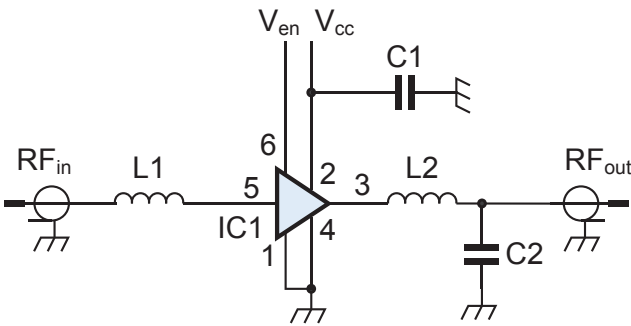
### Features

- ▶ Covers full GNSS L1 band, from 1559 to 1610 MHz
- ▶ Noise figure (NF) = 0.65 dB
- ▶ Gain = 16 dB
- ▶ High 1 dB compression point of -6 dBm
- ▶ High out-of-band IP<sub>3</sub> of 7 dBm
- ▶ Supply voltage 1.5 to 3.1 V
- ▶ Power-down mode current consumption < 1 μA
- ▶ Optimized performance at low supply current of 4.2 mA
- ▶ Integrated temperature stabilized bias for easy design
- ▶ Requires only one input matching inductor and one supply decoupling capacitor

1.5.2 GPS L2 and L5 bands

For professional applications, the L2 and L5 GPS bands are gaining interest. All BGU700x/BGU800x products can be easily matched to the L2 and L5 bands.

Application diagram



L2 application diagram for all GNSS LNAs

Recommended products

| Function | Product |             | Package | Type    |
|----------|---------|-------------|---------|---------|
| LNA      | MMIC    | SiGe:C MMIC | SOT886  | BGU7004 |
|          |         |             |         | BGU7005 |
|          |         |             |         | BGU7007 |
|          |         |             |         | BGU7008 |
|          |         |             | SOT1230 | BGU8007 |
|          |         |             |         | BGU8009 |
|          |         |             |         | BGU8010 |
|          |         |             |         | BGU8011 |

For automotive applications, BGU7004 and BGU7008 have been qualified against AECQ100 and operate in even the harshest environments, such as the car body.

Product highlight:  
BGU8009 SiGe:C LNA  
MMIC for GPS, GLONASS, and Galileo



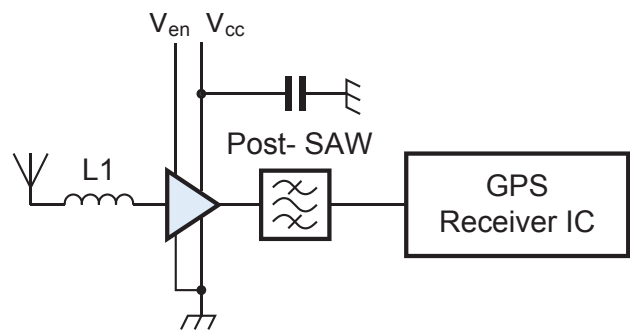
The BGU8009 is a low-noise amplifier (LNA) for GNSS receiver applications in a plastic leadless 6-pin extremely-small SOT886 package. It requires only one external matching inductor and one external decoupling capacitor.

- Features**
- ▶ Covers full GNSS L1 band, from 1559 to 1610 MHz
  - ▶ Noise figure (NF) = 0.65 dB
  - ▶ Gain = 18 dB
  - ▶ High 1 dB compression point of -7 dBm
  - ▶ High out-of-band IP<sub>3</sub> of 6 dBm
  - ▶ Supply voltage 1.5 to 3.1 V
  - ▶ Power-down mode current consumption < 1 μA
  - ▶ Optimized performance at low supply current of 4.2 mA
  - ▶ Integrated temperature stabilized bias for easy design
  - ▶ Requires only one input matching inductor and one supply decoupling capacitor

1.5.3 Mobile health and fitness: low current

In mobile health and fitness applications like GPS sports watches, low current is critical but linearity requirements can be relaxed since only 2.4 G WLAN and Bluetooth on-boards jammers are relevant. For these low-current applications, NXP offers the BGU8010, which requires only 3.2 mA of current and 16 dB of gain.

Application diagram



Mobile health and fitness block diagram

Recommended products

| Function | Product |             | Package | Type     |
|----------|---------|-------------|---------|----------|
| LNA      | MMIC    | SiGe:C MMIC | SOT891  | BGU7003  |
|          |         |             | SOT886  | BGU7003W |
|          |         |             | SOT1209 | BGU6101  |
|          |         |             |         | BGU6102  |
|          |         |             |         | BGU6104  |
|          |         |             | SOT1230 | BGU8010  |

Product highlight:  
BGU8010 SiGe:C LNA  
MMIC for GPS, GLONASS, Galileo and Compass

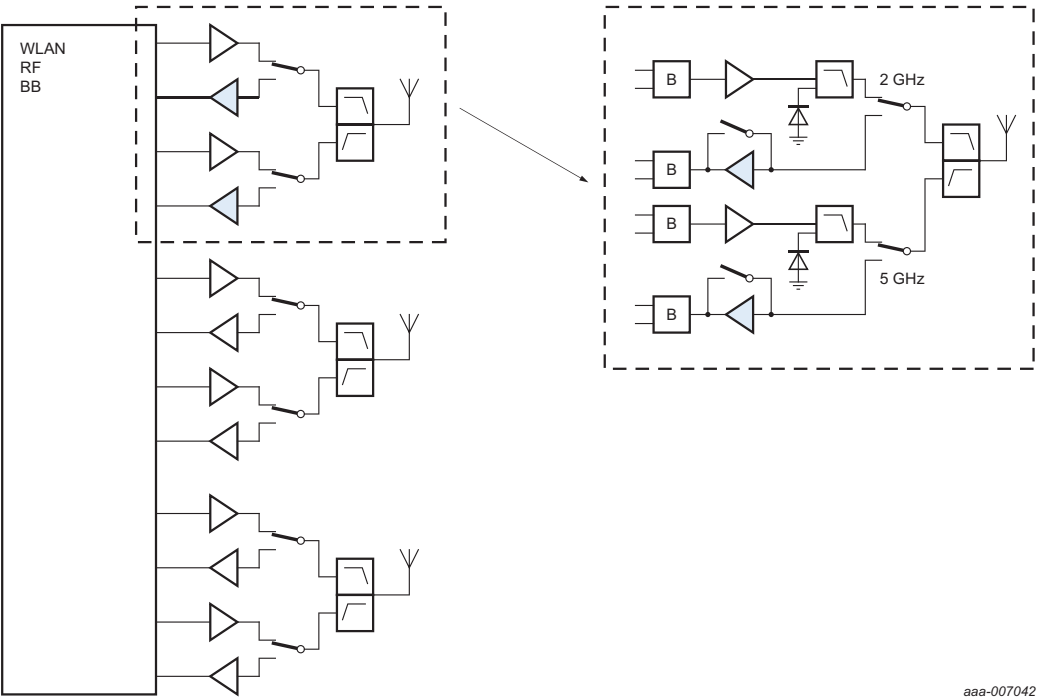
The BGU8010 adapts itself to the changing environment resulting from co-habitation of different radio systems in modern cellular handsets. It has been designed for low power consumption and optimal performance when jamming signals from co-existing cellular transmitters are present.



Features

- ▶ Covers full GNSS L1 band, from 1559 to 1610 MHz
- ▶ Noise figure (NF) = 0.7 dB
- ▶ Gain 16.1 dB
- ▶ Input 1 dB compression point of -9 dBm
- ▶ Out of band IP3i of 3 dBm
- ▶ Supply voltage 1.5 to 3.1 V
- ▶ Optimized performance at low supply current of 3.0 mA
- ▶ Power-down mode current consumption < 1 mA

Application diagram



aaa-007042

Recommended products

| Function | Product       |                   | Package | Type       |
|----------|---------------|-------------------|---------|------------|
| LNA      | RF transistor | SiGe:C transistor | SOT343F | BFU730F    |
|          |               |                   |         | BFU760F    |
|          |               |                   |         | BFU710F    |
|          |               |                   |         | BFU725F/N1 |
|          | RF            | MMIC              | SOT1189 | BFU730LX   |
|          |               |                   |         | BFU790F    |
|          |               |                   |         | BGU7224    |
|          |               |                   |         | BGU7258    |

Product highlight:

BFU760F NPN silicon germanium microwave transistor

The BGU760F is part of the family of 6<sup>th</sup> (Si) and 7<sup>th</sup> (SiGe:C) generation RF transistors and can be used to perform nearly any RF function. These next-generation wideband transistors offer the best RF noise figure versus gain performance, drawing the lowest current. This performance allows for better signal reception at low power and enables RF receivers to operate more robustly in noisy environments. The BFU760F delivers exceptional WLAN performance, meeting the latest 802.11ac Gigabit WLAN standard.



Features

- ▶ Meets 802.11ac WLAN standard
- ▶ System optimized gain of 12.5 dB at 2.4 GHz and 11 dB at 5.5 GHz
- ▶ Low noise figure (NF) of 1.1 dB @ 2.4 GHz and 5.5 GHz
- ▶ High input 1 dB gain compression ( $P_{i(1dB)}$ ) of -8 dBm at 2.4 GHz and -5 dBm at 5.5 GHz
- ▶ High input third order intercept point  $IP3$  of +3 dBm at 2.4 GHz and +8 dBm at 5.5 GHz
- ▶ Only eight external components required

1.5.5 FM radio

With NXP’s FM LNAs, consumers can listen to FM radio on their mobile phone speaker. These devices amplify the weak signal solving impedance mismatch between embedded antennas and the FM radio receiver, offering best-in-class performance.

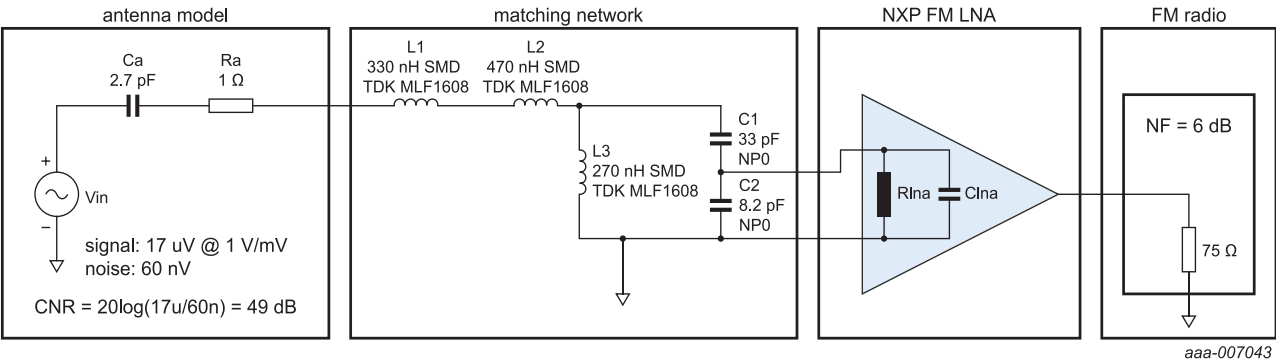
With most handsets, users can listen only to FM radio via the headset, which also serves as the antenna. The FM RF signal is picked up by the FM receiver while the audio is sent to the speaker by the audio amplifier.

By using the headset as a quarter wave length antenna of 75 cm, there is maximum signal pick-up as the antenna is used at the resonance frequency. Also, the antenna output is matched to the FM receiver’s input for maximum power transfer.

An embedded antenna allows users to listen to FM radio without using the headset, which gives them more freedom to do something else at the same time or listen to the radio together with friends or family.

The embedded antenna is about the same size as the handset, around 10 cm. The resonance frequency is higher than the FM band and the antenna cannot couple directly to the FM receiver due to impedance mismatch.

Application diagram



The NXP FM LNA serves as an interface that buffers the received voltage from high input to low output impedance, while adding minimal noise to maintain signal integrity.

Aside from delivering best-in-class performance (for a demonstration, visit [www.youtube.com/watch?v=IxSAPVLTRTw](http://www.youtube.com/watch?v=IxSAPVLTRTw)), NXP’s FM LNAs come in three different current-optimized versions for 1, 2, and 4 mA operation to allow for system-optimized gain and linearity.

NXP FM LNAs can be operated from a 1.5 to 5 V supply, and offer the lowest external component count, while still enabling matching to any high impedance antenna. This gives designers maximum flexibility.

Recommended products

| Function | Product |                | Package | Type     |
|----------|---------|----------------|---------|----------|
| LNA      | MMIC    | SiGe:C<br>MMIC | SOT1209 | BGU6101  |
|          |         |                |         | BGU6102  |
|          |         |                |         | BGU6104  |
|          |         |                | SOT886  | BGU7003W |



Product highlight:  
BGU6102 MMIC wideband amplifier

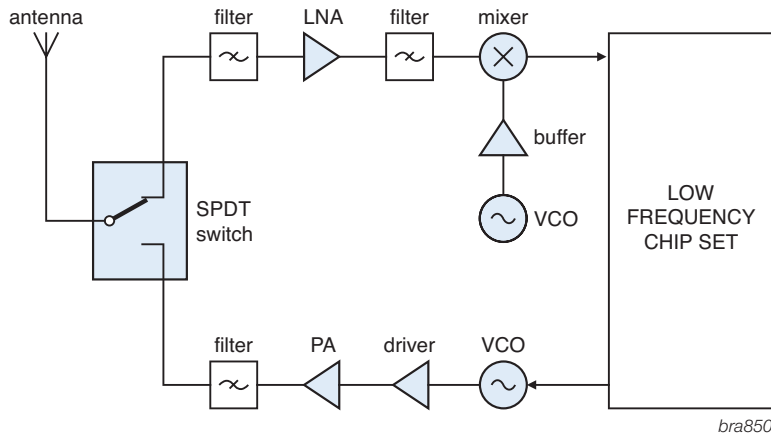
The BGU6102 is an unmatched MMIC featuring an integrated bias-enable function and a wide supply voltage. It is part of a family of three products (BGU6101, BGU6102, BGU6104), and is optimized for 2 mA operation.

Features

- ▶ Applicable between 40 MHz and 4 GHz
- ▶ High-ohmic FM LNA: 13 dB gain and 1.0 dB NF at 100 MHz
- ▶ 50 Ω FM LNA: 15 dB gain and 1.3 dB NF at 100 MHz
- ▶ Integrated temperature-stabilized bias for easy design
- ▶ Bias current configurable with external resistor
- ▶ Power-down mode current consumption < 6 μA
- ▶ ESD protection > 1 kV Human Body Model (HBM) on all pins
- ▶ Supply voltage from 1.5 to 5 V

## 1.5.6 Generic RF front-end

### Application diagram



### Recommended products

| Function    | Product  |                  | Package | Type     |
|-------------|----------|------------------|---------|----------|
| SPDT switch | RF diode | Bandswitch diode | SOD523  | BA277    |
|             |          |                  | SOD323  | BA591    |
|             |          | PIN diode        | Various | BAP51*   |
|             |          |                  | Various | BAP1321* |

| Function | Product               |                          | Package | Type       |
|----------|-----------------------|--------------------------|---------|------------|
| LNA      | RF bipolar transistor | Wideband transistor      | SOT23   | PBR951     |
|          |                       |                          | SOT323  | PRF957     |
|          |                       |                          | SOT323  | PRF947     |
|          |                       | SiGe:C transistor        | SOT343F | BFU610F    |
|          |                       |                          |         | BFU630F    |
|          |                       |                          |         | BFU660F    |
|          |                       |                          |         | BFU690F    |
|          |                       |                          |         | BFU710F    |
|          |                       |                          |         | BFU725F/N1 |
|          | BFU730F               |                          |         |            |
|          | BFU760F               |                          |         |            |
|          | BFU790F               |                          |         |            |
|          | MMIC                  | Low-noise wideband ampl. | SOT1209 | BGU6101    |
|          |                       |                          |         | BGU6102    |
|          |                       |                          |         | BGU6104    |
|          |                       |                          |         |            |

| Function | Product               |                       | Package | Type    |
|----------|-----------------------|-----------------------|---------|---------|
| Driver   | RF bipolar transistor | Wideband transistor   | SOT323  | PRF957  |
|          |                       |                       | SOT23   | PBR951  |
|          | MMIC                  | Gen-purp wideband amp | SOT363  | BGA2771 |
|          |                       |                       | SOT363  | BGA2866 |

\* Also available in ultra-small leadless package SOD882D



#### Product highlight:

#### BFU730F NPN wideband silicon germanium RF transistor

The BGU730F is part of the family of 6<sup>th</sup> (Si) and 7<sup>th</sup> (SiGe:C) generation RF transistors and can be used to perform nearly any RF function. These next-generation wideband transistors offer the best RF noise figure versus gain performance, drawing the lowest current. This performance allows for better signal reception at low power and enables RF receivers to operate more robustly in noisy environments.

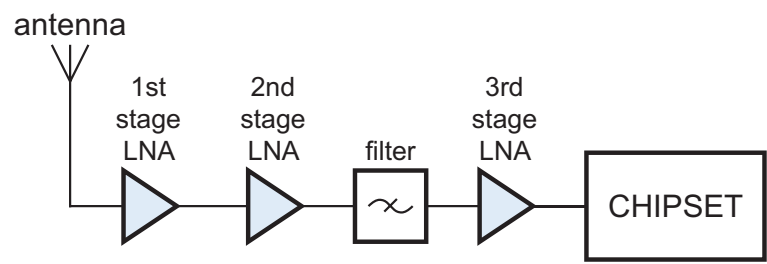
#### Features

- ▶ Operates at 2.3 GHz
- ▶ High maximum power gain (Gp) of 17.6 dB
- ▶ Noise figure (NF) of 0.8 dB
- ▶ Input 1dB gain compression (Pi(1dB)) of -15 dBm
- ▶ Input third order intercept point IP3I of +4.7 dBm

# 1.6 Automotive

## 1.6.1 SDARS and HD radio

### Application diagram



001aan958

### Recommended products

| Function                  | Product       |                   | Package | Type    |
|---------------------------|---------------|-------------------|---------|---------|
| 1 <sup>st</sup> stage LNA | RF transistor | SiGe:C transistor | SOT343F | BFU730F |

| Function                  | Product |                                    | Package | Type    |
|---------------------------|---------|------------------------------------|---------|---------|
| 2 <sup>nd</sup> stage LNA | MMIC    | General-purpose wideband amplifier | SOT343F | BFU690F |
|                           |         |                                    | SOT363  | BGA2869 |
|                           |         |                                    |         | BGA2851 |
|                           |         |                                    |         | BGA2803 |

| Function                  | Product       |                      | Package | Type       |
|---------------------------|---------------|----------------------|---------|------------|
| 3 <sup>rd</sup> stage LNA | RF transistor | Si/SiGe:C transistor | SOT343F | BFU690F    |
|                           |               |                      |         | BFU725F/N1 |
|                           |               |                      |         | BFU790F    |



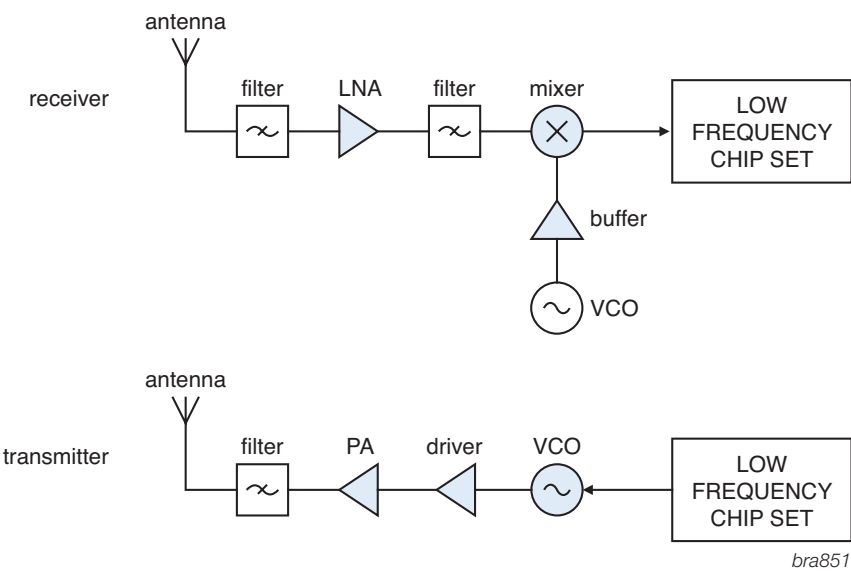
### Product highlight: BFU790F silicon NPN germanium microwave transistor

A silicon NPN germanium microwave transistor for high-speed, low-noise applications in a plastic, 4-pin dual-emitter SOT343F package.

- Features
- ▶ Low-noise, high-linearity microwave transistor
  - ▶ 110 GHz  $f_T$  silicon germanium technology
  - ▶ High maximum output power at 1 dB compression of 20 dBm at 1.8 GHz



Application diagram



Recommended products

| Function | Product               |                          | Package  | Type    |
|----------|-----------------------|--------------------------|----------|---------|
| LNA      | RF bipolar transistor | Wideband transistor      | SOT23    | PBR951  |
|          |                       |                          | SOT323   | PRF957  |
|          |                       |                          | SOT323   | PRF947  |
|          | MMIC                  | Low-noise wideband ampl. | SOT1209  | BGU6101 |
|          |                       |                          |          | BGU6102 |
|          |                       |                          |          | BGU6104 |
|          | SiGe:C MMIC           | SOT886                   | BGU7003W |         |
| Function | Product               |                          | Package  | Type    |
| Driver   | RF bipolar transistor | Wideband transistor      | SOT323   | PRF957  |
|          |                       |                          | SOT23    | PBR951  |
|          | MMIC                  | Gen-purp wideband amp    | SOT363   | BGA2771 |
|          |                       |                          | SOT363   | BGA2866 |
| Function | Product               |                          | Package  | Type    |
| VCO      | Varicap diodes        | VCO varicap diodes       | SOD323   | BB170   |
|          |                       |                          | SOD323   | BB174   |
|          |                       |                          | SOD523   | BB198   |
|          |                       |                          | SOD323   | BB156   |

\* AEC-Q101 qualified (some limitations apply)

| Function        | Product               |                                    | Package | Type    |
|-----------------|-----------------------|------------------------------------|---------|---------|
| Mixer           | RF bipolar transistor | Wideband transistor                | SOT343  | BFG410W |
|                 |                       |                                    | SOT343  | BFG425W |
|                 |                       |                                    | SOT343  | BFG480W |
| Function        | Product               |                                    | Package | Type    |
| Buffer          | RF bipolar transistor | Wideband transistor                | SOT23   | PBR951  |
|                 |                       |                                    | SOT323  | PRF957  |
|                 |                       |                                    | SOT323  | PRF947  |
|                 |                       |                                    | SOT416  | PRF949  |
| Function        | Product               |                                    | Package | Type    |
| Power amplifier | RF bipolar transistor | Wideband transistor                | SOT323  | PRF957  |
|                 |                       |                                    | SOT23   | PBR951  |
|                 | MMIC                  | General-purpose wideband amplifier | SOT363  | BGA2771 |
|                 |                       |                                    | SOT363  | BGA2866 |
|                 |                       |                                    | SOT908  | BGA7124 |

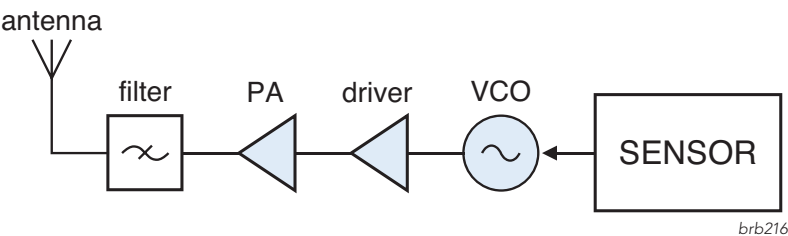
Product highlight:  
Varicap diodes as VCOs

Varicap diodes are principally used as voltage varicap capacitors, with their diode function a secondary option. These devices are ideal for voltage controlled oscillators (VCOs) in ISM band applications.

- Features
- ▶ Excellent linearity
  - ▶ Excellent matching
  - ▶ Very low series resistance
  - ▶ High capacitance ratio

1.6.3 Tire pressure monitoring system

Application diagram



Recommended products

| Function | Product               |                     | Package | Type     |
|----------|-----------------------|---------------------|---------|----------|
| PA       | RF bipolar transistor | Wideband transistor | SOT23   | BFR92A   |
|          |                       |                     | SOT323  | BFR92AW  |
|          |                       |                     | SOT23   | BFR94A*  |
|          |                       |                     | SOT323  | BFR93AW  |
|          |                       |                     | SOT323  | BFR94AW* |

| Function | Product               |                       | Package | Type      |
|----------|-----------------------|-----------------------|---------|-----------|
| Driver   | RF bipolar transistor | Wideband transistor   | SOT323  | PRF957    |
|          |                       | Amplifier             | SOT23   | PBR951    |
|          | MMIC                  | Gen-purp wideband amp | SOT363  | BGA2031/1 |
|          |                       |                       | SOT363  | BGA2771   |
|          |                       |                       | SOT363  | BGA2866   |

| Function | Product        |                    | Package | Type  |
|----------|----------------|--------------------|---------|-------|
| VCO      | Varicap diodes | VCO varicap diodes | SOD523  | BB198 |
|          |                |                    | SOD323  | BB156 |

\* AEC-Q101 qualified (some limitations apply)

Product highlight:  
BGU6101 MMIC wideband amplifier

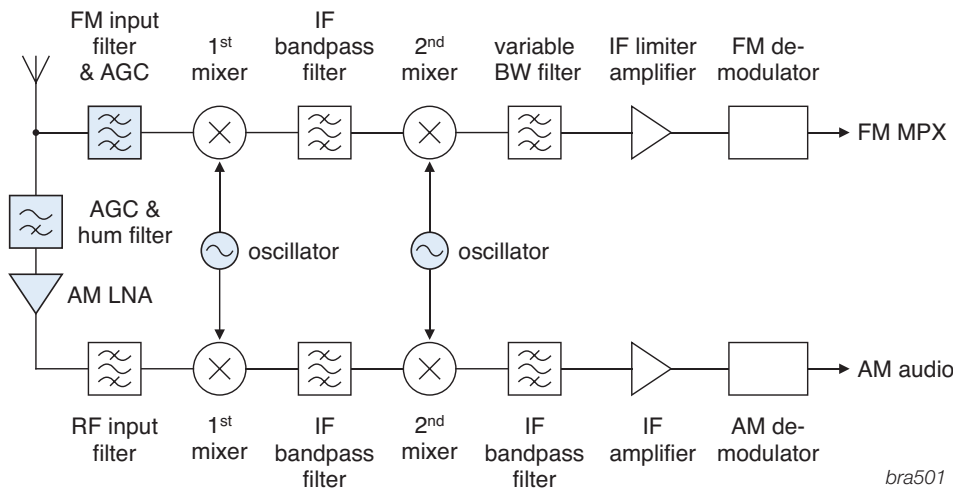
The BGU6101 is an unmatched MMIC featuring an integrated bias-enable function and a wide supply voltage. It is part of a family of three products (BGU6101, BGU6102, BGU6104), and is optimized for 2 mA operation.



Features

- ▶ Applicable between 40 MHz and 6 GHz
- ▶ 13 dB gain and 0.8 dB NF at 450 MHz
- ▶ 50 Ω FM LNA: 15 dB gain and 1.4 dB NF at 100 MHz
- ▶ Integrated temperature-stabilized bias for easy design
- ▶ Bias current configurable with external resistor
- ▶ Power-down mode current consumption < 1 μA
- ▶ ESD protection > 1 kV Human Body Model (HBM) on all pins

Application diagram



Recommended products

| Function                | Product       |               | Package | Type     |
|-------------------------|---------------|---------------|---------|----------|
| AM LNA                  | RF transistor | JFET          | SOT23   | BF862    |
|                         |               |               |         |          |
| Function                | Product       |               | Package | Type     |
| FM input filter and AGC | RF diode      | Varicap diode | SOT23   | BB201*   |
|                         |               |               | SOT23   | BB207    |
|                         |               | PIN diode     | SOD523  | BAP70-02 |
|                         |               |               | SOD323  | BAP70-03 |

\*OIRT

| Function           | Product  |               | Package | Type     |
|--------------------|----------|---------------|---------|----------|
| AGC and hum filter | RF diode | PIN diode     | SOT363  | BAP70AM  |
|                    |          |               |         |          |
| Function           | Product  |               | Package | Type     |
| Oscillator         | RF diode | Varicap diode | SOD323  | BB156    |
|                    |          |               | SOD523  | BB208-02 |

Note 1:  
The following recommended discrete products are applicable for NICEPACS, CCC, and DDICE:  
▶ NICE:TEA6840H, TEA6845H, TEA6846H,  
▶ NICEPACS:TEA6848H, TEA6849H,  
▶ CCC:TEF6901H, TEF6903H,  
▶ DDICE:TEA6721HL.  
All recommended discrete products are applicable, excluding AM LNA in: DICE2:TEF6730HWCE.

Note 2:  
Phones and portable radios (TEA5767/68) use varicap BB202 as the FM oscillator.

Product highlight:  
BF862 junction FET

Our tuning portfolio contains advanced products for car radio reception applications and in-vehicle media platforms. The NXP devices for this application ensure excellent reception quality and ease of design-in. Performance is demonstrated in reference designs. The high-performance junction FET BF862 is specially designed for AM radio amplifiers.



- Features
- ▶ High transition frequency and optimized input capacitance for excellent sensitivity
  - ▶ High transfer admittance resulting in high gain
  - ▶ Encapsulated in the versatile and easy-to-use SOT23 package

## 1.7 Industrial, scientific, and medical (ISM)

### 1.7.1 E-metering, RF generic front-end with a single antenna/ZigBee

#### Wireless microcontrollers for the Internet of things

NXP provides a complete approach for the development of IEEE802.15.4-based JenNet-IP, RF4CE, IEEE802.15.4, and ZigBee wireless network solutions, incorporating all the necessary hardware and software components. NXP's JN516x wireless microcontroller chips provide the optimum hardware platform around which wireless network nodes can be designed, combining high-performance processing and radio communications. NXP also supplies JN516x wireless microcontrollers mounted on modules, and an evaluation kit on which custom applications can be developed.

The on-chip peripherals support a wide range of applications. They include a 2-wire I<sup>2</sup>C port, an SPI port that can operate as either master or slave, a four-channel ADC with battery monitor, and a temperature sensor. Each device can support a large switch matrix of up to 100 elements or a 20-key capacitive touchpad.

#### Products

- ▶ JN5161-001 with 64 kB flash and 8 kB RAM for RF4CE and IEEE802.15.4 applications
- ▶ JN5164-001 with 160 kB flash and 32 kB RAM for JenNet-IP, RF4CE, and IEEE802.15.4 applications
- ▶ JN5168-001 with 256 kB flash and 32 kB RAM for JenNet-IP, IEEE802.15.4, RF4CE, and ZigBee applications
- ▶ JN5168-001-M00, JN5168-001-M03, JN5168-001-M05, JN5168-001-M06 modules

#### Features

- ▶ Single-chip device to run stack and application
- ▶ Very low-current solution for long battery life (10+ year)
- ▶ Ultra low-power MCU together with an IEEE802.15.4-compliant radio transceiver
- ▶ Supports multiple network stacks
- ▶ Enhanced 32-bit RISC processor for high performance and low power
- ▶ A rich mix of analog and digital peripherals
- ▶ Standard-power and high-power modules
- ▶ Software Developer's Kit (SDK), including JenNet-IP and ZigBee networking stacks

#### Software

A selection of network protocol stacks, based on the industry-standard IEEE802.15.4, are available to support the wireless connectivity requirements of your application. These include JenNet-IP and ZigBee Smart Energy, Light Link, Home Automation and Remote Control, which are provided as a set of software libraries. ZigBee is used for applications where interoperability is required. JenNet-IP is suitable for all proprietary applications, provides IPv6 connectivity to the end node, and is quickly emerging as a standard for lighting and automation applications in buildings.



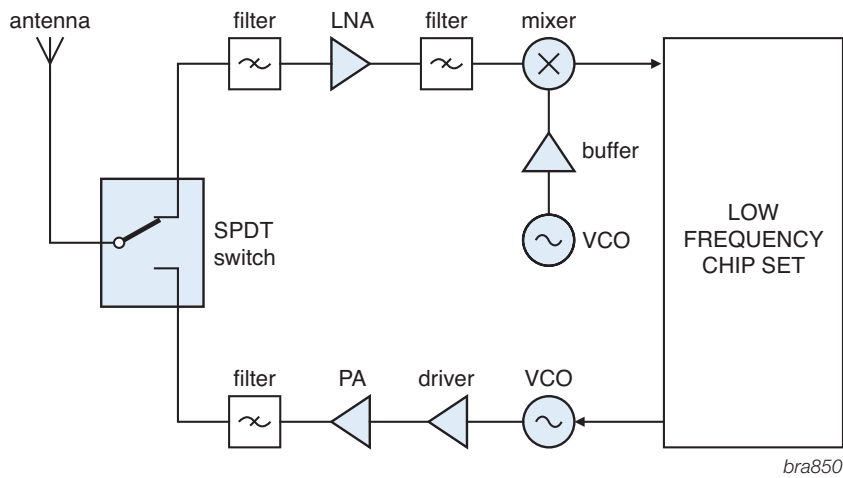
#### Product highlight: BGA7127 MMIC medium power amplifier



The BGA7127 MMIC is a one-stage driver amplifier offered in a low-cost, ultra-small SOT908 leadless package. It delivers 27 dBm output power at 1 dB gain compression, and superior performance for various narrowband-tuned application circuits at frequencies up to 2700 MHz.

#### Features

- ▶ Operating range: 400 to 2700 MHz
- ▶ 16 dB small signal gain at 2 GHz
- ▶ 27 dBm output power at 1 dB gain compression
- ▶ Integrated active biasing
- ▶ 3.3 / 5 V single-supply operation
- ▶ Simple quiescent current adjustment
- ▶ 1  $\mu$ A shutdown mode



Recommended products

| Function    | Product               |                       | Package | Type       |
|-------------|-----------------------|-----------------------|---------|------------|
| SPDT Switch | RF diode              | Bandswitch diode      | SOD523  | BA277      |
|             |                       |                       | SOD323  | BA591      |
|             |                       | PIN diode             | Various | BAP51*     |
|             |                       |                       | Various | BAP1321*   |
| LNA         | RF transistor         | SiGe:C transistor     | SOT343F | BFU610F    |
|             |                       |                       |         | BFU630F    |
|             |                       |                       |         | BFU660F    |
|             |                       |                       |         | BFU690F    |
|             |                       |                       |         | BFU710F    |
|             |                       |                       |         | BFU725F/N1 |
|             |                       |                       |         | BFU730F    |
|             |                       |                       |         | BFU760F    |
|             | MMIC                  | SiGe:C MMIC           | SOT886  | BGU7003W   |
| Driver      | RF bipolar transistor | Wideband transistor   | SOT343  | BFG425W    |
|             |                       | Gen-purp wideband amp | SOT363  | BGA2771    |
|             | MMIC                  | Gen-purp wideband amp | SOT363  | BGA2866    |

\* Also available in ultra-small leadless package SOD882D

| Function               | Product               |                                    | Package | Type    |
|------------------------|-----------------------|------------------------------------|---------|---------|
| Mixer                  | RF bipolar transistor | Wideband transistor                | SOT343  | BFG410W |
|                        |                       |                                    | SOT343  | BFG425W |
|                        | MMIC                  | Linear mixer                       | SOT343  | BFG480W |
|                        |                       |                                    | SOT363  | BGA2022 |
| Buffer                 | RF bipolar transistor | Wideband transistor                | SOT23   | PBR951  |
|                        |                       |                                    | SOT323  | PRF957  |
|                        |                       |                                    | SOT323  | PRF947  |
|                        |                       |                                    | SOT416  | PRF949  |
| Medium power amplifier | RF bipolar transistor | Wideband transistor                | SOT343  | BFG21W  |
|                        |                       |                                    |         | BGA6289 |
|                        | MMIC                  | General-purpose wideband amplifier | SOT89   | BGA6489 |
|                        |                       |                                    |         | BGA6589 |
|                        |                       |                                    | SOT908  | BGA7124 |
|                        |                       |                                    | SOT908  | BGA7127 |
| VCO                    | Varicap diodes        | VCO varicap diodes                 | SOD523  | BB198   |
|                        |                       |                                    | SOD323  | BB156   |

Product highlight:  
JN5168 wireless microcontroller



The JN516x series is a range of ultra low-power, high-performance wireless microcontrollers supporting JenNet-IP, ZigBee PRO, or RF4CE networking stacks to facilitate the development of home automation, smart energy, light link, and remote-control applications. They feature an enhanced 32-bit RISC processor with embedded Flash and EEPROM memory, offering high coding efficiency through

variable width instructions, a multi-stage instruction pipeline, and low-power operation with programmable clock speeds. They also include a 2.4 GHz IEEE802.15.4-compliant transceiver and a comprehensive mix of analog and digital peripherals. Three memory configurations are available to suit different applications. The best-in-class operating current of 15 mA, with a 0.6µA sleep timer mode, gives excellent battery life and allowing operation direct from a coin cell.

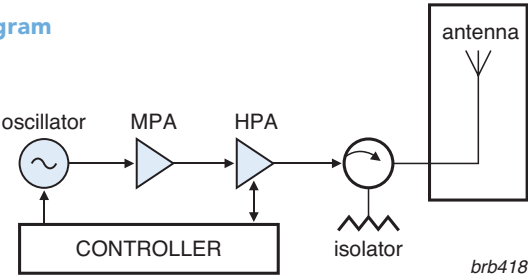
Whatever the need, NXP has the LDMOS solution tailored to fit  
Yesterday, today and tomorrow

The RF power industrial, scientific and medical (ISM) market covers a wide range of applications, from high-powered lasers to particle accelerators and ablation. These markets tend to exploit the benefits of applying RF energy for a very particular end use, served by bespoke RF amplifier designs. Our customers require suppliers who are true partners in providing devices that meet these specific needs through life-cycles that last a decade or more. At NXP, we pride ourselves in the way we manage the technology transitions that these timelines bring about, with our support in minimizing any disruption to our customers. By staying ahead of the game in terms of technology development, NXP has maintained a leadership position in this market segment and, going forward, our growing XR range and new OMP (over-molded plastic) parts will continue this trend for years to come.

Expanding XR

To meet the multiple demands of enhanced RF performance, security of supply, and cost-efficiency, the ISM market is currently in a transition from RF power solutions that use VDMOS transistors to ones that use new LDMOS transistors. LDMOS clearly exceeds VDMOS in terms of all technical and commercial parameters, apart from ruggedness in fault conditions. Of all RF power applications, those in the ISM segment have the most severe requirements in terms of ruggedness. To meet these needs, NXP has developed the XR technology, which enables a family of LDMOS devices that will meet all current and future market needs.

Application diagram



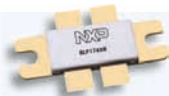
Recommended products

| Function                                                                            | Product       | Package | Type       | Function                              | Product | Package | Type    |
|-------------------------------------------------------------------------------------|---------------|---------|------------|---------------------------------------|---------|---------|---------|
| Oscillator                                                                          | RF transistor | SOT143  | BFG520     | MPA<br>(medium<br>power<br>amplifier) | MMIC    |         | BGA6289 |
|                                                                                     |               | SOT143  | BFG325/XR  |                                       |         | SOT89   | BGA6489 |
|                                                                                     |               | SOT23   | BFR520     |                                       |         |         | BGA6589 |
|                                                                                     |               | SOT323  | BFR92AW    |                                       |         | SOT908  | BGA7124 |
|                                                                                     |               | SOT323  | BFR93AW    |                                       |         | SOT89   | BGA7024 |
|                                                                                     |               | SOT323  | BFS520     |                                       |         | SOT908  | BGA7127 |
|                                                                                     |               | SOT343  | BFG520W    |                                       |         | SOT89   | BGA7027 |
|                                                                                     |               | SOT343  | BFG325W/XR |                                       |         | SOT908  | BGA7130 |
|                                                                                     |               | SOT363  | BFM520     |                                       |         |         |         |
|                                                                                     |               | SOT416  | BFR520T    |                                       |         |         |         |
| * Check status in section 3.1, as this type is not yet released for mass production |               |         |            |                                       |         |         |         |

| Function | Product | f <sub>min</sub> (MHz) | f <sub>max</sub> (MHz) | P1dB (W) | Package | Type             |
|----------|---------|------------------------|------------------------|----------|---------|------------------|
| HPA      | Driver  | 1                      | 2500                   | 12       | SOT975  | BLF25M612(G)*    |
|          | Final   | 425                    | 450                    | 200      | SOT1138 | BLP05M7200*      |
|          |         | 1300                   | 1300                   | 250      | SOT1121 | BLF6G13L(S)-250P |
|          |         | 400                    | 1000                   | 600      | SOT539  | BLF10H6600P(S)*  |
|          |         | 10                     | 128                    | 600      | SOT1214 | BLF174XR(S)      |
|          |         | 10                     | 500                    | 600      | SOT1214 | BLF574XR(S)      |
|          |         | 10                     | 128                    | 1400     | SOT539  | BLF178XR(S)      |
|          |         | 10                     | 500                    | 1400     | SOT539  | BLF578XR(S)      |

Product highlight:  
BLF174XR(S) power transistor

An extremely rugged 600 W push-pull LDMOS transistor in a thermally enhanced ceramic package for broadband applications in the range 10 to 128 MHz. The BLF174XR(S) is an addition to NXP’s leading XR range of LDMOS transistors, achieving 73% efficiency and 29 dB gain from a 50 V supply.



Features

- ▶ Extremely rugged performance in all fault conditions (VSWR >65:1)
- ▶ Excellent efficiency and reliability
- ▶ Low thermal resistance and excellent thermal stability
- ▶ Designed for broadband operation (10 to 128 MHz)
- ▶ Available in eared (bolt-down) and earless (surface-mount) versions

Applications

- ▶ Industrial lasers, RF heating, RF lighting, particle accelerators, synchrotrons, plasma generators

1.7.3 RF energy

RF power as a robust and highly efficient energy source

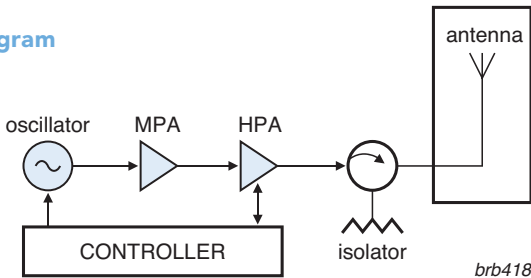
Opening up the 2.45 GHz band

The 100 MHz band between 2400 and 2500 MHz was long since allocated to commercial applications, the most popular being microwave ovens. This band is essentially unlicensed, meaning that it is best suited to applications that are tolerant to external emissions in this band, and that usually means applications that do not rely on a high level of two-way communication. For this reason, the 2.45 GHz band is now seeing an abundance of applications, like microwave cooking, that depend on a controlled delivery of a quantity of RF Energy. Some of these applications have the potential to take the world of RF power to new levels of volume, maybe 10 or 100 times higher than today’s run rates. For this potential to be realized, the market needs a supplier that can deliver the necessary breakthroughs in performance, system support, and the vital price-per-Watt level required to make the solutions commercially viable. As a broad-based semiconductor supplier with comprehensive RF coverage, NXP is set to play a leading role in making this market happen as soon as possible.

The first step: Dedicated 2.45 GHz LDMOS transistors

NXP is applying its latest generations of LDMOS technology to bring to market a range of ceramic-packaged transistors that are designed and characterized to meet the RF performance requirements for the 2.45 GHz segment. These products take the best components available today and tune them to get the best possible performance for the particular needs of these new applications. In this way, customers can move on from ‘paper-only’ concept designs and address a critical phase of hardware development, today. These products are more than engineering samples, they will be fully released and supported, just like all other LDMOS devices.

Application diagram



Recommended products

| Function   | Product       | Package | Type              | Function                        | Product | Package | Type    |
|------------|---------------|---------|-------------------|---------------------------------|---------|---------|---------|
| Oscillator | RF transistor | SOT343F | BFU630F           | MPA<br>(medium power amplifier) | MMIC    | SOT89   | BGA6289 |
|            |               |         | BFU660F           |                                 |         |         | BGA6489 |
|            |               |         | BFU690F           |                                 |         | SOT908  | BGA6589 |
|            |               |         | BFU730F           |                                 |         |         | BGA7124 |
|            |               |         | BFU760F           |                                 |         | SOT89   | BGA7024 |
|            |               |         | BFU790F           |                                 |         | SOT908  | BGA7127 |
| HPA        | Driver        | SOT975  | BLF2425M7L(S)140  |                                 |         | SOT89   | BGA7027 |
|            |               |         | BLF2425M6L(S)180P |                                 |         | SOT908  | BGA7130 |
|            |               |         | BLF2425M7L(S)250P |                                 |         |         |         |
|            |               |         |                   |                                 |         |         |         |

| Function | Product | f <sub>min</sub> (MHz) | f <sub>max</sub> (MHz) | P1dB (W) | Package | Type              |
|----------|---------|------------------------|------------------------|----------|---------|-------------------|
| HPA      | Driver  | 1                      | 2500                   | 12       | SOT975  | BLF25M612(G)*     |
|          |         | 2400                   | 2500                   | 140      | SOT502  | BLF2425M7L(S)140  |
|          | Final   | 2400                   | 2500                   | 180      | SOT539  | BLF2425M6L(S)180P |
|          |         | 2400                   | 2500                   | 250      | SOT539  | BLF2425M7L(S)250P |

\* Check status in section 3.1, as this type is not yet released for mass production

Product highlight:  
BLF2425M7L(S)250P power transistor



A 250 W push-pull LDMOS transistor in a thermally enhanced ceramic package for applications in the range of 2400 to 2500 MHz. The BLF2425M7L(S)250P uses NXP’s Gen7 LDMOS technology to provide a device that delivers best-in-class power density, achieving 51% efficiency and 15 dB gain from a 28 V supply.

Features

- ▶ High efficiency (51%) and high gain (15 dB) in continuous wave (CW) operation
- ▶ Excellent ruggedness in fault conditions (VSWR >10:1)
- ▶ Low thermal resistance and excellent thermal stability
- ▶ Optimized for 2.45 GHz operation
- ▶ Available in eared (bolt-down) and earless (surface-mount) versions

Applications

- ▶ RF cooking, RF lighting, RF heating, RF drying, RF ignition, RF ablation

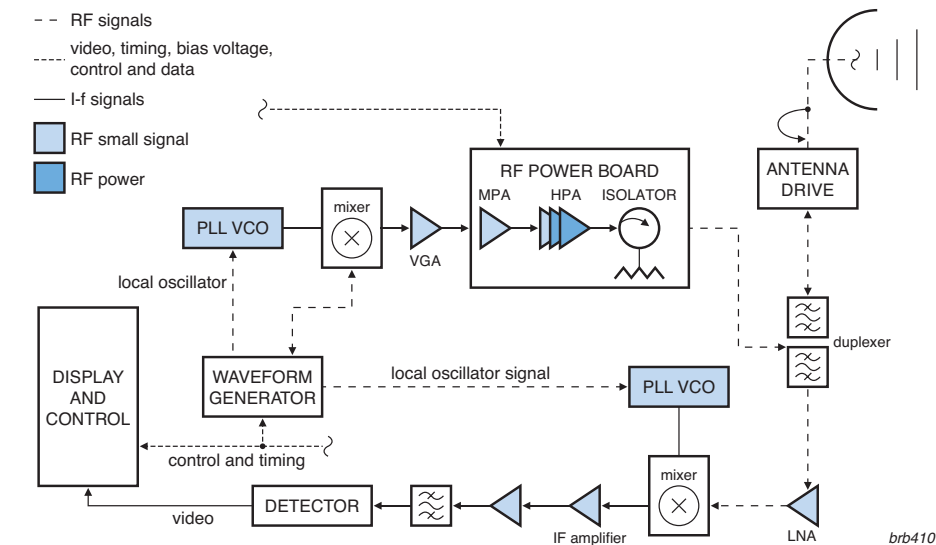
1.8 Aerospace and defense

1.8.1 Microwave products for L- and S-band radar and avionics applications

NXP builds on more than 50 years of history in semiconductor technology and component design. For more than three decades, we have led in providing high-performance RF technologies for microwave applications. The company has built a strong position in the field of RF small-signal and power transistors for microwave amplifiers with best-in-class Si devices and processing technologies.

We were the first semiconductor company to supply S-band transistors (2700 to 3500 MHz) based on LDMOS. To further strengthen our position towards the future, we are currently developing new high-power and high-bandwidth technologies based GaN material.

Application diagram



Recommended products

| Function | Product | f <sub>min</sub> (MHz) | f <sub>max</sub> (MHz) | P1dB (W) | Package | Type                |
|----------|---------|------------------------|------------------------|----------|---------|---------------------|
| HPA      | Driver  | 500                    | 1400                   | 25       | SOT467C | BLL6H0514-25        |
|          |         | 2700                   | 3500                   | 30       | SOT1135 | BLS6G2735L(S)-30    |
|          | Final   | 500                    | 1400                   | 130      | SOT1135 | BLL6H0514L(S)-130   |
|          |         | 1030                   | 1090                   | 200      | SOT502  | BLA6G1011L(S)-200RG |
|          |         | 1200                   | 1400                   | 250      | SOT502  | BLL6H1214L(S)-250   |
|          |         | 2700                   | 2900                   | 350      | SOT539  | BLS7G2729L(S)-350P* |
|          |         | 3100                   | 3500                   | 350      | SOT539  | BLS7G3135L(S)-350P* |
|          |         | 960                    | 1215                   | 500      | SOT634A | BLA6H0912-500       |
|          |         | 1200                   | 1400                   | 500      | SOT539A | BLL6H1214-500       |
|          |         | 1030                   | 1090                   | 600      | SOT539A | BLA6H1011-600       |

\* Check status in section 3.1, as this type is not yet released for mass production

Product highlight:  
BLS6G2735L(S)-30 power transistor



The BLS6G2735L(S)-30 is a broadband transistor that encompasses many of the features that make NXP the leading supplier of semi-conductors for the microwave and radar markets. Using the tried and trusted Gen6 LDMOS technology, NXP's unparalleled matching techniques, and the best thermally enhanced packaging the

BLS6G2735L(S)-30 can be applied in any number of applications as a driver in S-band radar amplifiers.

Features

- ▶ Internal matching to cover full S-band between 2700 and 3500 MHz
- ▶ High gain and efficiency in broad- and narrowband applications
- ▶ Low thermal resistance and excellent thermal stability
- ▶ Excellent ruggedness in fault conditions



| Function                            | Product       |                   | Package | Type       |
|-------------------------------------|---------------|-------------------|---------|------------|
| LNA (low-noise amplifier) and Mixer | RF transistor | SiGe:C transistor | SOT343F | BFU710F    |
|                                     |               |                   |         | BFU725F/N1 |
|                                     |               |                   |         | BFU730F    |

| Function     | Product |                                     | Package | Type    |  |
|--------------|---------|-------------------------------------|---------|---------|--|
| IF amplifier | MMIC    | MMIC                                | SOT363  | BGA2800 |  |
|              |         |                                     |         | BGA2801 |  |
|              |         |                                     |         | BGA2815 |  |
|              |         |                                     |         | BGA2816 |  |
|              |         |                                     |         | BGA2850 |  |
|              |         |                                     |         | BGA2865 |  |
|              |         |                                     |         | BGA2866 |  |
|              |         | General-purpose wideband amplifiers |         | BGM1014 |  |
|              |         |                                     |         | BGM1013 |  |
|              |         |                                     |         | BGM1012 |  |

| Function             | Product |           | Package | Type      |
|----------------------|---------|-----------|---------|-----------|
| PLL/VCO LO generator | RF IC   | SiGe:C IC | SOT616  | TFF1003HN |
|                      |         |           |         | TFF1007HN |

| Function                             | Product | Gain range | Package | Type    |
|--------------------------------------|---------|------------|---------|---------|
| Single VGA (variable-gain amplifier) | MMIC    | 31 dB      | SOT617  | BGA7210 |
|                                      |         |            |         | BGA7204 |

| Function                           | Product | Gain range | Package | Type    |
|------------------------------------|---------|------------|---------|---------|
| Dual VGA (variable-gain amplifier) | MMIC    | 24 dB      | SOT617  | BGA7350 |
|                                    |         | 28 dB      |         | BGA7351 |

| Function                     | Product | P <sub>L</sub> (1 dB) @ 940 MHz | Package | Type    |
|------------------------------|---------|---------------------------------|---------|---------|
| MPA (medium power amplifier) | MMIC    | 24 dBm                          | SOT89   | BGA7024 |
|                              |         | 28 dBm                          |         | BGA7027 |
|                              |         | 25 dBm                          | SOT908  | BGA7124 |
|                              |         | 28 dBm                          |         | BGA7127 |
|                              |         | 30 dBm                          |         | BGA7130 |

\* 8 different types with LO ranges: 7-15 GHz, see 3.4.4

### Product highlight: BGA28xx-family of IF gain blocks

The BGA28xx IF gain blocks are silicon Monolithic Microwave Integrated Circuit (MMIC) wideband amplifiers with internal matching circuitry in a 6-pin SOT363 plastic SMD package.



### Features

- ▶ No output inductor necessary when used at the output stage
- ▶ Internally matched to 50  $\Omega$
- ▶ Reverse isolation > 30 dB up to 2 GHz
- ▶ Good linearity with low second order

## 2. Technologies

### 2.1 Looking for a leader in SiGe:C? You just found us!

NXP's QUBiC4 BiCMOS SiGe:C technology enables future generations of RF products – including low-noise amplifiers, medium-power amplifiers and local oscillator (LO) generators – to operate at higher performance levels, including higher frequency and higher integration. Use cases include increasing the performance of base stations, mobile phones, and other mobile platforms and communications infrastructure equipment. The QUBiC4 process also helps speed satellite tracking and better connectivity with GPS signals for GPS systems, enhances satellite, WLAN, and microwave radio applications, and strengthens performance in radar, and more.

#### Excellent RF signal quality and more functionality in one design

Silicon-germanium (SiGe) process technology-based QUBiC4 offers high RF performance at a competitive cost, while ensuring excellence in signal quality via robust, highly integrated functionalities and value-added solutions. This in-house process builds upon mature processes in mass production since 2002. The QUBiC4 process allows integrating more functionality onto devices at a smaller footprint and with greater reliability and manufacturing efficiency, offering a clear competitive advantage to our customers.

#### More than an alternative

QUBiC4 delivers several benefits. It achieves RF performance comparable to GaAs for linearity, noise figure, and phase noise. It also provides higher robustness and reliable design (active ESD protection), and offers the option to integrate dense analog circuitry and digital control on the same mixed-signal IC. SiGe also offers lower DC power consumption. It allows wireless equipment manufacturers to add more functionality onto devices with less space, at a competitive cost, and with greater reliability and manufacturing efficiency. With QUBiC4, customers can speed their migration from GaAs technology to silicon by enabling cutting-edge, low-noise performance and IP availability.

QUBiC4 comes in three variants (QUBiC4+, QUBiC4x, and QBiC4xi), each with its own optimization for specific application areas.

#### QUBiC4+

The QUBiC4+ process features 0.25  $\mu\text{m}$  CMOS with five metal layers for integration of dense digital logic-based smart functionality, a rich set of active and passive devices for

high-frequency mixed-signal designs, including thick top metal layers for high-quality inductors. The device set includes 35 GHz fT NPNs with 3.8 V breakdown voltage ( $BV_{ce0}$ ) and low noise figure ( $NF < 1.1 \text{ dB @ } 2 \text{ GHz}$ ), 5 GHz fT VPNNs, a 28 GHz high-voltage NPN with 5.9 V breakdown voltage, differential and single-ended varicaps with Q-factor  $> 30$ , scalable inductors with Q-factor  $> 20$ , 800 MHz FT lateral PNNs, 0.25  $\mu\text{m}$  CMOS, 137, 220, and 12 to 2000  $\Omega/\text{sq.}$  poly and active resistors, a 270  $\Omega/\text{sq.}$  SiCr thin film resistor, a 5.7  $\text{fF}/\mu\text{m}^2$  oxide capacitor and a 5  $\text{fF}/\mu\text{m}^2$  MIM capacitor, one to six  $\text{fF}/\mu\text{m}^2$  oxide capacitors and various other devices including L-PNNs, isolated NMOS, 3.3 V CMOS and RF-CMOS transistors capacitor. The QUBiC4+ process is silicon-based and ideal for applications up to 5 GHz (fT = 35 GHz,  $NF < 1.1 \text{ dB @ } 2 \text{ GHz}$ ), as well as for medium-power QUBiC4X.

#### QUBiC4X

The QUBiC4X process is a SiGe:C-based extension of the QUBiC4 process for high-frequency mixed-signal designs and offers a rich set of transistor devices, including a 110 GHz fT NPN with 2.0 V breakdown voltage and very low noise figure ( $NF < 1.0 \text{ dB @ } 10 \text{ GHz}$ ), 0.25  $\mu\text{m}$  CMOS, a variety of resistors, a 5.7  $\text{fF}/\mu\text{m}^2$  oxide capacitor, and a 5  $\text{fF}/\mu\text{m}^2$  MIM capacitor. QUBiC4x is ideal for applications that typically operate at up to 30 GHz such as wireless infrastructure, Satcom, point-to-point or wireless connectivity.

#### QUBiC4Xi

The QUBiC4Xi process further enhances the QUBiC4X process. It offers 200 GHz fT NPNs and offers ultra-low noise figure ( $NF < 0.6 \text{ dB @ } 10 \text{ GHz}$ ), 0.25  $\mu\text{m}$  CMOS, several resistors, a 5.7  $\text{fF}/\mu\text{m}^2$  oxide capacitor and a 5  $\text{fF}/\mu\text{m}^2$  MIM capacitor. QUBiC4xi is ideal for applications operating at high frequencies ( $> 20 \text{ GHz}$ ), such as wireless infrastructure point-to-point, car radar, and aerospace.

## 2.2 Gallium-Nitride (GaN): Gain a clear advantage as NXP takes GaN mainstream

With 35+ years of experience delivering RF power transistors, NXP leads the industry in offering GaN RF power devices through a secure and reliable mainstream supply chain for wireless infrastructure, Industrial Scientific & Medical (ISM), and Aerospace & Defense applications.

NXP's first-generation GaN process technology features best-in-class linearity while at the same time allowing designers to maintain power, ruggedness, and efficiency. This enables an uncompromised amplifier design that can minimize component count and reduce amplifier footprint.

Our leading back-end assembly facility consistently leverages the high power density of GaN into smaller and more broadband circuitry. Through a broad portfolio of high-performance GaN and LDMOS products, NXP offers you an unbiased choice in enabling optimized designs for your application.

### Key features

- ▶ High frequencies, bandwidth up to 6 GHz
- ▶ High efficiencies
- ▶ Excellent linearity
- ▶ High power density
- ▶ High thermal conductivity
- ▶ Operation at higher temperatures, without loss of reliability (250 °C compared to 225 °C for Si LDMOS)
- ▶ Excellent ruggedness

### Applications

- ▶ Commercial wireless infrastructure (base stations)
- ▶ Radar systems
- ▶ Broadband and narrowband general-purpose amplifiers
- ▶ Public mobile radios
- ▶ ISM applications
- ▶ Jammers
- ▶ Test instrumentation
- ▶ EMC testing

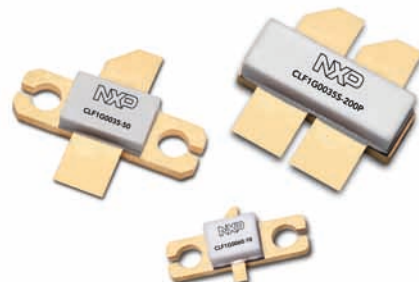
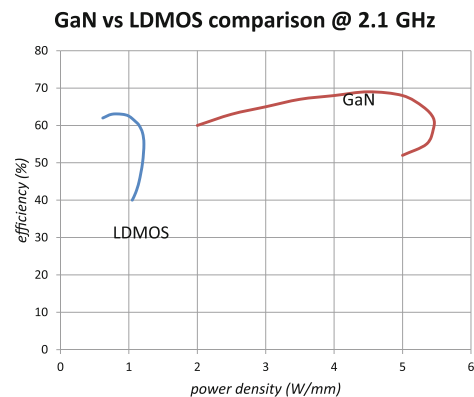
### Setting new performance boundaries for RF power amplifiers

GaN products are termed High-Electron Mobility Transistors (HEMT), a name that captures one of the intrinsic benefits of GaN – the high electron drift velocity. However, these transistors are depletion-mode devices, so they are normally on and require a negative gate bias to switch them off. This biasing is not straightforward, so NXP also has a tried-and-tested bias circuit available.

A further advantage of GaN is that it is a very hard structure, so it's capable of withstanding very high temperatures. NXP's GaN transistors are specified to a maximum temperature of 250 °C, compared to 225 °C for Si LDMOS. With such high temperature capability, there is a greater need to have packages capable of exploiting this feature. For this, customers benefit from NXP's 35-year legacy in RF power products.

Simply put, GaN makes a step increase in efficiency and power density performance over Si LDMOS in most applications (see figure). If independent market research claims come true, GaN product sales will exceed US\$ 300 million in 2014. But this can only happen if GaN is made available through mainstream semiconductor companies.

Currently, NXP is the only GaN supplier with the industrial base that brings customers excellence in product reliability, cost, and a high degree of confidence in the supply chain. As we like to say, we are taking GaN mainstream.



## 2.3 Best-in-class LDMOS to drive almost any RF application

**LDMOS (Laterally Diffused Metal Oxide Semiconductor) is the dominant device technology used in high-power RF amplifiers for frequencies ranging from 10 MHz to 3.8 GHz. LDMOS offers significant advantages over silicon bipolar transistors, including very high ruggedness and efficiency, high gain, and compatibility with low-cost packaging platforms. In all but a few markets, LDMOS is the most commercially viable solution compared to GaN-based power amplifiers.**

NXP's LDMOS technology platforms are designed for devices that run from supply voltages in the range of 28 to 50 V, with outstanding efficiency, power, and ruggedness. The technology draws on NXP's heritage of proven product and technology innovation in RF, which spans over 35 years. Now in its 8th-generation, our LDMOS devices deliver record performance up to 3.8 GHz and can be used to, for example, help wireless network operators realize best-in-class efficiencies for wireless base stations and hence reduce operating costs.

### Advanced processes and architectures

These high efficiencies are achieved by combining Gen8 LDMOS devices with specific amplifier circuit designs such as Doherty. The technology enables Doherty amplifiers with higher power, higher efficiencies, fewer memory effects and better pre-distortion capabilities. Doherty amplifiers are available fully integrated into a single transistor package, so engineers do not need to worry about the intricate design of such a circuit - All splitters, delay lines, and combiners are already included, so design-in is similar to that of a Class-AB circuit.

### Higher power densities and ruggedness

For the aerospace and defense, broadcast, and ISM markets, NXP uses the proven Gen6 & Gen7 LDMOS platforms for devices fine-tuned to the specific needs required by these applications. For example, the Gen6 technology has been re-optimized for 42 to 50 V operation with the Gen6HV process, and then improved further again as Gen6XR to enable devices with extreme ruggedness, equivalent to the older VDMOS technology. The Gen6XR process is essential for ISM applications that suffer from severe mismatch conditions, since the technology enables products that withstand them all without compromising the RF performance.

Historically, the broadcast market has led the way in terms of power demands. NXP has risen to this challenge, time and again, with a succession of LDMOS products that set new milestones in terms of power density. These products clearly demonstrate the strengths of NXP's LDMOS to deliver new levels of consistency in power distribution over a die, and also in production, from batch to batch and year to year.

The improvements in LDMOS technology have enabled the aerospace and defense radar markets to migrate from designs using Si bipolar power transistors to LDMOS. LDMOS RF performance now equals Si bipolar in most respects and exceeds it in the remaining few. LDMOS is also an easier technology to apply and has significant cost of ownership benefits in these markets. In these markets, NXP has raised the bar for LDMOS with 350 W S-band devices in the range of 2.7 to 3.5 GHz.

### Benefits

- ▶ Competitive products to fit all applications covered by LDMOS
- ▶ Continuous technology improvements to keep pace with market needs
- ▶ Dedicated technology nodes designed around specific application requirements

### Features

- ▶ Gen8 with enhanced VBW performance for 28-32 V base station applications
- ▶ Gen7 core technology for 28-32 V applications: base stations, aerospace and defense
- ▶ Gen6XR for 42-50 V ISM applications requiring extreme ruggedness
- ▶ Gen6HV for 42-50 V high power density broadcast applications

## 2.4 High-performance, small-size packaging enabled by NXP's leadless package platform and WL-CSP technology

### RF small-signal packaging is driven by two major trends which partly overlap

- ▶ Lower parasitics for better RF performance
- ▶ Smaller form factors for portable applications

### To cope with these trends, NXP uses several approaches

- ▶ For non-space-restricted applications, the use of flat-pack packages instead of gull-wing versions reduces the parasitic impedance because of shorter lead length (e.g. SOT343F instead of SOT343). This results in better RF performance in the Ku and Ka bands (13 to 20 GHz). To reduce PCB board space, a smaller version (SOT1206) is also available.



