2.4-2.5 GHz Power Amplifier
SST12LP00

Preliminary Specifications

FEATURES:

- **High Gain:**
  - Typically 28 dB gain across 2.4– 2.5 GHz over temperatures 0– 85°C
- **High linear output power:**
  - >24 dBm P1dB
- **High power-added efficiency/low operating current for Bluetooth applications**
  - ~50% PAE or 115 mA total current consumption @ Pout = 23 dBm for V_{cc} = 3.3V and GCTL = 3.0V
- **Low idle current**
  - ~10 mA I_{CQ}
- **Simple input/output matching**
- **Packages available**
  - 6-contact VQFN and UQFN (3 x 1.6mm^2)

APPLICATIONS:

- **Bluetooth**
- **USB Dongles**
- **2.4 GHz Cordless phones**

PRODUCT DESCRIPTION

The SST12LP00 is a high-power and high-gain power amplifier based on the highly reliable InGaP/GaAs HBT technology. SST12LP00 is easily configured for high-power and high-efficiency applications while operating over the 2.4- 2.5 GHz frequency band. This device typically provides 30 dB gain with better than 50% power added efficiency @ P_{out} = 23 dBm.

The SST12LP00's excellent linearity is well suited for Class 1 Bluetooth operation. The power amplifier IC also features easy board-level usage along with high speed power up/down control. A low reference current makes SST12LP00 ideal for the final stage power amplification in battery-powered Bluetooth, USB Dongle, or cordless phone transmitter applications.

The SST12LP00 is offered in both 6-contact VQFN and UQFN packages. See Figure 2 for pin assignments and Table 1 for pin descriptions.

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These specifications are subject to change without notice.

FUNCTIONAL BLOCKS

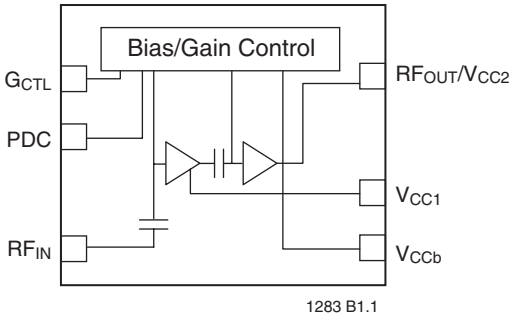


FIGURE 1: Functional Block Diagram

PIN ASSIGNMENTS

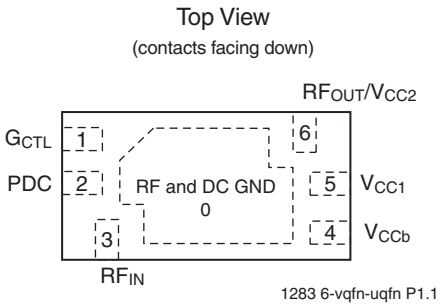


FIGURE 2: Pin Assignments for 6-contact VQFN and UQFN

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.
G_{CTL}	1			Power Amplifier Gain Control
PDC	2			Power-down Control
RF_{IN}	3		I	RF input, DC decoupled
V_{CCb}	4	Power Supply	PWR	Vcc power supply, bias circuit
V_{CC1}	5	Power Supply	PWR	Vcc power supply, 1st stage
RF_{OUT}/V_{CC2}	6		O/PWR	Vcc power supply, 2nd 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 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.)

