

# 2.4-2.5 GHz Low-Noise Amplifier

## SST12LN01



*Data Sheet*

### FEATURES:

- **Suitable Gain:**
  - Typically 14 dB gain across 2.4–2.5 GHz
- **Low-Noise Figure:**
  - Typically 1.55 dB across 2.4–2.5 GHz
- **IIP3:**
  - >1dBm across 2.4–2.5 GHz
- **Low-Current Consumption**
  - 10-12 mA across 2.4–2.5 GHz
- **50 $\Omega$  Input/Output Matched**
- **Packages available**
  - 6-contact UQFN – 3 mm x 1.6 mm
- **All non-Pb (lead-free) devices are RoHS compliant**

### APPLICATIONS:

- **WLAN**
- **Bluetooth**
- **Wireless Network**

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## PRODUCT DESCRIPTION

The SST12LN01 is a cost effective Low-Noise Amplifier (LNA) which requires no external RF-matching components. This device is based on the 0.5m GaAs PHEMT technology, and complies with 802.11 b/g applications.

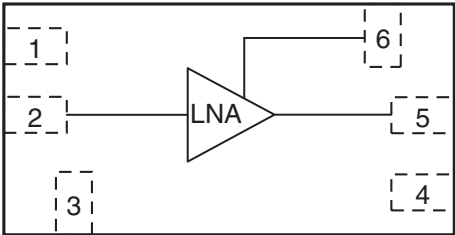
SST12LN01 provides high-performance, low-noise, and moderate-gain operation within the 2.4–2.5 GHz frequency band. Across this frequency band, the LNA typically provides 14 dB gain and 1.55 dB noise figure.

This LNA cell is designed with a self DC-biasing scheme, which maintains low DC current consumption, nominally at 11 mA, during operation. Optimum performance is achieved with only a single power supply, and no external bias resistors or networks are required. The input and output ports are single-ended 50 $\Omega$  matched. RF ports are also DC isolated requiring no DC blocking capacitors or matching components.

The SST12LN01 is offered in a 6-contact UQFN package. See Figure 2 for pin assignments and Table 1 for pin descriptions.



FUNCTIONAL BLOCKS



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FIGURE 1: Functional Block Diagram

