SST12LN01

2.4-2.5 GHz WLAN Low-Noise Amplifier

Features

- Gain:
  - Typically 13.5 dB gain across 2.4–2.5 GHz
- Noise Figure:
  - Typically 1.5 dB across 2.4–2.5 GHz
- P1dB:
  - Typically -5dBm with V_{DD} 3.3V
- Low-Current Consumption
  - 10 mA across 2.4–2.5 GHz
- 50Ω 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

1.0 PRODUCT DESCRIPTION

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

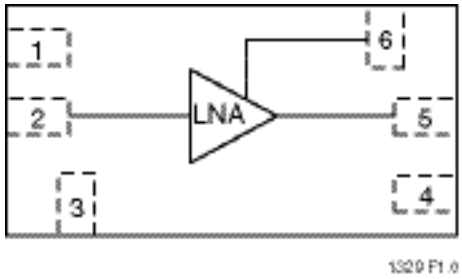
SST12LN01 provides high-performance, low-noise, and moderate-gain operation within the 2.4–2.5 GHz frequency band. Across this frequency band, the LNA typically provides 13.5 dB gain and 1.5 dB noise figure.

This LNA cell is designed with a self DC-biasing scheme, which maintains low DC current consumption, nominally at 10 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 50Ω matched. RF ports are also DC isolated requiring no DC blocking capacitors or matching components.

SST12LN01 is offered in a 6-contact UQFN package. See Figure 3-1 for pin assignments and Table 4-1 for pin descriptions.

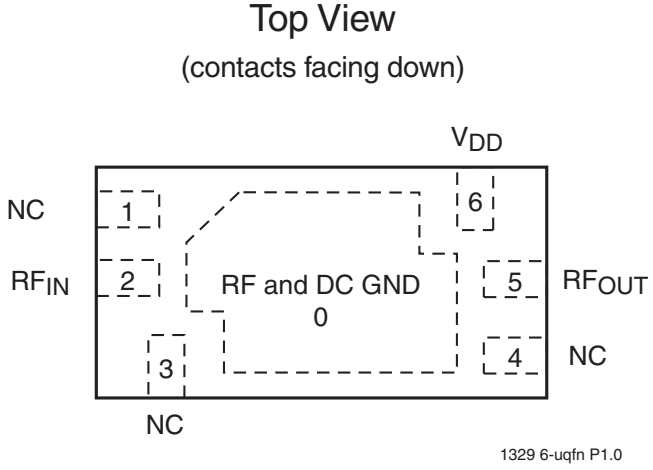
2.0 FUNCTIONAL BLOCKS

FIGURE 2-1: FUNCTIONAL BLOCK DIAGRAM



3.0 PIN ASSIGNMENTS

FIGURE 3-1: PIN ASSIGNMENTS FOR 16-CONTACT UQFN



4.0 PIN DESCRIPTIONS

TABLE 4-1: PIN DESCRIPTION

Symbol	Pin No.	Pin Name	Type[1]	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

5.0 ELECTRICAL SPECIFICATIONS

The AC and DC specifications for the power amplifier interface signals. Refer to Table 5-2 for the DC voltage and current specifications. Refer to Figure 6-1 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 dBm
Average output power (P_{OUT})[1] . . . . . 9 dBm
Supply Voltage at pin 6 (V_{DD}) . . . . . -0.3V to +4.6V
DC supply current (I_{DD}) . . . . . 14 mA
Operating Temperature (T_A) . . . . . -40ºC to +85ºC
Storage Temperature (T_{STG}) . . . . . -40ºC to +120ºC
Maximum Junction Temperature (T_J) . . . . . +150ºC
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.

