
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
- 50 Ω 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.

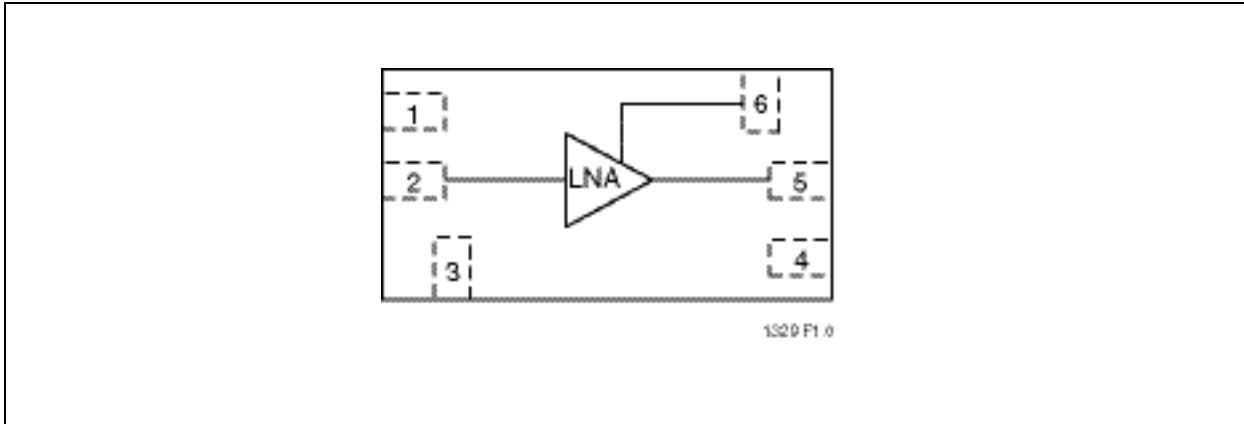
SST12LN01 provides high-performance, low-noise, and moderate-gain operation within the 2.4–2.5 GHz frequency band. Across this frequency band, the LNA typically provides 13.5 dB gain and 1.5 dB noise figure.

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 50 Ω 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.

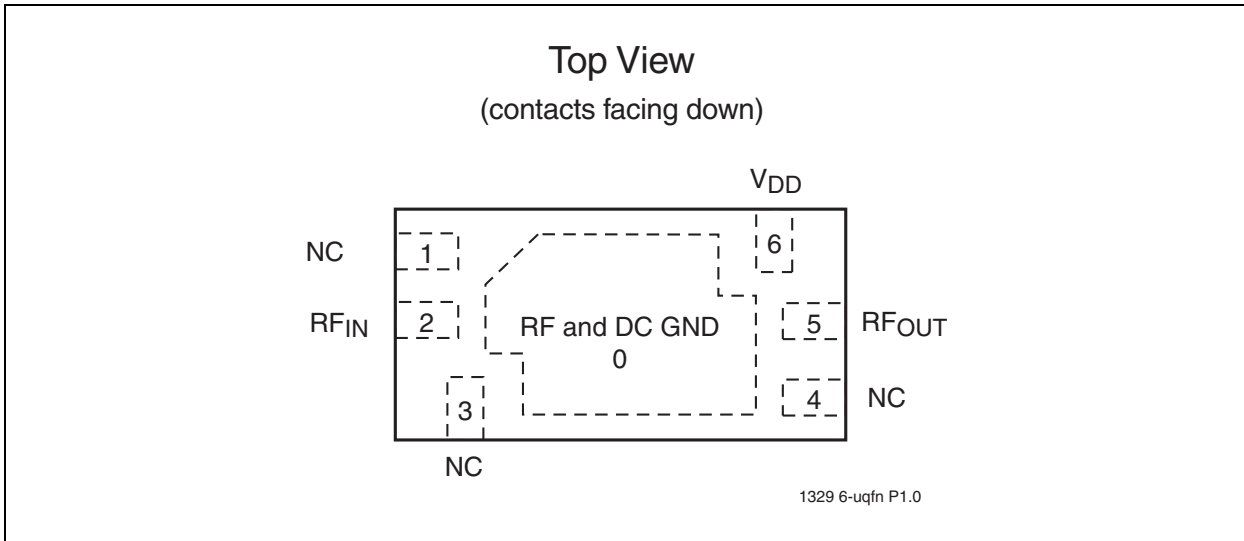
2.0 FUNCTIONAL BLOCKS

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) | -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.