## PIN ASSIGNMENTS

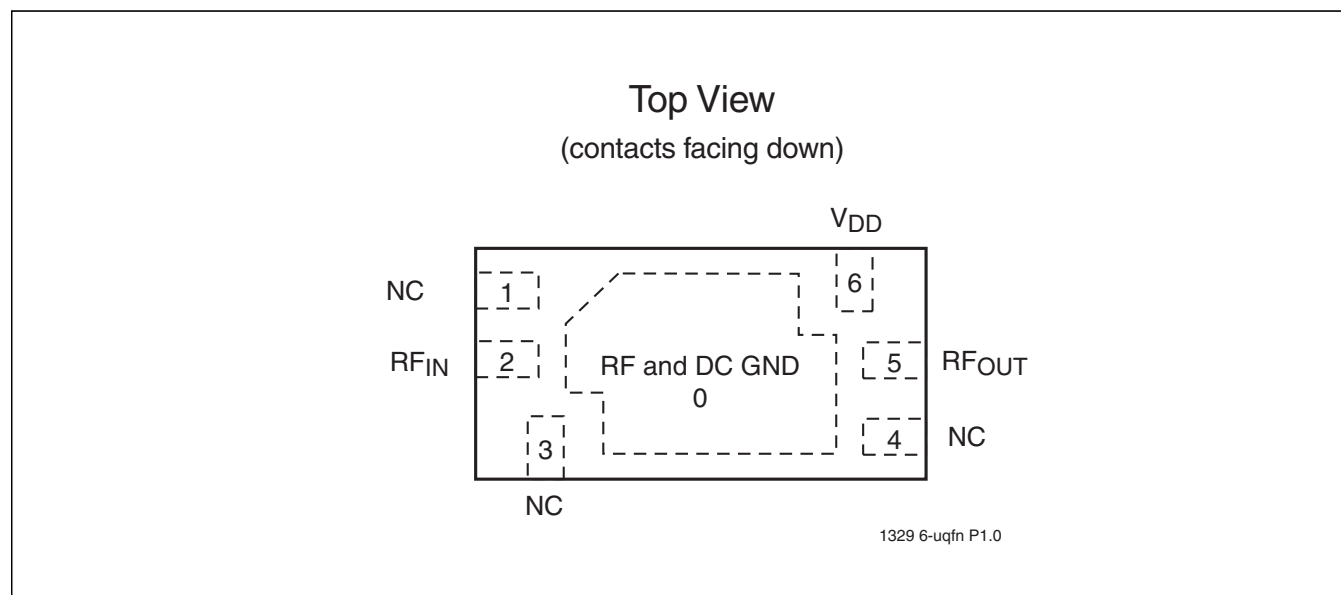


FIGURE 2: Pin Assignments for 16-contact UQFN

## PIN DESCRIPTIONS

TABLE 1: Pin Description

Symbol	Pin No.	Pin Name	Type <sup>1</sup>	Function
GND	0	Ground		
NC	1	No Connection		Unconnected pin
RFIN	2		I	2.4G RF input
NC	3	No Connection		Unconnected pin
NC	4	No Connection		Unconnected pin
RFOUT	5		O	2.4G RF output
VDD	6	Power Supply	PWR	

1. I=Input, O=Output

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## ELECTRICAL SPECIFICATIONS

The AC and DC specifications for the power amplifier interface signals. Refer to Table 2 for the DC voltage and current specifications. Refer to Figure 3 for the RF performance.

**Absolute Maximum Stress Ratings** (Applied conditions greater than those listed under “Absolute Maximum Stress Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these conditions or conditions greater than those defined in the operational sections of this data sheet is not implied. Exposure to absolute maximum stress rating conditions may affect device reliability.)

Input power to pin 2 ( $P_{IN}$ ) . . . . . 0 Bm  
Average output power ( $P_{OUT}$ )<sup>1</sup> . . . . . 9 dBm  
Supply Voltage at pin 6 ( $V_{DD}$ ) . . . . . -0.3V to +4.6V  
DC supply current ( $I_{CC}$ ) . . . . . 14 mA  
Operating Temperature ( $T_A$ ) . . . . . -40°C to +85°C  
Storage Temperature ( $T_{STG}$ ) . . . . . -40°C to +120°C  
Maximum Junction Temperature ( $T_J$ ) . . . . . +150°C  
Surface Mount Solder Reflow Temperature . . . . . 260°C for 10 seconds

1. Never measure with CW source. Pulsed single-tone source with <50% duty cycle is recommended. Exceeding the maximum rating of average output power could cause permanent damage to the device.

### Operating Range

Range	Ambient Temp	$V_{CC}$
Extended	-20 to +80°C	2.9–3.5V

**TABLE 2: DC Electrical Characteristics**

Symbol	Parameter	Min.	Typ	Max.	Unit
$V_{CC}$	Supply Voltage at pin 6		3.3		V
$I_{CC}$	Supply Current 2.4–2.5 GHz		11		mA

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**TABLE 3: AC Electrical Characteristics for Configuration**

Symbol	Parameter	Min.	Typ	Max.	Unit
$F_{L-U}$	Frequency range	2400		2550	MHz
G	Small signal gain, 2.4–2.55 GHz		14		dB
NF	Noise Figure, 2.4–2.55 GHz		1.55		dB
IIP3	2.4–2.55 GHz	1	3		dBm

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## TYPICAL PERFORMANCE CHARACTERISTICS

Test Conditions:  $V_{DDL} = 3.0V$ ,  $T_A = 25^\circ C$ , unless otherwise specified