TABLE 5-1: OPERATING RANGE

Range	Ambient Temp	V_{DD}
Extended	-20°C to +85°C	2.4–3.6V

TABLE 5-2: DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Min.	Typ	Max.	Unit
V_{DD}	Supply Voltage at pin 6		3.3		V
I_{DD}	Supply Current 2.4–2.5 GHz		10		mA

TABLE 5-3: AC ELECTRICAL CHARACTERISTICS FOR CONFIGURATION, V_{DD}=3.3V

Symbol	Parameter	Min.	Typ	Max.	Unit
F_{L-U}	Frequency range	2400		2500	MHz
G	Small signal gain, 2.4–2.5 GHz		13.5		dB
NF	Noise Figure, 2.4–2.5 GHz		1.5		dB
IP1dB	Input 1 dB compression point		-5		dBm

6.0 TYPICAL PERFORMANCE CHARACTERISTICS

Test Conditions: V_{DD} = 3.3V, T_A = 25°C, unless otherwise specified

FIGURE 6-1: S-PARAMETERS

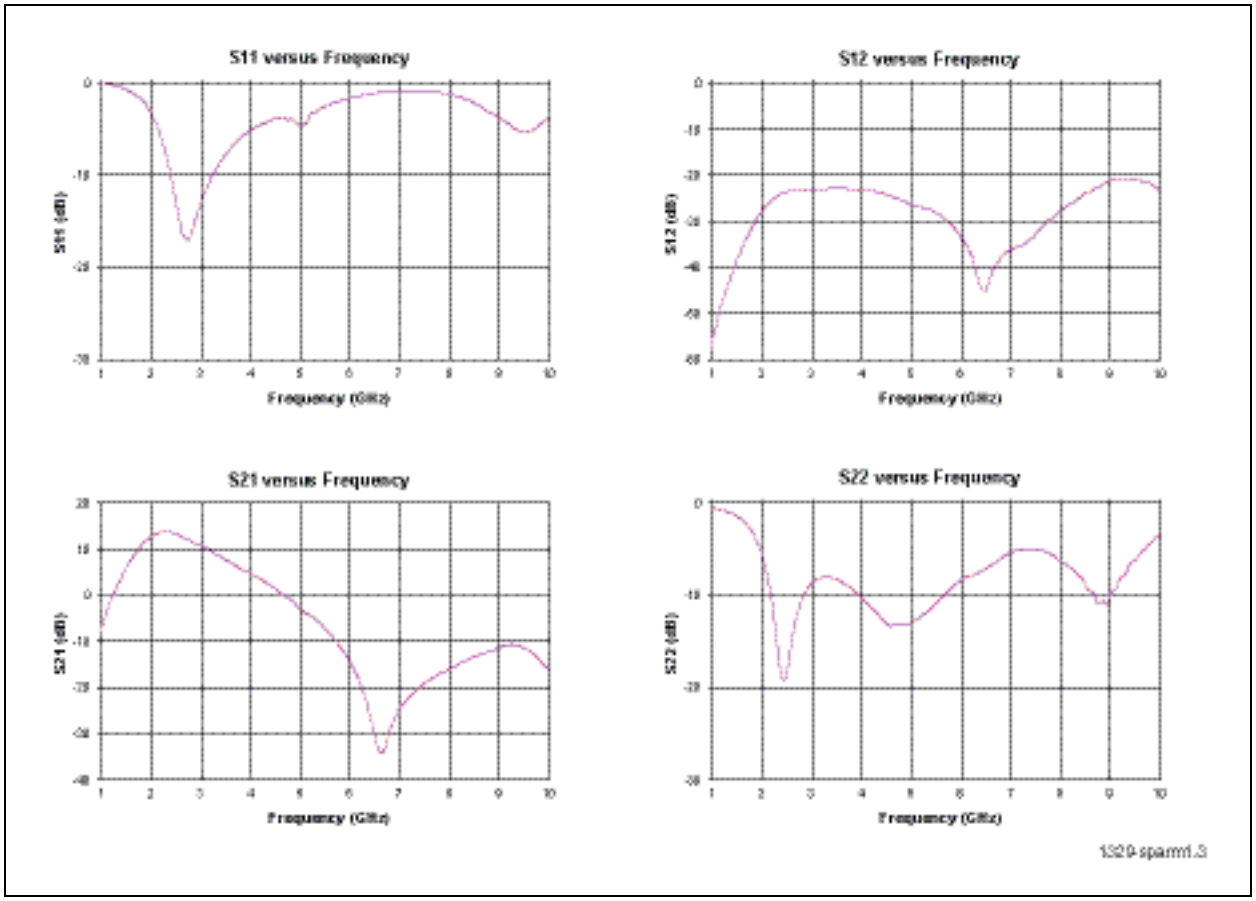


FIGURE 6-2: NOISE FIGURE VERSUS FREQUENCY

