



High performance aerospace and defense solutions



Introduction

NXP Semiconductors has been a trusted source and a leading provider of components to the Aerospace and Defense market for over 30 years. NXP's components are applied in a wide array of Aerospace and Defense systems including Radar, SDR (Software Defined Radio), ECM (Electronic Countermeasures) and EW (Electronic Warfare).

Our RF and microwave transistors and modules are the amplifier components of choice due to their excellent RF performance, ruggedness and reliability. NXP offers a wide array of COTS (Commercial Off-the-Shelf) devices for the Aerospace and Defense market, including a full suite of ARM-based microcontrollers like our Cortex™ M0 and Cortex™ M4. To supply power to your designs, we offer our award winning GreenChip™ based power controllers and a broad range of Trench MOSFETs and power diodes.

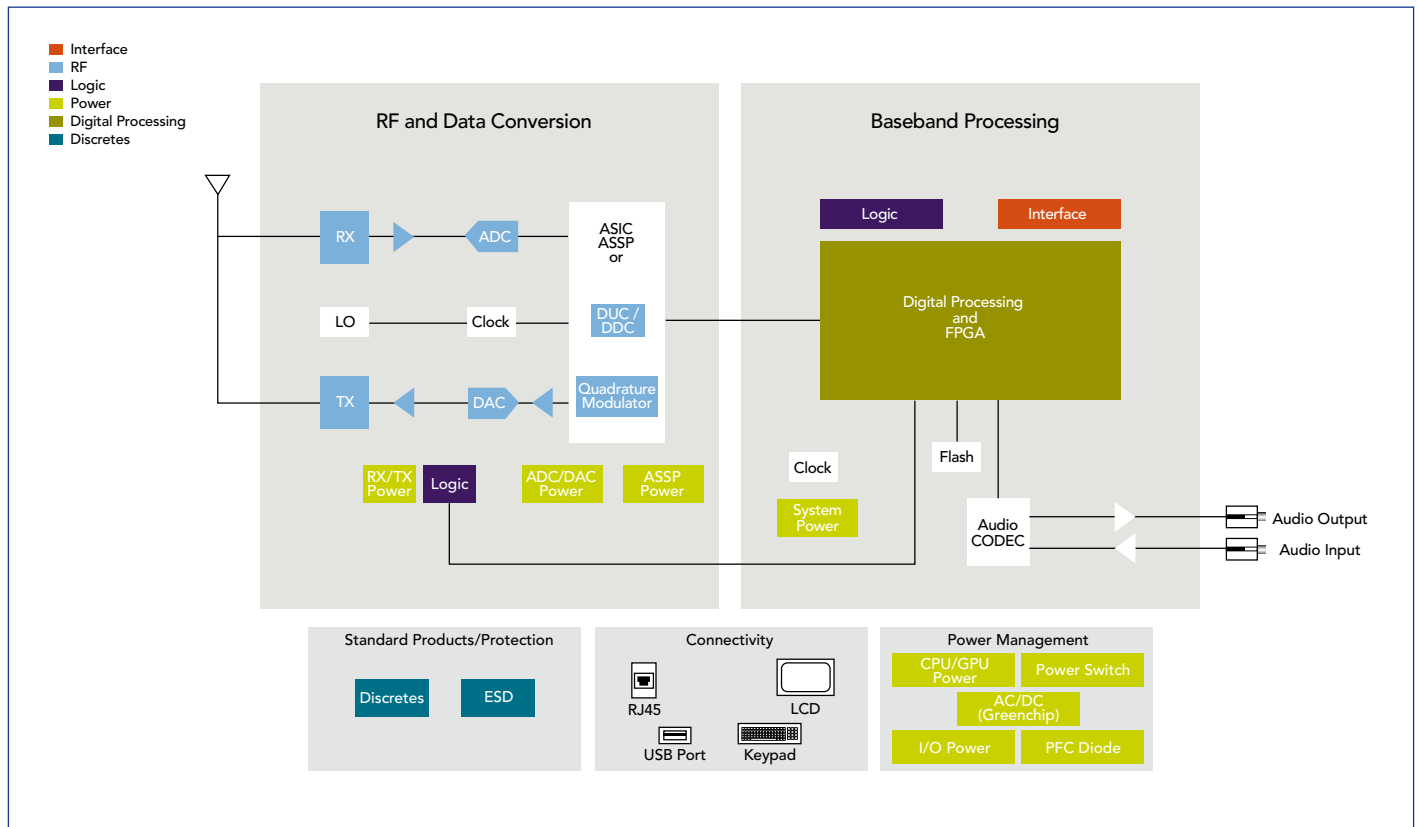
On top of our ASSP products, we have the broadest portfolio of 'standard products' including general application transistors,

diodes and logic (specified to automotive quality levels).

Our commitment to high performance products and excellence in quality and reliability make NXP a perfect fit for the Aerospace and Defense market -

- ▶ High Performance RF components for the complete RF front-end employing state-of-the-art LDMOS and SiGe:C process technology
- ▶ High-Speed Data Converters with the most advanced serialization techniques for a dramatic reduction in parallel lines
- ▶ A large portfolio of ARM-based Microcontrollers for control functions
- ▶ An extensive portfolio of Interface products to connect complex systems
- ▶ A wide portfolio of Standard Products to complete the system and allow for vendor reduction

SDR architecture



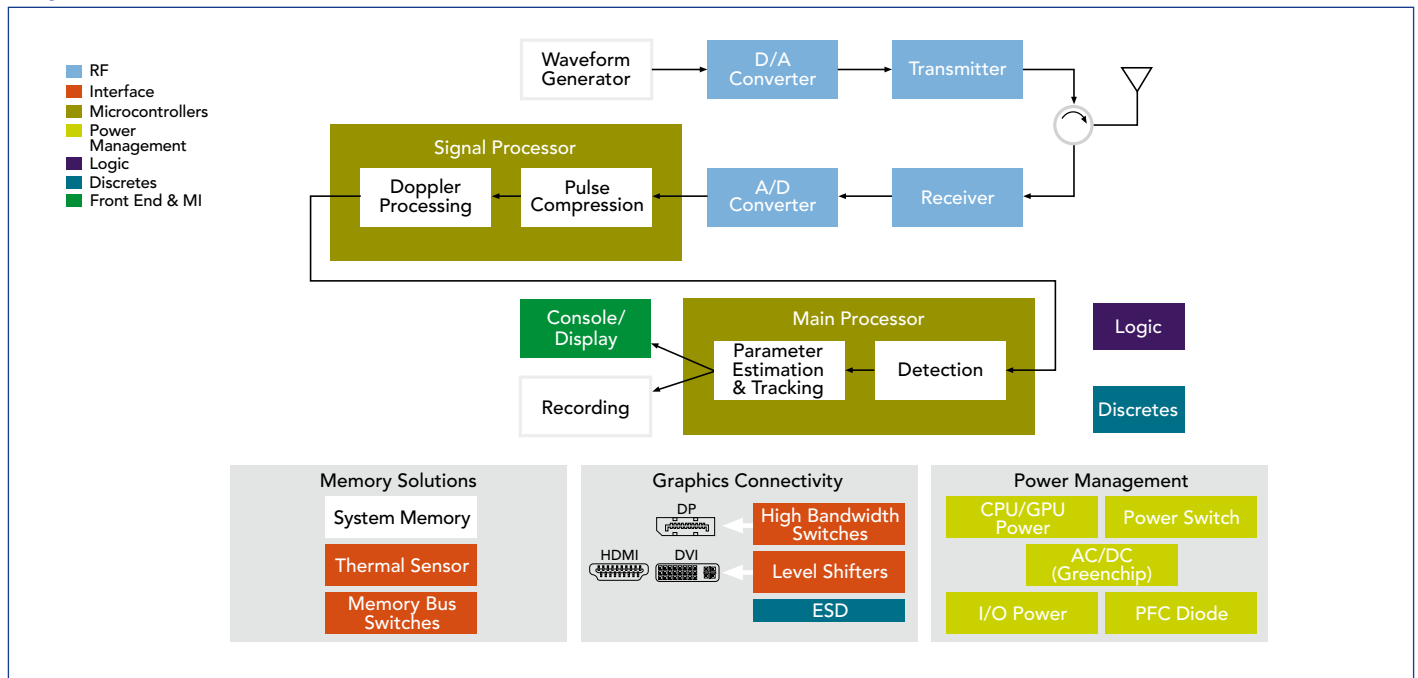
Challenges for today's aerospace and defense systems

NXP recognizes the tough challenges that face today's aerospace and defense designers. With the advancement in AESA (Actively Electronically Scanned Array) radars come many hurdles. AESA radars have dramatically improved the performance and reliability of more traditional mechanically scanned arrays through innovation in system architectures that now contain thousands of Transmit and Receive Modules (TRMs). The TRM needs to have the most efficient power amplifier available, along with proven ruggedness and reliability. NXP's LDMOS technology is used by leading radar companies across the globe from VHF and UHF

radars, to high S-Band radars. A pioneer in designing LDMOS for pulsed applications, NXP's experienced designers have developed complete line-ups that work seamlessly to speed you through your development. Our advanced roadmaps are ready for the future with a full portfolio of GaN-based products.

As a result of the large number of TRMs and the trend to digital beam forming, high-speed data conversion is a critical piece of the puzzle. NXP's new range of CGV™ high-speed converters, utilizing the latest JESD204A serialization architectures, is ideal.

Simplified radar



The CGV converters allow for massive reduction in parallel data lines, in fact, a dual 14-bit ADC can be reduced from 28 parallel data lines to two high-speed JESD204A data lanes! With optional data scrambling CGV converters can make your system secure. We have worked with the world's premier FPGA manufacturers like Altera, Lattice and Xilinx to implement the JESD204A on their high performance cores to support seamless operation between our high-speed converters and your processing needs.

Most TRMs today are made up of discrete GaAs components for RF processing. With NXP's state of the art SiGe:C process we are able to integrate such functions as LNA, Mixers, PLL/VCO and Phase Shifters. This integration allows systems to be smaller,

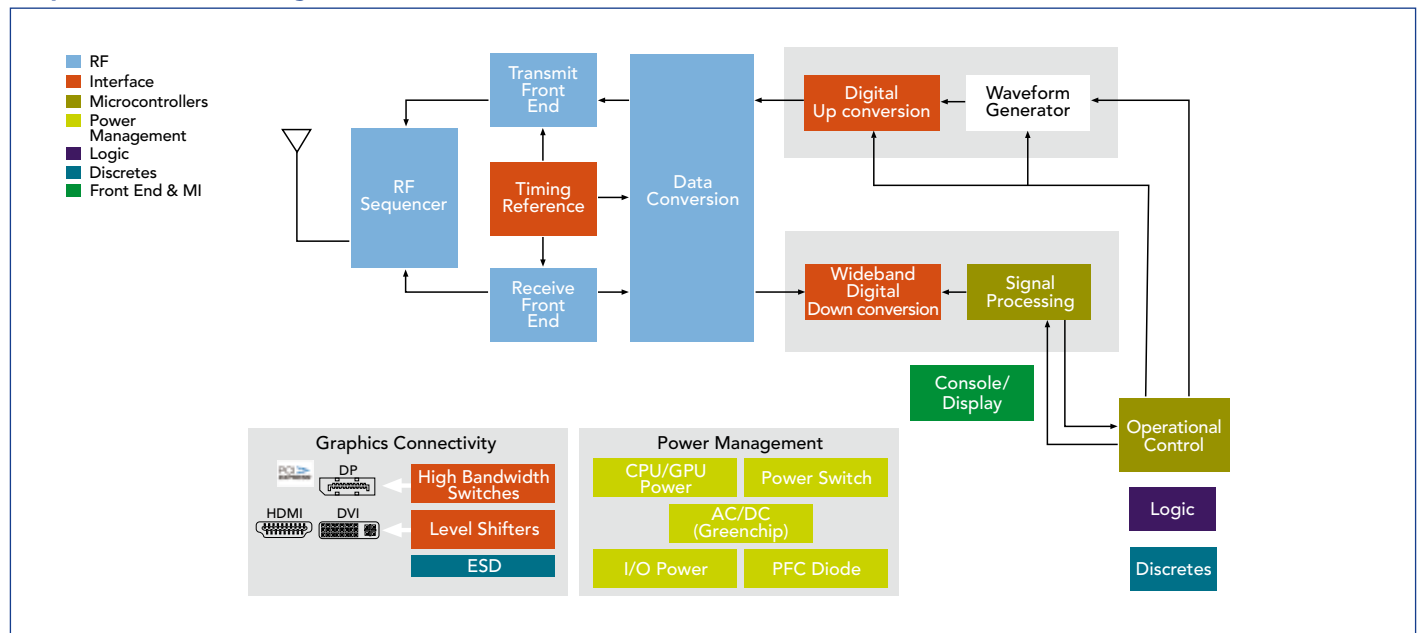
lighter and much more reliable. Our SiGe:C process is running in 8" silicon fabs with amazing processing consistency allowing very tight RF tolerances and best-in-class, batch-to-batch performance.

Most modern military communications are now based on SDR (Software Defined Radio). This advancement has led to more efficient communications over larger operating bandwidths and greatly improved inter-operability between different services. The advent of SDR has posed a significant challenge for power amplifiers. The broadband, multi-mode SDR is still somewhat limited by the bandwidth of the amplifier. NXP's LDMOS is used today in the world's premier radios due to its excellent operating bandwidth and extremely rugged design – which can survive harsh mismatches

in extreme circumstances. As with AESA radar, our SiGe:C process plays a crucial role in offering integration to radio designers for RF signal processing and consistent RF performance over temperature and processing.