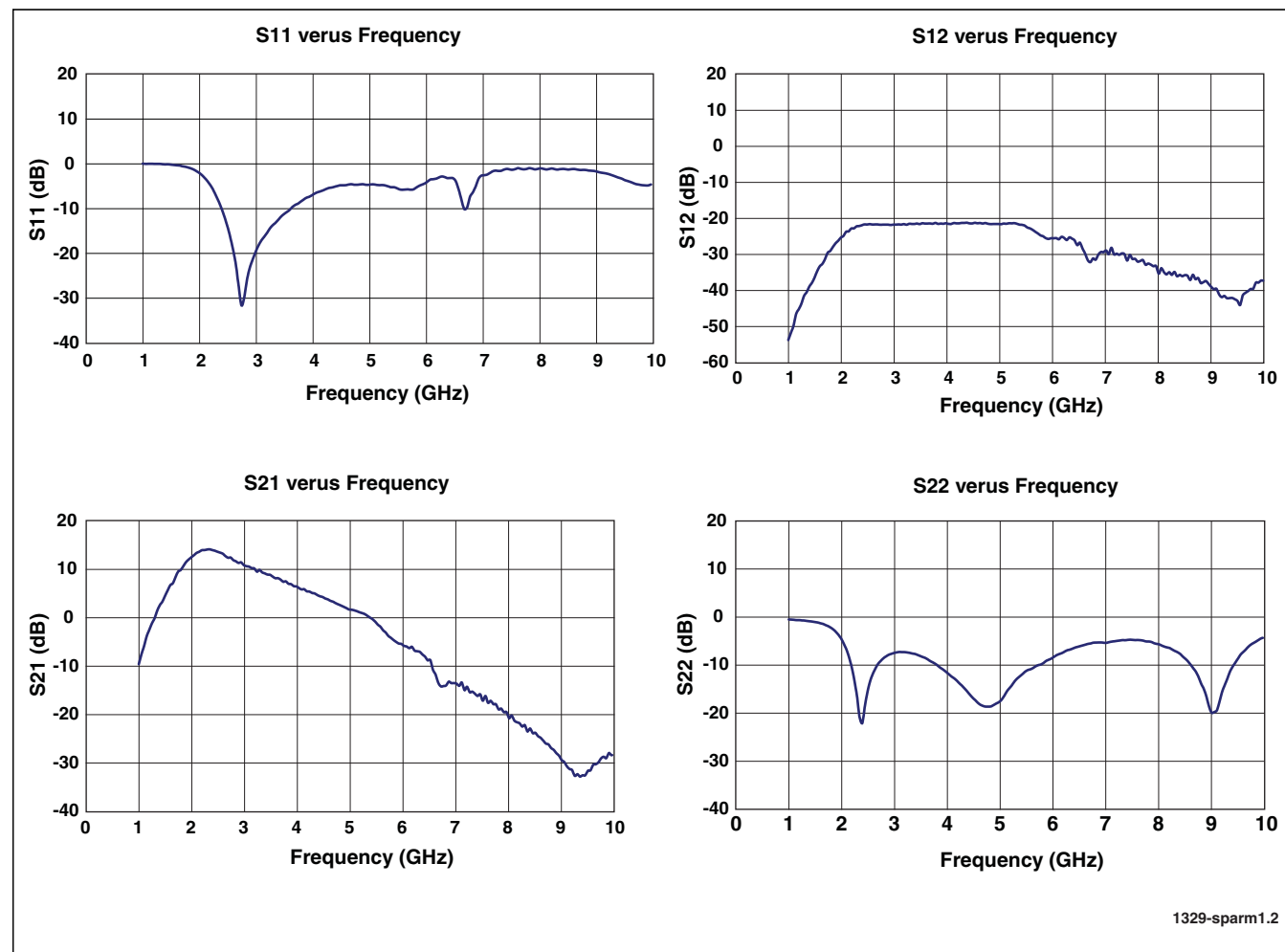


FIGURE 3: S-Parameters