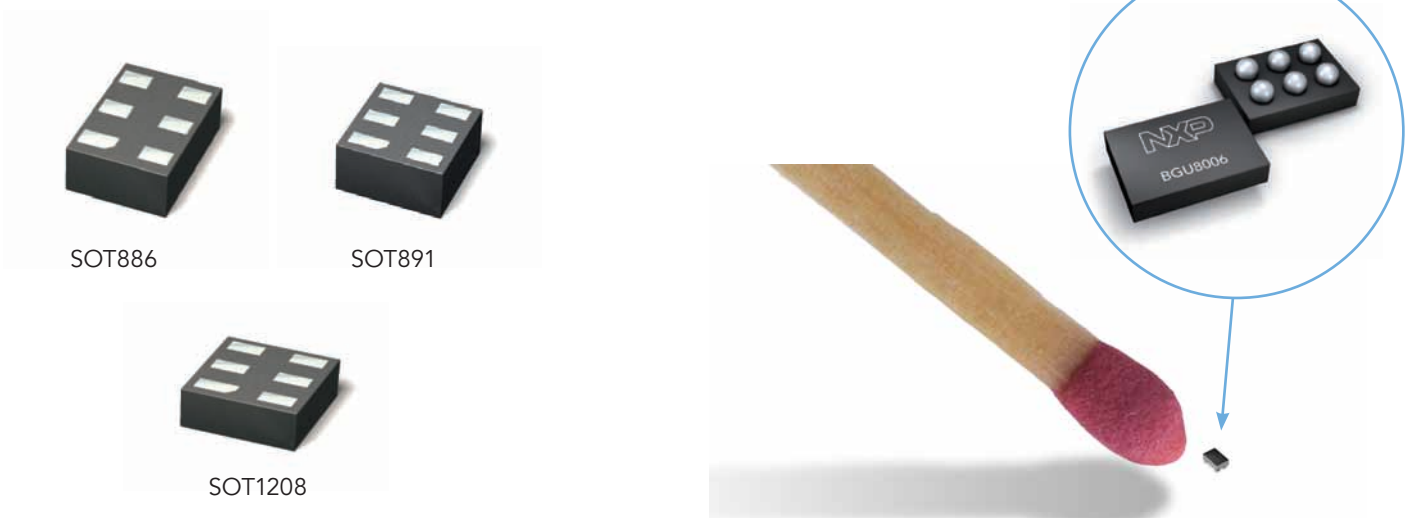
- ▶ For space-restricted applications there are two routes to reduce the form factor and parasitics:
  - Leadless package platform
  - Wafer Level Chip Scale Package (WL-CSP) technology

The **leadless package platform** (>25 variants already released) is highly flexible with respect to package size, package height, and I/O pitch. For example, the 6-pin packages range in size from 1.45 x 1 x 0.5 mm with 0.5 mm pitch to 0.8 x 0.8 x 0.35 mm with 0.3 mm pitch.

Because of the compact size of the design, wire lengths and parasitic impedance are also restricted. The absence of leads further reduces the inductance.

**Wafer Level Chip Scale Package technology** is ideally for RF functions where the I/O pitch has to fit within the chip area. With larger pitches and smaller designs (and thus little effective chip area), it is more cost-effective to do the fan-out using a leadless package instead of increasing the chip size.

The absence of wires gives the lowest parasitic inductance available.



0.65 x 0.44 x 0.29 mm (including 0.09 mm balls)  
5 I/Os @ 0.22 mm pitch

# 3. Products by function

NXP RF product catalog:

<http://www.nxp.com/rf>

## 3.1 New products

DEV = in development

CQS = customer qualification samples

RFS = release for supply

| Type                                                                  | Application/description                                                            | Expected status June 2013 | Planned release | Chapter |
|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------|-----------------|---------|
| <b>NEW: SiGe:C LNAs (for e.g. GPS)</b>                                |                                                                                    |                           |                 |         |
| BGU8009                                                               | GPS LNA, 18 dB gain                                                                | RFS                       | Released        | 3.4.1   |
| BGU8010                                                               | GPS LNA, 16 dB gain                                                                | RFS                       | Released        | 3.4.1   |
| BGU8011                                                               | GPS LNA, 16 dB gain                                                                | RFS                       | Released        | 3.4.1   |
| <b>NEW: MMIC broadband amplifiers for TV and distribution systems</b> |                                                                                    |                           |                 |         |
| BGA3012                                                               | Extreme broadband amplifier, 12 dB gain, SOT89                                     | RFS                       | Released        | 3.4.1   |
| BGA3015                                                               | Extreme broadband amplifier, 15 dB gain, SOT89                                     | RFS                       | Released        | 3.4.1   |
| BGA3018                                                               | Extreme broadband amplifier, 18 dB gain, SOT89                                     | RFS                       | Released        | 3.4.1   |
| <b>NEW: upstream VGA for Docsis 3.0</b>                               |                                                                                    |                           |                 |         |
| BGA3031                                                               | 5 - 85 MHz high-linearity variable-gain amplifier, 58 dB gain range                | RFS                       | Released        | 3.4.1   |
| <b>NEW: LNAs for WLAN</b>                                             |                                                                                    |                           |                 |         |
| BGU7224                                                               | 2.4 GHz LNA for WLAN, 802.11b/g/n                                                  | DEV                       | Q4 2013         | 3.4.1   |
| BGU7258                                                               | 5.8 GHz LNA for WLAN, 802.11a/n/ac                                                 | DEV                       | Q4 2013         | 3.4.1   |
| <b>NEW: LNAs for wireless infrastructures</b>                         |                                                                                    |                           |                 |         |
| BGU8051                                                               | LNA 900 MHz - from 0.5 to 1.5 GHz, 0.43 NF                                         | RFS                       | Released        | 3.4.1   |
| BGU8052                                                               | LNA 1.9 GHz - from 1.5 and 2.5 GHz, 0.52 NF                                        | RFS                       | Released        | 3.4.1   |
| BGU8053                                                               | LNA 2.5 GHz - from 2.3 and 2.8 GHz, 0.63 NF                                        | RFS                       | Released        | 3.4.1   |
| <b>NEW: VGA for wireless infrastructures</b>                          |                                                                                    |                           |                 |         |
| BGA7352                                                               | 10 - 200 MHz high-linearity Si variable gain amplifier; 31.5 dB gain range         | CQS                       | Q4 2013         | 3.4.1   |
| <b>NEW: Downconverters for satellite</b>                              |                                                                                    |                           |                 |         |
| TFF1024HN                                                             | Downconverter with PLL/VCO for VSAT, eight different Ku sub-bands with one crystal | CQS                       | Q4 2013         | 3.4.1   |
| TFF1012HN                                                             | Downconverter with PLL/VCO for Satellite LNBs                                      | CQS                       | Q4 2013         | 3.4.1   |
| <b>NEW: CATV power doublers</b>                                       |                                                                                    |                           |                 |         |
| CGD982LC                                                              | 1 GHz power doubler, 22 - 24 dB, 48 dBmV                                           | RFS                       | Released        | 3.6.3   |
| CGD985LC                                                              | 1 GHz power doubler, 24 - 26 dB, 48 dBmV                                           | RFS                       | Released        | 3.6.3   |
| CGD1042L                                                              | 1 GHz power doubler, 22 - 24 dB, 54 dBmV                                           | RFS                       | Released        | 3.6.3   |
| <b>NEW: RF Power transistors for base stations</b>                    |                                                                                    |                           |                 |         |
| BLF6H10L(S)-160                                                       | Gen6 ceramic high-voltage LDMOS transistor for GSM & LTE applications              | RFS                       | Released        | 3.7.1   |
| BLF7G10L(S)-250                                                       | Gen7 ceramic LDMOS transistor for GSM, WCDMA & LTE applications                    | RFS                       | Released        | 3.7.1   |
| BLF7G21LS-160                                                         | Gen7 ceramic LDMOS transistor for CDMA applications                                | RFS                       | Released        | 3.7.1   |
| BLF7G27L-135                                                          | Gen7 ceramic LDMOS transistor for WCDMA & LTE applications                         | RFS                       | Released        | 3.7.1   |
| BLF7G27L-200PB                                                        | Gen7 ceramic push-pull LDMOS transistor for WCDMA & LTE applications               | RFS                       | Released        | 3.7.1   |
| BLF8G10L(S)-160                                                       | Gen8 ceramic LDMOS transistor for GSM, WCDMA & LTE applications                    | RFS                       | Released        | 3.7.1   |
| BLF8G10LS-160V                                                        | Gen8 ceramic LDMOS transistor for GSM, WCDMA & LTE applications                    | RFS                       | Released        | 3.7.1   |
| BLF8G10LS-270                                                         | Gen8 ceramic LDMOS transistor for GSM, WCDMA & LTE applications                    | RFS                       | Released        | 3.7.1   |
| BLF8G10LS-270(GJV)                                                    | Gen8 ceramic LDMOS transistor for GSM, WCDMA & LTE applications (gull-wing)        | RFS                       | Released        | 3.7.1   |
| BLF8G19LS-170BV                                                       | Gen8 VBW ceramic LDMOS transistor for GSM & LTE applications                       | RFS                       | Released        | 3.7.1   |



| Type               | Application/description                                                           | Expected status June 2013 | Planned release | Chapter |
|--------------------|-----------------------------------------------------------------------------------|---------------------------|-----------------|---------|
| BLF8G20LS-200V     | Gen8 ceramic LDMOS transistor for GSM & LTE applications                          | RFS                       | Released        | 3.7.1   |
| BLF8G20LS-260A     | Gen8 ceramic asymmetrical Doherty LDMOS transistor for GSM & LTE applications     | RFS                       | Released        | 3.7.1   |
| BLF8G20L(S)-220    | Gen8 ceramic LDMOS transistor for GSM & LTE applications                          | RFS                       | Released        | 3.7.1   |
| BLF8G20LS-400P(G)V | Gen8 ceramic LDMOS transistor for GSM & LTE applications                          | RFS                       | Released        | 3.7.1   |
| BLF8G22LS-140      | Gen8 ceramic LDMOS transistor for WCDMA & LTE applications                        | RFS                       | Released        | 3.7.1   |
| BLF8G22LS-200(G)V  | Gen8 ceramic LDMOS transistor for WCDMA & LTE applications (gull-wing)            | RFS                       | Released        | 3.7.1   |
| BLF8G22LS-220      | Gen8 ceramic LDMOS transistor for WCDMA & LTE applications                        | RFS                       | Released        | 3.7.1   |
| BLF8G22LS-240      | Gen8 ceramic LDMOS transistor for WCDMA & LTE applications                        | RFS                       | Released        | 3.7.1   |
| BLF8G22LS-270      | Gen8 ceramic LDMOS transistor for WCDMA & LTE applications                        | RFS                       | Released        | 3.7.1   |
| BLF8G22LS-270(G)V  | Gen8 ceramic LDMOS transistor for WCDMA & LTE applications (gull-wing)            | RFS                       | Released        | 3.7.1   |
| BLF8G22LS-310AV    | Gen8 ceramic asymmetrical Doherty LDMOS transistor for Multi band applications    | DEV                       | Q3 2013         | 3.7.1   |
| BLF8G24L(S)-200P   | Gen8 ceramic push-pull LDMOS transistor for WCDMA & LTE applications              | RFS                       | Released        | 3.7.1   |
| BLF8G27LS-100V     | Gen8 ceramic LDMOS transistor for WCDMA & LTE applications                        | RFS                       | Released        | 3.7.1   |
| BLF8G27LS-100P     | Gen8 ceramic LDMOS transistor for WCDMA & LTE applications                        | RFS                       | Released        | 3.7.1   |
| BLF8G27LS-140      | Gen8 ceramic LDMOS transistor for WCDMA & LTE applications                        | RFS                       | Released        | 3.7.1   |
| BLF8G27LS-140V     | Gen8 ceramic LDMOS transistor for WCDMA & LTE applications                        | RFS                       | Released        | 3.7.1   |
| BLF8G27LS-150(G)V  | Gen8 ceramic LDMOS transistor for WCDMA & LTE applications (gull-wing)            | RFS                       | Released        | 3.7.1   |
| BLC8G27LS-160AV    | Gen8 ceramic asymmetrical Doherty LDMOS transistor for Multi band applications    | DEV                       | Q3 2013         | 3.7.1   |
| BLM7G22S-60PB(G)   | Gen7 LDMOS MMIC for WCDMA applications (gull-wing)                                | RFS                       | Released        | 3.7.1   |
| BLP7G07S-140P(G)   | Gen7 OMP push-pull LDMOS transistor for GSM, WCDMA & LTE applications (gull-wing) | RFS                       | Released        | 3.7.1   |
| BLP7G22-05         | Gen7 OMP LDMOS transistor general purpose applications                            | RFS                       | Released        | 3.7.1   |
| BLP7G22-10         | Gen7 OMP LDMOS transistor general purpose applications                            | RFS                       | Released        | 3.7.1   |
| BLP8G10S-45P(G)    | Gen7 OMP push-pull LDMOS transistor for GSM, WCDMA & LTE applications (gull-wing) | RFS                       | Released        | 3.7.1   |
| BLP8G21S-160PV     | Gen8 OMP push-pull LDMOS transistor for GSM, TDSCDMA applications                 | DEV                       | Q3 2013         | 3.7.1   |
| BLP8G22S-60P(G)    | Gen8 OMP push-pull LDMOS transistor for Multi applications                        | DEV                       | Q3 2013         | 3.7.1   |

#### NEW: RF power LDMOS transistors for 1 - 1600 MHz (UHF/VHF/ISM)

|                |                                                                                |     |          |       |
|----------------|--------------------------------------------------------------------------------|-----|----------|-------|
| BLF10H6600P(S) | Gen6 ceramic push-pull LDMOS transistor for ISM applications                   | RFS | Released | 3.7.2 |
| BLF174XR(S)    | XR ceramic push-pull LDMOS transistor for ISM applications                     | RFS | Released | 3.7.2 |
| BLF25M612(G)   | Gen6 ceramic LDMOS driver transistor for 2.45 GHz ISM applications (gull-wing) | DEV | Q3 2013  | 3.7.2 |
| BLF574XR(S)    | XR ceramic push-pull LDMOS transistor for ISM applications                     | RFS | Released | 3.7.2 |
| BLF644P        | Ceramic LDMOS transistor for microwave, broadcast/ISM applications             | DEV | Q3 2013  | 3.7.2 |
| BLF988(S)      | Ceramic push-pull LDMOS transistor for microwave, broadcast & ISM applications | RFS | Released | 3.7.2 |
| BLP05M7200     | Gen7 OMP LDMOS transistor for broadcast & ISM applications                     | DEV | Q3 2013  | 3.7.2 |
| BLP15M7160P    | Gen7 OMP LDMOS transistor for broadcast & ISM applications                     | DEV | Q3 2013  | 3.7.2 |
| BLP25M710      | Gen7 OMP LDMOS driver transistor for broadcast & ISM applications              | DEV | Q3 2013  | 3.7.2 |

#### NEW: RF power LDMOS transistors for L-band

|                   |                                                                    |     |         |       |
|-------------------|--------------------------------------------------------------------|-----|---------|-------|
| BLL6G1214L(S)-250 | Gen6 ceramic LDMOS transistor for L-band applications              | DEV | Q3 2013 | 3.7.2 |
| BLL6H1214LS-500   | Gen6 high-voltage ceramic LDMOS transistor for L-band applications | DEV | Q3 2013 | 3.7.2 |

#### NEW: RF power LDMOS transistors for S-band

|                    |                                                                       |     |          |       |
|--------------------|-----------------------------------------------------------------------|-----|----------|-------|
| BLS7G2729L(S)-350P | Gen7 ceramic push-pull LDMOS transistor for S-band radar applications | DEV | Q3 2013  | 3.7.2 |
| BLS7G2730L(S)-200P | Gen7 ceramic push-pull LDMOS transistor for S-band radar applications | RFS | Released | 3.7.2 |
| BLS7G3135L(S)-200  | Gen7 ceramic LDMOS S-band radar power transistor                      | DEV | Q3 2013  | 3.7.2 |
| BLS7G3135L(S)-350P | Gen7 ceramic push-pull LDMOS transistor for S-band radar applications | DEV | Q3 2013  | 3.7.2 |

#### NEW: Gallium Nitride (GaN) RF power amplifiers

|                   |                                                |     |         |       |
|-------------------|------------------------------------------------|-----|---------|-------|
| CLF1G0035(S)-50   | Gen1 ceramic GaN broadband amplifier           | DEV | Q1 2014 | 3.7.4 |
| CLF1G0035(S)-100  | Gen1 ceramic GaN broadband amplifier           | DEV | Q1 2014 | 3.7.4 |
| CLF1G0035(S)-100P | Gen1 ceramic GaN push-pull broadband amplifier | DEV | Q2 2014 | 3.7.4 |
| CLF1G0035(S)-200P | Gen1 ceramic GaN push-pull broadband amplifier | DEV | Q2 2014 | 3.7.4 |
| CLF1G0060(S)-10   | Gen1 ceramic GaN broadband driver amplifier    | DEV | Q2 2014 | 3.7.4 |
| CLF1G0060(S)-30   | Gen1 ceramic GaN broadband driver amplifier    | DEV | Q2 2014 | 3.7.4 |

#### NEW: Low power wireless microcontrollers and networking stacks

|                |                                                                        |     |          |     |
|----------------|------------------------------------------------------------------------|-----|----------|-----|
| JNS161-001     | 2.4 - 2.4835 GHz Single chip RF4CE & IEEE802.15.4                      | RFS | Released | 3.8 |
| JNS164-001     | 2.4 - 2.4835 GHz Single chip JenNet-IP & RF4CE & IEEE802.15.4          | RFS | Released | 3.8 |
| JNS168-001     | 2.4 - 2.4835 GHz single chip JenNet-IP & ZigBee & RF4CE & IEEE802.15.4 | RFS | Released | 3.8 |
| JNS168-001-M00 | 2.4 - 2.4835 GHz module JenNet-IP & ZigBee & RF4CE & IEEE802.15.4      | RFS | Released | 3.8 |
| JNS168-001-M03 | 2.4 - 2.4835 GHz module JenNet-IP & ZigBee & RF4CE & IEEE802.15.4      | RFS | Released | 3.8 |
| JNS168-001-M05 | 2.4 - 2.4835 GHz module JenNet-IP & ZigBee & RF4CE & IEEE802.15.4      | RFS | Released | 3.8 |
| JNS168-001-M06 | 2.4 - 2.4835 GHz module JenNet-IP & ZigBee & RF4CE & IEEE802.15.4      | RFS | Released | 3.8 |

## 3.2 RF diodes

### 3.2.1 Varicap diodes

Varicap selection guide on [www.nxp.com/varicaps](http://www.nxp.com/varicaps)  
Easy-to-use parametric filters help you choose the right varicap for your design.

#### Why choose NXP's varicap diodes:

- ▶ Reference designs for TV and radio tuning
- ▶ Direct matching process
- ▶ Small tolerances
- ▶ Short lead time
- ▶ Complete portfolio covering broad range of frequencies and packages (including leadless)
- ▶ Reliable volume supply

#### VCO and FM radio tuning varicap diodes

| Type      | Package | Number of diodes | Configuration | @ f = 1 MHz        |                    |                    |                    |                    |                    |                    |                    |                                      |                                      |        |        | r <sub>s</sub> typ | r <sub>s</sub> max | @ f = |
|-----------|---------|------------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------------------------|--------------------------------------|--------|--------|--------------------|--------------------|-------|
|           |         |                  |               | C <sub>d</sub> min | C <sub>d</sub> typ | C <sub>d</sub> max | @ V <sub>R</sub> = | C <sub>d</sub> min | C <sub>d</sub> typ | C <sub>d</sub> max | @ V <sub>R</sub> = | C <sub>d1</sub> /C <sub>d2</sub> min | C <sub>d1</sub> /C <sub>d2</sub> max | @ V1 = | @ V2 = |                    |                    |       |
|           |         |                  |               | (pF)               | (pF)               | (pF)               | (V)                | (pF)               | (pF)               | (pF)               | (V)                |                                      |                                      | (V)    | (V)    |                    |                    |       |
| BB145B    | SOD523  | 1                | SG            | 6.4                | -                  | 7.2                | 1                  | 2.55               | -                  | 2.95               | 4                  | 2.2                                  | -                                    | 1      | 4      | -                  | 0.6                | 470   |
| BB156     | SOD323  | 1                | SG            | 14.4               | 16                 | 17.6               | 1                  | 4.2                | 4.8                | 5.4                | 7.5                | 2.7                                  | 3.9                                  | 1      | 7.5    | 0.4                | 0.7                | 470   |
| BB198     | SOD523  | 1                | SG            | 25                 | -                  | 28.5               | 1                  | 4.8                | -                  | 6.8                | 4                  | -                                    | -                                    | -      | -      | -                  | 0.8                | 100   |
| BB199     | SOD523  | 1                | SG            | 36.5               | -                  | 42.5               | 0.5                | 11.8               | -                  | 13.8               | 2                  | 2.8                                  | -                                    | 0.5    | 2      | 0.25               | -                  | 100   |
| BB201     | SOT23   | 2                | CC            | 89                 | 95                 | 102                | 1                  | 25.5               | 27.6               | 29.7               | 7.5                | 3.1                                  | 3.8                                  | 1      | 7.5    | 0.25               | 0.5                | 100   |
| BB202^    | SOD523  | 1                | SG            | 28.2               | -                  | 33.5               | 0.2                | 7.2                | -                  | 11.2               | 2.3                | 2.5                                  | -                                    | 0.2    | 2.3    | 0.35               | 0.6                | 100   |
| BB207*    | SOT23   | 2                | CC            | 76                 | 81                 | 86                 | 1                  | 25.5               | 27.6               | 29.7               | 7.5                | 2.6                                  | 3.3                                  | 1      | 7.5    | 0.2                | 0.4                | 100   |
| BB208-02* | SOD523  | 1                | SG            | 19.9               | -                  | 23.2               | 1                  | 4.5                | -                  | 5.4                | 7.5                | 3.7                                  | 5.2                                  | 1      | 7.5    | 0.35               | 0.5                | 100   |
| BB208-03* | SOD323  | 1                | SG            | 19.9               | -                  | 23.2               | 1                  | 4.5                | -                  | 5.4                | 7.5                | 3.7                                  | 5.2                                  | 1      | 7.5    | 0.35               | 0.5                | 100   |

\* Includes special design for FM car radio (CREST-IC:TEF6860)

^ Includes special design for mobile phone tuner ICs

Type of connection:

CC:

SG:

common cathode

single

#### UHF varicap diodes

| Type      | Package | @ f = 1 MHz           |                       |                       |                       |                                         |                                         |                                         |                       |                       | r <sub>s</sub><br>typ | r <sub>s</sub><br>max | @ f = | @<br>C <sub>d</sub> = | ΔC <sub>d</sub> /<br>C <sub>d</sub> | @ V <sub>1</sub><br>= | @ V <sub>2</sub><br>= | @<br>N <sub>s</sub><br>= |
|-----------|---------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------|-----------------------|-------------------------------------|-----------------------|-----------------------|--------------------------|
|           |         | C <sub>d</sub><br>min | C <sub>d</sub><br>typ | C <sub>d</sub><br>max | @ V <sub>R</sub><br>= | C <sub>d1</sub> /C <sub>d2</sub><br>min | C <sub>d1</sub> /C <sub>d2</sub><br>typ | C <sub>d1</sub> /C <sub>d2</sub><br>max | @ V <sub>1</sub><br>= | @ V <sub>2</sub><br>= |                       |                       |       |                       |                                     |                       |                       |                          |
|           |         | (pF)                  | (pF)                  | (pF)                  | (V)                   |                                         |                                         |                                         | (V)                   | (V)                   | (Ω)                   | (Ω)                   | (MHz) | (pF)                  |                                     | (V)                   | (V)                   |                          |
| Unmatched |         |                       |                       |                       |                       |                                         |                                         |                                         |                       |                       |                       |                       |       |                       |                                     |                       |                       |                          |
| BB174     | SOD523  | 1.951                 | 2.1                   | 2.225                 | 28                    | 8.45                                    | 9                                       | 10.9                                    | 1                     | 28                    | 0.6                   | 0.75                  | 470   | 9                     | 2                                   | 1                     | 28                    | 10                       |
| BB174LX   | SOD882D | 1.95                  | 2.1                   | 2.22                  | 28                    | 8.45                                    | 9                                       | 10.9                                    | 1                     | 28                    | 0.65                  | -                     | 470   | 30                    | 2                                   | 1                     | 28                    | 5                        |
| Unmatched |         |                       |                       |                       |                       |                                         |                                         |                                         |                       |                       |                       |                       |       |                       |                                     |                       |                       |                          |
| BB135     | SOD323  | 1.7                   | -                     | 2.1                   | 28                    | 8.9                                     | -                                       | 12                                      | 0.5                   | 28                    | -                     | 0.75                  | 470   | 9                     | -                                   | -                     | -                     | -                        |

**Bold** = highly recommended product



## VHF varicap diodes

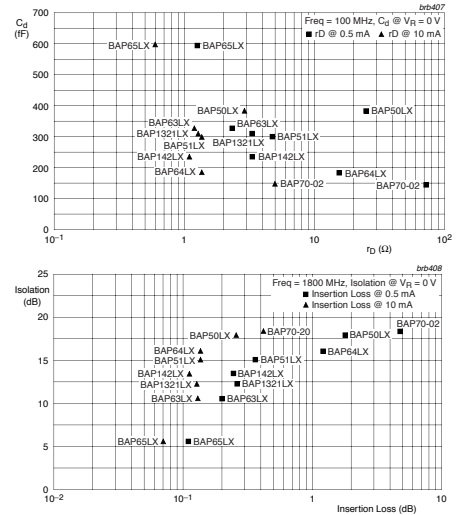
| Type           | Package | @ f = 1 MHz           |                       |                       |                       |                                             |                                             |                                             |                       |                       | r <sub>s</sub><br>typ | r <sub>s</sub><br>max | @ f = | @ C <sub>d</sub><br>= | ΔC <sub>d</sub> /<br>C <sub>d</sub> | @ V <sub>1</sub><br>= | @ V <sub>2</sub><br>= | @ N <sub>s</sub><br>= |
|----------------|---------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------|-----------------------|-------------------------------------|-----------------------|-----------------------|-----------------------|
|                |         | C <sub>d</sub><br>min | C <sub>d</sub><br>typ | C <sub>d</sub><br>max | @ V <sub>R</sub><br>= | C <sub>d1</sub> /<br>C <sub>d2</sub><br>min | C <sub>d1</sub> /<br>C <sub>d2</sub><br>typ | C <sub>d1</sub> /<br>C <sub>d2</sub><br>max | @ V <sub>1</sub><br>= | @ V <sub>2</sub><br>= |                       |                       |       |                       |                                     |                       |                       |                       |
|                |         | (pF)                  | (pF)                  | (pF)                  | (V)                   |                                             |                                             |                                             | (V)                   | (V)                   |                       |                       |       |                       |                                     |                       |                       |                       |
| Unmatched      |         |                       |                       |                       |                       |                                             |                                             |                                             |                       |                       |                       |                       |       |                       |                                     |                       |                       |                       |
| BB170          | SOD323  | 2.4                   | 2.6                   | 2.75                  | 28                    | 14.5                                        | 15                                          | -                                           | 1                     | 28                    | -                     | 0.9                   | 100   | 12                    | 2                                   | 0.5                   | 28                    | 10                    |
| BB171          | SOD323  | 2.48                  | 2.7                   | 2.89                  | 28                    | 20.6                                        | 22                                          | -                                           | 1                     | 28                    | 1                     | 1.2                   | 100   | 30                    | 2                                   | 1                     | 28                    | 10                    |
| BB172          | SOD323  | 2.361                 | 2.6                   | 2.754                 | 28                    | 13.5                                        | 15                                          | -                                           | 1                     | 28                    | 0.65                  | 0.8                   | 100   | 30                    | 2                                   | 1                     | 28                    | 10                    |
| <b>BB173</b>   | SOD523  | 2.361                 | 2.6                   | 2.754                 | 28                    | 13.5                                        | 15                                          | -                                           | 1                     | 28                    | 0.65                  | 0.8                   | 100   | 30                    | 2                                   | 1                     | 28                    | 10                    |
| <b>BB173LX</b> | SOD882D | 2.36                  | 2.6                   | 2.75                  | 28                    | 13.5                                        | 15                                          | -                                           | 1                     | 28                    | 0.7                   | -                     | 470   | 30                    | 2                                   | 1                     | 28                    | 5                     |
| <b>BB175</b>   | SOD523  | 2.48                  | 2.7                   | 2.89                  | 28                    | 20.6                                        | 22                                          | -                                           | 1                     | 28                    | 1                     | 1.2                   | 100   | 30                    | 2                                   | 1                     | 28                    | 10                    |
| BB131          | SOD323  | 0.7                   | -                     | 1.055                 | 28                    | 12                                          | -                                           | 16                                          | 0.5                   | 28                    | -                     | 3                     | 470   | 9                     | -                                   | -                     | -                     | -                     |
| BB181          | SOD523  | 0.7                   | -                     | 1.055                 | 28                    | 12                                          | -                                           | 16                                          | 0.5                   | 28                    | -                     | 3                     | 470   | 9                     | -                                   | -                     | -                     | -                     |
| BBY40          | SOT23   | 4.3                   | -                     | 6                     | 25                    | 5                                           | -                                           | 6.5                                         | 3                     | 25                    | -                     | 0.7                   | 200   | 25                    | -                                   | -                     | -                     | -                     |

## 3.2.2 PIN diodes

PIN diode selection guide on [www.nxp.com/pindiodes](http://www.nxp.com/pindiodes)  
Easy-to-use parametric filters help you choose the right PIN diode for your design.

### Why choose NXP's PIN diodes:

- Broad portfolio
- Unrivalled performance
- Short lead time
- Low series inductance
- Low insertion loss
- Low capacitance



For more information: [www.nxp.com/pindiodes](http://www.nxp.com/pindiodes)

### PIN diodes: typical r<sub>D</sub> @ 1 mA ≤ 2, switching diodes

| Type      | Package | Number of diodes | Config | V <sub>R</sub> max (V) | IF max (mA) | @ f = 100 MHz          |                        |                        |                        |                        |                        | @ f = 1 MHz             |                         |                         |                         |                         |
|-----------|---------|------------------|--------|------------------------|-------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|           |         |                  |        |                        |             | @ IF = 0.5 mA          |                        | @ IF = 1 mA            |                        | @ IF = 10 mA           |                        | @ V <sub>R</sub> = 0 V  | @ V <sub>R</sub> = 1 V  |                         | @ V <sub>R</sub> = 20 V |                         |
|           |         |                  |        |                        |             | r <sub>D</sub> typ (Ω) | r <sub>D</sub> max (Ω) | r <sub>D</sub> typ (Ω) | r <sub>D</sub> max (Ω) | r <sub>D</sub> typ (Ω) | r <sub>D</sub> max (Ω) | C <sub>d</sub> typ (pF) | C <sub>d</sub> typ (pF) | C <sub>d</sub> max (pF) | C <sub>d</sub> typ (pF) | C <sub>d</sub> max (pF) |
| BAP65LX   | SOD882D | 1                | SG     | 30                     | 100         | -                      | -                      | 0.94                   | -                      | 0.49                   | 0.9                    | 0.61                    | 0.48                    | 0.85                    | 0.37                    | -                       |
| BAP65-02  | SOD523  | 1                | SG     | 30                     | 100         | -                      | -                      | 1                      | -                      | 0.56                   | 0.9                    | 0.65                    | 0.55                    | 0.9                     | 0.375                   | -                       |
| BAP65-03  | SOD323  | 1                | SG     | 30                     | 100         | -                      | -                      | 1                      | -                      | 0.56                   | 0.9                    | 0.65                    | 0.55                    | 0.9                     | 0.375                   | -                       |
| BAP65-05  | SOT23   | 2                | CC     | 30                     | 100         | -                      | -                      | 1                      | -                      | 0.56                   | 0.9                    | 0.7                     | 0.575                   | 0.9                     | 0.425                   | -                       |
| BAP65-05W | SOT323  | 2                | CC     | 30                     | 100         | -                      | -                      | 1                      | -                      | 0.56                   | 0.9                    | 0.7                     | 0.575                   | 0.9                     | 0.425                   | -                       |
| BAP63LX   | SOD882D | 1                | SG     | 50                     | 100         | 2.3                    | 3.3                    | 1.87                   | 3                      | 1.19                   | 1.8                    | 0.34                    | 0.29                    | -                       | 0.24                    | 0.3                     |
| BAP63-02  | SOD523  | 1                | SG     | 50                     | 100         | 2.5                    | 3.5                    | 1.95                   | 3                      | 1.17                   | 1.8                    | 0.36                    | 0.32                    | -                       | 0.25                    | 0.32                    |
| BAP63-03  | SOD323  | 1                | SG     | 50                     | 100         | 2.5                    | 3.5                    | 1.95                   | 3                      | 1.17                   | 1.8                    | 0.4                     | 0.35                    | -                       | 0.27                    | 0.32                    |
| BAP63-05W | SOT323  | 2                | CC     | 50                     | 100         | 2.5                    | 3.5                    | 1.95                   | 3                      | 1.17                   | 1.8                    | 0.4                     | 0.35                    | -                       | 0.3                     | 0.35                    |

### PIN diode: selection on isolation and insertion loss in SOD882D

| Type      | ISL (isolation) |              |              | IL (Insertion loss) |           |            |             |              |           |            |             |              |           |            |             |
|-----------|-----------------|--------------|--------------|---------------------|-----------|------------|-------------|--------------|-----------|------------|-------------|--------------|-----------|------------|-------------|
|           | f = 900 MHz     | f = 1800 MHz | f = 2450 MHz | f = 900 MHz         |           |            |             | f = 1800 MHz |           |            |             | f = 2450 MHz |           |            |             |
|           | VR = 0 V        | VR = 0 V     | VR = 0 V     | IF = 0.5 mA         | IF = 1 mA | IF = 10 mA | IF = 100 mA | IF = 0.5 mA  | IF = 1 mA | IF = 10 mA | IF = 100 mA | IF = 0.5 mA  | IF = 1 mA | IF = 10 mA | IF = 100 mA |
|           |                 |              |              |                     |           |            |             |              |           |            |             |              |           |            |             |
| BAP65LX   | 10              | 5.5          | 3.9          | 0.09                | 0.06      | 0.06       | 0.05        | 0.09         | 0.07      | 0.07       | 0.06        | 0.1          | 0.08      | 0.08       | 0.07        |
| BAP63LX   | 15.9            | 10.5         | 8.3          | 0.2                 | 0.17      | 0.12       | 0.11        | 0.2          | 0.17      | 0.13       | 0.11        | 0.21         | 0.19      | 0.15       | 0.15        |
| BAP55LX   | 19              | 14           | 12           | 0.24                | 0.17      | 0.08       | 0.05        | 0.25         | 0.18      | 0.09       | 0.07        | 0.26         | 0.19      | 0.1        | 0.08        |
| BAP1321LX | 17              | 12           | 10           | 0.25                | 0.19      | 0.11       | 0.09        | 0.26         | 0.2       | 0.13       | 0.11        | 0.27         | 0.21      | 0.14       | 0.12        |
| BAP142LX  | 18              | 13           | 11           | 0.24                | 0.18      | 0.1        | 0.07        | 0.24         | 0.19      | 0.11       | 0.09        | 0.25         | 0.25      | 0.12       | 0.1         |
| BAP51LX   | 19              | 15           | 13           | 0.36                | 0.25      | 0.12       | 0.9         | 0.36         | 0.26      | 0.14       | 0.1         | 0.38         | 0.27      | 0.15       | 0.12        |
| BAP64LX   | 22              | 16           | 14           | 1.22                | 0.22      | 0.12       | 0.09        | 1.21         | 0.23      | 0.13       | 0.1         | 1.22         | 0.24      | 0.15       | 0.11        |
| BAP50LX   | 20.3            | 17.9         | 16.5         | 1.82                | 1.07      | 0.25       | -           | 1.8          | 1.06      | 0.26       | -           | 1.81         | 1.08      | 0.27       | -           |

**Bold** = highly recommended product

### PIN diodes: typical $r_D$ @ 1 mA = 2.2 - 2.4, switching diodes

| Type             | Package | Number of diodes | Config | $V_R$ max (V) | IF max (mA) | @ f = 100 MHz          |                        |                        |                        |                        |                        | @ f = 1 MHz    |                |                |                |                |
|------------------|---------|------------------|--------|---------------|-------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|----------------|----------------|----------------|----------------|----------------|
|                  |         |                  |        |               |             | @ IF = 0.5 mA          |                        | @ IF = 1 mA            |                        | @ IF = 10 mA           |                        | @ $V_R$ = 0 V  | @ $V_R$ = 1 V  |                | @ $V_R$ = 20 V |                |
|                  |         |                  |        |               |             | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $C_d$ typ (pF) | $C_d$ typ (pF) | $C_d$ max (pF) | $C_d$ typ (pF) | $C_d$ max (pF) |
| <b>BAP55LX</b>   | SOD882D | 1                | SG     | 50            | 100         | 3.3                    | 4.5                    | 2.2                    | 3.3                    | 0.8                    | 1.2                    | 0.28           | 0.23           | -              | 0.18           | 0.28           |
| BAP1321-02       | SOD523  | 1                | SG     | 60            | 100         | 3.4                    | 5                      | 2.4                    | 3.6                    | 1.2                    | 1.8                    | 0.4            | 0.35           | 0.45           | 0.25           | 0.32           |
| BAP1321-03       | SOD323  | 1                | SG     | 60            | 100         | 3.4                    | 5                      | 2.4                    | 3.6                    | 1.2                    | 1.8                    | 0.4            | 0.35           | 0.45           | 0.25           | 0.32           |
| BAP1321-04       | SOT23   | 2                | SR     | 60            | 100         | 3.4                    | 5                      | 2.4                    | 3.6                    | 1.2                    | 1.8                    | 0.42           | 0.375          | 0.45           | 0.275          | 0.325          |
| <b>BAP1321LX</b> | SOD882D | 1                | SG     | 60            | 100         | 3.3                    | 5                      | 2.4                    | 3.6                    | 1.2                    | 1.8                    | 0.32           | 0.27           | 0.38           | 0.21           | 0.28           |
| <b>BAP142LX</b>  | SOD882D | 1                | SG     | 50            | 100         | 3.3                    | 5                      | 2.4                    | 3.6                    | 1                      | 1.8                    | 0.25           | 0.22           | -              | 0.16           | 0.26           |

### PIN diodes: typical $r_D$ @ 1 mA = 3.2 - 3.6, switching diodes

| Type           | Package | Number of diodes | Config | $V_R$ max (V) | IF max (mA) | @ f = 100 MHz          |                        |                        |                        |                        |                        | @ f = 1 MHz    |                |                |                |                |
|----------------|---------|------------------|--------|---------------|-------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|----------------|----------------|----------------|----------------|----------------|
|                |         |                  |        |               |             | @ IF = 0.5 mA          |                        | @ IF = 1 mA            |                        | @ IF = 10 mA           |                        | @ $V_R$ = 0 V  | @ $V_R$ = 1 V  |                | @ $V_R$ = 20 V |                |
|                |         |                  |        |               |             | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $C_d$ typ (pF) | $C_d$ typ (pF) | $C_d$ max (pF) | $C_d$ typ (pF) | $C_d$ max (pF) |
| <b>BAP51LX</b> | SOD882D | 1                | SG     | 60            | 100         | 4.9                    | 9                      | 3.2                    | 6.5                    | 1.4                    | 2.5                    | 0.3            | 0.22           | 0.4            | 0.17           | 0.3            |
| BAP51-02       | SOD523  | 1                | SG     | 60            | 50          | 5.5                    | 9                      | 3.6                    | 6.5                    | 1.5                    | 2.5                    | 0.4            | 0.3            | 0.55           | 0.2            | 0.35           |
| BAP51-03       | SOD323  | 1                | SG     | 50            | 50          | 5.5                    | 9                      | 3.6                    | 6.5                    | 1.5                    | 2.5                    | 0.4            | 0.3            | 0.55           | 0.2            | 0.35           |
| BAP51-04W      | SOT323  | 2                | SR     | 50            | 50          | 5.5                    | 9                      | 3.6                    | 6.5                    | 1.5                    | 2.5                    | 0.4            | 0.3            | 0.55           | 0.2            | 0.35           |
| BAP51-05W      | SOT323  | 2                | CC     | 50            | 50          | 5.5                    | 9                      | 3.6                    | 6.5                    | 1.5                    | 2.5                    | 0.4            | 0.3            | 0.55           | 0.2            | 0.35           |
| BAP51-06W      | SOT323  | 2                | CA     | 50            | 50          | 5.5                    | -                      | 3.6                    | -                      | 2                      | -                      | 0.4            | 0.3            | -              | 0.2            | -              |

### PIN diodes: typical $r_D$ @ 1 mA = 10, attenuator/switching diodes

| Type            | Package | Number of diodes | Config | $V_R$ max (V) | IF max (mA) | @ f = 100 MHz          |                        |                        |                        |                        |                        | @ f = 1 MHz    |                |                |                |                |
|-----------------|---------|------------------|--------|---------------|-------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|----------------|----------------|----------------|----------------|----------------|
|                 |         |                  |        |               |             | @ IF = 0.5 mA          |                        | @ IF = 1 mA            |                        | @ IF = 10 mA           |                        | @ $V_R$ = 0 V  | @ $V_R$ = 1 V  |                | @ $V_R$ = 20 V |                |
|                 |         |                  |        |               |             | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $C_d$ typ (pF) | $C_d$ typ (pF) | $C_d$ max (pF) | $C_d$ typ (pF) | $C_d$ max (pF) |
| <b>BAP64Q</b>   | SOT753  | 4                | SR     | 100           | 100         | 20                     | 40                     | 10                     | 20                     | 2                      | 3.8                    | 0.52           | 0.37           | -              | 0.23           | 0.35           |
| BAP64-02        | SOD523  | 1                | SG     | 175           | 100         | 20                     | 40                     | 10                     | 20                     | 2                      | 3.8                    | 0.48           | 0.35           | -              | 0.23           | 0.35           |
| BAP64-03        | SOD323  | 1                | SG     | 175           | 100         | 20                     | 40                     | 10                     | 20                     | 2                      | 3.8                    | 0.48           | 0.35           | -              | 0.23           | 0.35           |
| BAP64-04        | SOT23   | 2                | SR     | 175           | 100         | 20                     | 40                     | 10                     | 20                     | 2                      | 3.8                    | 0.52           | 0.37           | -              | 0.23           | 0.35           |
| BAP64-04W       | SOT323  | 2                | SR     | 100           | 100         | 20                     | 40                     | 10                     | 20                     | 2                      | 3.8                    | 0.52           | 0.37           | -              | 0.23           | 0.35           |
| BAP64-05        | SOT23   | 2                | CC     | 175           | 100         | 20                     | 40                     | 10                     | 20                     | 2                      | 3.8                    | 0.52           | 0.37           | -              | 0.23           | 0.35           |
| BAP64-05W       | SOT323  | 2                | CC     | 100           | 100         | 20                     | 40                     | 10                     | 20                     | 2                      | 3.8                    | 0.52           | 0.37           | -              | 0.23           | 0.35           |
| BAP64-06        | SOT23   | 2                | CA     | 175           | 100         | 20                     | 40                     | 10                     | 20                     | 2                      | 3.8                    | 0.52           | 0.37           | -              | 0.23           | 0.35           |
| BAP64-06W       | SOT323  | 2                | CA     | 100           | 100         | 20                     | 40                     | 10                     | 20                     | 2                      | 3.8                    | 0.52           | 0.37           | -              | 0.23           | 0.35           |
| <b>BAP64LX^</b> | SOD882D | 1                | SG     | 60            | 100         | 31                     | 50                     | 16                     | 26                     | 2.6                    | 4.4                    | 0.48           | 0.34           | -              | 0.17*          | 0.3*           |

^ = attenuator / switching diode      \* = @  $V_R$  = 20 V

### PIN diodes: typical $r_D$ @ 1 mA = 14 - 16, attenuator diodes

| Type           | Package | Number of diodes | Config | $V_R$ max (V) | IF max (mA) | @ f = 100 MHz          |                        |                        |                        |                        |                        | @ f = 1 MHz    |                |                |                |                |
|----------------|---------|------------------|--------|---------------|-------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|----------------|----------------|----------------|----------------|----------------|
|                |         |                  |        |               |             | @ IF = 0.5 mA          |                        | @ IF = 1 mA            |                        | @ IF = 10 mA           |                        | @ $V_R$ = 0 V  | @ $V_R$ = 1 V  |                | @ $V_R$ = 5 V  |                |
|                |         |                  |        |               |             | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $C_d$ typ (pF) | $C_d$ typ (pF) | $C_d$ max (pF) | $C_d$ typ (pF) | $C_d$ max (pF) |
| BAP50-02       | SOD523  | 1                | SG     | 50            | 50          | 25                     | 40                     | 14                     | 25                     | 3                      | 5                      | 0.4            | 0.3            | 0.55           | 0.22           | 0.35           |
| BAP50-03       | SOD323  | 1                | SG     | 50            | 50          | 25                     | 40                     | 14                     | 25                     | 3                      | 5                      | 0.4            | 0.3            | 0.55           | 0.2            | 0.35           |
| BAP50-04       | SOT23   | 2                | SR     | 50            | 50          | 25                     | 40                     | 14                     | 25                     | 3                      | 5                      | 0.45           | 0.35           | 0.6            | 0.3            | 0.5            |
| BAP50-04W      | SOT323  | 2                | SR     | 50            | 50          | 25                     | 40                     | 14                     | 25                     | 3                      | 5                      | 0.45           | 0.35           | 0.6            | 0.3            | 0.5            |
| BAP50-05       | SOT23   | 2                | CC     | 50            | 50          | 25                     | 40                     | 14                     | 25                     | 3                      | 5                      | 0.45           | 0.3            | 0.5            | 0.35           | 0.6            |
| BAP50-05W      | SOT323  | 2                | CC     | 50            | 50          | 25                     | 40                     | 14                     | 25                     | 3                      | 5                      | 0.45           | 0.35           | 0.6            | 0.3            | 0.5            |
| <b>BAP50LX</b> | SOD882D | 1                | SG     | 50            | 50          | 26                     | 40                     | 14                     | 25                     | 3                      | 5                      | 0.4            | 0.28           | 0.55           | 0.19           | 0.35           |

### PIN diodes: typical $r_D$ @ 1 mA = 40, attenuator diodes

| Type            | Package | Number of diodes | Config | $V_R$ max (V) | IF max (mA) | @ f = 100 MHz          |                        |                        |                        |                        |                        | @ f = 1 MHz    |                |                |                |                |
|-----------------|---------|------------------|--------|---------------|-------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|----------------|----------------|----------------|----------------|----------------|
|                 |         |                  |        |               |             | @ IF = 0.5 mA          |                        | @ IF = 1 mA            |                        | @ IF = 10 mA           |                        | @ $V_R$ = 0 V  | @ $V_R$ = 1 V  |                | @ $V_R$ = 20 V |                |
|                 |         |                  |        |               |             | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $r_D$ typ ( $\Omega$ ) | $r_D$ max ( $\Omega$ ) | $C_d$ typ (pF) | $C_d$ typ (pF) | $C_d$ max (pF) | $C_d$ max (pF) | $C_d$ typ (pF) |
| <b>BAP70Q</b>   | SOT753  | 4                | SR     | 50            | 100         | 77                     | 100                    | 40                     | 50                     | 5.4                    | 7                      | 0.6            | 0.43           | -              | 0.25           | 0.3            |
| <b>BAP70-02</b> | SOD523  | 1                | SG     | 50            | 100         | 77                     | 100                    | 40                     | 50                     | 5.4                    | 7                      | 0.57           | 0.4            | -              | 0.2            | 0.25           |
| <b>BAP70-03</b> | SOD323  | 1                | SG     | 50            | 100         | 77                     | 100                    | 40                     | 50                     | 5.4                    | 7                      | 0.57           | 0.4            | -              | 0.2            | 0.25           |
| BAP70-04W       | SOT323  | 2                | SR     | 50            | 100         | 77                     | 100                    | 40                     | 50                     | 5.4                    | 7                      | 0.6            | 0.43           | -              | 0.25           | 0.3            |
| BAP70-05        | SOT23   | 2                | CC     | 50            | 100         | 77                     | 100                    | 40                     | 50                     | 5.4                    | 7                      | 0.6            | 0.43           | -              | 0.25           | 0.3            |
| <b>BAP70AM</b>  | SOT363  | 4                | SR     | 50            | 100         | 77                     | 100                    | 40                     | 50                     | 5.4                    | 7                      | 0.57           | 0.4            | -              | 0.2            | 0.25           |

**Bold** = highly recommended product

SG = single  
SR = series

CC = common cathode  
CA = common anode

### 3.2.3 Band-switch diodes

#### Why choose NXP's band-switch diodes:

- ▶ Reliable volume supplier
- ▶ Short lead time
- ▶ Low series inductance
- ▶ Low insertion loss
- ▶ Low capacitance
- ▶ High reverse isolation

| Type  | Package | $V_R$ max (V) | $I_F$ max (mA) | $r_D$ max ( $\Omega$ ) | @ $I_F$ = (mA) | @ $f$ = (MHz) | $C_j$ max (pF) | @ $V_R$ = (V) | @ $f$ = (MHz) |
|-------|---------|---------------|----------------|------------------------|----------------|---------------|----------------|---------------|---------------|
| BA591 | SOD323  | 35            | 100            | 0.7                    | 3              | 100           | 0.9            | 3             | 1             |
| BA891 | SOD523  | 35            | 100            | 0.7                    | 3              | 100           | 0.9            | 3             | 1             |
| BAT18 | SOT23   | 35            | 100            | 0.7                    | 5              | 200           | 1              | 20            | 1             |

### 3.2.4 Schottky diodes

Schottky diode selection guide on [www.nxp.com/rfschottkydiodes](http://www.nxp.com/rfschottkydiodes)  
Easy-to-use parametric filters help you choose the right Schottky diode for your design.

#### Why choose NXP's Schottky diodes:

- ▶ Low diode capacitance
- ▶ Low forward voltage
- ▶ Single- and triple-isolated diode
- ▶ Small package

#### Applications

- ▶ Digital applications:
  - Ultra high-speed switching
  - Clamping circuits
- ▶ RF applications:
  - Diode ring mixer
  - RF detector
  - RF voltage doubler

#### Low-capacitance Schottky diodes

| Type      | Package | Configuration   | $V_R$ max. (V) | $I_F$ max. (mA) | $V_F$ max. (mV)    | $C_D$ max. (pF) |
|-----------|---------|-----------------|----------------|-----------------|--------------------|-----------------|
| BAT17     | SOT23   | Single          | 4              | 30              | 450 @ $I_F$ = 1 mA | 1 @ $V_R$ = 0 V |
| PMBD353   | SOT23   | Dual-series     | 4              | 30              | 450 @ $I_F$ = 1 mA | 1 @ $V_R$ = 0 V |
| PMBD354^  | SOT23   | Dual-series     | 4              | 30              | 450 @ $I_F$ = 1 mA | 1 @ $V_R$ = 0 V |
| 1PS76SB17 | SOD323  | Single          | 4              | 30              | 450 @ $I_F$ = 1 mA | 1 @ $V_R$ = 0 V |
| 1PS66SB17 | SOT666  | Triple-isolated | 4              | 30              | 450 @ $I_F$ = 1 mA | 1 @ $V_R$ = 0 V |
| 1PS79SB17 | SOD523  | Single          | 4              | 30              | 450 @ $I_F$ = 1 mA | 1 @ $V_R$ = 0 V |
| 1PS88SB82 | SOT363  | Triple-isolated | 15             | 30              | 340 @ $I_F$ = 1 mA | 1 @ $V_R$ = 0 V |
| 1PS70SB82 | SOT323  | Single          | 15             | 30              | 340 @ $I_F$ = 1 mA | 1 @ $V_R$ = 0 V |
| 1PS70SB84 | SOT323  | Dual-series     | 15             | 30              | 340 @ $I_F$ = 1 mA | 1 @ $V_R$ = 0 V |
| 1PS70SB85 | SOT323  | Dual c.c.       | 15             | 30              | 340 @ $I_F$ = 1 mA | 1 @ $V_R$ = 0 V |
| 1PS70SB86 | SOT323  | Dual c.a.       | 15             | 30              | 340 @ $I_F$ = 1 mA | 1 @ $V_R$ = 0 V |
| 1PS66SB82 | SOT666  | Triple-isolated | 15             | 30              | 340 @ $I_F$ = 1 mA | 1 @ $V_R$ = 0 V |
| 1PS10SB82 | SOD882  | Single          | 15             | 30              | 340 @ $I_F$ = 1 mA | 1 @ $V_R$ = 0 V |

**Bold** = highly recommended product

^ Diodes have matched capacitance

3.3 RF bipolar transistors

3.3.1 Wideband transistors

RF wideband transistor selection guide on [www.nxp.com/rftransistors](http://www.nxp.com/rftransistors)  
Easy-to-use parametric filters help you choose the right RF wideband transistor for your design.

Why choose NXP’s wideband transistors:

- ▶ Broad portfolio (1<sup>st</sup> - 7<sup>th</sup> generation)
- ▶ Short lead time
- ▶ Smallest packages
- ▶ Volume delivery

Wideband transistors

The  $f_T$ - $I_C$  curve represents transition frequency ( $f_T$ ) characteristics as a function of collector current ( $I_C$ ) for the seven generations of RF wideband transistors. A group of transistors having the same  $I_C$  and similar  $f_T$  represents a curve. The curve number matches the products in the selection tables of this section (third column of each table), detailing their RF characteristics.

Wideband transistor line-ups per frequency

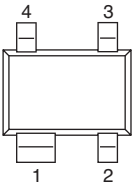
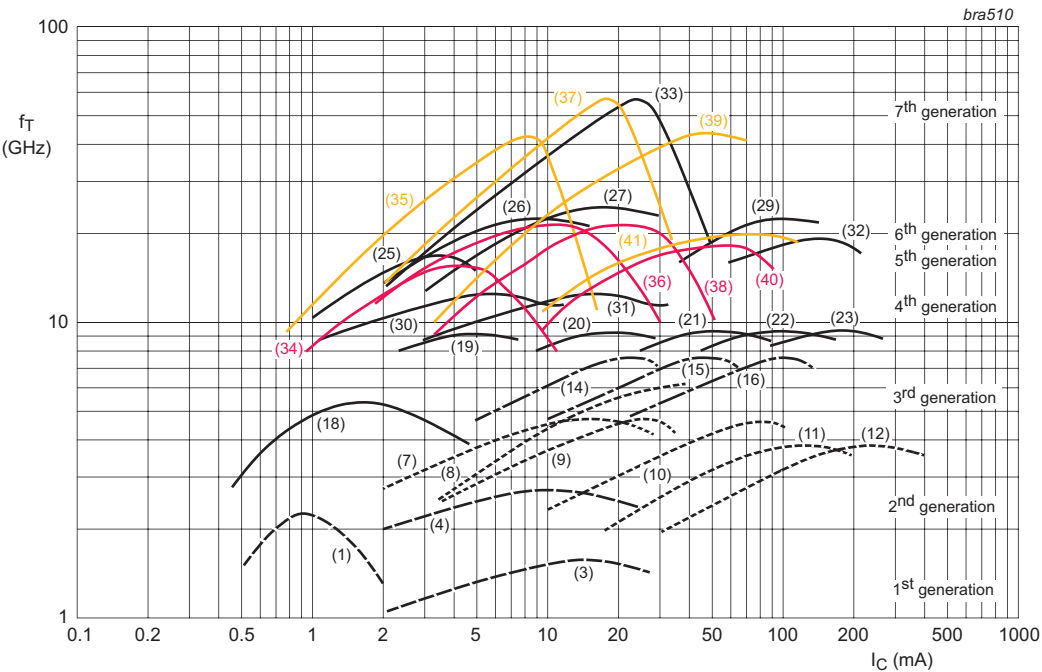


Figure 1

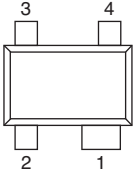


Figure 2

| Pin                | Description |
|--------------------|-------------|
| Type (Figure 1)    |             |
| 1                  | Collector   |
| 2                  | Base        |
| 3                  | Emitter     |
| 4                  | Emitter     |
| Type/X (Figure 1)  |             |
| 1                  | Collector   |
| 2                  | Emitter     |
| 3                  | Base        |
| 4                  | Emitter     |
| Type/XR (Figure 2) |             |
| 1                  | Collector   |
| 2                  | Emitter     |
| 3                  | Base        |
| 4                  | Emitter     |

## Wideband transistors

| Function        | LNAs, mixers, frequency multipliers, buffers |            |             | High-linearity, high-output amplifiers and drivers |            |             | Oscillators |            |             |
|-----------------|----------------------------------------------|------------|-------------|----------------------------------------------------|------------|-------------|-------------|------------|-------------|
| Frequency range | <6 GHz                                       | 6 – 12 GHz | 12 – 18 GHz | <6 GHz                                             | 6 – 12 GHz | 12 – 18 GHz | <6 GHz      | 6 – 12 GHz | 12 – 18 GHz |
| Band            | L, S, C                                      | X, Ku low  | Ku high, Ka | L, S, C                                            | X, Ku low  | Ku high     | L, S, C     | X, Ku low  | Ku high, Ka |
| Type            |                                              |            |             |                                                    |            |             |             |            |             |
| BFU610F         | •                                            | •          |             |                                                    |            |             |             |            | •           |
| BFU630F         | •                                            | •          |             | •                                                  |            |             | •           |            | •           |
| BFU660F         | •                                            |            |             | •                                                  |            |             | •           | •          |             |
| BFU690F         | •                                            |            |             | •                                                  |            |             | •           | •          |             |
| BFU725F/N1      | •                                            | •          | •           | •                                                  | •          |             | •           |            | •           |
| BFU710F         | •                                            | •          | •           |                                                    |            |             |             |            | •           |
| BFU730F         | •                                            | •          | •           | •                                                  | •          | •           | •           |            | •           |
| BFU760F         | •                                            | •          |             | •                                                  | •          |             | •           |            |             |
| BFU790F         | •                                            |            |             | •                                                  |            |             | •           |            |             |

Red = application note available on NXP.com

## RF power transistors for portable equipment (VHF)

| Type     | Package | V <sub>CEO</sub> (max) (V) | I <sub>C</sub> (max) (mA) | P <sub>tot</sub> (max) (mW) | Polarity | GUM (typ) (dB) | @ f = (MHz) | @ I <sub>C</sub> = (mA) | @ V <sub>CE</sub> = (V) |
|----------|---------|----------------------------|---------------------------|-----------------------------|----------|----------------|-------------|-------------------------|-------------------------|
| BFG10    | SOT143  | 8                          | 250                       | 400                         | NPN      | 7              | 1900        | 1                       | 3.6                     |
| BFG10/X  | SOT143  | 8                          | 250                       | 400                         | NPN      | 7              | 1900        | 1                       | 3.6                     |
| BFG10W/X | SOT343  | 10                         | 250                       | 400                         | NPN      | 7              | 1900        | 1                       | 3.6                     |
| BLT50    | SOT223  | 10                         | 500                       | 2000                        | NPN      | -              | -           | -                       | -                       |
| BLT70    | SOT223H | 8                          | 250                       | 2100                        | NPN      | -              | -           | -                       | -                       |
| BLT80    | SOT223  | 10                         | 250                       | 2000                        | NPN      | -              | -           | -                       | -                       |
| BLT81    | SOT223  | 9.5                        | 500                       | 2000                        | NPN      | -              | -           | -                       | -                       |