Our CGV high-speed converters also play a critical role in the digitization of the RF signal for digital down-conversion and up-conversion.

Simplified ECM block diagram



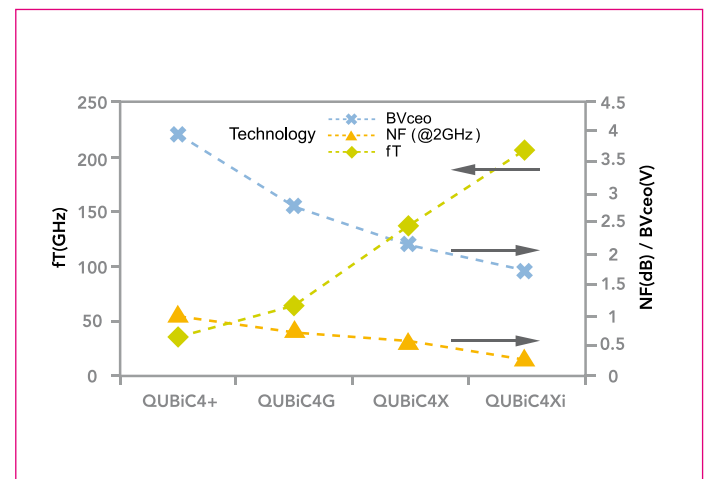
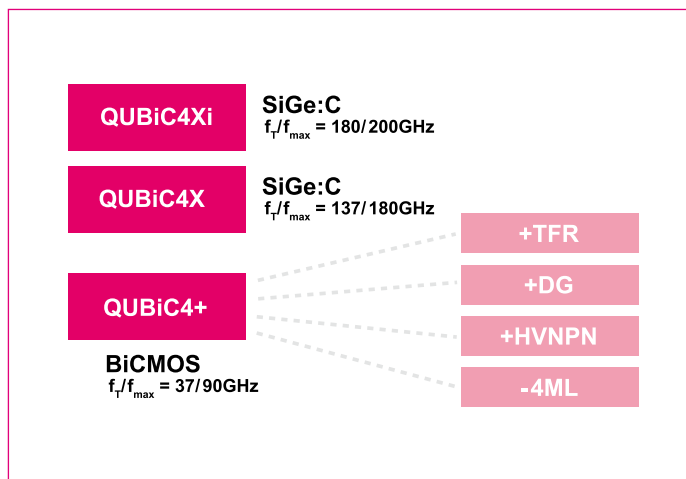
Key technologies

SiGe:C - QUBiC4 boosts innovation

NXP's innovative 180GHz SiGe:C BiCMOS process allows customers to incorporate more functionality into devices with size, cost, reliability and manufacturing advantage. Our state-of-the-art

QUBiC4 technology speeds the migration from GaAs components to silicon by enabling cutting-edge, low noise performance and IP availability.

QUBiC4 Family Overview



QUBiC4+

- ▶ Baseline, 0.25 μm CMOS, single poly, 5 metal
- ▶ Digital gate density 26k gates/ mm^2
- ▶ $f_T/f_{MAX} = 37/90\text{GHz}$
- ▶ +TFR - Thin Film Resistor
- ▶ +DG - Dual Gate Oxide MOS
- ▶ +HVNPN - High voltage NPN
- ▶ High density 5fF/ μm^2 MIM capacitor
- ▶ Wide range of active and high quality passive devices
- ▶ Optimized for up to 5GHz applications

QUBiC4X

- ▶ SiGe:C BiCMOS process
- ▶ $f_T/f_{MAX} = 137/180\text{GHz}$
- ▶ Optimized for up to 20GHz applications

QUBiC4Xi

- ▶ Improves f_T/f_{MAX} up to 180/200GHz
- ▶ Optimized for ultra-low noise for microwave above 10GHz

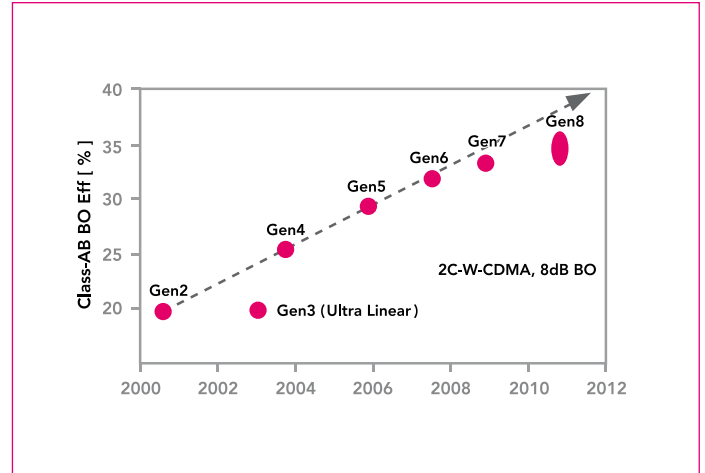
Best-in-class LDMOS

NXP has the most advanced LDMOS process worldwide, enabling design of high efficiency amplifiers with unrivalled ruggedness and the highest gain available. From the most

advanced Doherty designs to new developments in “digital switching amplifiers,” our system architects have developed novel techniques to push amplifier performance to the highest levels.

Gen7 LDMOS Pushes Performance Limits

- ▶ 20% higher power density
 - ▶ 10% lower output capacitance
 - ▶ 25% lower R_{th}
 - ▶ 2% higher efficiency
 - ▶ Low memory effect
 - ▶ Very good pre-distortability
- (Current Portfolio in BiC LDMOS Gen6)

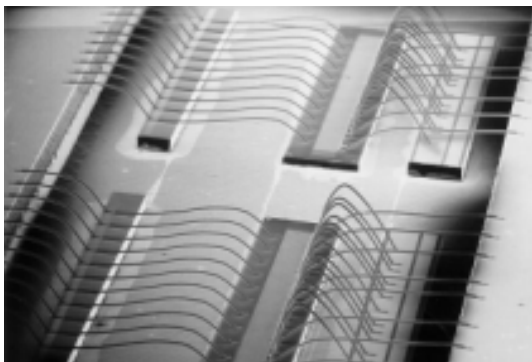


The world's most rugged LDMOS for the toughest applications

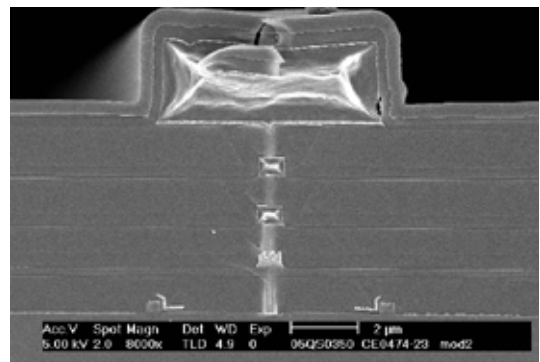
Ruggedness, or the ability to withstand a mismatch condition without failure, is a critical reliability parameter for RF power transistors. NXP has been leading the way in ruggedness since we introduced our first LDMOS transistors nearly a decade ago. Our transistors have proved to be literally indestructible.

For tough applications like very high power broadcast transmitters, our products pass the most stringent “hot swap” tests in the industry, surviving severe high power VSWR conditions through all angles.

NXP uses a fully automated process for die attach and wire bonding, ensuring optimal performance and device-to-device consistency.



Cross section of an NXP Gen6 LDMOS transistor, showing the thick and wide drain connection designed to reduced current density and drain capacitance, dramatically improving performance and reliability.



High performance RF products

RF Power

NXP's ongoing commitment to the Aerospace and Defense market is built on a 30+ year track record of providing world class products into avionics, communications, jammer, and radar applications. For these and other high power, high performance applications, we offer state-of-the-art 28V and 50V LDMOS (Laterally Diffused Metal Oxide Semiconductor) products delivering high power density and high efficiency from a few MHz up through S-band. Our latest 7th Generation LDMOS technology offers even greater advantages over bipolar technologies, including higher gain, lower thermal impedance, improved MTTF, unparalleled thermal stability, and inherently stable pulsed performance. As the first semiconductor company to supply LDMOS-based S-band transistors with a range of 2700-3500MHz, we are expanding our product portfolio with new, higher power and higher bandwidth components based on GaN technology.

We stand behind our products with best-in-class applications support. Providing a depth of application experience, from custom device tuning to fully integrated, highly linear amplifiers, NXP offers a range of support to meet your specific needs. One example of our high performance, easy-to-use approach is our BLS6G2933P-200 LDMOS-based, industry standard 200 watt power pallet, delivering more than 40% efficiency and including the complete bias network. This pallet is one example of NXP's command of the market developing drop-in, building block components.

NXP GaN - enabling the future

Our new gallium-nitride (GaN) technology, the result of a collaborative development effort, enables high power amplifiers that deliver very high efficiency in next-generation wireless communication and Aerospace and Defense systems.

NXP is not only designing next-generation transistors in GaN technology with breakthrough specifications, we're leading the charge in discovery and innovation in the field of digital transmitter switching power amplifiers based on GaN technology. GaN technology is truly enabling an age of universal transmitters.

NXP is a partner you can count on for your most challenging high power requirements.

RF power product highlight

The BLS6G2933P-200 is the first LDMOS-based, industry standard pallet produced by NXP. This pallet offers more than 40% efficiency and includes the complete bias network for S-band applications.

Key features

Reduces component count and considerably simplifies radar system design

- ▶ P1dB output power 200W
- ▶ Efficiency > 40%
- ▶ Industry standard footprint
- ▶ 50Ω in/out matched for entire bandwidth
- ▶ Lightweight heat sink included
- ▶ The advantages of LDMOS in comparison with Bipolar
 - Higher gain and better efficiency
 - Better ruggedness – overdrive without risk to 5dB
 - Improved pulse droop and insertion phase
 - Very consistent performance – no tuning required
 - Improved thermal characteristics, no thermal runaway
 - Non-toxic packaging and ROHS compliance



Performance targets

Saturated output power at 50V	100W
Frequency	2.2GHz
Maximum PAE	68%
Linear power gain	19dB
2C-WCDMA linear efficiency with DPD	40% at -52dBC IM3 at 8dB OPBO

Avionics LDMOS transistors

Function	Type	Package	f_{range}	$P_{L(av)}$	η_D	G_p	@ V_{DS}	Mode of operation
			MHz	W	%	dB	V	
driver	BLL6H0514-25	SOT467C	500 - 1400	25 (min)	50	19	50	PULSED RF; class AB
final	BLA0912-250R	SOT502A2	960 - 1215	250	50	13.5	36	PULSED RF; class AB
final	BLA6H0912-500	SOT539A	960 - 1215	450	50	17	50	PULSED RF; class AB
final	BLA6H1011-600	SOT539A	1030 - 1090	600	52	19	50	PULSED RF; class AB
final	BLA6G1011-200R	SOT502A2	1030 - 1090	200	65	20	28	PULSED RF; class AB

L-Band LDMOS transistors

Function	Type	Package	f_{range}	$P_{L(av)}$	η_D	G_p	@ V_{DS}	Mode of operation
			MHz	W	%	dB	V	
driver	BLL6H0514-25	SOT467C	500 - 1400	25 (min)	50	19	50	PULSED RF; class AB
final	BLL6H1214-500	SOT539A	1200 - 1400	500 (min)	50	17	50	PULSED RF; class AB
final	BLL6H1214L(S)-250	SOT502	1200 - 1400	250	55	17	50	Pulsed RF
final	BLL6HL(S)0514-130	SOT1135	1200 - 1400	130	50	18	50	Pulsed RF

S-Band LDMOS transistors

Function	Type	Package	f_{range}	$P_{L(av)}$	η_D	G_p	@ V_{DS}	Mode of operation
			MHz	W	%	dB	V	
driver	BLS6G2731-6G	SOT975C	2700 - 3100	6	33	15	32	PULSED RF; class AB
driver	BLS6G3135-20	SOT608A	3100 - 3500	20	45	15.5	32	PULSED RF; class AB
driver	BLS6G3135S-20	SOT608B	3100 - 3500	20	45	15.5	32	PULSED RF; class AB
final	BLS6G2731-120	SOT502A	2700 - 3100	120	48	13.5	32	PULSED RF; class AB
final	BLS6G2731S-120	SOT502B	2700 - 3100	120	48	13.5	32	PULSED RF; class AB
final	BLS6G2933S-130	SOT922-1	2900 - 3300	130	47	12.5	32	PULSED RF; class AB
final	BLS6G3135-120	SOT502A	3100 - 3500	120	43	11	32	PULSED RF; class AB
final	BLS6G3135S-120	SOT502B	3100 - 3500	120	43	11	32	PULSED RF; class AB
final	BLS6G2933P-200	pallet	2900 - 3300	200	45	11	32	PULSED RF; class AB
final	BLS6G2731P-200	pallet	2700 - 3100	200	45	11	32	PULSED RF; class AB
final	BLS6G2731S-130	SOT922	2700 - 3100	130	49	13	32	Pulsed RF