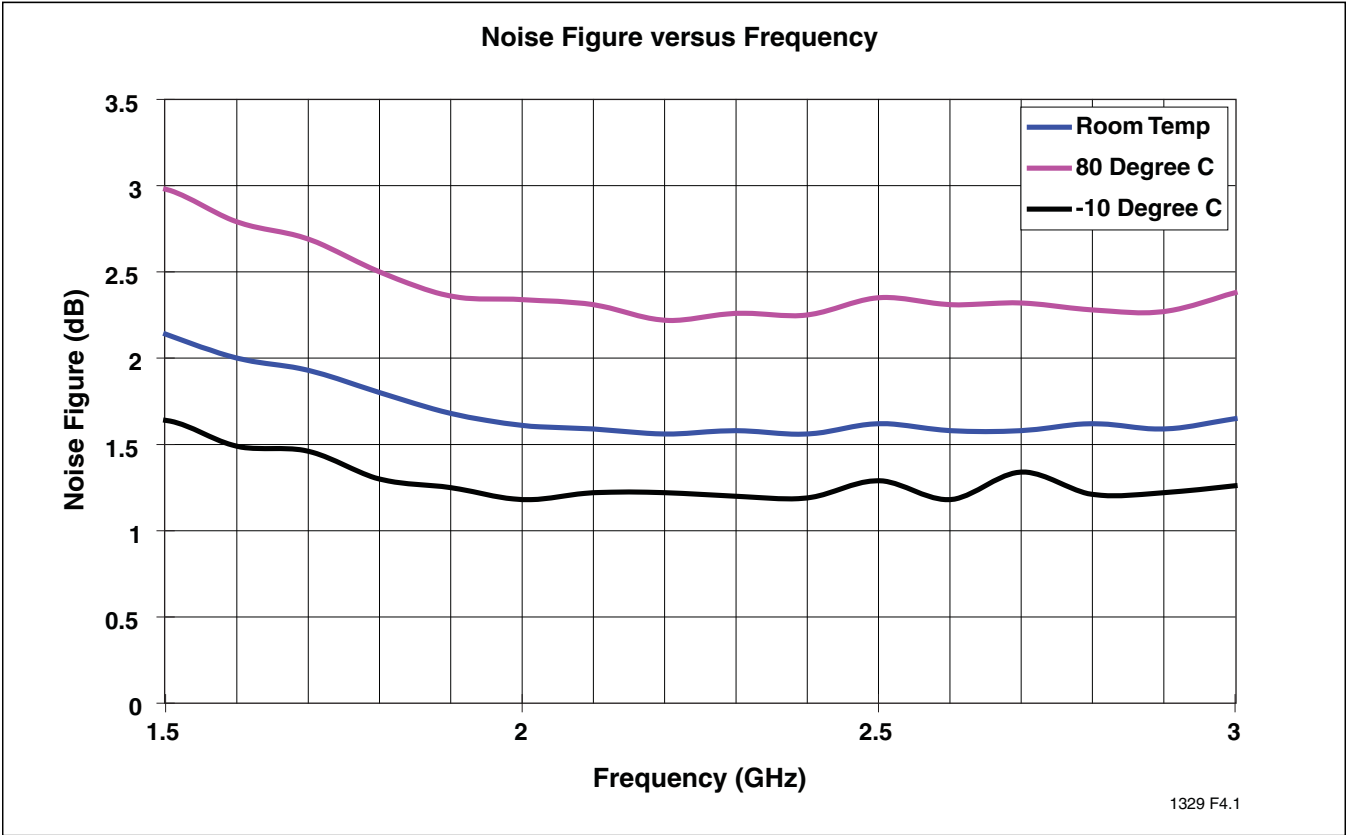


FIGURE 4: Noise Figure versus Frequency