## RF wideband transistors generations 1 to 3

| Type            | Generation | Curve | Package | f <sub>r</sub> (typ) (GHz) | V <sub>CEO</sub> (max) (V) | I <sub>C</sub> (max) (mA) | P <sub>tot</sub> (max) (mW) | Polarity | GUM (typ) (dB) | @ f = (MHz) | @ I <sub>C</sub> = (mA) | @ V <sub>CE</sub> = (V) | GUM (typ) (dB) | @ f = (MHz) | @ I <sub>C</sub> = (mA) | @ V <sub>CE</sub> = (V) | NF (typ) (dB) | @ f = (MHz) | @ I <sub>C</sub> = (mA) | @ V <sub>CE</sub> = (V) | NF (typ) (dB) | @ f = (MHz) | @ I <sub>C</sub> = (mA) | @ V <sub>CE</sub> = (V) |
|-----------------|------------|-------|---------|----------------------------|----------------------------|---------------------------|-----------------------------|----------|----------------|-------------|-------------------------|-------------------------|----------------|-------------|-------------------------|-------------------------|---------------|-------------|-------------------------|-------------------------|---------------|-------------|-------------------------|-------------------------|
| BFS17           | 1          | 3     | SOT23   | 1                          | 15                         | 25                        | 300                         | NPN      | -              | -           | -                       | -                       | -              | -           | -                       | -                       | 4.5           | 500         | 2                       | 5                       | -             | -           | -                       | -                       |
| <b>BFS17W</b>   | 1          | 3     | SOT323  | 1.6                        | 15                         | 50                        | 300                         | NPN      | -              | -           | -                       | -                       | -              | -           | -                       | -                       | 4.5           | 500         | 2                       | 5                       | -             | -           | -                       | -                       |
| BFT25           | 1          | 1     | SOT23   | 2.3                        | 5                          | 6.5                       | 30                          | NPN      | 18             | 500         | 1                       | 1                       | 12             | 800         | 1                       | 1                       | 3.8           | 500         | 1                       | 1                       | -             | -           | -                       | -                       |
| BFG25A/X        | 2          | 18    | SOT143B | 5                          | 5                          | 6.5                       | 32                          | NPN      | -              | -           | -                       | -                       | 18             | 1000        | 0.5                     | 1                       | 1.8           | 1000        | 0.5                     | 1                       | -             | -           | -                       | -                       |
| BFG25AW         | 2          | 18    | SOT343N | 5                          | 5                          | 6.5                       | 500                         | NPN      | -              | -           | -                       | -                       | 16             | 2000        | 0.5                     | 1                       | 2             | 1000        | 1                       | 1                       | -             | -           | -                       | -                       |
| BFG25AW/X       | 2          | 18    | SOT343N | 5                          | 5                          | 6.5                       | 500                         | NPN      | 16             | 1000        | 0.5                     | 1                       | 8              | 2000        | 0.5                     | 1                       | 2             | 1000        | 1                       | 1                       | -             | -           | -                       | -                       |
| BFG31           | 2          | 10    | SOT223  | 5                          | -15                        | -100                      | 1000                        | PNP      | 16             | 500         | -70                     | -10                     | 12             | 800         | -70                     | -10                     | -             | -           | -                       | -                       | -             | -           | -                       | -                       |
| BFG35           | 2          | 11    | SOT223  | 4                          | 18                         | 150                       | 1000                        | NPN      | 15             | 500         | 100                     | 10                      | 11             | 800         | 100                     | 10                      | -             | -           | -                       | -                       | -             | -           | -                       | -                       |
| BFG92A/X        | 2          | 7     | SOT143B | 5                          | 15                         | 25                        | 400                         | NPN      | 16             | 1000        | 15                      | 10                      | 11             | 2000        | 15                      | 10                      | 2             | 1000        | 5                       | 10                      | 3             | 2000        | 5                       | 10                      |
| BFG97           | 2          | 10    | SOT223  | 5.5                        | 15                         | 100                       | 1000                        | NPN      | 16             | 500         | 70                      | 10                      | 12             | 800         | 70                      | 10                      | -             | -           | -                       | -                       | -             | -           | -                       | -                       |
| BFQ149          | 2          | 10    | SOT89   | 5                          | -15                        | -100                      | 1000                        | PNP      | 12             | 500         | -50                     | -10                     | -              | -           | -                       | -                       | 3.75          | 500         | -50                     | -10                     | -             | -           | -                       | -                       |
| BFQ18A          | 2          | 11    | SOT89   | 4                          | 18                         | 150                       | 1000                        | NPN      | -              | -           | -                       | -                       | -              | -           | -                       | -                       | -             | -           | -                       | -                       | -             | -           | -                       | -                       |
| BFQ19           | 2          | 10    | SOT89   | 5.5                        | 15                         | 100                       | 1000                        | NPN      | 11.5           | 500         | 50                      | 10                      | 7.5            | 800         | 50                      | 10                      | 3.3           | 500         | 50                      | 10                      | -             | -           | -                       | -                       |
| BFR106          | 2          | 10    | SOT23   | 5                          | 15                         | 100                       | 500                         | NPN      | -              | -           | -                       | -                       | 11.5           | 800         | 30                      | 6                       | 3.5           | 800         | 30                      | 6                       | -             | -           | -                       | -                       |
| BFR92A          | 2          | 7     | SOT23   | 5                          | 15                         | 25                        | 300                         | NPN      | 14             | 1000        | 15                      | 10                      | 8              | 2000        | 15                      | 10                      | 3             | 2000        | 5                       | 10                      | 2.1           | 1000        | 5                       | 10                      |
| <b>BFR92AW</b>  | 2          | 7     | SOT323  | 5                          | 15                         | 25                        | 300                         | NPN      | 14             | 1000        | 15                      | 10                      | 8              | 2000        | 15                      | 10                      | 2             | 1000        | 5                       | 10                      | 3             | 2000        | 5                       | 10                      |
| BFS17A          | 2          | 4     | SOT23   | 2.8                        | 15                         | 25                        | 300                         | NPN      | -              | -           | -                       | -                       | 13.5           | 800         | 14                      | 10                      | 2.5           | 800         | 2                       | 5                       | -             | -           | -                       | -                       |
| BFS25A          | 2          | 18    | SOT323  | 5                          | 5                          | 6.5                       | 32                          | NPN      | -              | -           | -                       | -                       | 13             | 1000        | 0.5                     | 1                       | 1.8           | 1000        | 1                       | 1                       | -             | -           | -                       | -                       |
| BFT25A          | 2          | 18    | SOT23   | 5                          | 5                          | 6.5                       | 32                          | NPN      | -              | -           | -                       | -                       | 15             | 1000        | 0.5                     | 1                       | 1.8           | 1000        | 0.5                     | 1                       | -             | -           | -                       | -                       |
| BFT92           | 2          | 7     | SOT23   | 5                          | -15                        | -25                       | 300                         | PNP      | 18             | 500         | -14                     | -10                     | -              | -           | -                       | -                       | 2.5           | 500         | -5                      | -10                     | -             | -           | -                       | -                       |
| BFT92W          | 2          | 7     | SOT323  | 4                          | -15                        | -35                       | 300                         | PNP      | 17             | 500         | -15                     | -10                     | 11             | 1000        | -15                     | -10                     | 2.5           | 500         | -5                      | -10                     | 3             | 1000        | -5                      | -10                     |
| BFT93           | 2          | 9     | SOT23   | 5                          | -12                        | -35                       | 300                         | PNP      | 16.5           | 500         | -30                     | -5                      | -              | -           | -                       | -                       | 2.4           | 500         | -10                     | -5                      | -             | -           | -                       | -                       |
| BFT93W          | 2          | 9     | SOT323  | 4                          | -12                        | -50                       | 300                         | PNP      | 15.5           | 500         | -30                     | -5                      | 10             | 1000        | -30                     | -5                      | 2.4           | 500         | -10                     | -5                      | 3             | 1000        | -10                     | -5                      |
| BFG135          | 3          | 16    | SOT223  | 7                          | 15                         | 150                       | 1000                        | NPN      | 16             | 500         | 100                     | 10                      | 12             | 800         | 100                     | 10                      | -             | -           | -                       | -                       | -             | -           | -                       | -                       |
| BFG198          | 3          | 15    | SOT223  | 8                          | 10                         | 100                       | 1000                        | NPN      | 18             | 500         | 50                      | 8                       | 15             | 800         | 50                      | 8                       | -             | -           | -                       | -                       | -             | -           | -                       | -                       |
| BFG590          | 3          | 22    | SOT143B | 5                          | 15                         | 200                       | 400                         | NPN      | 13             | 900         | 80                      | 4                       | 7.5            | 2000        | 80                      | 4                       | -             | -           | -                       | -                       | -             | -           | -                       | -                       |
| BFG590/X        | 3          | 22    | SOT143B | 5                          | 15                         | 200                       | 400                         | NPN      | 13             | 900         | 80                      | 4                       | 7.5            | 2000        | 80                      | 4                       | -             | -           | -                       | -                       | -             | -           | -                       | -                       |
| BFG591          | 3          | 22    | SOT223  | 7                          | 15                         | 200                       | 2000                        | NPN      | 13             | 900         | 70                      | 12                      | 7.5            | 2000        | 70                      | 12                      | -             | -           | -                       | -                       | -             | -           | -                       | -                       |
| BFG67           | 3          | 14    | SOT143B | 8                          | 10                         | 50                        | 380                         | NPN      | 17             | 1000        | 15                      | 8                       | 10             | 2000        | 15                      | 8                       | 1.7           | 1000        | 15                      | 8                       | 2.5           | 2000        | 5                       | 8                       |
| BFG67/X         | 3          | 14    | SOT143B | 8                          | 10                         | 50                        | 380                         | NPN      | 17             | 1000        | 15                      | 8                       | 10             | 2000        | 15                      | 8                       | 1.7           | 1000        | 15                      | 8                       | 2.5           | 2000        | 5                       | 8                       |
| BFG93A          | 3          | 8     | SOT143B | 6                          | 12                         | 35                        | 300                         | NPN      | 16             | 1000        | 30                      | 8                       | 10             | 2000        | 30                      | 8                       | 1.7           | 1000        | 5                       | 8                       | 2.3           | 2000        | 5                       | 8                       |
| BFG93A/X        | 3          | 8     | SOT143B | 6                          | 12                         | 35                        | 300                         | NPN      | 16             | 1000        | 30                      | 8                       | 10             | 2000        | 30                      | 8                       | 1.7           | 1000        | 5                       | 8                       | 2.3           | 2000        | 5                       | 8                       |
| BFG94           | 3          | 8     | SOT223  | 6                          | 12                         | 60                        | 700                         | NPN      | -              | -           | -                       | -                       | 13.5           | 1000        | 45                      | 10                      | 2.7           | 500         | 45                      | 10                      | 3             | 1000        | 45                      | 10                      |
| BFQ591          | 3          | 22    | SOT89   | 7                          | 15                         | 200                       | 2250                        | NPN      | 11             | 900         | 70                      | 12                      | 5.5            | 2000        | 70                      | 12                      | -             | -           | -                       | -                       | -             | -           | -                       | -                       |
| BFQ67W          | 3          | 14    | SOT323  | 8                          | 10                         | 50                        | 300                         | NPN      | 13             | 1000        | 15                      | 8                       | 8              | 2000        | 15                      | 8                       | 1.3           | 1000        | 5                       | 8                       | 2.7           | 2000        | 15                      | 8                       |
| BFR93A          | 3          | 8     | SOT23   | 6                          | 12                         | 35                        | 300                         | NPN      | 13             | 1000        | 30                      | 8                       | 7              | 2000        | 30                      | 8                       | 1.9           | 1000        | 5                       | 8                       | 3             | 2000        | 5                       | 8                       |
| <b>BFR94A^</b>  | 3          | 8     | SOT23   | 6                          | 15                         | 25                        | 300                         | NPN      | 14             | 1000        | 15                      | 10                      | 8              | 2000        | 15                      | 10                      | 2.1           | 1000        | 5                       | 10                      | 3             | 2000        | 10                      | 8                       |
| BFR93AR         | 3          | 8     | SOT23   | 6                          | 12                         | 35                        | 300                         | NPN      | 13             | 1000        | 30                      | 8                       | 7              | 2000        | 30                      | 8                       | 1.9           | 1000        | 5                       | 8                       | 3             | 2000        | 5                       | 8                       |
| <b>BFR93AW</b>  | 3          | 8     | SOT323  | 5                          | 12                         | 35                        | 300                         | NPN      | 13             | 1000        | 30                      | 8                       | 8              | 2000        | 30                      | 8                       | 1.5           | 1000        | 5                       | 8                       | 2.1           | 2000        | 5                       | 8                       |
| <b>BFR94AW^</b> | 3          | 8     | SOT323  | 5                          | 15                         | 25                        | 300                         | NPN      | 14             | 1000        | 15                      | 10                      | 8              | 2000        | 15                      | 10                      | 2.0           | 1000        | 5                       | 10                      | 3             | 2000        | 10                      | 8                       |

**Bold** = highly recommended product ^ AEC-Q101 qualified (some limitations apply)

## RF wideband transistors generations 4 and 4.5

| Type              | Generation | Curve | Package | $f_t$ (typ) (GHz) | $V_{CE0}$ (max) (V) | $I_C$ (max) (mA) | $P_{tot}$ (max) (mW) | Polarity | GUM (typ) (dB) | @ $f =$ (MHz) | @ $I_C =$ (mA) | @ $V_{CE} =$ (V) | NF (typ) (dB) | @ $f =$ (MHz) | @ $I_C =$ (mA) | @ $V_{CE} =$ (V) | NF (typ) (dB) | @ $f =$ (MHz) | @ $I_C =$ (mA) | @ $V_{CE} =$ (V) | $PL_1$ (dB) (typ) (dBmW) | @ $V_{CE} =$ (V) | @ $f =$ (MHz) | @ $I_C =$ (mA) | IP3 (typ) (dBm) | @ $I_C =$ (mA) | @ $V_{CE} =$ (V) |
|-------------------|------------|-------|---------|-------------------|---------------------|------------------|----------------------|----------|----------------|---------------|----------------|------------------|---------------|---------------|----------------|------------------|---------------|---------------|----------------|------------------|--------------------------|------------------|---------------|----------------|-----------------|----------------|------------------|
| BFG505            | 4          | 19    | SOT143B | 9                 | 15                  | 18               | 150                  | NPN      | 13             | 2000          | 5              | 6                | 1.6           | 900           | 5              | 6                | 1.9           | 2000          | 1.25           | 6                | 4                        | 6                | 900           | 5              | 10              | 5              | 6                |
| BFG505/X          | 4          | 19    | SOT143B | 9                 | 15                  | 18               | 150                  | NPN      | 13             | 2000          | 5              | 6                | 1.6           | 900           | 5              | 6                | 1.9           | 2000          | 1.25           | 6                | 4                        | 6                | 900           | 5              | 10              | 5              | 6                |
| BFG505W           | 4          | 19    | SOT343N | 9                 | 15                  | 18               | 500                  | NPN      | 12             | 2000          | 5              | 6                | 1.6           | 900           | 5              | 6                | 1.9           | 2000          | 1.25           | 6                | 4                        | 6                | 900           | 5              | 10              | 5              | 6                |
| BFG505W/X         | 4          | 19    | SOT343N | 9                 | 15                  | 18               | 500                  | NPN      | 12             | 2000          | 5              | 6                | 1.6           | 900           | 5              | 6                | 1.9           | 2000          | 1.25           | 6                | 4                        | 6                | 900           | 5              | 10              | 5              | 6                |
| BFG505W/XR        | 4          | 19    | SOT343R | 9                 | 15                  | 18               | 500                  | NPN      | 12             | 2000          | 5              | 6                | 1.6           | 900           | 5              | 6                | 1.9           | 2000          | 1.25           | 6                | 4                        | 6                | 900           | 5              | 10              | 5              | 6                |
| BFG520            | 4          | 20    | SOT143B | 9                 | 15                  | 70               | 300                  | NPN      | 13             | 2000          | 20             | 6                | 1.6           | 900           | 20             | 6                | 1.9           | 2000          | 5              | 6                | 17                       | 6                | 900           | 20             | 26              | 20             | 6                |
| <b>BFG520/X</b>   | 4          | 20    | SOT143B | 9                 | 15                  | 70               | 300                  | NPN      | 13             | 2000          | 20             | 6                | 1.6           | 900           | 20             | 6                | 1.9           | 2000          | 5              | 6                | 17                       | 6                | 900           | 20             | 26              | 20             | 6                |
| BFG520/XR         | 4          | 20    | SOT143R | 9                 | 15                  | 70               | 300                  | NPN      | 13             | 2000          | 20             | 6                | 1.6           | 900           | 20             | 6                | 1.9           | 2000          | 5              | 6                | 17                       | 6                | 900           | 20             | 26              | 20             | 6                |
| BFG520W           | 4          | 20    | SOT343N | 9                 | 15                  | 70               | 500                  | NPN      | 11             | 2000          | 20             | 6                | 1.1           | 900           | 5              | 6                | 1.85          | 2000          | 5              | 6                | 17                       | 6                | 900           | 20             | 26              | 20             | 6                |
| <b>BFG520W/X</b>  | 4          | 20    | SOT343N | 9                 | 15                  | 70               | 500                  | NPN      | 11             | 2000          | 20             | 6                | 1.1           | 900           | 5              | 6                | 1.85          | 2000          | 5              | 6                | 17                       | 6                | 900           | 20             | 26              | 20             | 6                |
| BFG540            | 4          | 21    | SOT143B | 9                 | 15                  | 120              | 400                  | NPN      | 11             | 2000          | 40             | 8                | 1.3           | 900           | 10             | 8                | 2.1           | 2000          | 10             | 8                | 21                       | 8                | 900           | 40             | 34              | 40             | 8                |
| BFG540/X          | 4          | 21    | SOT143B | 9                 | 15                  | 120              | 400                  | NPN      | 11             | 2000          | 40             | 8                | 1.3           | 900           | 10             | 8                | 2.1           | 2000          | 10             | 8                | 21                       | 8                | 900           | 40             | 34              | 40             | 8                |
| BFG540/XR         | 4          | 21    | SOT143R | 9                 | 15                  | 120              | 400                  | NPN      | 11             | 2000          | 40             | 8                | 1.3           | 900           | 10             | 8                | 2.1           | 2000          | 10             | 8                | 21                       | 8                | 900           | 40             | 34              | 40             | 8                |
| BFG540W           | 4          | 21    | SOT343N | 9                 | 15                  | 120              | 500                  | NPN      | 10             | 2000          | 40             | 8                | 1.3           | 900           | 10             | 8                | 2.1           | 2000          | 10             | 8                | 21                       | 8                | 900           | 40             | 34              | 40             | 8                |
| BFG540W/X         | 4          | 21    | SOT343N | 9                 | 15                  | 120              | 500                  | NPN      | 10             | 2000          | 40             | 8                | 1.3           | 900           | 10             | 8                | 2.1           | 2000          | 10             | 8                | 21                       | 8                | 900           | 40             | 34              | 40             | 8                |
| BFG540W/XR        | 4          | 21    | SOT343R | 9                 | 15                  | 120              | 500                  | NPN      | 10             | 2000          | 40             | 8                | 1.3           | 900           | 10             | 8                | 2.1           | 2000          | 10             | 8                | 21                       | 8                | 900           | 40             | 34              | 40             | 8                |
| BFG541            | 4          | 21    | SOT223  | 9                 | 15                  | 120              | 650                  | NPN      | 9              | 2000          | 40             | 8                | 1.3           | 900           | 10             | 8                | 2.1           | 2000          | 10             | 8                | 21                       | 8                | 900           | 40             | 34              | 40             | 8                |
| BFM505            | 4          | 19    | SOT363A | 9                 | 8                   | 18               | 500                  | NPN      | 10             | 2000          | 5              | 3                | 1.1           | 900           | 1              | 3                | 1.9           | 2000          | 5              | 3                | -                        | -                | -             | -              | -               | -              | -                |
| BFM520            | 4          | 20    | SOT363A | 9                 | 8                   | 70               | 1000                 | NPN      | 9              | 2000          | 20             | 3                | 1.2           | 900           | 5              | 3                | 1.9           | 2000          | 5              | 3                | -                        | -                | -             | -              | -               | -              | -                |
| BFQ540            | 4          | 21    | SOT89   | 9                 | 15                  | 120              | 1,200                | NPN      | -              | -             | -              | -                | 1.9           | 900           | 40             | 8                | -             | -             | -              | -                | -                        | -                | -             | -              | -               | -              | -                |
| BFQ67             | 4          | 14    | SOT23   | 8                 | 10                  | 50               | 300                  | NPN      | 8              | 2000          | 15             | 8                | 1.7           | 1000          | 15             | 8                | 2.7           | 2000          | 15             | 8                | -                        | -                | -             | -              | -               | -              | -                |
| BFR505            | 4          | 19    | SOT23   | 9                 | 15                  | 18               | 150                  | NPN      | 10             | 2000          | 5              | 6                | 1.2           | 900           | 5              | 6                | 1.9           | 2000          | 5              | 6                | 4                        | 6                | 900           | 5              | 10              | 5              | 6                |
| <b>BFR505T</b>    | 4          | 19    | SOT416  | 9                 | 15                  | 18               | 150                  | NPN      | 10             | 2000          | 5              | 6                | 1.2           | 900           | 1.25           | 6                | 1.9           | 2000          | 1.25           | 6                | 5                        | 6                | 900           | 5              | 10              | 5              | 6                |
| BFR520            | 4          | 20    | SOT23   | 9                 | 15                  | 70               | 300                  | NPN      | 9              | 2000          | 20             | 6                | 1.1           | 900           | 5              | 6                | 1.9           | 2000          | 5              | 6                | 17                       | 6                | 900           | 20             | 26              | 20             | 6                |
| <b>BFR520T</b>    | 4          | 20    | SOT416  | 9                 | 15                  | 70               | 150                  | NPN      | 9              | 2000          | 20             | 6                | 1.1           | 900           | 5              | 6                | 1.9           | 2000          | 5              | 6                | 17                       | 6                | 900           | 20             | 26              | 20             | 6                |
| <b>BFR540</b>     | 4          | 21    | SOT23   | 9                 | 15                  | 120              | 500                  | NPN      | 7              | 2000          | 40             | 8                | 1.3           | 900           | 10             | 8                | 2.1           | 2000          | 10             | 8                | 21                       | 8                | 900           | 40             | 34              | 40             | 8                |
| BFS505            | 4          | 19    | SOT323  | 9                 | 15                  | 18               | 150                  | NPN      | 10             | 2000          | 5              | 6                | 1.2           | 900           | 1.25           | 6                | 1.9           | 2000          | 1.25           | 6                | 4                        | 6                | 900           | 5              | 10              | 5              | 6                |
| BFS520            | 4          | 20    | SOT323  | 9                 | 15                  | 70               | 300                  | NPN      | 9              | 2000          | 20             | 6                | 1.1           | 900           | 5              | 6                | 1.9           | 2000          | 5              | 6                | 17                       | 6                | 900           | 20             | 26              | 20             | 6                |
| BFS540            | 4          | 21    | SOT323  | 9                 | 15                  | 120              | 500                  | NPN      | 8              | 2000          | 40             | 8                | 1.3           | 900           | 10             | 8                | 2.1           | 2000          | 10             | 8                | 21                       | 8                | 900           | 40             | 34              | 40             | 8                |
| PBR941            | 4          | 20    | SOT23   | 8                 | 10                  | 50               | 360                  | NPN      | 9.5            | 2000          | 15             | 6                | 1.4           | 1000          | 5              | 6                | 2             | 2000          | 5              | 6                | -                        | -                | -             | -              | -               | -              | -                |
| PBR951            | 4          | 21    | SOT23   | 8                 | 10                  | 100              | 365                  | NPN      | 8              | 2000          | 30             | 6                | 1.3           | 1000          | 5              | 6                | 2             | 2000          | 5              | 6                | -                        | -                | -             | -              | -               | -              | -                |
| PRF947            | 4          | 20    | SOT323  | 8.5               | 10                  | 50               | 250                  | NPN      | 10             | 2000          | 15             | 6                | 1.5           | 1000          | 5              | 6                | 2.1           | 2000          | 5              | 6                | -                        | -                | -             | -              | -               | -              | -                |
| <b>PRF949</b>     | 4          | 20    | SOT416  | 9                 | 10                  | 50               | 150                  | NPN      | 10             | 2000          | 15             | 6                | 1.5           | 1000          | 5              | 6                | 2.1           | 2000          | 5              | 6                | -                        | -                | -             | -              | -               | -              | -                |
| PRF957            | 4          | 21    | SOT323  | 8.5               | 10                  | 100              | 270                  | NPN      | 9.2            | 2000          | 30             | 6                | 1.3           | 1000          | 5              | 6                | 1.8           | 2000          | 5              | 6                | -                        | -                | -             | -              | -               | -              | -                |
| BFG310/XR         | 4.5        | 30    | SOT143R | 14                | 6                   | 10               | 60                   | NPN      | 18             | 1800          | 5              | 3                | -             | -             | -              | -                | 1             | 2000          | 1              | 3                | 1.8                      | 3                | 1800          | 5              | 8.5             | 5              | 3                |
| BFG310W/XR        | 4.5        | 30    | SOT343R | 14                | 6                   | 10               | 60                   | NPN      | 18             | 1800          | 5              | 3                | -             | -             | -              | -                | 1             | 2000          | 1              | 3                | 1.8                      | 3                | 1800          | 5              | 8.5             | 5              | 3                |
| <b>BFG325/XR</b>  | 4.5        | 31    | SOT143R | 14                | 6                   | 35               | 210                  | NPN      | 18.3           | 1800          | 15             | 3                | -             | -             | -              | -                | 1.1           | 2000          | 3              | 3                | 8.7                      | 3                | 1800          | 15             | 19.4            | 15             | 3                |
| <b>BFG325W/XR</b> | 4.5        | 31    | SOT343R | 14                | 6                   | 35               | 210                  | NPN      | 18.3           | 1800          | 15             | 3                | -             | -             | -              | -                | 1.1           | 2000          | 3              | 3                | 8.7                      | 3                | 1800          | 15             | 19.4            | 15             | 3                |

## RF wideband transistors generations 5 to 7

| Type       | Generation | Curve | Package | $f_t$ (typ) (GHz) | $V_{CE0}$ (max) (V) | $I_C$ (max) (mA) | $P_{tot}$ (max) (mW) | Polarity | GUM (typ) (dB) | @ $f =$ (MHz) | @ $I_C =$ (mA) | @ $V_{CE} =$ (V) | NF (typ) (dB) | @ $f =$ (MHz) | @ $I_C =$ (mA) | @ $V_{CE} =$ (V) | NF (typ) (dB) | @ $f =$ (MHz) | @ $I_C =$ (mA) | @ $V_{CE} =$ (V) | $PL_1$ (1dB) (typ) (dBmW) | @ $V_{CE} =$ (V) | @ $f =$ (MHz) | @ $I_C =$ (mA) | IP3 (typ) (dBm) | @ $I_C =$ (mA) | @ $VCE =$ (V) |
|------------|------------|-------|---------|-------------------|---------------------|------------------|----------------------|----------|----------------|---------------|----------------|------------------|---------------|---------------|----------------|------------------|---------------|---------------|----------------|------------------|---------------------------|------------------|---------------|----------------|-----------------|----------------|---------------|
| BFG21W     | 5          | 32    | SOT343R | -                 | 4.5                 | 500              | 600                  | NPN      | 10             | 1900          | 1              | 3.6              | -             | -             | -              | -                | -             | -             | -              | -                | -                         | -                | -             | -              | -               | -              | -             |
| BFG403W    | 5          | 25    | SOT343R | 17                | 4.5                 | 3.6              | 16                   | NPN      | 22             | 2000          | 3              | 2                | 1             | 900           | 1              | 2                | 1.6           | 2000          | 1              | 2                | 5                         | 1                | 900           | 1              | 6               | 1              | 1             |
| BFG410W    | 5          | 26    | SOT343R | 22                | 4.5                 | 12               | 54                   | NPN      | 21             | 2000          | 10             | 2                | 0.9           | 900           | 1              | 2                | 1.2           | 2000          | 1              | 2                | 5                         | 2                | 2000          | 10             | 15              | 10             | 2             |
| BFG424F    | 5          | 27    | SOT343F | 25                | 4.5                 | 30               | 135                  | NPN      | 23             | 2000          | 25             | 2                | 0.8           | 900           | 2              | 2                | 1.2           | 2000          | 2              | 2                | 12                        | 2                | 2000          | 25             | 22              | 25             | 2             |
| BFG424W    | 5          | 27    | SOT343R | 25                | 4.5                 | 30               | 135                  | NPN      | 22             | 2000          | 25             | 2                | 0.8           | 900           | 2              | 2                | 1.2           | 2000          | 2              | 2                | 12                        | 2                | 2000          | 25             | 22              | 25             | 2             |
| BFG425W    | 5          | 27    | SOT343R | 25                | 4.5                 | 30               | 135                  | NPN      | 20             | 2000          | 25             | 2                | 0.8           | 900           | 2              | 2                | 1.2           | 2000          | 2              | 2                | 12                        | 2                | 2000          | 25             | 22              | 25             | 2             |
| BFG480W    | 5          | 29    | SOT343R | 21                | 4.5                 | 250              | 360                  | NPN      | 16             | 2000          | 80             | 2                | 1.2           | 900           | 8              | 2                | 1.8           | 2000          | 8              | 2                | 20                        | 3.6              | 2000          | 1              | 28              | 80             | 2             |
| BFU610F    | 6          | 34    | SOT343F | 40                | 5                   | 10               | 50                   | NPN      | 21             | 5800          | 8              | 2                | 0.75          | 2400          | 1              | 2                | 1.4           | 5800          | 1              | 2                | -                         | -                | -             | -              | 14              | 8              | 5             |
| BFU630F    | 6          | 36    | SOT343F | 40                | 5                   | 30               | 130                  | NPN      | 28             | 2400          | 25             | 2                | 0.58          | 1500          | 5              | 2                | 0.73          | 2400          | 5              | 2                | -                         | -                | -             | -              | 23              | 25             | 5             |
| BFU660F    | 6          | 38    | SOT343F | 40                | 5                   | 70               | 200                  | NPN      | 28.5           | 1500          | 60             | 2                | 0.6           | 1500          | 20             | 2                | 0.75          | 2400          | 20             | 2                | -                         | -                | -             | -              | 30              | 60             | 5             |
| BFU690F    | 6          | 40    | SOT343F | 40                | 5                   | 100              | 300                  | NPN      | 25.6           | 1500          | 90             | 2                | 0.7           | 1500          | 50             | 2                | 0.9           | 2400          | 50             | 2                | -                         | -                | -             | -              | 35              | 90             | 5             |
| BFU710F    | 7          | 35    | SOT343F | 70                | 2.8                 | 10               | 30                   | NPN      | 16.5           | 12000         | 8              | 2                | 0.9           | 5800          | 2              | 2                | 1.5           | 12000         | 2              | 2                | -                         | -                | -             | -              | 14.5            | 8              | 2             |
| BFU725F/N1 | 7          | 37    | SOT343F | 70                | 2.8                 | 40               | 136                  | NPN      | 18             | 5800          | 25             | 2                | 0.47          | 2400          | 5              | 2                | 0.7           | 5800          | 5              | 2                | 8                         | 2                | 5800          | 25             | 19              | 25             | 2             |
| BFU730F    | 7          | 33    | SOT343F | 70                | 2.8                 | 30               | 130                  | NPN      | 18.5           | 5800          | 25             | 2                | 0.56          | 2400          | 5              | 2                | 0.8           | 5800          | 5              | 2                | -                         | -                | -             | -              | 20.5            | 25             | 2             |
| BFU730LX   | 7          | -     | SOT883C | 53                | 3.0                 | 30               | 160                  | NPN      | 13.3           | 5800          | 25             | 2                | 0.55          | 2400          | 5              | 2                | 0.8           | 5800          | 5              | 2                | -                         | -                | -             | -              | 26              | 12.4           | 2.3           |
| BFU760F    | 7          | 39    | SOT343F | 70                | 2.8                 | 70               | 220                  | NPN      | 25             | 2400          | 60             | 2                | 0.5           | 1500          | 20             | 2                | 0.6           | 2400          | 20             | 2                | -                         | -                | -             | -              | 23              | 60             | 2             |
| BFU790F    | 7          | 41    | SOT343F | 70                | 2.8                 | 100              | 250                  | NPN      | 20.4           | 2400          | 90             | 2                | 0.56          | 1500          | 50             | 2                | 0.7           | 2400          | 50             | 2                | -                         | -                | -             | -              | 24              | 90             | 2             |
| BFU768F    | 7          | 39    | SOT343F | 70                | 2.8                 | 70               | 220                  | NPN      | 13             | 5800          | 10.8           | 2.1              | 0.5           | 2400          | 10.8           | 2.1              | 0.7           | 5800          | 10.8           | 2.1              | 5                         | 2.1              | 5800          | 10.8           | 19              | 10.8           | 2.1           |

## 3.4 RF ICs

### 3.4.1 RF MMIC amplifiers and mixers

RF MMIC amplifiers and mixers selection guide on [www.nxp.com/mmics](http://www.nxp.com/mmics)  
Easy-to-use parametric filters help you choose the right RF MMIC for your design.

#### Why choose NXP's RF MMIC amplifiers and mixers:

- ▶ Reduced RF component count
- ▶ Easy circuit design-in
- ▶ Reduced board size
- ▶ Short time-to-market
- ▶ Broad portfolio
- ▶ Volume delivery
- ▶ Short lead time



#### General-purpose wideband amplifiers (50 Ω)

| Type           | Package | V <sub>cc</sub> (V) | I <sub>s</sub> (mA) | G <sub>p</sub> [dB] |         |          | P <sub>1</sub> (1dB) [dBm] |         |          | NF [dB] |         |          | IP <sub>3o</sub> [dBm] |          | Z <sub>out</sub> [Ohm] | External Inductor |
|----------------|---------|---------------------|---------------------|---------------------|---------|----------|----------------------------|---------|----------|---------|---------|----------|------------------------|----------|------------------------|-------------------|
|                |         |                     |                     | 250 MHz             | 500 MHz | 750 MHz  | 250 MHz                    | 500 MHz | 750 MHz  | 250 MHz | 500 MHz | 750 MHz  | 250 MHz                | 750 MHz  |                        |                   |
| <b>BGA2870</b> | SOT363  | 2.5                 | 15.6                | 31.2                | 31.1    | 31.0     | 5.0                        | 4.0     | 4.0      | 3.1     | 3.2     | 3.7      | 15.0                   | 13.0     | 50                     | N                 |
| <b>BGA2874</b> | SOT363  | 2.5                 | 16.0                | 31.1                | 31.0    | 30.6     | 5.0                        | 4.0     | 4.0      | 3.0     | 3.1     | 3.4      | 19.0                   | 17.0     | 50                     | N                 |
|                |         |                     |                     | 250 MHz             | 950 MHz | 2150 MHz | 250 MHz                    | 950 MHz | 2150 MHz | 250 MHz | 950 MHz | 2150 MHz | 250 MHz                | 2150 MHz |                        |                   |
| <b>BGA2800</b> | SOT363  | 3                   | 10.5                | 19.9                | 20.5    | 20.2     |                            |         | -2.0     | 3.7     | 3.6     | 3.7      | 11.0                   | 8.0      | 50                     | N                 |
| <b>BGA2803</b> | SOT363  | 3                   | 5.8                 | 23.6                | 23.4    | 23.0     | -6.0                       | -6.0    | -8.0     | 3.7     | 3.6     | 3.4      | 5.0                    | 2.0      | 50                     | N                 |
| BGA2748        | SOT363  | 3                   | 5.7                 | 17.6                | 21.9    | 17.8     |                            | -9.2    | -10.9    | 1.7     | 1.9     | 2.4      | -1.9                   | -1.4     | 50                     | N                 |
| BGA2714        | SOT363  | 3                   | 4.6                 | 20.7                | 20.4    | 20.8     | -7.8                       | -7.9    | -9.0     | 2.4     | 2.2     | 3.0      | 2.1                    | 0.0      | 50                     | N                 |
| BGA2801        | SOT363  | 3                   | 14.3                | 22.2                | 22.4    | 23.0     | 2.0                        | 2.0     | 0.0      | 3.8     | 3.8     | 3.9      | 14.0                   | 9.0      | 50                     | N                 |
| <b>BGA2802</b> | SOT363  | 3                   | 12.5                | 25.6                | 25.8    | 25.5     | 3.0                        | 1.0     | -3.0     | 4.2     | 4.1     | 3.6      | 13.0                   | 6.0      | 50                     | N                 |
| <b>BGA2815</b> | SOT363  | 3                   | 18.2                | 25.8                | 25.3    | 25.2     | 8.0                        | 5.0     | 1.0      | 3.7     | 3.8     | 3.7      | 17.0                   | 10.0     | 50                     | N                 |
| <b>BGA2817</b> | SOT363  | 3                   | 20.0                | 24.5                | 24.7    | 25.1     | 6.0                        | 6.0     | 5.0      | 3.9     | 3.9     | 3.8      | 18.0                   | 15.0     | 50                     | N                 |
| BGM1012        | SOT363  | 3                   | 14.6                | 19.6                | 20.0    | 20.4     |                            | 6.0     | 3.4      | 4.9     | 4.8     | 4.9      | 18.0                   | 13.0     | 50                     | Y                 |
| <b>BGA2816</b> | SOT363  | 3                   | 22.0                | 31.9                | 32.0    | 26.9     | 7.0                        | 5.0     |          | 3.2     | 3.2     | 3.2      | 15.0                   | 8.0      | 50                     | N                 |
| <b>BGA2818</b> | SOT363  | 3                   | 19.9                | 30.1                | 29.8    | 30.0     | 7.0                        | 6.0     | 4.0      | 3.5     | 3.3     | 3.3      | 18.0                   | 14.0     | 50                     | N                 |
| <b>BGA2850</b> | SOT363  | 5                   | 9.1                 | 23.2                | 24.0    | 22.9     |                            |         | -2.0     | 4.2     | 4.1     | 4.0      | 10.0                   | 8.0      | 50                     | N                 |
| <b>BGA2851</b> | SOT363  | 5                   | 7.0                 | 23.3                | 24.7    | 25.2     | -3.0                       | -4.0    | -5.0     | 4.0     | 3.2     | 3.0      | 8.0                    | 5.0      | 50                     | N                 |
| BGA2715        | SOT363  | 5                   | 4.3                 | 15.6                | 21.5    | 23.3     |                            | -8.0    | -8.5     | 2.6     | 2.6     | 3.1      | 2.3                    | 0.6      | 50                     | N                 |
| BGA2717        | SOT363  | 5                   | 8.0                 | 20.0                | 24.2    | 25.1     |                            | -2.6    | -3.1     | 2.3     | 2.3     | 2.9      | 10.0                   | 6.3      | 50                     | N                 |
| BGA2712        | SOT363  | 5                   | 12.3                | 21.1                | 21.2    | 22.0     |                            | 0.2     | -2.0     | 4.2     | 3.9     | 4.3      | 11.0                   | 6.0      | 50                     | N                 |
| <b>BGA2866</b> | SOT363  | 5                   | 17.4                | 23.2                | 23.9    | 24.3     | 4.0                        | 4.0     | 3.0      | 3.9     | 3.8     | 3.9      | 17.0                   | 12.0     | 50                     | N                 |
| <b>BGA2867</b> | SOT363  | 5                   | 21.7                | 26.4                | 27.2    | 27.2     | 6.8                        | 6.5     | 4.9      | 3.7     | 3.8     | 3.7      | 18.8                   | 14.1     | 50                     | N                 |
| BGA2709        | SOT363  | 5                   | 23.5                | 22.5                | 22.7    | 23.0     |                            | 8.3     | 5.7      | 4.3     | 4.0     | 5.1      | 22.0                   | 14.0     | 50                     | Y                 |
| BGA2716        | SOT363  | 5                   | 15.9                | 22.4                | 22.8    | 22.9     |                            | 8.9     | 6.1      | 5.5     | 5.3     | 5.5      | 22.2                   | 15.9     | 50                     | Y                 |
| BGA2776        | SOT363  | 5                   | 24.4                | 22.9                | 23.2    | 23.2     |                            | 7.2     | 6.0      | 4.7     | 4.9     | 5.3      | 18.6                   | 14.4     | 50                     | Y                 |
| <b>BGA2865</b> | SOT363  | 5                   | 26.4                | 30.9                | 32.2    | 29.6     | 9.0                        | 8.0     | 2.0      | 3.8     | 3.9     | 4.0      | 19.0                   | 10.0     | 50                     | N                 |
| <b>BGA2869</b> | SOT363  | 5                   | 22.0                | 30.9                | 30.9    | 32.2     | 8.8                        | 8.8     | 7.6      | 3.8     | 3.9     | 4.0      | 20.0                   | 19.0     | 50                     | N                 |
| BGM1013        | SOT363  | 5                   | 27.5                | 35.3                | 35.6    | 32.1     |                            | 13.0    | 8.1      | 4.6     | 4.6     | 4.9      | 22.7                   | 18.6     | 75                     | Y                 |
| BGM1014        | SOT363  | 5                   | 21.0                | 30.2                | 32.2    | 34.3     |                            | 11.2    | 5.7      | 4.3     | 4.2     | 4.2      | 20.5                   | 15.1     | 75                     | Y                 |

Products by function

#### General-purpose LNA MMICs

| Type                   | Package | V <sub>cc</sub> (V) | I <sub>s</sub> (mA) | [S <sub>21</sub> ] [dB] |         |                     |          |          | P <sub>1</sub> (1dB) [dBm] |         |                     | NF <sub>min</sub> [dB] |         |                    |          |          | IP <sub>3o</sub> [dBm] |         |          |                     |          | ESD protection |     |
|------------------------|---------|---------------------|---------------------|-------------------------|---------|---------------------|----------|----------|----------------------------|---------|---------------------|------------------------|---------|--------------------|----------|----------|------------------------|---------|----------|---------------------|----------|----------------|-----|
|                        |         |                     |                     | 450 MHz                 | 900 MHz | 1800 MHz            | 2400 MHz | 5800 MHz | 450 MHz                    | 900 MHz | 2400 MHz            | 450 MHz                | 900 MHz | 1800 MHz           | 2400 MHz | 5800 MHz | 450 MHz                | 900 MHz | 1800 MHz | 2400 MHz            | 5800 MHz | kV             | HBM |
| BGA2001                | SOT343R | 2.5                 | 4.0                 |                         | 18.0    | 14.0                |          |          |                            |         |                     | 1.3                    | 1.3     |                    |          |          |                        | -7.4    | -4.5     |                     |          | -              |     |
| BGA2002 <sup>(1)</sup> | SOT343R | 2.5                 | 4.0                 |                         | 18.0    | 14.0                |          |          |                            |         |                     | 1.3                    | 1.3     |                    |          |          |                        | -7.4    | -4.5     |                     |          | -              |     |
| BGA2003                | SOT343R | 2.5                 | 10.0                |                         | 19.0    | 14.0                |          |          |                            |         |                     | 1.8                    | 1.8     |                    |          |          |                        | -6.5    | -4.8     |                     |          | -              |     |
| BGA2011                | SOT363  | 3                   | 15.0                |                         | 19.0    |                     |          |          |                            |         |                     | 1.5                    |         |                    |          |          |                        | 10.0    |          |                     |          | -              |     |
| BGA2012                | SOT363  | 3                   | 7.0                 |                         | 16.0    |                     |          |          |                            |         |                     | 1.7                    |         |                    |          |          |                        | 10.0    |          |                     |          | -              |     |
| <b>BGU7003</b>         | SOT891  | 2.5                 | 5.0                 | 20.0                    |         | 15.2                | 11.4     |          |                            |         |                     | 0.6                    |         | 0.8                | 1.5      |          |                        |         |          |                     |          | 1              |     |
| <b>BGU7003W</b>        | SOT886  | 2.5                 | 5.0                 | 20.0                    |         | 15.2                | 11.4     |          |                            |         |                     | 0.6                    |         | 0.8                | 1.5      |          |                        |         |          |                     |          | 1              |     |
| <b>BGU6101</b>         | SOT1209 | 3                   | 1.5                 | 13.0                    | 12.0    | 13.0 <sup>(2)</sup> |          |          | -11.0                      | -11.5   | -6.5 <sup>(2)</sup> | 0.8                    | 0.8     | 1.3 <sup>(2)</sup> |          |          | -2.5                   | -2.0    |          | 6.5 <sup>(2)</sup>  | 3        |                |     |
| <b>BGU6102</b>         | SOT1209 | 3                   | 3.0                 | 18.5                    | 16.5    | 14.0 <sup>(3)</sup> |          |          | -5.0                       | -5.5    | 0 <sup>(3)</sup>    | 0.7                    | 0.8     | 1.2 <sup>(3)</sup> |          |          | 5.5                    | 6.0     |          | 11.5 <sup>(3)</sup> | 3        |                |     |
| <b>BGU6104</b>         | SOT1209 | 3                   | 6.0                 | 22.5                    | 18.5    | 12.8 <sup>(4)</sup> |          |          | 0.5                        | 0.5     | 6.5 <sup>(4)</sup>  | 0.8                    | 0.8     | 1.1 <sup>(4)</sup> |          |          | 11.0                   | 12.0    |          | 18.5 <sup>(4)</sup> | 3        |                |     |

**Bold** = highly recommended product

<sup>(1)</sup> AEC-Q101 qualified <sup>(2)</sup> I<sub>cc</sub> 3 mA <sup>(3)</sup> I<sub>cc</sub> 6 mA <sup>(4)</sup> I<sub>cc</sub> 12 mA



## SiGe:C LNAs (for GPS and others)

|          |         |                 |      |                 |     |     | @ 1.575 GHz                    |              |     |                   |                                      |                              |                              |                              |                              |                              |                                                                                           |                               |                               |                              |                              |                              |                              |                              |                              |                                                 |                               |                               |    |   |
|----------|---------|-----------------|------|-----------------|-----|-----|--------------------------------|--------------|-----|-------------------|--------------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------------------------------------------------------------------|-------------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------------------------|-------------------------------|-------------------------------|----|---|
| Type     | Package | Supply voltage  |      | Supply current  |     |     | Insertion power gain           |              |     | Noise figure      | Input power at 1 dB gain compression |                              |                              |                              |                              |                              | Input third-order intercept point<br>f <sub>1</sub> = 1713 MHz, f <sub>2</sub> = 1851 MHz |                               |                               |                              |                              |                              |                              |                              |                              |                                                 |                               |                               |    |   |
|          |         | V <sub>cc</sub> |      | I <sub>cc</sub> |     |     | s <sub>21</sub>   <sup>2</sup> |              |     | NF                | P <sub>L(1dB)</sub>                  |                              |                              |                              |                              |                              | IP <sub>3</sub>                                                                           |                               |                               |                              |                              |                              |                              |                              |                              |                                                 |                               |                               |    |   |
|          |         | (V)             |      | (mA)            |     |     | (dB)                           |              |     | (dB)              | (dBm)                                |                              |                              |                              |                              |                              | (dBm)                                                                                     |                               |                               |                              |                              |                              |                              |                              |                              |                                                 |                               |                               |    |   |
|          |         | Min             | Max  | Min             | Typ | Max | Min                            | Typ          | Max | Typ               | V <sub>cc</sub> = 1.5 V, Min         | V <sub>cc</sub> = 1.5 V, Typ | V <sub>cc</sub> = 1.8 V, Min | V <sub>cc</sub> = 1.8 V, Typ | V <sub>cc</sub> = 2.2 V, Min | V <sub>cc</sub> = 2.2 V, Typ | V <sub>cc</sub> = 2.5 V, I <sub>cc</sub> = 5 mA                                           | V <sub>cc</sub> = 2.85 V, Min | V <sub>cc</sub> = 2.85 V, Typ | V <sub>cc</sub> = 1.5 V, Min | V <sub>cc</sub> = 1.5 V, Typ | V <sub>cc</sub> = 1.8 V, Min | V <sub>cc</sub> = 1.8 V, Typ | V <sub>cc</sub> = 2.2 V, Min | V <sub>cc</sub> = 2.2 V, Typ | V <sub>cc</sub> = 2.5 V, I <sub>cc</sub> = 5 mA | V <sub>cc</sub> = 2.85 V, Min | V <sub>cc</sub> = 2.85 V, Typ |    |   |
| BGU7003  | SOT891  | 2.2             | 2.85 | 3               | -   | 15  | 16                             | 18.3         | 20  | 0.8               | -                                    | -                            | -                            | -                            | -                            | -                            | -20                                                                                       | -                             | -                             | -                            | -                            | -                            | -                            | -                            | -                            | -                                               | -                             | -                             | -  | - |
| BGU7004^ | SOT886  | 1.5             | 2.85 | -               | 4.5 | -   | -                              | 16.5 / 17.5* | -   | 0.9               | -                                    | -                            | -14                          | -11                          | -                            | -                            | -                                                                                         | -11                           | -8                            | -                            | -                            | -                            | 5                            | 9                            | -                            | -                                               | -                             | 5                             | 12 |   |
| BGU7005  | SOT886  | 1.5             | 2.85 | -               | 4.5 | -   | -                              | 16.5 / 17.5* | -   | 0.9               | -                                    | -                            | -14                          | -11                          | -                            | -                            | -                                                                                         | -11                           | -8                            | -                            | -                            | -                            | 5                            | 9                            | -                            | -                                               | -                             | 5                             | 12 |   |
| BGU7007  | SOT886  | 1.5             | 2.85 | -               | 4.8 | -   | -                              | 18.5 / 19.5* | -   | 0.9               | -                                    | -                            | -15                          | -12                          | -                            | -                            | -                                                                                         | -14                           | -11                           | -                            | -                            | 1                            | 4                            | -                            | -                            | -                                               | 2                             | 5                             |    |   |
| BGU7008^ | SOT886  | 1.5             | 2.85 | -               | 4.8 | -   | -                              | 18.5 / 19.5* | -   | 0.9               | -                                    | -                            | -15                          | -12                          | -                            | -                            | -                                                                                         | -14                           | -11                           | -                            | -                            | 1                            | 4                            | -                            | -                            | -                                               | 2                             | 5                             |    |   |
| BGU8006  | WL-CSP  | 1.5             | 3.1  | -               | 4.1 | -   | -                              | 17.5 / 19.0  | -   | 0.6 <sup>#</sup>  | -                                    | -                            | -                            | -10                          | -                            | -                            | -                                                                                         | -                             | -8                            | -                            | -                            | -                            | 5                            | -                            | -                            | -                                               | -                             | 8                             |    |   |
| BGU8007  | SOT886  | 1.5             | 2.2  | -               | 4.6 | -   | -                              | 19.0 / 20.5* | -   | 0.75 <sup>#</sup> | -15                                  | -12                          | -                            | -                            | -13                          | -10                          | -                                                                                         | -                             | -                             | 1                            | 4                            | -                            | -                            | 2                            | 5                            | -                                               | -                             | -                             |    |   |
| BGU8009  | SOT1230 | 1.5             | 3.1  | -               | 4.4 | -   | -                              | 17.6 / 20*   | -   | 0.65 <sup>#</sup> | -                                    | -                            | -                            | -10                          | -                            | -                            | -                                                                                         | -7                            | -                             | -                            | -                            | 3                            | -                            | -                            | -                            | -                                               | -                             | 6                             |    |   |
| BGU8010  | SOT1230 | 1.5             | 3.1  | -               | 3.0 | -   | -                              | 16.1 / 17*   | -   | 0.70 <sup>#</sup> | -                                    | -                            | -                            | -12                          | -                            | -                            | -                                                                                         | -9                            | -                             | -                            | -                            | 0                            | -                            | -                            | -                            | -                                               | -                             | 3                             |    |   |
| BGU8011  | SOT1230 | 1.5             | 3.1  | -               | 4.4 | -   | -                              | 16.3 / 17.5* | -   | 0.65 <sup>#</sup> | -                                    | -                            | -                            | -8                           | -                            | -                            | -                                                                                         | -6                            | -                             | -                            | -                            | 6                            | -                            | -                            | -                            | -                                               | -                             | 7                             |    |   |

\* dB with/without jammer

^ AEC-Q101 qualified (some limitations apply)

# Evaluation board losses excluded

## LNAs for set-top boxes (75 $\Omega$ )

| Type    | Package | Frequency range<br>(MHz) | Mode                 | @        |          | Gain <sup>(1)</sup><br>(dB) | NF<br>(dB) | $P_{L(1dB)}$<br>(dBm) | OIP3<br>(dBm) | FL <sup>(2)</sup><br>(dB) | RL <sub>out</sub><br>(dB) | RL <sub>in</sub><br>(dB) |
|---------|---------|--------------------------|----------------------|----------|----------|-----------------------------|------------|-----------------------|---------------|---------------------------|---------------------------|--------------------------|
|         |         |                          |                      | $V_{cc}$ | $I_{cc}$ |                             |            |                       |               |                           |                           |                          |
|         |         |                          |                      | (V)      | (mA)     |                             |            |                       |               |                           |                           |                          |
| BGU7031 | SOT363  | 40 - 1000                | G <sub>p</sub> 10 dB | 5        | 43       | 10                          | 4.5        | 14                    | 29            | -0.2                      | 12                        | 18                       |
| BGU7032 | SOT363  | 40 - 1000                | G <sub>p</sub> 10 dB | 5        | 43       | 10                          | 4.5        | 14                    | 29            | -0.2                      | 12                        | 18                       |
|         |         |                          | Bypass               | 5        | 4        | -2                          | 2.5        | -                     | 29            | -0.2                      | 8                         | 8                        |
| BGU7033 | SOT363  | 40 - 1000                | G <sub>p</sub> 10 dB | 5        | 43       | 10                          | 4.5        | 14                    | 29            | -0.2                      | 12                        | 18                       |
|         |         |                          | G <sub>p</sub> 5 dB  | 5        | 43       | 5                           | 6          | 9                     | 29            | -0.2                      | 12                        | 17                       |
|         |         |                          | Bypass               | 5        | 4        | -2                          | 2.5        | -                     | 29            | -0.2                      | 8                         | 8                        |
| BGU7041 | SOT363  | 40 - 1000                | G <sub>p</sub> 10 dB | 3.3      | 38       | 10                          | 4          | 12                    | 29            | -0.2                      | 12                        | 21                       |
| BGU7042 | SOT363  | 40 - 1000                | G <sub>p</sub> 10 dB | 3.3      | 38       | 10                          | 4          | 12                    | 29            | -0.2                      | 12                        | 21                       |
|         |         |                          | Bypass               | 3.3      | 3        | -2                          | 2.5        | -                     | 29            | -0.2                      | 10                        | 10                       |
| BGU7044 | SOT363  | 40 - 1000                | G <sub>p</sub> 14 dB | 3.3      | 34       | 14                          | 2.8        | 13                    | 29            | -0.2                      | 12                        | 20                       |
| BGU7045 | SOT363  | 40 - 1000                | G <sub>p</sub> 14 dB | 3.3      | 34       | 14                          | 2.8        | 13                    | 29            | -0.2                      | 12                        | 20                       |
|         |         |                          | Bypass               | 3.3      | 3        | -2                          | 2.5        | -                     | 27            | -0.2                      | 10                        | 9                        |

## LNAs for wireless infrastructures (50 $\Omega$ )

| Type    | Package   | @ $V_{cc}$ | @ $I_{cc}$ | frange | frange | G <sub>ass</sub> | NF    | $P_{L(1dB)}$ | IP <sub>3O</sub> | RL <sub>in</sub> | RL <sub>out</sub> |
|---------|-----------|------------|------------|--------|--------|------------------|-------|--------------|------------------|------------------|-------------------|
|         |           | [typ]      | [typ]      | [min]  | [max]  | [typ]            | [typ] | [typ]        | [typ]            | [typ]            | [typ]             |
|         |           | (V)        | (mA)       | (MHz)  | (MHz)  | (dB)             | (dB)  | (dBm)        | (dBm)            | (dB)             | (dB)              |
| BGU7051 | SOT650-1  | 3.3        | 65         | 500    | 750    | 23.5             | 0.6   | 17           | 32               | 27.5             | 18                |
|         |           |            |            | 750    | 850    | 21.5             | 0.63  | 16.5         | 32               | 26               | 17.5              |
|         |           |            |            | 900    | 1500   | 21               | 0.65  | 16.5         | 33               | 24.5             | 18                |
| BGU7052 | SOT650-1  | 3.3        | 80         | 1500   | 1750   | 21.5             | 0.76  | 15.5         | 37               | 23               | 22                |
|         |           |            |            | 1850   | 1900   | 20               | 0.76  | 14.5         | 35.5             | 23               | 22                |
|         |           |            |            | 1950   | 2500   | 19.7             | 0.79  | 14.5         | 35               | 22               | 21                |
| BGU7053 | SOT650-1  | 3.3        | 90         | 2300   | 2500   | 18.5             | 0.85  | 13.5         | 36               | 23               | 19.5              |
|         |           |            |            | 2700   | 2800   | 17.5             | 0.9   | 13           | 36               | 26               | 23                |
| BGU7060 | SOT1301AA | 5          | 200        | 700    | 800    | 3                | 21    | 11           | 25.5             | 20               | 19                |
|         |           |            |            |        |        | 12               | 15    | 7.5          | 22.5             | 20               | 19                |
|         |           |            |            |        |        | 18               | 7.2   | -7           | 4.5              | 20               | 19                |
|         |           |            |            |        |        | 35               | 1     | -12.5        | 2.5              | 24               | 19                |
| BGU7061 | SOT1301AA | 5          | 200        | 800    | 950    | 3                | 21    | 11           | 25.5             | 20               | 19                |
|         |           |            |            |        |        | 12               | 15    | 7.5          | 22.5             | 20               | 19                |
|         |           |            |            |        |        | 18               | 7.2   | -7           | 4.5              | 20               | 19                |
|         |           |            |            |        |        | 35               | 1     | -12.5        | 2.5              | 24               | 19                |

**Bold red** = new, highly recommended product



## LNAs for wireless infrastructures (50 Ω)

| Type           | Package   | @ V <sub>cc</sub> | @ I <sub>cc</sub> | frange | frange | G <sub>ass</sub> | NF    | P <sub>L(1dB)</sub> | IP3 <sub>O</sub> | RL <sub>in</sub> | RL <sub>out</sub> |
|----------------|-----------|-------------------|-------------------|--------|--------|------------------|-------|---------------------|------------------|------------------|-------------------|
|                |           | [typ]             | [typ]             | [min]  | [max]  | [typ]            | [typ] | [typ]               | [typ]            | [typ]            | [typ]             |
|                |           | (V)               | (mA)              | (MHz)  | (MHz)  | (dB)             | (dB)  | (dBm)               | (dBm)            | (dB)             | (dB)              |
| BGU7062        | SOT1301AA | 5                 | 185               | 1710   | 1785   | 3                | 20.6  | 10.7                | 25.6             | 23               | 16                |
|                |           |                   |                   |        |        | 12               | 15    | 5.4                 | 21               | 23               | 16                |
|                |           |                   |                   |        |        | 18               | 9.3   | -7                  | 3.4              | 23               | 16                |
|                |           |                   |                   |        |        | 35               | 0.98  | -12.8               | 1                | 26               | 16                |
| BGU7063        | SOT1301AA | 5                 | 190               | 1920   | 1980   | 18               | 6.4   | -6.4                | 5.4              | 35               | 15                |
|                |           |                   | 230               |        |        | 35               | 1.05  | -12.5               | 0.9              | 31               | 15                |
|                |           |                   |                   |        |        |                  |       |                     |                  |                  |                   |
| <b>BGU8051</b> | SOT1327   | 5                 | 50                | 500    | 900    |                  |       |                     |                  |                  |                   |
|                |           |                   |                   | 900    | 900    | 18               | 0.43  | 19.3                | 41               | 27               | 20                |
|                |           |                   |                   | 900    | 1500   |                  |       |                     |                  |                  |                   |
| <b>BGU8052</b> | SOT1327   | 5                 | 47                | 1500   | 1900   |                  |       |                     |                  |                  |                   |
|                |           |                   |                   | 1900   | 1900   | 18               | 0.52  | 19                  | 39               | 27               | 12                |
|                |           |                   |                   | 1900   | 2300   |                  |       |                     |                  |                  |                   |
| <b>BGU8053</b> | SOT1327   | 5                 | 51                | 2300   | 2500   |                  |       |                     |                  |                  |                   |
|                |           |                   |                   | 2500   | 2500   | 18               | 0.63  | 20                  | 39               | 23               | 12                |
|                |           |                   |                   | 2500   | 5000   |                  |       |                     |                  |                  |                   |
| <b>BGU7224</b> | SOT1189   | 3.3               | 12                | 2400   | 2500   | 14               | 1.0   | 4                   | 8                | 10               | 12                |
| <b>BGU7258</b> | SOT1189   | 3.3               | 12                | 5000   | 6000   | 12               | 1.4   | 0                   | 7                | 10               | 12                |

## General-purpose medium power amplifiers

| Type           | Package | @ V <sub>cc</sub> | @ I <sub>cc</sub> | Frequency range | RF input frequency | Gain  | P <sub>L(1dB)</sub> | IP3 <sub>O</sub> | NF    |
|----------------|---------|-------------------|-------------------|-----------------|--------------------|-------|---------------------|------------------|-------|
|                |         | [typ]             | [typ]             | [min]           | [max]              | [typ] | [typ]               | [typ]            | [typ] |
|                |         | (V)               | (mA)              | (MHz)           | (MHz)              | (dB)  | (dBm)               | (dBm)            | (dB)  |
| BGA6289        | SOT89   | 4.1               | 84                | 100-3000        | 900                | 15.0  | 17.0                | 31.0             | 3.5   |
|                |         |                   |                   |                 | 1800               | 13.0  | 15.0                | 28.0             | 3.7   |
| BGA6489        | SOT89   | 5.1               | 78                | 100-3000        | 900                | 20.0  | 20.0                | 33.0             | 3.1   |
|                |         |                   |                   |                 | 1800               | 16.0  | 17.0                | 30.0             | 3.3   |
| BGA6589        | SOT89   | 4.8               | 81                | 100-3000        | 900                | 22.0  | 21.0                | 33.0             | 3     |
|                |         |                   |                   |                 | 1800               | 17.0  | 20.0                | 32.0             | 3.3   |
| <b>BGA7024</b> | SOT89   | 5                 | 110               | 400 - 2700      | 940                | 22.0  | 24.0                | 37.5             | 2.9   |
|                |         |                   |                   |                 | 1960               | 16.0  | 25.5                | 38.0             | 3.7   |
|                |         |                   |                   |                 | 2140               | 15.0  | 25.5                | 38.0             | 3.7   |
|                |         |                   |                   |                 | 2445               | 14.0  | 24.5                | 37.5             | 4.0   |
| <b>BGA7027</b> | SOT89   | 5                 | 165               | 400 - 2700      | 940                | 19.0  | 29.0                | 41.5             | 2.6   |
|                |         |                   |                   |                 | 1960               | 11.5  | 27.5                | 43.0             | 3.8   |
|                |         |                   |                   |                 | 2140               | 11.0  | 28.0                | 42.5             | 3.9   |
| <b>BGA7124</b> | SOT908  | 5                 | 140               | 400 - 2700      | 940                | 23.0  | 25.0                | 38.5             | 5.2   |
|                |         |                   |                   |                 | 1960               | 16.5  | 24.5                | 38.0             | 4.6   |
|                |         |                   |                   |                 | 2140               | 16.0  | 24.5                | 37.5             | 4.8   |
|                |         |                   |                   |                 | 2445               | 14.0  | 23.5                | 36.0             | 5.4   |
| <b>BGA7127</b> | SOT908  | 5                 | 180               | 400 - 2700      | 940                | 20.0  | 27.5                | 41.5             | 3.1   |
|                |         |                   |                   |                 | 1960               | 13.0  | 28.5                | 42.5             | 4.5   |
|                |         |                   |                   |                 | 2140               | 12.0  | 28.0                | 42.0             | 4.6   |
|                |         |                   |                   |                 | 2445               | 10.5  | 27.5                | 41.5             | 4.7   |
| <b>BGA7130</b> | SOT908  | 5                 | 450               | 400 - 2700      | 750                | 18.0  | 30.0                | 43.0             | 5.0   |
|                |         |                   |                   |                 | 2140               | 10.0  | 30.0                | 44.0             | 5.0   |
| BGA6130        | SOT908  | 3.6               | 70                | 400 - 2700      | 434                | 17.0  | 28.0                | 29.5             | 4.5   |
|                |         |                   |                   |                 | 915                | 14.0  | 29.0                | 30.0             | 4.0   |

**Bold** = highly recommended product

**Bold red** = new, highly recommended product

## Extreme broadband amplifiers

| Type           | Package | Frequency range | @ V <sub>CC</sub> | @ I <sub>CC</sub> | Gain | NF   | P1dB  | OIP3  | OIP2  |
|----------------|---------|-----------------|-------------------|-------------------|------|------|-------|-------|-------|
|                |         |                 | [typ]             | [typ]             |      |      |       |       |       |
|                |         | MHz             | (V)               | (mA)              | (dB) | (dB) | (dBm) | (dBm) | (dBm) |
| <b>BGA3012</b> | SOT89   | 40 - 1006       | 8                 | 110               | 12   | 3.1  | 21.5  | 40    | 60    |
|                |         |                 | 5                 | 70                | 12   | 2.9  | 18.0  | 36    | 54    |
|                |         | 5 - 300         | 8                 | 110               | 12   | 3.0  | 23.0  | 40    | 60    |
|                |         |                 | 5                 | 70                | 12   | 2.9  | 17.0  | 40    | 55    |
| <b>BGA3015</b> | SOT89   | 40 - 1006       | 8                 | 110               | 15   | 2.5  | 22.5  | 40    | 60    |
|                |         |                 | 5                 | 70                | 15   | 2.3  | 18.0  | 36    | 55    |
|                |         | 5 - 300         | 8                 | 110               | 15   | 2.3  | 24.0  | 40    | 60    |
|                |         |                 | 5                 | 70                | 15   | 2.3  | 18.0  | 40    | 55    |
| <b>BGA3018</b> | SOT89   | 40 - 1006       | 8                 | 120               | 18   | 2.1  | 23.5  | 40    | 60    |
|                |         |                 | 5                 | 75                | 18   | 2.2  | 18.0  | 36    | 54    |
|                |         | 5 - 300         | 8                 | 120               | 18   | 1.9  | 25.0  | 40    | 60    |
|                |         |                 | 5                 | 75                | 18   | 1.9  | 20.0  | 36    | 54    |

## VGAs for wireless infrastructures

| Type           | Package  | Type   | @ V <sub>CC</sub> | @ I <sub>CC</sub> | f <sub>range</sub> | f <sub>range</sub> | Gp @ minimum attenuation | Attenuation range | NF    | P <sub>L(1dB)</sub> | IP3 <sub>O</sub> |
|----------------|----------|--------|-------------------|-------------------|--------------------|--------------------|--------------------------|-------------------|-------|---------------------|------------------|
|                |          |        | [typ]             | [typ]             | [min]              | [max]              | (dB)                     | (dB)              | [typ] | [typ]               | [typ]            |
|                |          |        | (V)               | (mA)              | (MHz)              | (MHz)              |                          |                   | (dB)  | (dBm)               | (dBm)            |
| <b>BGA7204</b> | SOT617-3 | Single | 5                 | 115               | 400                | 700                | 18.5                     | 31.5              | 7     | 21                  | 38               |
|                |          |        | 5                 | 115               | 700                | 1450               | 18.5                     | 31.5              | 6.5   | 21                  | 37.5             |
|                |          |        | 5                 | 115               | 1450               | 2100               | 17.5                     | 30.5              | 6.5   | 20.5                | 36               |
|                |          |        | 5                 | 115               | 2100               | 2750               | 16.5                     | 30                | 7     | 20                  | 34               |
| <b>BGA7210</b> | SOT617-3 | Single | 5                 | 185               | 700                | 1400               | 30                       | 31.5              | 6.5   | 21                  | 39               |
|                |          |        | 5                 | 185               | 1400               | 1700               | 29.5                     | 31.5              | 6.5   | 21                  | 37               |
|                |          |        | 5                 | 185               | 1700               | 2200               | 29                       | 31.5              | 6.5   | 21                  | 35               |
|                |          |        | 5                 | 185               | 2200               | 2800               | 28                       | 30.5              | 7     | 23                  | 35               |
| BGA7350        | SOT617-1 | Dual   | 5                 | 245               | 50                 | 250                | 18.5                     | 24                | 6     | 17                  | 43               |
| <b>BGA7351</b> | SOT617-1 | Dual   | 5                 | 280               | 50                 | 250                | 22                       | 28                | 6     | 16.5                | 46               |
| <b>BGA7352</b> | SOT617-1 | Dual   | 5                 | 225               | 10                 | 200                | 24                       | 31.5              | 6.5   | 16                  | 45               |

## Upstream VGA for DOCSIS 3.0

| Type           | Package | Type   | @ V <sub>CC</sub> | @ I <sub>CC</sub> | f <sub>range</sub> | f <sub>range</sub> | Gp @ minimum attenuation | Attenuation range | NF    | P <sub>L(1dB)</sub> | IMD3 @ 64 dBmV |
|----------------|---------|--------|-------------------|-------------------|--------------------|--------------------|--------------------------|-------------------|-------|---------------------|----------------|
|                |         |        | [typ]             | [typ]             | [min]              | [max]              | (dB)                     | (dB)              | [typ] | [typ]               | [typ]          |
|                |         |        | (V)               | (mA)              | (MHz)              | (MHz)              |                          |                   | (dB)  | (dBmV)              | (dBc)          |
| <b>BGA3031</b> | SOT662  | Single | 5                 | 310               | 5                  | 85                 | 34                       | 58                | 3.5   | 74                  | -70            |

## 2-stage variable-gain linear amplifier

| Type      | Package | @              |                | Frequency range | @ 900 MHz           |                   |                  |       | @ 1900 MHz          |                   |                  |       | Limits         |                |                  |
|-----------|---------|----------------|----------------|-----------------|---------------------|-------------------|------------------|-------|---------------------|-------------------|------------------|-------|----------------|----------------|------------------|
|           |         | V <sub>s</sub> | I <sub>s</sub> |                 | Gain <sup>(1)</sup> | DG <sup>(2)</sup> | P <sub>1dB</sub> | ACPR  | Gain <sup>(1)</sup> | DG <sup>(2)</sup> | P <sub>1dB</sub> | ACPR  | V <sub>s</sub> | I <sub>s</sub> | P <sub>tot</sub> |
|           |         | (V)            | (mA)           |                 | (dB)                | (dB)              | (dBm)            | (dBc) | (dB)                | (dB)              | (dBm)            | (dBc) | (V)            | (mA)           | (mW)             |
| BGA2031/1 | SOT363  | 3              | 51             | 800 - 2500      | 24                  | 62                | 11               | 49    | 23                  | 56                | 13               | 49    | 3.3            | 77             | 200              |

<sup>(1)</sup> Gain = GP, power gain    <sup>(2)</sup> DG = gain control range

## Wideband linear mixer

| Type    | Package | @              |                | RF input Frequency range | IF output Frequency range | @ 880 MHz |                     |       | @ 1900 MHz |                     |       | Limits         |                |                  |
|---------|---------|----------------|----------------|--------------------------|---------------------------|-----------|---------------------|-------|------------|---------------------|-------|----------------|----------------|------------------|
|         |         | V <sub>s</sub> | I <sub>s</sub> |                          |                           | NF        | Gain <sup>(1)</sup> | OIP3  | NF         | Gain <sup>(1)</sup> | OIP3  | V <sub>s</sub> | I <sub>s</sub> | P <sub>tot</sub> |
|         |         | (V)            | (mA)           |                          |                           | (dB)      | (dB)                | (dBm) | (dB)       | (dB)                | (dBm) | (V)            | (mA)           | (mW)             |
| BGA2022 | SOT363  | 3              | 6              | 800 - 2500               | 50 - 500                  | 9         | 5                   | 4     | 9          | 6                   | 10    | 4              | 10             | 40               |