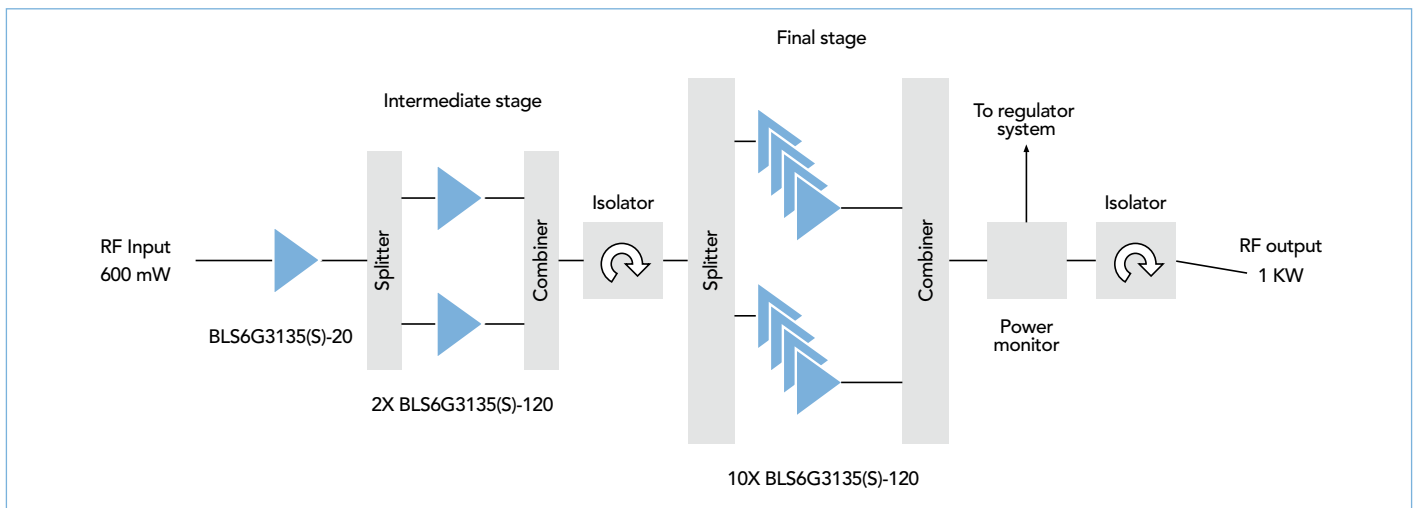
0-1000MHz (UHF/VHF/HF/ISM) LDMOS line up

Function	Type	Package	f_{range}	$P_{L(AV)}$	η_D	G_p	@ V_{DS}	Mode of operation
			MHz	W	%	dB	V	
driver	BLF871	SOT467C	0 - 1000	100	47	21	40	2-TONE
			0 - 1000	24	33	22	40	DVB-T
driver	BLF871S	SOT467B	0 - 1000	100	47	21	40	2-TONE
			0 - 1000	24	33	22	40	DVB-T
driver	BLF881	SOT467C	0 - 1000	140	49	21	50	2-TONE
			0 - 1000	33	34	21	50	DVB-T
driver	BLF881S	SOT467C	0 - 1000	140	49	21	50	2-TONE
			0 - 1000	33	34	21	50	DVB-T
final	BLF645	SOT540A	0 - 1400	100	45	18	32	2-TONE
			0 - 1400	100	56	18	32	CW
driver	BLF571	SOT467C	0 - 1000	20	70	27.5	50	CW
final	BLF573	SOT502A3	0 - 1000	300	70	27.2	50	CW
final	BLF573S	SOT502B	0 - 1000	300	70	27.2	50	CW
final	BLF574	SOT539A	0 - 1000	500	70	26.5	50	CW
final	BLF578	SOT539A	0 - 1000	1200	71	24	50	PULSED RF
			0 - 1000	1000	75	26	50	CW

470-876MHz (UHF) LDMOS line up

Function	Type	Package	f_{range}	$P_{L(AV)}$	η_D	G_P	$@V_{DS}$	Mode of operation
			MHz	W	%	dB	V	
driver	BLF871	SOT467C	0 - 1000	100	47	21	40	2-TONE
			0 - 1000	24	33	22	40	DVB-T
driver	BLF871S	SOT467B	0 - 1000	100	47	21	40	2-TONE
			0 - 1000	24	33	22	40	DVB-T
final	BLF878	SOT979A	470 - 860	300	32	21	42	CW
			470 - 860	75	46	21	42	DVB-T
driver	BLF881S	SOT467C	0 - 1000	120	48	21	50	2-TONE
			0 - 1000	30	31	21	50	DVB-T
driver	BLF881	SOT467C	0 - 1000	120	48	21	50	2-TONE
			0 - 1000	30	31	21	50	DVB-T
final	BLF888	SOT979A	470 - 860	250	46	19	50	2-TONE
			470 - 860	110	31	19	50	DVB-T
final	BLF888AS	SOT539B	470 - 860	250	46	19	50	2-TONE
			470 - 860	110	31	19	50	DVB-T
final	BLF888A	SOT539B	470 - 860	255	47	19	50	2-TONE
			470 - 860	115	32	19	50	DVB-T

3.1 – 3.5 GHz band radar

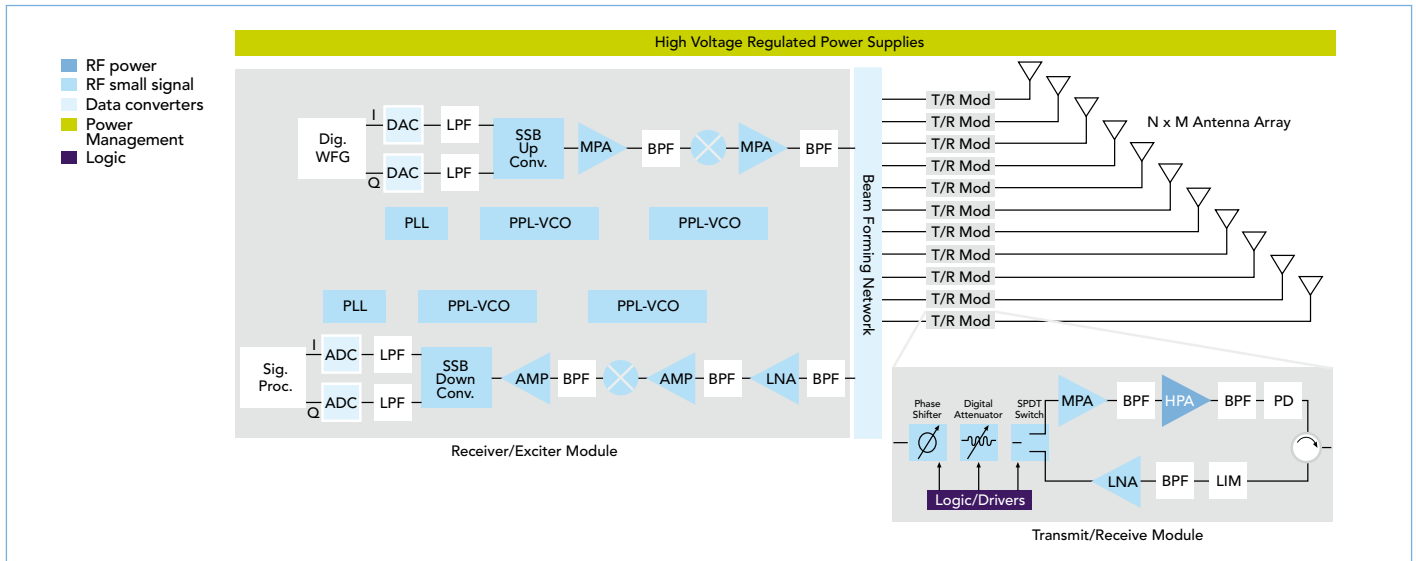


RF small signal

NXP's 30+ year heritage as a supplier of high performance semiconductors for the Aerospace and Defense market continues today with our line of RF Small Signal products based on our in-house CMOS, RF CMOS, 7th generation bipolar and industry leading QUBIC SiGe:C technology. These technologies support our growing Small Signal portfolio, ranging from discrete

diodes/transistors to matched low noise/medium power amplifiers to fully integrated VCO/PLLs. NXP's RF Small Signal products will simplify and shorten your design cycles, and deliver the performance you need for your next generation radar, communications or electronic warfare/jammer systems.

Active electronically scanned array



MMIC low noise amplifiers

NXP's QUBiCxi process delivers an impressive noise figure of 0.5dB at 13GHz – performance at one time the exclusive domain of GaAs HEMT devices. With the inherent integration

capability of silicon, such as built-in power-down functionality, NXP enables best-in-class performance and ease-of-use for your receive chain amplifier needs.

SiGe:C MMICs (for e.g. GPS)

Type	Package	Supply voltage		Supply current			@ 1.575 GHz													
							Insertion power gain			Noise figure	Input power at 1 dB gain compression				Input third-order intercept point f1 = 1713 MHz, f2 = 1851 MHz					
		V _{cc}		I _{cc}			S ₂₁ ²			NF	P _{I(1 dB)}					IP _{3i}				
		V		mA			dB			dB	dBm					dBm				
		Min	Max	Min	Type	Max	Min	Type	Max	Type	V _{cc} = 1.8V, Min	V _{cc} = 1.8V, Type	V _{cc} = 2.5V, I _{cc} = 5mA	V _{cc} = 2.85V, Min	V _{cc} = 2.85V, Type	V _{cc} = 1.8V, Min	V _{cc} = 1.8V, Type	V _{cc} = 2.5V, I _{cc} = 5 mA	V _{cc} = 2.85V, Min	V _{cc} = 2.85V Type
BGU7003	SOT891	2.2	2.85	3	-	15	16	18,3	20	0.8	-	-	-20	-	-	-	-	0	-	-
BGU7005	SOT886	1.5	2.85	-	4.5	-	-	16.5	-	0.9	-14	-11	-	-11	-8	5	9	-	5	12
BGU7007	SOT886	1.5	2.85	-	4.8	-	-	18	-	0.9	-14	-11	-	-11	-8	5	9	-	5	12

SiGe:C MMIC LNAs

Type	Package	Vsupply (Typ)	@ I _C =	@ f =	G _{ass} (Typ)	NF (Typ)	P _{L(1dB)} (Typ)	OIP3 (Typ)	IRL	IRL
		(V)	(mA)	(MHz)	(dB)	(dB)	(dBmW)	(dBm)	(dB)	(dB)
BGU7051*	SOT650	3.3	65	900	20.9	0.7	17.8	34	22	15.8
BGU7052*	SOT650	3.3	65	1900	20.1	0.9	18	35.5	20	15
BGU7053*	SOT650	3.3	65	2500	20	1	18	35	20	15
BGU7054*	SOT650	3.3	65	3500	20	1.1	18	35	20	15

* = check product status, as this type has not been released for mass production

Bold Red = New, highly recommended product

MMIC medium power amplifiers

Our recently released line of BiCMOS medium power amplifiers once again demonstrates NXP's leading edge SiGe:C technology. Our BGA7124 sets a new benchmark in performance for silicon-based amplifiers with its integrated active bias, quiescent current adjustment and shutdown capability, excellent thermal performance, high ESD rating, and silicon repeatability/reliability. This device

operates from 400-2700MHz, delivers 24dBm of power, 17dB of gain (2Ghz) and OIP3 of 37dBm, all in a 3 x 3 mm low profile package. The performance and ease-of-use of this amplifier family makes it a perfect solution for many amplification requirements in both transmit and receive paths of today's RF systems.

Medium power amplifier MMICs for all 400 - 2700MHz applications

Type	Package		f MHz	Supply			Shutdown control					RF performance				RF performance			
				V _{cc}	I _{cc}		V _{I(DL)(SHDN)}		V _{I(DH)(SHDN)}		I _{I(DL)(SHDN)}	Typ @ f = 940MHz				Typ @ f = 1960MHz			
				Typ	Typ	Max	Min	Max	Min	Max	Typ	Gp	P _{L1dB}	OIP3	NF	Gp	P _{L1dB}	OIP3	NF
BGA7124	SOT908	leadless	400 - 2700	5	130	200	0	0.7	2.5	Vbias	4	22	25	38	5	16	24	38	5
BGA7024	SOT89	leaded	400 - 2700	5	110	-	-	-	-	-	-	22	24	38	3	16	25	38	4
BGA7127	SOT908	leadless	400 - 2700	5	180	325	0	0.7	2.5	Vbias	4	20	28	44	3	13	28	43	5
BGA7027	SOT89	leaded	400 - 2700	5	170	-	-	-	-	-	-	19	28	41	3	12	28	43	4
BGA6130*	SOT908	leadless	100 - 1000	5	-	-	0	0.7	2.5	Vbias	4	18	30	45	4	12	30	45	4
BGA6133*	SOT908	leadless	100 - 1000	5	-	-	0	0.7	2.5	Vbias	4	18	33	46	4	12	33	47	4

The specifications of the BGA7130 and BGA7133 are target specifications until development is completed

* = check product status, as this type has not been released for mass production

Bold Red = New, highly recommended product

MMIC variable gain amplifiers

Our newest lines of MMICs are variable gain amplifiers designed for a wide attenuation range, broad frequency range and excellent linearity.

These VGAs are packaged in an industry standard SOT617 QFN package and provide excellent performance in a small footprint and low profile form factor.

SiGe:C MMICs variable gain amplifiers

Type	Package	Control interface	Vsup (V)	Isup (mA)	Frequency (MHz)	Gain range (dB)	@ minimum attenuation			@ maximum attenuation		
							Gain	OIP3	NF	Gain	OIP3	NF
							(dB)	(dBm)	(dB)	(dB)	(dBm)	(dB)
BGA7202*	SOT617	Analog	5	710	700 – 1450	27	24	45	6.5	-3	23.5	33.5
BGA7203*	SOT617	Analog	5	710	1450 – 2200	27	24	45	6.5	-3	23.5	33.5
BGA7204*	SOT617	Parallel, serial	5	160	2100 – 2750	27	24	45	6.5	-3	23.5	33.5
BGA7350*	SOT617	Parallel, digital	5	240	700 – 2750	31.5	24	37	6.5	-7.5	19	38
BGA7351*	SOT617	Parallel, digital	5	240	50 – 250	24	18.5	-	6	-5.5	50	30
						28	18.5	-	6	-9.5	50	34

BGA7350 and BGA7351 are dual VGA products. The VGA function is twice on the chip.