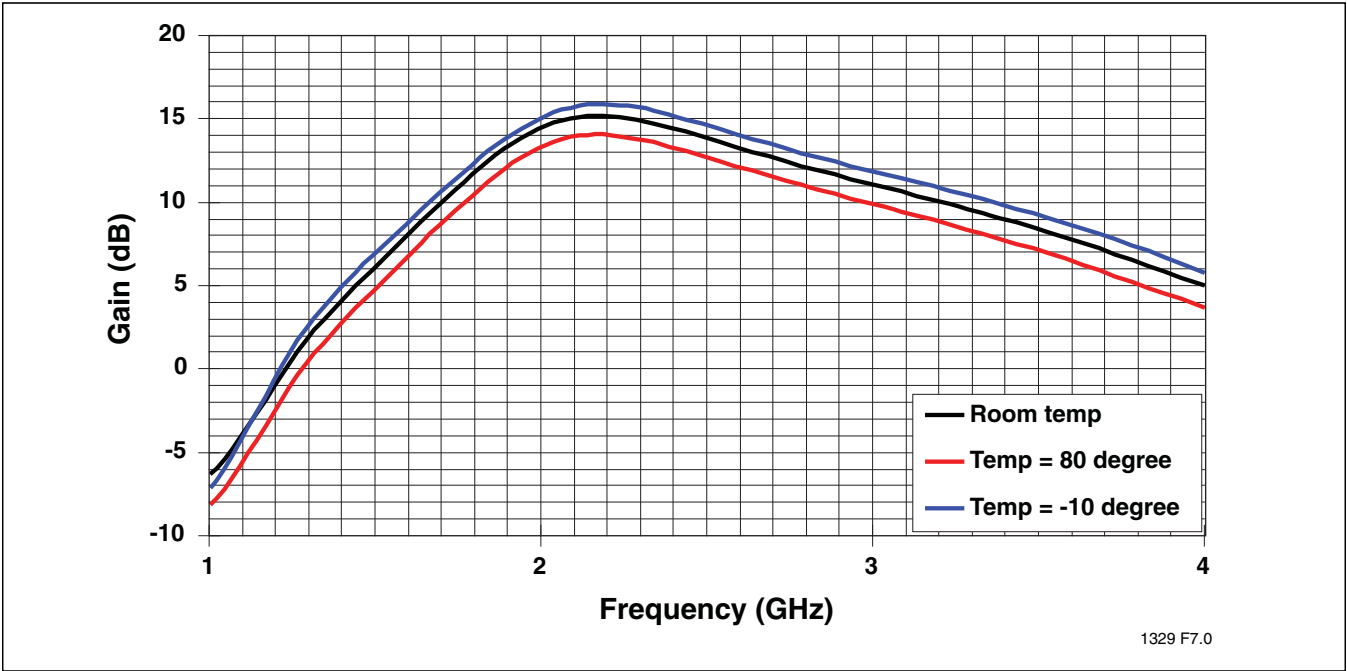
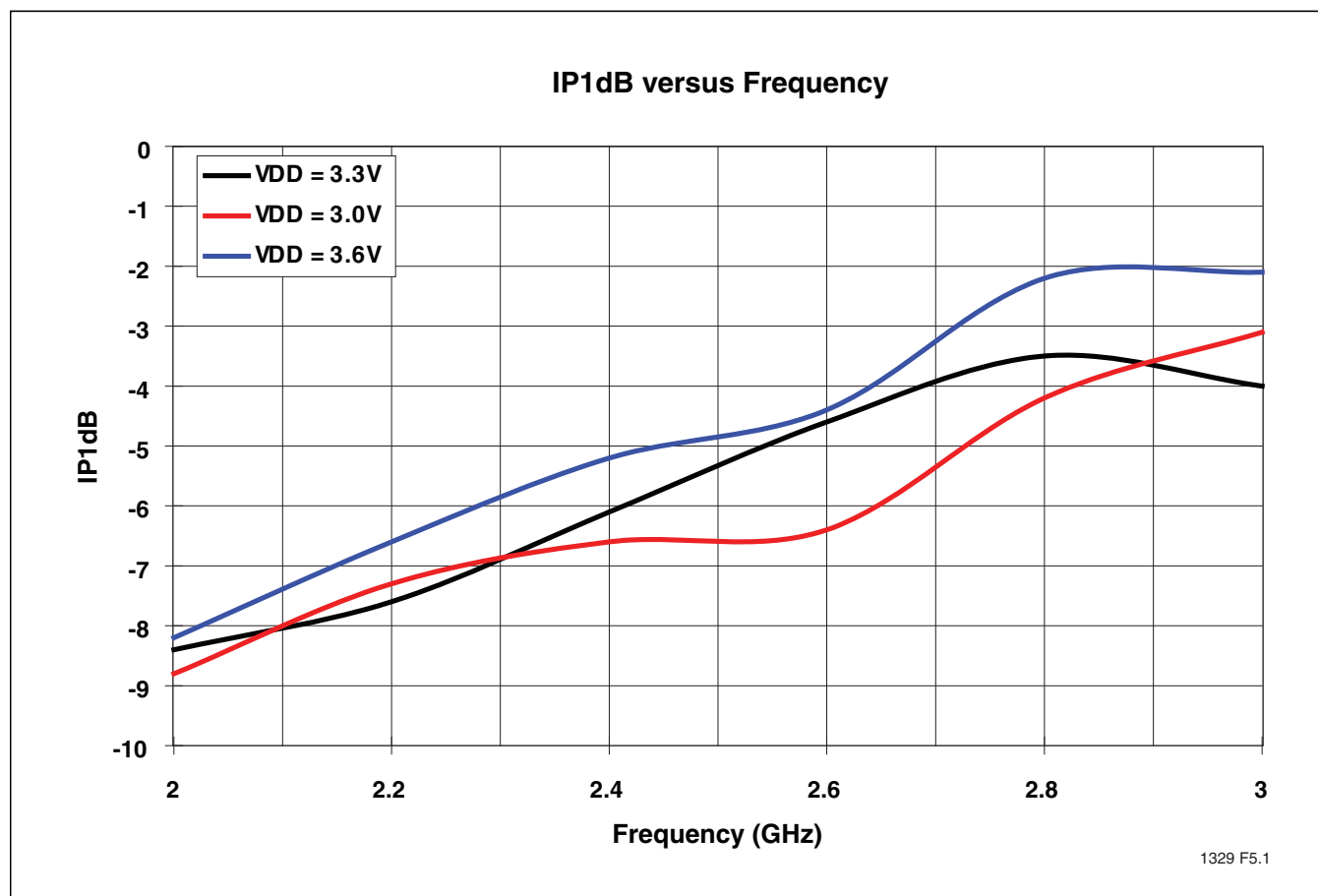