Supply Voltage at pins 4, 5, and 6 (V_{CC}) . . . . . -0.3V to +3.6V
Power-down Control Voltage (PDC) . . . . . -0.3V to V_{CC}
Gain Control Voltage (G_{CTL}) . . . . . -0.3V to V_{CC}
Radio Frequency Input Power (RF_{IN}) . . . . . +10 dBm
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, 5, and 6	2.7	3.3	3.6	V	
I_{CC}	Supply Current @ P_{OUT} = 23 dBm		115		mA	
G_{CTL}	Power Amplifier Gain Control Voltage	0.1	3.0	3.3	V	
I_{GCTL}	Current through G_{CTL} pin		55	100	µA	
PDC	Logic High Voltage	2.6			V	
	Logic Low Voltage			0.8	V	
I_{CQ}	Idle Current (G_{CTL} = 3.0V)		10		mA	

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TABLE 3: AC Electrical Characteristics

Symbol	Parameter	Min.	Typ	Max.	Unit
F_{L-U}	Frequency range	2402		2480	MHz
P_{OUT}	Output power @ PIN = -7 dBm, V_{CC} = 3.3V, G_{CTL} = 3.0V		23		dBm
G	Small signal gain		27		dB
G_{VAR}	Gain variation over band (2400~2485 MHz)		0.2	0.5	dB

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TYPICAL PERFORMANCE CHARACTERISTICS