BGA7350 and BGA7351 are designed for receiving.

* = check product status, as this type has not been released for mass production

Bold Red = New, highly recommended product

MMIC IF gain blocks

For compatibility with existing designs, the BGA28xx series uses a market standard package, the SOT363, and the pin-compliant SOT363F package. The pinning is identical to NXP's current gain block family, and the blocks deliver similar noise figures.

New features include flatter gain, a gain slope of 0.5dB, improved P1dB vs. I_{cc}, without the need of an output inductor (also not at high P1dB models).

Quick reference to IF gain MMICs

Type	Package	@		F _u (GHz)	@ 1 GHz			Gain (dB) @			
		V _s	I _s		NF	Gain	OIP3	250	950	1550	2150
		(V)	(mA)		(dB)	(dB)	(dBm)	(MHz)	(MHz)	(MHz)	(MHz)
BGA280	SOT363	3.3	9.7	>3	3.4	20.2	11.5	20.0	20.2	20.6	20.6
BGA280	SOT363	3.3	12.4	3.0	3.6	22.1	13.6	22.3	22.1	23.0	23.8
BGA281	SOT363	3.3	16.4	>3	3.4	25.4	18.2	26.2	25.4	25.5	25.8
BGA281	SOT363	3.3	19.6	2.3	2.8	31.2	16.1	32.0	31.2	30.6	28.7
BGA285	SOT363	5.0	7.7	>3	3.9	23.3	8.7	22.9	23.2	23.9	24.0
BGA286	SOT363	5.0	22.7	2.6	3.7	31.9	20.9	31.2	31.8	32.6	31.4
BGA286	SOT363	5.0	15.4	>3	3.6	23.4	17.7	23.0	23.3	24.0	24.3

No output inductor necessary when using the new BGA28xx IF Gain blocks at the output stage.

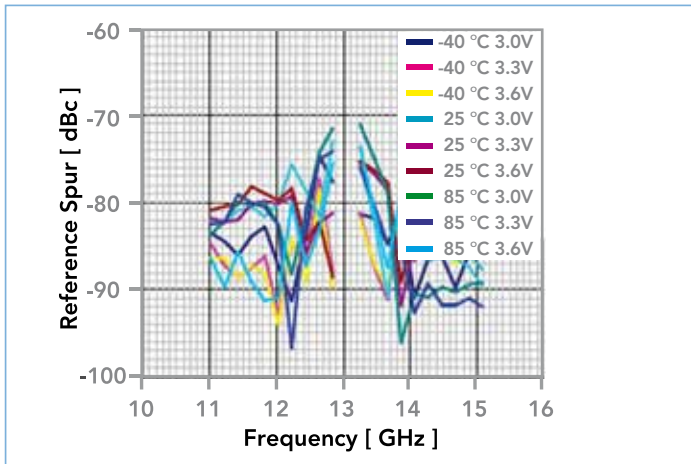
Integrated VCO/PLL

NXP's new line of silicon-based VCO/PLL products is another example of NXP's leadership in RF silicon products. Spanning 7-15GHz, our new VCO/PLL product family delivers ultra-low noise, low power consumption, highly accurate (alignment free and stable) performance in a small footprint. The level of integration saves board space and simplifies the design-in process, improving performance and reducing development

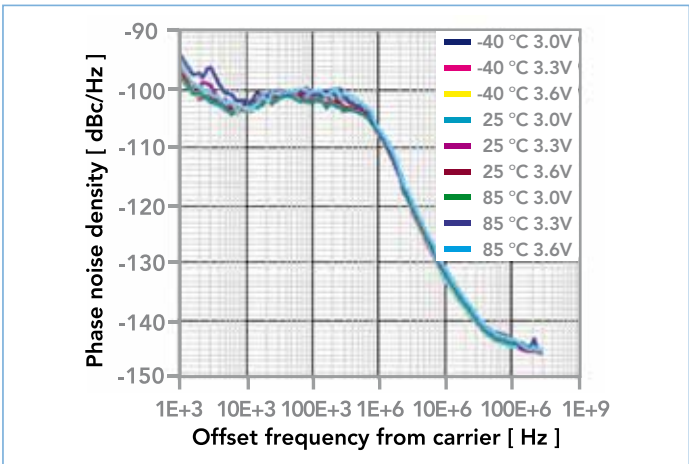
cycles and time-to-market.

Another important advantage and distinction of our integrated VCO/PLL solutions is the incredibly low power consumption (especially when compared to GaAs-based products), possible because of our high performance QUBiC SiGe:C process.

Ref spurious < -70dB



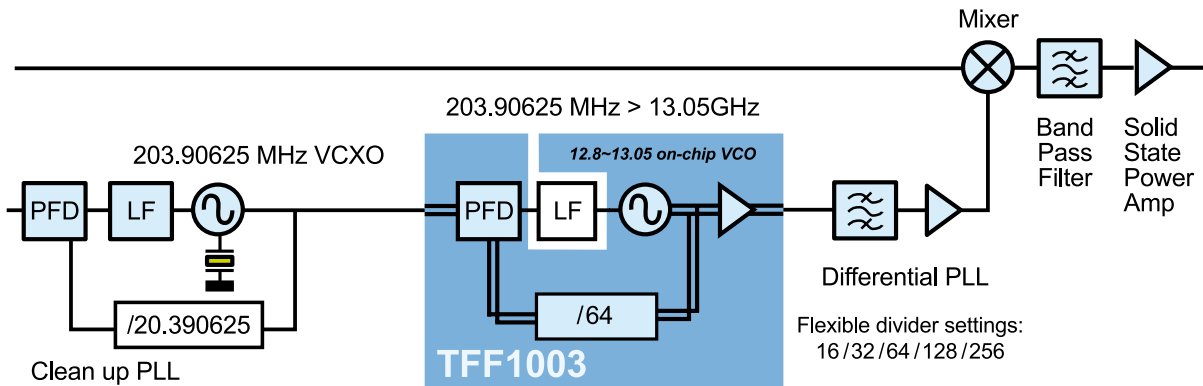
SSB phase noise density < -100dB/Hz



Power consumption
< 350mW

T [°C]	Icc [mA]	Vcc [V]
-40	92	3.3
25	99	3.3
85	104	3.3

One of the first in the family of fully integrated silicon LO generator products, the TFF1003 offers integrated VCO and divider PLL for Ku-band operation.



Low noise LO generators for VSAT applications

Type	Package	$f_{IN(REF)}$	V_{CC}	I_{CC}	PLL phase noise @ N=64, @100kHz	PLL $f_{o(RF)}$	Output buffer		Input S_i
							P_o	$RL_{out(RF)}$	
		MHz	Typ V	Typ mA	Max dBc/Hz	GHz	Typ dBm	Max dB	Min dBm
TFF1003HN	SOT616	50~815	3.3	100	-92	12.8~13.05	-5	-10	-10
TFF1007HN*	SOT616	230.46~234.38	3.3	100	-104	14.75~15	-3	-10	-10

Low noise LO generators for general microwave applications

Type	Package	$f_{IN(REF)}$	V_{CC}	I_{CC}	PLL phase noise @ N=64		PLL $f_{o(RF)}$			Output buffer		Input S_i
					@ 100kHz	@ 10MHz	Min	Typ	Max	P_o	$RL_{out(RF)}$	
		MHz	Typ V	Typ mA	dBc/Hz	dBc/Hz	GHz	GHz	GHz	Typ dBm	Max dB	Min dBm
TFF11070HN*	SOT616	27 - 448	3.3	100	-95	-131	6.84	7.00	7.16	-5	-10	-10
TFF11073HN*	SOT616	28 - 468	3.3	100	-95	-131	7.16	7.33	7.49	-5	-10	-10
TFF11077HN*	SOT616	29 - 490	3.3	100	-95	-131	7.49	7.67	7.84	-5	-10	-10
TFF11080HN*	SOT616	31 - 513	3.3	100	-95	-131	7.84	8.02	8.21	-5	-10	-10
TFF11084HN*	SOT616	32 - 537	3.3	100	-95	-131	8.21	8.40	8.59	-5	-10	-10
TFF11088HN*	SOT616	34 - 562	3.3	100	-95	-131	8.59	8.79	8.99	-5	-10	-10
TFF11092HN*	SOT616	35 - 588	3.3	100	-95	-131	8.99	9.20	9.41	-5	-10	-10
TFF11096HN*	SOT616	37 - 616	3.3	100	-95	-131	9.41	9.63	9.85	-5	-10	-10
TFF11101HN*	SOT616	38 - 644	3.3	100	-95	-131	9.85	10.07	10.31	-5	-10	-10
TFF11105HN*	SOT616	40 - 674	3.3	100	-95	-131	10.31	10.54	10.79	-5	-10	-10
TFF11110HN*	SOT616	42 - 706	3.3	100	-95	-131	10.79	11.03	11.29	-5	-10	-10
TFF11115HN*	SOT616	44 - 738	3.3	100	-95	-131	11.29	11.55	11.81	-5	-10	-10
TFF11121HN*	SOT616	46 - 773	3.3	100	-95	-131	11.81	12.09	12.36	-5	-10	-10
TFF11126HN*	SOT616	48 - 809	3.3	100	-95	-131	12.36	12.65	12.94	-5	-10	-10
TFF11139HN*	SOT616	53 - 886	3.3	100	-95	-131	13.54	13.85	14.17	-5	-10	-10
TFF11145HN*	SOT616	55 - 927	3.3	100	-95	-131	14.17	14.50	14.83	-5	-10	-10
TFF11152HN*	SOT616	58 - 970	3.3	100	-95	-131	14.83	15.18	15.52	-5	-10	-10

* = check product status, as this type has not been released for mass production

Bold Red = New, highly recommended product

The right match with our 6th and 7th generation of SiGe:C wideband transistors

Meet the trend toward higher frequencies with NXP's latest SiGe:C microwave NPN transistors, offering you high switching frequencies with extremely high gain and low noise.

All this in an easy-to-use SOT343F package. An ideal solution for applications up to 30 GHz.

RF wideband transistors

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)	PL1 (dB) (typ) (dBmW)	@ V_{CE} = (V)	@ f = (MHz)	@ I_C = (mA)	IP3 (typ) (dBm)	@ IC = (mA)	@ VCE = (V)
BFU610F*	6th	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*	6th	35	SOT343F	40	5	30	130	NPN	28	2400	25	2	0.58	1500	5	2	0.73	2400	5	2	-	-	-	-	23	25	5
BFU660F*	6th	36	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*	6th	37	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*	7th	38	SOT343F	70	2.8	10	30	NPN	16.5	12000	8	2	0.9	5800	2	2	1.7	12000	2	2	-	-	-	-	14.5	8	2
BFU725F/N1	7th	33	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*	7th	39	SOT343F	70	2.8	30	130	NPN	20.3	5800	25	2	0.56	2400	5	2	1	5800	5	2	-	-	-	-	20.5	25	2
BFU760F*	7th	40	SOT343F	70	2.8	70	200	NPN	25	2400	60	2	0.5	1500	20	2	0.6	2400	20	2	-	-	-	-	23	60	2
BFU790F*	7th	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

* = check product status, as this type has not been released for mass production

Bold Red = New, highly recommended product

PIN diodes

For higher power switching and attenuation applications requiring fast switching speed, NXP offers a full line of PIN diodes designed with very low series on resistance (r_D) and low off capacitance (C_d).

These diodes are available in a number of different configurations and surface mount package styles to meet your requirements.

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

Type	Package	Number of diodes	Conf	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 (Ω)	r_D max (Ω)	r_D typ (Ω)	r_D max (Ω)	r_D typ (Ω)	r_D max (Ω)	C_d typ (pF)	C_d typ (pF)	C_d max (pF)	C_d typ (pF)	C_d max (pF)	
BAP64Q	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	

Bold Red = New, highly recommended product

SG = Single
SR = Series

CC = Common Cathode
CA = Common Anode

RF ASICs

Now, the same advanced ASIC services that NXP has provided to select customers for more than 10 years is available to a wider audience. Developers now have the chance to leverage NXP's state-of-the-art process technologies and comprehensive IP portfolio to deliver customized performance for their most sophisticated designs.

Our ASIC partners can create superior RF products with ultra-low noise, active devices with f_T up to 180GHz, and high quality passives. We enable highly integrated products with best-in-class ratings for linearity, noise factor, immunity, power consumption and output power.

QUBiC4 is a BiCMOS process, based on a 0.25 μ m CMOS technology, that has bipolar transistors with an f_T up to 180GHz. The process provides the optimum in terms of RF performance, integration capabilities, and cost. It's an ideal choice for integrated circuits and enables GaAs replacement in high performance applications.