**Bold** = highly recommended product

**Bold red** = new, highly recommended product

<sup>(1)</sup> Gain = GP, power gain    <sup>(2)</sup> DG = gain control range

### 3.4.2 Wireless infrastructure ICs

#### IQ modulators for wireless infrastructure

| Type           | Package  | @ V <sub>CC</sub> | @ I <sub>CC</sub> | flo range  | flo   | P <sub>o</sub> | BW <sub>mod</sub> | Nflr(o) *     | P <sub>L(1dB)</sub> | IP2 <sub>o</sub> | IP3 <sub>o</sub> | SBS   | CF    |
|----------------|----------|-------------------|-------------------|------------|-------|----------------|-------------------|---------------|---------------------|------------------|------------------|-------|-------|
|                |          | [typ]             | [typ]             |            |       | [typ]          | [typ]             | [typ]         | [typ]               | [typ]            | [typ]            | [typ] | [typ] |
|                |          | (V)               | (mA)              | (MHz)      | (MHz) | (dBm)          | (MHz)             | (dBm/Hz)      | (dBm)               | (dBm)            | (dBm)            | (dBc) | (dBm) |
| <b>BGX7100</b> | SOT616-3 | 5                 | 165               | 400 - 4000 | 750   | -0.2           | 400               | -159 / -158.5 | 11.5                | 71               | 29               | 55    | -55   |
|                |          |                   | 165               |            | 910   |                |                   | -159 / -158.5 | 11.5                | 72               | 29               | 49    | -55   |
|                |          |                   | 173               |            | 1840  |                |                   | -158.5 / -158 | 11.5                | 69               | 27               | 47    | -50   |
|                |          |                   | 173               |            | 1960  |                |                   | -158.5 / -158 | 11.5                | 72.5             | 27               | 49    | -48   |
|                |          |                   | 178               |            | 2140  |                |                   | -158.5 / -158 | 11.5                | 74               | 27               | 51    | -45   |
|                |          |                   | 178               |            | 2650  |                |                   | -158.5 / -158 | 11.5                | 62               | 26               | 60    | -45   |
|                |          |                   | 184               |            | 3650  |                |                   | -158 / -158   | 11.5                | 60               | 25               | 53    | -43   |
|                |          |                   | 184               |            | 3650  |                |                   | -158 / -158   | 11.5                | 60               | 25               | 53    | -43   |
| <b>BGX7101</b> | SOT616-3 | 5                 | 172               | 400 - 4000 | 750   | 4              | 650               | -159 / -158.5 | 12                  | 71               | 28               | 63    | -51   |
|                |          |                   | 172               |            | 910   |                |                   | -159 / -158.5 | 12                  | 75               | 28               | 49    | -57   |
|                |          |                   | 180               |            | 1840  |                |                   | -158.5 / -158 | 12                  | 71               | 27               | 55    | -50   |
|                |          |                   | 180               |            | 1960  |                |                   | -158.5 / -158 | 12                  | 72               | 27               | 57    | -47   |
|                |          |                   | 178               |            | 2140  |                |                   | -158.5 / -158 | 12                  | 75               | 27               | 63    | -45   |
|                |          |                   | 182               |            | 2650  |                |                   | -158 / -158   | 12                  | 65               | 26               | 50    | -45   |
|                |          |                   | 182               |            | 2650  |                |                   | -158 / -158   | 12                  | 65               | 26               | 50    | -45   |
|                |          |                   | 188               |            | 3650  |                |                   | -158 / -158   | 12                  | 65               | 25               | 57    | -42   |

\* Without modulation/with modulation

#### Dual mixers for wireless infrastructure

| Type           | Package   | @ V <sub>CC</sub> | @ I <sub>CC</sub> | RF input frequency | RF input frequency | Local oscillator frequency | Local oscillator frequency | Second-order spurious rejection 2RF-2LO | NFSSB single-sideband | IP3 <sub>i</sub> | G <sub>conv</sub> |
|----------------|-----------|-------------------|-------------------|--------------------|--------------------|----------------------------|----------------------------|-----------------------------------------|-----------------------|------------------|-------------------|
|                |           | [typ]             | [typ]             | [min]              | [max]              | [min]                      | [max]                      | [max]                                   | [typ]                 | [typ]            | [typ]             |
|                |           | (V)               | (mA)              | (MHz)              | (MHz)              | (MHz)                      | (MHz)                      | (dBc)                                   | (dB)                  | (dBm)            | (dB)              |
| <b>BGX7220</b> | SOT1092-2 | 5                 | 330               | 700                | 950                | 500                        | 1150                       | -60                                     | 10                    | 26               | 8                 |
| <b>BGX7221</b> | SOT1092-2 | 5                 | 365               | 1400               | 2700               | 1500                       | 2500                       | -60                                     | 10                    | 25.5             | 8.5               |

**Bold** = highly recommended product

### 3.4.3 Satellite LNB RF ICs

#### Downconverter with PLL/VCO

| Type             | Package  | Input freq range | V <sub>cc</sub> | I    | G <sub>conv</sub> | NF   | OIP3  | LO Freq     | Integrated phase noise density (degrees RMS) |
|------------------|----------|------------------|-----------------|------|-------------------|------|-------|-------------|----------------------------------------------|
|                  |          |                  | (V)             | (mA) | (dB)              | (dB) | (dBm) | (GHz)       |                                              |
| <b>TFF1012HN</b> | SOT763-1 | 10.7 - 12.75     | 5               | 56   | 30                | 8    | 17    | 9.75 / 10.6 | 1.5                                          |
| <b>TFF1013HN</b> | SOT763-1 | 10.7 - 12.75     | 5               | 56   | 34                | 8    | 17    | 9.75 / 10.6 | 1.5                                          |
| <b>TFF1014HN</b> | SOT763-1 | 10.7 - 12.75     | 5               | 52   | 36                | 7    | 13    | 9.75 / 10.6 | 1.5                                          |
| <b>TFF1015HN</b> | SOT763-1 | 10.7 - 12.75     | 5               | 52   | 39                | 7    | 13    | 9.75 / 10.6 | 1.5                                          |
| <b>TFF1017HN</b> | SOT763-1 | 10.7 - 12.75     | 5               | 52   | 42                | 7    | 13    | 9.75 / 10.6 | 1.5                                          |
| <b>TFF1018HN</b> | SOT763-1 | 10.7 - 12.75     | 5               | 52   | 45                | 7    | 13    | 9.75 / 10.6 | 1.5                                          |

### 3.4.4 VSAT LNB RF ICs

#### Downconverter with PLL/VCO for VSAT

| Type             | Package  | Input freq range | V <sub>cc</sub> | I    | G <sub>conv</sub> | NF   | OIP3  | LO Freq     | Integrated phase noise density (degrees RMS) |
|------------------|----------|------------------|-----------------|------|-------------------|------|-------|-------------|----------------------------------------------|
|                  |          |                  | (V)             | (mA) | (dB)              | (dB) | (dBm) | (GHz)       |                                              |
| <b>TFF1024HN</b> | SOT763-1 | 10.7 - 12.75     | 5               | 54   | 30                | 7    | 16    | 9.75 / 11.3 | 1                                            |

### 3.4.5 Low-noise LO generators for VSAT and general microwave applications

#### Why choose NXP's low-noise LO generators:

- ▶ Lowest total cost of ownership
- ▶ Alignment-free concept
- ▶ Easy circuit design-in
- ▶ Improved LO stability

#### Low-noise LO generators for VSAT applications

| Type             | Package | f <sub>IN(REF)</sub> | V <sub>cc</sub> | I <sub>cc</sub> | PLL phase noise @ N=64,<br>@ 100 kHz | PLL<br>f <sub>o(RF)</sub> | Output buffer  |                       | Input          |
|------------------|---------|----------------------|-----------------|-----------------|--------------------------------------|---------------------------|----------------|-----------------------|----------------|
|                  |         | (MHz)                | Typ             | Typ             | Max                                  |                           | P <sub>o</sub> | RL <sub>out(RF)</sub> | S <sub>i</sub> |
|                  |         |                      | (V)             | (mA)            | (dBc/Hz)                             | (GHz)                     | (dBm)          | (dB)                  | (dBm)          |
| <b>TFF1003HN</b> | SOT616  | 50 - 815             | 3.3             | 100             | -92                                  | 12.8 - 13.05              | -5             | -10                   | -10            |
| <b>TFF1007HN</b> | SOT616  | 230.46 - 234.38      | 3.3             | 100             | -104                                 | 14.62 - 15                | -3             | -10                   | -10            |

#### Low-noise LO generators for general microwave applications

| Type       | Package | f <sub>IN(REF)</sub> | V <sub>cc</sub> | I <sub>cc</sub> | PLL phase noise @ N=64 |          | PLL<br>fo(RF) |       |       | Output buffer<br>P <sub>o</sub> RL <sub>out(RF)</sub> |      | Input<br>S <sub>i</sub> | Frequency band |
|------------|---------|----------------------|-----------------|-----------------|------------------------|----------|---------------|-------|-------|-------------------------------------------------------|------|-------------------------|----------------|
|            |         | (MHz)                | Typ             | Typ             | @ 100 kHz              | @ 10 MHz | Min           | Typ   | Max   | Typ                                                   | Max  | Min                     |                |
|            |         |                      | (V)             | (mA)            | (dBc/Hz)               | (dBc/Hz) | (GHz)         | (GHz) | (GHz) | (dBm)                                                 | (dB) | (dBm)                   |                |
| TFF11088HN | SOT616  | 34 - 562             | 3.3             | 100             | -95                    | -131     | 8.59          | 8.79  | 8.99  | -5                                                    | -10  | -10                     | X              |
| TFF11092HN | SOT616  | 35 - 588             | 3.3             | 100             | -95                    | -131     | 8.99          | 9.2   | 9.41  | -5                                                    | -10  | -10                     | X              |
| TFF11096HN | SOT616  | 37 - 616             | 3.3             | 100             | -95                    | -131     | 9.41          | 9.63  | 9.85  | -5                                                    | -10  | -10                     | X              |
| TFF11101HN | SOT616  | 39 - 633             | 3.3             | 100             | -95                    | -131     | 9.92          | 10.02 | 10.13 | -3                                                    | -10  | -10                     | X              |
| TFF11142HN | SOT616  | 55 - 901             | 3.3             | 100             | -95                    | -131     | 14.3          | 14.27 | 14.42 | -4                                                    | -10  | -10                     | X              |
| TFF11132HN | SOT616  | 51 - 846             | 3.3             | 100             | -95                    | -131     | 12.9          | 13.2  | 13.5  | -5                                                    | -10  | -10                     | Ku             |
| TFF11139HN | SOT616  | 53 - 886             | 3.3             | 100             | -95                    | -131     | 13.54         | 13.85 | 14.17 | -5                                                    | -10  | -10                     | Ka             |
| TFF11145HN | SOT616  | 55 - 927             | 3.3             | 100             | -95                    | -131     | 14.17         | 14.5  | 14.83 | -5                                                    | -10  | -10                     | Ka             |

**Bold** = highly recommended product

**Bold red** = new, highly recommended product

## 3.5 RF MOS transistors

### 3.5.1 JFETs

JFET selection guide on [www.nxp.com/rffets](http://www.nxp.com/rffets)

Easy-to-use parametric filters help you choose the right junction field-effect transistor for your design.

#### Why choose NXP's JFETs:

- Reliable volume supplier
- Short lead time
- Broad portfolio

#### N-channel junction field-effect transistors for switching

| Type     | Package | V <sub>DS</sub> | I <sub>G</sub> | Characteristics  |     |                      |     |                     |                 |       |                 |     |                  |     |
|----------|---------|-----------------|----------------|------------------|-----|----------------------|-----|---------------------|-----------------|-------|-----------------|-----|------------------|-----|
|          |         | (V)             | (mA)           | I <sub>DSS</sub> |     | V <sub>DS(off)</sub> |     | R <sub>DS(on)</sub> | C <sub>rs</sub> |       | t <sub>on</sub> |     | t <sub>off</sub> |     |
|          |         | max             | max            | min              | max | min                  | max | max                 | min             | max   | typ             | max | typ              | max |
| BSR56    | SOT23   | 40              | 50             | 50               | -   | 4                    | 10  | 25                  | -               | 5     | -               | -   | -                | 25  |
| BSR57    | SOT23   | 40              | 50             | 20               | 100 | 2                    | 6   | 40                  | -               | 5     | -               | -   | -                | 50  |
| BSR58    | SOT23   | 40              | 50             | 8                | 80  | 0.8                  | 4   | 60                  | -               | 5     | -               | -   | -                | 100 |
| PMBFJ108 | SOT23   | 25              | 50             | 80               | -   | 3                    | 10  | 8                   | -               | 15    | 4               | -   | 6                | -   |
| PMBFJ109 | SOT23   | 25              | 50             | 40               | -   | 2                    | 6   | 12                  | -               | 15    | 4               | -   | 6                | -   |
| PMBFJ110 | SOT23   | 25              | 50             | 10               | -   | 0.5                  | 4   | 18                  | -               | 15    | 4               | -   | 6                | -   |
| PMBFJ111 | SOT23   | 40              | 50             | 20               | -   | 3                    | 10  | 30                  | -               | typ.3 | 13              | -   | 35               | -   |
| PMBFJ112 | SOT23   | 40              | 50             | 5                | -   | 1                    | 5   | 50                  | -               | typ.3 | 13              | -   | 35               | -   |
| PMBFJ113 | SOT23   | 40              | 50             | 2                | -   | 0.5                  | 3   | 100                 | -               | typ.3 | 13              | -   | 35               | -   |
| PMBF4391 | SOT23   | 40              | 50             | 50               | 150 | 4                    | 10  | 30                  | -               | 3.5   | -               | 15  | -                | 20  |
| PMBF4392 | SOT23   | 40              | 50             | 25               | 75  | 2                    | 5   | 60                  | -               | 3.5   | -               | 15  | -                | 35  |
| PMBF4393 | SOT23   | 40              | 50             | 5                | 30  | 0.5                  | 3   | 100                 | -               | 3.5   | -               | 15  | -                | 50  |

#### P-channel junction field-effect transistors for switching

| Type     | Package | V <sub>DS</sub> | I <sub>G</sub> | Characteristics  |     |                    |      |                     |                 |     |                 |     |                  |     |
|----------|---------|-----------------|----------------|------------------|-----|--------------------|------|---------------------|-----------------|-----|-----------------|-----|------------------|-----|
|          |         |                 |                | I <sub>DSS</sub> |     | V <sub>GSoff</sub> |      | R <sub>DS(on)</sub> | C <sub>rs</sub> |     | t <sub>on</sub> |     | t <sub>off</sub> |     |
|          |         | (V)             | (mA)           | (mA)             |     | (V)                |      | (Ω)                 | (pF)            |     | (ns)            |     | (ns)             |     |
|          |         | max             | max            | min              | max | min                | max  | max                 | min             | max | typ             | max | typ              | max |
| PMBFJ174 | SOT23   | 30              | 50             | 20               | 135 | 5                  | 10   | 85                  | typ.4           |     | 7               | -   | 15               | -   |
| PMBFJ175 | SOT23   | 30              | 50             | 7                | 70  | 3                  | 6    | 125                 | typ.4           |     | 15              | -   | 30               | -   |
| PMBFJ176 | SOT23   | 30              | 50             | 2                | 35  | 1                  | 4    | 250                 | typ.4           |     | 35              | -   | 35               | -   |
| PMBFJ177 | SOT23   | 30              | 50             | 1.5              | 20  | 0.8                | 2.25 | 300                 | typ.4           |     | 45              | -   | 45               | -   |

#### N-channel junction field-effect transistors for general RF applications

| Type                                                              | Package | V <sub>DS</sub> | I <sub>G</sub> | Characteristics  |     |                    |     |                 |     |                 |     |
|-------------------------------------------------------------------|---------|-----------------|----------------|------------------|-----|--------------------|-----|-----------------|-----|-----------------|-----|
|                                                                   |         |                 |                | I <sub>DSS</sub> |     | V <sub>asoff</sub> |     | Y <sub>fs</sub> |     | C <sub>rs</sub> |     |
|                                                                   |         | (V)             | (mA)           | (mA)             |     | (V)                |     | (mS)            |     | (pF)            |     |
|                                                                   |         | max             | max            | min              | max | min                | max | min             | max | min             | max |
| DC, LF, and HF amplifiers                                         |         |                 |                |                  |     |                    |     |                 |     |                 |     |
| BF545A                                                            | SOT23   | 30              | 10             | 2                | 6.5 | 0.4                | 7.5 | 3               | 6.5 | 0.8             | -   |
| BF545B                                                            | SOT23   | 30              | 10             | 6                | 15  | 0.4                | 7.5 | 3               | 6.5 | 0.8             | -   |
| BF545C                                                            | SOT23   | 30              | 10             | 12               | 25  | 0.4                | 7.5 | 3               | 6.5 | 0.8             | -   |
| BF556A                                                            | SOT23   | 30              | 10             | 3                | 7   | 0.5                | 7.5 | 4.5             | -   | 0.8             | -   |
| Pre-amplifiers for AM tuners in car radios                        |         |                 |                |                  |     |                    |     |                 |     |                 |     |
| BF861A                                                            | SOT23   | 25              | 10             | 2                | 6.5 | 0.2                | 1.0 | 12              | 20  | 2.1             | 2.7 |
| BF861B                                                            | SOT23   | 25              | 10             | 6                | 15  | 0.5                | 1.5 | 16              | 25  | 2.1             | 2.7 |
| BF861C                                                            | SOT23   | 25              | 10             | 12               | 25  | 0.8                | 2   | 20              | 30  | 2.1             | 2.7 |
| <b>BF862</b>                                                      | SOT23   | 20              | 10             | 10               | 25  | 0.3                | 2   | 35              | -   | 1.9 (typ)       | -   |
| RF stages FM portables, car radios, main radios, and mixer stages |         |                 |                |                  |     |                    |     |                 |     |                 |     |
| BF510 <sup>(1)</sup>                                              | SOT23   | 20              | 10             | 0.7              | 3   | typ. 0.8           |     | 2.5             |     | 0.4             | 0.5 |
| BF511 <sup>(1)</sup>                                              | SOT23   | 20              | 10             | 2.5              | 7   | typ. 1.5           |     | 4               |     | 0.4             | 0.5 |
| BF512 <sup>(1)</sup>                                              | SOT23   | 20              | 10             | 6                | 12  | typ. 2.2           |     | 6               |     | 0.4             | 0.5 |
| BF513 <sup>(1)</sup>                                              | SOT23   | 20              | 10             | 10               | 18  | typ. 3             |     | 7               |     | 0.4             | 0.5 |
| Low-level general-purpose amplifiers                              |         |                 |                |                  |     |                    |     |                 |     |                 |     |
| BFR30                                                             | SOT23   | 25              | 5              | 4                | 10  | < 5                |     | 1               | 4   | 1.5             | -   |
| BFR31                                                             | SOT23   | 25              | 5              | 1                | 5   | < 2.5              |     | 1.5             | 4.5 | 1.5             | -   |
| General-purpose amplifiers                                        |         |                 |                |                  |     |                    |     |                 |     |                 |     |
| BFT46                                                             | SOT23   | 25              | 5              | 0.2              | 1.5 | < 1.2              |     | > 1             |     | 1.5             | -   |
| AM input stages UHF/VHF amplifiers                                |         |                 |                |                  |     |                    |     |                 |     |                 |     |
| PMBFJ308                                                          | SOT23   | 25              | 50             | 12               | 60  | 1                  | 6.5 | > 10            |     | 1.3             | 2.5 |
| PMBFJ309                                                          | SOT23   | 25              | 50             | 12               | 30  | 1                  | 4   | > 10            |     | 1.3             | 2.5 |
| <b>PMBFJ310</b>                                                   | SOT23   | 25              | 50             | 24               | 60  | 2                  | 6.5 | > 10            |     | 1.3             | 2.5 |
| <b>PMBFJ620</b>                                                   | SOT363  | 25              | 50             | 24               | 60  | 2                  | 6.5 | 10              |     | 1.3             | 2.5 |

**Bold** = highly recommended product

<sup>(1)</sup> Asymmetrical

## 3.5.2 MOSFETs

RF MOSFET selection guide on [www.nxp.com/rfjets](http://www.nxp.com/rfjets)

Easy-to-use parametric filters help you choose the right RF MOSFET for your design.

### Why choose NXP's MOSFETs:

- ▶ Reference designs for TV tuning
- ▶ Short lead time
- ▶ Broad portfolio
- ▶ Smallest packages
- ▶ 2-in-1 FETs for tuner applications
- ▶ Reliable volume supply
- ▶ Highest performing MOSFETs for TV tuning



### N-channel, single MOSFETs for switching

| Type                | Package | V <sub>DS</sub> | Characteristics |                  |     |                     |     |                     |                 |     |                 |     |                  |     |                                    | MODE |                                     |
|---------------------|---------|-----------------|-----------------|------------------|-----|---------------------|-----|---------------------|-----------------|-----|-----------------|-----|------------------|-----|------------------------------------|------|-------------------------------------|
|                     |         |                 | I <sub>D</sub>  | I <sub>DSS</sub> |     | V <sub>GS(th)</sub> |     | R <sub>DS(on)</sub> | C <sub>rs</sub> |     | t <sub>on</sub> |     | t <sub>off</sub> |     | S <sub>21(on)</sub>   <sub>2</sub> |      | S <sub>21(off)</sub>   <sub>2</sub> |
|                     |         | (V)             | (mA)            | (mA)             |     | (V)                 |     | (Ω)                 | (pF)            |     | (ns)            |     | (ns)             |     | (dB)                               |      | (dB)                                |
|                     |         | max             | max             | min              | max | min                 | max | max                 | min             | max | typ             | max | typ              | max | max                                | min  |                                     |
| BSS83               | SOT143  | 10              | 50              | -                | -   | 0.1                 | 2   | 45                  | typ.0.6         |     | -               | 1   | -                | 5   | -                                  | -    | Enh.                                |
| Silicon RF Switches |         |                 |                 |                  |     |                     |     |                     |                 |     |                 |     |                  |     |                                    |      |                                     |
| BF1107              | SOT23   | 3               | 10              | -                | 100 | -                   | 7   | 20                  | -               | -   | -               | -   | -                | -   | 2.5                                | 30   | Depl.                               |
| BF1108              | SOT143B | 3               | 10              | -                | 100 | -                   | 7   | 20                  | -               | -   | -               | -   | -                | -   | 3                                  | 30   | Depl.                               |
| BF1108R             | SOT143R | 3               | 10              | -                | 100 | -                   | 7   | 20                  | -               | -   | -               | -   | -                | -   | 3                                  | 30   | Depl.                               |
| BF1108W             | SOT343  | 3               | 10              | -                | 100 | -                   | 7   | 20                  | -               | -   | -               | -   | -                | -   | 3                                  | 30   | Depl.                               |
| BF1108WR            | SOT343R | 3               | 10              | -                | 100 | -                   | 7   | 20                  | -               | -   | -               | -   | -                | -   | 3                                  | 30   | Depl.                               |
| BF1118              | SOT143B | 3               | 10              | -                | 100 | -                   | 7   | 22                  | -               | -   | -               | -   | -                | -   | 3                                  | 30   | Depl.                               |
| BF1118R             | SOT143R | 3               | 10              | -                | 100 | -                   | 7   | 22                  | -               | -   | -               | -   | -                | -   | 3                                  | 30   | Depl.                               |
| BF1118W             | SOT343  | 3               | 10              | -                | 100 | -                   | 7   | 22                  | -               | -   | -               | -   | -                | -   | 3                                  | 30   | Depl.                               |
| BF1118WR            | SOT343R | 3               | 10              | -                | 100 | -                   | 7   | 22                  | -               | -   | -               | -   | -                | -   | 3                                  | 30   | Depl.                               |

**Bold** = highly recommended product

### N-channel, dual-gate MOSFETs

| Type                | Package | V <sub>DS</sub> | I <sub>D</sub> | Characteristics  |     |                     |      |                 |     |                     |                    |                    |   | VHF | UHF |
|---------------------|---------|-----------------|----------------|------------------|-----|---------------------|------|-----------------|-----|---------------------|--------------------|--------------------|---|-----|-----|
|                     |         |                 |                | I <sub>DSX</sub> |     | V <sub>GS(th)</sub> |      | Y <sub>fs</sub> |     | C <sub>is</sub>     | C <sub>os</sub>    | F @ 800 MHz        |   |     |     |
|                     |         |                 |                | (mA)             |     | (V)                 |      | (mS)            |     | (pF)                | (pF)               | (dB)               |   |     |     |
|                     |         | min             | max            | min              | max | min                 | max  | typ             | typ | typ                 |                    |                    |   |     |     |
| With external bias  |         |                 |                |                  |     |                     |      |                 |     |                     |                    |                    |   |     |     |
| BF908               | SOT143  | 12              | 40             | 3                | 27  | -                   | -2   | 36              | 50  | 3.1                 | 1.7                | 1.5                | X | X   |     |
| BF908R              | SOT143R | 12              | 40             | 3                | 27  | -                   | -2   | 36              | 50  | 3.1                 | 1.7                | 1.5                | X | X   |     |
| BF908WR             | SOT343R | 12              | 40             | 3                | 27  | -                   | -2   | 36              | 50  | 3.1                 | 1.7                | 1.5                | X | X   |     |
| BF991               | SOT143  | 20              | 20             | 4                | 25  | -                   | -2.5 | 10              | -   | 2.1                 | 1.1                | 1                  | X | -   |     |
| BF992               | SOT143  | 20              | 40             | -                | -   | -                   | -1.3 | 20              | -   | 4                   | 2                  | 1.2 <sup>(1)</sup> | X | -   |     |
| BF994S              | SOT143  | 20              | 30             | 4                | 20  | -                   | -2.5 | 15              | -   | 2.5                 | 1                  | 1 <sup>(1)</sup>   | X | -   |     |
| BF996S              | SOT143  | 20              | 30             | 4                | 20  | -                   | -2.5 | 15              | -   | 2.3                 | 0.8                | 1.8                | - | X   |     |
| BF998               | SOT143  | 12              | 30             | 2                | 18  | -                   | -2.0 | 21              | -   | 2.1                 | 1.05               | 1                  | X | X   |     |
| BF998R              | SOT143R | 12              | 30             | 2                | 18  | -                   | -2.0 | 21              | -   | 2.1                 | 1.05               | 1                  | X | X   |     |
| BF998WR             | SOT343R | 12              | 30             | 2                | 18  | -                   | -2.5 | 22              | -   | 2.1                 | 1.05               | 1                  | X | X   |     |
| Fully internal bias |         |                 |                |                  |     |                     |      |                 |     |                     |                    |                    |   |     |     |
| BF1105R             | SOT343R | 7               | 30             | 8                | 16  | -                   | 0.3  | 2               | 25  | -2.2 <sup>(3)</sup> | 1.2 <sup>(2)</sup> | 1.7                | X | X   |     |

<sup>(1)</sup> @ 200 MHz

<sup>(2)</sup> COSS

<sup>(3)</sup> Cig

## 3.6 RF modules

CATV module selection guide on [www.nxp.com/catv](http://www.nxp.com/catv)  
Easy-to-use parametric filters help you choose the right CATV module for your design.

### Why choose NXP's RF modules:

- ▶ Excellent linearity, stability, and reliability
- ▶ Rugged construction
- ▶ Extremely low noise
- ▶ High power gain
- ▶ Low total cost of ownership

### CATV types for Chinese (C-types) and 1 GHz GaAs HFET line-ups

The C-types are specially designed for the Chinese market, customized for two major governmental projects. The GaAs HFET family includes a complete 1 GHz line-up for high-end applications around the world.

### C-types (China)

- ▶ CATV push-pulls, section 3.6.1: BGY588C, BGE788C, CGY888C
- ▶ CATV power doublers, section 3.6.3: BGD712C, CGD982HCi, CGD985HCi, CGD987HCi
- ▶ CATV optical receivers, section 3.6.4: BGO807C, BGO807CE

### 1 GHz GaAs HFET high-end hybrids

- ▶ CATV push-pulls, section 3.6.2: CGY1032, CGY1041, CGY1043, CGY1047, CGY1049
- ▶ CATV power doublers, section 3.6.3: CGD1040Hi, CGD1042Hi, CGD1044Hi, CGD1046Hi, CGD1042H, CGD1044H

### 3.6.1 CATV push-pulls

| Type    | Frequency range (MHz) <sup>(1)</sup> | Gain (dB)   | Slope (dB) | FL (dB) <sup>(2)</sup> | RL <sub>IN</sub> /RL <sub>OUT</sub> (dB) | CTB (dB) <sup>(3)</sup> | X <sub>mod</sub> (dB) <sup>(3)</sup> | CSO (dB) <sup>(3)</sup> | @ Ch | @ Vo (dBmV) | NF @ f <sub>max</sub> (dB) | I <sub>tot</sub> (mA) |
|---------|--------------------------------------|-------------|------------|------------------------|------------------------------------------|-------------------------|--------------------------------------|-------------------------|------|-------------|----------------------------|-----------------------|
| BGY588C | 40 - 550                             | 33.5 - 35.5 | 0.2 - 1.7  | 0.5                    | 16 / 16                                  | -57                     |                                      | -62                     | 77   | 44          | 8                          | 345                   |
| BGY785A | 40 - 750                             | 18 - 19     | 0 - 2      | 0.1                    | 20 / 20                                  | -54.5                   | -57.5                                | -62                     | 110  | 44          | 6                          | 225                   |
| BGE788C |                                      | 33.2 - 35.2 | 0.3 - 2.3  | 0.6                    | 16 / 16                                  | -49                     |                                      | -52                     | 110  | 44          | 8                          | 325                   |
| BGY787  |                                      | 21 - 22     | 0 - 1.5    | 0.2                    | 20 / 20                                  | -54.5                   | -54                                  | -57.5                   | 110  | 44          | 5                          | 220                   |
| BGE787B |                                      | 28.5 - 29.5 | 0.2 - 2.2  | 0.45                   | 20 / 20                                  | -48                     | -52                                  | -56                     | 110  | 44          | 6.5                        | 340                   |
| BGE885  | 40 - 870                             | 16.5 - 17.5 | 0.2 - 1.2  | 0.5                    | 14 / 14                                  |                         |                                      |                         |      |             | 8                          | 240                   |
| BGX885N |                                      | 16.5 - 17.5 | 0.2 - 1.4  | 0.3                    | 20 / 20                                  |                         |                                      |                         |      |             | 8                          | 240                   |
| BGY885A |                                      | 18 - 19     | 0 - 2      | 0.2                    | 20 / 20                                  | -65                     | -65                                  | -67                     | 49   | 44          | 6                          | 225                   |
| BGY887  |                                      | 21 - 22     | 0.2 - 2    | 0.2                    | 20 / 20                                  | -64.5                   | -64.5                                | -67.5                   | 49   | 44          | 5                          | 220                   |
| CGY888C |                                      | 34.5 - 36.5 | 1.5        | 0.25                   | 20 / 20                                  | -65                     | -72                                  | -63                     | 112  | 44          | 4                          | 280                   |
| BGY835C |                                      | 33.5 - 34.5 | 0.5 - 2.5  | 0.5                    | 20 / 20                                  | -60                     |                                      | -55                     | 49   | 44          | 7                          | 340                   |
| BGY887B |                                      | 28.5 - 29.5 | 0.5 - 2.5  | 0.5                    | 20 / 20                                  | -60                     | -60                                  | -60                     | 49   | 44          | 6.5                        | 340                   |
| BGY888  |                                      | 33.5 - 34.5 | 0.5 - 2.5  | 0.2                    | 20 / 20                                  | -63.5                   | -63                                  | -64                     | 49   | 44          | 5.5                        | 325                   |

### 3.6.2 CATV push-pulls 1 GHz

| Type           | Frequency range (MHz) <sup>(1)</sup> | Gain (dB) | Slope (dB)  | FL (dB) <sup>(1)</sup> | RL <sub>IN</sub> /RL <sub>OUT</sub> (dB) | CTB (dB) <sup>(3)</sup> | X <sub>mod</sub> (dB) <sup>(3)</sup> | CSO (dB) <sup>(3)</sup> | @ Ch                                   | @ Vo (dBmV) | NF @ f <sub>max</sub> (dB) | I <sub>tot</sub> (mA) |
|----------------|--------------------------------------|-----------|-------------|------------------------|------------------------------------------|-------------------------|--------------------------------------|-------------------------|----------------------------------------|-------------|----------------------------|-----------------------|
| <b>CGY1041</b> | 40 - 1003                            | 21 - 22.5 | 1.2 - 2.7   | 0.9                    | 20 / 18                                  | -62                     | -58                                  | -64                     | 79 NTSC channels + 75 digital channels | 44          | 4.3                        | 265                   |
| <b>CGY1043</b> |                                      | 23 - 24.5 | 1.2 - 2.7   | 0.9                    | 20 / 18                                  | -62                     | -58                                  | -64                     | 79 NTSC channels + 75 digital channels | 44          | 4.2                        | 265                   |
| <b>CGY1047</b> |                                      | 27 - 28.5 | 1.5 - 2.5   | 0.8                    | 20 / 18                                  | -64                     | -60                                  | -66                     | 79 NTSC channels + 75 digital channels | 44          | 4.5                        | 250                   |
| <b>CGY1049</b> |                                      | 29 - 31   | 0.85 - 2.35 | 0.85                   | 20 / 18                                  | -62                     | -58                                  | -64                     | 79 NTSC channels + 75 digital channels | 44          | 4.5                        | 265                   |
| <b>CGY1032</b> |                                      | 32 - 34   | 1.05 - 2.55 | 0.85                   | 20 / 18                                  | -62                     | -58                                  | -64                     | 79 NTSC channels + 75 digital channels | 44          | 4.4                        | 265                   |
| BGY1085A       |                                      | 18 - 19   | 0 - 2       | 0.3                    | 20 / 20                                  | -53                     | -54                                  | -56                     | 150                                    | 40          | 7.5                        | 240                   |

**Bold** = highly recommended product

<sup>(1)</sup> Frequency range: minimum and maximum frequency in MHz at which data are characterized (@ Ch / @ Vo)

<sup>(2)</sup> FL is flatness of frequency response

<sup>(3)</sup> The number of channels and the output voltage at which CTB, Xmod, CSO, IMD2, and IMD3 are characterized, are @ f<sub>max</sub>

<sup>(4)</sup> S is minimum responsivity of optical receivers

### 3.6.3 CATV power doublers

| Type             | Frequency range (MHz) <sup>(1)</sup> | Gain (dB)   | Slope (dB) | FL (dB) <sup>(1)</sup> | RL <sub>IN</sub> /RL <sub>OUT</sub> (dB) | CTB (dB) <sup>(3)</sup> | X <sub>mod</sub> (dB) <sup>(3)</sup> | CSO (dB) <sup>(3)</sup> | @ Ch | @ Vo (dBmV) | NF @ f <sub>max</sub> (dB) | I <sub>tot</sub> (mA) |
|------------------|--------------------------------------|-------------|------------|------------------------|------------------------------------------|-------------------------|--------------------------------------|-------------------------|------|-------------|----------------------------|-----------------------|
| BGD712           | 40 - 750                             | 18.2 - 18.8 | 0.5 - 1.5  | 0.35                   | 17 / 17                                  | -62                     | -63                                  | -63                     | 112  | 44          | 7                          | 395                   |
| BGD712C          |                                      | 18.2 - 18.8 | 0.5 - 1.5  | 0.35                   | 17 / 17                                  | -62                     | -63                                  | -63                     | 112  | 44          | 7                          | 410                   |
| BGD714           |                                      | 20 - 20.6   | 0.5 - 1.5  | 0.35                   | 23 / 23                                  | -61                     | -62                                  | -62                     | 112  | 44          | 7                          | 395                   |
| BGD812           | 40 - 870                             | 18.2 - 18.8 | 0.4 - 1.4  | 0.5                    | 25 / 23                                  | -57                     | -62                                  | -58                     | 132  | 44          | 7.5                        | 395                   |
| BGD814           |                                      | 19.7 - 20.3 | 0.5 - 1.5  | 0.5                    | 25 / 24                                  | -56                     | -61                                  | -57                     | 132  | 44          | 7.5                        | 395                   |
| BGD816L          |                                      | 21.2 - 21.8 | 0.5 - 1.5  | 0.5                    | 22 / 25                                  | -55                     | -58                                  | -56                     | 132  | 44          | 7.5                        | 360                   |
| CGD942C          |                                      | 22 - 24     | 1 - 2      | 0.5                    | 20 / 20                                  | -66                     | -66                                  | -66                     | 98   | 48          | 3.5                        | 450                   |
| CGD944C          |                                      | 24 - 26     | 1 - 2      | 0.5                    | 20 / 20                                  | -66                     | -66                                  | -66                     | 98   | 48          | 3.5                        | 450                   |
| <b>CGD1040HI</b> | 40 - 1003                            | 19.5 - 22   | 0.5 - 2    | 1                      | 20 / 20                                  | -70                     | -66                                  | -76                     | 79   | 58.4        | 5.5                        | 440                   |
| <b>CGD1042HI</b> |                                      | 22 - 23.5   | 0.5 - 2    | 1                      | 20 / 20                                  | -70                     | -65                                  | -75                     | 79   | 58.4        | 5.5                        | 440                   |
| <b>CGD1044HI</b> |                                      | 23.5 - 25.5 | 0.5 - 2    | 1                      | 20 / 20                                  | -70                     | -64                                  | -75                     | 79   | 58.4        | 5                          | 440                   |
| <b>CGD1046HI</b> |                                      | 26.5 - 28   | 0.7 - 2.2  | 1                      | 20 / 20                                  | -75                     | -68                                  | -70                     | 79   | 56.4        | 5                          | 450                   |
| CGD1042H         |                                      | 22 - 24     | 1.5        | 0.5                    | 20 / 21                                  | -75                     | -67                                  | -76                     | 79   | 59          | 5                          | 450                   |
| CGD1044H         |                                      | 24 - 26     | 1          | 0.5                    | 20 / 21                                  | -75                     | -67                                  | -76                     | 79   | 59          | 5                          | 450                   |
| <b>CGD982HCI</b> |                                      | 22 - 24     | 0.5 - 2    | 1                      | 20 / 20                                  | -66                     | -68                                  | -69                     | 98   | 48          | 5.5                        | 440                   |
| <b>CGD985HCI</b> |                                      | 23.5 - 25.5 | 0.5 - 2    | 1                      | 20 / 20                                  | -66                     | -68                                  | -69                     | 98   | 48          | 5                          | 440                   |
| <b>CGD987HCI</b> |                                      | 26 - 28     | 0.7 - 2    | 1                      | 20 / 20                                  | -66                     | -68                                  | -66                     | 98   | 48          | 5                          | 440                   |
| <b>CGD982LC</b>  |                                      | 22 - 24     | 0.5 - 2    | 0.8                    | 20 / 20                                  | -65                     | -60                                  | -70                     | 98   | 48          | 6.5                        | 365                   |
| <b>CGD985LC</b>  |                                      | 24 - 26     | 0.5 - 2    | 0.8                    | 20 / 20                                  | -65                     | -60                                  | -70                     | 98   | 48          | 6.5                        | 365                   |
| <b>CGD1042L</b>  |                                      | 22 - 24     | 0.5 - 2    | 0.8                    | 20 / 20                                  | -75                     | -68                                  | -77                     | 79   | 54          | 6.5                        | 375                   |

### 3.6.4 CATV optical receivers

| Type            | Frequency range (MHz) <sup>(1)</sup> | S (V/W) <sup>(4)</sup> | Slope (dB) | FL (dB) <sup>(1)</sup> | RL <sub>OUT</sub> (dB) | IMD3 (dB) <sup>(3)</sup> | IMD2 (dB) <sup>(3)</sup> | @ f <sub>measured</sub> (MHz) | @ P <sub>lept</sub> (mW) | NF @ f <sub>max</sub> (dB) | I <sub>tot</sub> (mA) | Connectors |
|-----------------|--------------------------------------|------------------------|------------|------------------------|------------------------|--------------------------|--------------------------|-------------------------------|--------------------------|----------------------------|-----------------------|------------|
| BGO807C         | 40 - 870                             | 750                    | 0 - 2      | 1                      | 11                     | -71                      | -55                      | 854.5                         | 1                        | 8.5                        | 205                   | FC and SC  |
| <b>BGO807CE</b> |                                      | 750                    | 0 - 2      | 1                      | 11                     | -69                      | -53                      | 854.5                         | 1                        | 8.5                        | 205                   | FC and SC  |

### 3.6.5 CATV reverse hybrids

| Type   | Frequency range (MHz) <sup>(1)</sup> | Gain (dB)   | Slope (dB) | FL (dB) <sup>(1)</sup> | RL <sub>IN</sub> /RL <sub>OUT</sub> (dB) | CTB (dB) <sup>(3)</sup> | X <sub>mod</sub> (dB) <sup>(3)</sup> | CSO (dB) <sup>(3)</sup> | @ Ch | @ Vo (dBmV) | NF @ f <sub>max</sub> (dB) | I <sub>tot</sub> (mA) |
|--------|--------------------------------------|-------------|------------|------------------------|------------------------------------------|-------------------------|--------------------------------------|-------------------------|------|-------------|----------------------------|-----------------------|
| BGY68  | 5 - 75                               | 29.2 - 30.8 | -0.2 - 0.5 | 0.2                    | 20 / 20                                  | -68                     | -60                                  |                         | 4    | 50          | 3.5                        | 135                   |
| BGY66B | 5 - 120                              | 24.5 - 25.5 | -0.2 - 0.5 | 0.2                    | 20 / 20                                  | -66                     | -54                                  |                         | 14   | 48          | 5                          | 135                   |
| BGY67  | 5 - 200                              | 21.5 - 22.5 | -0.2 - 0.5 | 0.2                    | 20 / 20                                  | -67                     | -60                                  |                         | 22   | 50          | 5.5                        | 215                   |
| BGY67A |                                      | 23.5 - 24.5 | -0.2 - 0.5 | 0.2                    | 20 / 20                                  | -67                     | -59                                  |                         | 22   | 50          | 5.5                        | 215                   |
| BGR269 |                                      | 34.5 - 35.5 | -0.2 - 0.6 | 0.5                    | 20 / 20                                  | -57                     | -50                                  | -66                     | 28   | 50          | 5.5                        | 160                   |

**Bold** = highly recommended product

<sup>(1)</sup> Frequency range: minimum and maximum frequency in MHz at which data are characterized (@ Ch / @ Vo)

<sup>(2)</sup> FL is flatness of frequency response

<sup>(3)</sup> The number of channels and the output voltage at which CTB, X<sub>mod</sub>, CSO, IMD2, and IMD3 are characterized, are @ f<sub>max</sub>

<sup>(4)</sup> S is minimum responsivity of optical receivers





### 3.7 RF power transistors

### 3.7.1 RF power transistors for base stations

## Device naming conventions RF power transistors for base stations

| B | L | F | 8 | G | 22 | L | S | -45 | P | R | B | N | G | V | A                                        |
|---|---|---|---|---|----|---|---|-----|---|---|---|---|---|---|------------------------------------------|
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | asymmetrical Doherty                     |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | video bandwidth enhanced                 |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | gullwing-shaped leads                    |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | specialty                                |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | option: current sense lead               |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | enhanced ruggedness                      |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | push-pull device                         |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | P1dB power                               |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | option: earless package                  |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | option: low thermal resistivity          |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | operating frequency (in 100MHz; maximum) |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | G: standard                              |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | H: high voltage LDMOS (50V)              |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | LDMOS technology generation              |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | F: ceramic package                       |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | C: air cavity plastic (ACP) package      |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | D: fully integrated Doherty amplifier    |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | M: MMIC module                           |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | P: overmolded plastic package (OMP)      |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | L: high frequency power transistor       |
|   |   |   |   |   |    |   |   |     |   |   |   |   |   |   | B: semiconductor die made of Si          |

## Why choose NXP's RF power transistors for base stations:

- ▶ Leading technology (generations 6, 7, and 8 of LDMOS)
- ▶ Highest efficiency
- ▶ Best ruggedness
- ▶ Advanced Doherty amplifier designs
- ▶ Very broadband (video bandwidth enhanced) devices
- ▶ Industry's first 3.8 GHz Doherty
- ▶ Industry's first three-way, 900 MHz Doherty
- ▶ Industry's first 50 V, 600 W, single-package Doherty

NXP offers complete line-ups of RF power transistors operating from 800 MHz right up to 3.8 GHz for base stations, covering all cellular technologies [MC-GSM/EDGE, TDMA, (TD-S)CDMA, W-CDMA/UMTS, LTE] and WiMAX infrastructures.

### 3.7.1.1 0.7 - 1.0 GHz line-up

|                     |              |                           |                           |             |          | Test signal performance |                       |            |                       |                        |             |           |
|---------------------|--------------|---------------------------|---------------------------|-------------|----------|-------------------------|-----------------------|------------|-----------------------|------------------------|-------------|-----------|
| Type                | Product      | f <sub>min</sub><br>(MHz) | f <sub>max</sub><br>(MHz) | P1dB<br>(W) | Matching | VDS<br>(V)              | P <sub>L</sub><br>(W) | BO<br>(dB) | η <sub>D</sub><br>(%) | G <sub>p</sub><br>(dB) | Test signal | Package   |
| BLP7G22-05          | Driver       | 700                       | 2200                      | 5           | -        | 28                      | 1                     | 7.0        | 26                    | 17                     | 2-c WCDMA   | SOT1179   |
| BLF6G21-10G         |              | 1                         | 2200                      | 10          | -        | 28                      | 0.7                   | 11.5       | 15                    | 18.5                   | 2-c WCDMA   | SOT538    |
| BLP7G22-10          |              | 700                       | 2200                      | 10          | -        | 28                      | 2                     | 7.0        | 26                    | 17                     | 2-c WCDMA   | SOT1179   |
| BLM6G10-30(G)       | MMIC         | 920                       | 960                       | 30          | I/O      | 28                      | 2                     | 11.8       | 11.5                  | 29                     | 2-c WCDMA   | SOT822    |
| BLF6G10L-40BRN      |              | 700                       | 1000                      | 40          | I        | 28                      | 2.5                   | 12.1       | 15                    | 23                     | 2-c WCDMA   | SOT1112   |
| BLF6G10(S)-45       | Driver/final | 700                       | 1000                      | 45          | I        | 28                      | 1                     | 16.5       | 8                     | 23                     | 2-c WCDMA   | SOT608    |
| BLP8G10S-45P(G)     |              | 700                       | 1000                      | 45          | I/O      | 28                      | 2.5                   | 12.6       | 21.4                  | 21.5                   | 2-c WCDMA   | SOT1223/4 |
| BLF6G10(LS)-135RN   |              | 700                       | 1000                      | 135         | I        | 28                      | 26.5                  | 7.1        | 28                    | 21                     | 2-c WCDMA   | SOT502    |
| BLP7G07S-140P       |              | 700                       | 900                       | 140         | O        | 28                      | 35                    | 6.0        | 28                    | 19                     | 2-c WCDMA   | SOT1223   |
| BLP7G09S-140P(G)*   |              | 900                       | 1000                      | 140         | O        | 28                      | 35                    | 6.0        | 28                    | 19                     | 2-c WCDMA   | SOT1223/4 |
| BLF6G10(LS)-160RN   |              | 700                       | 1000                      | 160         | I        | 32                      | 32                    | 7.0        | 27                    | 22.5                   | 2-c WCDMA   | SOT502    |
| BLF6H10L(S)-160     |              | 700                       | 1000                      | 160         | -        | 50                      | 45                    | 5.5        | 30                    | 20                     | 2-c WCDMA   | SOT467    |
| BLF8G10L(S)-160     |              | 920                       | 960                       | 160         | I/O      | 30                      | 35                    | 6.6        | 29                    | 19.7                   | 2-c WCDMA   | SOT502    |
| BLF8G10LS-160V      |              | 925                       | 960                       | 160         | I/O      | 30                      | 35                    | 6.6        | 29                    | 20                     | 2-c WCDMA   | SOT1244   |
| BLF6G10(LS)-200RN   |              | 688                       | 1000                      | 200         | I        | 28                      | 40                    | 7.0        | 28.5                  | 20                     | 2-c WCDMA   | SOT502    |
| BLP8G10S-200P(G)*   | Final        | 700                       | 1000                      | 200         | I/O      | 28                      | 40                    | 7.0        | 28.5                  | 20                     | 2-c WCDMA   | SOT1223/4 |
| BLF7G10L(S)-250     |              | 920                       | 960                       | 250         | I/O      | 30                      | 60                    | 6.2        | 30.5                  | 19.5                   | 2-c WCDMA   | SOT502    |
| BLF6G10L(S)-260PRN  |              | 700                       | 1000                      | 260         | I        | 28                      | 40                    | 8.1        | 26.5                  | 22                     | 2-c WCDMA   | SOT539    |
| BLF8G10LS-270       |              | 820                       | 960                       | 270         | I/O      | 28                      | 67                    | 6.1        | 33                    | 18.5                   | 2-c WCDMA   | SOT502    |
| BLF8G10LS-270(G)V   |              | 720                       | 960                       | 270         | I/O      | 28                      | 50                    | 7.3        | 27                    | 19.6                   | 2-c WCDMA   | SOT1244   |
| BLF8G10LS-300PV*    |              | 700                       | 1000                      | 300         | I/O      | 28                      | 62                    | 6.8        | 43                    | 18                     | 2-c WCDMA   | SOT1247   |
| BLF8G09LS-400PG(V)* |              | 700                       | 1000                      | 400         | I/O      | 28                      | 79                    | 7.0        | 27                    | 19.4                   | 2-c WCDMA   | SOT1242   |

**Bold red** = new, highly recommended product

\* Check status in section 3.1, as this type is not yet released for mass production

### 3.7.1.2 1.4 - 1.6 GHz line-up

| Type              | Product      | f <sub>min</sub><br>(MHz) | f <sub>max</sub><br>(MHz) | P1dB<br>(W) | Matching | Test signal performance |                       |            |                       |                        |             | Package |
|-------------------|--------------|---------------------------|---------------------------|-------------|----------|-------------------------|-----------------------|------------|-----------------------|------------------------|-------------|---------|
|                   |              |                           |                           |             |          | VDS<br>(V)              | P <sub>L</sub><br>(W) | BO<br>(dB) | η <sub>D</sub><br>(%) | G <sub>p</sub><br>(dB) | Test signal |         |
| BLP7G22-05        | Driver       | 700                       | 2200                      | 5           | -        | 28                      | 1                     | 7.0        | 26                    | 17                     | 2-c WCDMA   | SOT1179 |
| BLF6G21-10G       |              | 1                         | 2200                      | 10          | -        | 28                      | 0.7                   | 11.5       | 15                    | 18.5                   | 2-c WCDMA   | SOT538  |
| BLP7G22-10        |              | 700                       | 2200                      | 10          | -        | 28                      | 2                     | 7.0        | 26                    | 17                     | 2-c WCDMA   | SOT1179 |
| BLF6G15LS-40RN    | Driver/final | 1450                      | 1550                      | 40          | I/O      | 28                      | 2.5                   | 12.0       | 13                    | 21.5                   | 2-c WCDMA   | SOT1135 |
| BLF7G15LS-200     | Final        | 1450                      | 1550                      | 200         | I/O      | 28                      | 50                    | 6.0        | 29                    | 19.5                   | 2-c WCDMA   | SOT502  |
| BLF6G15LS-250PBRN |              | 1450                      | 1550                      | 250         | I/O      | 28                      | 60                    | 6.2        | 33                    | 18.5                   | 2-c WCDMA   | SOT1110 |
| BLF7G15LS-300P    |              | 1450                      | 1550                      | 300         | I/O      | 28                      | 85                    | 5.5        | 31                    | 18                     | 2-c WCDMA   | SOT539  |

### 3.7.1.3 1.8 - 2.0 GHz line-up

| Type                   | Product      | f <sub>min</sub><br>(MHz) | f <sub>max</sub><br>(MHz) | P1dB<br>(W) | Matching | Test signal performance |                       |            |                       |                        |             | Package |
|------------------------|--------------|---------------------------|---------------------------|-------------|----------|-------------------------|-----------------------|------------|-----------------------|------------------------|-------------|---------|
|                        |              |                           |                           |             |          | VDS<br>(V)              | P <sub>L</sub><br>(W) | BO<br>(dB) | η <sub>D</sub><br>(%) | G <sub>p</sub><br>(dB) | Test signal |         |
| BLP7G22-05             | Driver       | 700                       | 2200                      | 5           | -        | 28                      | 1                     | 7.0        | 26                    | 17                     | 2-c WCDMA   | SOT1179 |
| BLF6G21-10G            |              | 1                         | 2200                      | 10          | -        | 28                      | 0.7                   | 11.5       | 15                    | 18.5                   | 2-c WCDMA   | SOT538  |
| BLP7G22-10             |              | 700                       | 2200                      | 10          | -        | 28                      | 2                     | 7.0        | 26                    | 17                     | 2-c WCDMA   | SOT1179 |
| BLF6G20-40             | Driver/final | 1800                      | 2000                      | 40          | I/O      | 28                      | 2.5                   | 12.0       | 15                    | 18.8                   | 2-c WCDMA   | SOT608  |
| BLM7G1822S-40PB(G)*    | MMIC         | 1800                      | 2200                      | 40          | I/O      | 28                      | 2                     | 13.0       | 11                    | 30                     | 2-c WCDMA   | SOT1212 |
| BLF6G20(S)-45          | Driver/final | 1800                      | 2000                      | 45          | I/O      | 28                      | 2.5                   | 12.6       | 14                    | 19.2                   | 2-c WCDMA   | SOT608  |
| BLF6G20(LS)-75         | Final        | 1800                      | 2000                      | 75          | I/O      | 28                      | 29.5                  | 4.1        | 37.5                  | 19                     | GSM EDGE    | SOT502  |
| BLF6G20(LS)-110        |              | 1800                      | 2000                      | 110         | I/O      | 28                      | 25                    | 6.4        | 32                    | 19                     | 2-c WCDMA   | SOT502  |
| BLF6G20LS-140          |              | 1800                      | 2000                      | 140         | I/O      | 28                      | 35.5                  | 6.0        | 30                    | 16.5                   | 2-c WCDMA   | SOT502  |
| BLF7G20LS-140P         |              | 1800                      | 2000                      | 140         | I/O      | 28                      | 60                    | 3.7        | 41                    | 17.5                   | GSM EDGE    | SOT1121 |
| BLF7G21LS-160          |              | 1800                      | 2050                      | 160         | I/O      | 28                      | 45                    | 5.5        | 34                    | 18                     | 2-c WCDMA   | SOT1121 |
| BLF7G21LS-160P         |              | 1800                      | 2050                      | 160         | I/O      | 28                      | 45                    | 5.5        | 34                    | 18                     | 2-c WCDMA   | SOT1121 |
| BLP8G21S-160PV*        |              | 1800                      | 2025                      | 160         | I/O      | 28                      | 45                    | 5.5        | 33                    | 18                     | 2-c WCDMA   | SOT1223 |
| <b>BLF8G19LS-170BV</b> |              | 1800                      | 1990                      | 170         | I/O      | 32                      | 60                    | 4.5        | 32                    | 18                     | 2-c WCDMA   | SOT1120 |
| BLF6G20-180PN          |              | 1800                      | 2000                      | 180         | I/O      | 32                      | 50                    | 5.6        | 29.5                  | 18                     | 2-c WCDMA   | SOT539  |
| BLF6G20(LS)-180RN      |              | 1800                      | 2000                      | 180         | I/O      | 30                      | 40                    | 6.5        | 27                    | 17.2                   | 2-c WCDMA   | SOT502  |
| BLF7G20LS-200          |              | 1805                      | 1990                      | 200         | I/O      | 28                      | 55                    | 5.6        | 33                    | 18                     | 2-c WCDMA   | SOT502  |
| <b>BLF8G20LS-200V</b>  |              | 1800                      | 2000                      | 200         | I/O      | 28                      | 55                    | 5.6        | 33                    | 17.5                   | 2-c WCDMA   | SOT1120 |
| BLF8G20LS-220          |              | 1800                      | 1900                      | 220         | I/O      | 28                      | 55                    | 6.0        | 31                    | 17                     | 2-c WCDMA   | SOT502  |
| BLF8G20LS-220V*        |              | 1800                      | 1900                      | 220         | I/O      | 28                      | 55                    | 6.0        | 31                    | 17                     | 2-c WCDMA   | SOT1120 |
| BLF7G20LS-250P         |              | 1805                      | 1880                      | 250         | I/O      | 28                      | 70                    | 5.5        | 35                    | 18                     | 2-c WCDMA   | SOT539  |
| <b>BLF8G20LS-260A</b>  |              | 1800                      | 1900                      | 260         | I/O      | 28                      | 50                    | 7.2        | 44 *                  | 15.5                   | 2-c WCDMA   | SOT539  |
| BLF8G20LS-400P(G)V*    |              | 1800                      | 1900                      | 400         | I/O      | 28                      | 80                    | 7.0        | 27                    | 19                     | 2-c WCDMA   | SOT1242 |
| BLF8G20LS-410P(G)V*    |              | 1800                      | 1900                      | 400         | I/O      | 28                      | 80                    | 7.0        | 27                    | 19                     | 2-c WCDMA   | SOT1242 |

### 3.7.1.4 2.0 - 2.2 GHz line-up

| Type                     | Product            | f <sub>min</sub><br>(MHz) | f <sub>max</sub><br>(MHz) | P1dB<br>(W) | Matching | Test signal performance |                       |            |                       |                        |             | Package   |
|--------------------------|--------------------|---------------------------|---------------------------|-------------|----------|-------------------------|-----------------------|------------|-----------------------|------------------------|-------------|-----------|
|                          |                    |                           |                           |             |          | VDS<br>(V)              | P <sub>L</sub><br>(W) | BO<br>(dB) | η <sub>D</sub><br>(%) | G <sub>p</sub><br>(dB) | Test signal |           |
| BLP7G22-05               | Driver             | 700                       | 2200                      | 5           | -        | 28                      | 1                     | 7.0        | 26                    | 17                     | 2-c WCDMA   | SOT1179   |
| BLF6G21-10G              |                    | 1                         | 2200                      | 10          | -        | 28                      | 0.7                   | 11.5       | 15                    | 18.5                   | 2-c WCDMA   | SOT538    |
| BLP7G22-10               |                    | 700                       | 2200                      | 10          | -        | 28                      | 2                     | 7.0        | 26                    | 17                     | 2-c WCDMA   | SOT1179   |
| BLM6G22-30(G)            | MMIC               | 2100                      | 2200                      | 30          | I/O      | 28                      | 2                     | 11.8       | 9                     | 29.5                   | 2-c WCDMA   | SOT822    |
| BLF6G22L-40BN            | Driver/final       | 2000                      | 2200                      | 40          | I/O      | 28                      | 2.5                   | 12.0       | 16                    | 19                     | 2-c WCDMA   | SOT1112   |
| BLF6G22LS-40BN           |                    | 2000                      | 2200                      | 40          | I/O      | 28                      | 2.5                   | 12.0       | 16                    | 19                     | 2-c WCDMA   | SOT1112   |
| BLF6G22LS-40P            |                    | 2110                      | 2170                      | 40          | I/O      | 28                      | 13.5                  | 4.7        | 30                    | 19                     | 2-c WCDMA   | SOT1121   |
| BLM7G1822S-40PB(G)*      | MMIC               | 1800                      | 2200                      | 40          | I/O      | 28                      | 2                     | 13.0       | 11                    | 30                     | 2-c WCDMA   | SOT1212   |
| BLF6G22(S)-45            | Driver/final       | 2000                      | 2200                      | 45          | I/O      | 28                      | 2.5                   | 12.6       | 13                    | 18.5                   | 2-c WCDMA   | SOT608    |
| BLD6G21LS-50             | Integrated Doherty | 2010                      | 2025                      | 50          | O        | 28                      | 8                     | 8.0        | 43                    | 14.5                   | TD-SCDMA    | SOT1130   |
| BLD6G22LS-50             |                    | 2110                      | 2170                      | 50          | I/O      | 28                      | 8                     | 8.0        | 40                    | 14                     | TD-SCDMA    | SOT1130   |
| BLM7G22S-60PB(G)         | Final              | 2000                      | 2200                      | 60          | I/O      | 28                      | 3.2                   | 12.7       | 10                    | 30                     | 2-c WCDMA   | SOT1212   |
| BLP8G22S-60P(G)*         |                    | 1800                      | 2200                      | 60          | I/O      | 28                      | 4                     | 11.8       | 20                    | 18                     | 2-c WCDMA   | SOT1223/4 |
| BLF6G22LS-75             |                    | 2000                      | 2200                      | 75          | I/O      | 28                      | 17                    | 6.4        | 30.5                  | 18.7                   | 2-c WCDMA   | SOT502    |
| BLF6G22LS-100            |                    | 2000                      | 2200                      | 100         | I/O      | 28                      | 25                    | 6.0        | 29                    | 18.5                   | 2-c WCDMA   | SOT502    |
| BLF7G22LS-100P           |                    | 2000                      | 2200                      | 100         | I/O      | 28                      | 20                    | 7.0        | 28.5                  | 19.1                   | 2-c WCDMA   | SOT1121   |
| BLF6G22LS-130            |                    | 2000                      | 2200                      | 130         | I/O      | 28                      | 30                    | 6.4        | 28.5                  | 17                     | 2-c WCDMA   | SOT502    |
| BLF7G22LS-130            |                    | 2000                      | 2200                      | 130         | I/O      | 28                      | 30                    | 6.4        | 32                    | 18.5                   | 2-c WCDMA   | SOT502    |
| BLF8G22LS-140            |                    | 2000                      | 2200                      | 140         | I/O      | 28                      | 33                    | 6.3        | 32.5                  | 18.5                   | 2-c WCDMA   | SOT502    |
| BLF7G22LS-160            |                    | 2000                      | 2200                      | 160         | I/O      | 28                      | 43                    | 5.7        | 30                    | 18                     | 2-c WCDMA   | SOT502    |
| BLF8G22LS-160BV          |                    | 2000                      | 2200                      | 160         | I/O      | 32                      | 55                    | 4.6        | 32                    | 18                     | 2-c WCDMA   | SOT1120   |
| BLF6G22LS-180PN          |                    | 2000                      | 2200                      | 180         | I/O      | 32                      | 50                    | 5.6        | 27.5                  | 17.5                   | 2-c WCDMA   | SOT539    |
| BLF6G22LS-180RN          |                    | 2000                      | 2200                      | 180         | I/O      | 30                      | 40                    | 6.5        | 25                    | 16                     | 2-c WCDMA   | SOT502    |
| BLF7G22LS-200            |                    | 2110                      | 2170                      | 200         | I/O      | 28                      | 55                    | 5.6        | 31                    | 18.5                   | 2-c WCDMA   | SOT502    |
| <b>BLF8G22LS-200(G)V</b> |                    | 2000                      | 2200                      | 200         | I/O      | 28                      | 48                    | 6.2        | 27                    | 20                     | 2-c WCDMA   | SOT1244   |
| BLF8G22LS-220            |                    | 2110                      | 2170                      | 220         | I/O      | 28                      | 55                    | 6.0        | 31                    | 17                     | 2-c WCDMA   | SOT502    |
| BLF8G22LS-240            |                    | 2110                      | 2170                      | 240         | I/O      | 28                      | 55                    | 6.4        | 28                    | 19                     | 2-c WCDMA   | SOT502    |
| BLF7G22LS-250P           |                    | 2110                      | 2170                      | 250         | I/O      | 28                      | 70                    | 5.5        | 31                    | 18.5                   | 2-c WCDMA   | SOT539    |
| BLP8G22S-250V*           |                    | 2110                      | 2170                      | 250         | I/O      | 28                      | 70                    | 5.5        | 30                    | 19                     | 2-c WCDMA   | SOT1223   |
| BLF8G22LS-270            |                    | 2110                      | 2170                      | 270         | I/O      | 28                      | 80                    | 5.3        | 30                    | 17.7                   | 2-c WCDMA   | SOT502    |
| <b>BLF8G22LS-270(G)V</b> |                    | 2000                      | 2200                      | 270         | I/O      | 28                      | 50                    | 7.3        | 25                    | 17.7                   | 2-c WCDMA   | SOT1244   |
| <b>BLF8G22LS-310AV*</b>  |                    | 2110                      | 2170                      | 310         | I/O      | 30                      | 63                    | 6.9        | 45                    | 15.8                   | 2-c WCDMA   | SOT1110   |
| BLF8G22LS-460AV*         |                    | 2110                      | 2170                      | 460         | I/O      | 30                      | 83                    | 7.4        | 44                    | 14.5                   | 2-c WCDMA   | SOT1110   |

**Bold red** = new, highly recommended product

\* Check status in section 3.1, as this type is not yet released for mass production

