4.9-5.8 GHz High-Linearity Power Amplifier
SST11LP12

Data Sheet

FEATURES:

- **High gain**
- **High linear output power:**
  - Meets 802.11a OFDM Spectrum Mask requirement up to 24 dBm over the entire band
  - Added EVM <4% up to 21 dBm for 54 Mbps 802.11a signal
- **High power-added efficiency/Low operating current for 6 Mbps 802.11a applications**
  - ~17% @ P_{OUT} = 23 dBm for 6 Mbps
- **Built-in Ultra-low I_{REF} power-up/down control**
  - I_{REF} <3 mA
- **Low idle current**
  - ~150 mA I_{CQ}
- **High speed power up/down**
  - Turn on/off time (10%~90%) <100 ns
  - Typical power-up/down delay with driver delay included <200 ns
- **High temperature stability**
- **Low shut-down current (~2 µA)**
- **On-chip power detection**
- **20 dB dynamic range on-chip power detection**
- **Simple input/output matching**
- **Packages available**
  - 16-contact WQFN (3mm x 3mm)
  - Non-Pb (lead-free) packages available

APPLICATIONS:

- **WLAN (IEEE 802.11a)**
- **Japan WLAN**
- **HyperLAN2**
- **Multimedia**

PRODUCT DESCRIPTION

The SST11LP12 is a high-power, high-gain power amplifier based on the highly-reliable InGaP/GaAs HBT technology.

The SST11LP12 can be easily configured for high-power, high-efficiency applications with superb power-added efficiency while operating over the entire 802.11a frequency band for U.S., European, and Japanese markets (4.9-5.8 GHz).

The SST11LP12 has excellent linearity, typically <4% added EVM at 21 dBm output power which is essential for 54 Mbps 802.11a operation while meeting 802.11a spectrum mask at 24 dBm. SST11LP12 also has wide-range (>20 dB), temperature-stable (~1 dB over 85°C), single-ended/differential power detectors which lower users' cost on power control.

The power amplifier IC also features easy board-level usage along with high-speed power-up/down control. Ultra-low reference current (total I_{REF} <3 mA) makes the SST11LP12 controllable by an on/off switching signal directly from the baseband chip. These features coupled with low operating current make the SST11LP12 ideal for the final stage power amplification in battery-powered 802.11a WLAN transmitter and access point applications.

The SST11LP12 is offered in 16-contact WQFN package. See Figure 2 for pin assignments and Table 1 for pin descriptions.