FIGURE 5: Frequency Response of Gain (S21) for three Temperatures



**FIGURE 6: Input P1dB versus Frequency**

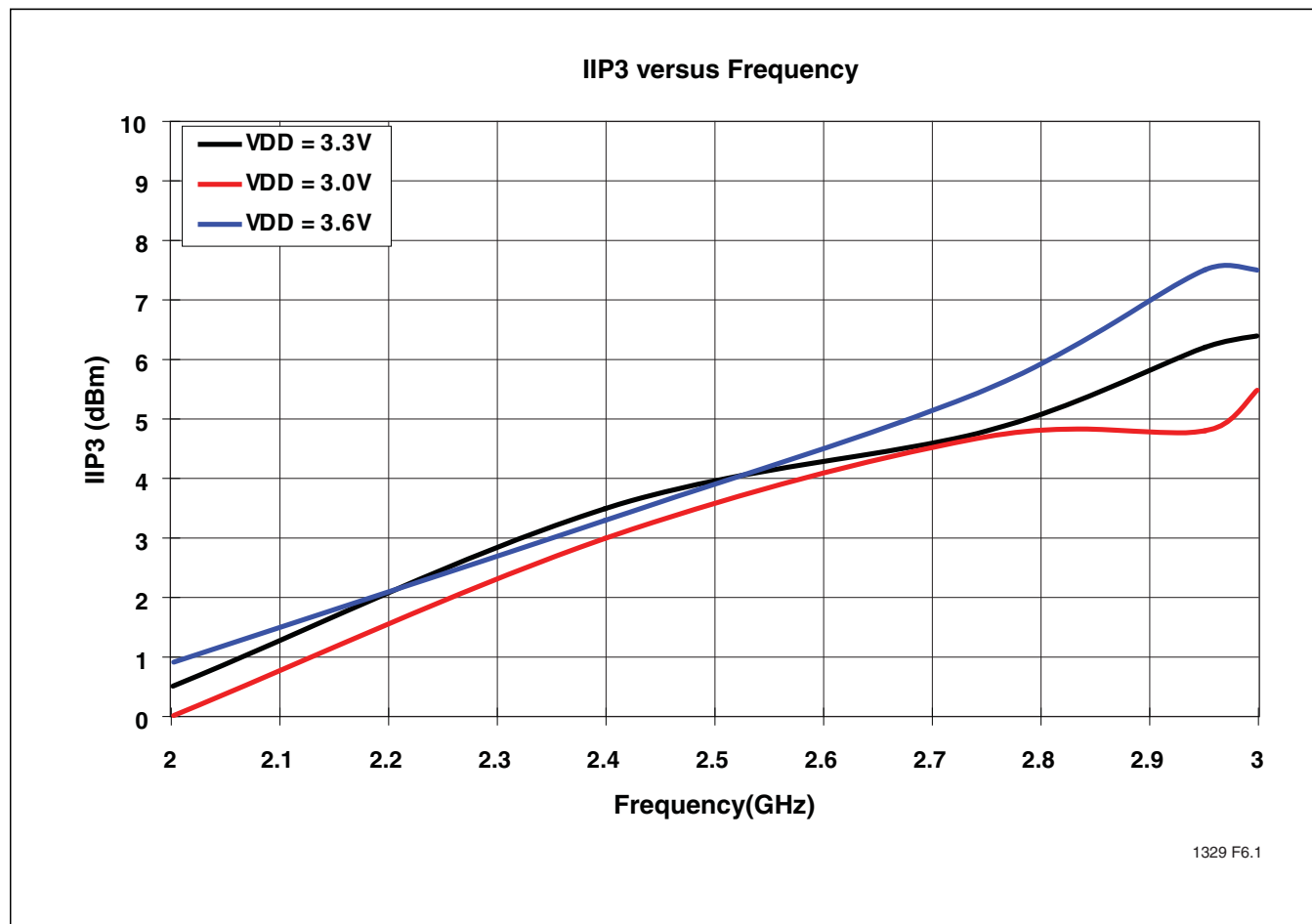


FIGURE 7: Input IP3 versus Frequency

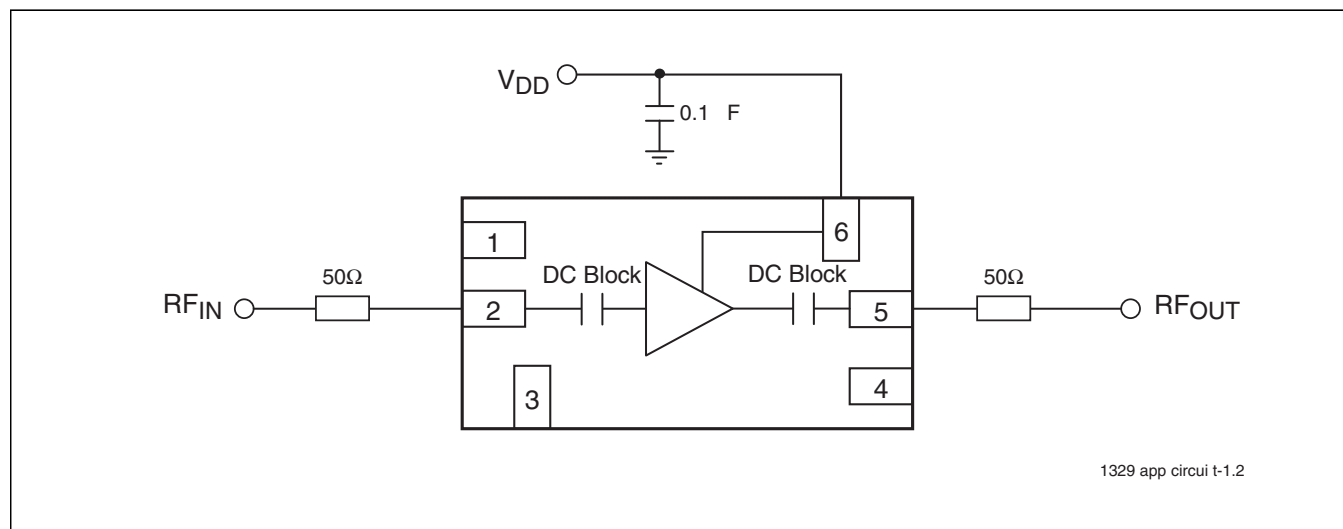


FIGURE 8: Typical Application Circuit

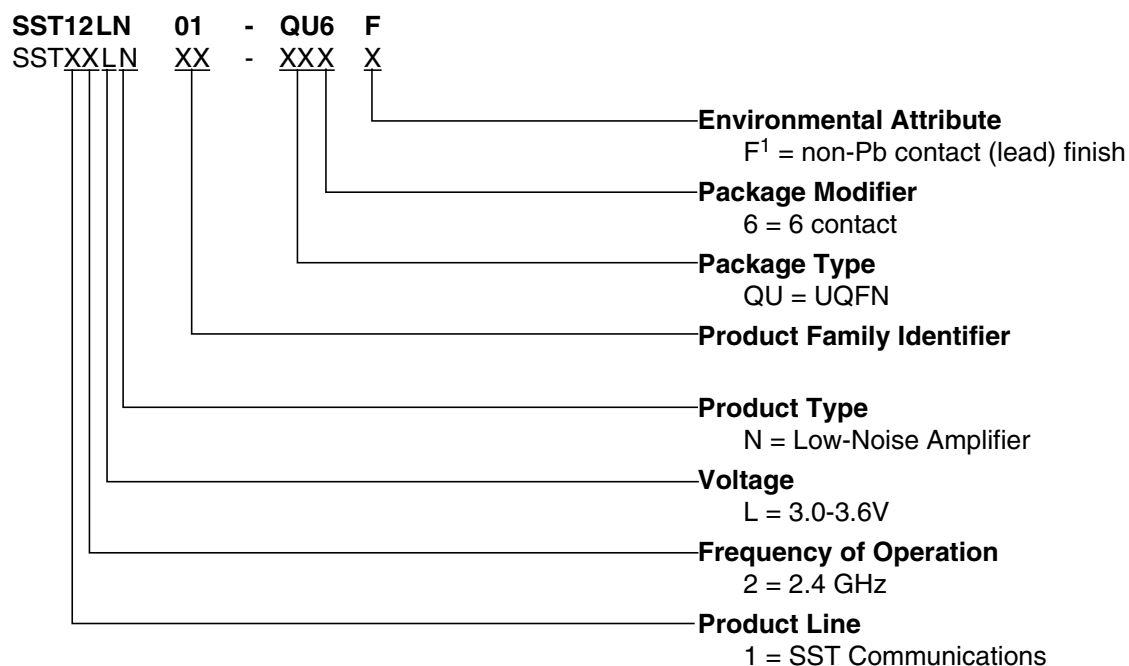


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Data Sheet

### PRODUCT ORDERING INFORMATION



1. Environmental suffix "F" denotes non-Pb solder.  
SST non-Pb solder devices are "RoHS Compliant".

### Valid combinations for SST12LN01

SST12LN01-QU6F

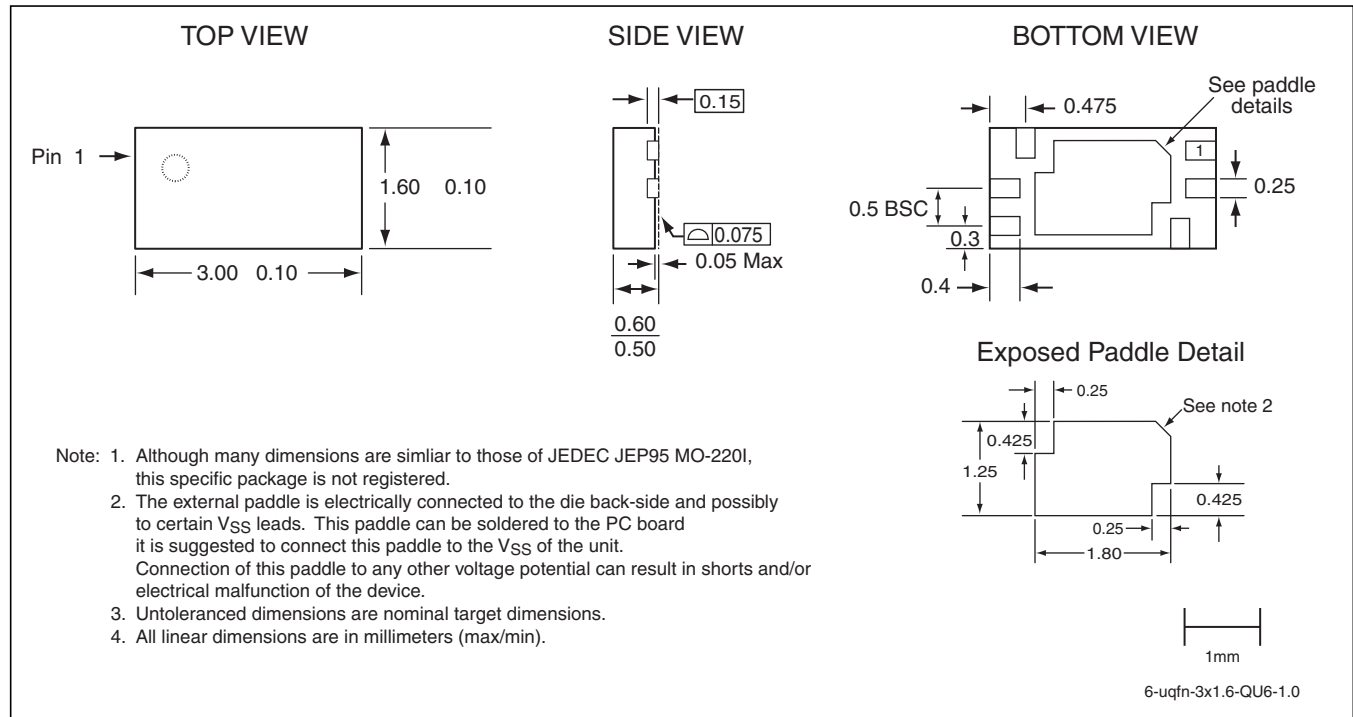
### SST12LN01 Evaluation Kits

SST12LN01-QU6F-K