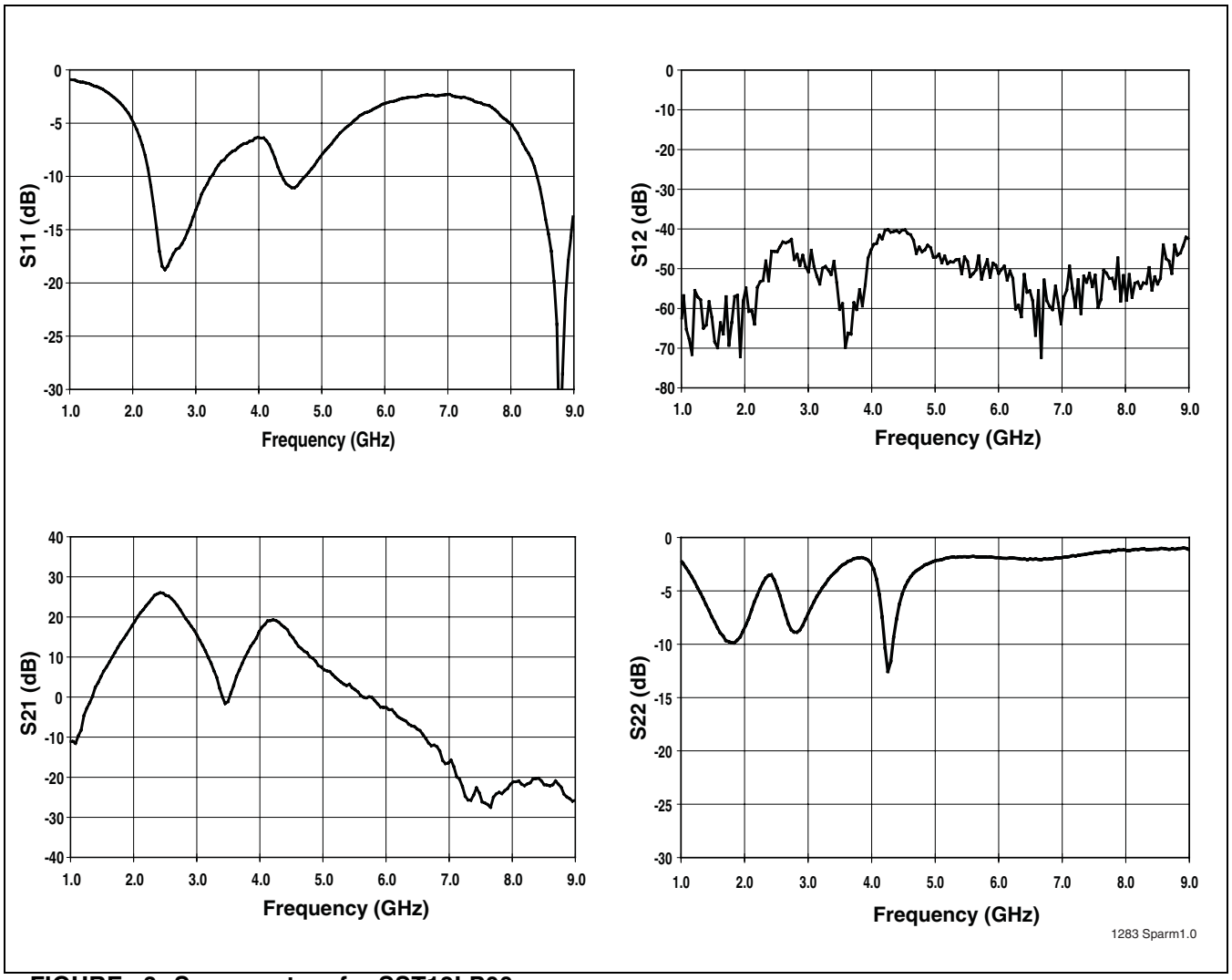


FIGURE 3: S-parameters for SST12LP00

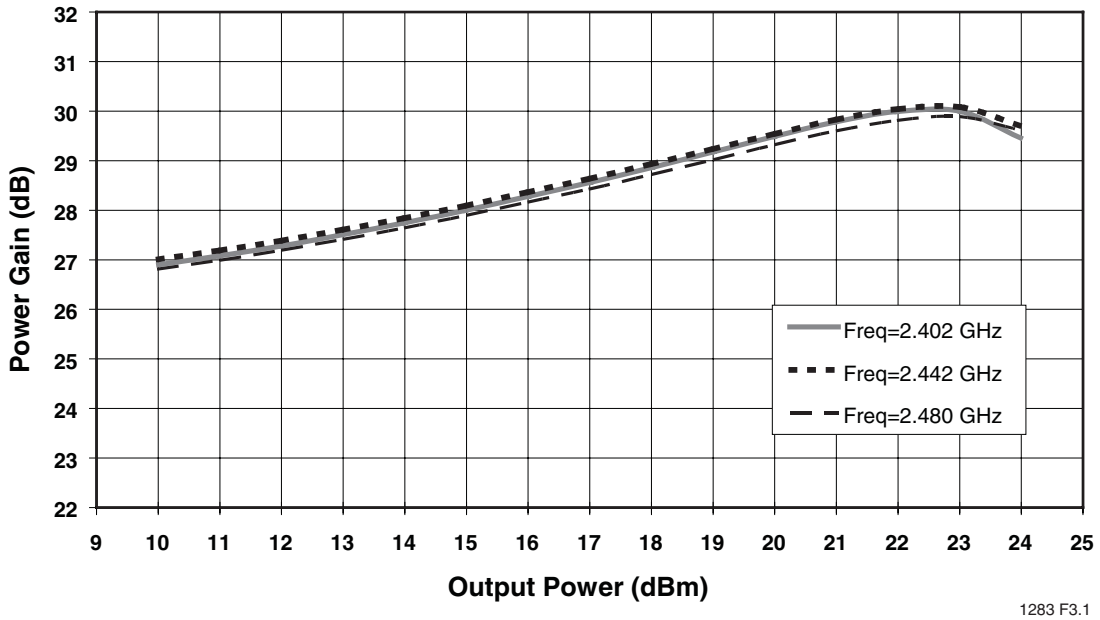


FIGURE 4: Power Gain versus Output Power