### 3.7.1.5 2.3 - 2.4 GHz line-up

| Type                    | Product | f <sub>min</sub><br>(MHz) | f <sub>max</sub><br>(MHz) | P1dB<br>(W) | Matching | Test signal performance |                       |            |                       |                        |             | Package |
|-------------------------|---------|---------------------------|---------------------------|-------------|----------|-------------------------|-----------------------|------------|-----------------------|------------------------|-------------|---------|
|                         |         |                           |                           |             |          | VDS<br>(V)              | P <sub>L</sub><br>(W) | BO<br>(dB) | η <sub>D</sub><br>(%) | G <sub>p</sub><br>(dB) | Test signal |         |
| BLP7G22-05              | Driver  | 700                       | 2200                      | 5           | -        | 28                      | 1                     | 7.0        | 26                    | 17                     | 2-c WCDMA   | SOT1179 |
| BLP7G22-10              |         | 700                       | 2200                      | 10          | -        | 28                      | 2                     | 7.0        | 26                    | 17                     | 2-c WCDMA   | SOT1179 |
| BLF7G24L(S)-100         | Final   | 2300                      | 2400                      | 100         | I/O      | 28                      | 20                    | 7.0        | 27                    | 18                     | N-CDMA/IS95 | SOT502  |
| BLF8G24LS-100(G)V*      |         | 2300                      | 2400                      | 100         | I/O      | 28                      | 25                    | 6.0        | 31                    | 18                     | 2-c WCDMA   | SOT1244 |
| BLF7G24L(S)-140         |         | 2300                      | 2400                      | 140         | I/O      | 28                      | 30                    | 6.7        | 26.5                  | 18.5                   | N-CDMA/IS95 | SOT502  |
| BLF7G24L(S)-160P        |         | 2300                      | 2400                      | 160         | I/O      | 28                      | 30                    | 7.3        | 27.5                  | 18.5                   | N-CDMA/IS95 | SOT539  |
| <b>BLF8G24L(S)-200P</b> |         | 2300                      | 2400                      | 200         | I/O      | 28                      | 60                    | 5.2        | 31                    | 17                     | 1-c WCDMA   | SOT539  |
| BLC8G24LS-240A*         |         | 2300                      | 2400                      | 240         | I/O      | 28                      | 63                    | 7.5        | 29                    | 18                     | 1-c WCDMA   | SOT1250 |

### 3.7.1.6 2.5 - 2.7 GHz line-up

| Type                  | Product      | f <sub>min</sub><br>(MHz) | f <sub>max</sub><br>(MHz) | P1dB<br>(W) | Matching | Test signal performance |                       |            |                       |                        |             | Package |
|-----------------------|--------------|---------------------------|---------------------------|-------------|----------|-------------------------|-----------------------|------------|-----------------------|------------------------|-------------|---------|
|                       |              |                           |                           |             |          | VDS<br>(V)              | P <sub>L</sub><br>(W) | BO<br>(dB) | η <sub>D</sub><br>(%) | G <sub>p</sub><br>(dB) | Test signal |         |
| BLP7G22-05            | Driver       | 700                       | 2200                      | 5           | -        | 28                      | 1                     | 7.0        | 26                    | 17                     | 2-c WCDMA   | SOT1179 |
| BLP7G22-10            |              | 700                       | 2200                      | 10          | -        | 28                      | 2                     | 7.0        | 26                    | 17                     | 2-c WCDMA   | SOT1179 |
| BLF6G27L(S)-40P       | Driver/final | 2500                      | 2700                      | 40          | I/O      | 28                      | 20                    | 3.0        | 37                    | 17.5                   | 1-c WCDMA   | SOT1121 |
| BLF6G27(S)-45         |              | 2500                      | 2700                      | 45          | I/O      | 28                      | 7                     | 8.1        | 24                    | 18                     | N-CDMA/IS95 | SOT608  |
| BLF6G27L(S)-50BN      | Final        | 2500                      | 2700                      | 50          | I/O      | 28                      | 3                     | 12.2       | 14.5                  | 16.5                   | 2-c WCDMA   | SOT1112 |
| BLF6G27(LS)-75        |              | 2500                      | 2700                      | 75          | I/O      | 28                      | 9                     | 9.2        | 23                    | 17                     | N-CDMA/IS95 | SOT502  |
| BLF7G27L(S)-75P       |              | 2300                      | 2700                      | 75          | I/O      | 28                      | 12                    | 8.0        | 26                    | 17                     | N-CDMA/IS95 | SOT1121 |
| BLF7G27L(S)-90P       |              | 2500                      | 2700                      | 90          | I/O      | 28                      | 16                    | 7.5        | 29                    | 18.5                   | N-CDMA/IS95 | SOT1121 |
| BLF6G27(LS)-100       |              | 2500                      | 2700                      | 100         | I/O      | 28                      | 14                    | 8.5        | 23                    | 17                     | 1-c WCDMA   | SOT502  |
| BLF7G27L(S)-100       |              | 2500                      | 2700                      | 100         | I/O      | 28                      | 25                    | 6.0        | 28                    | 18                     | N-CDMA/IS95 | SOT502  |
| <b>BLF8G27LS-100V</b> |              | 2500                      | 2700                      | 100         | I/O      | 28                      | 25                    | 6.0        | 28                    | 17                     | 2-c WCDMA   | SOT1244 |
| <b>BLF8G27LS-100P</b> |              | 2500                      | 2700                      | 100         | I/O      | 28                      | 25                    | 6.0        | 29                    | 17.5                   | 2-c WCDMA   | SOT1121 |
| BLF6G27(LS)-135       |              | 2500                      | 2700                      | 135         | I/O      | 32                      | 20                    | 8.3        | 22.5                  | 16                     | N-CDMA/IS95 | SOT502  |
| BLF7G27L-135          |              | 2600                      | 2700                      | 135         | I/O      | 28                      | 25                    | 7.3        | 24                    | 16.5                   | N-CDMA/IS95 | SOT502  |
| BLF7G27L(S)-140       |              | 2500                      | 2700                      | 140         | I/O      | 28                      | 30                    | 6.7        | 22                    | 16.5                   | N-CDMA/IS95 | SOT502  |
| BLF8G27LS-140         |              | 2500                      | 2700                      | 140         | I/O      | 28                      | 50                    | 4.5        | 31                    | 18                     | 2-c WCDMA   | SOT502  |
| <b>BLF8G27LS-140V</b> |              | 2600                      | 2700                      | 140         | I/O      | 32                      | 45                    | 4.9        | 30                    | 16.5                   | 2-c WCDMA   | SOT1244 |
| BLF7G27L(S)-150P      |              | 2500                      | 2700                      | 150         | I/O      | 28                      | 30                    | 7.0        | 26                    | 16.5                   | N-CDMA/IS95 | SOT539  |
| BLF8G27LS-150(G)V*    |              | 2500                      | 2700                      | 150         | I/O      | 28                      | 40                    | 5.7        | 28                    | 18                     | 2-c WCDMA   | SOT502  |
| BLC8G27LS-160AV*      |              | 2500                      | 2700                      | 160         | I/O      | 28                      | 30                    | 8.0        | 29                    | 18                     | 2-c WCDMA   | SOT1275 |
| BLF7G27L-200PB        |              | 2600                      | 2700                      | 200         | I/O      | 32                      | 65                    | 4.9        | 29                    | 16.5                   | 2-c WCDMA   | SOT1110 |
| BLF8G27LS-200GV*      |              | 2500                      | 2700                      | 200         | I/O      | 28                      | 32                    | 8.0        | 23                    | 17                     | 2-c WCDMA   | SOT1244 |
| BLF8G27LS-200AV*      |              | 2500                      | 2700                      | 200         | I/O      | 28                      | 40                    | 7.0        | 28                    | 17                     | 2-c WCDMA   | SOT1242 |
| BLF8G27LS-200V*       |              | 2500                      | 2700                      | 200         | I/O      | 28                      | 32                    | 8.0        | 23                    | 17                     | 2-c WCDMA   | SOT1244 |

### 3.7.1.7 3.5 - 3.8 GHz line-up

| Type            | Product      | f <sub>min</sub><br>(MHz) | f <sub>max</sub><br>(MHz) | P1dB<br>(W) | Matching | Test signal performance |                       |            |                       |                        |             | Package |
|-----------------|--------------|---------------------------|---------------------------|-------------|----------|-------------------------|-----------------------|------------|-----------------------|------------------------|-------------|---------|
|                 |              |                           |                           |             |          | VDS<br>(V)              | P <sub>L</sub><br>(W) | BO<br>(dB) | η <sub>D</sub><br>(%) | G <sub>p</sub><br>(dB) | Test signal |         |
| BLF6G38-10(G)   | Driver       | 3400                      | 3600                      | 10          | I/O      | 28                      | 2                     | 7.0        | 20                    | 14                     | N-CDMA/IS95 | SOT975  |
| BLF6G38(S)-25   |              | 3400                      | 3800                      | 25          | I/O      | 28                      | 4.5                   | 7.4        | 24                    | 15                     | N-CDMA/IS95 | SOT608  |
| BLF6G38(LS)-50  | Driver/final | 3400                      | 3800                      | 50          | I/O      | 28                      | 9                     | 7.4        | 23                    | 14                     | N-CDMA/IS95 | SOT502  |
| BLF6G38(LS)-100 | Final        | 3400                      | 3600                      | 100         | I/O      | 28                      | 18.5                  | 7.3        | 21.5                  | 13                     | N-CDMA/IS95 | SOT502  |

**Bold red** = new, highly recommended product

\* Check status in section 3.1, as this type is not yet released for mass production

### 3.7.1.8 Power LDMOS Doherty designs

| Freq band (MHz)              | PPEAK (dBm) | POUT-AVG (dBm) | VDS (V) | Gain (dB) | Drain efficiency (%) | Type       | Main transistor        | Peak transistor        |
|------------------------------|-------------|----------------|---------|-----------|----------------------|------------|------------------------|------------------------|
| <b>758 - 803 MHz</b>         |             |                |         |           |                      |            |                        |                        |
| 773 - 803                    | 50.5        | 41.5           | 28      | 17.1      | 39                   | SYM        | 1/2 BLP7G10LS-140P     | 1/2 BLP7G10LS-140P     |
| 773 - 803                    | 52.2        | 44.5           | 28      | 17.8      | 46.5                 | SYM        | 1/2 BLP7G07LS-140P     | 1/2 BLP7G07LS-140P     |
| 758 - 803                    | 55          | 48.4           | 28      | 16.5      | 49                   | SYM        | BLP7G10LS-140P         | BLP7G10LS-140P         |
| 758 - 803                    | 55.6        | 48.4           | 28      | 17.8      | 47                   | SYM        | BLF8G10LS-160          | BLF8G10LS-160          |
| <b>728 - 821 MHz</b>         |             |                |         |           |                      |            |                        |                        |
| 728 - 768                    | 51.7        | 45             | 28      | 19        | 48                   | SYM        | 1/2 BLP7G10LS-140P     | 1/2 BLP7G10LS-140P     |
| 790 - 821                    | 55.5        | 47             | 28      | 19        | 42                   | SYM        | 1/2 BLF6G10L(S)-260PRN | 1/2 BLF6G10L(S)-260PRN |
| 728 - 768                    | 48.3        | 41             | 28      | 19        | 45                   | SYM        | 1/2 BLP8G10S-45P       | 1/2 BLP8G10S-45P       |
| 790 - 821                    | 57.2        | 49.5           | 32      | 20        | 42                   | SYM        | BLF6G10LS-200RN        | BLF6G10LS-200RN        |
| 728 - 768                    | 58          | 50             | 32      | 20.5      | 47                   | SYM        | BLF6G10LS-200RN        | BLF6G10LS-200RN        |
| 758 - 803                    | 55.8        | 47.9           | 28      | 17.8      | 44                   | SYM        | 1/2 BLF8G10LS-300PV    | 1/2 BLF8G10LS-300PV    |
| 790 - 821                    | 55.7        | 47.9           | 28      | 19.3      | 44                   | SYM        | 1/2 BLF8G10L-300P      | 1/2 BLF8G10L-300P      |
| 728 - 768                    | 56          | 47.7           | 28      | 19.4      | 44                   | SYM        | 1/2 BLF8G10L-300P      | 1/2 BLF8G10L-300P      |
| <b>790 - 960 MHz</b>         |             |                |         |           |                      |            |                        |                        |
| 790 - 960                    | 55.4        | 47             | 50      | 18.5      | 40                   | SYM        | BLF6H10L-160           | BLF6H10L-160           |
| 790 - 960                    | 55.2        | 47             | 50      | 18.5      | 40                   | SYM        | 1/2 BLF6H10L(S)-300P   | 1/2 BLF6H10L(S)-300P   |
| 790 - 960                    | 58.2        | 50             | 50      | 18.5      | 38.5                 | SYM        | BLF6H10L(S)-300P       | BLF6H10L(S)-300P       |
| <b>869 - 960 MHz</b>         |             |                |         |           |                      |            |                        |                        |
| 925 - 960                    | 46          | 35.5           | 30      | 20        | 38                   | SYM        | BLP7G22S-10            | BLP7G22S-10            |
| 925 - 960                    | 48          | 40             | 28      | 17        | 47                   | SYM        | 1/2 BLP8G10S-45P       | 1/2 BLP8G10S-45P       |
| 869 - 960                    | 55.8        | 48             | 50      | 18.7      | 42                   | SYM        | BLF6H10L-160           | BLF6H10L-160           |
| 925 - 960                    | 57.4        | 49             | 50      | 16.8      | 49                   | 3-WAY      | BLF6H10L-160           | 2xBLF6H10L-160         |
| 920 - 960                    | 46          | 38             | 28      | 24        | 51                   | SYM        | BLF6G21-10G            | BLF6G21-10G            |
| 869 - 894                    | 52          | 44             | 28      | 20        | 48                   | SYM        | BLF6G10S-45            | BLF6G10S-45            |
| 869 - 894                    | 52.7        | 44.5           | 28      | 15        | 50                   | 3-WAY      | BLF6G10S-45            | 2x BLF6G10S-45         |
| 920 - 960                    | 54.7        | 47.5           | 28      | 17.3      | 48                   | SYM        | BLF6G10LS-135RN        | BLF6G10LS-135RN        |
| 920 - 960                    | 55.2        | 48             | 30      | 16.9      | 46.3                 | SYM        | BLF8G10LS-160V         | BLF8G10LS-160V         |
| 920 - 960                    | 55.1        | 47.1           | 28      | 20.5      | 44                   | SYM        | 1/2 BLF6G10L(S)-260PRN | 1/2 BLF6G10L(S)-260PRN |
| 920 - 960                    | 55.5        | 48             | 28      | 16.5      | 48.5                 | SYM        | 1/2 BLF8G10L-300P      | 1/2 BLF8G10L-300P      |
| 920 - 960                    | 56.2        | 48             | 28      | 18.5      | 40                   | SYM        | BLF6G10LS-135RN        | BLF6G10LS-135RN        |
| 920 - 960                    | 56.6        | 50             | 30      | 18.8      | 44.5                 | SYM        | BLF6G10LS-200RN        | BLF6G10LS-200RN        |
| 920 - 960                    | 57.1        | 49             | 30      | 16.1      | 46.7                 | ASYM       | BLF8G10LS-160          | BLF7G10LS-250          |
| 920 - 960                    | 57.1        | 49             | 28      | 15        | 48                   | ASYM       | BLF8G10LS-160          | 2xBLF8G10LS-160        |
| 920 - 960                    | 57.3        | 49.3           | 30      | 16        | 50                   | ASYM       | BLF8G10LS-160          | BLF7G10LS-250          |
| 869 - 894                    | 57.5        | 50.8           | 30      | 18        | 48.8                 | ASYM       | BLF6G10LS-200RN        | BLF7G10LS-250          |
| 925 - 960                    | 57.7        | 49.7           | 28      | 20.5      | 40                   | SYM / MPPM | BLF6G10L(S)-260PRN     | BLF6G10L(S)-260PRN     |
| 869 - 894                    | 57.9        | 52             | 28      | 18.2      | 50.1                 | SYM/MMPP   | BLF6G10LS-260PRN       | BLF6G10LS-260PRN       |
| 869 - 894                    | 58          | 50             | 32      | 20.5      | 46                   | SYM        | BLF6G10-200RN          | BLF6G10-200RN          |
| 925 - 960                    | 58.9        | 50.9           | 32      | 22        | 47                   | SYM / MMPP | BLF6G10L(S)-260PRN     | BLF6G10L(S)-260PRN     |
| 920 - 960                    | 57          | 49.2           | 28      | 15.8      | 48                   | SYM        | BLF7G10LS-250          | BLF7G10LS-250          |
| 869 - 894                    | 57.2        | 49.3           | 28      | 16.5      | 49.5                 | SYM        | BLF7G10LS-250          | BLF7G10LS-250          |
| 869 - 894                    | 59.2        | 50.4           | 28      | 16        | 52                   | ASYM       | BLF7G10LS-250          | BLF7G10LS-250X2        |
| 920 - 960                    | 43          | 36             | 28      | 24.3      | 38                   | CLASS AB   | BLP7G22-10P            |                        |
| 869 - 894                    | 58.9        | 52             | 28      | 16.1      | 49.1                 | ASYM       | BLF6G10LS-200RN        | 2xBLF7G10LS-250        |
| 869 - 895                    | 58.5        | 50.5           | 28      | 16.4      | 49                   | SYM        | BLF8G10LS-270          | BLF8G10LS-270          |
| 869 - 895                    | 57.3        | 49             | 28      | 17        | 46                   | SYM        | BLF7G10LS-250          | BLF7G10LS-250          |
| 869 - 895                    | 51.5        | 44             | 28      | 16.6      | 46                   | SYM        | 1/2 BLP7G10LS-140P     | 1/2 BLP7G10LS-140P     |
| 869 - 895                    | 59.9        | 52             | 28      | 15.2      | 580                  | ASYM       | BLF8G10LS-270          | 2xBLF8G10LS-270        |
| 920 - 960                    | 59.1        | 51.5           | 32      | 15.6      | 53                   | 3-WAY      | BLF8G10LS-200V         | 2x BLF8G10LS-200V      |
| <b>1476 - 1555 MHz</b>       |             |                |         |           |                      |            |                        |                        |
| 1526 - 1555                  | 56.6        | 48.6           | 28      | 18.4      | 42                   | SYM        | BLF7G15LS-200          | BLF7G15LS-200          |
| 1476 - 1511                  | 58.1        | 49.6           | 28      | 16        | 42                   | ASYM       | BLF7G15LS-200          | BLF7G15LS-300P         |
| 1476 - 1511                  | 58.6        | 50.6           | 32      | 16.5      | 42                   | SYM        | BLF6G15LS-250PBRN      | BLF6G15LS-250PBRN      |
| <b>1805 - 1880 MHz (DCS)</b> |             |                |         |           |                      |            |                        |                        |
| 1845 - 1880                  | 52.6        | 45             | 28      | 14.5      | 46.5                 | SYM        | 1/2 BLF7G21LS-160P     | 1/2 BLF7G21LS-160P     |
| 1805 - 1880                  | 48          | 40             | 28      | 15.4      | 42.4                 | SYM        | 1/2 BLF6G22LS-40P      | 1/2 BLF6G22LS-40P      |
| 1805 - 1880                  | 50          | 42.8           | 28      | 15.8      | 48                   | SYM        | 1/2 BLF7G20LS-90P      | 1/2 BLF7G20LS-90P      |
| 1805 - 1880                  | 52.5        | 44.5           | 28      | 16        | 44                   | SYM        | 1/2 BLF7G21LS-160P     | 1/2 BLF7G21LS-160P     |
| 1805 - 1880                  | 55          | 49             | 28      | 15.5      | 47                   | SYM        | BLF7G21LS-160          | BLF7G21LS-160          |
| 1805 - 1880                  | 55.4        | 47.5           | 31      | 16.3      | 49                   | ASYM       | BLF7G20LS-90P          | BLF7G21LS-160          |
| 1805 - 1880                  | 55.5        | 47             | 28      | 16        | 41                   | SYM        | 1/2 BLF7G20L(S)-250P   | 1/2 BLF7G20L(S)-250P   |
| 1805 - 1880                  | 56.1        | 48.1           | 30      | 15.2      | 48                   | ASYM       | BLF7G20LS-90P          | BLF7G20LS-200          |

\* Check status in section 3.1, as this type is not yet released for mass production

| Freq band (MHz)                      | PPEAK (dBm) | POUT-AVG (dBm) | VDS (V) | Gain (dB) | Drain efficiency (%) | Type     | Main transistor              | Peak transistor              |
|--------------------------------------|-------------|----------------|---------|-----------|----------------------|----------|------------------------------|------------------------------|
| 1805 - 1881                          | 56.2        | 49             | 28      | 15        | 52.3                 | ASYM     | BLF8G19LS-170BV              | BLF8G20LS-220                |
| 1805 - 1880                          | 57.1        | 49             | 28      | 14.3      | 45.1                 | ASYM     | BLF7G21LS-160                | 2x BLF7G21LS-160             |
| 1805 - 1880                          | 57.5        | 49.5           | 30      | 16        | 42                   | SYM      | BLF7G20LS-200                | BLF7G20LS-200                |
| 1805 - 1880                          | 57.5        | 50.5           | 28      | 14        | 48                   | ASYM     | BLF7G20LS-200                | BLF7G20LS-250P               |
| 1805 - 1880                          | 58.2        | 50             | 28      | 16        | 42                   | SYM MPPM | BLF7G20LS-250P               | BLF7G20LS-250P               |
| 1805 - 1880                          | 58.6        | 51             | 28      | 16        | 47.6                 | 3-WAY    | BLF7G20LS-200                | 2x BLF7G20LS-200             |
| 1805 - 1880                          | 54          | 47             | 28      | 16        | 49                   | SYM      | BLF6G20LS-110V               | BLF6G20LS-110                |
| 1805 - 1880                          | 56.2        | 49.3           | 28      | 15        | 47.5                 | SYM      | BLF8G20LS-200V               | BLF8G20LS-200V               |
| 1805 - 1880                          | 56.5        | 49             | 28      | 32        | 45.5                 | E-SYM    | BLF6G21-10G+BLF7G20LS-200    | BLF6G21-10G+BLF7G20LS-200    |
| 1805 - 1880                          | 57.8        | 50.4           | 30      | 16        | 41.5                 | SYM      | BLF7G20LS-250P               | BLF7G20LS-250P               |
| 1805 - 1880                          | 57.3        | 50             | 28      | 15.7      | 48                   | ASYM     | BLF8G20LS-200V               | BLF7G20LS-250P               |
| 1805 - 1880                          | 57.3        | 50.5           | 30      | 17        | 50                   | ASYM     | BLF8G20LS-220                | BLF8G20LS-220                |
| 1805 - 1880                          | 58.2        | 50.5           | 28      | 14.2      | 50                   | ASYM     | BLF8G20LS-220                | 2XBLF8G20LS-220              |
| <b>1930 - 1990 MHz (PCS)</b>         |             |                |         |           |                      |          |                              |                              |
| 1930 - 1990                          | 53          | 45             | 28      | 16.5      | 40                   | SYM      | BLF6G20-75                   | BLF6G20-75                   |
| 1930 - 1990                          | 54.2        | 47.4           | 28      | 16.6      | 47.7                 | SYM      | BLF6G20LS-110                | BLF6G20LS-110                |
| 1930 - 1990                          | 54.3        | 47.4           | 28      | 16.7      | 48.2                 | SYM      | BLF6G20LS-110                | BLF6G20LS-110                |
| 1930 - 1990                          | 55.2        | 47.2           | 28      | 16        | 40                   | SYM      | 1/2 BLF7G20LS-250P           | 1/2 BLF7G20LS-250P           |
| 1930 - 1990                          | 55.5        | 47.5           | 28      | 14.5      | 46                   | ASYM     | BLF7G20LS-90P                | BLF7G20LS-200                |
| 1930 - 1990                          | 55.7        | 49             | 28      | 14.5      | 48                   | ASYM     | BLF7G21LS-160                | BLF7G20LS-200                |
| 1930 - 1990                          | 56          | 48             | 31      | 15.3      | 38                   | SYM      | BLF6G20LS-140                | BLF6G20LS-140                |
| 1930 - 1990                          | 56          | 48             | 28      | 14.8      | 45                   | ASYM     | BLF7G20LS-140P               | BLF7G20LS-200                |
| 1930 - 1990                          | 57          | 49             | 30      | 17.2      | 41                   | SYM      | BLF7G20LS-200                | BLF7G20LS-200                |
| 1930 - 1990                          | 57          | 49.5           | 28      | 15.1      | 46                   | ASYM     | BLF7G21LS-160                | 2x BLF7G21LS-160             |
| 1930 - 1990                          | 58.2        | 50             | 28      | 16        | 40                   | SYM      | BLF7G20LS-250P               | BLF7G20LS-250P               |
| 1930 - 1990                          | 56.8        | 49.1           | 28      | 32        | 42.3                 | E-SYM    | BLF6G21-10G+BLF7G20LS-200    | BLF6G10-G+BLF7G20LS-200      |
| 1930 - 1990                          | 58.5        | 50.5           | 30      | 15.7      | 43                   | 3-WAY    | BLF7G20LS-200                | 2x BLF7G20LS-200             |
| 1930 - 1990                          | 57.3        | 50.5           | 30      | 17        | 50                   | ASYM     | BLF8G20LS-220                | BLF8G20LS-220                |
| 1930 - 1990                          | 57.3        | 50             | 28      | 16.2      | 44                   | ASYM     | BLF8G20LS-200V               | BLF7G20LS-250P               |
| 1930 - 1990                          | 58.5        | 50.7           | 32      | 15.9      | 44                   | 3-WAY    | BLF8G19LS-170BV              | 2x BLF8G19LS-170BV           |
| 1930 - 1990                          | 55.3        | 47.5           | 28      | 16.8      | 46                   | ASYM     | BLF8G20LS-260A_main          | BLF8G20LS-260A_peak          |
| <b>1805 - 2025 MHz (TD - SCDDMA)</b> |             |                |         |           |                      |          |                              |                              |
| 2010 - 2025                          | 47          | 39             | 28      | 14.4      | 41                   | SYM      | BLD6G21L(S)-50               | BLD6G21L(S)-50               |
| 1880 - 2025                          | 50          | 42             | 28      | 17        | 46                   | SYM      | 1/2 BLF7G20L(S)-90P          | 1/2 BLF7G20L(S)-90P          |
| 2010 - 2025                          | 50          | 42             | 28      | 17.2      | 47.2                 | SYM      | 1/2 BLF7G20L(S)-90P          | 1/2 BLF7G20L(S)-90P          |
| 1805 - 2050                          | 52          | 44.5           | 28      | 15.2      | 41.5                 | SYM      | 1/2 BLF7G21LS-160P           | 1/2 BLF7G21LS-160P           |
| 1880 - 1920                          | 52.5        | 44.5           | 28      | 16        | 44                   | SYM      | 1/2 BLF7G21LS-160P           | 1/2 BLF7G21LS-160P           |
| 2010 - 2025                          | 52.2        | 44             | 28      | 15.6      | 43                   | SYM      | 1/2 BLF7G21LS-160P           | 1/2 BLF7G21LS-160P           |
| <b>2110 - 2170 MHz (UMTS/LTE)</b>    |             |                |         |           |                      |          |                              |                              |
| 2110 - 2170                          | 55.8        | 48             | 28      | 16        | 41                   | SYM      | BLP7G22LS-140P               | BLP7G22LS-140P               |
| 2110 - 2170                          | 47          | 39             | 28      | 13        | 38                   | SYM      | BLD6G22L(S)-50               | BLD6G22L(S)-50               |
| 2110 - 2170                          | 48.3        | 40             | 28      | 17        | 44                   | SYM      | 1/2 BLF6G22LS-40P            | 1/2 BLF6G22LS-40P            |
| 2110 - 2170                          | 48.5        | 40.5           | 28      | 17.2      | 46                   | SYM      | 1/2 BLF6G22L-40P             | 1/2 BLF6G22L-40P             |
| 2110 - 2170                          | 50          | 42             | 28      | 17        | 42                   | SYM      | ½ BLF7G22LS-100P             | ½ BLF7G22LS-100P             |
| 2110 - 2170                          | 49          | 40.5           | 28      | 28        | 34                   | SYM      | ½ BLM7G22S-60PBG             | ½ BLM7G22S-60PBG             |
| 2110 - 2170                          | 49          | 40.5           | 28      | 28        | 34                   | SYM      | ½ BLM7G22S-60PBG             | ½ BLM7G22S-60PBG             |
| 2110 - 2170                          | 54.7        | 46.5           | 28      | 16.5      | 43                   | SYM      | BLF6G22LS-100                | BLF6G22LS-100                |
| 2110 - 2170                          | 54.9        | 47             | 28      | 17        | 43                   | SYM      | BLF7G22L(S)-130              | BLF7G22L(S)-130              |
| 2110 - 2170                          | 55          | 46.7           | 28      | 16        | 43                   | SYM      | BLF8G22LS-140                | BLF8G22LS-140                |
| 2110 - 2170                          | 55          | 47             | 28      | 17        | 43                   | SYM      | 1/2 BLF7G22LS-250P           | 1/2 BLF7G22LS-250P           |
| 2110 - 2170                          | 55          | 47             | 28      | 15.5      | 38                   | SYM      | BLF6G22L(S)-130              | BLF6G22L(S)-130              |
| 2110 - 2170                          | 55.5        | 46.4           | 28      | 15        | 43                   | ASYM     | BLF7G22L(S)-130              | BLF7G22L(S)-200              |
| 2110 - 2171                          | 55.6        | 49             | 28      | 15        | 52                   | ASYM     | BLF8G22LS-140                | BLF8G22LS-220                |
| 2110 - 2170                          | 55.7        | 49             | 28      | 14.5      | 47                   | ASYM     | BLF7G22LS-130                | BLF7G22LS-200                |
| 2110 - 2170                          | 55.9        | 47.9           | 28      | 17.3      | 42                   | SYM      | BLF7G22LS-160                | BLF7G22LS-160                |
| 2110 - 2170                          | 56          | 48             | 30      | 16        | 47                   | ASYM     | BLF8G22LS-310A_main          | BLF8G22LS-310A_peak          |
| 2110 - 2170                          | 56          | 48             | 30      | 15.8      | 45                   | ASYM     | BLF8G22LS-310AV_main         | BLF8G22LS-310AV_peak         |
| 2110 - 2170                          | 56          | 48             | 28      | 15        | 48                   | 3-WAY    | BLF7G22L(S)-130              | 2x BLF7G22L(S)-130           |
| 2110 - 2170                          | 56.5        | 48.5           | 28      | 16.2      | 41                   | SYM      | BLF7G22L(S)-200              | BLF7G22L(S)-200              |
| 2110 - 2170                          | 57          | 49             | 32      | 14.5      | 41                   | ASYM     | BLF6G22-100                  | BLF6G22-180PN                |
| 2110 - 2170                          | 57.2        | 49.2           | 28      | 16        | 47                   | 3-WAY    | BLF7G22LS-160                | 2x BLF7G22LS-160             |
| 2110 - 2170                          | 58          | 50             | 32      | 15        | 40                   | SYM      | BLF6G22-180PN                | BLF6G22-180PN                |
| 2110 - 2170                          | 56.8        | 50.5           | 28      | 30        | 49                   | E-sym.   | BLF6G21s-10G + BLF8G22LS-220 | BLF6G21s-10G + BLF8G22LS-220 |
| 2110 - 2170                          | 56.5        | 49             | 28      | 14.2      | 46                   | ASYM     | BLF7G22LS-160                | BLF7G22LS-200                |
| 2110 - 2170                          | 57.6        | 50             | 28      | 17.2      | 40                   | SYM      | BLF8G22LS-200V               | BLF8G22LS-200V               |
| 2110 - 2170                          | 58          | 50             | 32      | 17.5      | 40                   | SYM      | BLF7G22LS-250P               | BLF7G22LS-250P               |

| Freq band (MHz)                    | PPEAK (dBm) | POUT-AVG (dBm) | VDS (V) | Gain (dB) | Drain efficiency (%) | Type | Main transistor      | Peak transistor      |
|------------------------------------|-------------|----------------|---------|-----------|----------------------|------|----------------------|----------------------|
| <b>2300 - 2400 MHz (WiBRO/LTE)</b> |             |                |         |           |                      |      |                      |                      |
| 2300 - 2400                        | 49.5        | 42             | 28      | 14.6      | 44                   | SYM  | 1/2 BLF7G27L(S)-75P  | 1/2 BLF7G27L(S)-75P  |
| 2300 - 2400                        | 53          | 45             | 28      | 15        | 42.3                 | SYM  | 1/2 BLF7G24LS-160P   | 1/2 BLF7G24LS-160P   |
| 2300 - 2400                        | 54.1        | 47             | 28      | 15.5      | 45                   | SYM  | BLF7G24LS-100        | BLF7G24LS-100        |
| 2300 - 2400                        | 56.2        | 48.5           | 30      | 15        | 40                   | SYM  | BLF7G24LS-140        | BLF7G24LS-140        |
| 2300 - 2400                        | 56.8        | 48.5           | 30      | 15        | 42                   | ASYM | BLF7G24LS-100        | BLF7G24LS-100 X2     |
| 2300 - 2400                        | 55          | 47.5           | 28      | 15.2      | 44                   | ASYM | BLF7G24LS-100        | BLF7G24LS-140        |
| 2300 - 2400                        | 50.6        | 42             | 28      | 15.4      | 38.4                 | SYM  | 1/2 BLF7G27LS-90P    | 1/2 BLF7G27LS-90P    |
| 2300 - 2400                        | 51.1        | 41.5           | 30      | 15.7      | 34.4                 | SYM  | 1/2 BLF7G27LS-90P    | 1/2 BLF7G27LS-90P    |
| 2300 - 2400                        | 51.1        | 42.5           | 31      | 15.5      | 36.8                 | SYM  | 1/2 BLF7G27LS-90P    | 1/2 BLF7G27LS-90P    |
| 2300 - 2401                        | 56.8        | 49             | 28      | 15.5      | 42.1                 | SYM  | BLF8G24LS-200P       | BLF8G24LS-200P       |
| <b>2500 - 2700 MHz (WiMAX/LTE)</b> |             |                |         |           |                      |      |                      |                      |
| 2620 - 2690                        | 46.9        | 39             | 28      | 14.6      | 46.2                 | ASYM | BLF6G27-10G          | 1/2 BLF6G27LS-40P    |
| 2580 - 2620                        | 48.2        | 40             | 28      | 14.4      | 41                   | SYM  | 1/2 BLF6G27LS-40P    | 1/2 BLF6G27LS-40P    |
| 2620 - 2690                        | 48.2        | 40             | 28      | 14.6      | 44                   | SYM  | 1/2 BLF6G27LS-40P    | 1/2 BLF6G27LS-40P    |
| 2570 - 2620                        | 49.5        | 42             | 28      | 15        | 43                   | SYM  | 1/2 BLF7G27L(S)-75P  | 1/2 BLF7G27L(S)-75P  |
| 2570 - 2620                        | 49.8        | 42             | 28      | 13.9      | 39                   | SYM  | 1/2 BLF7G27LS-90PG   | 1/2 BLF7G27LS-90PG   |
| 2500 - 2700                        | 50          | 42             | 28      | 15        | 37.5                 | SYM  | BLF6G27S-45          | BLF6G27S-45          |
| 2500 - 2700                        | 50.3        | 42.3           | 28      | 14.5      | 39                   | SYM  | 1/2 BLF7G27LS-90P    | 1/2 BLF7G27LS-90P    |
| 2500 - 2600                        | 52          | 44             | 28      | 14        | 40                   | ASYM | BLF6G27-45           | 2x BLF6G27-45        |
| 2600 - 2700                        | 52          | 44             | 28      | 14        | 40                   | ASYM | BLF6G27-45           | 2x BLF6G27-45        |
| 2600 - 2700                        | 52          | 44             | 28      | 14        | 40                   | ASYM | BLF6G27-45           | BLF6G27(LS)-100      |
| 2500 - 2700                        | 52.5        | 44.5           | 28      | 14        | 38                   | SYM  | 1/2 BLF7G27LS-150P   | 1/2 BLF7G27LS-150P   |
| 2570 - 2620                        | 54.1        | 47             | 28      | 15.2      | 43                   | SYM  | BLF7G27LS-100        | BLF7G27LS-100        |
| 2530 - 2630                        | 53          | 45             | 28      | 14        | 43                   | ASYM | BLF8G27LS160AV_main  | BLF8G27LS160AV_peak  |
| 2500 - 2700                        | 54          | 46             | 28      | 13        | 44.5                 | ASYM | BLF8G27LS-200AV_main | BLF8G27LS-200AV_peak |
| 2620 - 2690                        | 55.2        | 47.2           | 30      | 15        | 41                   | ASYM | BLF7G27LS-100        | BLF7G27LS-140        |
| 2620 - 2690                        | 57.5        | 48             | 28      | 13        | 37                   | ASYM | BLF8G27LS-140G       | BLF8G27LS-140G x2    |
| 2545 - 2660                        | 54          | 46.5           | 28      | 15.2      | 45                   | SYM  | BLF8G27LS-100V       | BLF8G27LS-100V       |
| 2570 - 2620                        | 51.1        | 43             | 28      | 14.2      | 44.5                 | SYM  | 1/2BLF8G27LS-100P    | 1/2BLF8G27LS-100P    |
| 2570 - 2620                        | 55.4        | 47             | 28      | 15        | 40.4                 | ASYM | BLF7G27LS-100        | BLF7G27LS-140        |
| 2545 - 2575                        | 55.3        | 47.5           | 28      | 15.4      | 43.7                 | ASYM | BLF7G27LS-100        | BLF7G27LS-140        |
| 2620 - 2690                        | 54.9        | 47             | 28      | 15.2      | 41.9                 | ASYM | BLF7G27LS-100        | BLF7G27LS-140        |
| 2620 - 2690                        | 55          | 47.5           | 30      | 15.7      | 43.5                 | ASYM | BLF7G27LS-100        | BLF7G27LS-140        |
| 2570 - 2620                        | 55.9        | 48             | 32      | 15.6      | 41                   | ASYM | BLF7G27LS-100        | BLF7G27LS-140        |
| 2620 - 2690                        | 56          | 48             | 32      | 15.6      | 40                   | ASYM | BLF7G27LS-100        | BLF7G27LS-140        |
| 2545 - 2630                        | 53.8        | 44.9           | 28      | 14.1      | 34.4                 | SYM  | 1/2 BLF7G27L-200PB   | 1/2 BLF7G27L-200PB   |
| 2620 - 2690                        | 54.8        | 45             | 32      | 17        | 19                   | SYM  | 1/2 BLF7G27L-200PB   | 1/2 BLF7G27L-200PB   |
| 2620 - 2690                        | 56.17       | 47.6           | 32      | 15.2      | 33                   | SYM  | BLF7G27L-135         | BLF7G27L-135         |
| 2620 - 2690                        | 56.2        | 48             | 32      | 15.2      | 39.1                 | SYM  | BLF8G27LS-140V       | BLF8G27LS-140V       |
| 2496 - 2690                        | 55.3        | 47             | 28      | 13.6      | 41.5                 | ASYM | BLF8G27LS-100GV      | BLF8G27LS-150GV      |
| 2620 - 2690                        | 58.8        | 50.2           | 29      | 13.4      | 42.5                 | ASYM | BLF8G27LS-200PGV     | BLF8G27LS-200GV (2X) |
| <b>3300 - 3800 MHz (WiMAX)</b>     |             |                |         |           |                      |      |                      |                      |
| 3500 - 3700                        | 52          | 45             | 28      | 10        | 30                   | ASYM | BLF6G38LS-50         | BLF6G38LS-100        |
| 3400 - 3600                        | 51          | 43             | 28      | 11.5      | 32                   | SYM  | BLF6G38-50           | BLF6G38-50           |

### 3.7.1.9 Single Package Asymmetric Doherty (PAD) power transistors

| Type                    | Product | f <sub>min</sub> (MHz) | f <sub>max</sub> (MHz) | P1dB (W) | Matching | VDS (V) | P <sub>L</sub> (W) | B <sub>o</sub> (dB) | η <sub>o</sub> (%) | G <sub>o</sub> (dB) | Test signal | Package |
|-------------------------|---------|------------------------|------------------------|----------|----------|---------|--------------------|---------------------|--------------------|---------------------|-------------|---------|
| <b>BLC8G27LS-160AV*</b> | Final   | 2500                   | 2700                   | 160      | I/O      | 28      | 30                 | 8.0                 | 29                 | 18                  | 2-c WCDMA   | SOT1275 |
| BLF8G27LS-200AV*        |         | 2500                   | 2700                   | 200      | I/O      | 28      | 40                 | 7.0                 | 28                 | 17                  | 2-c WCDMA   | SOT1242 |
| BLC8G24LS-240A*         |         | 2300                   | 2400                   | 240      | I/O      | 28      | 63                 | 7.5                 | 29                 | 18                  | 1-c WCDMA   | SOT1250 |
| BLF8G20LS-260A          |         | 1800                   | 1900                   | 260      | I/O      | 28      | 50                 | 7.2                 | 44 *               | 15.5                | 2-c WCDMA   | SOT539  |
| <b>BLF8G22LS-310AV*</b> |         | 2110                   | 2170                   | 310      | I/O      | 30      | 63                 | 6.9                 | 45                 | 15.8                | 2-c WCDMA   | SOT1110 |
| BLF8G22LS-460AV*        |         | 2110                   | 2170                   | 460      | I/O      | 30      | 83                 | 7.4                 | 44                 | 14.5                | 2-c WCDMA   | SOT1110 |

### 3.7.1.10 OMP power transistors

| Type                   | Product      | f <sub>min</sub> (MHz) | f <sub>max</sub> (MHz) | P1dB (W) | Matching | VDS (V) | P <sub>L</sub> (W) | B <sub>o</sub> (dB) | η <sub>o</sub> (%) | G <sub>o</sub> (dB) | Test signal | Package   |
|------------------------|--------------|------------------------|------------------------|----------|----------|---------|--------------------|---------------------|--------------------|---------------------|-------------|-----------|
| BLP7G22-05             | Driver       | 700                    | 2200                   | 5        | -        | 28      | 1                  | 7.0                 | 26                 | 17                  | 2-c WCDMA   | SOT1179   |
| <b>BLP7G22-10</b>      |              | 700                    | 2200                   | 10       | -        | 28      | 2                  | 7.0                 | 26                 | 17                  | 2-c WCDMA   | SOT1179   |
| BLP8G10S-45P(G)        | Driver/final | 700                    | 1000                   | 45       | I/O      | 28      | 2.5                | 12.6                | 21.4               | 21.5                | 2-c WCDMA   | SOT1223/4 |
| BLP8G22S-60P(G)*       |              | 1800                   | 2200                   | 60       | I/O      | 28      | 4                  | 11.8                | 20                 | 18                  | 2-c WCDMA   | SOT1223/4 |
| <b>BLP7G07S-140P</b>   | Final        | 700                    | 900                    | 140      | O        | 28      | 35                 | 6.0                 | 28                 | 19                  | 2-c WCDMA   | SOT1223   |
| BLP7G09S-140P(G)*      |              | 900                    | 1000                   | 140      | O        | 28      | 35                 | 6.0                 | 28                 | 19                  | 2-c WCDMA   | SOT1223/4 |
| <b>BLP8G21S-160PV*</b> |              | 1800                   | 2025                   | 160      | I/O      | 28      | 45                 | 5.5                 | 33                 | 18                  | 2-c WCDMA   | SOT1223   |
| BLP8G10S-200P(G)*      |              | 700                    | 1000                   | 200      | I/O      | 28      | 40                 | 7.0                 | 28.5               | 20                  | 2-c WCDMA   | SOT1223/4 |
| BLP8G22S-250V*         |              | 2110                   | 2170                   | 250      | I/O      | 28      | 70                 | 5.5                 | 30                 | 19                  | 2-c WCDMA   | SOT1223   |

**Bold red** = new, highly recommended product

\* Check status in section 3.1, as this type is not yet released for mass production



### 3.7.1.11 MMIC power transistors

| Type                    | Product | $f_{min}$<br>(MHz) | $f_{max}$<br>(MHz) | P1dB<br>(W) | Matching | VDS<br>(V) | $P_L$<br>(W) | $B_o$<br>(dB) | $\eta_D$<br>(%) | $G_p$<br>(dB) | Test signal | Package |
|-------------------------|---------|--------------------|--------------------|-------------|----------|------------|--------------|---------------|-----------------|---------------|-------------|---------|
| BLM6G10-30(G)           | MMIC    | 920                | 960                | 30          | I/O      | 28         | 2            | 11.8          | 11.5            | 29            | 2-c WCDMA   | SOT822  |
| BLM6G22-30(G)           |         | 2100               | 2200               | 30          | I/O      | 28         | 2            | 11.8          | 9               | 29.5          | 2-c WCDMA   | SOT822  |
| BLM7G1822S-40PB(G)*     |         | 1800               | 2200               | 40          | I/O      | 28         | 2            | 13.0          | 11              | 30            | 2-c WCDMA   | SOT1212 |
| <b>BLM7G22S-60PB(G)</b> |         | 2000               | 2200               | 60          | I/O      | 28         | 3.2          | 12.7          | 10              | 30            | 2-c WCDMA   | SOT1212 |

### 3.7.1.12 Small cell power transistors

| Type                    | Product      | $f_{min}$<br>(MHz) | $f_{max}$<br>(MHz) | P1dB<br>(W) | Matching | VDS<br>(V) | $P_L$<br>(W) | $B_o$<br>(dB) | $\eta_D$<br>(%) | $G_p$<br>(dB) | Test signal | Package   |
|-------------------------|--------------|--------------------|--------------------|-------------|----------|------------|--------------|---------------|-----------------|---------------|-------------|-----------|
| BLP7G22-05              | Driver       | 700                | 2200               | 5           | -        | 28         | 1            | 7.0           | 26              | 17            | 2-c WCDMA   | SOT1179   |
| BLF6G21-10G             |              | 1                  | 2200               | 10          | -        | 28         | 0.7          | 11.6          | 15              | 18.5          | 2-c WCDMA   | SOT538    |
| BLF6G27-10(G)           |              | 2300               | 2700               | 10          | I        | 28         | 2            | 7.0           | 20              | 19            | N-CDMA/IS95 | SOT975    |
| <b>BLP7G22-10</b>       |              | 700                | 2200               | 10          | -        | 28         | 2            | 7.0           | 26              | 17            | 2-c WCDMA   | SOT1179   |
| BLF6G22L(S)-40P         | Driver/final | 2110               | 2170               | 40          | I/O      | 28         | 13.5         | 4.8           | 30              | 19            | 2-c WCDMA   | SOT1121   |
| BLF6G27L(S)-40P         |              | 2500               | 2700               | 40          | I/O      | 28         | 20           | 3.0           | 37              | 17.5          | 1-c WCDMA   | SOT1121   |
| BLM7G1822S-40PB(G)*     | MMIC         | 1800               | 2200               | 40          | I/O      | 28         | 2            | 13.0          | 11              | 30            | 2-c WCDMA   | SOT1212   |
| <b>BLP8G10S-45P(G)</b>  | Driver/final | 700                | 1000               | 45          | I/O      | 28         | 2.5          | 12.6          | 21.4            | 21.5          | 2-c WCDMA   | SOT1223/4 |
| BLD6G21L(S)-50          | Integrated   | 2010               | 2025               | 50          | O        | 28         | 8            | 8.0           | 43              | 14.5          | TD-SCDMA    | SOT1130   |
| BLD6G22L(S)-50          | Doherty      | 2110               | 2170               | 50          | I/O      | 28         | 8            | 8.0           | 40              | 14            | TD-SCDMA    | SOT1130   |
| <b>BLM7G22S-60PB(G)</b> | MMIC         | 2000               | 2200               | 60          | I/O      | 28         | 3.2          | 12.8          | 10              | 30            | 2-c WCDMA   | SOT1212   |
| BLP8G22S-60P(G)*        | Driver/final | 1800               | 2200               | 60          | I/O      | 28         | 4            | 11.8          | 20              | 18            | 2-c WCDMA   | SOT1223/4 |
| BLF7G27L(S)-75P         | fFinal       | 2300               | 2700               | 75          | I/O      | 28         | 12           | 8.0           | 26              | 17            | N-CDMA/IS95 | SOT1121   |

### 3.7.1.13 High voltage power transistors

| Type            | Product | $f_{min}$<br>(MHz) | $f_{max}$<br>(MHz) | P1dB<br>(W) | Matching | VDS<br>(V) | $P_L$<br>(W) | $B_o$<br>(dB) | $\eta_D$<br>(%) | $G_p$<br>(dB) | Test signal | Package |
|-----------------|---------|--------------------|--------------------|-------------|----------|------------|--------------|---------------|-----------------|---------------|-------------|---------|
| BLF6H10L(S)-160 | Final   | 700                | 1000               | 160         | -        | 50         | 45           | 5.5           | 30              | 20            | 2-c WCDMA   | SOT467  |

**Bold red** = new, highly recommended product

\* Check status in section 3.1, as this type is not yet released for mass production

### 3.7.2 RF power transistors for broadcast/ISM applications

#### Why choose NXP's RF power transistors for broadcast/ISM applications:

- ▶ Highest power
- ▶ Best ruggedness
- ▶ Best broadband performance
- ▶ Best-in-class design support
- ▶ Very low thermal resistance design for unrivalled reliability

NXP's leading LDMOS technologies, together with advanced package concepts, enable power amplifiers that deliver best-in-class performance. We offer the industry's highest power and best ruggedness for all broadcast technologies. Our portfolio includes transistors for Ultra High Frequency (UHF), Very High Frequency (VHF), and High Frequency (HF) applications and covers ISM frequency bands.

#### 3.7.2.1 1 - 1600 MHz (UHF/VHF/HF/ISM) LDMOS line-up

| Type               | Product      | $f_{\min}$<br>(MHz) | $f_{\max}$<br>(MHz) | P1dB<br>(W) | Matching | VDS<br>(V) | $P_L$<br>(W) | $\eta_D$<br>(%) | $G_P$<br>(dB) | Test signal | Package  |
|--------------------|--------------|---------------------|---------------------|-------------|----------|------------|--------------|-----------------|---------------|-------------|----------|
| BLF1043            | Driver       | 1                   | 1000                | 10          | -        | 26         | 10           | 52              | 18.5          | CW          | SOT538A  |
| BLF2043F           |              | 1                   | 2200                | 10          | -        | 26         | 10           | 35              | 13.5          | CW          | SOT467C  |
| BLF640             |              | 1                   | 2200                | 10          | -        | 28         | 2            | 31              | 19.3          | 1-c WCDMA   | SOT538A  |
| BLF571             |              | 10                  | 500                 | 20          | -        | 50         | 20           | 70              | 27.5          | CW          | SOT467C  |
| BLF642             |              | 1                   | 1400                | 35          | -        | 32         | 35           | 63              | 19            | CW          | SOT467C  |
| BLF1046            | Driver/final | 1                   | 1000                | 45          | -        | 26         | 45           | 63              | 15.5          | CW          | SOT467C  |
| BLF644P*           | Final        | 1                   | 1300                | 70          | -        | 32         | 70           | -               | 19            | CW          | SOT1228A |
| BLF645             |              | 1                   | 1400                | 100         | -        | 32         | 100          | 56              | 18            | CW          | SOT540A  |
| BLF871(S)          |              | 1                   | 1000                | 100         | -        | 40         | 100          | 60              | 21            | CW          | SOT467   |
| BLF881(S)          |              | 1                   | 1000                | 140         | -        | 50         | 140          | 49              | 21            | CW          | SOT467   |
| BLF10M6(LS)200*    |              | 700                 | 1000                | 200         | I        | 28         | 40           | 28.5            | 20            | 2-c WCDMA   | SOT502   |
| <b>BLF647P(S)</b>  |              | 1                   | 1500                | 200         | -        | 32         | 200          | 70              | 18            | Pulsed      | SOT1121  |
| BLF573(S)          |              | 10                  | 500                 | 300         | -        | 50         | 300          | 70              | 27.2          | CW          | SOT502   |
| BLF647             |              | 1                   | 800                 | 300         | -        | 32         | 150          | 60              | 12.5          | CW          | SOT540A  |
| BLF369             |              | 10                  | 500                 | 500         | -        | 32         | 500          | 60              | 18            | CW          | SOT800-2 |
| BLF10H6600P(S)*    |              | 400                 | 1000                | 600         | I        | 50         | 600          | 58              | 20            | Pulsed      | SOT539   |
| <b>BLF174XR(S)</b> |              | 10                  | 128                 | 600         | -        | 50         | 600          | 73              | 29            | Pulsed      | SOT1214  |
| BLF574             |              | 10                  | 500                 | 600         | -        | 50         | 500          | 70              | 26.5          | CW          | SOT539A  |
| BLF574XR(S)        |              | 10                  | 500                 | 600         | -        | 50         | 600          | 74.7            | 24            | Pulsed      | SOT1214  |
| BLF178P            |              | 10                  | 128                 | 1200        | -        | 50         | 1200         | 75              | 28.5          | Pulsed      | SOT539A  |
| BLF578             |              | 10                  | 500                 | 1200        | -        | 50         | 1200         | 71              | 24            | Pulsed      | SOT539A  |
| BLF178XR(S)        |              | 10                  | 128                 | 1400        | -        | 50         | 1400         | 72              | 28            | Pulsed      | SOT539   |
| BLF578XR(S)        |              | 10                  | 500                 | 1400        | -        | 50         | 1400         | 69              | 23.5          | Pulsed      | SOT539   |

#### 3.7.2.2 UHF 470-860 MHz LDMOS line-up

| Type              | Product | $f_{\min}$<br>(MHz) | $f_{\max}$<br>(MHz) | P1dB<br>(W) | Matching | VDS<br>(V) | $P_L$<br>(W) | $\eta_D$<br>(%) | $G_P$<br>(dB) | Test signal | Package |
|-------------------|---------|---------------------|---------------------|-------------|----------|------------|--------------|-----------------|---------------|-------------|---------|
| BLF642            | Driver  | 1                   | 1400                | 35          | -        | 32         | 35           | 63              | 19            | CW          | SOT467C |
| BLF871(S)         | Final   | 1                   | 1000                | 100         | -        | 40         | 100          | 60              | 21            | CW          | SOT467  |
| BLF881(S)         |         | 1                   | 1000                | 140         | -        | 50         | 140          | 49              | 21            | CW          | SOT467  |
| BLF861A           |         | 470                 | 860                 | 150         | I/O      | 32         | 150          | 52              | 15            | CW          | SOT540A |
| <b>BLF647P(S)</b> |         | 1                   | 1500                | 200         | -        | 32         | 200          | 70              | 18            | Pulsed      | SOT1121 |
| BLF647            |         | 1                   | 800                 | 300         | -        | 32         | 150          | 60              | 12.5          | CW          | SOT540A |
| BLF878            |         | 470                 | 860                 | 300         | I/O      | 42         | 300          | 46              | 21            | CW          | SOT979A |
| BLF884P(S)        |         | 470                 | 860                 | 350         | I        | 50         | 150          | 46              | 21            | CW          | SOT1121 |
| BLF879P(S)        |         | 470                 | 860                 | 500         | I        | 42         | 200          | 47              | 21            | CW          | SOT539  |
| BLF888            |         | 470                 | 860                 | 500         | I        | 50         | 250          | 46              | 19            | CW          | SOT979A |
| <b>BLF888A(S)</b> |         | 470                 | 860                 | 600         | I        | 50         | 250          | 46              | 21            | CW          | SOT539  |
| BLF888B(S)        |         | 470                 | 860                 | 650         | I        | 50         | 250          | 46              | 21            | CW          | SOT539  |
| BLF578            |         | 10                  | 500                 | 1200        | -        | 50         | 1200         | 71              | 24            | Pulsed      | SOT539A |
| BLF578XR(S)       |         | 10                  | 500                 | 1400        | -        | 50         | 1400         | 69              | 23.5          | Pulsed      | SOT539  |

#### 3.7.2.3 2.45 GHz ISM LDMOS line-up

| Type                     | Product | $f_{\min}$<br>(MHz) | $f_{\max}$<br>(MHz) | P1dB<br>(W) | Matching | VDS<br>(V) | $P_L$<br>(W) | $\eta_D$<br>(%) | $G_P$<br>(dB) | Test signal | Package   |
|--------------------------|---------|---------------------|---------------------|-------------|----------|------------|--------------|-----------------|---------------|-------------|-----------|
| BLP25M710*               | Driver  | 10                  | 2500                | 10          | -        | 28         | 10           | 74              | 24            | CW          | SOT1179-1 |
| BLF25M612(G)*            |         | 1                   | 2500                | 12          | I        | 28         | 12           | 60              | 19            | CW          | SOT975    |
| BLF2425M7L(S)140         | Final   | 2400                | 2500                | 140         | I/O      | 28         | 140          | 52              | 18.5          | CW          | SOT502    |
| BLF2425M6L(S)180P        |         | 2400                | 2500                | 180         | I/O      | 28         | 180          | 53.5            | 13.3          | CW          | SOT539    |
| <b>BLF2425M7L(S)250P</b> |         | 2400                | 2500                | 250         | I/O      | 28         | 250          | 51              | 15            | CW          | SOT539    |

**Bold red** = new, highly recommended product

\* Check status in section 3.1, as this type is not yet released for mass production



### 3.7.3 RF power transistors for aerospace and defense

#### Device naming conventions RF power transistors for aerospace and defense

| B                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | L | S | 6 | G | 2731 | S | -120 | G |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|------|---|------|---|
| option: gullwing shaped leads<br>P: push-pull device<br>R: enhanced ruggedness<br>P1dB power<br>S: earless package<br>P: pallet<br>frequency band (in 100MHz; here: 2700-3100)<br>G: standard LDMOS ( $\leq 28V$ )<br>H: high voltage LDMOS (50V)<br>LDMOS technology generation<br>A: avionics frequency band operation<br>L: L-Band frequency operation<br>S: S-Band frequency operation<br>L: high frequency power transistor<br>B: semiconductor die made of Si |   |   |   |   |      |   |      |   |

#### Why choose NXP's microwave RF power transistors

- High gain
- High efficiency
- Highest reliability
- Improved pulse droop and insertion phase
- Improved ruggedness - overdrive without risk to +5 dB
- Reduces component count and helps simplify L- and S-band radar design
- Uses non-toxic, RoHS-compliant packages

#### 3.7.3.1 Avionics LDMOS transistors

| Type                      | Product | $f_{min}$<br>(MHz) | $f_{max}$<br>(MHz) | P1dB<br>(W) | VDS<br>(V) | $P_L$<br>(W) | $\eta_D$<br>(%) | $G_p$<br>(dB) | Test signal | Package |
|---------------------------|---------|--------------------|--------------------|-------------|------------|--------------|-----------------|---------------|-------------|---------|
| BLA1011-2                 | Driver  | 1030               | 1090               | 2           | 36         | 2            | -               | 16            | Pulsed      | SOT538A |
| BLA1011-10                |         | 1030               | 1090               | 10          | 36         | 10           | 40              | 16            | Pulsed      | SOT467C |
| BLA1011(S)-200R           | Final   | 1030               | 1090               | 200         | 36         | 200          | 50              | 15            | Pulsed      | SOT502  |
| BLA6G1011-200R            |         | 1030               | 1090               | 200         | 28         | 200          | 65              | 20            | Pulsed      | SOT502A |
| BLA6G1011LS-200RG         |         | 1030               | 1090               | 200         | 28         | 200          | 65              | 20            | Pulsed      | SOT502  |
| BLA0912-250R              |         | 960                | 1215               | 250         | 36         | 250          | 50              | 13.5          | Pulsed      | SOT502A |
| BLA1011-300               |         | 1030               | 1090               | 300         | 32         | 300          | 57              | 16.5          | Pulsed      | SOT957A |
| BLA6H0912-500             |         | 960                | 1215               | 500         | 50         | 450          | 50              | 17            | Pulsed      | SOT634A |
| BLA6H1011-600             |         | 1030               | 1090               | 600         | 48         | 600          | 52              | 17            | Pulsed      | SOT539A |
| <b>BLU6H0410L(S)-600P</b> |         | 400                | 1000               | 600         | 50         | 600          | 57              | 20            | Pulsed      | SOT539  |

#### 3.7.3.2 L-band LDMOS transistors

| Type               | Product | $f_{min}$<br>(MHz) | $f_{max}$<br>(MHz) | P1dB<br>(W) | Matching | VDS<br>(V) | $P_L$<br>(W) | $\eta_D$<br>(%) | $G_p$<br>(dB) | Test signal | Package |
|--------------------|---------|--------------------|--------------------|-------------|----------|------------|--------------|-----------------|---------------|-------------|---------|
| BLL6H0514-25       | Driver  | 500                | 1400               | 25          | -        | 50         | 25           | 50              | 19            | Pulsed      | SOT467C |
| BLL1214-35         |         | 1200               | 1400               | 35          | I        | 36         | 35           | 43              | 13            | Pulsed      | SOT467C |
| BLL6H0514L(S)-130  | Final   | 500                | 1400               | 130         | I        | 50         | 130          | 50              | 17            | Pulsed      | SOT1135 |
| BLL1214-250        |         | 1200               | 1400               | 250         | I/O      | 36         | 250          | 47              | 13            | Pulsed      | SOT502A |
| BLL1214-250R       |         | 1200               | 1400               | 250         | I/O      | 36         | 250          | 47              | 13            | Pulsed      | SOT502A |
| BLL6G1214L(S)-250* |         | 1200               | 1400               | 250         | I/O      | 36         | 250          | 45              | 15            | Pulsed      | SOT502  |
| BLL6H1214L(S)-250  |         | 1200               | 1400               | 250         | I/O      | 50         | 250          | 55              | 17            | Pulsed      | SOT502  |
| BLL6H1214-500      |         | 1200               | 1400               | 500         | I/O      | 50         | 500          | 50              | 17            | Pulsed      | SOT539A |
| BLL6H1214LS-500*   |         | 1200               | 1400               | 500         | I/O      | 50         | 500          | 50              | 17            | Pulsed      | SOT539B |

**Bold red** = new, highly recommended product

\* Check status in section 3.1, as this type is not yet released for mass production

### 3.7.3.3 S-band LDMOS transistors

| Type                       | Product | f <sub>min</sub><br>(MHz) | f <sub>max</sub><br>(MHz) | P1dB<br>(W) | Matching | VDS<br>(V) | P <sub>L</sub><br>(W) | η <sub>5</sub><br>(%) | G <sub>p</sub><br>(dB) | Test signal | Package  |
|----------------------------|---------|---------------------------|---------------------------|-------------|----------|------------|-----------------------|-----------------------|------------------------|-------------|----------|
| BLS6G2731-6G               | Driver  | 2700                      | 3100                      | 6           | I        | 32         | 6                     | 33                    | 15                     | Pulsed      | SOT975C  |
| BLS6G3135(S)-20            |         | 3100                      | 3500                      | 20          | I/O      | 32         | 20                    | 45                    | 15.5                   | Pulsed      | SOT608   |
| <b>BLS6G2735L(S)-30</b>    |         | 2700                      | 3500                      | 30          | I/O      | 32         | 30                    | 50                    | 13                     | Pulsed      | SOT1135  |
| BLS2933-100                | Final   | 2900                      | 3300                      | 100         | O        | 32         | 100                   | 40                    | 8                      | Pulsed      | SOT502A  |
| BLS7G2325L-105             |         | 2300                      | 2500                      | 105         | I/O      | 30         | 105                   | 55                    | 16.5                   | Pulsed      | SOT502A  |
| BLS6G2731(S)-120           |         | 2700                      | 3100                      | 120         | I/O      | 32         | 120                   | 48                    | 13.5                   | Pulsed      | SOT502   |
| BLS6G3135(S)-120           |         | 3100                      | 3500                      | 120         | I/O      | 32         | 120                   | 43                    | 11                     | Pulsed      | SOT502   |
| BLS6G2731S-130             |         | 2700                      | 3100                      | 130         | I/O      | 32         | 130                   | 50                    | 12                     | Pulsed      | SOT922-1 |
| BLS6G2933S-130             |         | 2900                      | 3300                      | 130         | I/O      | 32         | 130                   | 47                    | 12.5                   | Pulsed      | SOT922-1 |
| BLS7G2933S-150             |         | 2900                      | 3300                      | 150         | I/O      | 32         | 150                   | 47                    | 13.5                   | Pulsed      | SOT922-1 |
| BLS7G2730L(S)-200P         |         | 2700                      | 3000                      | 200         | I/O      | 32         | 200                   | 48                    | 12                     | Pulsed      | SOT539   |
| BLS7G3135L(S)-200*         |         | 3100                      | 3500                      | 200         | I/O      | 32         | 200                   | 43                    | 10                     | Pulsed      | SOT502   |
| <b>BLS7G2729L(S)-350P*</b> |         | 2700                      | 2900                      | 350         | I/O      | 32         | 350                   | 50                    | 13.5                   | Pulsed      | SOT539   |
| <b>BLS7G3135L(S)-350P*</b> |         | 3100                      | 3500                      | 350         | I/O      | 32         | 350                   | 37                    | 11.5                   | Pulsed      | SOT539   |

### 3.7.4 Gallium Nitride (GaN) RF power amplifiers

#### Device naming conventions GaN RF power amplifiers

| C                                                                              | L | F | 1G | 0040 | S | 50 | P |
|--------------------------------------------------------------------------------|---|---|----|------|---|----|---|
| P: push-pull indicator, P = push-pull type; no P means single-ended transistor |   |   |    |      |   |    |   |
| 2 to 1500: nominal P3dB in Watts: eg 50 = 50W                                  |   |   |    |      |   |    |   |
| S: earless type, S = earless; no S means eared package                         |   |   |    |      |   |    |   |
| 35 to 60: upper frequency, 10x GHz value: 35 = 3.5GHz; 60 = 6.0GHz             |   |   |    |      |   |    |   |
| 00 to 40: lower frequency, 10x GHz value: 00 = 0GHz or DC; 40 = 4.0GHz         |   |   |    |      |   |    |   |
| 1G: technology generation: 1G = 1st generation                                 |   |   |    |      |   |    |   |
| F: package style: F = ceramic, P = overmolded plastic                          |   |   |    |      |   |    |   |
| L: high frequency power transistor                                             |   |   |    |      |   |    |   |
| C: primary material identifier: C = wide band-gap compound materials, eg GaN   |   |   |    |      |   |    |   |

| Type                     | Product      | f <sub>min</sub><br>(MHz) | f <sub>max</sub><br>(MHz) | P1dB<br>(W) | Matching | VDS<br>(V) | P <sub>L</sub><br>(W) | η <sub>D</sub><br>(%) | G <sub>p</sub><br>(dB) | Test signal | Package |
|--------------------------|--------------|---------------------------|---------------------------|-------------|----------|------------|-----------------------|-----------------------|------------------------|-------------|---------|
| <b>CLF1G0060(S)-10*</b>  | Driver       | 0                         | 6000                      | 10          | -        | 50         | 10                    | 33.2                  | 17                     | Pulsed      | SOT1227 |
| <b>CLF1G0060(S)-30*</b>  |              | 0                         | 6000                      | 30          | -        | 50         | 30                    | 59                    | 15.9                   | Pulsed      | SOT1227 |
| <b>CLF1G0035(S)-50*</b>  | Driver/final | 0                         | 3500                      | 50          | -        | 50         | 50                    | 49                    | 13                     | Pulsed      | SOT467  |
| <b>CLF1G0035(S)-100*</b> |              | 0                         | 3500                      | 100         | -        | 50         | 100                   | 59.5                  | 13.9                   | Pulsed      | SOT467  |
| CLF1G0035(S)-100P*       | Final        | 0                         | 3500                      | 100         | -        | 50         | 100                   | 50.1                  | 12.7                   | Pulsed      | SOT1228 |
| CLF1G0035(S)-200P*       |              | 0                         | 3500                      | 200         | -        | 50         | 200                   | 43.5                  | 11.5                   | Pulsed      | SOT1228 |

## 3.8 Wireless microcontroller chipsets and modules

| Type                  | Module/<br>single chip | Application                                                     | TX power | Receiver<br>sensitivity | TX<br>current | RX<br>current | Operating<br>voltage | Form<br>factor                 |
|-----------------------|------------------------|-----------------------------------------------------------------|----------|-------------------------|---------------|---------------|----------------------|--------------------------------|
| <b>JN5148-001-M00</b> | Module                 | 2.4 - 2.4835 GHz<br>JenNet & IEEE802.15.4                       | +2.5 dBm | -95 dBm                 | 15 mA         | 17.5 mA       | 2.3 - 3.6 V          | Integral antenna<br>18 x 32 mm |
| <b>JN5148-001-M03</b> | Module                 | 2.4 - 2.4835 GHz<br>JenNet & IEEE802.15.4                       | +2.5 dBm | -95 dBm                 | 15 mA         | 17.5 mA       | 2.3 - 3.6 V          | U.FL connector<br>18 x 30 mm   |
| <b>JN5148-001-M04</b> | Module                 | 2.4 - 2.4835 GHz<br>JenNet & IEEE802.15.4                       | +20 dBm  | -98 dBm                 | 110mA         | 23 mA         | 2.7 - 3.6 V          | U.FL connector<br>18 x 41 mm   |
| <b>JN5148-J01</b>     | Single chip            | 2.4 - 2.4835 GHz<br>JenNet - IP                                 | +2.5 dBm | -95 dBm                 | 15 mA         | 17.5 mA       | 2.3 - 3.6 V          | 8 x 8 mm QFN56                 |
| <b>JN5148-001</b>     | Single chip            | 2.4 - 2.4835 GHz<br>JenNet & IEEE802.15.4                       | +2.5 dBm | -95 dBm                 | 15 mA         | 17.5 mA       | 2.3 - 3.6 V          | 8 x 8 mm QFN56                 |
| <b>JN5148-Z01</b>     | Single chip            | 2.4 - 2.4835 GHz<br>ZigBee PRO                                  | +2.5 dBm | -95 dBm                 | 15 mA         | 17.5 mA       | 2.3 - 3.6 V          | 8 x 8 mm QFN56                 |
| <b>JN5161-001</b>     | Single chip            | 2.4 - 2.4835 GHz<br>RF4CE & IEEE802.15.4                        | +2.5 dBm | -95 dBm                 | 15 mA         | 17 mA         | 2.3 - 3.6 V          | 6 x 6 mm QFN40                 |
| <b>JN5164-001</b>     | Single chip            | 2.4 - 2.4835 GHz<br>JenNet - IP & RF4CE & IEEE802.15.4          | +2.5 dBm | -95 dBm                 | 15 mA         | 17 mA         | 2.3 - 3.6 V          | 6 x 6 mm QFN40                 |
| <b>JN5168-001</b>     | Single chip            | 2.4 - 2.4835 GHz<br>JenNet - IP & ZigBee & RF4CE & IEEE802.15.4 | +2.5 dBm | -95 dBm                 | 15 mA         | 17 mA         | 2.3 - 3.6 V          | 6 x 6 mm QFN40                 |
| <b>JN5168-001-M00</b> | Module                 | 2.4 - 2.4835 GHz<br>JenNet - IP & ZigBee & RF4CE & IEEE802.15.4 | +2.5 dBm | -95 dBm                 | 15 mA         | 17 mA         | 2.3 - 3.6 V          | Integral antenna<br>16 x 30 mm |
| <b>JN5168-001-M03</b> | Module                 | 2.4 - 2.4835 GHz<br>JenNet - IP & ZigBee & RF4CE & IEEE802.15.4 | +2.5 dBm | -95 dBm                 | 15 mA         | 17 mA         | 2.3 - 3.6 V          | UFL connector<br>16 x 21 mm    |
| <b>JN5168-001-M05</b> | Module                 | 2.4 - 2.4835 GHz<br>JenNet - IP & ZigBee & RF4CE & IEEE802.15.4 | +9.5 dBm | -96 dBm                 | 35 mA         | 22 mA         | 2.3 - 3.6 V          | UFL connector<br>16 x 30 mm    |
| <b>JN5168-001-M06</b> | Module                 | 2.4 - 2.4835 GHz<br>JenNet - IP & ZigBee & RF4CE & IEEE802.15.4 | +22 dBm  | -100 dBm                | 175 mA        | 22 mA         | 2.3 - 3.6 V          | UFL connector<br>16 x 30 mm    |
| <b>JN516X-EK001</b>   | Evaluation<br>kit      | 2.4 - 2.4835 GHz<br>JenNet - IP & ZigBee & RF4CE & IEEE802.15.4 | n/a      | n/a                     | n/a           | n/a           | n/a                  | n/a                            |

**Bold red** = new, highly recommended product

\* Check status in section 3.1, as this type is not yet released for mass production

## 4. Design support

This chapter guides you through the available tools, documents, materials, and links that ease the design-in of our products. New this year is our online community, the Engineers' Corner.