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FUNCTIONAL BLOCKS

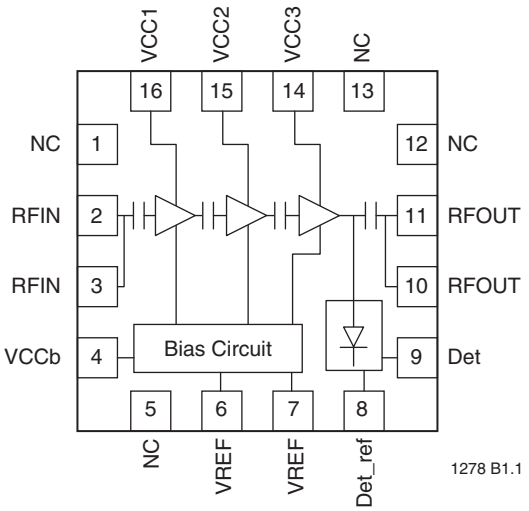


FIGURE 1: Functional Block Diagram

PIN ASSIGNMENTS

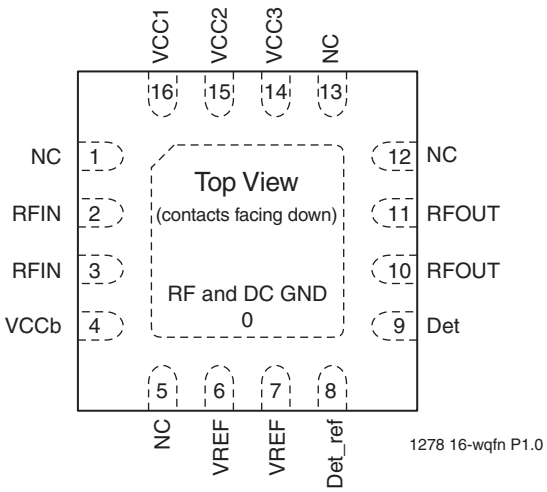


FIGURE 2: Pin Assignments for 16-contact WQFN

PIN DESCRIPTIONS

TABLE 1: Pin Description

Symbol	Pin No.	Pin Name	Type[1]	Function
GND	0	Ground		The center pad should be connected to RF ground with several low inductance, low resistance vias.
NC	1	No Connection		Unconnected pin
RFIN	2		I	RF input, DC decoupled
RFIN	3		I	RF input, DC decoupled
VCCb	4	Power Supply	PWR	Supply voltage for bias circuit
NC	5	No Connection		Unconnected pin
VREF	6		PWR	Current Control
VREF	7		PWR	Current Control
Det_ref	8		O	On-chip power detector reference
Det	9		O	On-chip power detector
RFOUT	10		O	RF output
RFOUT	11		O	RF output
NC	12	No Connection		Unconnected pin
NC	13	No Connection		Unconnected pin
VCC3	14	Power Supply	PWR	Power supply, 3rd stage
VCC2	15	Power Supply	PWR	Power supply, 2nd stage
VCC1	16	Power Supply	PWR	Power supply, 1st stage

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1. I=Input, O=Output

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 Figures 3 through 8 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.)

Supply Voltage at pins 4, 14, 15, 16 (V_{CC}) . . . . . -0.3V to +4.8V
DC supply current (I_{CC}) . . . . . 500 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

OPERATING RANGE

Range	Ambient Temp	V_{CC}
Industrial	-40°C to +85°C	3.3V

TABLE 2: DC Electrical Characteristics

Symbol	Parameter	Min.	Typ	Max.	Unit	Test Conditions
V_{CC}	Supply Voltage at pins 4, 14, 15, 16	2.7	3.3	3.6	V	
I_{CC}	Supply Current @ P_{OUT} = 23 dBm at V_{CC} = 3.3V			400	mA	
I_{CQ}	V_{CC} quiescent current		150		mA	
I_{OFF}	Shut down current		<1.0		µA	
V_{REG}	Reference Voltage for recommended application		2.85	3.0	V	

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TABLE 3: AC Electrical Characteristics for Configuration[1]

Symbol	Parameter	Min	Typ	Max	Unit
F_{L-U}	Frequency range	4.9		5.8	GHz
Linearity	Output power with <4% EVM at 54 Mbps OFDM signal when operating at 3.3V V_{CC}		21		dBm
	Output power level with 802.11a mask compliance across 4.9-5.8 GHz		23		dBm
G	Gain over band (4.9-5.1 MHz)		33		dB
	Gain over band (5.3-5.5 MHz)		31		dB
	Gain over band (5.7-5.8 MHz)		27		dB
Det	Power detector output voltage range	0.5		2.0	V
Det_ref	Power detector output reference	0.5	0.6		V
2f, 3f, 4f, 5f	Harmonics at 22 dBm, without trapping capacitors		-50		dBc

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1. Performance is only valid using the recommended schematic. V_{CC} = 3.3V, V_{REG} = 2.85, Temperature = 25ºC

TYPICAL PERFORMANCE CHARACTERISTICS

Test Conditions: V_{CC} = 3.3V, T_A = 25°C, $V_{REG1,2}$ = 2.85V unless otherwise noted