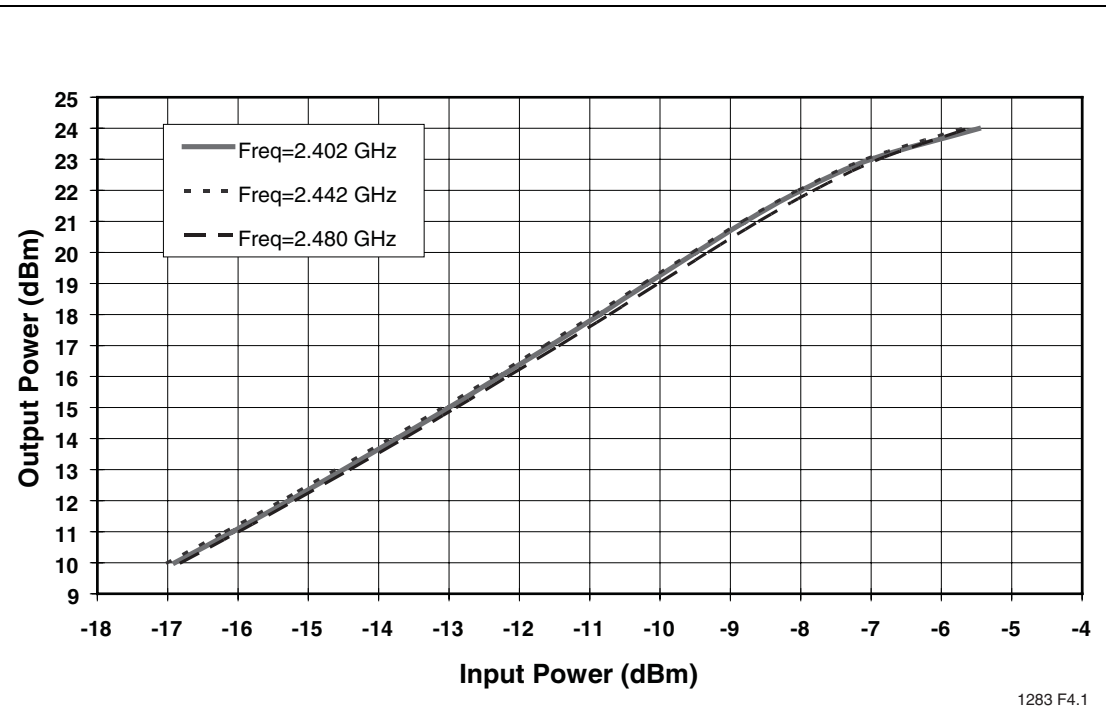


FIGURE 5: Output Power versus Input Power

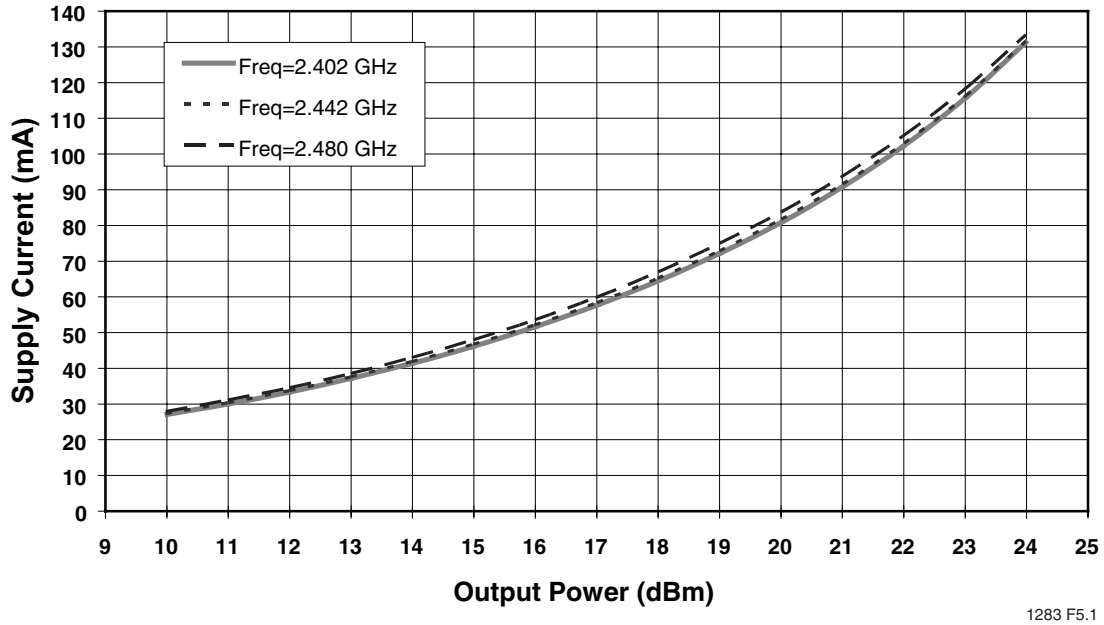