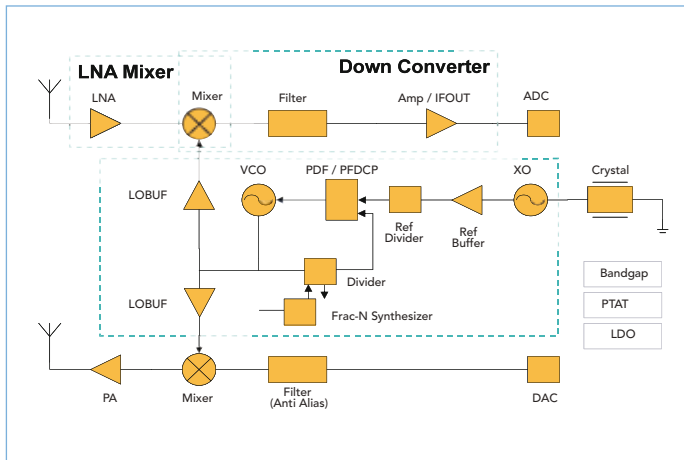
Our ABCD and EZ-HV processes are best-in-class high voltage/power processes for SOI. Supporting applications ranging from 12 to 650V, they enable robust monolithic integration of CMOS, Bipolar and DMOS (BCD) on one chip, and advanced performance in automotive, lighting, power-conversion, and audio designs. These processes are complemented by the 16V, 0.14 μ m C14P process for interface and portable audio applications.

The C14AMS process, a 0.14 μ m, 55GHz RF-CMOS mixed signal technology, includes (flash) memories and delivers superior performance in data converters, audio applications, microcontrollers, and interfaces.

Our broad-based portfolio of design IP lets you choose from a wide selection of advanced functions. Along with our digital standard and I/O cells, we offer an extensive range of CMOS functions (processors, memories, interfaces, buses, data converters, PLLs, oscillators) and state-of-the-art RF function (VCOs, LNAs, PLLs, PAs, mixers, down converters, dividers, synthesizers).

You can select from several Customer-Owned Tooling (COT) business models and decide on the level of service you need. Our offerings can include complete design suites for COT design, design consultancy and DfT support, and fast prototyping that covers MPW runs, grinding/sawing, and sample assembly. We can also provide design debug and modification (FIB), along with test development and product engineering. Life testing, failure analysis, and qualification are other options. All our wafer production, assembly, and test operations are conducted in-house, so you deal with one supplier, from start to finish.

NXP delivers advanced performance with high integration



Key features

- ▶ Mature, high yielding process technologies
 - QUBiC4 (SiGe RF-BiCMOS, SiGe:C)
 - ABCD/EZ-HV/C14P (high voltage/power)
 - C14AMS (RF-CMOS mixed-signal, including memories)
- ▶ Broad portfolio of design IP
 - Digital standard cells and I/O cells
 - CMOS: processors, memories, interfaces, buses, data converters, PLLs, oscillators
 - RF: VCOs, LNAs, PLLs, PAs, mixers, down converters, dividers, synthesizers
 - High voltage: high-side driver and latch, pulse generator, multiplier, bandgap
- ▶ Proven in-house manufacturing and design IP supported by experienced design engineers
- ▶ Fast prototyping and wide packaging portfolio
- ▶ Full set of design tools with accurate, compact models, plus consultancy services

High-speed data converters

Building on over two decades of experience in developing high-speed data converters, NXP has introduced a new line of ADC and DAC products suitable for the most demanding Aerospace and Defense applications. NXP's high-speed analog-to-digital converters range between 8- to 16-bit and sample between 40 to 250Msps. These high performance ADCs fit well within the receiver chain of Software Define Radio, tactical and emergency radios and radar receivers.

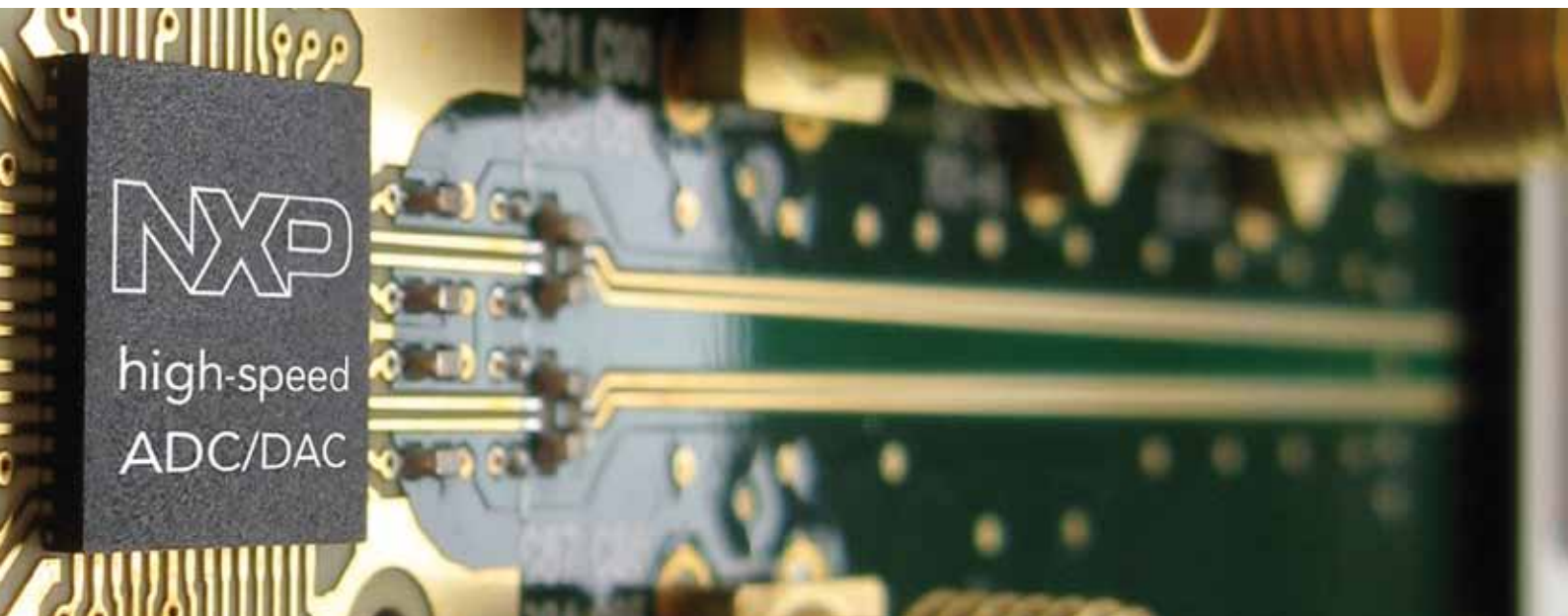
NXP's high-speed digital-to-analog converters range between 10- and 16-bit with sampling speeds of 105Msps to 1Gsps. These ADCs and DACs are offered with three different choices of digital interfaces: Low Voltage CMOS, Low Voltage Differential Signaling Dual Data Rate (LVDS DDR) and the newest high-speed gigabit JESD204A-based serial interface.

This new JEDEC standardized serial interface between high-speed converters and VLSI baseband processors (FPGA or DSP based) maintains state-of-the-art core converter dynamic performance (SFDR, SNR), while running powerful embedded synchronization and scrambling protocols without any additional software overhead.

The JESD204A serial interface achieves transfer speeds of up to 4Gbps with up to 100cm compliant signal reach.

The reduction in the number of digital interface lanes allows the PCB designer to reduce board size by 10% as well as reduce the number of layers, leading to an overall 25% reduction in PCB cost. Aside from the cost benefits, the JESD204A interface promotes higher system performance by reducing EMI/RFI interference and facilitating multi-channel coherent synchronization across multiple converter devices.





DAC offering

- ▶ Dual Channel
- ▶ Resolution: 10- to 14-bits
- ▶ Sampling rates: 125 to 750Msps
- ▶ Supply voltages: 1.8 / 3.3V
- ▶ Low power dissipation
- ▶ Excellent SFDR ratings
- ▶ Interpolation: 2x, 4x, 8x
- ▶ High-speed dual DACs
- ▶ JESD204A, LVCMOS and LVDS DDR
- ▶ Packages: HVQFN, HTQFP, LQF

For its COTS (Commercial Off-the-Shelf) products NXP also offers extended qualification and reliability testing in order to meet the stringent Aerospace and Defense lifetime requirements. NXP has the capability to use the standard COTS products and integrate them into ceramic packages and extend the qualification and lot acceptance testing based on MIL-STD-883 and ESA/SCC standards. See "NXP Quality and Military Standards" section of this brochure for more details.

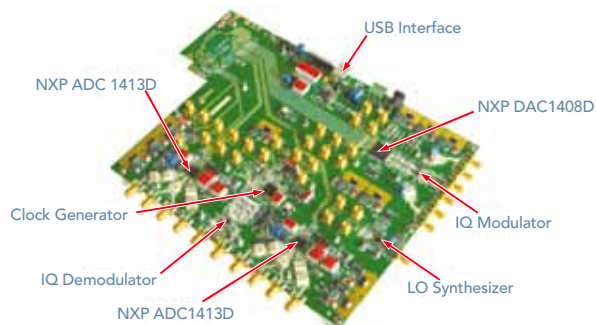
Across all interfaces, our high-speed DACs and ADCs deliver best-in-class converter core performance and ultra-stable dynamic performance across a broad temperature range. We're also the only semiconductor vendor to support true system-level integration across the RF front-end.

NXP offers numerous reference designs, including this radio reference design complete with receiver RF demodulation, transmitter RF modulation, transmitter DPD feedback ADC, and SMA, FMC

ADC offering

- ▶ Single, dual and quads
- ▶ Resolution: 8- to 16-bits
- ▶ Sampling rates: 20 to 250Msps
- ▶ Supply voltages: 1.8 / 3.3 / 5.0V
- ▶ Serial interface, input buffer, internal V_{ref}
- ▶ JESD204A and LVCMOS and LVDS DDR
- ▶ Low power dissipation
- ▶ Excellent SFDR and SNR ratings
- ▶ Packages: HVQFN, QFP, SSOP, LQFP, HTQFN

and HSMC connections to FPGA baseboards. Other reference designs include standalone ADC and DAC performance evaluation boards, interoperability demonstration boards with Altera, Lattice and Xilinx FPGAs, and a universal data acquisition and generation card with USB connectivity. NXP has dedicated data converter field application engineers across the world. They are backed up with regional application engineering centers staffed by NXP high-speed data converter experts supported with high quality lab test equipment.



High-speed ADCs

Type	Description	Supply Voltage (V)	Power Dissipation (mW)	SFDR (dBc)	SNR (dBFS)	Digital Interface	Package
ADC1613D series	Dual 16-bit ADC up to 65/80/105/125Msps with serial interface	1.8 / 3.3	445	93	73.2	JESD204A	HVQFN56 8x8
ADC1610S series	Single 16-bit ADC up to 65/80/105/125Msps	1.8 / 3.3	350	93	73.2	LVC MOS and LVDS/DRR	HVQFN40 6x6
ADC1415S series	Single 14-bit ADC up to 65/80/105/125Msps with input buffer	1.8 / 3.3/5	550	91	73.2	LVC MOS and LVDS/DRR	HVQFN40 6x6
ADC1413D series	Dual 14-bit ADC up to 65/80/105/125Msps with serial interface	1.8 / 3.3	445	91	73.2	JESD204A	HVQFN56 8x8
ADC1412D series	Dual 14-bit ADC up to 65/80/105/125Msps with serial interface	1.8 / 3.3	350	91	73.2	LVC MOS and LVDS/DRR	HVQFN64 9x9
ADC1410S series	Single 14-bit ADC up to 65/80/105/125Msps	1.8 / 3.3	350	91	73.2	LVC MOS and LVDS/DRR	HVQFN40 6x6
ADC1215S series	Single 12-bit ADC up to 65/80/105/125Msps with input buffer	1.8 / 3.3/5	550	91	70.7	LVC MOS and LVDS/DRR	HVQFN40 6x6
ADC1213D series	Dual 12-bit ADC up to 65/80/105/125Msps with serial interface	1.8 / 3.3	445	91	70.7	JESD204A	HVQFN56 8x8
ADC1212D series	Dual 12-bit ADC up to 65/80/105/125Msps	1.8 / 3.3	350	91	70.7	LVC MOS and LVDS/DRR	HVQFN64 9x9
ADC1210S series	Single 12-bit ADC up to 65/80/105/125Msps	1.8 / 3.3	350	91	70.7	LVC MOS and LVDS/DRR	HVQFN40 6x6
ADC1207S080	Single 12-bit ADC 80Msps	5	840	90	71	parallel LVC MOS	HTQFN48 7x7
ADC1206S series	Single 12-bit ADC 40/50/70Msps	3.3 / 5.0	550	72	64	parallel CMOS and TTL	QFP44
ADC1115S125	Single 11-bit ADC up to 125Msps with input buffer	1.8 / 3.3/5	790	90	66.7	LVC MOS and LVDS/DRR	HVQFPN40 6x6
ADC1113D125	Dual 11-bit ADC up to 125Msps with serial interface	1.8 / 3.3	635	90	66.7	JESD204A	HVQFPN56 8x8
ADC1015S series	Single 10-bit ADC up to 65/80/105/125Msps with input buffer	1.8 / 3.3/5	550	91	61.7	LVC MOS and LVDS/DRR	HVQFPN40 6x6
ADC1010S series	Single 10-bit ADC up to 125Msps	1.8 / 3.3	350	91	61.7	LVC MOS and LVDS/DRR	HVQFPN40 6x6
ADC1006S series	Single 10-bit ADC 50/70Msps	3.3 / 5.0	550	71	59	parallel CMOS and TTL	QFP44
ADC1005S060	Single 10-bit ADC 60Msps	5	312	72	58	parallel CMOS and TTL	SSOP28
ADC1004S series	Single 10-bit ADC 30/40/50Msps	5	175	72	58	parallel CMOS and TTL	SSOP28
ADC1003S series	Single 10-bit ADC 30/40/50Msps with internal Vref	5	235	70	58	parallel CMOS and TTL	SSOP28
ADC1002S020	Single 10-bit ADC 20Msps	3 to 5.25	53	72	60	parallel CMOS and TTL	LQFP32
ADC0808S series	Single 8-bit ADC 125/250Msps	1.8 / 3.3	215	57	50	parallel CMOS/LVDS clk	HTQFN48 7x7
ADC0804S series	Single 8-bit ADC 30/40/50Msps	5	175	72	49	parallel CMOS and TTL	SSOP28
ADC0801S040	Single 8-bit ADC 40Msps	2.7 to 5.5	30	59	47	parallel CMOS and TTL	SSOP20