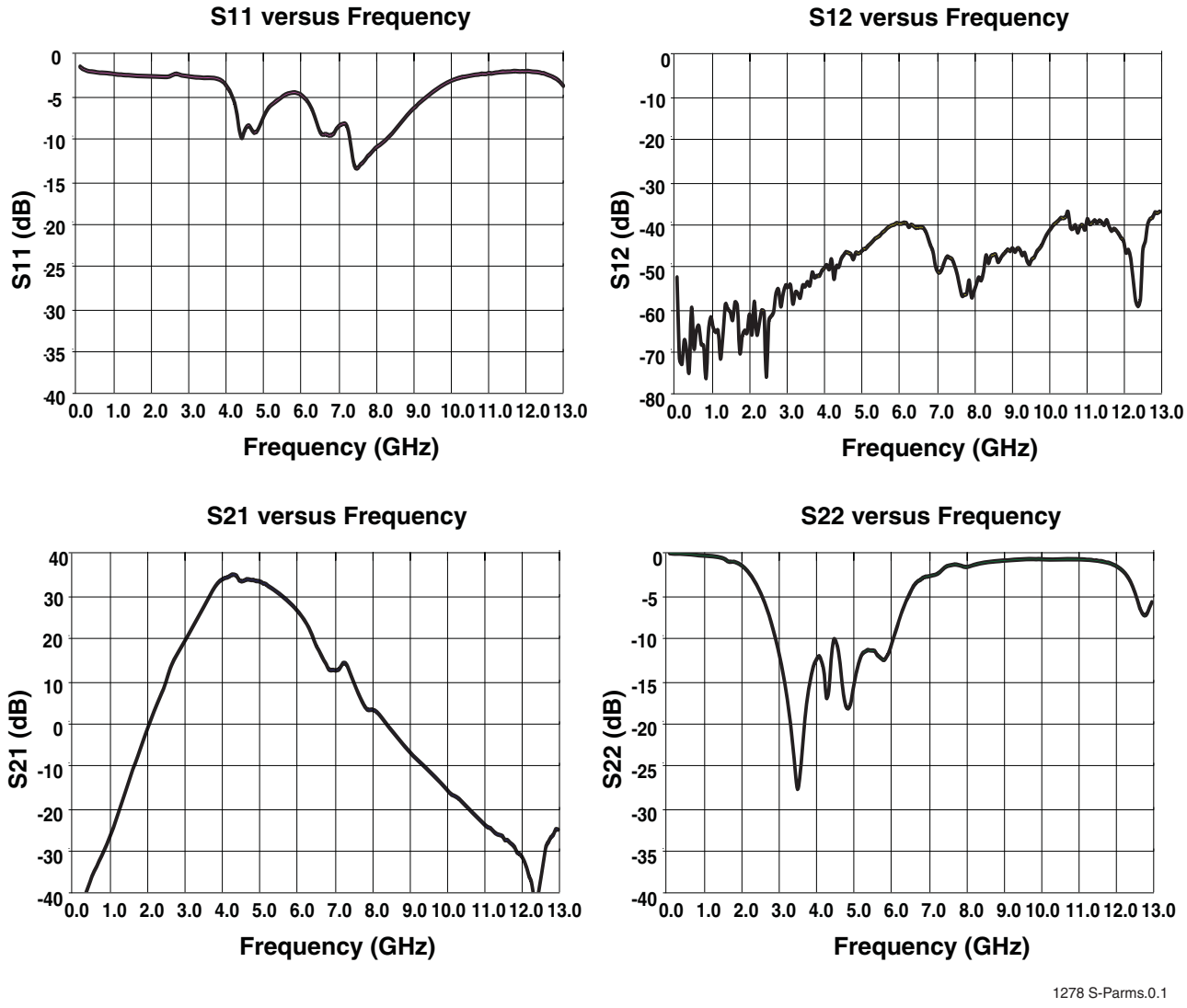


FIGURE 3: S-Parameters

TYPICAL PERFORMANCE CHARACTERISTICS

Test Conditions: V_{CC} = 3.3V, T_A = 25°C, V_{REG} = 2.85V unless otherwise specified