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: $V_{DD} = 3.3V$, $T_A = 25^\circ C$, unless otherwise specified

FIGURE 6-1: S-PARAMETERS

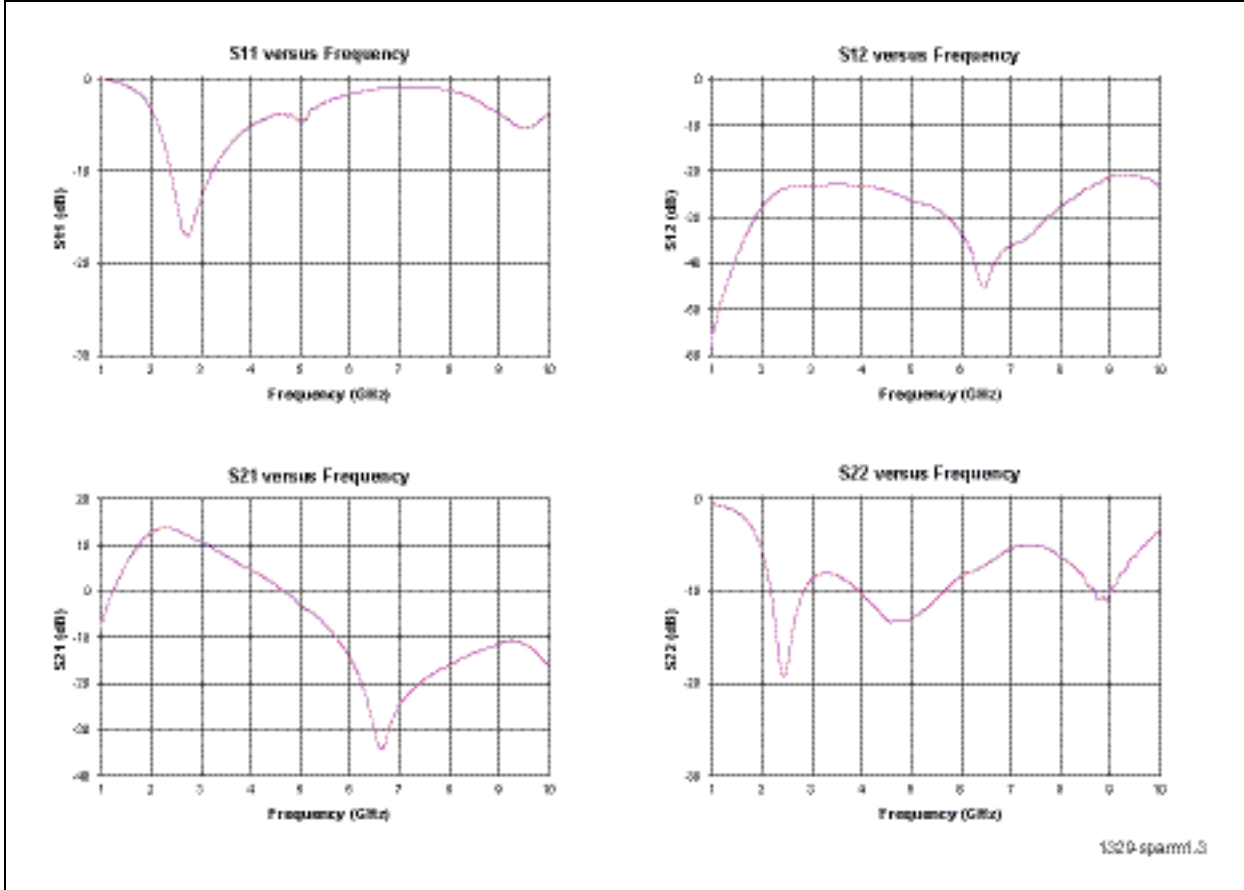