High-speed DACs

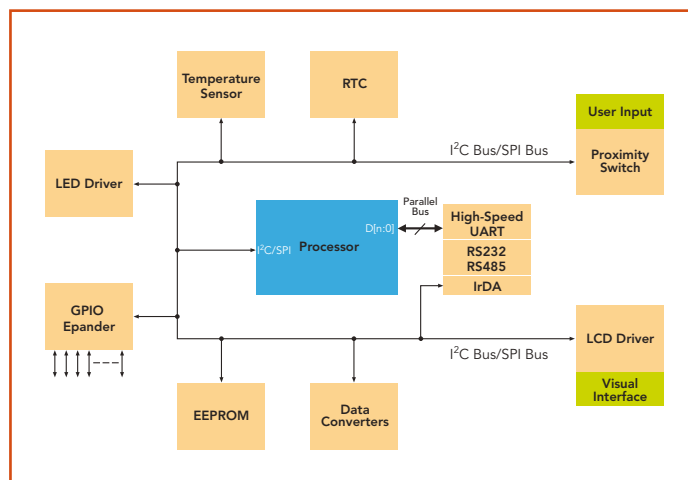
Type	Description	Supply Voltage (V)	Power Dissipation (mW)	SFDR (dBc)	Interpolation	Package
DAC1408D series	Dual 14-bit DAC up to 650/750Msps	1.8 / 3.3	850	77	2x, 4x, 8x	HVQFN64 9x9
DAC1405D series	Dual 14-bit DAC up to 650/750Msps	1.8 / 3.3	550	77	2x, 4x, 8x	HTQFP100 14x14
DAC1403D160	Dual 14-bit DAC 160Msps	3.3	210	80	2x	HTQFP80 12x12
DAC1401D125	Dual 14-bit DAC 125Msps	3.3	105	88	-	LQFP48
DAC1208D series	Dual 12-bit DAC up to 650/750Msps	1.8 / 3.3	850	77	2x, 4x, 8x	HVQFN64 9x9
DAC1205D series	Dual 12-bit DAC up to 650/750Msps	1.8 / 3.3	550	80	2x, 4x, 8x	HTQFP100 14x14
DAC1203D160	Dual 12-bit DAC 160Msps	3.3	210	77	2x	HTQFP80 12x12
DAC1201D125	Dual 12-bit DAC 125Msps	3.3	105	65	-	LQFP48
DAC1008D series	Dual 10-bit DAC up to 650/750Msps	1.8 / 3.3	850	77	2x, 4x, 8x	HVQFN64 9x9
DAC1005D series	Dual 10-bit DAC up to 650/750Msps	1.8 / 3.3	550	77	2x, 4x, 8x	HTQFP100 14x14
DAC1003D160	Dual 10-bit DAC 160Msps	3.3	210	80	2x	HTQFP80 12x12
DAC1001D125	Dual 10-bit DAC 125Msps	3.3	105	65	-	LQFP48

Interface products

With one of the most extensive portfolios of interface products, NXP is positioned to support Aerospace and Defense core designs by providing essential I²C-Bus, analog, and RF functions, including modular RF/IF blocks, audio amplifiers, and op amps. The majority of our devices are characterized from -40°C to +125°C, a critical specification when considering optimal reliability and operation in harsh conditions.

Our advanced processing technology is the cornerstone of our commitment to the aerospace and defense engineer to continue developing the latest in interface products with unparalleled performance.

The adjacent block diagram illustrates a variety of interface product functions as the peripheral devices around the processor.



Interface product devices and temperature ranges

GPIO expander		
PCA9554	8-bit I ² C GPIO expander	-40°C to +85°C

General purpose input (GPI)		
PCA9701	16-bit 18-V tolerant SPI GPI	
PCA9703	16-bit 18-V tolerant SPI GPI with maskable interrupt	-40°C to +125°C

LED controller		
PCA9635	16-bit LED controller	-40°C to +85°C
PCA9685	16-bit LED controller	-40°C to +85°C

Voltage-level translator		
GTL2002	2-bit bidirectional low voltage translator	-40°C to +85°C

Real-time clock (RTC)		
PCA8565	I ² C-Bus real-time clock/calendar	-40°C to +125°C
PCA21125	SPI-Bus real-time clock/calendar	-40°C to +125°C
PCF85163	Low-power I ² C-Bus real-time clock/calendar	-40°C to +85°C
PCF2123	Low-power SPI-Bus real-time clock/calendar	-40°C to +85°C
PCF2127A	SPI/I ² C-Bus real-time clock/calendar/RAM	-40°C to +85°C
PCF2129A	SPI/I ² C-Bus real-time clock/calendar	-40°C to +85°C
PCA8802	SmartCard real-time clock	-40°C to +85°C

LCD segment driver		
PCF85162	128 segment driver, I ² C, Mux 1:4	-40°C to +85°C
PCA85162	128 segment driver, I ² C, Mux 1:4	-40°C to +95°C
PCF85176	160 segment driver, I ² C, Mux 1:4	-40°C to +85°C
PCA85176	160 segment driver, I ² C, Mux 1:4	-40°C to +95°C
PCF85134	240 segment driver, I ² C, Mux 1:4	-40°C to +85°C
PCF85133	320 segment driver, I ² C, Mux 1:4	-40°C to +85°C
PCA85133	320 segment driver, I ² C, Mux 1:4	-40°C to +95°C
PCA85132	640 segment driver, I ² C, Mux 1:4	-40°C to +95°C

LCD character driver		
PCF2113	2-line x 12-character plus 120 icons	-40°C to +85°C
PCF2116	2-Line x 24-character	-40°C to +85°C
PCF2119	2-line x 16-character plus 160 icons	-40°C to +85°C

LCD graphic driver		
PCF8531	34 x 128 small 4 x 20 text character full graphics	-40°C to +85°C
PCF8811	80 x 128 large universal display	-40°C to +85°C

For an extensive list of interface products, visit <http://www.ics.nxp.com/interface>

Microcontroller products

NXP Semiconductors has a broad portfolio of microcontroller solutions that complement Aerospace and Defense core designs by providing best-in-class embedded memory with many peripheral options to meet every design need. Many of the devices are qualified to operate within an extended temperature range from -40°C up to +125°C and are designed to ensure reliable operation under harsh conditions. NXP is committed to supporting the aerospace and defense system requirements and will continue to release new microcontroller products that leverage NXP's most advanced processing technology to create best-in-class performance. From the smallest 8-bit to the highest performing 32-bit ARM microcontrollers, we drive the industry as an innovation

leader with our highly integrated and cost effective products. Our leading ARM9/ARM7-based LPC3000 and LPC2000 families have numerous, sophisticated integrated peripherals available. The industry's fastest microcontrollers based on the low-power, cost-effective ARM Cortex-M3 and Cortex-M0 cores are part of our exciting new LPC1000 family, running at speeds of up to 100MHz and offering best-in-class performance and peripheral support. Our ARM-based LH7A and LH7 families feature high resolution integrated LCD controllers and provide System-on-Chip capability. Our established LPC900, LPC700, and 80C51 microcontroller families deliver solid 80C51-based performance. Be sure to visit our support section at www.nxp.com/microcontrollers

Microcontroller devices

LPC3000 family

The 32-bit LPC3000 family is based on the ARM926EJ core and is the only ARM9 microcontroller that provides a vector floating-point co-processor and integrated USB On-The-Go, as well as the ability

to operate in ultra-low power mode down to 0.9V. With speeds of up to 266MHz, the NXP LPC3000 family supports Linux and WinCE.

Type	Memory				Timers		Serial interfaces							Analog	LCD Controller/ Interface	SD/MMC	I/O pins	External bus interface	PLL	Max. freq. (MHz)	CPU voltage	I/O voltage	Temp. range options	Package
	FLASH	RAM	Instruction cache	Data cache	No. of timers*	PWM channels	Ethernet	USB	UART	I ² C	SPI	SSP	I ² S	ADC (10-bit) No. of chan- nels										
LPC3250		256 KB	32 KB	32 KB	8	11	1	1	7	2	2	2	2	3	•	•	87	•	•	266/ 208	1.35/ 1.2 V	1.8/ 2.8/ 3.0 V	F	LFBGA296
LPC3240		256 KB	32 KB	32 KB	8	11	1	1	7	2	2	2	2	3		•	87	•	•	266/ 208	1.35/ 1.2 V	1.8/ 2.8/ 3.0 V	F	LFBGA296
LPC3230		256 KB	32 KB	32 KB	8	11		1	7	2	2	2	2	3	•	•	87	•	•	266/ 208	1.35/ 1.2 V	1.8/ 2.8/ 3.0 V	F	LFBGA296
LPC3220		128 KB	32 KB	32 KB	8	11		1	7	2	2	2	2	3		•	87	•	•	266/ 208	1.35/ 1.2 V	1.8/ 2.8/ 3.0 V	F	LFBGA296
LPC3154		192 KB	16 KB	16 KB	4	1		1	1	1	1		1	3	•	•	157	•	•	180	1.2 V	1.8/ 2.8/ 3.3 V	F	TFBGA208
LPC3152		192 KB	16 KB	16 KB	4	1		1	1	1	1		1	3	•	•	157	•	•	180	1.2 V	1.8/ 2.8/ 3.3 V	F	TFBGA208
LPC3143		192 KB	16 KB	16 KB	4	1		1	1	2	1		2	4	•	•	97	•	•	270	1.2 V	1.8/ 2.8/ 3.3 V	F	TFBGA180
LPC3141		192 KB	16 KB	16 KB	4	1		1	1	2	1		2	4	•	•	97	•	•	270	1.2 V	1.8/ 2.8/ 3.3 V	F	TFBGA180
LPC3131		192 KB	16 KB	16 KB	4	1		1	1	2	1		2	4	•	•	97	•	•	180	1.2 V	1.8/ 2.8/ 3.3 V	F	TFBGA180
LPC3130		96 KB	16 KB	16 KB	4	1		1	1	2	1		2	4	•	•	97	•	•	180	1.2 V	1.8/ 2.8/ 3.3 V	F	TFBGA180
LPC3180/01		64 KB	32 KB	32 KB	4	2		1	7	2	2			3		•	55	•	•	208	1.2 V	1.8/ 2.8/ 3.0 V	F	LFBGA320

LPC1000 family

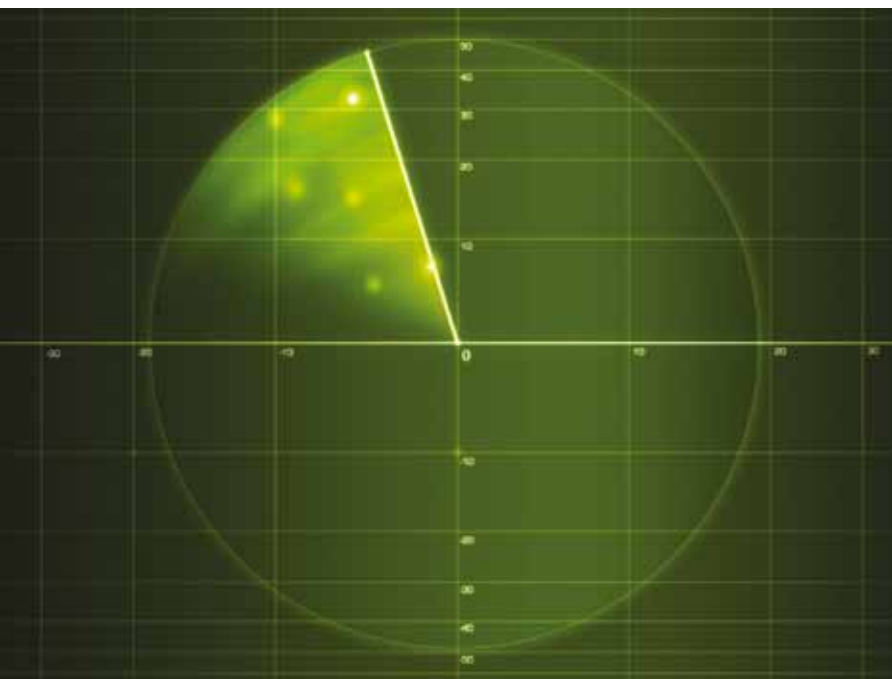
The LPC1100 series, based on the ARM Cortex-M0, is the lowest priced 32-bit MCU solution on the market. It delivers unprecedented performance, simplicity, low power, and dramatic reductions in

code size for every application. Based on the ARM Cortex-M3 core, operating at up to 120MHz, the LPC1700 series are low power 32-bit microcontrollers featuring a broad range of serial interfaces.