EVM for 54 Mbps operation

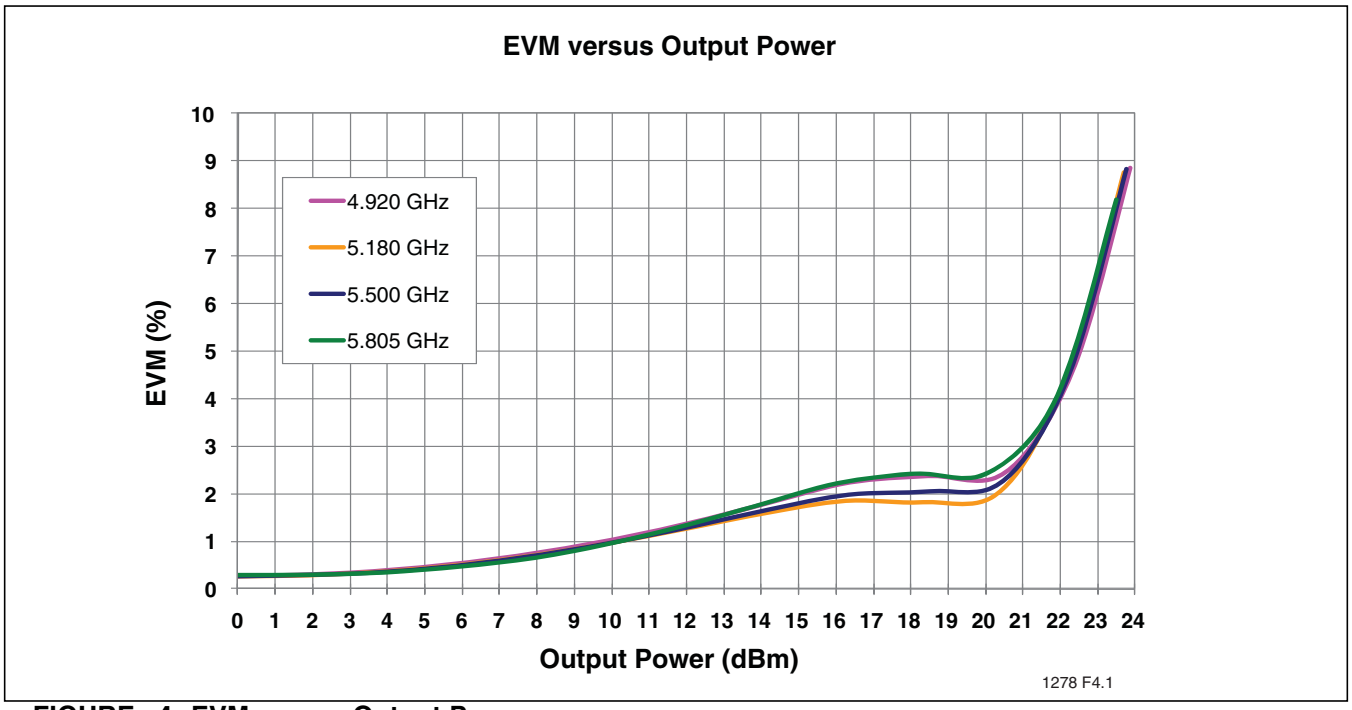


FIGURE 4: EVM versus Output Power

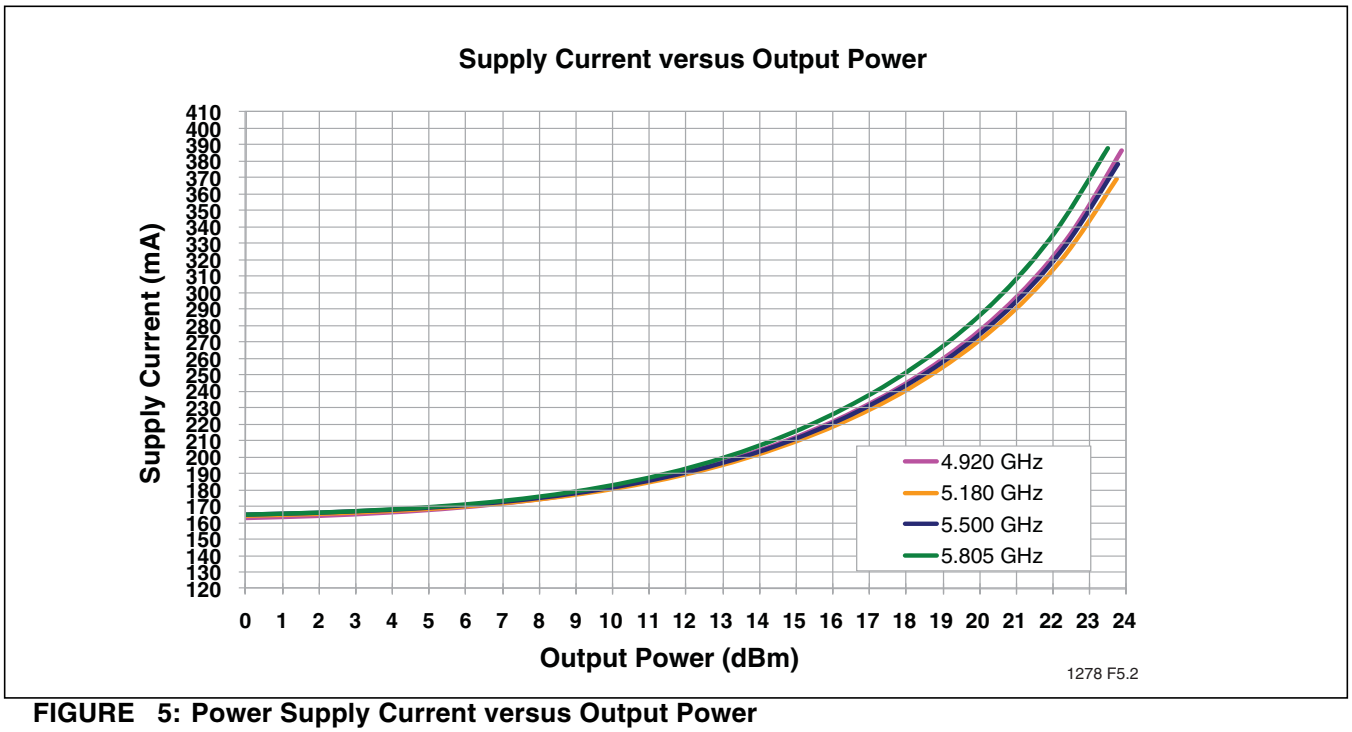


FIGURE 5: Power Supply Current versus Output Power