FIGURE 6-2: NOISE FIGURE VERSUS FREQUENCY

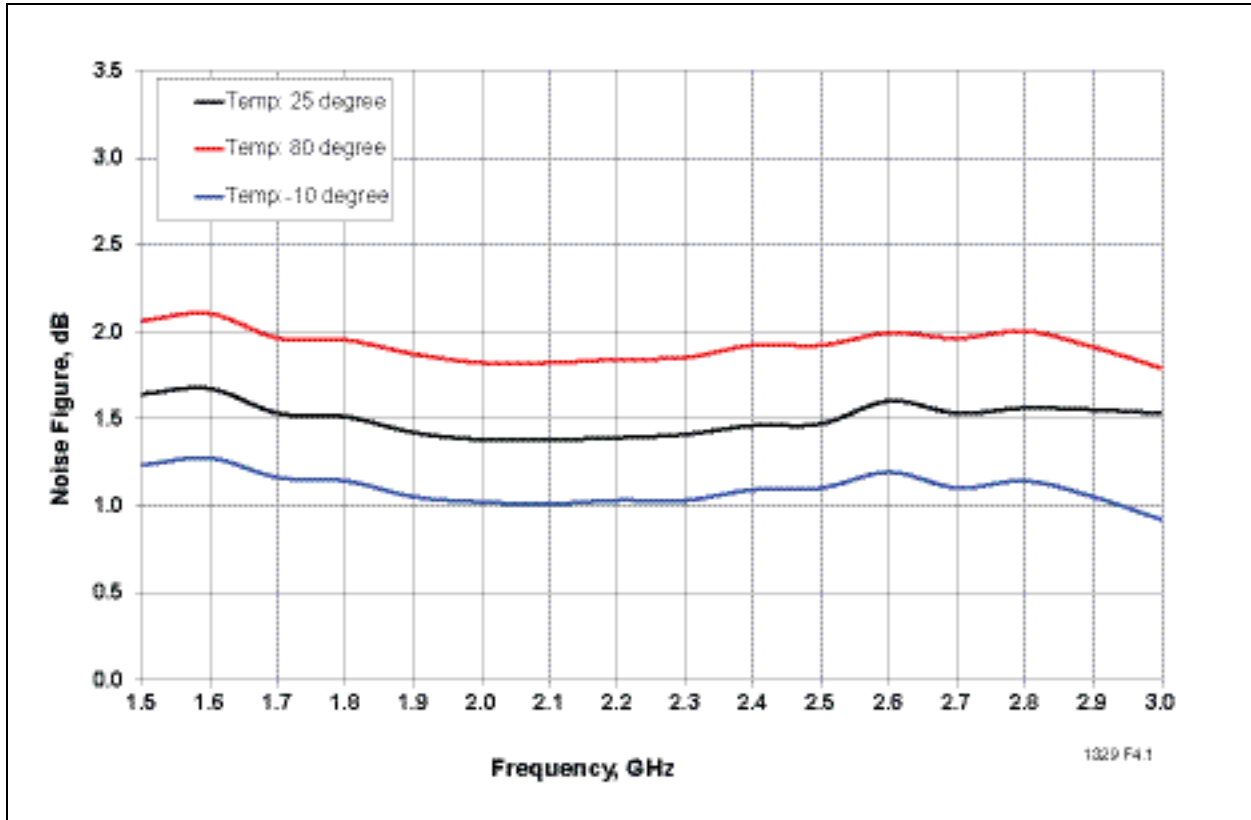


FIGURE 6-3: FREQUENCY RESPONSE OF GAIN (S21) FOR THREE TEMPERATURES