### 4.1 Knowing NXP's RF portfolio

Beyond this RF Manual, you can learn about NXP's broad RF portfolio through the NXP Technical Academy, various webinars and the NXP channel on YouTube.

The NXP Technical Academy provides training modules where you can learn about our products and applications, watch hands-on trainings, and even get certified! The training modules can be viewed on mobile devices as well ([elearning.nxp.com](http://elearning.nxp.com)).

NXP provides RF webinars on a regular basis.  
([www.nxp.com/news/meet-nxp/webinars-and-podcasts.html#rf](http://www.nxp.com/news/meet-nxp/webinars-and-podcasts.html#rf))

On NXP's YouTube channel ([www.youtube.com/user/nxpsemiconductors](http://www.youtube.com/user/nxpsemiconductors)), there are short videos that explain NXP's portfolio, application information, tips and tricks to optimize your system's performance, and more.

### 4.2 Product selection on NXP.com

Every RF product has its own webpage on the NXP website. Pages can be accessed in several ways: by product tree, by application area, or via cross-reference search. Or, simply type 'nxp <product>' in the Google search bar.

#### Product tree and parametric search

Our online product tree ([www.nxp.com/products/rf](http://www.nxp.com/products/rf)) categorizes the product by function. The parametric search tool allows you to refine the selection based on performance requirements.

#### Application area

To find out what NXP offers in each application area, use the Explore Application section of the NXP website.

#### Cross-reference

NXP maintains a cross-reference of competitor products and NXP alternatives. This list can be searched online via the search tool bar on the NXP website or off-line by installing the X-Reference-Tool.

### 4.3 Product evaluation

NXP offers a broad range of support material for evaluating RF products and optimizing the performance of your application.

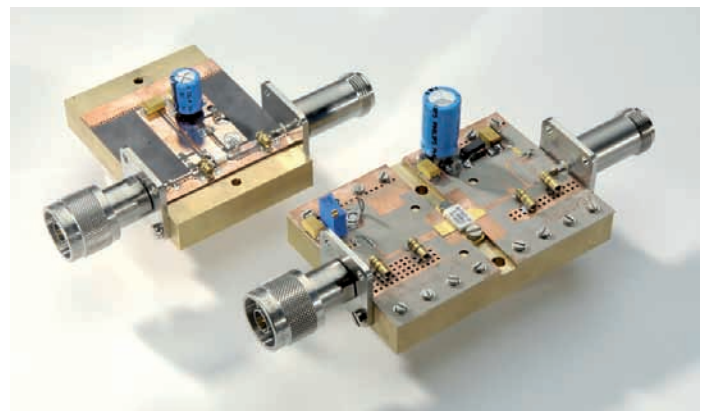
#### Data sheets and application notes

The first chapter of this RF Manual includes application diagrams, recommended type numbers, and product highlights. More in-depth application information is available in the second chapter, in product data sheets or in the Application Notes section of the NXP website ([www.nxp.com/products/all\\_appnotes](http://www.nxp.com/products/all_appnotes)).

#### Simulation tools

To help you evaluate our products in your specific application, NXP offers various simulation tools, including small-signal touchstone S-parameters and parametric models that let you customize the biasing conditions. The parametric models are based on best-in-class Mextram models and RFLDMOS models developed by Philips Research, a recognized leader in physics-based models. The parametric models fully support AC, DC, S-parameter, harmonic balance, and time-domain simulations. These models allow designers to assess the performance of complex systems at an early stage of the development process.

The models are available for Advanced Design System (ADS), Microwave Office (MWO) and Ansoft Designer. Spice versions of the parametric models, which can be used with almost any commercial design tool, are also available.



## Customer evaluation kits and samples

Several kits are available for evaluation of our products. Boards are provided with industry-standard RF connectors to facilitate measurements and design-in. The features and content of each kit are described on the NXP website and are listed on the corresponding product page. On the Customer Evaluation Kits page you can also find support materials, such as the latest user manuals and software updates. You can order small quantities of all products to build and evaluate prototypes. To obtain a kit or order samples, please contact your local NXP representative or authorized distributor.



## 4.4 Engineers' corner

Our new online community, the Engineers' Corner, is an engineer-to-engineer space that lets RF small-signal enthusiasts collaborate, get technical support, and share ideas. Have question? Want to discuss the topics you face in your day-to-day life as an RF engineer? This is the place. NXP's own RF small-signal experts are part of the community, so you can be sure you're connecting with people who know their stuff. Curious? Visit [www.nxp.com/engineerscorner](http://www.nxp.com/engineerscorner)

## 4.5 Additional design-in support

If you need additional design-in support, please contact your local NXP sales representative or authorized distributor. You can also submit a question using the web form on the NXP website.

## 4.6 Application notes

| Product category | Filename | Description                                                                                             |
|------------------|----------|---------------------------------------------------------------------------------------------------------|
| Amplifiers       | AN11222  | BGA3018 - 1 GHz 18 dB gain wideband amplifier MMIC                                                      |
| Amplifiers       | AN11221  | BGA3015 - 1 GHz 15 dB gain wideband amplifier MMIC                                                      |
| Amplifiers       | AN11220  | BGA3012 - 1 GHz 12 dB gain wideband amplifier MMIC                                                      |
| Amplifiers       | AN11171  | BGU7063 evaluation board application note                                                               |
| Amplifiers       | AN11288  | BGU8009 GNSS LNA evaluation board                                                                       |
| Amplifiers       | AN10896  | Mounting and Soldering of RF transistors                                                                |
| Amplifiers       | AN11284  | BGU8006 GNSS front end evaluation board                                                                 |
| Amplifiers       | AN10967  | BLF578 demo for 352 MHz 1 kW CW power                                                                   |
| Amplifiers       | AN11230  | BGU8006 GNSS LNA evaluation board                                                                       |
| Amplifiers       | AN11228  | BGA301x Wideband Variable Gain Amplifier Application                                                    |
| Amplifiers       | AN11086  | BGU7003 LNA application for GPS L2 band                                                                 |
| Amplifiers       | AN11072  | BGU7003 400 MHz and 900 MHz application                                                                 |
| Amplifiers       | AN11198  | Life-time requirements of NXP HVSON12 plastic drivers                                                   |
| Amplifiers       | AN11251  | BGA7210 Operation Frequency Extension Down to 400 MHz                                                   |
| Amplifiers       | AN11226  | TTL bias switching                                                                                      |
| Amplifiers       | AN11191  | Application Note for the BGA7130 EVB 1930 - 1995 MHz                                                    |
| Amplifiers       | AN11190  | Application Note for the BGA7130 EVB 865 - 880 MHz                                                      |
| Amplifiers       | AN11068  | BGU8007/BGU7005 Matching Options for Improved LTE Jammer Immunity                                       |
| Amplifiers       | AN11097  | CMMB LNA with BGU7003, 400 to 800 MHz                                                                   |
| Amplifiers       | AN11148  | BGU7003 1900 to 2100 MHz LNA Application                                                                |
| Amplifiers       | AN11152  | Reducing the Spurs at RF_out caused by the biasing choke during fast switching on and off in TDD system |
| Amplifiers       | AN11135  | Replacing HMC625 by NXP BGA7204                                                                         |
| Amplifiers       | AN11130  | Bias module for 50 V GaN demonstration boards                                                           |
| Amplifiers       | AN11103  | Externally-matched 900 MHz LNA using BGU7005                                                            |
| Amplifiers       | AN11090  | 50 Ohm FM LNA for embedded Antenna in Portable applications with BGU6102                                |
| Amplifiers       | AN11091  | Ohmic FM LNA for embedded Antenna in Portable applications with BGU6102                                 |
| Amplifiers       | AN11101  | BGU7007 GPS front end evaluation board                                                                  |
| Amplifiers       | AN11035  | 50 Ohm FM LNA for embedded Antenna in Portable applications with BGU7003W                               |
| Amplifiers       | AN11034  | High Ohmic FM LNA for embedded Antenna in Portable applications with BGU7003W                           |
| Amplifiers       | AN11062  | Broadband DVB-T UHF power amplifier with the BLF888A                                                    |
| Amplifiers       | AN10923  | 1.5 GHz Doherty power amplifier for base station applications using the BLF6G15L-250PBRN                |

## 4.6 Application notes (continued)

| Product category | Filename | Description                                                                               |
|------------------|----------|-------------------------------------------------------------------------------------------|
| Amplifiers       | AN10953  | BLF645 10 to 600 MHz 120 W amplifier                                                      |
| Amplifiers       | AN10944  | 1930 to 1990 MHz Doherty amplifier using the BLF7G20LS-200                                |
| Amplifiers       | AN10951  | 1805 to 1880 MHz asymmetrical Doherty amplifier with the BLF7G20LS-90P and BLF7G21LS-160P |
| Amplifiers       | AN10945  | 174 to 230 MHz DVB-T power amplifier with the BLF881                                      |
| Amplifiers       | AN10933  | 2.5 to 2.7 GHz Doherty power amplifier using the BLF7G27LS-150P                           |
| Amplifiers       | AN10921  | BLF7G20LS-200 Doherty 1.805 - 1.88 GHz RF power amplifier                                 |
| Amplifiers       | AN10869  | Broadband DVB-T UHF power amplifier with the BLF888                                       |
| Amplifiers       | AN10858  | 174 to 230 MHz DVB-T power amplifier with the BLF578                                      |
| Amplifiers       | AN10885  | Doherty RF performance analysis using the BLF7G22LS-130                                   |
| Amplifiers       | AN10847  | Doherty RF performance using the BLF6G20-230PRN                                           |
| Amplifiers       | AN10714  | Using the BLF574 in the 88 - 108 MHz FM band                                              |
| Amplifiers       | AN10882  | Dependency of BLF578 gate bias voltage on temperature                                     |
| Amplifiers       | AN10800  | Using the BLF578 in the 88 to 108 MHz FM band                                             |
| Transistors      | AN11339  | Maximum RF Input Power BFU730LX                                                           |
| Transistors      | AN10896  | Mounting and Soldering of RF transistors                                                  |
| Transistors      | AN11006  | Single stage 2.3 - 2.7 GHz LNA with BFU730F                                               |
| Transistors      | AN11223  | Low Noise Fast Turn ON/OFF 2.4 - 2.5GHz WiFi LNA with BFU730LX                            |
| Transistors      | AN11224  | Low Noise Fast Turn ON/OFF 5 - 5.9GHz WiFi LNA with BFU730LX                              |
| Transistors      | AN11007  | Single stage 5 - 6 GHz WLAN LNA with BFU730F                                              |
| Transistors      | AN10967  | BLF578 demo for 352 MHz 1 kW CW power                                                     |
| Transistors      | AN11114  | 2.4 - 5.9 GHz Broadband WiFi LNA With BFU730F                                             |
| Transistors      | AN11140  | Low Noise Fast Turn ON/OFF 5 - 5.9 GHz WiFi LNA with BFU730F                              |
| Transistors      | AN11147  | Low Noise Fast Turn ON/OFF 2.4 - 2.5 GHz WiFi LNA with BFU730F                            |
| Transistors      | AN11198  | Life-time requirements of NXP HVSON12 plastic drivers                                     |
| Transistors      | AN11226  | TTL bias switching                                                                        |
| Transistors      | AN11225  | Demonstration of a 1 GHz discrete VCO based on BFR92A                                     |
| Transistors      | AN11130  | Bias module for 50 V GaN demonstration boards                                             |
| Transistors      | AN11118  | BFU725F/N1 1.5 GHz LNA evaluation board                                                   |
| Transistors      | AN11066  | SDARS active antenna 1st stage LNA with BFU730F, 2.33 GHz                                 |
| Transistors      | AN11024  | SDARS active antenna 2nd stage LNA with BFU690, 2.33 GHz                                  |
| Transistors      | AN11102  | BFU725F/N1 2.4 GHz LNA evaluation board                                                   |
| Transistors      | AN11062  | Broadband DVB-T UHF power amplifier with the BLF888A                                      |

| Product category  | Filename | Description                                                                               |
|-------------------|----------|-------------------------------------------------------------------------------------------|
| Transistors       | AN10923  | 1.5 GHz Doherty power amplifier for base station applications using the BLF6G15L-250PBRN  |
| Transistors       | AN10953  | BLF645 10 to 600 MHz 120 W amplifier                                                      |
| Transistors       | AN11010  | Single stage Ku band LNA using BFU730F                                                    |
| Transistors       | AN10944  | 1930 to 1990 MHz Doherty amplifier using the BLF7G20LS-200                                |
| Transistors       | AN10951  | 1805 to 1880 MHz asymmetrical Doherty amplifier with the BLF7G20LS-90P and BLF7G21LS-160P |
| Transistors       | AN10945  | 174 to 230 MHz DVB-T power amplifier with the BLF881                                      |
| Transistors       | AN10933  | 2.5 to 2.7 GHz Doherty power amplifier using the BLF7G27LS-150P                           |
| Transistors       | AN10921  | BLF7G20LS-200 Doherty 1.805 - 1.88 GHz RF power amplifier                                 |
| Transistors       | AN10869  | Broadband DVB-T UHF power amplifier with the BLF888                                       |
| Transistors       | AN10858  | 174 to 230 MHz DVB-T power amplifier with the BLF578                                      |
| Transistors       | AN10885  | Doherty RF performance analysis using the BLF7G22LS-130                                   |
| Transistors       | AN10847  | Doherty RF performance using the BLF6G20-230PRN                                           |
| Transistors       | AN10714  | Using the BLF574 in the 88 - 108 MHz FM band                                              |
| Transistors       | AN10882  | Dependency of BLF578 gate bias voltage on temperature                                     |
| Transistors       | AN10800  | Using the BLF578 in the 88 to 108 MHz FM band                                             |
| Mixers/modulators | AN10998  | BGX7221 evaluation board application note                                                 |
| Mixers/modulators | AN11132  | BGX7220 evaluation board application note                                                 |
| Mixers/modulators | AN11144  | Universal Single LNB with TFF101x FIMOD IC                                                |
| Mixers/modulators | AN11014  | BGX7100 evaluation board application note                                                 |
| Mixers/modulators | AN11189  | BGX7101 evaluation board application note                                                 |

## 4.7 Simulation models

### 4.7.1 Simulation models for RF power devices

Updates of this overview are available in PDF format at: [http://www.nxp.com/wcm\\_documents/models/RFPower\\_Model\\_Overview.pdf](http://www.nxp.com/wcm_documents/models/RFPower_Model_Overview.pdf)

#### Overview of RF power models

| Type              | ADS model |          | MicroWave Office model | S-parameter data |
|-------------------|-----------|----------|------------------------|------------------|
|                   | ADS 2009  | ADS 2011 |                        |                  |
| BLA0912-250       |           |          |                        | 36 V, 150 mA     |
| BLA6G1011-200R    | Available |          | Available              |                  |
| BLA6G1011L-200RG  | Available |          | Available              |                  |
| BLA6G1011LS-200RG | Available |          | Available              |                  |
| BLA6H0912-500     | Available |          | Available              |                  |
| BLA6H1011-600     | Available |          | Available              |                  |
| BLD6G22L-50       |           |          | Available              |                  |
| BLD6G22LS-50      |           |          | Available              |                  |
| BLF1043           |           |          |                        | 28 V, 50 mA      |
| BLF1046           |           |          |                        | 28 V, 300 mA     |
| BLF174XR          |           |          | Available              |                  |
| BLF174XRS         |           |          | Available              |                  |
| BLF178XR          |           |          | Available              |                  |
| BLF178XRS         |           |          | Available              |                  |
| BLF369            | Available |          |                        |                  |
| BLF3G21-30        |           |          |                        | 26 V, 450 mA     |
| BLF3G21-6         | Available |          |                        |                  |
| BLF571            | Available |          | Available              |                  |
| BLF573            | Available |          | Available              |                  |
| BLF573S           | Available |          | Available              |                  |
| BLF574            | Available |          | Available              |                  |
| BLF574XR          |           |          | Available              |                  |
| BLF574XRS         |           |          | Available              |                  |
| BLF578            | Available |          | Available              |                  |
| BLF578XR          |           |          | Available              |                  |
| BLF578XRS         |           |          | Available              |                  |
| BLF642            |           |          | Available              |                  |
| BLF645            | Available |          | Available              |                  |
| BLF6G10-200RN     | Available |          |                        |                  |
| BLF6G10-45        | Available |          | Available              |                  |
| BLF6G10L-260PRN   | Available |          |                        |                  |
| BLF6G10L-40BRN    | Available |          |                        |                  |
| BLF6G10LS-135RN   | Available |          | Available              |                  |
| BLF6G10LS-200RN   | Available |          |                        |                  |
| BLF6G10LS-260PRN  | Available |          |                        |                  |
| BLF6G10S-45       | Available |          | Available              |                  |
| BLF6G15L-250PBRN  | Available |          |                        |                  |
| BLF6G15L-40BRN    | Available |          |                        |                  |
| BLF6G20-230PRN    | Available |          |                        |                  |
| BLF6G20-45        | Available |          | Available              |                  |
| BLF6G20LS-180RN   | Available |          |                        |                  |
| BLF6G20S-45       | Available |          | Available              |                  |
| BLF6G21-10G       | Available |          | Available              |                  |
| BLF6G22-45        | Available |          | Available              |                  |
| BLF6G22L-40P      | Available |          |                        |                  |
| BLF6G22LS-180RN   | Available |          |                        |                  |
| BLF6G22LS-40P     | Available |          |                        |                  |
| BLF6G22S-45       | Available |          | Available              |                  |
| BLF6G27-10        | Available |          |                        |                  |
| BLF6G27-10G       | Available |          | Available              |                  |
| BLF6G27-45        | Available |          | Available              |                  |
| BLF6G27-75        | Available |          |                        |                  |
| BLF6G27L-40P      | Available |          | Available              |                  |
| BLF6G27LS-40P     | Available |          | Available              |                  |
| BLF6G27LS-75      | Available |          |                        |                  |
| BLF6G27S-45       | Available |          | Available              |                  |
| BLF6G38-10        | Available |          |                        |                  |
| BLF6G38-100       | Available |          |                        |                  |
| BLF6G38-10G       | Available |          | Available              |                  |
| BLF6G38-25        | Available |          | Available              |                  |
| BLF6G38-50        | Available |          | Available              |                  |
| BLF6G38LS-100     | Available |          |                        |                  |
| BLF6G38LS-50      | Available |          | Available              |                  |
| BLF6G38S-25       | Available |          | Available              |                  |
| BLF6H10L-160      |           |          | Available              |                  |
| BLF6H10LS-160     |           |          | Available              |                  |
| BLF7G15LS-200     | Available |          |                        |                  |

## Overview of RF power models

| Type             | ADS model |           | MicroWave Office model | S-parameter data |
|------------------|-----------|-----------|------------------------|------------------|
|                  | ADS 2009  | ADS 2011  |                        |                  |
| BLF7G15LS-300P   | Available |           |                        |                  |
| BLF7G20L-200     | Available |           | Available              |                  |
| BLF7G20L-250P    | Available |           | Available              |                  |
| BLF7G20L-90P     | Available |           |                        |                  |
| BLF7G20LS-140P   | Available |           |                        |                  |
| BLF7G20LS-200    | Available |           | Available              |                  |
| BLF7G20LS-250P   | Available |           | Available              |                  |
| BLF7G20LS-90P    | Available |           |                        |                  |
| BLF7G21L-160P    | Available |           |                        |                  |
| BLF7G21LS-160P   | Available |           |                        |                  |
| BLF7G22L-130     | Available |           | Available              |                  |
| BLF7G22L-160     | Available |           |                        |                  |
| BLF7G22L-200     | Available |           | Available              |                  |
| BLF7G22L-250P    | Available |           |                        |                  |
| BLF7G22LS-130    | Available |           | Available              |                  |
| BLF7G22LS-160    | Available |           |                        |                  |
| BLF7G22LS-200    | Available |           | Available              |                  |
| BLF7G22LS-250P   | Available |           |                        |                  |
| BLF7G24L-100     | Available |           |                        |                  |
| BLF7G24L-140     | Available |           |                        |                  |
| BLF7G24LS-100    | Available |           |                        |                  |
| BLF7G24LS-140    | Available |           |                        |                  |
| BLF7G27L-100     | Available |           | Available              |                  |
| BLF7G27L-140     | Available |           | Available              |                  |
| BLF7G27L-150P    | Available |           |                        |                  |
| BLF7G27L-200PB   | Available |           |                        |                  |
| BLF7G27L-75P     | Available |           |                        |                  |
| BLF7G27L-90P     | Available |           | Available              |                  |
| BLF7G27LS-100    | Available |           | Available              |                  |
| BLF7G27LS-140    | Available |           | Available              |                  |
| BLF7G27LS-150P   | Available |           |                        |                  |
| BLF7G27LS-75P    | Available |           |                        |                  |
| BLF7G27LS-90P    | Available |           | Available              |                  |
| BLF871           | Available |           | Available              |                  |
| BLF871S          | Available |           | Available              |                  |
| BLF878           | Available |           | Available              |                  |
| BLF879P          |           |           | Available              |                  |
| BLF879PS         |           |           | Available              |                  |
| BLF881           | Available |           | Available              |                  |
| BLF881S          | Available |           | Available              |                  |
| BLF884P          | Available |           |                        |                  |
| BLF884PS         | Available |           |                        |                  |
| BLF888           | Available |           |                        |                  |
| BLF888A          | Available |           | Available              |                  |
| BLF888AS         | Available |           | Available              |                  |
| BLL6H0514-25     | Available |           | Available              |                  |
| BLL6H0514L-130   | Available |           | Available              |                  |
| BLL6H0514LS-130  | Available |           | Available              |                  |
| BLL6H1214-500    | Available |           |                        |                  |
| BLL6H1214L-250   | Available |           | Available              |                  |
| BLL6H1214LS-250  | Available |           | Available              |                  |
| BLM6G22-30       | Available |           |                        |                  |
| BLS6G2731-6G     | Available |           |                        |                  |
| BLS6G2731S-130   | Available |           | Available              |                  |
| BLS6G3135-120    | Available |           | Available              |                  |
| BLS6G3135-20     | Available |           |                        |                  |
| BLS6G3135S-120   | Available |           | Available              |                  |
| BLS6G3135S-20    | Available |           |                        |                  |
| BLS7G2729L-350P  | Available |           |                        |                  |
| BLS7G2729LS-350P | Available |           |                        |                  |
| CLF1G0035-100    | Available | Available | Available              | 50 V, 330 mA     |
| CLF1G0035-100P   | Available | Available | Available              | 50 V, 340 mA     |
| CLF1G0035-50     | Available | Available | Available              | 50 V, 150 mA     |
| CLF1G0035S-100   | Available | Available | Available              | 50 V, 330 mA     |
| CLF1G0035S-100P  | Available | Available | Available              | 50 V, 340 mA     |
| CLF1G0035S-50    | Available | Available | Available              | 50 V, 150 mA     |
| CLF1G0060-10     | Available | Available | Available              | 50 V, 20 mA      |
| CLF1G0060-30     | Available | Available | Available              | 50 V, 50 mA      |
| CLF1G0060S-10    | Available | Available | Available              | 50 V, 20 mA      |
| CLF1G0060S-30    | Available | Available | Available              | 50 V, 50 mA      |



#### 4.7.2 Simulation models for RF bipolar wideband transistors

[illegible]



## 4.7.2 Simulation models for RF bipolar wideband transistors (continued)

| Attached to PIP/model page |            |              |             |               |              | Supported simulators                                  |                                                       |                                      |              |
|----------------------------|------------|--------------|-------------|---------------|--------------|-------------------------------------------------------|-------------------------------------------------------|--------------------------------------|--------------|
| Wideband transistors       | Demo board | S-parameters | Spice model | Mextram model | Device model | S-parameters                                          | Spice model                                           | Mextram model                        | Device model |
| BFR540                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFR92A                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFR92AW                    |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFR93A                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFR93AW                    |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFS17                      |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFS17A                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFS17W                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFS25A                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFS505                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFS520                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFS540                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFT25                      |            | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                                     | -                                    | -            |
| BFT25A                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFT92                      |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFT92W                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFT93                      |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFT93W                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFU725F                    | √          | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFU725F/N1                 | √          | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BFU610F                    | √          | √            | √           | √             |              | ADS 2009, ADS 2011                                    | ADS 2009, ADS 2011, Microwave Office                  | ADS 2009, ADS 2011, Microwave Office | -            |
| BFU630F                    | √          | √            | √           | √             |              | ADS 2009, ADS 2011                                    | ADS 2009, ADS 2011, Microwave Office                  | ADS 2009, ADS 2011, Microwave Office | -            |
| BFU660F                    | √          | √            | √           | √             |              | ADS 2009, ADS 2011                                    | ADS 2009, ADS 2011, Microwave Office                  | ADS 2009, ADS 2011, Microwave Office | -            |
| BFU690F                    | √          | √            | √           | √             |              | ADS 2009, ADS 2011                                    | ADS 2009, ADS 2011, Microwave Office                  | ADS 2009, ADS 2011, Microwave Office | -            |
| BFU710F                    | √          | √            | √           | √             |              | ADS 2009, ADS 2011                                    | ADS 2009, ADS 2011, Microwave Office                  | ADS 2009, ADS 2011, Microwave Office | -            |
| BFU730F                    | √          | √            | √           | √             |              | ADS 2009, ADS 2011                                    | ADS 2009, ADS 2011, Microwave Office                  | ADS 2009, ADS 2011, Microwave Office | -            |
| BFU730LX                   | √          | √            |             | √             |              | ADS 2011                                              | ADS 2011                                              | ADS 2011                             | -            |
| BFU760F                    | √          | √            | √           | √             |              | ADS 2009, ADS 2011                                    | ADS 2009, ADS 2011, Microwave Office                  | ADS 2009, ADS 2011, Microwave Office | -            |
| BFU790F                    | √          | √            | √           | √             |              | ADS 2009, ADS 2011                                    | ADS 2009, ADS 2011, Microwave Office                  | ADS 2009, ADS 2011, Microwave Office | -            |
| PBR941                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| PBR951                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| PRF947                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| PRF949                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| PRF957                     |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                    | -            |
| BF1211                     |            | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                                     | -                                    | -            |
| BF1211R                    |            | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                                     | -                                    | -            |
| BF1211WR                   |            | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                                     | -                                    | -            |

### 4.7.3 Simulation models for RF MOSFET transistors

| Attached to PIP/model page |            |              |             |               |              | Supported simulators                                  |                                                       |               |              |
|----------------------------|------------|--------------|-------------|---------------|--------------|-------------------------------------------------------|-------------------------------------------------------|---------------|--------------|
| Wideband transistors       | Demo board | S-parameters | Spice model | Mextram model | Device model | S-parameters                                          | Spice model                                           | Mextram model | Device model |
| BF1212                     |            | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                                     | -             | -            |
| BF1212R                    |            | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                                     | -             | -            |
| BF1212WR                   |            | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                                     | -             | -            |
| BF511                      |            | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                                     | -             | -            |
| BF513                      |            | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                                     | -             | -            |
| BF862                      |            | √            | √           |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -                                                     | -             | -            |
| BF904                      |            |              | √           |               |              | -                                                     | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -             | -            |
| BF908                      |            |              | √           |               |              | -                                                     | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -             | -            |
| BF909                      |            |              | √           |               |              | -                                                     | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -             | -            |
| BF998                      |            |              | √           |               |              | -                                                     | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -             | -            |

### 4.7.4 Simulation models for RF MMIC amplifiers

| Attached to PIP/model page |            |              |             |               |              | Supported simulators                                  |             |               |              |
|----------------------------|------------|--------------|-------------|---------------|--------------|-------------------------------------------------------|-------------|---------------|--------------|
| MMICs                      | Demo board | S-parameters | Spice model | Mextram model | Device model | S-parameters                                          | Spice model | Mextram model | Device model |
| BGA2001                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2002                    | √          |              |             |               |              | -                                                     | -           | -             | -            |
| BGA2003                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2711                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2748                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2771                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2776                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2709                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2712                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2714                    | √          |              |             |               |              | -                                                     | -           | -             | -            |
| BGA2715                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2716                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2717                    |            | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2011                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2012                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2031                    | √          |              |             |               |              | -                                                     | -           | -             | -            |
| BGA6289                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA6489                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA6589                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2800                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2801                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2815                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2816                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2850                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA2865                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA6130                    | √          |              |             |               | √            | -                                                     | -           | -             | ADS 2011     |
| BGA2866                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGA7024                    | √          | √            |             |               |              | -                                                     | -           | -             | -            |
| BGA7027                    | √          | √            |             |               |              | -                                                     | -           | -             | -            |
| BGA7124                    | √          | √            |             |               |              | -                                                     | -           | -             | -            |
| BGA7127                    | √          | √            |             |               |              | -                                                     | -           | -             | -            |
| BGA7130                    | √          |              |             |               | √            | -                                                     | -           | -             | ADS 2011     |
| BGM1011                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGM1012                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGM1013                    | √          | √            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |

#### 4.7.4 Simulation models for RF MMIC amplifiers (continued)

| Wideband transistors | Attached to PIP/model page |              |             |               |              | Supported simulators                                  |             |               |              |
|----------------------|----------------------------|--------------|-------------|---------------|--------------|-------------------------------------------------------|-------------|---------------|--------------|
|                      | Demo board                 | S-parameters | Spice model | Mextram model | Device model | S-parameters                                          | Spice model | Mextram model | Device model |
| BGM1014              | ✓                          | ✓            |             |               |              | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -           | -             | -            |
| BGU3012              | ✓                          |              |             |               |              | ADS 2011                                              | -           | -             | -            |
| BGU3015              | ✓                          |              |             |               |              | ADS 2011                                              | -           | -             | -            |
| BGU3018              | ✓                          |              |             |               |              | ADS 2011                                              | -           | -             | -            |
| BGU6102              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7031              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7032              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7033              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7041              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7042              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7044              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7045              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7050              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7051              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7052              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7053              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7061              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7062              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7063              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7064              | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7003              | ✓                          | ✓            |             |               |              | -                                                     | -           | -             | -            |
| BGU7003W             | ✓                          |              |             |               |              | -                                                     | -           | -             | -            |
| BGU7004              | ✓                          | ✓            |             |               |              | ADS 2011                                              | -           | -             | -            |
| BGU7005              | ✓                          | ✓            |             |               | ✓            | ADS 2011                                              | -           | -             | ADS 2011     |
| BGU7007              | ✓                          | ✓            |             |               | ✓            | ADS 2011                                              | -           | -             | ADS 2011     |
| BGU8006              | ✓                          | ✓            |             |               | ✓            | ADS 2011                                              | -           | -             | ADS 2011     |
| BGU8007              | ✓                          | ✓            |             |               |              | ADS 2011                                              | -           | -             | -            |
| BGU8009              | ✓                          | ✓            |             |               | ✓            | ADS 2011                                              | -           | -             | ADS 2011     |

Design support

#### 4.7.5 Simulation models for RF varicap diodes

| Varicap | Attached to PIP/model page |              |             |               |              | Supported simulators |                                                       |               |              |
|---------|----------------------------|--------------|-------------|---------------|--------------|----------------------|-------------------------------------------------------|---------------|--------------|
|         | Demo board                 | S-parameters | Spice model | Mextram model | Device model | S-parameters         | Spice model                                           | Mextram model | Device model |
| BB145B  |                            |              | ✓           |               |              | -                    | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -             | -            |
| BB156   |                            |              | ✓           |               |              | -                    | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -             | -            |
| BB201   |                            |              | ✓           |               |              | -                    | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -             | -            |
| BB202   |                            |              | ✓           |               |              | -                    | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -             | -            |
| BB207   |                            |              | ✓           |               |              | -                    | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -             | -            |
| BB208-2 |                            |              | ✓           |               |              | -                    | ADS 2009, ADS 2011, Microwave Office, Ansoft Designer | -             | -            |

# 5. Cross-references and replacements

## NXP cross-references:

<http://www.nxp.com/xref/nxp?typenumber>

## NXP end-of-life:

<http://www.nxp.com/products/eol/>

## 5.1 Cross-references: manufacturer types versus NXP types

### In alphabetical order of manufacturer type

Abbreviations:

|             |                                         |
|-------------|-----------------------------------------|
| BS diode    | Band switch diode                       |
| CATV OR     | CATV optical receiver                   |
| CATV PD     | CATV power doubler                      |
| CATV PPA    | CATV push-pull amplifier                |
| CATV PPA/HG | CATV push-pull amplifier high gain      |
| CATV RA     | CATV reverse amplifier                  |
| FET         | Field-effect transistor                 |
| MMIC        | Monolithic microwave integrated circuit |
| Varicap     | Varicap diode                           |
| WB trs 1-4  | Wideband transistor 1-4 generation      |
| WB trs 5-7  | Wideband transistor 5-7 generation      |

| Manufacturer type | Manufacturer | NXP type  | Product family |
|-------------------|--------------|-----------|----------------|
| 1SS314            | Toshiba      | BA591     | BS diode       |
| 1SS356            | Rohm         | BA591     | BS diode       |
| 1SS390            | Rohm         | BA891     | BS diode       |
| 1SV172            | Toshiba      | BAP50-04  | PIN diode      |
| 1SV215            | Toshiba      | BB172     | Varicap        |
| 1SV228            | Toshiba      | BB201     | Varicap        |
| 1SV231            | Toshiba      | BB171     | Varicap        |
| 1SV232            | Toshiba      | BB170     | Varicap        |
| 1SV233            | Sanyo        | BAP70-03  | PIN diode      |
| 1SV234            | Sanyo        | BAP64-04  | PIN diode      |
| 1SV239            | Toshiba      | BB145B    | Varicap        |
| 1SV241            | Sanyo        | BAP64-02  | PIN diode      |
| 1SV246            | Sanyo        | BAP64-04W | PIN diode      |
| 1SV247            | Sanyo        | BAP70-02  | PIN diode      |
| 1SV248            | Sanyo        | BAP50-02  | PIN diode      |
| 1SV249            | Sanyo        | BAP50-04W | PIN diode      |
| 1SV250            | Sanyo        | BAP50-03  | PIN diode      |
| 1SV251            | Sanyo        | BAP50-04  | PIN diode      |
| 1SV252            | Toshiba      | BAP50-04W | PIN diode      |
| 1SV263            | Sanyo        | BAP50-02  | PIN diode      |
| 1SV264            | Sanyo        | BAP50-04W | PIN diode      |
| 1SV266            | Sanyo        | BAP50-03  | PIN diode      |
| 1SV267            | Sanyo        | BAP50-04  | PIN diode      |
| 1SV269            | Toshiba      | BB170     | Varicap        |
| 1SV270            | Toshiba      | BB156     | Varicap        |
| 1SV271            | Toshiba      | BAP50-03  | PIN diode      |
| 1SV284            | Toshiba      | BB156     | Varicap        |
| 1SV288            | Toshiba      | BB171     | Varicap        |
| 1SV294            | Sanyo        | BAP70-03  | PIN diode      |
| 1SV305            | Toshiba      | BB202     | Varicap        |
| 1SV307            | Toshiba      | BAP51-03  | PIN diode      |
| 1SV308            | Toshiba      | BAP51-02  | PIN diode      |
| 1T363A            | PEC          | BB172     | Varicap        |
| 1T368A            | PEC          | BB170     | Varicap        |
| 1T369             | PEC          | BB171     | Varicap        |
| 1T379             | PEC          | BB131     | Varicap        |
| 1T397             | PEC          | BB171     | Varicap        |
| 1T399             | PEC          | BB170     | Varicap        |
| 2F1G20DS          | RFHIC        | CGD1040Hi | CATV PD        |
| 2F1G20DS          | RFHIC        | CGD1042H  | CATV PD        |
| 2F1G20P           | RFHIC        | CGY1041   | CATV PP        |
| 2F1G22DS          | RFHIC        | CGD1042H  | CATV PD        |

| Manufacturer type | Manufacturer        | NXP type  | Product family |
|-------------------|---------------------|-----------|----------------|
| 2F1G22DS          | RFHIC               | CGD1042Hi | CATV PD        |
| 2F1G22DS          | RFHIC               | CGD982HCi | CATV PD        |
| 2F1G23P           | RFHIC               | CGY1041   | CATV PP        |
| 2F1G23P           | RFHIC               | CGY1043   | CATV PP        |
| 2F1G24D           | RFHIC               | CGD1044Hi | CATV PD        |
| 2F1G24D           | RFHIC               | CGD985HCi | CATV PD        |
| 2F1G24DS          | RFHIC               | CGD1044H  | CATV PD        |
| 2F722DS           | RFHIC               | BGD816L   | CATV PD        |
| 2F8718P           | RFHIC               | BGY885A   | CATV PP        |
| 2F8719DS          | RFHIC               | BGD812    | CATV PD        |
| 2F8720DS          | RFHIC               | BGD814    | CATV PD        |
| 2F8723P           | RFHIC               | BGY887    | CATV PP        |
| 2F8734P           | RFHIC               | CGY888C   | CATV PP        |
| 2N4856            | Standard            | BSR56     | FET            |
| 2N4857            | Standard            | BSR57     | FET            |
| 2N4858            | Standard            | BSR58     | FET            |
| 2SA1977(NE97733)  | Renesas             | BFT93     | WB trs 1-4     |
| 2SA1978(NE97833)  | Renesas             | BFT93     | WB trs 1-4     |
| 2SC2735           | Renesas             | BFS17     | WB trs 1-4     |
| 2SC3356           | Renesas             | BFG540    | WB trs 1-4     |
| 2SC3356           | Renesas             | BFG591    | WB trs 1-4     |
| 2SC3357           | Renesas             | BFG540    | WB trs 1-4     |
| 2SC3357           | Renesas             | BFG591    | WB trs 1-4     |
| 2SC3583(NE68133)  | Renesas             | BFR520    | WB trs 1-4     |
| 2SC3585(NE68033)  | Renesas             | BFR520    | WB trs 1-4     |
| 2SC4093(NE85639E) | Renesas             | BFR540    | WB trs 1-4     |
| 2SC4094           | Renesas Electronics | BFG520/XR | WB trs 1-4     |
| 2SC4094           | NEC                 | BFG520/XR | WB trs 1-4     |
| 2SC4095           | Renesas Electronics | BFG520/XR | WB trs 1-4     |
| 2SC4095           | NEC                 | BFG520/XR | WB trs 1-4     |
| 2SC4182           | Renesas Electronics | BFS17W    | WB trs 1-4     |
| 2SC4182           | NEC                 | BFS17W    | WB trs 1-4     |
| 2SC4184           | Renesas Electronics | BFS17W    | WB trs 1-4     |
| 2SC4184           | NEC                 | BFS17W    | WB trs 1-4     |
| 2SC4185           | Renesas Electronics | BFS17W    | WB trs 1-4     |
| 2SC4185           | NEC                 | BFS17W    | WB trs 1-4     |
| 2SC4186           | Renesas Electronics | BFR92AW   | WB trs 1-4     |
| 2SC4186           | NEC                 | BFR92AW   | WB trs 1-4     |
| 2SC4226           | Renesas Electronics | PRF957    | WB trs 1-4     |
| 2SC4226           | NEC                 | PRF957    | WB trs 1-4     |
| 2SC4227           | Renesas Electronics | BFG67W    | WB trs 1-4     |
| 2SC4227           | NEC                 | BFG67W    | WB trs 1-4     |

| Manufacturer type | Manufacturer        | NXP type   | Product family |
|-------------------|---------------------|------------|----------------|
| 2SC4228           | Renesas Electronics | BFS505     | WB trs 1-4     |
| 2SC4228           | NEC                 | BFS505     | WB trs 1-4     |
| 2SC4247           | Toshiba             | BFR92AW    | WB trs 1-4     |
| 2SC4248           | Toshiba             | BFR92AW    | WB trs 1-4     |
| 2SC4315           | Toshiba             | BFG520/XR  | WB trs 1-4     |
| 2SC4320           | Toshiba             | BFG520/XR  | WB trs 1-4     |
| 2SC4321           | Toshiba             | BFQ67W     | WB trs 1-4     |
| 2SC4325           | Toshiba             | BFS505     | WB trs 1-4     |
| 2SC4394           | Toshiba             | PRF957     | WB trs 1-4     |
| 2SC4536           | Renesas Electronics | BFQ19      | WB trs 1-4     |
| 2SC4536           | NEC                 | BFQ19      | WB trs 1-4     |
| 2SC4537           | Renesas Electronics | BFR93AW    | WB trs 1-4     |
| 2SC4537           | Renesas             | BFR93AW    | WB trs 1-4     |
| 2SC4570(NE58130)  | Renesas             | BFR92AW    | WB trs 1-4     |
| 2SC4571(NE58230)  | Renesas             | BFR93AW    | WB trs 1-4     |
| 2SC4592           | Renesas Electronics | BFG520/XR  | WB trs 1-4     |
| 2SC4592           | Renesas             | BFG520/XR  | WB trs 1-4     |
| 2SC4593           | Renesas Electronics | BFS520     | WB trs 1-4     |
| 2SC4593           | Renesas             | BFS520     | WB trs 1-4     |
| 2SC4703           | Renesas Electronics | BFQ19      | WB trs 1-4     |
| 2SC4703           | NEC                 | BFQ19      | WB trs 1-4     |
| 2SC4784           | Renesas Electronics | BFS505     | WB trs 1-4     |
| 2SC4784           | Renesas             | BFS505     | WB trs 1-4     |
| 2SC4807           | Renesas Electronics | BFQ18A     | WB trs 1-4     |
| 2SC4807           | Renesas             | BFQ18A     | WB trs 1-4     |
| 2SC4842           | Toshiba             | BFG540W/XR | WB trs 1-4     |
| 2SC4899           | Renesas Electronics | BFS505     | WB trs 1-4     |
| 2SC4899           | Renesas             | BFS505     | WB trs 1-4     |
| 2SC4900           | Renesas Electronics | BFG520/XR  | WB trs 1-4     |
| 2SC4900           | Renesas             | BFG520/XR  | WB trs 1-4     |
| 2SC4901           | Renesas Electronics | BFS520     | WB trs 1-4     |
| 2SC4901           | Renesas             | BFS520     | WB trs 1-4     |
| 2SC4926           | Renesas             | BFG425W    | WB trs 5-7     |
| 2SC4957(NE68539E) | Renesas             | BFG520/X   | WB trs 1-4     |
| 2SC4988           | Renesas Electronics | BFQ540     | WB trs 1-4     |
| 2SC4988           | Renesas             | BFQ540     | WB trs 1-4     |
| 2SC5004(NE58219)  | Renesas             | PRF949     | WB trs 1-4     |
| 2SC5006           | Renesas             | BFR520T    | WB trs 5-7     |
| 2SC5006-T1-A      | NEC                 | BFR520T    | WB trs 1-4     |
| 2SC5007(NE68119)  | Renesas             | PRF949     | WB trs 1-4     |
| 2SC5008(NE68019)  | Renesas             | PRF949     | WB trs 1-4     |
| 2SC5010(NE68519)  | Renesas             | BFR520T    | WB trs 1-4     |
| 2SC5011           | Renesas Electronics | BFG540W/XR | WB trs 1-4     |
| 2SC5011           | NEC                 | BFG540W/XR | WB trs 1-4     |
| 2SC5012           | Renesas Electronics | BFG540W/XR | WB trs 1-4     |
| 2SC5012           | NEC                 | BFG540W/XR | WB trs 1-4     |
| 2SC5013(NE68018)  | Renesas             | BFG425W    | WB trs 5-7     |
| 2SC5015(NE68518)  | Renesas             | BFG425W    | WB trs 5-7     |
| 2SC5065           | Toshiba             | PRF957     | WB trs 1-4     |
| 2SC5085           | Toshiba             | PRF957     | WB trs 1-4     |
| 2SC5087           | Toshiba             | BFG520/XR  | WB trs 1-4     |
| 2SC5088           | Toshiba             | BFG540W/XR | WB trs 1-4     |
| 2SC5090           | Toshiba             | BFS520     | WB trs 1-4     |
| 2SC5092           | Toshiba             | BFG520/XR  | WB trs 1-4     |
| 2SC5095           | Toshiba             | BFS505     | WB trs 1-4     |
| 2SC5107           | Toshiba             | BFS505     | WB trs 1-4     |
| 2SC5180(NE68618)  | Renesas             | BFG410W    | WB trs 5-7     |
| 2SC5181(NE68619)  | Renesas             | BFG410W    | WB trs 5-7     |
| 2SC5185(NE68718)  | Renesas             | BFG425W    | WB trs 5-7     |
| 2SC5186(NE68719)  | Renesas             | BFG425W    | WB trs 5-7     |
| 2SC5288(NE68939)  | Renesas             | BGA7024    | WB trs 1-4     |
| 2SC5289(NE69039)  | Renesas             | BGA7027    | WB trs 1-4     |
| 2SC5336           | Renesas             | BFQ591     | WB trs 1-4     |
| 2SC5337(NE461M02) | Renesas             | BFR540     | WB trs 1-4     |
| 2SC5338(NE462M02) | Renesas             | BFR540     | WB trs 1-4     |
| 2SC5369(NE696M01) | Renesas             | BFM520     | WB trs 1-4     |
| 2SC5454(NE67739)  | Renesas             | BFG520     | WB trs 1-4     |
| 2SC5455(NE67839)  | Renesas             | BFG520     | WB trs 1-4     |
| 2SC5463           | Toshiba             | BFQ67W     | WB trs 1-4     |
| 2SC5507(NE661M04) | Renesas             | BFU610F    | WB trs 5-7     |
| 2SC5508           | Renesas Electronics | BFU660F    | WB trs 5-7     |
| 2SC5508           | Renesas Electronics | BFU660F    | WB trs 5-7     |
| 2SC5508-T2-A      | NEC                 | BFG424F    | WB trs 5-7     |
| 2SC5509(NE663M04) | Renesas             | BFU690F    | WB trs 5-7     |
| 2SC5593           | Renesas Electronics | BFG410W    | WB trs 5-7     |
| 2SC5593           | Renesas             | BFG410W    | WB trs 5-7     |
| 2SC5594           | Renesas Electronics | BFG425W    | WB trs 5-7     |
| 2SC5594           | Renesas             | BFG425W    | WB trs 5-7     |
| 2SC5606(NE66219)  | Renesas             | BFR520T    | WB trs 1-4     |
| 2SC5623           | Renesas Electronics | BFG410W    | WB trs 5-7     |
| 2SC5623           | Renesas             | BFG410W    | WB trs 5-7     |
| 2SC5624           | Renesas Electronics | BFG425W    | WB trs 5-7     |
| 2SC5624           | Renesas             | BFG425W    | WB trs 5-7     |
| 2SC5631           | Renesas Electronics | BFQ540     | WB trs 1-4     |
| 2SC5631           | Renesas             | BFQ540     | WB trs 1-4     |
| 2SC5704(NE662M16) | Renesas             | BFU630F    | WB trs 5-7     |
| 2SC5750(NE67718)  | Renesas             | BFU660F    | WB trs 5-7     |
| 2SC5751(NE677M04) | Renesas             | BFU660F    | WB trs 5-7     |
| 2SC5752(NE67818)  | Renesas             | BFU660F    | WB trs 5-7     |
| 2SC5753(NE678M04) | Renesas             | BFU660F    | WB trs 5-7     |

| Manufacturer type | Manufacturer        | NXP type  | Product family |
|-------------------|---------------------|-----------|----------------|
| 2SC5754(NE664M04) | Renesas             | BGA7027   | WB trs 1-4     |
| 2SC5772           | Renesas             | BFG425W   | WB trs 5-7     |
| 2SC5787(NE894M13) | Renesas             | BFU630F   | WB trs 5-7     |
| 2SC5800-T1-A      | NEC                 | BFR93AW   | WB trs 1-4     |
| 2SC5801(NE851M13) | Renesas             | PBR941    | WB trs 1-4     |
| 2SC5820           | Renesas             | BFU630F   | WB trs 5-7     |
| 2SC6023           | Sanyo               | BFG424W   | WB trs 5-7     |
| 2SK163-K          | Renesas             | J113      | FET            |
| 2SK163-L          | Renesas             | J113      | FET            |
| 2SK163-M          | Renesas             | J113      | FET            |
| 2SK163-N          | Renesas             | J113      | FET            |
| 2SK210BL          | Renesas Electronics | PMBFJ309  | FET            |
| 2SK210BL          | Renesas             | PMBFJ309  | FET            |
| 2SK370BL          | Renesas             | J109      | FET            |
| 2SK370GR          | Renesas             | J109      | FET            |
| 2SK370V           | Renesas             | J109      | FET            |
| 2SK381            | Renesas             | J113      | FET            |
| 2SK43             | Renesas             | J113      | FET            |
| 2SK435            | Renesas             | J113      | FET            |
| 2SK508            | Renesas Electronics | PMBFJ308  | FET            |
| 2SK508            | Renesas             | PMBFJ308  | FET            |
| 3SK290            | Renesas Electronics | BF998WR   | FET            |
| AD8376            | ADI                 | BGA7350   | MMIC           |
| AD8376            | ADI                 | BGA7351   | MMIC           |
| ADL5354           | ADI                 | BGX7221   | MMIC           |
| ADL5356           | ADI                 | BGX7221   | MMIC           |
| ADL5358           | ADI                 | BGX7220   | MMIC           |
| ADL5372           | ADI                 | BGX7101   | MMIC           |
| ADL5375           | ADI                 | BGX7101   | MMIC           |
| ADL5812           | ADI                 | BGX7221   | MMIC           |
| ADRF660x          | ADI                 | BGX7211   | MMIC           |
| AH118             | Triquint            | BGA7024   | MMIC           |
| AH118             | Triquint            | BGA7024   | MMIC           |
| AH118             | Triquint            | BGA7124   | MMIC           |
| AH118             | Triquint            | BGA7124   | MMIC           |
| AH125             | Triquint            | BGA7127   | MMIC           |
| AH125             | Triquint            | BGA7027   | MMIC           |
| AH125             | Triquint            | BGA7127   | MMIC           |
| AH215             | Triquint            | BGA7130   | MMIC           |
| AH215             | Triquint            | BGA7130   | MMIC           |
| AN26112A          | Panasonic           | BGU7045   | MMIC           |
| AN26120A          | Panasonic           | BGU7042   | MMIC           |
| AN26122A          | Panasonic           | BGU7045   | MMIC           |
| BA592             | Infineon            | BA591     | BS diode       |
| BA595             | Infineon            | BAP51-03  | PIN diode      |
| BA595             | Infineon            | BAP70-03  | PIN diode      |
| BA597             | Infineon            | BAP70-03  | PIN diode      |
| BA885             | Infineon            | BAP70-03  | PIN diode      |
| BA892             | Infineon            | BA891     | BS diode       |
| BA892-02V         | Infineon            | BA891     | PIN diode      |
| BA892V-02V-GS08   | Vishay              | BA891     | PIN diode      |
| BA895             | Infineon            | BAP70-02  | PIN diode      |
| BAR14-1           | Infineon            | BAP70-03  | PIN diode      |
| BAR15-1           | Infineon            | BAP70-03  | PIN diode      |
| BAR16-1           | Infineon            | BAP70-03  | PIN diode      |
| BAR17             | Infineon            | BAP50-03  | PIN diode      |
| BAR50-02L         | Infineon            | BAP50LX   | PIN diode      |
| BAR50-02V         | Infineon            | BAP50-02  | PIN diode      |
| BAR50-02V         | Infineon            | BAP50-03  | PIN diode      |
| BAR50-02V         | Infineon            | BAP50-05  | PIN diode      |
| BAR50-03W         | Infineon            | BAP70-02  | PIN diode      |
| BAR60             | Infineon            | BAP50-03  | PIN diode      |
| BAR61             | Infineon            | BAP50-03  | PIN diode      |
| BAR63             | Infineon            | BAP63-03  | PIN diode      |
| BAR63-02L         | Infineon            | BAP63-02  | PIN diode      |
| BAR63-02L         | Infineon            | BAP63LX   | PIN diode      |
| BAR63-02V         | Infineon            | BAP63-02  | PIN diode      |
| BAR63-02W         | Infineon            | BAP63-02  | PIN diode      |
| BAR63-03W         | Infineon            | BAP63-03  | PIN diode      |
| BAR63-05          | Infineon            | BAP63-05W | PIN diode      |
| BAR63-05W         | Infineon            | BAP63-05W | PIN diode      |
| BAR63V-02V-GS08   | Vishay              | BAP63-02  | PIN diode      |
| BAR63V-05W-GS08   | Vishay              | BAP63-05W | PIN diode      |
| BAR64-02LRH       | Infineon            | BAP64LX   | PIN diode      |
| BAR64-02V         | Infineon            | BAP64-02  | PIN diode      |
| BAR64-02W         | Infineon            | BAP64-02  | PIN diode      |
| BAR64-03W         | Infineon            | BAP64-03  | PIN diode      |
| BAR64-04          | Infineon            | BAP64-04  | PIN diode      |
| BAR64-04W         | Infineon            | BAP64-04W | PIN diode      |
| BAR64-05          | Infineon            | BAP64-05  | PIN diode      |
| BAR64-05W         | Infineon            | BAP64-05W | PIN diode      |
| BAR64-06          | Infineon            | BAP64-06  | PIN diode      |
| BAR64-06W         | Infineon            | BAP64-06W | PIN diode      |
| BAR64V-02V-GS08   | Vishay              | BAP64-02  | PIN diode      |
| BAR64V-04-GS08    | Vishay              | BAP64-04  | PIN diode      |
| BAR64V-05-GS08    | Vishay              | BAP64-05  | PIN diode      |
| BAR64V-06-GS08    | Vishay              | BAP64-06  | PIN diode      |
| BAR64V-06W-GS08   | Vishay              | BAP64-06W | PIN diode      |
| BAR65-02L         | Infineon            | BAP65LX   | PIN diode      |
| BAR65-02V         | Infineon            | BAP65-02  | PIN diode      |

| Manufacturer type | Manufacturer | NXP type   | Product family |
|-------------------|--------------|------------|----------------|
| BAR65-02W         | Infineon     | BAP65-02   | PIN diode      |
| BAR65-03W         | Infineon     | BAP65-03   | PIN diode      |
| BAR65V-02V-GS08   | Vishay       | BAP65-02   | PIN diode      |
| BAR66             | Infineon     | BAP1321-04 | PIN diode      |
| BAR67-02W         | Infineon     | BAP1321-02 | PIN diode      |
| BAR67-03W         | Infineon     | BAP1321-03 | PIN diode      |
| BAT18-04          | Infineon     | BAT18      | PIN diode      |
| BB639             | Infineon     | BB170      | Varicap        |
| BB639             | Infineon     | BB172      | Varicap        |
| BB640             | Infineon     | BB171      | Varicap        |
| BB641             | Infineon     | BB171      | Varicap        |
| BB669             | Infineon     | BB171      | Varicap        |
| BB814             | Infineon     | BB201      | Varicap        |
| BB831             | Infineon     | BB131      | Varicap        |
| BB833             | Infineon     | BB131      | Varicap        |
| BB835             | Infineon     | BB131      | Varicap        |
| BBY58-02V         | Infineon     | BB202      | Varicap        |
| BBY65             | Infineon     | BB202      | Varicap        |
| BF1005R           | Infineon     | BF1105R    | FET            |
| BF1005SR          | Infineon     | BF1105R    | FET            |
| BF770A            | Infineon     | BFR93A     | WB trs 1-4     |
| BF771             | Infineon     | PBR951     | WB trs 1-4     |
| BF771W            | Infineon     | BFS540     | WB trs 1-4     |
| BF772             | Infineon     | BFG540     | WB trs 1-4     |
| BF775             | Infineon     | BFR92A     | WB trs 1-4     |
| BF775A            | Infineon     | BFR92A     | WB trs 1-4     |
| BF775W            | Infineon     | BFR92AW    | WB trs 1-4     |
| BF851A            | Standard     | BF861A     | FET            |
| BF851B            | Standard     | BF861B     | FET            |
| BF851C            | Standard     | BF861C     | FET            |
| BF994S            | Vishay       | BF994S     | FET            |
| BF996S            | Vishay       | BF996S     | FET            |
| BF998             | Infineon     | BF998      | FET            |
| BF998             | Vishay       | BF998      | FET            |
| BF998-GS08        | Vishay       | BF998      | FET            |
| BF998R            | Vishay       | BF998R     | FET            |
| BF998R            | Infineon     | BF998R     | FET            |
| BF998R-GS08       | Vishay       | BF998R     | FET            |
| BF998RW           | Vishay       | BF998WR    | FET            |
| BF998W            | Infineon     | BF998WR    | FET            |
| BFG135A           | Infineon     | BFG135     | WB trs 1-4     |
| BFG193            | Infineon     | BFG198     | WB trs 1-4     |
| BFG194            | Infineon     | BFG31      | WB trs 1-4     |
| BFG196            | Infineon     | BFG541     | WB trs 1-4     |
| BFG19S            | Infineon     | BFG97      | WB trs 1-4     |
| BFG235            | Infineon     | BFG135     | WB trs 1-4     |
| BFP180            | Infineon     | BFG505/X   | WB trs 1-4     |
| BFP181            | Infineon     | BFG67/X    | WB trs 1-4     |
| BFP181T-GS08      | Vishay       | BFG67/X    | WB trs 1-4     |
| BFP182            | Infineon     | BFG67/X    | WB trs 1-4     |
| BFP183            | Infineon     | BFG520/X   | WB trs 1-4     |
| BFP183R           | Infineon     | BFG520/XR  | WB trs 1-4     |
| BFP183T-GS08      | Vishay       | BFG520/X   | WB trs 1-4     |
| BFP183TW-GS08     | Vishay       | BFG520W/X  | WB trs 1-4     |
| BFP193            | Infineon     | BFG540/X   | WB trs 1-4     |
| BFP193W           | Infineon     | BFG540W/XR | WB trs 1-4     |
| BFP196T-GS08      | Vishay       | BFG540/X   | WB trs 1-4     |
| BFP196TR-GS08     | Vishay       | BFG540/XR  | WB trs 1-4     |
| BFP196TRW-GS08    | Vishay       | BFG540W/XR | WB trs 1-4     |
| BFP196TW-GS08     | Vishay       | BFG540W/X  | WB trs 1-4     |
| BFP196W           | Infineon     | BFG540W/XR | WB trs 1-4     |
| BFP280            | Infineon     | BFG505/X   | WB trs 1-4     |
| BFP405            | Infineon     | BFG410W    | WB trs 5-7     |
| BFP420            | Infineon     | BFG425W    | WB trs 5-7     |
| BFP450            | Infineon     | BFG480W    | WB trs 5-7     |
| BFP620            | Infineon     | BFU660F    | WB trs 5-7     |
| BFP640            | Infineon     | BFU630F    | WB trs 5-7     |
| BFP640            | Infineon     | BFU660F    | WB trs 5-7     |
| BFP650            | Infineon     | BFU690F    | WB trs 5-7     |
| BFP650            | Infineon     | BFU760F    | WB trs 5-7     |
| BFP650            | Infineon     | BFU790F    | WB trs 5-7     |
| BFP67-GS08        | Vishay       | BFG67/X    | WB trs 1-4     |
| BFP67R-GS08       | Vishay       | BFG67/X    | WB trs 1-4     |
| BFP720            | Infineon     | BFU710F    | WB trs 5-7     |
| BFP720            | Infineon     | BFU730F    | WB trs 5-7     |
| BFP740            | Infineon     | BFU710F    | WB trs 5-7     |
| BFP740            | Infineon     | BFU725F/N1 | WB trs 5-7     |
| BFP740            | Infineon     | BFU730F    | WB trs 5-7     |
| BFP740F           | Infineon     | BFU725F/N1 | WB trs 5-7     |
| BFP750            | Infineon     | BFU690F    | WB trs 5-7     |
| BFP750            | Infineon     | BFU760F    | WB trs 5-7     |
| BFP750            | Infineon     | BFU790F    | WB trs 5-7     |
| BFQ193            | Infineon     | BFQ540     | WB trs 1-4     |
| BFQ19S            | Infineon     | BFQ19      | WB trs 1-4     |
| BFQ67-GS08        | Vishay       | BFQ67W     | WB trs 1-4     |
| BFR106            | Infineon     | BFR106     | WB trs 1-4     |
| BFR180            | Infineon     | BFR505     | WB trs 1-4     |
| BFR180W           | Infineon     | BFS505     | WB trs 1-4     |
| BFR181            | Infineon     | BFR520     | WB trs 1-4     |
| BFR181T-GS08      | Vishay       | BFR520     | WB trs 1-4     |