Type	Memory		Timers		Serial interfaces								Analog			I/O pins	PLL	Max. freq. (MHz)	CPU voltage	I/O voltage	Temp. range options	Package
	FLASH	RAM	No. of timers*	PWM channels	Ethernet	USB	UART	I ² C	CAN	SPI	SSP	I ² S	ADC channels/ resolution	DAC (10-bit) No. of channels								
LPC1700 devices																						
LPC1769	512 KB	64 KB	6	6	1	1	4	3	2	1	2	1	8/12 b	1		70	•	120	3.3 V	F	LQFP100	
LPC1768	512 KB	64 KB	6	6	1	1	4	3	2	1	2	1	8/12 b	1		70	•	100	3.3 V	F	LQFP100, TFBGA100	
LPC1767	512 KB	64 KB	6	6	1		4	3		1	2	1	8/12 b	1		70	•	100	3.3 V	F	LQFP100	
LPC1766	256 KB	64 KB	6	6	1	1	4	3	2	1	2	1	8/12 b	1		70	•	100	3.3 V	F	LQFP100	
LPC1765	256 KB	64 KB	6	6		1	4	3	2	1	2	1	8/12 b	1		70	•	100	3.3 V	F	LQFP100	
LPC1764	128 KB	32 KB	6	6	1	1	4	3	2	1	2		8/12 b			70	•	100	3.3 V	F	LQFP100	
LPC1759	512 KB	64 KB	6	6		1	4	2	2	1	2	1	6/12 b	1		52	•	120	3.3 V	F	LQFP80	
LPC1758	512 KB	64 KB	6	6	1	1	4	2	2	1	2	1	6/12 b	1		52	•	100	3.3 V	F	LQFP80	
LPC1756	256 KB	32 KB	6	6		1	4	2	2	1	2	1	6/12 b	1		52	•	100	3.3 V	F	LQFP80	
LPC1754	128 KB	32 KB	6	6		1	4	2	1	1	2		6/12 b	1		52	•	100	3.3 V	F	LQFP80	
LPC1752	64 KB	16 KB	6	6		1	4	2	1	1	2		6/12 b			52	•	100	3.3 V	F	LQFP80	
LPC1751	32 KB	8 KB	6	6		1	4	2	1	1	2		6/12 b			52	•	100	3.3 V	F	LQFP80	
LPC1100 devices																						
LPC1114	32 KB	4-8 KB	5	13**			1	1			1-2		8/10 b			28 - 42	•	50	3.3 V	F	HVQFN33, LQFP48	
LPC1113	24 KB	4-8 KB	5	13**			1	1			1-2		8/10 b			28 - 42	•	50	3.3 V	F	HVQFN33, LQFP48	
LPC1112	16 KB	2-4 KB	5	13**			1	1			1		8/10 b			28	•	50	3.3 V	F	HVQFN33	
LPC1111	8 KB	2-4 KB	5	13**			1	1			1		8/10 b			28	•	50	3.3 V	F	HVQFN33	
LPC11C00 devices																						
LPC11C12	16 KB	8 KB	5	13**			1	1	1		2		8/10 b			42	•	50	3.3 V	F	LQFP48	
LPC11C14	32 KB	8 KB	5	13**			1	1	1		2		8/10 b			42	•	50	3.3 V	F	LQFP48	

* Includes Watchdog timer and real-time clock. ** Using timers 0-3.

For an extensive list of all our microcontroller products and tools, visit <http://www.ics.nxp.com/microcontrollers>



Power management products

NXP offers a wide variety of AC-DC power conversion controllers and regulators. We have flyback controllers, resonant controllers and

secondary side controllers that provide the ultimate in efficiency and very low stand-by powers.

Type	Package	Description	Topology	f_{osc}^{max} [kHz]	V_{cc}^{max}	Overload protection	Soft start
TEA1610P	DIP16 SOT38-1	Zero-voltage-switching resonant converter controller	Resonant	500	15	Latched	No
TEA1610T	SO16 SOT109-1	Zero-voltage-switching resonant converter controller	Resonant	500	15	Latched	No
TEA1611T	SO20 SOT163-1	Zero-voltage-switching resonant converter controller	Resonant	500	20	Latched	Yes
TEA1713T	SO24 SOT137-1	GreenChip™ Resonant; LLC+PFC controller	Resonant+PFC	500	38	Latched	Yes
TEA1733AT	SO8 SOT96-1	GreenChip™ III Low Power, Flyback controller	FF Flyback	90	30 (35V < 100msec)	Safe Restart	Yes
TEA1733LT	SO8 SOT96-1	GreenChip™ III Low Power, Flyback controller	FF Flyback	67	30 (35V < 100msec)	Latched	Yes
TEA1733P	DIP8	GreenChip™ III Low Power, Flyback controller	FF Flyback	67	30 (35V < 100msec)	Safe Restart	Yes
TEA1733T	SO8 SOT96-1	GreenChip™ III Low Power, Flyback controller	FF Flyback	67	30 (35V < 100msec)	Safe Restart	Yes
TEA1750T	SO16 SOT109-1	GreenChip™ III, PFC + Flyback controller	QR PFC + QR Flyback	125 (PFC) / 125 (Flyback)	38	Safe Restart	Yes (PFC) / Yes (Flyback)
TEA1751LT	SO16 SOT109-1	GreenChip™ III, PFC + Flyback controller	QR PFC + QR Flyback	125 (PFC) / 125 (Flyback)	38	Safe Restart	Yes (PFC) / Yes (Flyback)
TEA1751T	SO16 SOT109-1	GreenChip™ III, PFC + Flyback controller	QR PFC + QR Flyback	125 (PFC) / 125 (Flyback)	38	Latched	Yes (PFC) / Yes (Flyback)
TEA1752LT	SO16 SOT109-1	GreenChip™ III, PFC + Flyback controller	QR PFC + QR Flyback	250 (PFC) / 125 (Flyback)	38	Safe Restart	Yes (PFC) / Yes (Flyback)
TEA1752T	SO16 SOT109-1	GreenChip™ III, PFC + Flyback controller	QR PFC + QR Flyback	250 (PFC) / 125 (Flyback)	38	Latched	Yes (PFC) / Yes (Flyback)
TEA1761T	SO8 SOT96-1	GreenChip™ SR, Sync. Rec. control + feedback	Synchronous Rectification	500	38		
TEA1762T	SO14 SOT108-1	GreenChip™ SR, Sync. Rec. control + feedback	Synchronous Rectification	500	38		
TEA1791AT	SO8 SOT96-1	GreenChip™ SR, Sync. Rec. control	Synchronous Rectification	500	38		
TEA1791T	SO8 SOT96-1	GreenChip™ SR, Sync. Rec. control	Synchronous Rectification	500	38		

Power solution product highlight

GreenChip™ III is the third generation of green Switched Mode Power Supply (SMPS) controller ICs. The TEA1751 combines a controller for Power Factor Correction (PFC) and a flyback controller. Its high level of integration allows the design of compact, high

efficiency power supplies with a very low number of external components. GreenChip™ III controllers are an excellent choice for power supplies up to about 250W.

Key features

- ▶ Integrated power factor correction (PFC) controller and flyback controller
- ▶ High level of integration, low external component count
- ▶ High voltage start-up current source
- ▶ Wide V_{cc} range (38V)
- ▶ Fast latch reset function implemented, enabling fast recovery by mains interrupt
- ▶ Soft (re)start for both flyback and PFC controller
- ▶ Mains under-voltage and brown-out protection integrated

Flyback controller

- ▶ Zero voltage switching
- ▶ Quasi-resonant operation with frequency limitation
- ▶ Frequency reduction at low loads

Power factor controller

- ▶ Switches off automatically at standby/low power mode (controlled by flyback controller)
- ▶ Dedicated circuitry built in to prevent audible noise during low power mode

Power MOSFET products

The LPAK (Loss Free PAcKage) is NXP's innovative solution for a reliable, thermally enhanced power package. LPAK offers the designer a MOSFET with similar electrical and thermal performance of DPAK, with a footprint 46% smaller.

The NXP LPAK is optimized for high density applications, delivering the ideal combination of ultra-low package resistance, superior reliability and thermal performance. All this in a very small package that ensures you can put power where you need it most.

The copper clip design overcomes the limitations of the wire bonds found in traditional power packages to give an extremely reliable package ideally suited for demanding applications. LPAK delivers compact power to many applications that were previously limited to large discrete power packages.

LPAK is fully qualified to AEC-Q101 standard for discrete devices.



Key features

- ▶ Low inductance
- ▶ Low thermal resistance
- ▶ Dimensions comparable to SO8
- ▶ Significantly thinner than SO8 & DPAK
- ▶ Wirebond free - Cu clip design
- ▶ High current transient robustness
- ▶ 100% avalanche tested
- ▶ AEC-Q101 qualified to 175°C
- ▶ Leads are optical-inspection friendly

VDS (V)	RDson max @ VGS = 10V (mΩ)	RDson max @ VGS = 5V (mΩ)	ID (MAX) @ 25°C (A)	QG(tot) Typ (nC)	Package
30	7		63	31	BUK7Y07-30B
	10		47	18.8	BUK7Y10-30B
	20		28	11.2	BUK7Y20-30B
	6	7	63	28.1	BUK9Y07-30B
	9	11	59		BUK9Y11-30B
	19	22	26.65	10.5	BUK9Y22-30B
40	8		58.85	36.3	BUK7Y08-40B
	13		41	19	BUK7Y13-40B
	25		25	12.1	BUK7Y25-40B
	8	9	53	30	BUK9Y09-40B
	11	14	40	21	BUK9Y14-40B
	24	27	24	11	BUK9Y27-40B
55	12		43.7	35.2	BUK7Y12-55B
	18		33.5	21.9	BUK7Y18-55B
	35		20.1	13.1	BUK7Y35-55B
	11	12	43.8	32	BUK9Y12-55B
	17.3	19	32	18	BUK9Y19-55B
	36	40	26	11	BUK9Y40-55B
75	18		34.9	35	BUK7Y18-75B
	28		25.1	21.2	BUK7Y28-75B
	54		15.1	12	BUK9Y54-75B
	18	19	34.1	30	BUK9Y19-75B
	28	30	24	19	BUK9Y30-75B
	53	58	14.66	10.7	BUK9Y58-75B
100	102		10.6	12.2	BUK7Y102-100B
	33		24.78		BUK7Y33-100B
	53		17.6	22	BUK7Y53-100B
	99	104	10.48	11	BUK9Y104-100B
	31.2	34	24.89		BUK9Y34-100B
	49	53	23		BUK9Y53-100B

Logic products

NXP is deeply committed to the Logic market. To ensure that our portfolio remains cutting-edge, we are continually investing in new process, packaging technologies and packaging facilities. We offer a broad variety of innovative products, ranging from state-of-the-art solutions for emerging applications to specialty functions and proven, mature solutions that enhance virtually every application.

We support a wide range of speed and performance options with a focus on reduced power consumption and smaller size. Our

advanced CMOS processes deliver robust performance and have driven the expansion of our low power 1.8V and 3.3V logic families. Logic families are characterized and specified from -40°C to +125°C.

NXP offers -

- ▶ More choices and better performance in low-voltage applications
- ▶ Industry's smallest package for gates, octals and MSI functions
- ▶ Miniature packages for space constrained applications
- ▶ Configurable logic functions
- ▶ Low-ohmic switches and translators for all of your logic needs

High-voltage logic spectrum

Increasing speed →

HEF4000B	HC/T	AHC/T	FAST	ABT	CBT
▶ 60 ns performance* ▶ ±3 mA drive* ▶ 600 µA standby current ▶ V_{CC}: 5 – 15V ▶ Gate, MSI, buffer functions ▶ Multi-sourced ▶ NXP number one worldwide ▶ DIL, SO, SSOP, TSSOP	▶ 9 ns performance ▶ ±8 mA drive ▶ 80 µA standby current ▶ V_{CC}: 2 – 6V ▶ Gate, MSI, buffer functions ▶ Analog switch functions ▶ PicoGate packaging ▶ Multi-sourced ▶ MicroPak packaging ▶ SO, TSSOP, DQFN	▶ 5 ns performance ▶ ±8 mA drive ▶ 40 µA standby current ▶ V_{CC}: 2 – 6V ▶ Gate, bus interface functions ▶ PicoGate packaging ▶ Multi-sourced ▶ MicroPak packaging ▶ SO, TSSOP, DQFN ▶ Replaces VHC/T	▶ 4 ns performance ▶ -15/24 mA drive ▶ 90 µA standby current ▶ V_{CC}: 4.5 – 5.5V ▶ Termination resistor option ▶ Gate, MSI, bus interface functions ▶ Multi-sourced ▶ DIL, SO, SSOP, TSSOP	▶ 3 ns performance ▶ -32/64 mA drive ▶ 250 µA standby current ▶ V_{CC}: 4.5 – 5.5V ▶ Bus hold option ▶ Termination resistor option ▶ Live insertion ▶ Gates, bus, interface functions ▶ Multi-sourced ▶ DIL, SO, SSOP, TSSOP	▶ Sub 1 ns prop delays ▶ 5 ohm RON ▶ V_{CC}: 4.5 – 5.5V ▶ For circuit isolation and switching ▶ Percharge circuit for hot plugging ▶ Schottky or charge pump undershoot protection ▶ Internal diode for level shifting ▶ Multi-sourced ▶ DIL, SO, SSOP, TSSOP
Function available = 85	Function available = 321	Function available = 105	Function available = 80	Function available = 64	Function available = 30