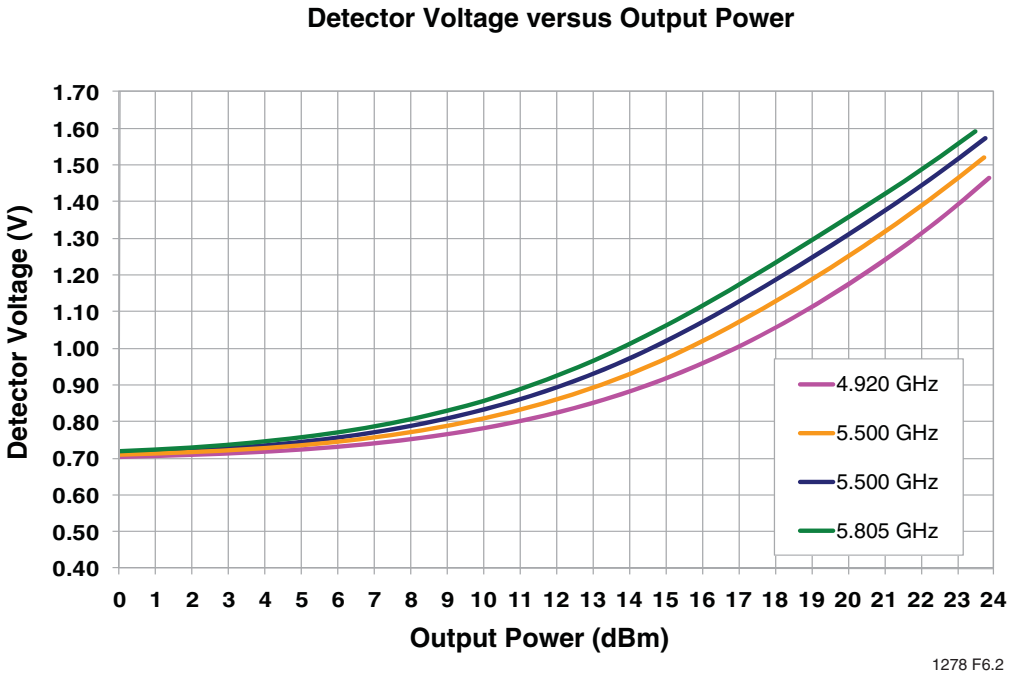


FIGURE 6: Detector Voltage versus Output Power

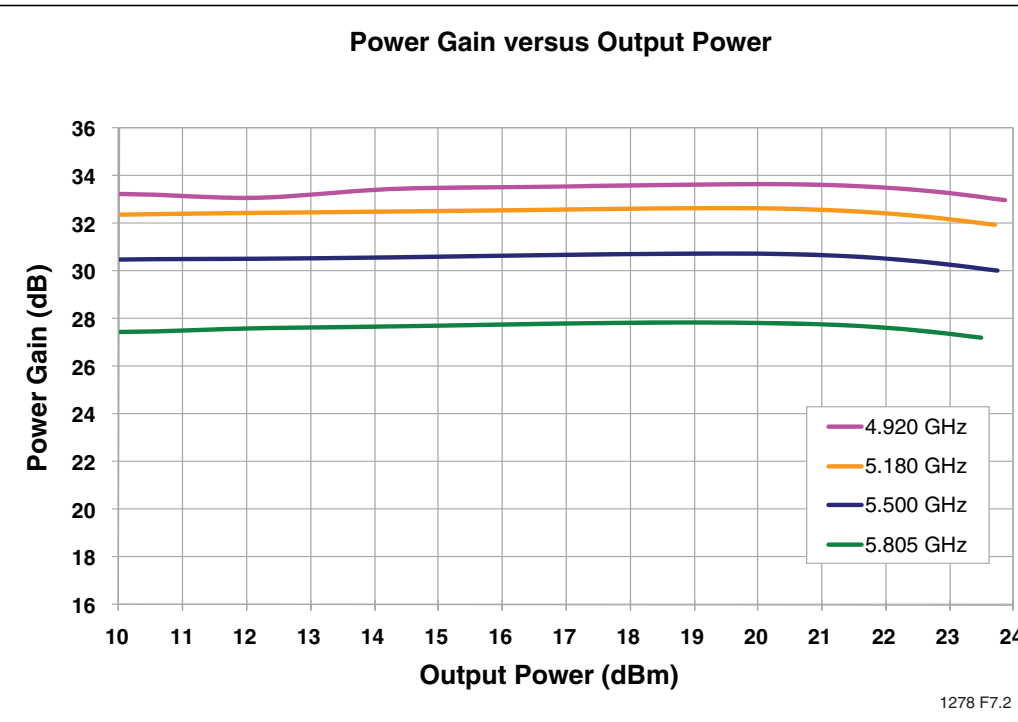


FIGURE 7: Power Gain versus Output Power

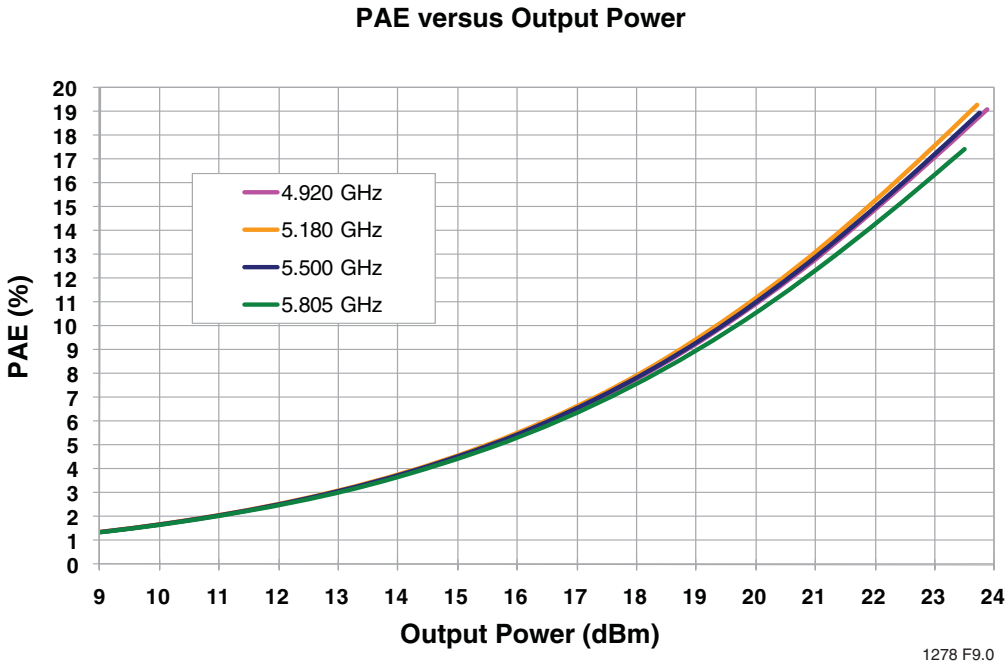


FIGURE 8: PAE versus Output Power

TABLE 4: 802.11a 6Mbps OFDM Mask Compliance Power

Frequency (GHz)	802.11a 6Mbps OFDM Mask Compliance Power (dBm)
4.920	24
5.180	23.8
5.500	23.5
5.805	23