| Manufacturer type | Manufacturer        | NXP type | Product family |
|-------------------|---------------------|----------|----------------|
| BFR181TW-GS08     | Vishay              | BFS520   | WB trs 1-4     |
| BFR181W           | Infineon            | BFS520   | WB trs 1-4     |
| BFR182            | Infineon            | PBR941   | WB trs 1-4     |
| BFR182W           | Infineon            | PRF947   | WB trs 1-4     |
| BFR183            | Infineon            | PBR951   | WB trs 1-4     |
| BFR183T-GS08      | Vishay              | PBR951   | WB trs 1-4     |
| BFR183TW-GS08     | Vishay              | PRF957   | WB trs 1-4     |
| BFR183W           | Infineon            | PRF957   | WB trs 1-4     |
| BFR193            | Infineon            | PBR951   | WB trs 1-4     |
| BFR193TW-GS08     | Vishay              | PRF957   | WB trs 1-4     |
| BFR193W           | Infineon            | PRF957   | WB trs 1-4     |
| BFR196T-GS08      | Vishay              | BFR540   | WB trs 1-4     |
| BFR196TW-GS08     | Vishay              | BFS540   | WB trs 1-4     |
| BFR35AP           | Infineon            | BFR92A   | WB trs 1-4     |
| BFR92AL           | Freescale           | BFR92A   | WB trs 1-4     |
| BFR92AW-GS08      | Vishay              | BFR92AW  | WB trs 1-4     |
| BFR92P            | Infineon            | BFR92A   | WB trs 1-4     |
| BFR92W            | Infineon            | BFR92AW  | WB trs 1-4     |
| BFR93-GS08        | Vishay              | BFR93A   | WB trs 1-4     |
| BFR93A            | Infineon            | BFR93A   | WB trs 1-4     |
| BFR93AL           | Freescale           | BFR93A   | WB trs 1-4     |
| BFR93AW           | Infineon            | BFR93AW  | WB trs 1-4     |
| BFR93AW-GS08      | Vishay              | BFR93AW  | WB trs 1-4     |
| BFS17-GS08        | Vishay              | BFS17    | WB trs 1-4     |
| BFS17-GS08        | Vishay              | BFS17A   | WB trs 1-4     |
| BFS17L            | Freescale           | BFS17    | WB trs 1-4     |
| BFS17P            | Infineon            | BFS17A   | WB trs 1-4     |
| BFS17W            | Infineon            | BFS17W   | WB trs 1-4     |
| BFS17W-GS08       | Vishay              | BFS17W   | WB trs 1-4     |
| BFS481            | Infineon            | BFM505   | WB trs 1-4     |
| BFS483            | Infineon            | BFM520   | WB trs 1-4     |
| BFT92             | Infineon            | BFT92    | WB trs 1-4     |
| BFT93             | Infineon            | BFT93    | WB trs 1-4     |
| BGA428            | Infineon            | BGU7003  | MMIC           |
| BGA461            | Infineon            | BGU7003  | MMIC           |
| BGA615            | Infineon            | BGU7007  | MMIC           |
| BGA715            | Infineon            | BGU8007  | MMIC           |
| BGA725            | Infineon            | BGU8007  | MMIC           |
| BGA825L56         | Infineon            | BGU8011  | MMIC           |
| BGA915            | Infineon            | BGU7005  | MMIC           |
| BGA925            | Infineon            | BGU8011  | MMIC           |
| BGB707            | Infineon            | BGU6102  | MMIC           |
| BGB717            | Infineon            | BGU6102  | MMIC           |
| BIC701M           | Renesas Electronics | BF1105R  | FET            |
| BIC702M           | Renesas Electronics | BF1105R  | FET            |
| BSR111            | Standard            | PMBFJ111 | FET            |
| BSR112            | Standard            | PMBFJ112 | FET            |
| BSR113            | Standard            | PMBFJ113 | FET            |
| BSR174            | Standard            | PMBFJ174 | FET            |
| BSR175            | Standard            | PMBFJ175 | FET            |
| BSR176            | Standard            | PMBFJ176 | FET            |
| BSR177            | Standard            | PMBFJ177 | FET            |
| CA901             | Standard            | BGX885N  | CATV PPA       |
| CA901A            | Standard            | BGX885N  | CATV PPA       |
| CMM6004-SC        | Mimix               | BGA7024  | MMIC           |
| CMM6004-SC        | Mimix               | BGA7124  | MMIC           |
| CMM6004-SC        | Mimix               | BGA7124  | MMIC           |
| CMM6004-SC        | Mimix               | BGA7204  | MMIC           |
| CMY91             | Infineon            | BGA2022  | MMIC           |
| CMY91             | Infineon            | BGA2022  | WB trs 1-4     |
| CXE1089Z          | RFMD                | BGA6489  | MMIC           |
| CXE1089Z          | RFMD                | BGA6589  | MMIC           |
| D10040180GT       | RFMD                | CGD1042H | CATV PD        |
| D10040180GTH      | RFMD                | CGD1042H | CATV PD        |
| D10040200GT       | RFMD                | CGD1042H | CATV PD        |
| D10040200GTH      | RFMD                | CGD1042H | CATV PD        |
| D10040200P1       | RFMD                | CGD1042H | CATV PD        |
| D10040200PH1      | RFMD                | CGD1042H | CATV PD        |
| D10040220GT       | RFMD                | CGD1042H | CATV PD        |
| D10040220GTH      | RFMD                | CGD1042H | CATV PD        |
| D10040230P1       | RFMD                | CGD1042H | CATV PD        |
| D10040230PH1      | RFMD                | CGD1042H | CATV PD        |
| D10040240GT       | RFMD                | CGD1044H | CATV PD        |
| D10040240GTH      | RFMD                | CGD1044H | CATV PD        |
| D10040250GT       | RFMD                | CGD1044H | CATV PD        |
| D10040250GTH      | RFMD                | CGD1044H | CATV PD        |
| D10040270GT       | RFMD                | CGD1044H | CATV PD        |
| D10040270GTH      | RFMD                | CGD1044H | CATV PD        |
| D10040270GTL      | RFMD                | CGD1044H | CATV PD        |
| D8740180GT        | RFMD                | CGD942C  | CATV PD        |
| D8740180GTH       | RFMD                | CGD942C  | CATV PD        |
| D8740220GT        | RFMD                | CGD942C  | CATV PD        |
| D8740220GTH       | RFMD                | CGD942C  | CATV PD        |
| D8740240GT        | RFMD                | CGD944C  | CATV PD        |
| D8740240GTH       | RFMD                | CGD944C  | CATV PD        |
| D8740250GT        | RFMD                | CGD944C  | CATV PD        |
| D8740250GTH       | RFMD                | CGD944C  | CATV PD        |
| D8740270GT        | RFMD                | CGD944C  | CATV PD        |
| D8740270GTH       | RFMD                | CGD944C  | CATV PD        |
| D8740320GT        | RFMD                | CGY888C  | CATV PP        |



| Manufacturer type | Manufacturer        | NXP type             | Product family |
|-------------------|---------------------|----------------------|----------------|
| D8740320GTH       | RFMD                | CGY888C              | CATV PP        |
| EC2C03C           | Sanyo               | BB145B               | Varicap        |
| FSD273TA          | Skyworks            | BB170                | Varicap        |
| HBFP0405          | Agilent             | BFG410W              | WB trs 5-7     |
| HBFP0420          | Agilent             | BFG425W              | WB trs 5-7     |
| HBFP0450          | Agilent             | BFG480W              | WB trs 5-7     |
| HMC454ST89E       | Hittite             | BGA7027              | MMIC           |
| HMC454ST89E       | Hittite             | BGA7127              | MMIC           |
| HMC454ST89E       | Hittite             | BGA7127              | MMIC           |
| HMC617LP3         | Hittite             | BGU7051              | MMIC           |
| HMC618LP3         | Hittite             | BGU7052              | MMIC           |
| HMC625            | Hittite             | BGA7204              | MMIC           |
| HMC667LP2         | Hittite             | BGU7053              | MMIC           |
| HSC277            | Renesas             | BA891                | BS diode       |
| HSMP3800          | Agilent             | BAP70-03             | PIN diode      |
| HSMP3802          | Agilent             | BAP50-04             | PIN diode      |
| HSMP3804          | Agilent             | BAP50-05             | PIN diode      |
| HSMP3810          | Agilent             | BAP50-03             | PIN diode      |
| HSMP3814          | Agilent             | BAP50-05             | PIN diode      |
| HSMP381B          | Agilent             | BAP50-03             | PIN diode      |
| HSMP381C          | Agilent             | BAP50-05             | PIN diode      |
| HSMP381F          | Agilent             | BAP64-05W            | PIN diode      |
| HSMP3820          | Agilent             | BAP1321-03           | PIN diode      |
| HSMP3822          | Agilent             | BAP1321-04           | PIN diode      |
| HSMP3830          | Agilent             | BAP64-03             | PIN diode      |
| HSMP3832          | Agilent             | BAP64-04             | PIN diode      |
| HSMP3833          | Agilent             | BAP64-06             | PIN diode      |
| HSMP3834          | Agilent             | BAP64-05             | PIN diode      |
| HSMP3860          | Agilent             | BAP50-03             | PIN diode      |
| HSMP3862          | Agilent             | BAP50-04             | PIN diode      |
| HSMP3864          | Agilent             | BAP50-05             | PIN diode      |
| HSMP386B          | Agilent             | BAP50-02             | PIN diode      |
| HSMP386E          | Agilent             | BAP50-04W            | PIN diode      |
| HSMP386L          | Agilent             | BAP50-05W            | PIN diode      |
| HSMP3880          | Agilent             | BAP51-03             | PIN diode      |
| HSMP3890          | Agilent             | BAP51-03             | PIN diode      |
| HSMP3892          | Agilent             | BAP64-04             | PIN diode      |
| HSMP3894          | Agilent             | BAP64-05             | PIN diode      |
| HSMP3895          | Agilent             | BAP51-02             | PIN diode      |
| HSMP389B          | Agilent             | BAP51-02             | PIN diode      |
| HSMP389C          | Agilent             | BAP64-04             | PIN diode      |
| HSMP389F          | Agilent             | BAP51-05W            | PIN diode      |
| HVB14S            | Renesas Electronics | BAP50-04W            | PIN diode      |
| HVB190S           | Renesas             | BAP70-04W            | PIN diode      |
| HVC131            | Renesas Electronics | BAP65-02             | PIN diode      |
| HVC131            | Renesas             | BAP65-02             | PIN diode      |
| HVC132            | Renesas Electronics | BAP51-02             | PIN diode      |
| HVC132            | Renesas             | BAP51-02             | PIN diode      |
| HVC190            | Renesas             | BAP50-02             | PIN diode      |
| HVC200A           | Renesas             | BB173                | Varicap        |
| HVC202A           | Renesas             | BB174                | Varicap        |
| HVC202B           | Renesas             | BB174                | Varicap        |
| HVC300A           | Renesas             | BB175                | Varicap        |
| HVC300B           | Renesas             | BB175                | Varicap        |
| HVC306A           | Renesas             | BB187                | Varicap        |
| HVC306B           | Renesas             | BB187                | Varicap        |
| HVC350B           | Renesas             | BB208-02             | Varicap        |
| HVC355B           | Renesas Electronics | BB145B               | Varicap        |
| HVC355B           | Renesas             | BB145B               | Varicap        |
| HVC358B           | Renesas             | BB208-02             | Varicap        |
| HVC359            | Renesas Electronics | BB202                | Varicap        |
| HVC359            | Renesas             | BB202                | Varicap        |
| HVC363A           | Renesas             | BB173, BB178         | Varicap        |
| HVC365            | Renesas             | BB202                | Varicap        |
| HVC368B           | Renesas             | BB208-02             | Varicap        |
| HVC375B           | Renesas             | BB208-02             | Varicap        |
| HVC376B           | Renesas Electronics | BB202                | Varicap        |
| HVC376B           | Renesas             | BB198                | Varicap        |
| HVC376B           | Renesas             | BB202                | Varicap        |
| HVC383B           | Renesas             | BB208-02             | Varicap        |
| HVD131KRF-E       | Renesas             | BAP65-02, BAP1321-02 | PIN diode      |
| HVD132            | Renesas Electronics | BAP51-02             | PIN diode      |
| HVD132            | Renesas             | BAP51-02             | PIN diode      |
| HVD142AKRF-E      | Renesas             | BAP1321-02           | PIN diode      |
| HVD144AKRF-E      | Renesas             | BAP63-02             | PIN diode      |
| HVD145KRF-E       | Renesas             | BAP1321-02           | PIN diode      |
| HVD147KRF-E       | Renesas             | BAP1321-02           | PIN diode      |
| HVD355B           | Renesas             | BB145B               | Varicap        |
| HVL142AKRF-E      | Renesas             | BAP55LX, BAP1321LX   | PIN diode      |
| HVL144AKRF-E      | Renesas             | BAP65LX, BAP1321LX   | PIN diode      |
| HVL147KRF-E       | Renesas             | BAP55LX              | PIN diode      |
| HVL358C           | Renesas             | BB174LX              | Varicap        |
| HVL368C           | Renesas             | BB174LX              | Varicap        |
| HVL375C           | Renesas             | BB174LX              | Varicap        |
| HVM14             | Renesas             | BAP70-05             | PIN diode      |
| HVM14S            | Renesas             | BAP50-04             | PIN diode      |
| HVM14SR           | Renesas             | BAP50-04             | PIN diode      |
| HVM187S           | Renesas             | BAP50-04             | PIN diode      |
| HVM187WK          | Renesas             | BAP50-05             | PIN diode      |
| HVU131            | Renesas Electronics | BAP65-03             | PIN diode      |

| Manufacturer type | Manufacturer        | NXP type   | Product family |
|-------------------|---------------------|------------|----------------|
| HVU131            | Renesas             | BAP65-03   | PIN diode      |
| HVU132            | Renesas Electronics | BAP51-03   | PIN diode      |
| HVU132            | Renesas             | BAP51-03   | PIN diode      |
| HVU187            | Renesas             | BAP70-02   | PIN diode      |
| HVU300A           | Renesas Electronics | BB171      | Varicap        |
| HVU300A           | Renesas             | BB171      | Varicap        |
| HVU307            | Renesas Electronics | BB170      | Varicap        |
| HVU307            | Renesas             | BB170      | Varicap        |
| HVU315            | Renesas Electronics | BB170      | Varicap        |
| HVU315            | Renesas             | BB170      | Varicap        |
| HVU316            | Renesas Electronics | BB131      | Varicap        |
| HVU316            | Renesas             | BB131      | Varicap        |
| HVU350B           | Renesas             | BB156      | Varicap        |
| HVU355B           | Renesas             | BB131      | Varicap        |
| HVU359            | Renesas             | BB172      | Varicap        |
| HVU363A           | Renesas Electronics | BB170      | Varicap        |
| HVU363A           | Renesas Electronics | BB172      | Varicap        |
| HVU363A           | Renesas             | BB170      | Varicap        |
| HVU363B           | Renesas Electronics | BB170      | Varicap        |
| HVU363B           | Renesas             | BB170      | Varicap        |
| HVU383B           | Renesas             | BB208-03   | Varicap        |
| INA-51063         | Agilent             | BGA2001    | MMIC           |
| JDP2S01E          | Toshiba             | BAP65-02   | PIN diode      |
| JDP2S01U          | Toshiba             | BAP65-03   | PIN diode      |
| JDP2S02AFS        | Toshiba             | BAP51-02   | PIN diode      |
| JDP2S02AS         | Toshiba             | BAP51-03   | PIN diode      |
| JDP2S02T          | Toshiba             | BAP63-02   | PIN diode      |
| JDP2S04E          | Toshiba             | BAP50-02   | PIN diode      |
| JDS2S03S          | Toshiba             | BA891      | BS diode       |
| KP2310R           | Toko                | BAP64-04W  | PIN diode      |
| KTK920*           | KEC                 | BF1108     | FET            |
| KTK920BT          | KEC                 | BF1108     | FET            |
| KTK920T           | KEC                 | BF1108R    | FET            |
| LTC5590           | Linear Technology   | BGX7220    | MMIC           |
| LTC5591           | Linear Technology   | BGX7221    | MMIC           |
| LTC5592           | Linear Technology   | BGX7221    | MMIC           |
| MA2SV01           | Renesas Electronics | BB202      | Varicap        |
| MA2SV01           | Renesas             | BB202      | Varicap        |
| MA357             | Panasonic           | BB172      | Varicap        |
| MA366             | Panasonic           | BB170      | Varicap        |
| MA368             | Panasonic           | BB131      | Varicap        |
| MA4CP101A         | Panasonic           | BAP65-03   | PIN diode      |
| MA4P274-1141      | Panasonic           | BAP51-03   | PIN diode      |
| MA4P275-1141      | Panasonic           | BAP65-03   | PIN diode      |
| MA4P275CK-287     | Panasonic           | BAP65-05   | PIN diode      |
| MA4P277-1141      | Panasonic           | BAP70-03   | PIN diode      |
| MA4P278-287       | Panasonic           | BAP70-03   | PIN diode      |
| MA4P789-1141      | Panasonic           | BAP1321-03 | PIN diode      |
| MA4P789ST-287     | Panasonic           | BAP1321-04 | PIN diode      |
| MAX19985A         | MAXIM               | BGX7220    | MMIC           |
| MAX19995          | MAXIM               | BGX7221    | MMIC           |
| MAX2634           | Maxim               | BGU6102    | MMIC           |
| MAX2657           | Maxim               | BGU8007    | MMIC           |
| MAX2658           | Maxim               | BGU7005    | MMIC           |
| MAX2659           | Maxim               | BGU7005    | MMIC           |
| MAX2667           | Maxim               | BGU8007    | MMIC           |
| MAX2687           | Maxim               | BGU7005    | MMIC           |
| MAX2694           | Maxim               | BGU7005    | MMIC           |
| MC-7831           | Renesas Electronics | BGY885A    | CATV PP        |
| MC-7831-HA        | Renesas Electronics | BGY1085A   | CATV PP        |
| MC-7832           | Renesas Electronics | BGY887     | CATV PP        |
| MC-7832-HA        | Renesas Electronics | CGY1041    | CATV PP        |
| MC-7833           | Renesas Electronics | BGY887B    | CATV PP        |
| MC-7836           | Renesas Electronics | BGY887B    | CATV PP        |
| MC-7836           | Renesas Electronics | CGY1047    | CATV PP        |
| MC-7846           | Renesas Electronics | CGD942C    | CATV PD        |
| MC-7847           | Renesas Electronics | CGD944C    | CATV PD        |
| MC-7882           | Renesas Electronics | BGD814     | CATV PD        |
| MC-7883           | Renesas Electronics | CGD942C    | CATV PD        |
| MC-7884           | Renesas Electronics | CGD944C    | CATV PD        |
| MC-7891           | Renesas Electronics | CGD1042H   | CATV PD        |
| MC-7893           | Renesas Electronics | CGD1042H   | CATV PD        |
| MC-7894           | Renesas Electronics | CDG1044H   | CATV PD        |
| MC-7896           | Renesas Electronics | CGD1044H   | CATV PD        |
| MC7712            | Renesas Electronics | BGY785A    | CATV PPA       |
| MC7716            | Renesas Electronics | BGY787     | CATV PPA       |
| MC7722            | Renesas Electronics | BGY785A    | CATV PPA       |
| MC7726            | Renesas Electronics | BGY787     | CATV PPA       |
| MC7831-HA         | Renesas Electronics | BGY1085A   | CATV PP        |
| MC7832-HA         | Renesas Electronics | CGY1041    | CATV PP        |
| MC7852            | Renesas Electronics | BGY885A    | CATV PPA       |
| MC7866            | Renesas Electronics | BGD816L    | CATV PD        |
| MC7893            | Renesas Electronics | CGD1042Hi  | CATV PD        |
| MC7893            | Renesas Electronics | CGD982HCi  | CATV PD        |
| MC7894            | Renesas Electronics | CGD1044Hi  | CATV PD        |
| MC7894            | Renesas Electronics | CGD985HCi  | CATV PD        |
| MC7896            | Renesas Electronics | CGD1046Hi  | CATV PD        |
| MC7896            | Renesas Electronics | CGD987HCi  | CATV PD        |
| MCH4009           | Sanyo               | BFG424F    | WB trs 5-7     |
| MGA-633P8         | Avago               | BGU8051    | LNA            |

| Manufacturer type | Manufacturer | NXP type | Product family |
|-------------------|--------------|----------|----------------|
| MGA-633P8         | Avago        | BGU8052  | LNA            |
| MGA631P8          | Avago        | BGU7051  | MMIC           |
| MGA632P8          | Avago        | BGU7052  | MMIC           |
| MGA632P8          | Avago        | BGU7053  | MMIC           |
| MHW10186N         | Freescale    | BGY1085A | CATV PP        |
| MHW10236N         | Freescale    | CGY1043  | CATV PP        |
| MHW10247AN        | Freescale    | CGD1044H | CATV PD        |
| MHW10276N         | Freescale    | CGY1047  | CATV PP        |
| MHW1224           | Freescale    | BGY67    | CATV RA        |
| MHW1244           | Freescale    | BGY67A   | CATV RA        |
| MHW1253LA         | Freescale    | BGY67A   | CATV RA        |
| MHW1254L          | Freescale    | BGY68    | CATV RA        |
| MHW1254LA         | Freescale    | BGY68    | CATV RA        |
| MHW1304L          | Freescale    | BGY68    | CATV RA        |
| MHW1304LA         | Freescale    | BGY68    | CATV RA        |
| MHW1304LAN        | Freescale    | BGY68    | CATV RA        |
| MHW1346           | Freescale    | BGY67A   | CATV RA        |
| MHW1353LA         | Freescale    | BGY67A   | CATV RA        |
| MHW1354LA         | Freescale    | BGY68    | CATV RA        |
| MHW7182B          | Freescale    | BGY785A  | CATV PPA       |
| MHW7182C          | Freescale    | BGY785A  | CATV PPA       |
| MHW7185C2         | Freescale    | BGD712   | CATV PD        |
| MHW7185CL         | Freescale    | BGD712   | CATV PD        |
| MHW7205C          | Freescale    | BGD714   | CATV PD        |
| MHW7205CL         | Freescale    | BGD714   | CATV PD        |
| MHW7205CLN        | Freescale    | BGD714   | CATV PD        |
| MHW7222           | Freescale    | BGY787   | CATV PPA       |
| MHW7222A          | Freescale    | BGY787   | CATV PPA       |
| MHW7222B          | Freescale    | BGY787   | CATV PPA       |
| MHW7242A          | Freescale    | BGE787B  | CATV PPA/HG    |
| MHW7272A          | Freescale    | BGE787B  | CATV PPA/HG    |
| MHW7292           | Freescale    | BGE787B  | CATV PPA/HG    |
| MHW7292A          | Freescale    | BGE787B  | CATV PPA/HG    |
| MHW7292AN         | Freescale    | BGE787B  | CATV PPA/HG    |
| MHW8182B          | Freescale    | BGY885A  | CATV PPA       |
| MHW8182C          | Freescale    | BGY885A  | CATV PPA       |
| MHW8182CN         | Freescale    | BGY885A  | CATV PP        |
| MHW8185           | Freescale    | BGD814   | CATV PD        |
| MHW8185L          | Freescale    | BGD812   | CATV PD        |
| MHW8188AN         | Freescale    | CGD942C  | CATV PD        |
| MHW8205           | Freescale    | BGD814   | CATV PD        |
| MHW820L           | Freescale    | BGD814   | CATV PD        |
| MHW8222BN         | Freescale    | BGY887   | CATV PP        |
| MHW8227A          | Freescale    | CGD942C  | CATV PD        |
| MHW8227AN         | Freescale    | CGD942C  | CATV PD        |
| MHW8247A          | Freescale    | CGD944C  | CATV PPA       |
| MHW8247AN         | Freescale    | CGD944C  | CATV PD        |
| MHW8292           | Freescale    | BGY887B  | CATV PPA       |
| MHW8342           | Freescale    | BGY888   | CATV PPA       |
| MHW8342N          | Freescale    | CGY888C  | CATV PP        |
| MHW9182B          | Freescale    | BGY1085A | CATV PPA       |
| MHW9182C          | Freescale    | BGY1085A | CATV PPA       |
| MHW9182CN         | Freescale    | BGY1085A | CATV PP        |
| MHW9186           | Freescale    | BGY885A  | CATV PPA       |
| MHW9186A          | Freescale    | BGY885A  | CATV PPA       |
| MHW9187N          | Freescale    | CGD942C  | CATV PD        |
| MHW9188AN         | Freescale    | CGD942C  | CATV PD        |
| MHW9188N          | Freescale    | CGD942C  | CATV PD        |
| MHW9227AN         | Freescale    | CGD942C  | CATV PD        |
| MHW9242A          | Freescale    | CGD1042H | CATV PD        |
| MHW9247           | Freescale    | CGD944C  | CATV PD        |
| MHW9247A          | Freescale    | CGD944C  | CATV PD        |
| MHW9247AN         | Freescale    | CGD944C  | CATV PD        |
| MHW9247N          | Freescale    | CGD944C  | CATV PD        |
| MHWJ7185A         | Freescale    | BGD712   | CATV PD        |
| MHWJ7205A         | Freescale    | BGD714   | CATV PD        |
| MHWJ7292          | Freescale    | BGE787B  | CATV PPA/HG    |
| MHWJ9182          | Freescale    | BGY1085A | CATV PPA       |
| MMBF4391          | Freescale    | PMBF4391 | FET            |
| MMBF4392          | Freescale    | PMBF4392 | FET            |
| MMBF4393          | Freescale    | PMBF4393 | FET            |
| MMBF4860          | Freescale    | PMBFJ112 | FET            |
| MMBF5484          | Freescale    | BFR31    | FET            |
| MMBFJ113          | Freescale    | PMBFJ113 | FET            |
| MMBFJ174          | Freescale    | PMBFJ174 | FET            |
| MMBFJ175          | Freescale    | PMBFJ175 | FET            |
| MMBFJ176          | Freescale    | PMBFJ176 | FET            |
| MMBFJ177          | Freescale    | PMBFJ177 | FET            |
| MMBFJ308          | Freescale    | PMBFJ308 | FET            |
| MMBFJ309          | Freescale    | PMBFJ309 | FET            |
| MMBFJ310          | Freescale    | PMBFJ310 | FET            |
| MMBFJ310          | Freescale    | PMBFJ310 | FET            |
| MMBR5031L         | Freescale    | BFS17    | WB trs 1-4     |
| MMBR5179L         | Freescale    | BFS17A   | WB trs 1-4     |
| MMBR571L          | Freescale    | PBR951   | WB trs 1-4     |
| MMBR901L          | Freescale    | BFR92A   | WB trs 1-4     |
| MMBR911L          | Freescale    | BFR93A   | WB trs 1-4     |
| MMBR920L          | Freescale    | BFR93A   | WB trs 1-4     |
| MMBR931L          | Freescale    | BFT25A   | WB trs 1-4     |
| MMBR941BL         | Freescale    | PBR941   | WB trs 1-4     |

| Manufacturer type | Manufacturer        | NXP type             | Product family |
|-------------------|---------------------|----------------------|----------------|
| MMBR941L          | Freescale           | PBR941               | WB trs 1-4     |
| MMBR951AL         | Freescale           | PBR951               | WB trs 1-4     |
| MMBR951L          | Freescale           | PBR951               | WB trs 1-4     |
| MMBV105GLT1       | ONSemicond.         | BB156                | Varicap        |
| MMBV109LT1        | ONSemicond.         | BB170                | Varicap        |
| MMG2001NTV        | Freescale           | BGD816L              | CATV PD        |
| MMG2001T1         | Freescale           | BGD816L              | CATV PD        |
| MMG3004NT1        | Freescale           | BGA7027              | MMIC           |
| MMG3004NT1        | Freescale           | BGA7127              | MMIC           |
| MMG3004NT1        | Freescale           | BGA7127              | MMIC           |
| MMG3014           | Freescale           | BGA7024              | MMIC           |
| MMG3014           | Freescale           | BGA7124              | MMIC           |
| MMG3014           | Freescale           | BGA7124              | MMIC           |
| MMG3014           | Freescale           | BGA7204              | MMIC           |
| MRF577            | Freescale           | PRF957               | WB trs 1-4     |
| MRF917            | Freescale           | BFQ67W               | WB trs 1-4     |
| MRF927            | Freescale           | BFS25A               | WB trs 1-4     |
| MRF9411L          | Freescale           | BFG520/X             | WB trs 1-4     |
| MRF947            | Freescale           | BFS520               | WB trs 1-4     |
| MRF947A           | Freescale           | PRF947               | WB trs 1-4     |
| MRF9511L          | Freescale           | BFG540/X             | WB trs 1-4     |
| MRF957            | Freescale           | PRF957               | WB trs 1-4     |
| MT45200T          | Toshiba             | BFG424W              | WB trs 5-7     |
| MT45200U          | Toshiba             | BFG425W              | WB trs 5-7     |
| MT4534U           | Toshiba             | BFG410W              | WB trs 5-7     |
| NE202930          | Renesas             | BFG425W              | WB trs 5-7     |
| NE661M05          | Renesas             | BFU630F              | WB trs 5-7     |
| NESG2021M05       | Renesas Electronics | BFU610F              | WB trs 5-7     |
| NESG2021M05       | Renesas             | BFU730F              | WB trs 5-7     |
| NESG2021M16       | Renesas             | BFU630F              | WB trs 5-7     |
| NESG2031M05       | Renesas Electronics | BFU630F              | WB trs 5-7     |
| NESG2031M05       | Renesas             | BFU630F              | WB trs 5-7     |
| NESG2031M16       | Renesas             | BFU630F              | WB trs 5-7     |
| NESG204619        | Renesas             | BFU630F              | WB trs 5-7     |
| NESG2101M05       | Renesas Electronics | BFU660F              | WB trs 5-7     |
| NESG2101M05       | Renesas Electronics | BFU760F              | WB trs 5-7     |
| NESG2101M05       | Renesas Electronics | BFU790F              | WB trs 5-7     |
| NESG2101M05       | Renesas             | BFU690F              | WB trs 5-7     |
| NESG2101M16       | Renesas             | BFU690F              | WB trs 5-7     |
| NESG210719        | Renesas             | BFU690F              | WB trs 5-7     |
| NESG210833        | Renesas             | BFU690F              | WB trs 5-7     |
| NESG220033        | Renesas             | BFU690F              | WB trs 5-7     |
| NESG220034        | Renesas             | BFU690F              | WB trs 5-7     |
| NESG240033        | Renesas             | BFU690F              | WB trs 5-7     |
| NESG240034        | Renesas             | BFU690F              | WB trs 5-7     |
| NESG3031M05       | Renesas Electronics | BFU730F              | WB trs 5-7     |
| NESG3031M05       | CEL                 | BFU630F              | WB trs 5-7     |
| NESG3031M05       | CEL                 | BFU725F              | WB trs 5-7     |
| NESG3031M05       | CEL                 | BFU730F              | WB trs 5-7     |
| NESG3031M14       | Renesas             | BFU730F              | WB trs 5-7     |
| NESG3032M14       | Renesas Electronics | BFU725F/N1           | WB trs 5-7     |
| NESG3032M14       | NEC                 | BFU725F              | WB trs 5-7     |
| NESG3033M14       | Renesas             | BFU730F              | WB trs 5-7     |
| NESG340033        | Renesas             | BFU790F              | WB trs 5-7     |
| NESG340034        | Renesas             | BFU790F              | WB trs 5-7     |
| NESG3400M01       | Renesas             | BFU790F              | WB trs 5-7     |
| NESG7030M04       | Renesas             | BFU730F              | WB trs 5-7     |
| NJG1140KA1        | JRC                 | BGU7044              | MMIC           |
| PRF947B           | Motorola            | PRF947               | WB trs 1-4     |
| PRF947B           | Infineon            | PRF947               | WB trs 1-4     |
| R0605250L         | RFMD                | BGY67A               | CATV RA        |
| R0605250L         | Standard            | BGY66B               | CATV RA        |
| R0605300L         | Standard            | BGY68                | CATV RA        |
| R0605300L         | RFMD                | BGY68                | CATV RA        |
| R1005250L         | RFMD                | BGY66B               | CATV RA        |
| R2005200P12       | RFMD                | BGY67                | CATV RA        |
| R2005240          | Standard            | BGY67A               | CATV RA        |
| R2005240          | RFMD                | BGY67A               | CATV RA        |
| R2005240P12       | RFMD                | BGY67A               | CATV RA        |
| R2005350L         | RFMD                | BGR269               | CATV RA        |
| RF3863            | RFMD                | BGU7051              | MMIC           |
| RF3863            | RFMD                | BGU7052              | MMIC           |
| RF3863            | RFMD                | BGU7053              | MMIC           |
| RF3863            | RFMD                | BGX7211              | MMIC           |
| RFFC2072          | RFMD                | BAP51LX              | PIN diode      |
| RKP200KP          | Renesas             | BAP51LX              | PIN diode      |
| RKP201KK          | Renesas             | BAP63-02             | PIN diode      |
| RKP201KL          | Renesas             | BAP63LX              | PIN diode      |
| RKP204KP          | Renesas             | BAP55LX              | PIN diode      |
| RKP300KJ          | Renesas             | BAP50-02, BAP64-02   | PIN diode      |
| RKP300KL          | Renesas             | BAP50-02             | PIN diode      |
| RKP300WKQE        | Renesas             | BAP64-05W            | PIN diode      |
| RKP350KV          | Renesas             | BAP63-03, BAP1321-03 | PIN diode      |
| RKS151KJ          | Renesas             | BA891                | BS diode       |
| RKS151KK          | Renesas             | BA891                | BS diode       |
| RKV500KG          | Renesas             | BB156, BB208-03      | Varicap        |
| RKV500KJ          | Renesas             | BB208-02             | Varicap        |
| RKV500KK          | Renesas             | BB208-02             | Varicap        |
| RKV501KG          | Renesas             | BB171                | Varicap        |
| RKV501KJ          | Renesas             | BB175                | Varicap        |
| RKV502KG          | Renesas             | BB171                | Varicap        |



| Manufacturer type | Manufacturer | NXP type   | Product family |
|-------------------|--------------|------------|----------------|
| RKV502KJ          | Renesas      | BB175      | Varicap        |
| RKV653KL          | Renesas      | BB145B     | Varicap        |
| RN142G            | Rohm         | BAP1321-03 | PIN diode      |
| RN142S            | Rohm         | BAP1321-02 | PIN diode      |
| RN242CS           | Rohm         | BAP51LX    | PIN diode      |
| RN731V            | Rohm         | BAP50-03   | PIN diode      |
| RN739D            | Rohm         | BAP50-04   | PIN diode      |
| RN739F            | Rohm         | BAP50-04W  | PIN diode      |
| S10040200P        | RFMD         | CGY1041    | CATV PP        |
| S10040220GT       | RFMD         | CGY1041    | CATV PP        |
| S10040220P        | RFMD         | CGY1041    | CATV PP        |
| S10040230GT       | RFMD         | CGY1043    | CATV PP        |
| S10040240P        | RFMD         | CGY1043    | CATV PP        |
| S10040280GT       | RFMD         | CGY1047    | CATV PP        |
| S595TR            | Vishay       | BF1105R    | FET            |
| S7540185          | Standard     | BGY785A    | CATV PPA       |
| S7540215          | Standard     | BGY787     | CATV PPA       |
| S8740180GT        | RFMD         | BGY885A    | CATV PP        |
| S8740190          | Standard     | BGD812     | CATV PD        |
| S8740190          | RFMD         | BGY885A    | CATV PP        |
| S8740200P         | RFMD         | BGY887     | CATV PP        |
| S8740220          | Standard     | BGD814     | CATV PD        |
| S8740220GT        | RFMD         | BGY887     | CATV PP        |
| S8740220P         | RFMD         | BGY887     | CATV PP        |
| S8740230          | Standard     | BGD816L    | CATV PD        |
| S8740240GT        | RFMD         | BGY887     | CATV PP        |
| S8740240P         | RFMD         | BGY887     | CATV PP        |
| S8740240P12       | RFMD         | BGY887     | CATV PP        |
| S8740340          | RFMD         | CGY888C    | CATV PP        |
| S8740340PT        | RFMD         | CGY888C    | CATV PP        |
| SGA8343Z          | Sirenza      | BFG425W    | WB trs 5-7     |
| SKY65048          | Skyworks     | BGU7051    | MMIC           |
| SKY65066          | Skyworks     | BGU7053    | MMIC           |
| SKY65084          | Skyworks     | BGU7052    | MMIC           |
| SKY67101-396LF    | Skyworks     | BGU8051    | LNA            |
| SMA3101           | Sanyo        | BGA2851    | MMIC           |
| SMA3101           | Sanyo        | BGA2851    | MMIC           |
| SMA3103           | Sanyo        | BGA2867    | MMIC           |
| SMA3103           | Sanyo        | BGA2867    | MMIC           |
| SMA3107           | Sanyo        | BGA2803    | MMIC           |
| SMA3107           | Sanyo        | BGA2803    | MMIC           |
| SMA3109           | Sanyo        | BGA2817    | MMIC           |
| SMA3109           | Sanyo        | BGA2817    | MMIC           |
| SMA3111           | Sanyo        | BGA2851    | MMIC           |
| SMA3111           | Sanyo        | BGA2851    | MMIC           |
| SMP1302-004       | Skyworks     | BAP50-05   | PIN diode      |
| SMP1302-005       | Skyworks     | BAP50-04   | PIN diode      |
| SMP1302-011       | Skyworks     | BAP50-03   | PIN diode      |
| SMP1302-074       | Skyworks     | BAP50-05W  | PIN diode      |
| SMP1302-075       | Skyworks     | BAP50-04W  | PIN diode      |
| SMP1302-079       | Skyworks     | BAP50-02   | PIN diode      |
| SMP1304-001       | Skyworks     | BAP70-03   | PIN diode      |
| SMP1304-011       | Skyworks     | BAP70-03   | PIN diode      |
| SMP1307-001       | Skyworks     | BAP70-03   | PIN diode      |
| SMP1307-011       | Skyworks     | BAP70-03   | PIN diode      |
| SMP1320-004       | Skyworks     | BAP65-05   | PIN diode      |
| SMP1320-011       | Skyworks     | BAP65-03   | PIN diode      |
| SMP1320-074       | Skyworks     | BAP65-05W  | PIN diode      |
| SMP1321-001       | Skyworks     | BAP1321-03 | PIN diode      |
| SMP1321-005       | Skyworks     | BAP1321-04 | PIN diode      |
| SMP1321-011       | Skyworks     | BAP1321-03 | PIN diode      |
| SMP1321-075       | Skyworks     | BAP1321-04 | PIN diode      |
| SMP1321-079       | Skyworks     | BAP1321-02 | PIN diode      |
| SMP1322-004       | Skyworks     | BAP65-05   | PIN diode      |
| SMP1322-011       | Skyworks     | BAP65-03   | PIN diode      |
| SMP1322-074       | Skyworks     | BAP65-05W  | PIN diode      |
| SMP1322-079       | Skyworks     | BAP65-02   | PIN diode      |
| SMP1340-011       | Skyworks     | BAP63-03   | PIN diode      |
| SMP1340-079       | Skyworks     | BAP63-02   | PIN diode      |
| SMP1352-011       | Skyworks     | BAP64-03   | PIN diode      |
| SMP1352-079       | Skyworks     | BAP64-02   | PIN diode      |
| SMV1235-004       | Skyworks     | BB181      | Varicap        |
| SMV1236-004       | Skyworks     | BB156      | Varicap        |
| SPF-5122Z         | RFMD         | BGU7051    | LNA            |
| SPF-5122Z         | RFMD         | BGU7052    | LNA            |
| SPF-5122Z         | RFMD         | BGU7053    | LNA            |
| SST111            | Standard     | PMBFJ111   | FET            |
| SST112            | Standard     | PMBFJ112   | FET            |
| SST113            | Standard     | PMBFJ113   | FET            |
| SST174            | Standard     | PMBFJ174   | FET            |
| SST175            | Standard     | PMBFJ175   | FET            |
| SST176            | Standard     | PMBFJ176   | FET            |
| SST177            | Standard     | PMBFJ177   | FET            |
| SST201            | Standard     | BFT46      | FET            |
| SST202            | Standard     | BFR31      | FET            |
| SST203            | Standard     | BFR30      | FET            |
| SST308            | Standard     | PMBFJ308   | FET            |
| SST309            | Standard     | PMBFJ309   | FET            |
| SST310            | Standard     | PMBFJ310   | FET            |
| SST4391           | Standard     | PMBF4391   | FET            |

| Manufacturer type | Manufacturer        | NXP type | Product family |
|-------------------|---------------------|----------|----------------|
| SST4392           | Standard            | PMBF4392 | FET            |
| SST4393           | Standard            | PMBF4393 | FET            |
| SST4856           | Standard            | BSR56    | FET            |
| SST4857           | Standard            | BSR57    | FET            |
| SST4859           | Standard            | BSR56    | FET            |
| SST4860           | Standard            | BSR57    | FET            |
| SST4861           | Standard            | BSR58    | FET            |
| SXA-389B          | RFMD                | BGA7024  | MMIC           |
| SXA-389B          | RFMD                | BGA7124  | MMIC           |
| SXA-389B          | RFMD                | BGA7124  | MMIC           |
| SXA-389B          | RFMD                | BGA7204  | MMIC           |
| SXB-4089          | RFMD                | BGA7127  | MMIC           |
| SXB-4089          | RFMD                | BGA7027  | MMIC           |
| SXB-4089          | RFMD                | BGA7127  | MMIC           |
| TMPF4091          | Standard            | PMBF4391 | FET            |
| TMPF4092          | Standard            | PMBF4392 | FET            |
| TMPF4093          | Standard            | PMBF4393 | FET            |
| TMPF4391          | Standard            | PMBF4391 | FET            |
| TMPF4392          | Standard            | PMBF4392 | FET            |
| TMPF4393          | Standard            | PMBF4393 | FET            |
| TMPFB246A         | Standard            | BSR56    | FET            |
| TMPFB246B         | Standard            | BSR57    | FET            |
| TMPFB246C         | Standard            | BSR58    | FET            |
| TMPFJ111          | Standard            | PMBFJ111 | FET            |
| TMPFJ112          | Standard            | PMBFJ112 | FET            |
| TMPFJ113          | Standard            | PMBFJ113 | FET            |
| TMPFJ174          | Standard            | PMBFJ174 | FET            |
| TMPFJ175          | Standard            | PMBFJ175 | FET            |
| TMPFJ176          | Standard            | PMBFJ176 | FET            |
| TMPFJ177          | Standard            | PMBFJ177 | FET            |
| TQP3M9005         | Triquint            | BGU8052  | LNA            |
| TRF370315         | TI                  | BGX7101  | MMIC           |
| TRF370417         | TI                  | BGX7101  | MMIC           |
| TRF3705           | TI                  | BGX7101  | MMIC           |
| UPA800T           | Renesas             | BFM520   | WB trs 1-4     |
| UPA801T           | Renesas             | BFM520   | WB trs 1-4     |
| UPA802T           | Renesas             | BFM520   | WB trs 1-4     |
| UPA804T           | Renesas             | BFM520   | WB trs 1-4     |
| UPA806T           | Renesas             | BFM520   | WB trs 1-4     |
| UPA807T           | Renesas             | BFM520   | WB trs 1-4     |
| UPA808T           | Renesas             | BFM520   | WB trs 1-4     |
| UPA810T           | Renesas             | BFM520   | WB trs 1-4     |
| UPA811T           | Renesas             | BFM520   | WB trs 1-4     |
| UPA812T           | Renesas             | BFM520   | WB trs 1-4     |
| UPA813T           | Renesas             | BFM520   | WB trs 1-4     |
| UPA828TD          | Renesas             | BFM520   | WB trs 1-4     |
| UPA831TD          | Renesas             | BFM520   | WB trs 1-4     |
| UPA860TD          | Renesas             | BFM520   | WB trs 1-4     |
| UPA861TD          | Renesas             | BFM520   | WB trs 1-4     |
| UPA862TD          | Renesas             | BFM520   | WB trs 1-4     |
| UPA863TD          | Renesas             | BFM520   | WB trs 1-4     |
| UPA869TD          | Renesas             | BFM520   | WB trs 1-4     |
| UPA873TD          | Renesas             | BFM520   | WB trs 1-4     |
| UPA895TD          | Renesas             | BFM520   | WB trs 1-4     |
| uPC2709           | Renesas Electronics | BGA2709  | MMIC           |
| uPC2711           | Renesas Electronics | BGA2711  | MMIC           |
| uPC2712           | Renesas Electronics | BGA2712  | MMIC           |
| uPC2745           | Renesas Electronics | BGA2001  | MMIC           |
| uPC2746           | Renesas Electronics | BGA2001  | MMIC           |
| uPC2748           | Renesas Electronics | BGA2748  | MMIC           |
| uPC2771           | Renesas Electronics | BGA2771  | MMIC           |
| uPC3224           | Renesas Electronics | BGA2851  | MMIC           |
| uPC3224           | Renesas Electronics | BGA2851  | MMIC           |
| uPC3226           | Renesas Electronics | BGA2867  | MMIC           |
| uPC3226           | Renesas Electronics | BGA2867  | MMIC           |
| uPC3227           | Renesas Electronics | BGA2851  | MMIC           |
| uPC3227           | Renesas Electronics | BGA2851  | MMIC           |
| uPC3240           | Renesas Electronics | BGA2802  | MMIC           |
| uPC3240           | Renesas Electronics | BGA2802  | MMIC           |
| uPC3241           | Renesas Electronics | BGA2817  | MMIC           |
| uPC3241           | Renesas Electronics | BGA2817  | MMIC           |
| uPC8112           | Renesas Electronics | BGA2022  | MMIC           |
| UPC8230TU         | Renesas Electronics | BGU7007  | MMIC           |
| UPC8236T6N        | Renesas Electronics | BGU8007  | MMIC           |
| uPD5740T6N        | Renesas Electronics | BGU7045  | MMIC           |
| uPD5756T6N        | Renesas Electronics | BGU7045  | MMIC           |

## 5.2 Cross-references: NXP discontinued types versus NXP replacement types

### In alphabetical order of manufacturer discontinued type

Abbreviations:

|          |                                     |
|----------|-------------------------------------|
| BS diode | Band switch diode                   |
| CATV     | Community antenna television system |
| FET      | Field-effect transistor             |
| RFP trs  | RF power transistor                 |
| Varicap  | Varicap diode                       |
| WB trs   | Wideband transistor                 |

| NXP discontinued type | Product family NXP | Replacement type NXP |
|-----------------------|--------------------|----------------------|
| BA792                 | BS diode           | BA591                |
| BAP142L               | PIN diode          | BAP142LX             |
| BAP51-01              | PIN diode          | BAP51LX              |
| BAP51L                | PIN diode          | BAP51LX              |
| BAP55L                | PIN diode          | BAP55LX              |
| BB145                 | Varicap            | BB145B               |
| BB145B-01             | Varicap            | BB145B               |
| BB151                 | Varicap            | BB135                |
| BB181LX               | Varicap            | BB181                |
| BB202LX               | Varicap            | BB202                |
| BB804                 | Varicap            | BB207                |
| BBY42                 | Varicap            | BBY40                |
| BF245A                | FET                | BF545A               |
| BF245B                | FET                | BF545B               |
| BF245C                | FET                | BF545C               |
| BF556B                | FET                | BF556A               |
| BF556C                | FET                | BF556A               |
| BF689K                | WB trs             | BFS17                |
| BF763                 | WB trs             | BFS17                |
| BF851A                | FET                | BF861A               |
| BF851C                | FET                | BF861C               |
| BF992/01              | FET                | BF992                |
| BFC505                | WB trs             | BFM505               |
| BFC520                | WB trs             | BFM520               |
| BFET505               | WB trs             | BFM505               |
| BFET520               | WB trs             | BFM520               |
| BFG17A                | WB trs             | BFS17A               |
| BFG197                | WB trs             | BFG198               |
| BFG197/X              | WB trs             | BFG198               |
| BFG410W/CA            | WB trs             | BFG410W              |
| BFG425W/CA            | WB trs             | BFG425W              |
| BFG505/XR             | WB trs             | BFG505/X             |
| BFG505W/XR            | WB trs             | BFG505               |
| BFG520W/XR            | WB trs             | BFG520W/X            |
| BFG590/XR             | WB trs             | BFG590/X             |
| BFG67/XR              | WB trs             | BFG67                |
| BFQ34/01              | WB trs             | BFG35                |
| BFR92                 | WB trs             | BFR92A               |
| BFR92AR               | WB trs             | BFR92A               |
| BFR92AT               | WB trs             | BFR92AW              |
| BFR93                 | WB trs             | BFR92A               |
| BFR93AT               | WB trs             | BFR93AW              |
| BFR93R                | WB trs             | BFR93A               |
| BFS17/FD              | WB trs             | BFS17                |
| BFU510                | WB trs             | BFU725F/N1           |
| BFU540                | WB trs             | BFU725F/N1           |
| BFU725F               | WB trs             | BFU725F/N1           |
| BGA2031               | WB trs             | BGA2031/1            |
| BGD502                | CATV               | BGD712               |
| BGD602D               | CATV               | BGD712               |
| BGD702                | CATV               | BGD712               |
| BGD702D               | CATV               | BGD712               |
| BGD702D/08            | CATV               | BGD712               |
| BGD702N               | CATV               | BGD712               |
| BGD704                | CATV               | BGD714               |
| BGD704N               | CATV               | BGD714               |
| BGD802                | CATV               | BGD812               |

| NXP discontinued type | Product family NXP | Replacement type NXP |
|-----------------------|--------------------|----------------------|
| BGD802N               | CATV               | BGD812               |
| BGD802N/07            | CATV               | BGD812               |
| BGD804                | CATV               | BGD814               |
| BGD804N               | CATV               | BGD814               |
| BGD804N/02            | CATV               | BGD814               |
| BGD902                | CATV               | BGD812               |
| BGD902L               | CATV               | BGD812               |
| BGD904                | CATV               | BGD814               |
| BGD904L               | CATV               | BGD814               |
| BGD906                | CATV               | CGD942C              |
| BGE788                | CATV               | BGE788C              |
| BGO807C               | CATV               | BGO807C/FCO          |
| BGO807CE              | CATV               | BGO807CE/SCO         |
| BGO827                | CATV               | BGO807CE/FCO         |
| BGO827/SCO            | CATV               | BGO807CE/SCO         |
| BGQ34/01              | WB trs             | BFG35                |
| BGU2003               | WB trs             | BGA2003              |
| BGX885/02             | CATV               | BGX885N              |
| BGY1085A/07           | CATV               | BGY1085A             |
| BGY585A               | CATV               | BGY785A              |
| BGY587                | CATV               | BGY787               |
| BGY587B               | CATV               | BGE787B              |
| BGY588N               | CATV               | BGY588C              |
| BGY66B/04             | CATV               | BGY66B               |
| BGY67/04              | CATV               | BGY67                |
| BGY67/09              | CATV               | BGY67                |
| BGY67/14              | CATV               | BGY67                |
| BGY67/19              | CATV               | BGY67                |
| BGY67A/04             | CATV               | BGY67A               |
| BGY67A/14             | CATV               | BGY67A               |
| BGY68/01              | CATV               | BGY68                |
| BGY685A               | CATV               | BGY785A              |
| BGY685AD              | CATV               | BGY785A              |
| BGY685AL              | CATV               | BGY785A              |
| BGY687                | CATV               | BGY787               |
| BGY687B               | CATV               | BGE787B              |
| BGY687B/02            | CATV               | BGE787B              |
| BGY785A/07            | CATV               | BGY785A              |
| BGY785A/09            | CATV               | BGY785A              |
| BGY785AD              | CATV               | BGY785A              |
| BGY785AD/06           | CATV               | BGY785A              |
| BGY785AD/8M           | CATV               | BGY885A              |
| BGY787/02             | CATV               | BGY787               |
| BGY787/07             | CATV               | BGY787               |
| BGY787/09             | CATV               | BGY787               |
| BGY883                | CATV               | BGY885A              |
| BGY887/02             | CATV               | BGY887               |
| BLF6G20LS-180RN       | RFP trs            | BLF7G20LS-200        |
| BLC6G10LS-160RN       | RFP trs            | BLF8G10LS-160        |
| BLF346                | RFP trs            | BLF642               |
| BLF872                | RFP trs            | BLF888A              |
| BLA1011-200R          | RFP trs            | BLA6G1011-200R       |
| BLA1011S-200R         | RFP trs            | BLA6G1011LS-200RG    |
| CGD1042               | CATV               | CGD1042H             |
| CGD1044               | CATV               | CGD1044H             |
| CGD914                | CATV               | CGD1042H             |
| CGY887A               | CATV               | CGY1043              |

| NXP discontinued type | Product family NXP | Replacement type NXP |
|-----------------------|--------------------|----------------------|
| CGY887B               | CATV               | CGY1047              |
| GD923                 | CATV               | CGD942C              |
| J108                  | FET                | PMBFJ108             |
| J109                  | FET                | PMBFJ109             |
| J110                  | FET                | PMBFJ110             |
| J111                  | FET                | PMBFJ111             |
| J112                  | FET                | PMBFJ112             |
| J113                  | FET                | PMBFJ113             |
| J174                  | FET                | PMBFJ174             |
| J175                  | FET                | PMBFJ175             |
| J176                  | FET                | PMBFJ176             |
| J177                  | FET                | PMBFJ177             |
| OM7650                | CATV               | BGY588C              |
| OM7670                | CATV               | BGE788C              |
| ON4831-2              | CATV               | BGY885A              |
| ON4876                | CATV               | BGY1085A             |
| ON4890                | CATV               | BGD712               |
| PMBT3640/AT           | WB trs             | BFS17                |
| PN4392                | FET                | PMBF4392             |
| PN4393                | FET                | PMBF4393             |
| TFF1004HN             | Satellite IC       | TFF1014HN            |

# 6. Packing and packaging information

## 6.1 Packing quantities per package with relevant ordering codes

|                                                                                     | Package      | Package dimensions<br>L x W x H (mm) | Packing<br>quantity | Product<br>12NC ending | Packing<br>method          | Type               |
|-------------------------------------------------------------------------------------|--------------|--------------------------------------|---------------------|------------------------|----------------------------|--------------------|
|    | SOD323/SC-76 | 1.7 x 1.25 x 0.9                     | 3,000               | 115                    | 8 mm tape and reel         |                    |
|                                                                                     |              |                                      | 10,000              | 135                    | 8 mm tape and reel         |                    |
|    | SOD523/SC-79 | 1.2 x 0.8 x 0.6                      | 3,000               | 115                    | 8 mm tape and reel         |                    |
|                                                                                     |              |                                      | 10,000              | 135                    | 8 mm tape and reel         |                    |
|                                                                                     |              |                                      | 8,000               | 315                    | 2 mm pitch tape and reel   |                    |
|                                                                                     |              |                                      | 20,000              | 335                    | 2 mm pitch tape and reel   |                    |
|    | SOD882D      | 1.0 x 0.6 x 0.4                      | 10,000              | 315                    | Reel                       |                    |
|    | SOT23        | 2.9 x 1.3 x 0.9                      | 3,000               | 215                    | 8 mm tape and reel         |                    |
|                                                                                     |              |                                      | 10,000              | 235                    | 8 mm tape and reel         |                    |
|    | SOT54        | 4.6 x 3.9 x 5.1                      | 5,000               | 112                    | Bulk, delta pinning        |                    |
|                                                                                     |              |                                      | 5,000               | 412                    | Bulk, straight leads       |                    |
|                                                                                     |              |                                      | 10,000              | 116                    | Tape and reel, wide pitch  |                    |
|                                                                                     |              |                                      | 10,000              | 126                    | Tape ammpack, wide pitch   |                    |
|    | SOT89/SC-62  | 4.5 x 2.5 x 1.5                      | 1,000               | 115                    | 12 mm tape and reel        |                    |
|                                                                                     |              |                                      | 4,000               | 135                    | 12 mm tape and reel        |                    |
|    | SOT115       | 44.5 x 13.65 x 20.4                  | 100                 | 112                    | 4 tray/box                 | Plastic            |
|    | SOT121B      | 24.8 x 6.4 x 6.7                     | 40                  | 112                    | Blister, tray              | Air-cavity ceramic |
|   | SOT143(N/R)  | 2.9 x 1.3 x 0.9                      | 3,000               | 215                    | 8 mm tape and reel         |                    |
|                                                                                     |              |                                      | 10,000              | 235                    | 8 mm tape and reel         |                    |
|  | SOT223/SC-73 | 6.7 x 3.5 x 1.6                      | 1,000               | 115                    | 12 mm tape and reel        | Plastic            |
|                                                                                     |              |                                      | 4,000               | 135                    | 12 mm tape and reel        |                    |
|  | SOT262A      | 34 x 9.8 x 5.4                       | 60                  | 112                    | Blister, tray              | Air-cavity ceramic |
|  | SOT307       | 10 x 10 x 1.75                       | 1,500               | 518                    | 13" tape and reel dry pack |                    |
|                                                                                     |              |                                      | 96                  | 551                    | 1 tray dry pack            |                    |
|                                                                                     |              |                                      | 480                 | 557                    | 5 tray dry pack            |                    |
|  | SOT323/SC-70 | 2.0 x 1.25 x 0.9                     | 3,000               | 115                    | 8 mm tape and reel         |                    |
|                                                                                     |              |                                      | 10,000              | 135                    | 8 mm tape and reel         |                    |
|  | SOT341       | 5.3 x 10.2 x 2.0                     | 1,000               | 118                    | 13" tape and reel          |                    |
|                                                                                     |              |                                      | 658                 | 112                    | Tube                       |                    |
|  | SOT343(N/R)  | 2.0 x 1.25 x 0.9                     | 3,000               | 115                    | 8 mm tape and reel         |                    |
|                                                                                     |              |                                      | 10,000              | 135                    | 8 mm tape and reel         |                    |
|  | SOT343F      | 2.1 x 1.25 x 0.7                     | 3,000               | 115                    | 8 mm tape and reel         | Plastic            |
|  | SOT360       | 6.5 x 4.4 x 0.9                      | 2,500               | 118                    | 16 mm tape and reel        |                    |
|  | SOT363/SC-88 | 2.0 x 1.25 x 0.9                     | 3,000               | 115                    | 8 mm tape and reel         |                    |
|                                                                                     |              |                                      | 10,000              | 135                    | 8 mm tape and reel         |                    |
|  | SOT401       | 5 x 5 x 1.4                          | 2,000               | 118                    | 13" tape and reel          |                    |
|                                                                                     |              |                                      | 360                 | 151                    | 1 tray                     |                    |
|  | SOT403       | 5.0 x 4.4 x 0.9                      | 2,500               | 118                    | 12 mm tape and reel        |                    |
|  | SOT416/SC-75 | 1.6 x 0.8 x 0.75                     | 3,000               | 115                    | 8 mm tape and reel         |                    |
|  | SOT467B      | 9.7 x 5.8 x 4.3                      | 60                  | 112                    | Blister, tray              |                    |
|                                                                                     |              |                                      | 400                 | 118                    | Tape and reel              |                    |
|  | SOT467C      | 20.3 x 5.8 x 4.3                     | 60                  | 112                    | Blister, tray              | Air-cavity ceramic |
|  | SOT502A      | 34.0 x 9.8 x 4.1                     | 60                  | 112                    | Blister, tray              |                    |
|                                                                                     |              |                                      | 300                 | 135                    | Reel                       |                    |
|                                                                                     |              |                                      | 100                 | 118                    | Tape and reel              |                    |

|                                                                                     | Package  | Package dimensions<br>L x W x H (mm) | Packing<br>quantity | Product<br>12NC ending | Packing<br>method              | Type               |
|-------------------------------------------------------------------------------------|----------|--------------------------------------|---------------------|------------------------|--------------------------------|--------------------|
|    | SOT502B  | 20.6 x 9.8 x 4.1                     | 60<br>100           | 112<br>118             | Blister, tray<br>Tape and reel | Air-cavity ceramic |
|                                                                                     | SOT502C  | 20.6 x 9.8 x 4.1                     | 60                  | 112                    | Blister, tray                  |                    |
|                                                                                     | SOT502D  | 34 x 9.8 x 4.1                       | 60                  | 112                    | Blister, tray                  |                    |
|                                                                                     | SOT502E  | 20.6 x 9.8 x 4.1                     | 60                  | 112                    | Blister, tray                  |                    |
|    |          |                                      | 100                 | 118                    | Blister, tray                  |                    |
|    |          |                                      | 24                  | 127                    | Tube                           |                    |
|    |          |                                      | 96                  | 127                    | Tube                           |                    |
|    | SOT538A  | 5.5 x 4.1 x 2.2                      | 500                 | 112                    | Blister, tray                  |                    |
|    | SOT539A  | 41.2 x 10.2 x 4.5                    | 60                  | 112                    | Blister, tray                  |                    |
|                                                                                     |          |                                      | 300                 | 135                    | Reel                           |                    |
|    |          |                                      | 100                 | 118                    | Tape and reel                  |                    |
|    | SOT539B  | 32.3 x 10.2 x 4.5                    | 60                  | 112                    | Blister, tray                  | Plastic            |
|    | SOT540A  | 34.0 x 9.8 x 5.4                     | 60                  | 112                    | Blister, tray                  |                    |
|    | SOT608A  | 20.3 x 10.2 x 4.2                    | 60                  | 112                    | Blister, tray                  |                    |
|                                                                                     |          |                                      | 100                 | 118                    | Tape and reel                  |                    |
|                                                                                     |          |                                      | 300                 | 135                    | Reel                           |                    |
|    | SOT608B  | 10.2 x 10.16 x 4.2                   | 60                  | 112                    | Blister, tray                  |                    |
|    |          |                                      | 300                 | 135                    | Tape and reel                  |                    |
|   |          |                                      |                     |                        |                                |                    |
|  | SOT616   | 4.0 x 4.0 x 0.85                     | 6,000               | 118                    | 12 mm tape and reel            |                    |
|                                                                                     |          |                                      | 1,500               | 115                    | 8 mm tape and reel             |                    |
|                                                                                     |          |                                      | 100                 | 551                    | Tray                           |                    |
|  | SOT617   | 5 x 5 x 0.85                         | 6,000               | 118                    | Tape and reel                  | Air-cavity ceramic |
|  | SOT618   | 6 x 6 x 0.85                         | 4,000               | 118                    | 13" tape and reel              |                    |
|                                                                                     |          |                                      | 1,000               | 515                    | 7" tape and reel dry pack      |                    |
|                                                                                     |          |                                      | 490                 | 551                    | 1 tray dry pack                |                    |
|                                                                                     |          |                                      | 2,450               | 157                    | 5 tray                         |                    |
|  | SOT634A  | 34 x 13.7 x 4.3                      | 60                  | 112                    | Blister, tray                  | Plastic            |
|  | SOT638   | 14 x 14 x 1                          | 1,000               | 518                    | 13" tape and reel dry pack     |                    |
|                                                                                     |          |                                      | 90                  | 551                    | 1 tray dry pack                |                    |
|                                                                                     |          |                                      | 450                 | 557                    | 5 tray dry pack                |                    |
|  | SOT650-1 | 3.0 x 3.0 x 0.85                     | 6,000               | 118                    | Reel                           |                    |
|  | SOT666   | 1.6 x 1.2 x 0.7                      | 4,000               | 115                    | 8 mm tape and reel             |                    |
|  | SOT684   | 8 x 8 x 0.85                         | 1,000               | 518                    | 13" tape and reel dry pack     |                    |
|                                                                                     |          |                                      | 260                 | 151                    | 1 tray                         |                    |
|                                                                                     |          |                                      | 260                 | 551                    | 1 tray dry pack                |                    |
|                                                                                     |          |                                      | 1,300               | 157                    | 5 tray dry pack                |                    |
|  | SOT724   | 8.7 x 3.9 x 1.47                     | 2,500               | 118                    | 16 mm tape and reel            | Air-cavity ceramic |
|  | SOT753   | 2.9 x 1.5 x 1.0                      | 3,000               | 125                    | 8 mm tape and reel             |                    |
|  | SOT763-1 | 2.5 x 3.5 x 0.85                     | 3,000               | 115                    | Reel                           |                    |
|                                                                                     |          |                                      | 6,000               | 135                    | Reel                           |                    |
|  | SOT778   | 6.0 x 6.0 x 0.85                     | 490                 | 551                    | Tray                           |                    |
|                                                                                     |          |                                      | 4,000               | 518                    | Multiple trays                 |                    |
|  | SOT822-1 | 15.9 x 11 x 3.4                      | 180                 | 127                    | Tube                           |                    |
|  | SOT834-1 | 15.9 x 11 x 3.4                      | 180                 | 127                    | Tube                           |                    |
|  | SOT883   | 1.0 x 0.6 x 0.5                      | 3,000               | 115                    | 8 mm tape and reel             |                    |
|  | SOT886   | 1.45 x 1.0 x 0.5                     | 5,000               | 115                    | 8 mm tape and reel             |                    |
|  | SOT891   | 1.0 x 1.0 x 0.5                      | 5,000               | 132                    | 8 mm tape and reel             | Air-cavity ceramic |
|  | SOT908   | 3.0 x 3.0 x 0.85                     | 6,000               | 118                    | 12 mm tape and reel            |                    |

|                                                                                     | Package   | Package dimensions<br>L x W x H (mm) | Packing<br>quantity | Product<br>12NC ending | Packing<br>method                                        | Type                  |
|-------------------------------------------------------------------------------------|-----------|--------------------------------------|---------------------|------------------------|----------------------------------------------------------|-----------------------|
|    | SOT922-1  | 17.6 x 9.4 x 3.9                     | 60                  | 112                    | Blister, tray                                            | Air-cavity<br>ceramic |
|    | SOT975B   | 7.1 x 6.9 x 3.3                      | 180<br>100          | 112<br>118             | Blister, tray<br>Tape and reel                           |                       |
|    | SOT975C   | 7.1 x 6.9 x 3.3                      | 180<br>100          | 112<br>118             | Blister, tray<br>Tape and reel                           |                       |
|    | SOT979A   | 41.2 x 10.2 x 5.3                    | 60                  | 112                    | Blister, tray                                            |                       |
|    | SOT1110A  | 41.2 x 10.2 x 4.9                    | 60                  | 112                    | Blister, tray                                            |                       |
|    | SOT1110B  | 32.3 x 10.2 x 4.9                    | 60                  | 112                    | Blister, tray                                            |                       |
|    | SOT1112A  | 20.3 x 9.8 x 4.2                     | 60                  | 112                    | Blister, tray                                            |                       |
|    | SOT1112B  | 9.8 x 9.8 x 4.2                      | 60                  | 112                    | Blister, tray                                            |                       |
|    | SOT1120A  | 34.0 x 9.8 x 4.1                     | 60<br>100           | 112<br>118             | Blister, tray<br>Tape and reel                           |                       |
|    | SOT1120B  | 20.6 x 9.8 x 4.1                     | 60<br>100           | 112<br>118             | Blister, tray<br>Tape and reel                           |                       |
|    | SOT1121A  | 34.0 x 9.8 x 4.1                     | 60<br>100           | 112<br>118             | Blister, tray<br>Tape and reel                           |                       |
|    | SOT1121B  | 20.6 x 9.8 x 4.1                     | 60<br>100           | 112<br>118             | Blister, tray<br>Tape and reel                           |                       |
|    | SOT1121C  | 20.6 x 9.8 x 4.1                     | 24<br>96            | 127<br>127             | Blister, tray<br>Blister, tray                           |                       |
|    | SOT1130A  | 20.3 x 9.8 x 4.2                     | 60                  | 112                    | Blister, tray                                            |                       |
|    | SOT1130B  | 9.8 x 9.8 x 4.2                      | 60                  | 112                    | Blister, tray                                            |                       |
|   | SOT1135A  | 20.3 x 9.8 x 4.1                     | 60<br>100           | 112<br>118             | Blister, tray<br>Reel                                    |                       |
|  | SOT1135B  | 9.8 x 9.8 x 4.2                      | 60                  | 112                    | Blister, tray                                            |                       |
|  | SOT1138-1 | 20.6 x 10 x 3.6                      | 100                 | 118                    | Tape and reel                                            | Plastic (OMP)         |
|  | SOT1179-1 | 6.0 x 4.0 x 0.9                      | 500                 | 135                    | Tape and reel                                            |                       |
|  | SOT1198-1 | 10.0 x 5.5 x 0.8                     | 1,000               | 115                    | Tape and reel                                            |                       |
|  | SOT1204-1 | 20.6 x 10 x 3.6                      | 100                 | 118                    | Tape and reel                                            |                       |
|  | SOT1209   | 2 x 1.3 x 0.35                       | 5,000               | 147                    | 8 mm tape and reel                                       |                       |
|  | SOT1230   | 1.1 x 0.0 x 0.37                     | 5,000               | 115                    | Reel                                                     |                       |
|  | SOT1242B  | 32.2 x 10 x 4.9                      | 100<br>15<br>60     | 115<br>127<br>127      | Tape and reel<br>Tube<br>Tube                            |                       |
|  | SOT1242C  | 32.2 x 10.2 x 4.9                    | 100<br>15<br>60     | 115<br>127<br>127      | Tape and reel<br>Tube<br>Tube                            | Air-cavity<br>ceramic |
|  | SOT1244B  | 20.6 x 9.8 x 4.1                     | 60<br>100           | 112<br>118             | Blister, traytape and reel<br>Blister, traytape and reel |                       |
|  | SOT1244C  | 20.6 x 9.8 x 4.1                     | 100<br>24<br>96     | 118<br>127<br>127      | Tape and reel<br>Tube<br>Tube                            |                       |
|  | SOT1211-1 | 20.6 x 10 x 3.6                      | 100                 | 118                    | Tape and reel                                            |                       |
|  | SOT1212-1 | 20.6 x 10 x 3.6                      | 100                 | 118                    | Tape and reel                                            | Plastic (OMP)         |
|  | SOT1214A  | 34 x 9.8 x 4.1                       | 60                  | 112                    | Blister, tray                                            | Air-cavity<br>ceramic |
|  | SOT1214B  | 20.6 x 9.8 x 4.1                     | 60                  | 112                    | Blister, tray                                            |                       |

|                                                                                    |           |                   |           |            |                                |                    |
|------------------------------------------------------------------------------------|-----------|-------------------|-----------|------------|--------------------------------|--------------------|
|    | SOT1221-1 | 20.6 x 10 x 3.6   | 100       | 118        | Tape and reel                  | Plastic (OMP)      |
|   | SOT1222-1 | 20.6 x 10 x 3.6   | 100       | 118        | Tape and reel                  |                    |
|   | SOT1223-1 | 20.6 x 10 x 3.6   | 100       | 118        | Tape and reel                  |                    |
|   | SOT1224-1 | 20.6 x 10 x 3.6   | 100       | 118        | Tape and reel                  |                    |
|                                                                                    | SOT1227A  | 14 x 4.1 x 2.9    | 60        | 112        | Blister, tray                  | Air-cavity ceramic |
|                                                                                    | SOT1227B  | 5.1 x 4.1 x 2.9   | 60        | 112        | Blister, tray                  |                    |
|                                                                                    | SOT1228A  | 29 x 5.8 x 4.7    | 60        | 112        | Blister, tray                  |                    |
|                                                                                    | SOT1228B  | 17.3 x 5.8 x 4.7  | 60        | 112        | Blister, tray                  |                    |
|                                                                                    | SOT1247B  | 32.3 x 10.2 x 4.9 | 60<br>100 | 112<br>118 | Blister, tray<br>Tape and reel |                    |
|   | SOT1250-1 | 32.3 x 10.2 x 4.5 | 60<br>100 | 112<br>118 | Blister, tray<br>Tape and reel | Air-cavity plastic |
|   | SOT1251-1 | 32.3 x 10.2 x 4.5 | 60<br>100 | 112<br>118 | Blister, tray<br>Tape and reel |                    |
|   | SOT1252-1 | 32.3 x 10.2 x 4.5 | 60<br>100 | 112<br>118 | Blister, tray<br>Tape and reel |                    |
|   | SOT1270-1 | 20.6 x 9.8 x 4.1  | 60<br>100 | 112<br>118 | Blister, tray<br>Tape and reel |                    |
|   | SOT1271-1 | 20.6 x 9.8 x 4.1  | 60<br>100 | 112<br>118 | Blister, tray<br>Tape and reel |                    |
|   | SOT1272-1 | 20.6 x 9.8 x 4.1  | 60<br>100 | 112<br>118 | Blister, tray<br>Tape and reel |                    |
|   | SOT1273-1 | 20.6 x 9.8 x 4.1  | 60<br>100 | 112<br>118 | Blister, tray<br>Tape and reel |                    |
|  | SOT1274-1 | 20.6 x 9.8 x 4.1  | 60<br>100 | 112<br>118 | Blister, tray<br>Tape and reel |                    |
|                                                                                    | SOT1275-1 | 20.6 x 9.8 x 4.1  | 60<br>100 | 112<br>118 | Blister, tray<br>Tape and reel |                    |