* At 15 V V_{CC}

Low-voltage logic spectrum

Increasing speed →

LV	LVC	AUP	ALVC	LVT	ALVT
▶ 9 ns performance ▶ 8 mA drive ▶ 20 µA standby current ▶ V_{CC}: 1 – 3.6V* ▶ Gate, MSI, buffer functions ▶ SO, SSOP, TSSOP ▶ Multi-sourced	▶ 4 ns performance ▶ -24/24 mA drive ▶ 20 µA standby current ▶ V_{CC}: 1.2 – 3.6V* ▶ 5V tolerant I/O's ▶ Live insertion ▶ Bus hold option ▶ Termination resistor option ▶ Gates, MSI, bus interface functions ▶ Multi-sourced ▶ SO, TSSOP, PicoGate DQFN ▶ MicroPak ▶ Replaces LCX	▶ 4 ns performance ▶ -4/4 mA static drive ▶ 0.9 µA standby current ▶ Cpd 4.5 pF ▶ Optimized for 1.8V ▶ V_{CC}: 0.8 – 3.6V ▶ 3.6 tolerant I/O's ▶ PicoGate and MicroPak ▶ Multi-sourced ▶ Replaces ULP	▶ 2 ns performance ▶ -24/24 mA drive ▶ 40 µA standby current ▶ V_{CC}: 1.2 – 3.6V ▶ 5 V tolerant I/O's** ▶ Bus hold option ▶ Termination resistor option ▶ Bus interface functions ▶ SO, VSSOP, TSSOP BGA, DQFN ▶ Multi-sourced ▶ Replaces VCX	▶ 2 ns performance ▶ -32/64 mA drive ▶ 120 – 190 µA standby current ▶ V_{CC}: 2.7 – 3.6V ▶ 5V tolerant I/O's ▶ Live insertion ▶ Built-in bus hold ▶ Termination resistor option ▶ Gates, bus interface functions ▶ SO, SSOP, BGA, TSSOP, DQFN ▶ Multi-sourced	▶ 1.5 ns performance ▶ 32/64 mA drive ▶ 90 µA standby current ▶ V_{CC}: 2.3 – 3.6V ▶ 5V tolerant I/O's ▶ Live insertion ▶ Built-in bus hold ▶ Termination resistor option ▶ Bus interface functions ▶ SSOP, TSSOP, BGA ▶ Multi-sourced
Function available = 46	Function available = 137	Function available = 57	Function available = 54	Function available = 44	Function available = 23

* LV: some functions can operate up to 5.5V ** ALVC: only non-bus hold types are 5V input tolerant

Discrete semiconductor products

NXP provides one of every four discrete devices used worldwide, a clear indication that these products are valued for their premium quality. We recognize the challenges faced by Aerospace and Defense industry engineers in ensuring they can create reliable designs that meet mission critical objectives. NXP supports these engineers with proven products enabling the realization of the most difficult design requirements. While many systems rely heavily on specialized integrated circuits, discrete devices are commonly used in the area of power management and system protection, where exposure to dangerous stimuli such as ESD or high voltage

transient spikes can bring upon permanent damage.

We are proud to offer a wide variety of bipolar transistors, diodes, small-signal MOSFETs, and complex integrated discrete devices to optimize protection of typical interface ports such as HDMI, USB, and Display Port. Not only are these devices offered with a full range of electrical characteristics but NXP, famous for developing the high volume SOT23 package, has a full catalog of scalable package options to allow for maximum design flexibility.

Diodes (Schottky, low VF MEGA Schottky rectifiers, general purpose, and Zener)

- ▶ Ideal for use as booster elements for DC/DC conversion
- ▶ MEGA (Maximized Efficiency General Applications) products are optimized for low forward voltage and are perfect for free-wheeling (fly back) applications
- ▶ Proven choice for reverse current/polarity protection
- ▶ More than 12 package options available
- ▶ Offered in many configurations, including but not limited to – single, dual series, dual common cathode, dual common anode, etc.
- ▶ Devices for low or medium power applications available
- ▶ Key standard products available: BAS70, BAS40, BAT754, BAT54, BAT120S, etc.
- ▶ Complete range of Zener products to match any design requirement
- ▶ For more information on the full NXP diode catalog, visit <http://www.nxp.com/products/diodes>



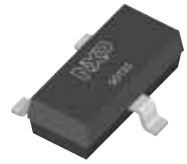
Small-signal transistors (general, matched, RETs, low V_{CEsat} BISS, medium power)

- ▶ Cost advantage alternative for many MOSFET based circuit designs
- ▶ Full support for classic devices: e.g. BC847, PMBT2222, MMBT3904, etc.
- ▶ Current gain matching to 10%, 5%, or 2% for matched pair configuration
- ▶ Resistor Equipped Transistors (RET) offer simplified layout for load-switching applications
- ▶ Innovative Low V_{CEsat} BISS (Breakthrough In Small Signal) transistors using MESH-emitter technology with base current extraction electrodes to achieve very low on-state resistance (down to 50m Ω)
- ▶ Best-in-class performance on many BISS products
- ▶ Integrated module with Schottky diode available for efficient DC/DC conversion circuits
- ▶ High voltage options available (V_{CEO} up to 500V)
- ▶ AEC-Q101 qualified
- ▶ For more information on the full NXP diode catalog, visit http://www.nxp.com/products/bipolar_transistors



Standard linear products (shunt & discrete voltage regulators, constant current source)

- ▶ NXP offers the standard TL431 commonly used in many opto-coupled fly-back power supply applications (visit, <http://standardproducts.nxp.com>)
- ▶ Inexpensive discrete linear regulator solution with internally connected Zener diode and bipolar transistor (visit, <http://standardproducts.nxp.com>)
- ▶ Constant current source that is also ideal for use as a voltage reference visit <http://standardproducts.nxp.com>



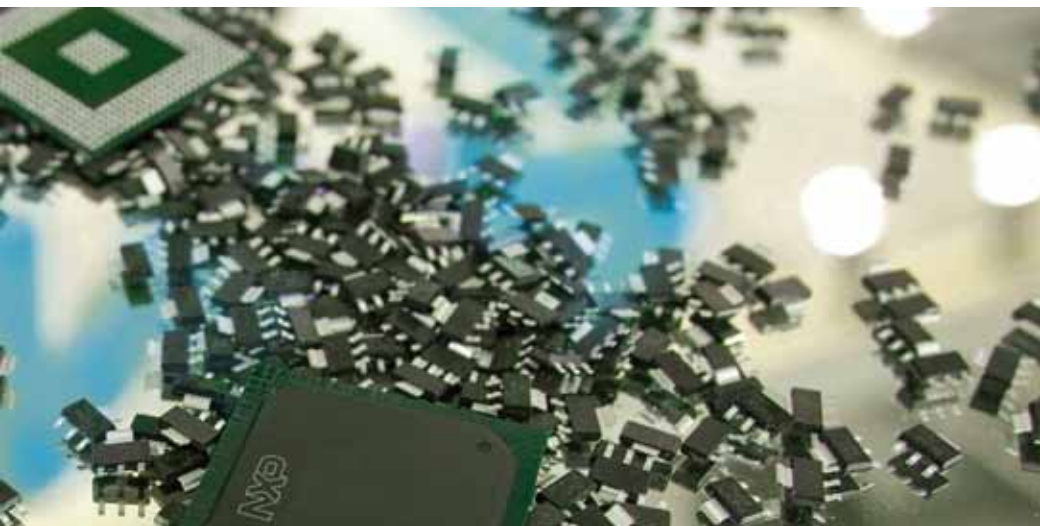
Small-signal MOSFETs (N-Channel, P-Channel, and FET-KYs)

- ▶ Ubiquitous in many power management systems including switched mode conversion schemes and load switching applications
- ▶ NXP offers a large N-Channel portfolio and is currently expanding the P-Channel product line
- ▶ Full range of options available for V_{DS} below 50V, or up to 300V for ID less than 5A
- ▶ Many variants of the trusted 2N7002 device available
- ▶ Broad package range with SOT23, SOT323, SOT363, SOT416 to SOT883 (leadless)
- ▶ Low $R_{DS(on)}$ products to reduce power dissipation
- ▶ Dual and FET-KYs options available
- ▶ For more information on the full NXP MOSFET catalog, visit <http://standardproducts.nxp.com>



Protection and signal conditioning (TVS diodes, standard ESD, and application specific ESD/EMI solutions)

- ▶ NXP is a leading technology supplier for ESD protection to safeguard all systems
- ▶ Broad portfolio from standard products to Femto Farad capacitance for critical high-speed applications
- ▶ Unidirectional, bidirectional, or rail-to-rail protection options of one or more signal lines.
- ▶ Transient Voltage Suppression (TVS) devices that manage up to 600W peak pulse power
- ▶ Integrated application specific solutions including USB, HDMI, LVDS, Display Port, LCD, and Audio interface protection that offer additional features such as EMI filtering or active functions such as level shifting.
- ▶ For more information on the full NXP protection device catalog, visit <http://standardproducts.nxp.com>



NXP quality and military standards

NXP realizes that quality in all its activities adds significant value to our customers' businesses. Our policy is commitment to 100% Quality and Operational Excellence. NXP prides itself on delivering leading edge products of superior quality into all environments. Starting with our supplier base, through design and manufacturing, we implement world-class quality methods, practices, and continuous improvement, all in the pursuit of our zero defect quality policy.

Our attention to quality is paramount in the Aerospace and Defense markets we serve. Harsh and unforgiving environments require not only the best performance, but also the highest quality – because, 'It just has to work'.

To deliver this high level of quality, NXP begins with semiconductor manufacturing and packaging that has passed numerous audits adhering to the most stringent commercial and automotive standards. Building on this provenance, NXP provides military level (Class B) and space level package and die screening. For those applications where more rugged packaging is necessary, NXP can deliver our standard products in hermetic and non-hermetic packaging.

NXP's heritage and decades of proven leadership in Aerospace and Defense will continue to support your increasingly complex communications, radar and electronic warfare platforms, with products of the highest caliber.

Typical lot acceptance standards testing flow

Level 1	Method
Shock test	MIL STD 883 met. 2002/B
Vibration	MIL STD 883 met. 200/A
Constant acceleration	MIL STD 883 met. 2001
Thermal shock	MIL STD 883 met. 1011/C
Moisture resistance	MIL STD 883 met. 1004
Seal test	MIL STD 883 met. 1014
Electrical test at 25°C	
External visual inspection	ESA/SCC 20500
Level 2 (endurance subgroup)	Method
Operating life 1000 hours	MIL STD 883 met. 1005
Electrical test	
External visual	ESA/SCC 20500
Level 3 (electrical subgroup)	Method
DC electrical test at room temperature	
AC electrical test at room temperature	
Electrical test at high temperature	
Electrical test at low temperature	
External visual inspection	ESA/SCC 20500
Level 3 (capability subgroup)	Method
Solderability	MIL STD 883 met. 2003
Permanence of marking	ESA/SCC 24800
Terminal strength	MIL STD 883 met. 2004

Working with NXP

NXP is the industry's only vendor to provide the entire RF signal chain – high speed converters, small signal RF and power RF ICs – delivering unmatched built-in compatibility in signal processing systems. This high level of signal chain coverage, added to our expansive microcontroller, logic, power management and discrete product portfolio, frees designers from the headaches associated with multi-vendor solutions – speeding design-to-delivery time and driving down BOM costs.

For NXP, the customer relationship begins with understanding your needs. We discuss your application goals, assess your technical requirements, and articulate delivery dates based on your deadline. We become your partner in the design process, offering creative thinking and expert support every step of the way.



NXP's history of firsts in RF

- 1963 - Philips diffuses first transistors and diodes on 0.75 inch wafers
- 1964 - Launches first RF wideband transistor with 1.5GHz max
- 1970 - Introduces the BFR90, 5GHz wideband transistor
- 1978 - Introduces the BFQ33, 14GHz wideband transistor
- 1989 - First to introduce output matching in common emitter basestation transistors
- 1992 - First to introduce highest-power broadcast bipolar devices
- 1996 - First to introduce the highest-performance 2GHz LDMOS
- 1999 - Introduces Bluetooth integrated radio in QUBiC3 BiCMOS process
- 2000 - NXP follows up with WLAN integrated radio in QUBiC3 BiCMOS process
- 2001 - First to demonstrate LDMOS-based 250W feedforward power amplifier at European Microwave Conference
- 2001 - First to fully qualify and introduce LDMOS power amplifier product BLA1011-200 for Pulsed Avionics applications
- 2001 - Introduces first integrated silicon tuner products in BiCMOS
- 2003 - First to introduce the ultra-linear LDMOS using Vt distribution at IMS2003
- 2004 - First to introduce an LDMOS-based 200W Doherty amplifier for UMTS at IMS2004
- 2004 - Introduces Gen5 LDMOS which becomes the industry's most advanced process for power amplifiers
- 2005 - Introduces next level of BiCMOS with QUBiC4+
- 2006 - First to introduce fully integrated Doherty transistors
- 2006 - First to introduce ultra-thin leadless packages for breakthrough RF performance
- 2007 - Launches TFF1004HN, industry's first fully integrated, silicon-based IC solution for satellite LNB
- 2007 - First to introduce high-power Novel 3-way Doherty for UMTS/LTE
- 2007 - NXP shows highest level of integration in BiCMOS with introduction of most advanced WiMAX transceivers
- 2008 - Introduces the first high-speed data converters based on JESD204A standard
- 2009 - First to launch 1kW single transistor (BLF578) PA for FM radio (88 to 108MHz)
- 2009 - First to introduce industry standard radar pallets with LDMOS transistors
- 2009 - First to introduce state-of-the-art next generation SiGe(C) BiCMOS QUBiC4x technology
- 2010 - NXP releases into production its new range of CGV™ high-speed data converters, the world's first high-speed converters featuring the new JEDEC JESD204A serial interface standard



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