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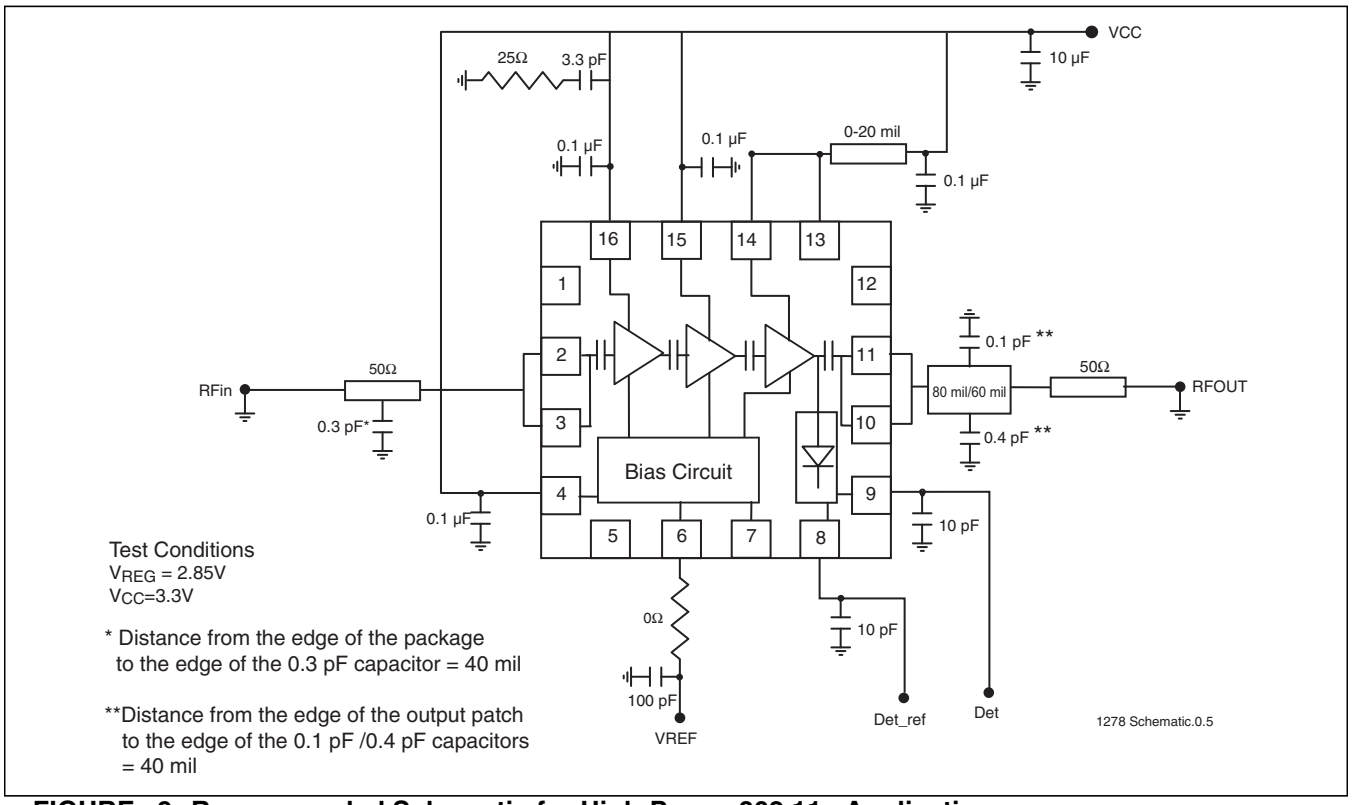
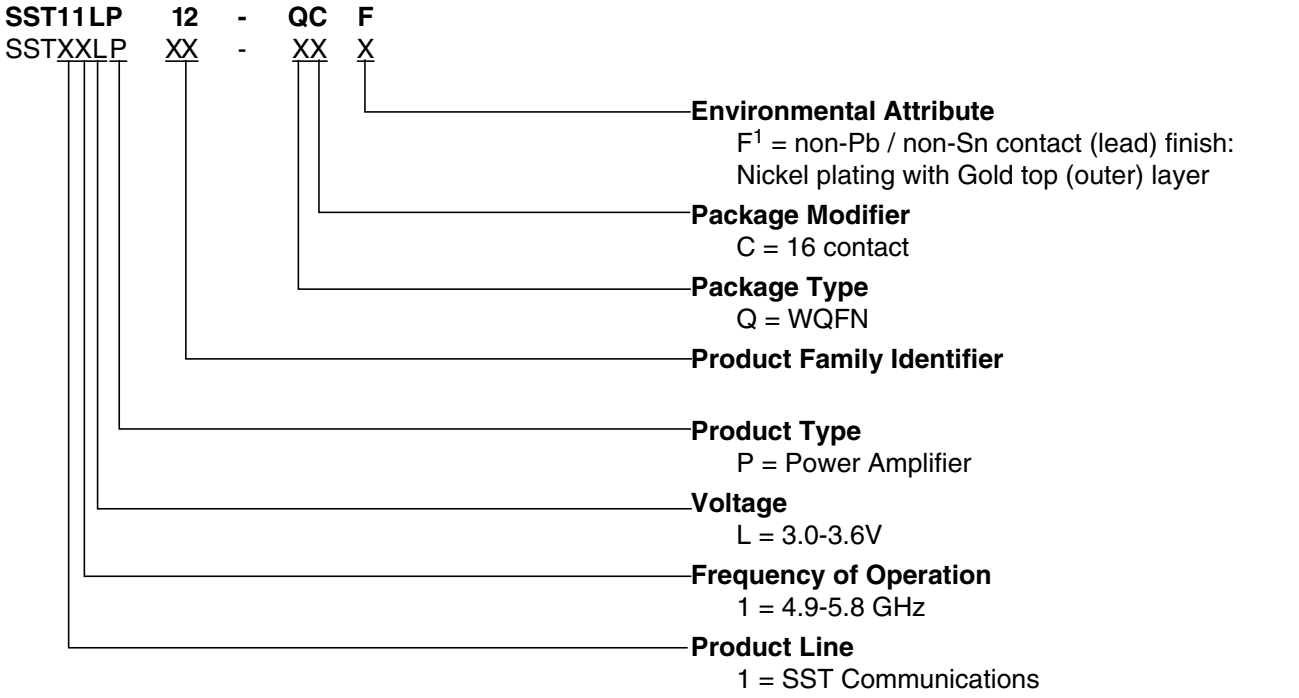