FIGURE 6: Supply Current versus Output Power

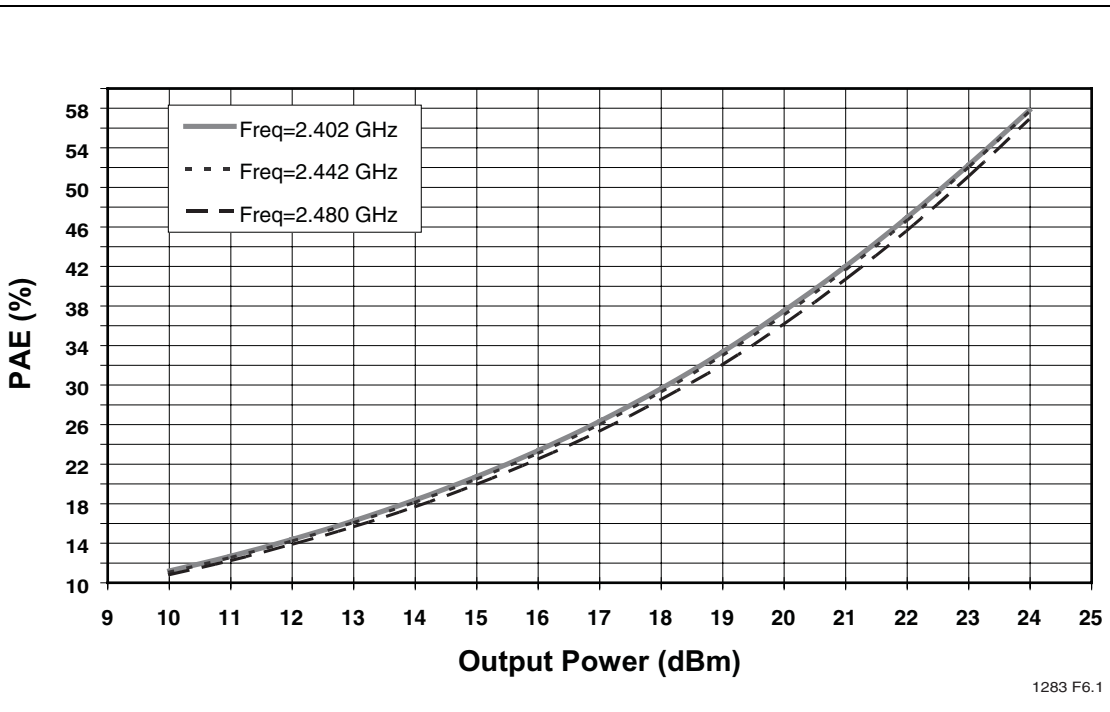


FIGURE 7: PAE versus Output Power

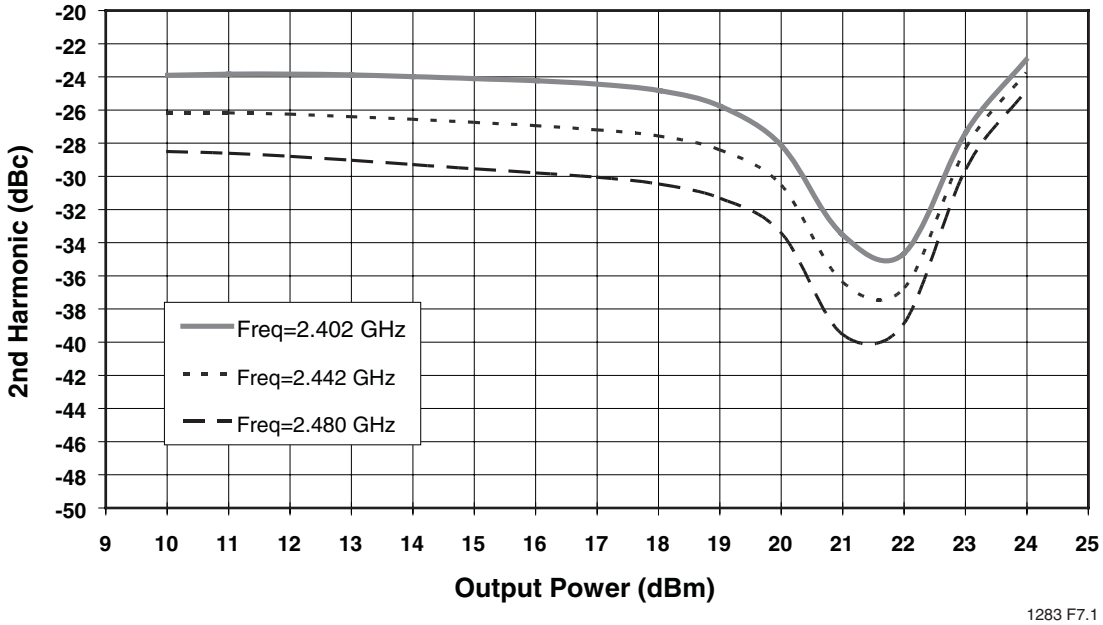