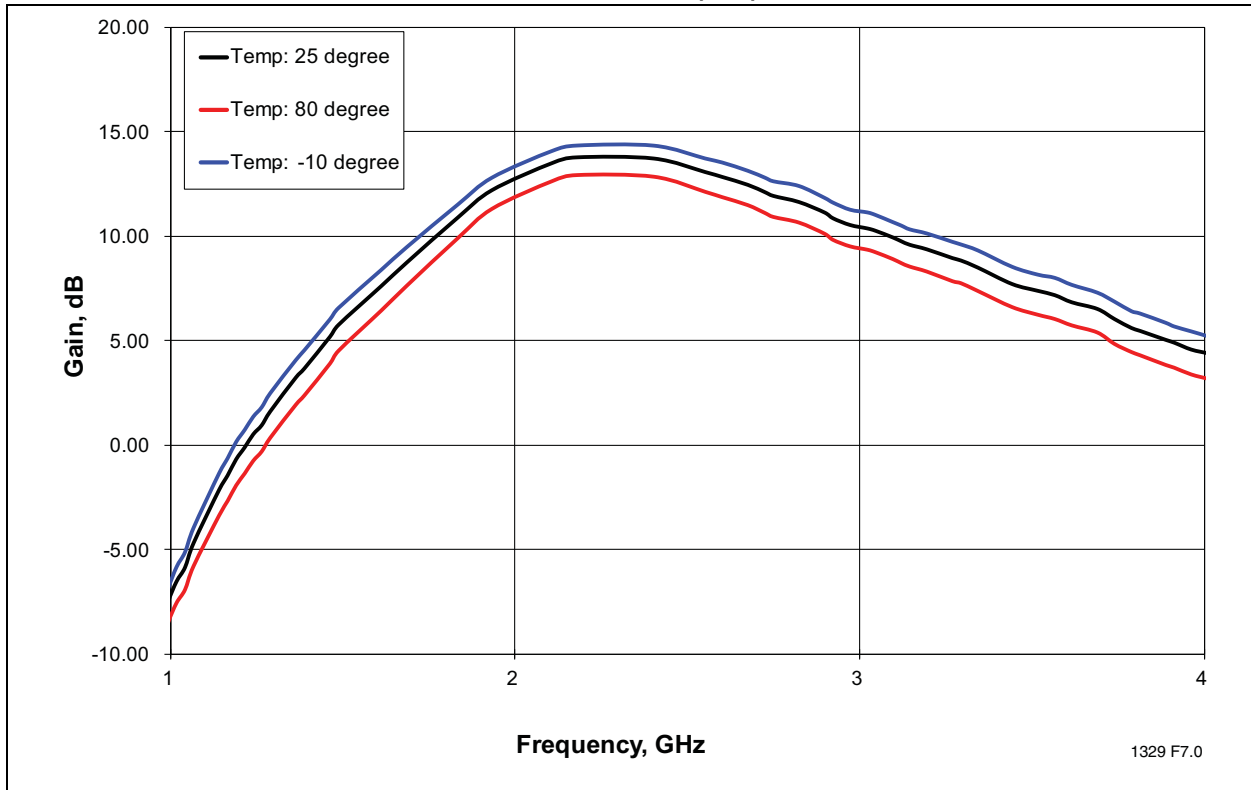


FIGURE 6-4: GAIN VERSUS OUTPUT POWER

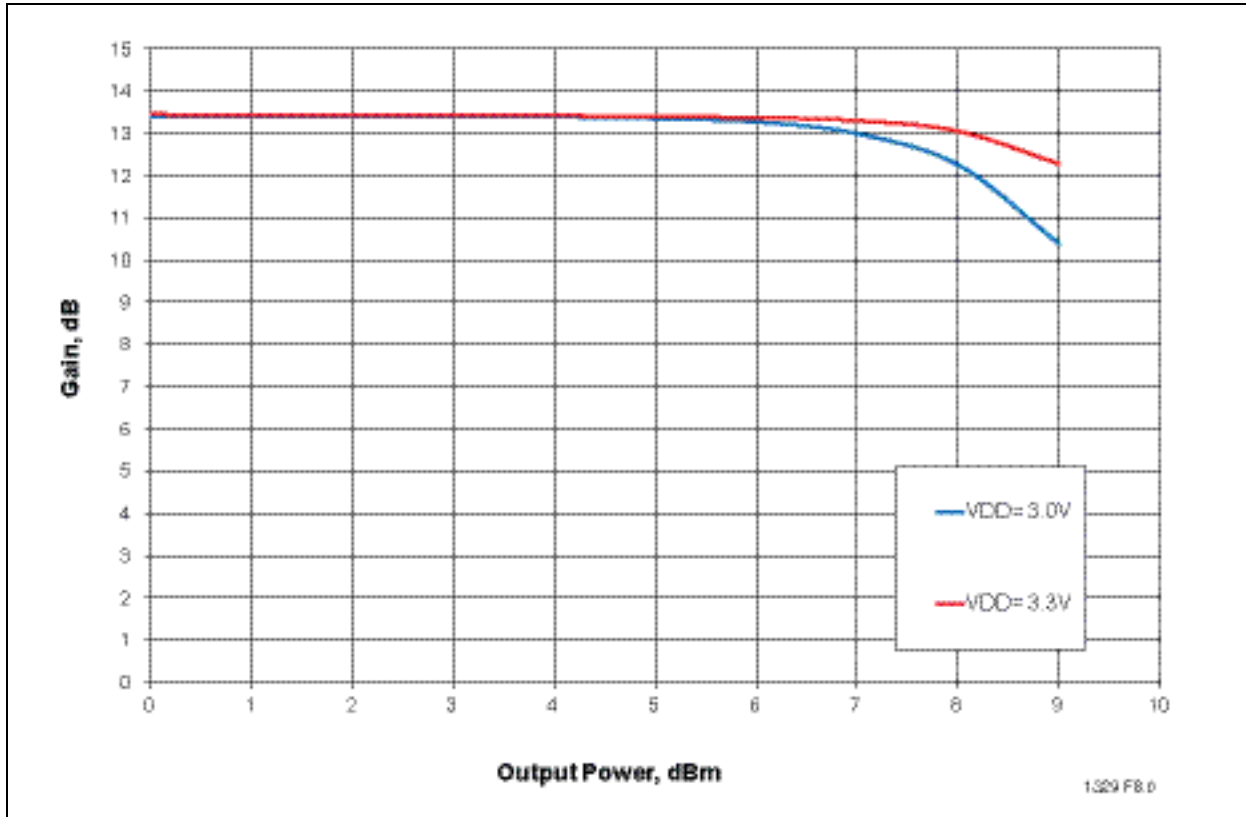
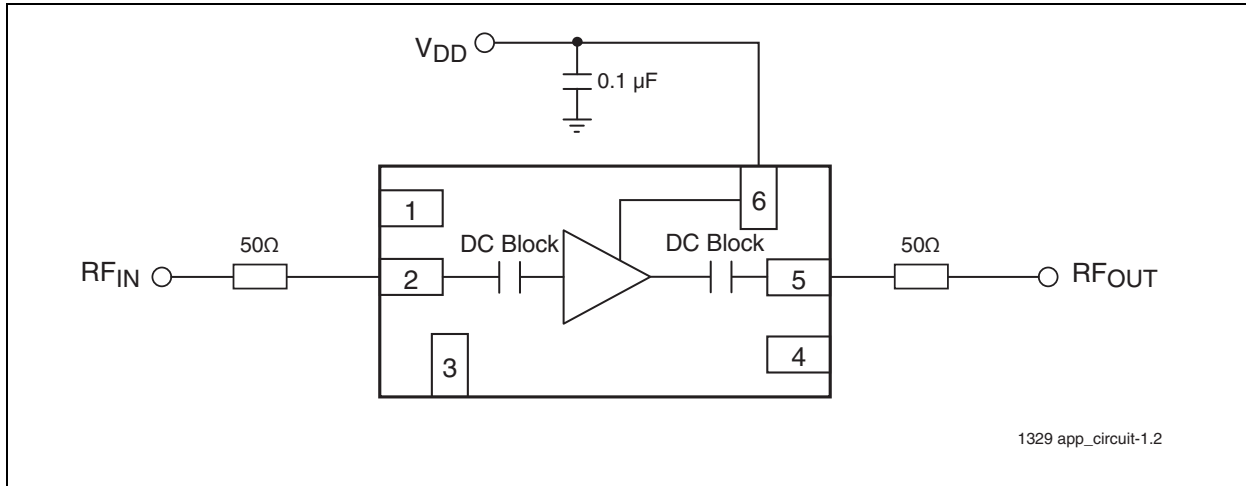