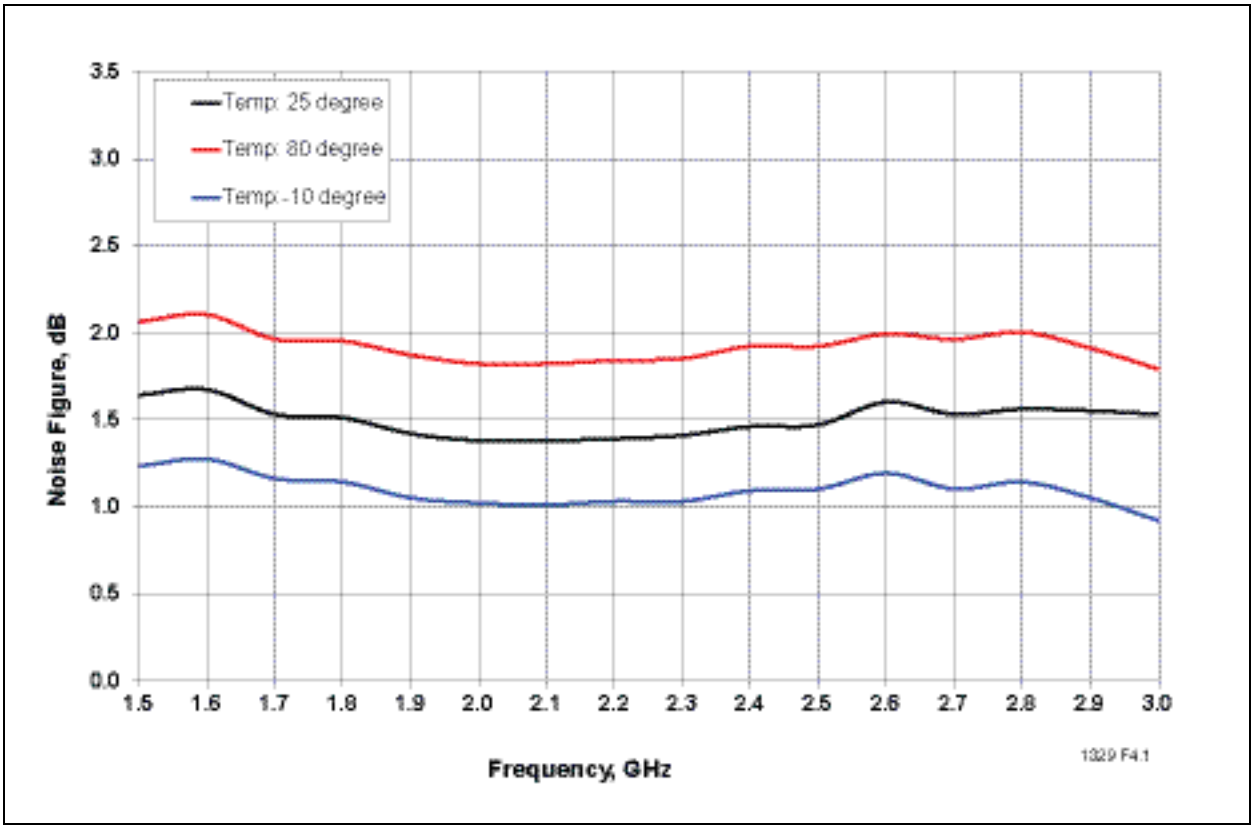


FIGURE 6-3: FREQUENCY RESPONSE OF GAIN (S21) FOR THREE TEMPERATURES

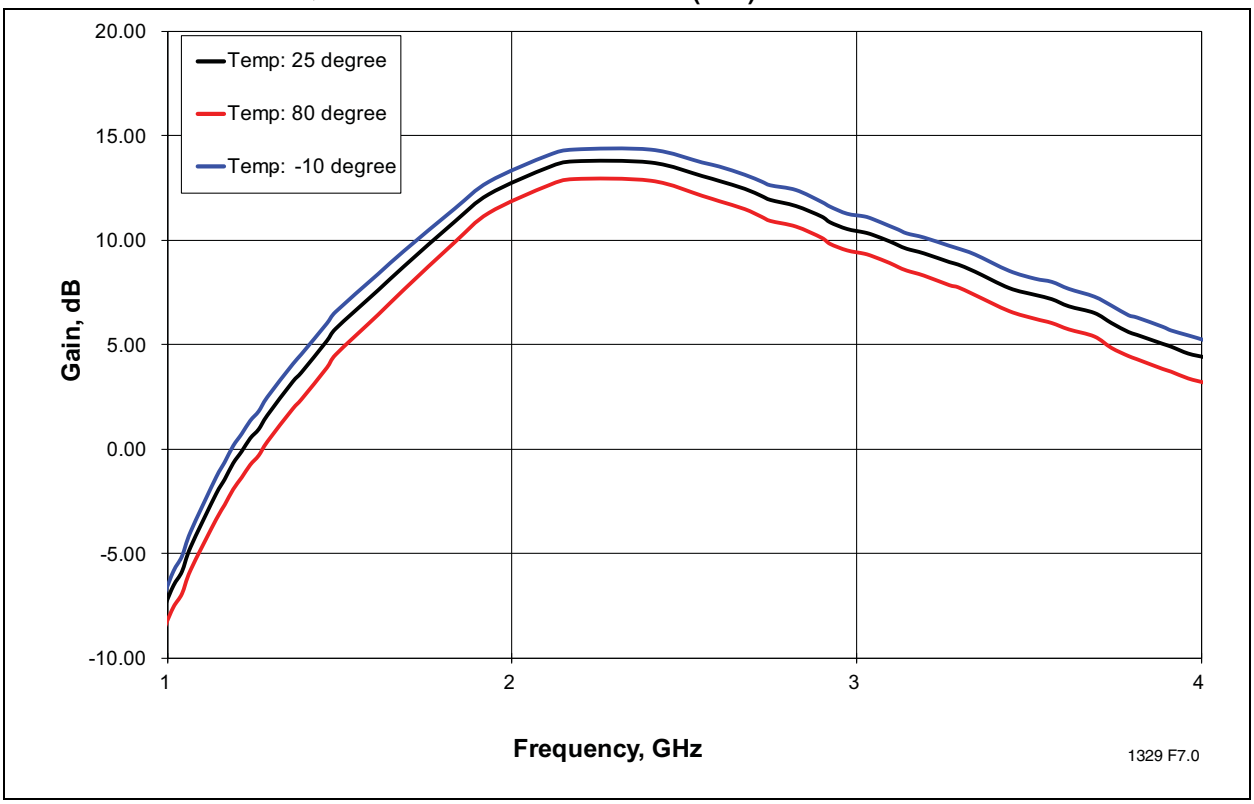


FIGURE 6-4: GAIN VERSUS OUTPUT POWER

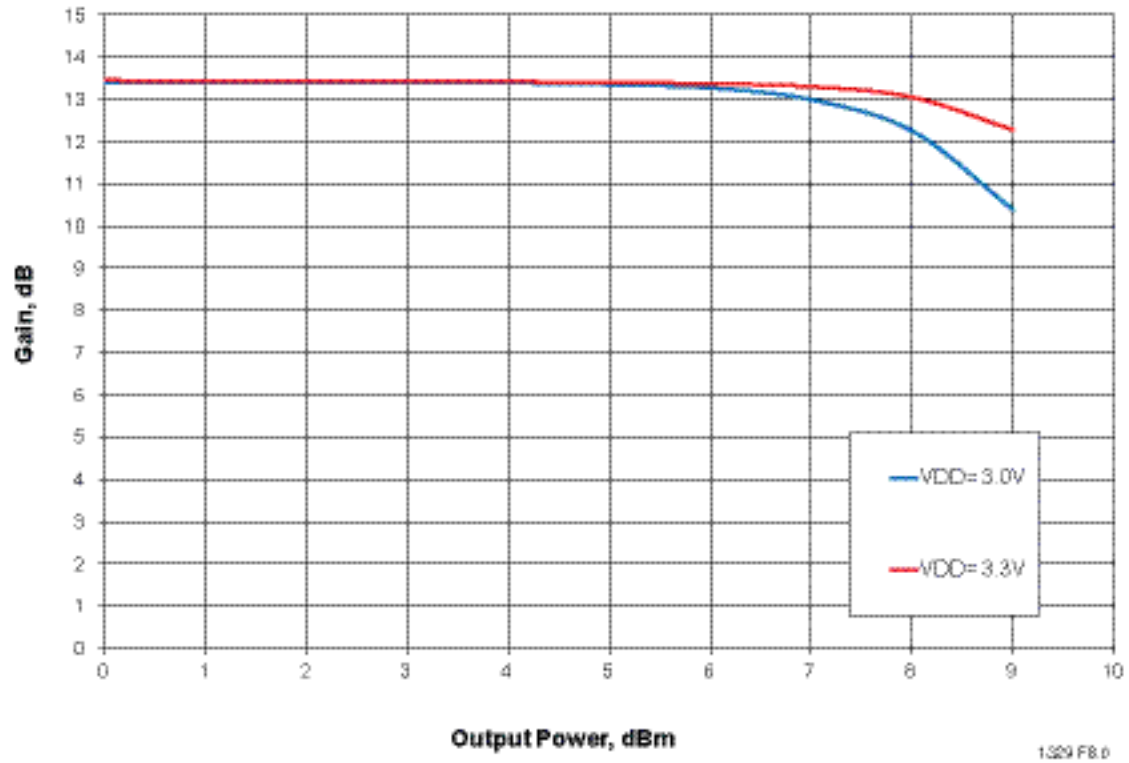
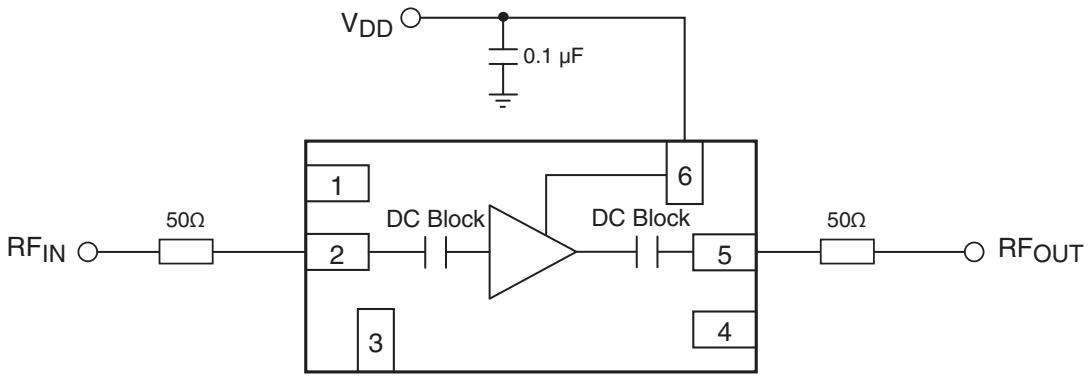