**Note:** Valid combinations are those products in mass production or will be in mass production. Consult your SST sales representative to confirm availability of valid combinations and to determine availability of new combinations.



## PACKAGING DIAGRAMS



**FIGURE 9: 6-contact Ultra-thin Quad Flat No-lead (UQFN)  
SST Package Code: QU6**

## 2.4-2.5 GHz Low-Noise Amplifier

### SST12LN01



Data Sheet

**TABLE 4: Revision History**

Revision	Description	Date
00	<ul style="list-style-type: none"><li>Initial release of data sheet</li></ul>	Sep 2006
01	<ul style="list-style-type: none"><li>Updated "Features:" on page 1</li></ul>	Sep 2007
02	<ul style="list-style-type: none"><li>Revised Product Description on page 1</li><li>Change Suitable Gain to 14 dB globally</li><li>Changed low-noise figure 1.55 dB globally</li><li>Changes low-current consumption to 10-12 mA</li><li>Edited Table 2, DC Electrical Characteristics and Table 3, AC Electrical Characteristics on page</li><li>Replaced Figures 3 through 7, pages 5 through 8</li><li>Edited Figure 8, page 8</li><li>Added Figure 5 on page 8</li></ul>	Jun 2008
03	<ul style="list-style-type: none"><li>Updated "" on page 11</li></ul>	Feb 2009
04	<ul style="list-style-type: none"><li>Updated document status from "Preliminary Specifications" to "Data Sheet"</li></ul>	Dec 2009
05	<ul style="list-style-type: none"><li>Revised IIPE values in Features on page 1 and Table 3 on page 4</li><li>Changed definition of "F" environmental attribute in "Product Ordering Information" on page 9</li></ul>	Nov 2010