## 6.2 Marking codes

In general, device marking includes the part number, some manufacturing information, and the NXP logo. If packages are too small for the full-length part number, a shorter, coded part number – marking code – is used (where % = placeholder for manufacturing site code). The full-length part number is always printed on the packing label on the box or bulk-pack in which the devices are supplied.

p = made in Hong Kong

t = made in Malaysia

W = made in China

| Marking code | Type        | Package |
|--------------|-------------|---------|
| 1            | BA277       | SOD523  |
| 2            | BB182       | SOD523  |
| 4            | BB189       | SOD523  |
| 4            | BB189/L     | SOD523  |
| 7            | BA891       | SOD523  |
| 8            | BB178       | SOD523  |
| 9            | BB179       | SOD523  |
| %13          | BB207       | SOT23   |
| %1V          | BFR93AW/DG  | SOT323  |
| %1W          | BAP51-05W   | SOT323  |
| %3A          | BGA6289     | SOT89   |
| %4A          | BGA6489     | SOT89   |
| %5A          | BGA6589     | SOT89   |
| %6G          | PMBF4393    | SOT23   |
| %6J          | PMBF4391    | SOT23   |
| %6K          | PMBF4392    | SOT23   |
| %6K          | BGA7024     | SOT89   |
| %6L          | BGA7027     | SOT89   |
| %6N          | ON5088      | SOT343  |
| %6S          | PMBFJ176    | SOT23   |
| %6W          | PMBFJ175    | SOT23   |
| %6W          | BGA3012     | SOT89   |
| %6X          | PMBFJ174    | SOT23   |
| %6X          | BGA3015     | SOT89   |
| %6Y          | PMBFJ177    | SOT23   |
| %6Y          | BGA3018     | SOT89   |
| %7N          | ON5087      | SOT343  |
| %8N          | ON5089      | SOT343  |
| %AB          | BF1210      | SOT363  |
| %BG          | PMBFJ177/DG | SOT23   |
| %M1          | BF908       | SOT143  |
| %M2          | BF908R      | SOT143  |
| %M3          | BF909       | SOT143  |
| %M4          | BF909R      | SOT143  |
| %M5          | BF909A      | SOT143  |
| %M6          | BF909AR     | SOT143  |
| %M7          | BF904A      | SOT143  |
| %M8          | BF904AR     | SOT143  |
| %M9          | BSS83       | SOT143  |
| %M9          | ON4906      | SOT143  |
| %MA          | BF991       | SOT143  |
| %MB          | BF992       | SOT143  |
| %MC          | BF904       | SOT143  |
| %MD          | BF904R      | SOT143  |
| %ME          | BFG505      | SOT143  |
| %MF          | BFG520      | SOT143  |
| %MG          | BFG540      | SOT143  |
| %MH          | BFG590      | SOT143  |
| %MK          | BFG505/X    | SOT143  |
| %ML          | BFG520/X    | SOT143  |
| %MM          | BFG540/X    | SOT143  |
| %MM          | ON4832      | SOT143  |
| %MN          | BFG590/X    | SOT143  |
| %MP          | BFG520/XR   | SOT143  |
| %MP          | ON4973      | SOT143  |
| %MR          | BFG540/XR   | SOT143  |
| %MS          | BFG10       | SOT143  |
| %MT          | BFG10/X     | SOT143  |
| %MU          | BFG25A/X    | SOT143  |
| %MV          | BFG67/X     | SOT143  |
| %MW          | BFG92A/X    | SOT143  |
| %MX          | BFG93A/X    | SOT143  |

| Marking code | Type      | Package |
|--------------|-----------|---------|
| %MY          | BF1100    | SOT143  |
| %VA          | BGU7041   | SOT363  |
| %VB          | BGU7042   | SOT363  |
| 10%          | BAT18     | SOT23   |
| 1000 1001    | BB173LX   | SOD882D |
| 1000 1010    | BB174LX   | SOD882D |
| 1001 0001    | BAP1321LX | SOD882D |
| 1001 0010    | BAP142LX  | SOD882D |
| 1001 0011    | BAP50LX   | SOD882D |
| 1001 0100    | BAP51LX   | SOD882D |
| 1001 0101    | BAP63LX   | SOD882D |
| 1001 0110    | BAP65LX   | SOD882D |
| 1001 0111    | BB179BLX  | SOD882D |
| 1111 1111    | BAP64LX   | SOD882D |
| 1111 1011    | BAP55LX/A | SOD882D |
| 1111 1100    | BB179LX   | SOD882D |
| 1111 1101    | BAP55LX   | SOD882D |
| 1111 1110    | BB178LX   | SOD882D |
| 1A           | BGU6101   | SOT1209 |
| 1B           | BGU6102   | SOT1209 |
| 1B%          | BGA2717   | SOT363  |
| 1C           | BGU6104   | SOT1209 |
| 1C%          | BAP50-05  | SOT23   |
| 1E           | BGU8131   | SOT1209 |
| 1N%          | BAP70-04W | SOT323  |
| 2            | BB182/L   | SOD523  |
| 20%          | BF545A    | SOT23   |
| 21%          | BF545B    | SOT23   |
| 22%          | BF545C    | SOT23   |
| 24%          | BF556A    | SOT23   |
| 25%          | BF556B    | SOT23   |
| 26%          | BF556C    | SOT23   |
| 28%          | BF861A    | SOT23   |
| 29%          | BF861B    | SOT23   |
| 2A%          | BF862     | SOT23   |
| 2E           | PRF949/DG | SOT416  |
| 2L           | BF1208    | SOT666  |
| 30%          | BF861C    | SOT23   |
| 31%          | BFR505    | SOT23   |
| 32%          | BFR520    | SOT23   |
| 33%          | BFR540    | SOT23   |
| 34%          | BFT25A    | SOT23   |
| 35%          | ON4288    | SOT23   |
| 36%          | ON4690    | SOT23   |
| 38%          | PMBFJ108  | SOT23   |
| 39%          | PMBFJ109  | SOT23   |
| 40%          | PMBFJ110  | SOT23   |
| 41%          | PMBFJ111  | SOT23   |
| 42%          | PMBFJ112  | SOT23   |
| 47%          | PMBFJ113  | SOT23   |
| 48%          | PMBFJ308  | SOT23   |
| 49%          | PMBFJ309  | SOT23   |
| 4A           | BF1208D   | SOT666  |
| 4H           | BB179     | SOD323  |
| 4J           | BB171     | SOD323  |
| 4K           | BB172     | SOD323  |
| 4K%          | BAP64-04  | SOT23   |
| 4L%          | BAP50-04  | SOT23   |
| 4W%          | BAP64-04W | SOT323  |
| 50%          | PMBFJ310  | SOT23   |
| 5K%          | BAP64-05  | SOT23   |
| 5W%          | BAP64-05W | SOT323  |

| Marking code | Type       | Package |
|--------------|------------|---------|
| 6F%          | BAP1321-04 | SOT23   |
| 6K%          | BAP64-06   | SOT23   |
| 6W%          | BAP50-04W  | SOT323  |
| 7            | BA891/L    | SOD523  |
| 7K%          | BAP65-05   | SOT23   |
| 8            | BB178/L    | SOD523  |
| 8K%          | BAP70-05   | SOT23   |
| 9            | BB179/L    | SOD523  |
| A            | BGU8009    | SOT1230 |
| A1           | BA591      | SOD323  |
| A1           | BB208-02   | SOD523  |
| A1           | BGA2001    | SOT343  |
| A1           | BAP64Q     | SOT753  |
| A2           | BB208-03   | SOD323  |
| A2           | BB184      | SOD523  |
| A2           | BGA2002    | SOT343  |
| A2           | BAP70Q     | SOT753  |
| A2%          | BGA2022    | SOT363  |
| A3           | BAP64-03   | SOD323  |
| A3           | BB198      | SOD523  |
| A3           | BGA2003    | SOT343  |
| A3%          | BGA2031/1  | SOT363  |
| A5           | BAP51-03   | SOD323  |
| A5%          | BGA2011    | SOT363  |
| A6%          | BGA2012    | SOT363  |
| A8           | BAP50-03   | SOD323  |
| A8%          | BFG325W/XR | SOT343  |
| A8%          | PMBFJ620   | SOT363  |
| A9           | BAP70-03   | SOD323  |
| AC           | BGU7005    | SOT886  |
| B3           | BGU7003    | SOT891  |
| B5%          | BSR12      | SOT23   |
| B5%          | BFG425W/B  | SOT343  |
| B6           | BGU7007    | SOT886  |
| B6%          | BGA2715    | SOT363  |
| B7           | BGU7008    | SOT886  |
| B7%          | BF862/B    | SOT23   |
| B7%          | BFU725F/N1 | SOT343  |
| B7%          | BGA2716    | SOT363  |
| BA%          | BGA2714    | SOT363  |
| BC%          | BFQ591     | SOT89   |
| BFG135       | BFG135     | SOT223  |
| BFG198       | BFG198     | SOT223  |
| BFG31        | BFG31      | SOT223  |
| BFG35        | BFG35      | SOT223  |
| BFG541       | BFG541     | SOT223  |
| BFG591       | BFG591     | SOT223  |
| BFG94        | BFG94      | SOT223  |
| BFG97        | BFG97      | SOT223  |
| BLT50        | BLT50      | SOT223  |
| BLT70        | BLT70      | SOT223  |
| BLT80        | BLT80      | SOT223  |
| BLT81        | BLT81      | SOT223  |
| C            | BB179B     | SOD523  |
| C1%          | BGM1011    | SOT363  |
| C2%          | BGM1012    | SOT363  |
| C4%          | BGM1013    | SOT363  |
| C5%          | BGM1014    | SOT363  |
| CE           | BB173      | SOD523  |
| CF           | BB174      | SOD523  |
| CH           | BB175      | SOD523  |
| D1           | BFU610F    | SOT343  |



| Marking code | Type           | Package |
|--------------|----------------|---------|
| D2           | BAP63-03       | SOD323  |
| D2           | BFU630F        | SOT343  |
| D3           | BAP65-03       | SOD323  |
| D3           | BFU660F        | SOT343  |
| D4           | BFU690F        | SOT343  |
| D5           | BFU710F        | SOT343  |
| D6           | BFU730F        | SOT343  |
| D7           | BFU760F        | SOT343  |
| D8           | BFU790F        | SOT343  |
| D9%          | BFG425W/DG/B2  | SOT343  |
| DG%          | PBR951/A2      | SOT23   |
| E1%          | BFS17          | SOT23   |
| E1%          | BFS17/FD       | SOT23   |
| E1%          | ON4438         | SOT23   |
| E1%          | BFS17W         | SOT323  |
| E2%          | BFS17A         | SOT23   |
| E2%          | ON5023         | SOT23   |
| E2%          | BGA2712        | SOT363  |
| E3%          | BGA2709        | SOT363  |
| FB           | BFQ19          | SOT89   |
| FF           | BFQ18A         | SOT89   |
| FG           | BFQ149         | SOT89   |
| G2           | BA278          | SOD523  |
| G2%          | BGA2711        | SOT363  |
| G3%          | BGA2748        | SOT363  |
| G4%          | BGA2771        | SOT363  |
| G5%          | BGA2776        | SOT363  |
| JR           | BB156/DG/B2    | SOD323  |
| JS           | BAP64-03/DG/B2 | SOD323  |
| K1           | BAP51-02       | SOD523  |
| K2           | BAP51-05W      | SOD523  |
| K4           | BAP50-02       | SOD523  |
| K5           | BAP63-02       | SOD523  |
| K6           | BAP65-02       | SOD523  |
| K7           | BAP1321-02     | SOD523  |
| K8           | BAP70-02       | SOD523  |
| K9           | BB199          | SOD523  |
| L2           | BB202          | SOD523  |
| L2%          | BF1203         | SOT363  |
| L3%          | BF1204         | SOT363  |
| L4%          | BF1205         | SOT363  |
| L6%          | BF1206         | SOT363  |
| L8           | BA792          | SOD110  |
| L9%          | BF1208         | SOT363  |
| LA           | BF1201WR       | SOT343  |
| LA%          | BF1201         | SOT143  |
| LB%          | BF1201R        | SOT143  |
| LB%          | PBR941B        | SOT23   |
| LD%          | BF1202         | SOT143  |
| LD%          | BF1202/L       | SOT143  |
| LE           | BF1202WR       | SOT343  |
| LE           | BF1202WR/L     | SOT343  |
| LE%          | BF1202R        | SOT143  |
| LF%          | BF1211         | SOT143  |
| LG%          | BF1212         | SOT143  |
| LH%          | BF1211R        | SOT143  |
| LJ%          | BGU7044        | SOT363  |
| LK%          | BF1212R        | SOT143  |
| LK%          | BGU7045        | SOT363  |
| LP%          | BGA2867        | SOT363  |
| LR%          | BGA2874        | SOT363  |
| LS%          | BGA2817        | SOT363  |
| M1%          | BFR30          | SOT23   |
| M2%          | BFR31          | SOT23   |
| M2%          | BF1207         | SOT363  |
| M26          | BF908          | SOT143  |
| M27          | BF908R         | SOT143  |
| M28          | BF909          | SOT143  |
| M29          | BF909R         | SOT143  |
| M3%          | BFT46          | SOT23   |
| M33          | BF909A         | SOT143  |
| M34          | BF909AR        | SOT143  |
| M4%          | BSR56          | SOT23   |
| M41          | BF904A         | SOT143  |
| M42          | BF904AR        | SOT143  |
| M5%          | BSR57          | SOT23   |
| M5%          | BF1216         | SOT363  |
| M56          | BF1100         | SOT143  |
| M6%          | BSR58          | SOT23   |
| M7%          | BF1218         | SOT363  |
| M74          | BSS83          | SOT143  |

| Marking code | Type         | Package |
|--------------|--------------|---------|
| M74          | ON4906       | SOT143  |
| M91          | BF991        | SOT143  |
| M92          | BF992        | SOT143  |
| MA%          | BGA2802      | SOT363  |
| MB           | BF998WR      | SOT343  |
| MB%          | BGA2803      | SOT363  |
| MC           | BF904WR      | SOT343  |
| MC%          | BGA2851      | SOT363  |
| MD           | BF908WR      | SOT343  |
| MD%          | BGA2869      | SOT363  |
| ME           | BF909WR      | SOT343  |
| MF           | BF1100WR     | SOT343  |
| MG           | BF909AWR     | SOT343  |
| MG%          | BF994S       | SOT143  |
| MH           | BF904AWR     | SOT343  |
| MH%          | BF996S       | SOT143  |
| MK           | BF1211WR     | SOT343  |
| ML           | BF1212WR     | SOT343  |
| ML           | BF1212WR/L   | SOT343  |
| MO%          | BF998        | SOT143  |
| MO%          | BF998R       | SOT143  |
| MO4          | BF904        | SOT143  |
| MO6          | BF904R       | SOT143  |
| MQ%          | BFR106/DG/B2 | SOT23   |
| MS%          | BFR92A/DG/B2 | SOT23   |
| MT%          | BF862/DG/B2  | SOT23   |
| MV%          | BFR30/DG/B2  | SOT23   |
| N            | BB181        | SOD523  |
| N0           | BF9505T      | SOT416  |
| N0%          | BFS505       | SOT323  |
| N0%          | BFM505       | SOT363  |
| N2           | BFR520T      | SOT416  |
| N2%          | BFS520       | SOT323  |
| N2%          | ON5030       | SOT323  |
| N2%          | BFM520       | SOT363  |
| N3           | BFG520W      | SOT343  |
| N33          | BFG505       | SOT143  |
| N36          | BFG520       | SOT143  |
| N37          | BFG540       | SOT143  |
| N38          | BFG590       | SOT143  |
| N39          | BFG505/X     | SOT143  |
| N4           | BFG520W/X    | SOT343  |
| N4           | BFQ540       | SOT89   |
| N4%          | BFS540       | SOT323  |
| N42          | BFG520/X     | SOT143  |
| N43          | BFG540/X     | SOT143  |
| N43          | ON4832       | SOT143  |
| N44          | BFG590/X     | SOT143  |
| N48          | BFG520/XR    | SOT143  |
| N49          | BFG540/XR    | SOT143  |
| N6%          | BFS25A       | SOT323  |
| N7           | BFG540W/X    | SOT343  |
| N70          | BFG10        | SOT143  |
| N71          | BFG10/X      | SOT143  |
| N8           | BFG540W/XR   | SOT343  |
| N9           | BFG540W      | SOT343  |
| N9%          | BAP70AM      | SOT363  |
| NA           | BF1105WR     | SOT343  |
| NA%          | BF1105R      | SOT143  |
| NC           | BF1101WR     | SOT343  |
| ND           | BFG424W      | SOT343  |
| NE           | BFG424F      | SOT343  |
| NE%          | BF1105       | SOT143  |
| NG%          | BF1108       | SOT143  |
| NG%          | BF1108/L     | SOT143  |
| NH%          | BF1108R      | SOT143  |
| NL%          | BFR94A       | SOT23   |
| none         | BFR540       | SOT143  |
| ON5026       | ON5026       | SOT223  |
| ON5046       | ON5046       | SOT223  |
| P1           | BB131        | SOD323  |
| P1           | BFG21W       | SOT343  |
| P2%          | BFR92A       | SOT23   |
| P2%          | ON4640       | SOT23   |
| P2%          | BFR92AW      | SOT323  |
| P3           | BFG403W      | SOT343  |
| P4           | BFG410W      | SOT343  |
| P5           | BB135        | SOD323  |
| P5           | BFG425W      | SOT343  |
| P6           | BFG480W      | SOT343  |
| P8           | BB148        | SOD323  |

| Marking code | Type                | Package |
|--------------|---------------------|---------|
| P9           | BB149               | SOD323  |
| PB           | BB152               | SOD323  |
| PC           | BB153               | SOD323  |
| PF           | BB156               | SOD323  |
| PL           | BB149A              | SOD323  |
| R2%          | BFR93A              | SOT23   |
| R2%          | BFR93AW             | SOT323  |
| R5%          | BFR93AR             | SOT23   |
| R7%          | BFR106              | SOT23   |
| R8%          | BFG93A              | SOT143  |
| S            | BAP64-02            | SOD523  |
| S2%          | BFG325/XR           | SOT143  |
| S2%          | BBY40               | SOT23   |
| S3%          | BF1107              | SOT23   |
| S6%          | BF510               | SOT23   |
| S7%          | BF511               | SOT23   |
| S8%          | BF512               | SOT23   |
| S9%          | BF513               | SOT23   |
| SB%          | BF1214              | SOT363  |
| SB%          | BF1214/L            | SOT363  |
| SC%          | BB201               | SOT23   |
| SC%          | BGU7031             | SOT363  |
| SD%          | BGU7032             | SOT363  |
| SE%          | BGU7033             | SOT363  |
| T5           | BFG10W/X            | SOT343  |
| UW           | BGU7003W            | SOT886  |
| UY           | BGU7004             | SOT886  |
| UZ           | BGU8007             | SOT886  |
| V0%          | PBR941              | SOT23   |
| V0%          | PRF947              | SOT323  |
| V1           | BFG25AW/X           | SOT343  |
| V1%          | BFT25               | SOT23   |
| V11          | BFG25A/X            | SOT143  |
| V12          | BFG67/X             | SOT143  |
| V14          | BFG92A/X            | SOT143  |
| V15          | BFG93A/X            | SOT143  |
| V2%          | BFQ67               | SOT23   |
| V2%          | ON5042              | SOT23   |
| V2%          | BFG67W              | SOT323  |
| V3%          | BFG67               | SOT143  |
| V4%          | BAP64-06W           | SOT323  |
| V6%          | BAP65-05W           | SOT323  |
| V8           | BAP1321-03          | SOD323  |
| VA           | BF1217WR            | SOT343  |
| VB           | BF1118W             | SOT343  |
| VC           | BF1118WR            | SOT343  |
| VC%          | BF1118              | SOT143  |
| VD%          | BF1118R             | SOT143  |
| W1           | BF1102              | SOT363  |
| W1%          | BFT92               | SOT23   |
| W1%          | BFT92W              | SOT323  |
| W2%          | PBR951              | SOT23   |
| W2%          | PRF957              | SOT323  |
| W2%          | BF1102R             | SOT363  |
| W4%          | BAP50-05W           | SOT323  |
| W6%          | BAP51-04W           | SOT323  |
| W7%          | BAP51-06W           | SOT323  |
| W9%          | BAP63-05W           | SOT323  |
| X            | BB187               | SOD523  |
| X            | BB187/L             | SOD523  |
| X1%          | BFT93               | SOT23   |
| X1%          | BFT93W              | SOT323  |
| XC%          | BAP70-04W/<br>DG/B2 | SOT323  |
| XG%          | BFR94AW             | SOT323  |
| Y3           | BAP70-02/<br>DG/B2  | SOD523  |
| Y4           | BAP64-02/<br>DG/B2  | SOD523  |
| YB           | BGU8009             | SOT886  |
| YC%          | BGA2870             | SOT363  |
| Z            | BB145B              | SOD523  |
| ZA%          | BFU668F             | SOT343  |
| ZB%          | BFU768F             | SOT343  |
| ZD           | BFU730LX            | SOT883  |
| ZK%          | ON5052              | SOT23   |
| ZY%          | PMBFJ620/A2         | SOT363  |

# 7. Abbreviations

|             |                                                                     |            |                                                                                      |
|-------------|---------------------------------------------------------------------|------------|--------------------------------------------------------------------------------------|
| 3-way       | Doherty design using three discrete transistors                     | MHz        | MegaHertz                                                                            |
| ACC         | Air Cavity Ceramic                                                  | MIM        | Metal Insulator Metal                                                                |
| AM          | Amplitude Modulation                                                | MMIC       | Monolithic Microwave Integrated Circuit                                              |
| ASIC        | Application Specific Integrated Circuit                             | MMPP       | Main and peak devices realized separately in halves of push-pull transistor          |
| ASYM        | Asymmetrical design of Doherty (main and peak device are different) | MPPM       | Main and peak device realized in same push-pull transistor (2 times)                 |
| BiCMOS      | Bipolar Complementary Metal-Oxide Semiconductor                     | MoCA       | Multimedia over Coax Alliance                                                        |
| BS diode    | Band switch diode                                                   | MOSFET     | Metal-Oxide-Semiconductor Field-Effect Transistor                                    |
| BPF         | Band Pass Filter                                                    | MPA        | Medium Power Amplifier                                                               |
| BUC         | Block Upconverter                                                   | MRI        | Magnetic Resonance Imaging                                                           |
| CATV        | Community Antenna Television                                        | NF         | Noise Figure                                                                         |
| CATV PD     | CATV power doubler                                                  | NIM        | Network Interface Module                                                             |
| CATV PPA    | CATV push-pull amplifier                                            | NMR        | Nuclear Magnetic Resonance                                                           |
| CATV PPA/HG | CATV push-pull amplifier high gain                                  | OMP        | Over-Molded Plastic                                                                  |
| CATV RA     | CATV reverse amplifier                                              | OPEX       | Operating Expense                                                                    |
| CATV OR     | CATV optical receiver                                               | PA         | Power Amplifier                                                                      |
| CDMA        | Code Division Multiple Access                                       | PAD        | Single Package Asymmetric Doherty                                                    |
| CMMB        | Chinese Multimedia Mobile Broadcasting                              | PAR        | Peak-to-Average Ratio                                                                |
| CMOS        | Complementary Metal Oxide Semiconductor                             | PEP        | Peak Envelope Power                                                                  |
| CQS         | Customer Qualification Samples                                      | pHEMT      | pseudomorphic High Electron Mobility Transistor                                      |
| CSO         | Composite Second Order beat                                         | PLL        | Phase-Locked Loop                                                                    |
| CTB         | Composite Triple Beat                                               | QUBiC      | Quality BiCMOS                                                                       |
| CW          | Continuous Waveform                                                 | RF         | Radio Frequency                                                                      |
| DAB         | Digital Audio Broadcasting                                          | RFP trs    | RF power transistor                                                                  |
| dB          | Decible                                                             | RFS        | Release For Supply                                                                   |
| DECT        | Digital Enhanced Cordless Telecommunications                        | RF4CE      | Radio Frequency for Consumer Electronics                                             |
| DEV         | Development                                                         | RoHS       | Restriction of Hazardous Substances                                                  |
| DiSEqC      | Digital Satellite Equipment Control                                 | Rx         | Receive                                                                              |
| DOCSIS      | Data Over Cable Service Interface Specification                     | SARFT      | State Administration For Radio, Film, and Television                                 |
| DPD         | Division of Parasitic Diseases                                      | SDARS      | Satellite Digital Audio Radio Service                                                |
| DSB         | Digital Signal Processor                                            | SER        | Serializer                                                                           |
| DVB         | Digital Video Broadcasting                                          | SiGe:C     | Sillicon Germanium Carbon                                                            |
| EDGE        | Enhanced Data Rates for GSM Evolution                               | SMATV      | Satellite Master Antenna Television                                                  |
| ESD         | ElectroStatic Device                                                | SMD        | Surface-Mounted Device                                                               |
| FET         | Field-Effect Transistor                                             | SOD        |                                                                                      |
| FM          | Frequency Modulation                                                | SOT        |                                                                                      |
| Freq        | Frequency                                                           | SPDT       | Single Pole, Double Throw                                                            |
| GaAs        | Gallium Arsenide                                                    | SYM        | Symmetrical design of Doherty (main and peak device are the same type of transistor) |
| GaN         | Gallium Nitride                                                     | TDD        | Time-Division Duplexing                                                              |
| Gen         | Generation                                                          | TD-SCDMA   | Time Division-Synchronous Code Division Multiple Access                              |
| GHz         | GigaHertz                                                           | TCAS       | Traffic Collision Avoidance Systems                                                  |
| GNSS        | Global Navigation Satellite System                                  | TMA        | Tower Mounted Amplifier                                                              |
| GPS         | Global Positioning System                                           | TTF        | Time To First Fix                                                                    |
| GSM         | Global System for Mobile communications                             | TTL        | Transistor-Transistor Logic                                                          |
| HBM         | Human Body Model                                                    | Tx         | Transmit                                                                             |
| HBT         | Heterojunction Bipolar Transistor                                   | uA         | Microamp                                                                             |
| HDTV        | High-Definition Television                                          | UHF        | Ultra High Frequency (470-860 MHz)                                                   |
| HF          | High Frequency (3-30 MHz)                                           | UMTS       | Universal Mobile Telecommunications System                                           |
| HFC         | Hybrid Fiber Coax                                                   | V          | Volt                                                                                 |
| HFET        | Heterostructure Field-Effect Transistor                             | Varicap    | Varicap diode                                                                        |
| HPA         | High Power Amplifier                                                | VCO        | Voltage-Controlled Oscillator                                                        |
| HVQFN       | Plastic thermally enhanced Very thin Quad Flat pack No leads        | VDMOS      | Vertical Double-diffused Metal Oxide Semiconductor                                   |
| IEEE        | Institute of Electrical and Electronics Engineers                   | VGA        | Variable-Gain Amplifier                                                              |
| IF          | Intermediate Frequency                                              | VHF        | Very High Frequency (30-300 MHz)                                                     |
| IQ          | Digital I and Q data                                                | VoIP       | Voice over Internet Protocol                                                         |
| ISM         | Industrial, Scientific, Medical - reserved frequency bands          | VSAT       | Very Small Aperture Terminal                                                         |
| JFET        | Junction Field-Effect Transistor                                    | W          | Watt                                                                                 |
| kW          | KiloWatt                                                            | WB trs 1-4 | Wideband transistor 1-4 generation                                                   |
| LDMOS       | Laterally Diffused Metal-Oxide-Semiconductor                        | WB trs 5-7 | Wideband transistor 5-7 generation                                                   |
| LNA         | Low-Noise Amplifier                                                 | WCDMA      | Wideband Code Division Multiple Access                                               |
| LNB         | Low-Noise Block                                                     | WiFi       | Wireless Fidelity                                                                    |
| LO          | Local Oscillator                                                    | WiMAX      | Worldwide interoperability for Microwave Access                                      |
| LPF         | Low Pass Filter                                                     | WLAN       | Wireless Local Area Network                                                          |
| LTE         | Long-Term Evolution                                                 | WL-CSP     | Wafer-Level Chip-Scale Package                                                       |
| mA          | Milliamp                                                            |            |                                                                                      |
| MESFET      | Metal Semiconductor Field-Effect Transistor                         |            |                                                                                      |

## 8. Contacts and web links

How to contact your authorized distributor or local NXP representative.

### Authorized distributors

#### Asia Pacific:

[http://www.nxp.com/profile/sales/asia\\_pacific\\_dist](http://www.nxp.com/profile/sales/asia_pacific_dist)

#### Europe/Africa/Middle East:

[http://www.nxp.com/profile/sales/europe\\_dist](http://www.nxp.com/profile/sales/europe_dist)

#### North America:

[http://www.nxp.com/profile/sales/northamerica\\_dist](http://www.nxp.com/profile/sales/northamerica_dist)

### Local NXP offices

#### Asia Pacific:

[http://www.nxp.com/profile/sales/asia\\_pacific](http://www.nxp.com/profile/sales/asia_pacific)

#### Europe/Africa/Middle East:

<http://www.nxp.com/profile/sales/europe>

#### North America:

<http://www.nxp.com/profile/sales/northamerica>

### Web links

#### NXP Semiconductors:

<http://www.nxp.com>

#### NXP RF Manual web page:

<http://www.nxp.com/rfmanual>

#### NXP RF products:

<http://www.nxp.com/rf>

#### NXP application notes:

<http://www.nxp.com/technical-support-portal/50812/50961>

#### NXP cross-references:

<http://www.nxp.com/xref/nxp/>

#### NXP packaging:

<http://www.nxp.com/package>

#### NXP end-of-life:

<http://www.nxp.com/products/eol>

#### NXP quality handbook:

<http://www.standardics.nxp.com/quality/handbook>

#### NXP literature:

<http://www.nxp.com/products/discretes/documentation>

#### NXP sales offices and distributors:

<http://www.nxp.com/profile/sales>

# 9. Product index

| Type       | Portfolio chapter | Type     | Portfolio chapter | Type       | Portfolio chapter | Type       | Portfolio chapter |
|------------|-------------------|----------|-------------------|------------|-------------------|------------|-------------------|
| 1PS10SB82  | 3.2.4             | BAT17    | 3.2.4             | BFG10/X    | 3.3.1             | BFR106     | 3.3.1             |
| 1PS66SB17  | 3.2.4             | BAT18    | 3.2.3             | BFG10W/X   | 3.3.1             | BFR30      | 3.5.1             |
| 1PS66SB82  | 3.2.4             | BB131    | 3.2.1             | BFG135     | 3.3.1             | BFR31      | 3.5.1             |
| 1PS70SB82  | 3.2.4             | BB135    | 3.2.1             | BFG198     | 3.3.1             | BFR505     | 3.3.1             |
| 1PS70SB84  | 3.2.4             | BB145B   | 3.2.1             | BFG21W     | 3.3.1             | BFR505T    | 3.3.1             |
| 1PS70SB85  | 3.2.4             | BB156    | 3.2.1             | BFG25A/X   | 3.3.1             | BFR520     | 3.3.1             |
| 1PS70SB86  | 3.2.4             | BB170    | 3.2.1             | BFG25AW    | 3.3.1             | BFR520T    | 3.3.1             |
| 1PS76SB17  | 3.2.4             | BB171    | 3.2.1             | BFG25AW/X  | 3.3.1             | BFR540     | 3.3.1             |
| 1PS79SB17  | 3.2.4             | BB172    | 3.2.1             | BFG31      | 3.3.1             | BFR92A     | 3.3.1             |
| 1PS88SB82  | 3.2.4             | BB173    | 3.2.1             | BFG310/XR  | 3.3.1             | BFR92AW    | 3.3.1             |
| BA591      | 3.2.3             | BB173LX  | 3.2.1             | BFG310W/XR | 3.3.1             | BFR93A     | 3.3.1             |
| BA891      | 3.2.3             | BB174    | 3.2.1             | BFG325/XR  | 3.3.1             | BFR93AR    | 3.3.1             |
| BAP1321-02 | 3.2.2             | BB174LX  | 3.2.1             | BFG325W/XR | 3.3.1             | BFR93AW    | 3.3.1             |
| BAP1321-03 | 3.2.2             | BB175    | 3.2.1             | BFG35      | 3.3.1             | BFR94A     | 3.3.1             |
| BAP1321-04 | 3.2.2             | BB181    | 3.2.1             | BFG403W    | 3.3.1             | BFR94AW    | 3.3.1             |
| BAP1321LX  | 3.2.2             | BB198    | 3.2.1             | BFG410W    | 3.3.1             | BFS17      | 3.3.1             |
| BAP142LX   | 3.2.2             | BB199    | 3.2.1             | BFG424F    | 3.3.1             | BFS17A     | 3.3.1             |
| BAP50-02   | 3.2.2             | BB201    | 3.2.1             | BFG424W    | 3.3.1             | BFS17W     | 3.3.1             |
| BAP50-03   | 3.2.2             | BB202    | 3.2.1             | BFG425W    | 3.3.1             | BFS25A     | 3.3.1             |
| BAP50-04   | 3.2.2             | BB207    | 3.2.1             | BFG480W    | 3.3.1             | BFS505     | 3.3.1             |
| BAP50-04W  | 3.2.2             | BB208-02 | 3.2.1             | BFG505     | 3.3.1             | BFS520     | 3.3.1             |
| BAP50-05   | 3.2.2             | BB208-03 | 3.2.1             | BFG505/X   | 3.3.1             | BFS540     | 3.3.1             |
| BAP50-05W  | 3.2.2             | BBY40    | 3.2.1             | BFG505W    | 3.3.1             | BFT25      | 3.3.1             |
| BAP50LX    | 3.2.2             | BF1105R  | 3.5.2             | BFG505W/X  | 3.3.1             | BFT25A     | 3.3.1             |
| BAP51-02   | 3.2.2             | BF1107   | 3.5.2             | BFG505W/XR | 3.3.1             | BFT46      | 3.5.1             |
| BAP51-03   | 3.2.2             | BF1108   | 3.5.2             | BFG520     | 3.3.1             | BFT92      | 3.3.1             |
| BAP51-04W  | 3.2.2             | BF1108R  | 3.5.2             | BFG520/X   | 3.3.1             | BFT92W     | 3.3.1             |
| BAP51-05W  | 3.2.2             | BF1108W  | 3.5.2             | BFG520/XR  | 3.3.1             | BFT93      | 3.3.1             |
| BAP51-06W  | 3.2.2             | BF1108WR | 3.5.2             | BFG520W    | 3.3.1             | BFT93W     | 3.3.1             |
| BAP51LX    | 3.2.2             | BF1118   | 3.5.2             | BFG520W/X  | 3.3.1             | BFU610F    | 3.3.1             |
| BAP55LX    | 3.2.2             | BF1118R  | 3.5.2             | BFG540     | 3.3.1             | BFU630F    | 3.3.1             |
| BAP63-02   | 3.2.2             | BF1118W  | 3.5.2             | BFG540/X   | 3.3.1             | BFU660F    | 3.3.1             |
| BAP63-03   | 3.2.2             | BF1118WR | 3.5.2             | BFG540/XR  | 3.3.1             | BFU690F    | 3.3.1             |
| BAP63-05W  | 3.2.2             | BF510    | 3.5.1             | BFG540W    | 3.3.1             | BFU710F    | 3.3.1             |
| BAP63LX    | 3.2.2             | BF511    | 3.5.1             | BFG540W/X  | 3.3.1             | BFU7258    | 3.4.1             |
| BAP64-02   | 3.2.2             | BF512    | 3.5.1             | BFG540W/XR | 3.3.1             | BFU725F/N1 | 3.3.1             |
| BAP64-03   | 3.2.2             | BF513    | 3.5.1             | BFG541     | 3.3.1             | BFU730F    | 3.3.1             |
| BAP64-04   | 3.2.2             | BF545A   | 3.5.1             | BFG590     | 3.3.1             | BFU730LX   | 3.3.1             |
| BAP64-04W  | 3.2.2             | BF545B   | 3.5.1             | BFG590/X   | 3.3.1             | BFU760F    | 3.3.1             |
| BAP64-05   | 3.2.2             | BF545C   | 3.5.1             | BFG591     | 3.3.1             | BFU768F    | 3.3.1             |
| BAP64-05W  | 3.2.2             | BF556A   | 3.5.1             | BFG67      | 3.3.1             | BFU790F    | 3.3.1             |
| BAP64-06   | 3.2.2             | BF861A   | 3.5.1             | BFG67/X    | 3.3.1             | BGA2001    | 3.4.1             |
| BAP64-06W  | 3.2.2             | BF861B   | 3.5.1             | BFG92A/X   | 3.3.1             | BGA2002    | 3.4.1             |
| BAP64LX    | 3.2.2             | BF861C   | 3.5.1             | BFG93A     | 3.3.1             | BGA2003    | 3.4.1             |
| BAP64Q     | 3.2.2             | BF862    | 3.5.1             | BFG93A/X   | 3.3.1             | BGA2011    | 3.4.1             |
| BAP65-02   | 3.2.2             | BF908    | 3.5.2             | BFG94      | 3.3.1             | BGA2012    | 3.4.1             |
| BAP65-03   | 3.2.2             | BF908R   | 3.5.2             | BFG97      | 3.3.1             | BGA2022    | 3.4.1             |
| BAP65-05   | 3.2.2             | BF908WR  | 3.5.2             | BFM505     | 3.3.1             | BGA2031/1  | 3.4.1             |
| BAP65-05W  | 3.2.2             | BF991    | 3.5.2             | BFM520     | 3.3.1             | BGA2709    | 3.4.1             |
| BAP65LX    | 3.2.2             | BF992    | 3.5.2             | BFQ149     | 3.3.1             | BGA2712    | 3.4.1             |
| BAP70-02   | 3.2.2             | BF994S   | 3.5.2             | BFQ18A     | 3.3.1             | BGA2714    | 3.4.1             |
| BAP70-03   | 3.2.2             | BF996S   | 3.5.2             | BFQ19      | 3.3.1             | BGA2715    | 3.4.1             |
| BAP70-04W  | 3.2.2             | BF998    | 3.5.2             | BFQ540     | 3.3.1             | BGA2716    | 3.4.1             |
| BAP70-05   | 3.2.2             | BF998R   | 3.5.2             | BFQ591     | 3.3.1             | BGA2717    | 3.4.1             |
| BAP70AM    | 3.2.2             | BF998WR  | 3.5.2             | BFQ67      | 3.3.1             | BGA2748    | 3.4.1             |
| BAP70Q     | 3.2.2             | BFG10    | 3.3.1             | BFQ67W     | 3.3.1             | BGA2776    | 3.4.1             |

| Type     | Portfolio chapter | Type              | Portfolio chapter | Type                | Portfolio chapter | Type               | Portfolio chapter |
|----------|-------------------|-------------------|-------------------|---------------------|-------------------|--------------------|-------------------|
| BGA2800  | 3.4.1             | BGU7033           | 3.4.1             | BLF2043F            | 3.7.2.1           | BLF7G20LS-140P     | 3.7.1.3           |
| BGA2801  | 3.4.1             | BGU7041           | 3.4.1             | BLF2425M6L(S)180P   | 3.7.2.3           | BLF7G21L(S)-160P   | 3.7.1.3           |
| BGA2802  | 3.4.1             | BGU7042           | 3.4.1             | BLF2425M7L(S)140    | 3.7.2.3           | BLF7G21LS-160      | 3.7.1.3           |
| BGA2803  | 3.4.1             | BGU7044           | 3.4.1             | BLF2425M7L(S)250P   | 3.7.2.3           | BLF7G22L(S)-100P   | 3.7.1.4           |
| BGA2815  | 3.4.1             | BGU7045           | 3.4.1             | BLF25M612(G)        | 3.7.2.3           | BLF7G22L(S)-130    | 3.7.1.4           |
| BGA2816  | 3.4.1             | BGU7051           | 3.4.1             | BLF369              | 3.7.2.1           | BLF7G22L(S)-160    | 3.7.1.4           |
| BGA2817  | 3.4.1             | BGU7052           | 3.4.1             | BLF571              | 3.7.2.1           | BLF7G22L(S)-200    | 3.7.1.4           |
| BGA2818  | 3.4.1             | BGU7053           | 3.4.1             | BLF573(S)           | 3.7.2.1           | BLF7G22L(S)-250P   | 3.7.1.4           |
| BGA2850  | 3.4.1             | BGU7060           | 3.4.1             | BLF574              | 3.7.2.1           | BLF7G24L(S)-100    | 3.7.1.5           |
| BGA2851  | 3.4.1             | BGU7061           | 3.4.1             | BLF574XR(S)         | 3.7.2.1           | BLF7G24L(S)-140    | 3.7.1.5           |
| BGA2865  | 3.4.1             | BGU7062           | 3.4.1             | BLF578              | 3.7.2.1           | BLF7G24L(S)-160P   | 3.7.1.5           |
| BGA2866  | 3.4.1             | BGU7063           | 3.4.1             | BLF578XR(S)         | 3.7.2.1           | BLF7G27L-135       | 3.7.1.6           |
| BGA2867  | 3.4.1             | BGU7224           | 3.4.1             | BLF640              | 3.7.2.1           | BLF7G27L-200PB     | 3.7.1.6           |
| BGA2869  | 3.4.1             | BGU7258           | 3.4.1             | BLF642              | 3.7.2.1           | BLF7G27L(S)-100    | 3.7.1.6           |
| BGA2870  | 3.4.1             | BGU8006           | 3.4.1             | BLF644P             | 3.7.2.1           | BLF7G27L(S)-140    | 3.7.1.6           |
| BGA2874  | 3.4.1             | BGU8007           | 3.4.1             | BLF645              | 3.7.2.1           | BLF7G27L(S)-150P   | 3.7.1.6           |
| BGA3012  | 3.4.1             | BGU8009           | 3.4.1             | BLF647              | 3.7.2.1           | BLF7G27L(S)-75P    | 3.7.1.6           |
| BGA3015  | 3.4.1             | BGU8010           | 3.4.1             | BLF647P(S)          | 3.7.2.1           | BLF7G27L(S)-90P    | 3.7.1.6           |
| BGA3018  | 3.4.1             | BGU8011           | 3.4.1             | BLF6G10(LS)-135RN   | 3.7.1.1           | BLF861A            | 3.7.2.2           |
| BGA3031  | 3.4.1             | BGU8051           | 3.4.1             | BLF6G10(LS)-160RN   | 3.7.1.1           | BLF871(S)          | 3.7.2.1           |
| BGA6130  | 3.4.1             | BGU8052           | 3.4.1             | BLF6G10(LS)-200RN   | 3.7.1.1           | BLF878             | 3.7.2.2           |
| BGA6289  | 3.4.1             | BGU8053           | 3.4.1             | BLF6G10(S)-45       | 3.7.1.1           | BLF879P(S)         | 3.7.2.2           |
| BGA6489  | 3.4.1             | BGX7100           | 3.4.2             | BLF6G10L-40BRN      | 3.7.1.1           | BLF881(S)          | 3.7.2.1           |
| BGA6589  | 3.4.1             | BGX7101           | 3.4.2             | BLF6G10L(S)-260PRN  | 3.7.1.1           | BLF884P(S)         | 3.7.2.2           |
| BGA7024  | 3.4.1             | BGX7220           | 3.4.2             | BLF6G15L(S)-250PBRN | 3.7.1.2           | BLF888             | 3.7.2.2           |
| BGA7027  | 3.4.1             | BGX7221           | 3.4.2             | BLF6G15L(S)-40RN    | 3.7.1.2           | BLF888A(S)         | 3.7.2.2           |
| BGA7124  | 3.4.1             | BGX885N           | 3.6.1             | BLF6G20-180PN       | 3.7.1.3           | BLF888B(S)         | 3.7.2.2           |
| BGA7127  | 3.4.1             | BGY1085A          | 3.6.2             | BLF6G20-40          | 3.7.1.3           | BLF8G09LS-400PG(V) | 3.7.1.1           |
| BGA7130  | 3.4.1             | BGY588C           | 3.6.1             | BLF6G20(LS)-110     | 3.7.1.3           | BLF8G10L(S)-160    | 3.7.1.1           |
| BGA7204  | 3.4.1             | BGY66B            | 3.6.5             | BLF6G20(LS)-180RN   | 3.7.1.3           | BLF8G10LS-160V     | 3.7.1.1           |
| BGA7210  | 3.4.1             | BGY67             | 3.6.5             | BLF6G20(LS)-75      | 3.7.1.3           | BLF8G10LS-270      | 3.7.1.1           |
| BGA7350  | 3.4.1             | BGY67A            | 3.6.5             | BLF6G20(S)-45       | 3.7.1.3           | BLF8G10LS-270(G)V  | 3.7.1.1           |
| BGA7351  | 3.4.1             | BGY68             | 3.6.5             | BLF6G20LS-140       | 3.7.1.3           | BLF8G10LS-300PV    | 3.7.1.1           |
| BGA7352  | 3.4.1             | BGY785A           | 3.6.1             | BLF6G21-10G         | 3.7.1.1           | BLF8G19LS-170BV    | 3.7.1.3           |
| BGD712   | 3.6.3             | BGY787            | 3.6.1             | BLF6G22(LS)-180PN   | 3.7.1.4           | BLF8G20L(S)-220    | 3.7.1.3           |
| BGD712C  | 3.6.3             | BGY835C           | 3.6.1             | BLF6G22(LS)-180RN   | 3.7.1.4           | BLF8G20L(S)-220V   | 3.7.1.3           |
| BGD714   | 3.6.3             | BGY885A           | 3.6.1             | BLF6G22(S)-45       | 3.7.1.4           | BLF8G20LS-200V     | 3.7.1.3           |
| BGD812   | 3.6.3             | BGY887            | 3.6.1             | BLF6G22L-40BN       | 3.7.1.4           | BLF8G20LS-260A     | 3.7.1.3           |
| BGD814   | 3.6.3             | BGY887B           | 3.6.1             | BLF6G22L(S)-40P     | 3.7.1.4           | BLF8G20LS-400P(G)V | 3.7.1.3           |
| BGD816L  | 3.6.3             | BGY888            | 3.6.1             | BLF6G22LS-100       | 3.7.1.4           | BLF8G20LS-410P(G)V | 3.7.1.3           |
| BGE787B  | 3.6.1             | BLA0912-250R      | 3.7.3.1           | BLF6G22LS-130       | 3.7.1.4           | BLF8G22LS-140      | 3.7.1.4           |
| BGE788C  | 3.6.1             | BLA1011-10        | 3.7.3.1           | BLF6G22LS-40BN      | 3.7.1.4           | BLF8G22LS-160BV    | 3.7.1.4           |
| BGE885   | 3.6.1             | BLA1011-2         | 3.7.3.1           | BLF6G22LS-75        | 3.7.1.4           | BLF8G22LS-200(G)V  | 3.7.1.4           |
| BGM1012  | 3.4.1             | BLA1011-300       | 3.7.3.1           | BLF6G27-10(G)       | 3.7.1.12          | BLF8G22LS-220      | 3.7.1.4           |
| BGM1013  | 3.4.1             | BLA1011(S)-200R   | 3.7.3.1           | BLF6G27(LS)-100     | 3.7.1.6           | BLF8G22LS-240      | 3.7.1.14          |
| BGM1014  | 3.4.1             | BLA6G1011-200R    | 3.7.3.1           | BLF6G27(LS)-135     | 3.7.1.6           | BLF8G22LS-270      | 3.7.1.4           |
| BGO807C  | 3.6.4             | BLA6G1011LS-200RG | 3.7.3.1           | BLF6G27(LS)-75      | 3.7.1.6           | BLF8G22LS-270(G)V  | 3.7.1.4           |
| BGO807CE | 3.6.4             | BLA6H0912-500     | 3.7.3.1           | BLF6G27(S)-45       | 3.7.1.6           | BLF8G22LS-310AV    | 3.7.1.4           |
| BGR269   | 3.6.5             | BLA6H1011-600     | 3.7.3.1           | BLF6G27L(S)-40P     | 3.7.1.6           | BLF8G22LS-460AV    | 3.7.1.4           |
| BGU6101  | 3.4.1             | BLC8G24LS-240A    | 3.7.1.5           | BLF6G27L(S)-50BN    | 3.7.1.6           | BLF8G24L(S)-200P   | 3.7.1.5           |
| BGU6102  | 3.4.1             | BLC8G27LS-160AV   | 3.7.1.5           | BLF6G38-10(G)       | 3.7.1.7           | BLF8G24LS-100(G)V  | 3.7.1.5           |
| BGU6104  | 3.4.1             | BLD6G21L(S)-50    | 3.7.1.4           | BLF6G38(LS)-100     | 3.7.1.7           | BLF8G27LS-100P     | 3.7.1.6           |
| BGU7003  | 3.4.1             | BLD6G22L(S)-50    | 3.7.1.4           | BLF6G38(LS)-50      | 3.7.1.7           | BLF8G27LS-100V     | 3.7.1.6           |
| BGU7003W | 3.4.1             | BLF1043           | 3.7.2.1           | BLF6G38(S)-25       | 3.7.1.7           | BLF8G27LS-140      | 3.7.1.6           |
| BGU7004  | 3.4.1             | BLF1046           | 3.7.2.1           | BLF6H10L(S)-160     | 3.7.1.1           | BLF8G27LS-140V     | 3.7.1.6           |
| BGU7005  | 3.4.1             | BLF10H6600P(S)    | 3.7.2.1           | BLF7G10L(S)-250     | 3.7.1.1           | BLF8G27LS-150(G)V  | 3.7.1.6           |
| BGU7007  | 3.4.1             | BLF10M6(LS)200    | 3.7.2.1           | BLF7G15LS-200       | 3.7.1.2           | BLF8G27LS-200AV    | 3.7.1.6           |
| BGU7008  | 3.4.1             | BLF174XR(S)       | 3.7.2.1           | BLF7G15LS-300P      | 3.7.1.2           | BLF8G27LS-200GV    | 3.7.1.6           |
| BGU7031  | 3.4.1             | BLF178P           | 3.7.2.1           | BLF7G20L(S)-200     | 3.7.1.3           | BLF8G27LS-200V     | 3.7.1.6           |
| BGU7032  | 3.4.1             | BLF178XR(S)       | 3.7.2.1           | BLF7G20L(S)-250P    | 3.7.1.3           | BLL1214-250        | 3.7.3.2           |

| Type               | Portfolio chapter |
|--------------------|-------------------|
| BLL1214-250R       | 3.7.3.2           |
| BLL1214-35         | 3.7.3.2           |
| BLL6G1214L(S)-250  | 3.7.3.2           |
| BLL6H0514-25       | 3.7.3.2           |
| BLL6H0514L(S)-130  | 3.7.3.2           |
| BLL6H1214-500      | 3.7.3.2           |
| BLL6H1214L(S)-250  | 3.7.3.2           |
| BLL6H1214LS-500    | 3.7.3.2           |
| BLM6G10-30(G)      | 3.7.1.1           |
| BLM6G22-30(G)      | 3.7.1.4           |
| BLM7G1822S-40PB(G) | 3.7.1.3           |
| BLM7G22S-60PB(G)   | 3.7.1.4           |
| BLP25M710          | 3.7.2.3           |
| BLP7G07S-140P      | 3.7.1.1           |
| BLP7G09S-140P(G)   | 3.7.1.1           |
| BLP7G22-05         | 3.7.1.1           |
| BLP7G22-10         | 3.7.1.1           |
| BLP8G10S-200P(G)   | 3.7.1.1           |
| BLP8G10S-45P(G)    | 3.7.1.1           |
| BLP8G21S-160PV     | 3.7.1.3           |
| BLP8G22S-250V      | 3.7.1.4           |
| BLP8G22S-60P(G)    | 3.7.1.4           |
| BLS2933-100        | 3.7.3.3           |
| BLS6G2731-6G       | 3.7.3.3           |
| BLS6G2731(S)-120   | 3.7.3.3           |
| BLS6G2731S-130     | 3.7.3.3           |
| BLS6G2735L(S)-30   | 3.7.3.3           |
| BLS6G2933S-130     | 3.7.3.3           |
| BLS6G3135(S)-120   | 3.7.3.3           |
| BLS6G3135(S)-20    | 3.7.3.3           |
| BLS7G2325L-105     | 3.7.3.3           |
| BLS7G2729L(S)-350P | 3.7.3.3           |
| BLS7G2730L(S)-200P | 3.7.3.3           |
| BLS7G2933S-150     | 3.7.3.3           |
| BLS7G3135L(S)-200  | 3.7.3.3           |
| BLS7G3135L(S)-350P | 3.7.3.3           |
| BLT50              | 3.3.1             |
| BLT70              | 3.3.1             |
| BLT80              | 3.3.1             |
| BLT81              | 3.3.1             |
| BLU6H0410L(S)-600P | 3.7.3.1           |
| BSR56              | 3.5.1             |
| BSR57              | 3.5.1             |
| BSR58              | 3.5.1             |
| BSS83              | 3.5.2             |
| CGD1040HI          | 3.6.3             |
| CGD1042H           | 3.6.3             |
| CGD1042HI          | 3.6.3             |
| CGD1042L           | 3.6.3             |
| CGD1044H           | 3.6.3             |
| CGD1044HI          | 3.6.3             |
| CGD1046HI          | 3.6.3             |
| CGD942C            | 3.6.3             |
| CGD944C            | 3.6.3             |
| CGD982HCI          | 3.6.3             |
| CGD982LC           | 3.6.3             |
| CGD985HCI          | 3.6.3             |
| CGD985LC           | 3.6.3             |
| CGD987HCI          | 3.6.3             |
| CGY1032            | 3.6.2             |

| Type              | Portfolio chapter |
|-------------------|-------------------|
| CGY1041           | 3.6.2             |
| CGY1043           | 3.6.2             |
| CGY1047           | 3.6.2             |
| CGY1049           | 3.6.2             |
| CGY888C           | 3.6.1             |
| CLF1G0035(S)-100  | 3.7.4             |
| CLF1G0035(S)-100P | 3.7.4             |
| CLF1G0035(S)-200P | 3.7.4             |
| CLF1G0035(S)-50   | 3.7.4             |
| CLF1G0060(S)-10   | 3.7.4             |
| CLF1G0060(S)-30   | 3.7.4             |
| JN5148-001        | 3.8               |
| JN5148-001-M00    | 3.8               |
| JN5148-001-M03    | 3.8               |
| JN5148-001-M04    | 3.8               |
| JN5148-J01        | 3.8               |
| JN5148-Z01        | 3.8               |
| JN5161-001        | 3.8               |
| JN5164-001        | 3.8               |
| JN5168-001        | 3.8               |
| JN5168-001-M00    | 3.8               |
| JN5168-001-M03    | 3.8               |
| JN5168-001-M05    | 3.8               |
| JN5168-001-M06    | 3.8               |
| JN516X-EK001      | 3.8               |
| PBR941            | 3.3.1             |
| PBR951            | 3.3.1             |
| PMBD353           | 3.2.4             |
| PMBD354           | 3.2.4             |
| PMBF4391          | 3.5.1             |
| PMBF4392          | 3.5.1             |
| PMBF4393          | 3.5.1             |
| PMBFJ108          | 3.5.1             |
| PMBFJ109          | 3.5.1             |
| PMBFJ110          | 3.5.1             |
| PMBFJ111          | 3.5.1             |
| PMBFJ112          | 3.5.1             |
| PMBFJ113          | 3.5.1             |
| PMBFJ174          | 3.5.1             |
| PMBFJ175          | 3.5.1             |
| PMBFJ176          | 3.5.1             |
| PMBFJ177          | 3.5.1             |
| PMBFJ308          | 3.5.1             |
| PMBFJ309          | 3.5.1             |
| PMBFJ310          | 3.5.1             |
| PMBFJ620          | 3.5.1             |
| PRF947            | 3.3.1             |
| PRF949            | 3.3.1             |
| PRF957            | 3.3.1             |
| TFF1003HN         | 3.4.5             |
| TFF1007HN         | 3.4.5             |
| TFF1012HN         | 3.4.3             |
| TFF1013HN         | 3.4.3             |
| TFF1014HN         | 3.4.3             |
| TFF1015HN         | 3.4.3             |
| TFF1017HN         | 3.4.3             |
| TFF1018HN         | 3.4.3             |
| TFF1024HN         | 3.4.4             |
| TFF11088HN        | 3.4.5             |
| TFF11092HN        | 3.4.5             |

| Type       | Portfolio chapter |
|------------|-------------------|
| TFF11096HN | 3.4.5             |
| TFF11101HN | 3.4.5             |
| TFF11132HN | 3.4.5             |
| TFF11139HN | 3.4.5             |
| TFF11142HN | 3.4.5             |
| TFF11145HN | 3.4.5             |

## This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

## Notes

[illegible]



[www.nxp.com](http://www.nxp.com)

© 2013 NXP Semiconductors N.V.

All rights reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Date of release: June 2013

Document order number: 9397 750 17428

Printed in the Netherlands



**PRINTED CLIMATE NEUTRALLY**  
certificate number: 53520-1305-1002  
[www.artoos.be](http://www.artoos.be)



**MIX**  
Paper from  
responsible sources  
FSC® C007370