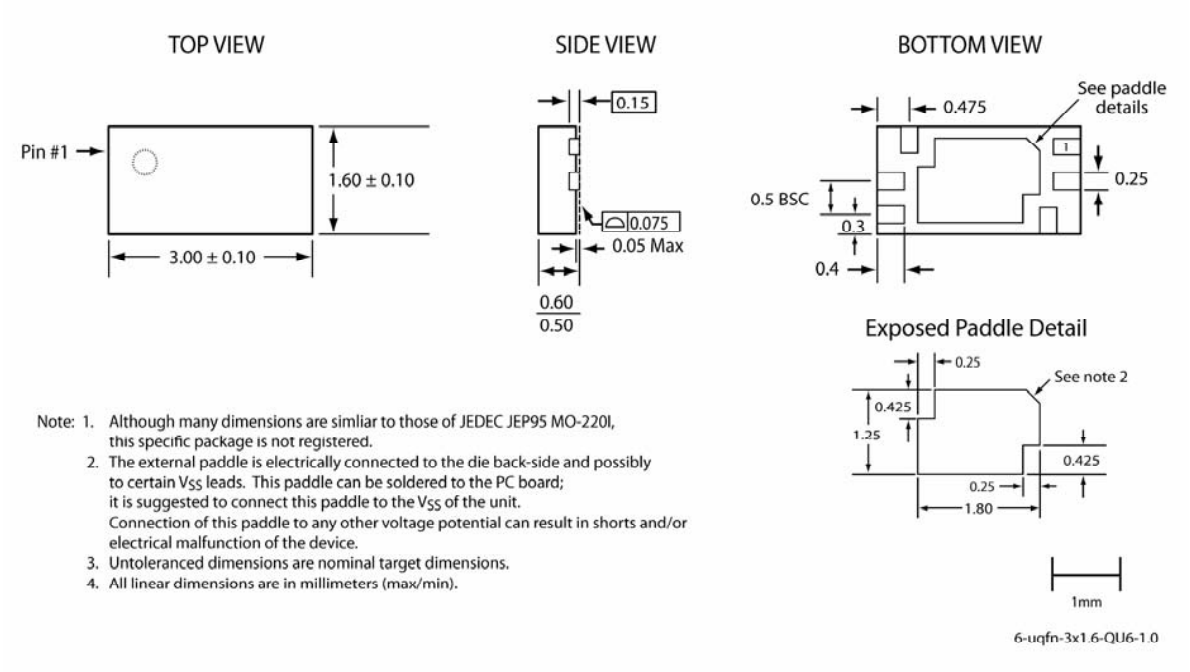
FIGURE 6-5: TYPICAL APPLICATION CIRCUIT



7.0 PACKAGING DIAGRAMS

6-Lead Ultra Thin Quad Flatpack No-Leads (QU6E/F) - 3x1.6 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Note: 1. Although many dimensions are simliar to those of JEDEC JEP95 MO-220I, this specific package is not registered.
2. The external paddle is electrically connected to the die back-side and possibly to certain V_{SS} leads. This paddle can be soldered to the PC board; it is suggested to connect this paddle to the V_{SS} of the unit. Connection of this paddle to any other voltage potential can result in shorts and/or electrical malfunction of the device.
3. Untoleranced dimensions are nominal target dimensions.
4. All linear dimensions are in millimeters (max/min).

Microchip Technology Drawing C04-14001A Sheet 1 of 1

TABLE 7-1: REVISION HISTORY

Revision	Description	Date
00	• Initial release of data sheet	Sep 2006
01	• Updated “Features” on page 1	Sep 2007
02	• Revised Product Description on page 1 • Change Suitable Gain to 14 dB globally • Changed low-noise figure 1.55 dB globally • Changes low-current consumption to 10-12 mA • Edited Table 2, DC Electrical Characteristics and Table 3, AC Electrical Characteristics on page • Replaced Figures 6-1 through 6-5, pages 5 through 8 • Edited Figure 6-5, page 8 • Added Figure 6-3 on page 8	Jun 2008
03	• Updated Contact Information	Feb 2009
04	• Updated document status from “Preliminary Specifications” to “Data Sheet”	Dec 2009
05	• Revised IIPE values in Features on page 1 and Table 5-3 on page 3 • Changed definition of “F” environmental attribute in “Packaging Diagrams” on page 7	Nov 2010
A	• Applied new document format • Released document under letter revision system • Updated Spec number from S71329 to DS70005143 • Updated “Features” on page 1, “Electrical Specifications” on page 3, and “Product Identification System” on page 10	Jan 2015

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8.0 PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.

PART NO. **XXX**

Device **Package**

Device:	SST12LN01	= 2.4-2.5 GHz Low-Noise Amplifier
Package:	QU6E/QU6F[1]	= UQFN (3mm x 1.6mm), 0.6 max thickness, 6-contact
Evaluation Kit Flag	K	= Evaluation Kit

1. Suffix E/F = Matte Tin finish

Valid Combinations:

SST12LN01-QU6E
SST12LN01-QU6E-K
SST12LN01-QU6F
SST12LN01-QU6F-K

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