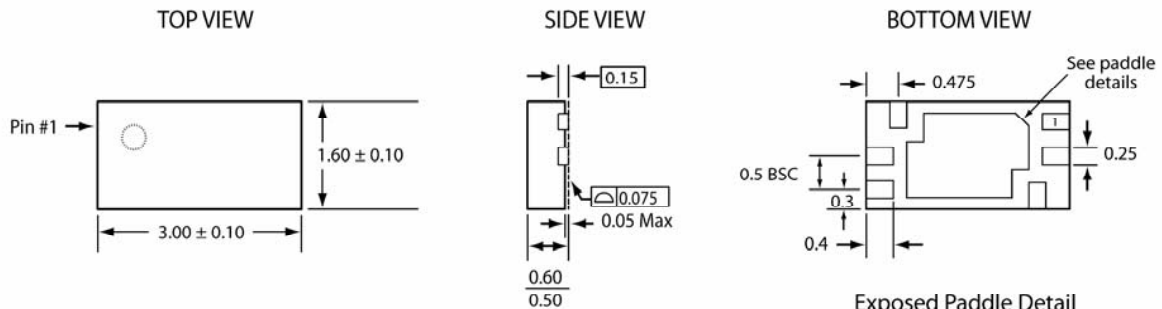
FIGURE 6-5: TYPICAL APPLICATION CIRCUIT



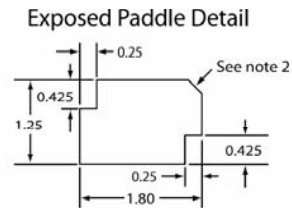
7.0 PACKAGING DIAGRAMS

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 similar 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).



6-uqfn-3x1.6-QU6-1.0

TABLE 7-1: REVISION HISTORY

| Revision | Description | Date |
|----------|---|----------|
| 00 | <ul style="list-style-type: none"> Initial release of data sheet | Sep 2006 |
| 01 | <ul style="list-style-type: none"> Updated “Features” on page 1 | Sep 2007 |
| 02 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Updated Contact Information | Feb 2009 |
| 04 | <ul style="list-style-type: none"> Updated document status from “Preliminary Specifications” to “Data Sheet” | Dec 2009 |
| 05 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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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| <u>PART NO.</u> | <u>XXX</u> | |
|----------------------------------|------------------------|--|
| 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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ISBN: 978-1-63277-014-1

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