FIGURE 9: Recommended Schematic for High-Power 802.11a Application

PRODUCT ORDERING INFORMATION



1. Environmental suffix “F” denotes non-Pb/non-Sn solder. SST non-Pb/non-Sn solder devices are “RoHS Compliant”.

Valid combinations for SST11LP12

SST11LP12-QCF

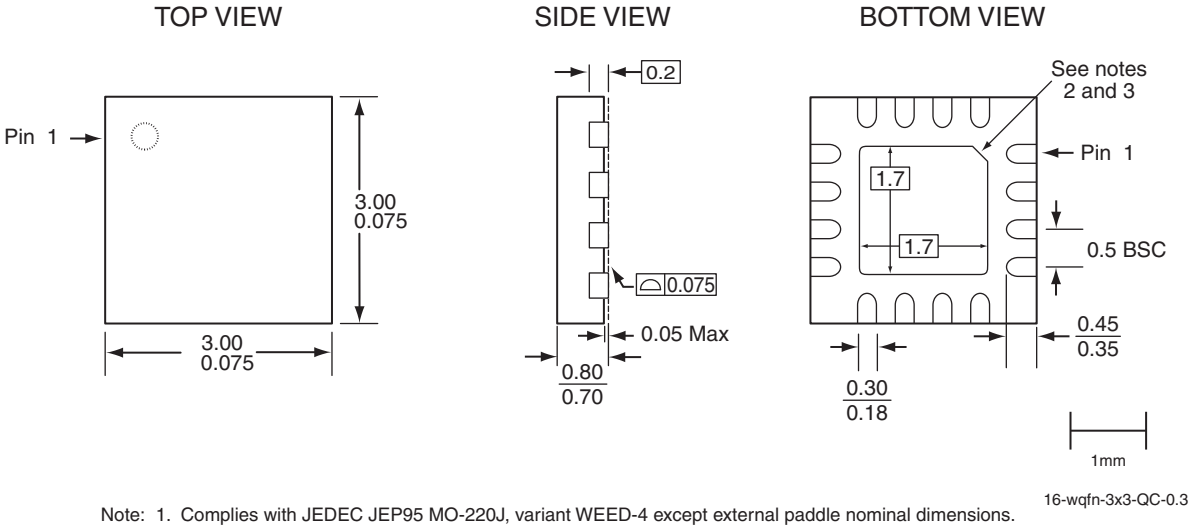
SST11LP12 Evaluation Kits

SST11LP12-QCF-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.

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PACKAGING DIAGRAMS



Note: 1. Complies with JEDEC JEP95 MO-220J, variant WEED-4 except external paddle nominal dimensions.
2. From the bottom view, the pin 1 indicator ma y be either a 45-degree chamfer or a half-circle notch.
3. 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.
4. Untoleranced dimensions are nominal target dimensions.
5. All linear dimensions are in millimeters (max/min).

FIGURE 10: 16-contact Very-thin Quad Flat No-lead (WQFN)
SST Package Code: QC

TABLE 5: Revision History

Revision	Description	Date
00	• S71278: SST conversion of data sheet GP1112	Jan 2005
01	• Corrected the spectrum mask value in “Product Description” on page 1 to read 802.11a • Corrected the solder reflow temperature under “Absolute Maximum Stress Ratings” on page 4 • Updated sales and marketing contact information • Changed VQFN to WQFN • Updated Product Ordering information • Updated Table 3 on page 5.	Jan 2006
02	• Updated document status from Preliminary Specifications to Data Sheet	Mar 2008
03	• Revised gain values in “Features:” and “Product Description” on page 1 and in Table 3 on page 5 • Updated “” on page 12	Feb 2009
04	• Updated Features, Table 2, Table 3, Table 4, and Figures 4-9 to indicate improved RF performance.	Dec 2010

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