FIGURE 8: 2nd Harmonic versus Output Power

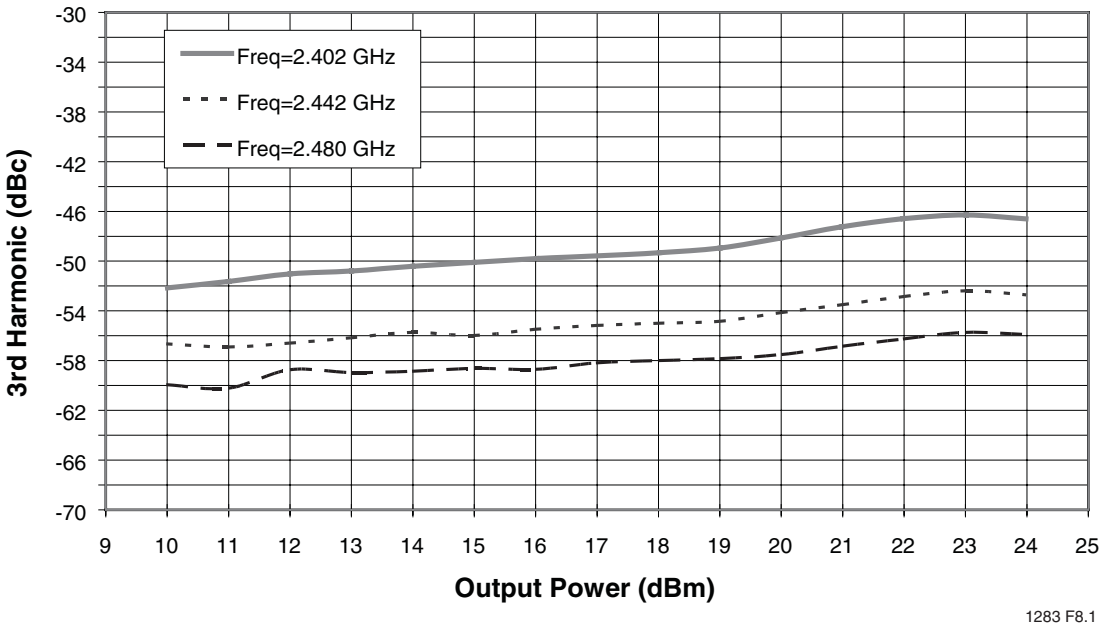


FIGURE 9: 3rd Harmonic versus Output Power

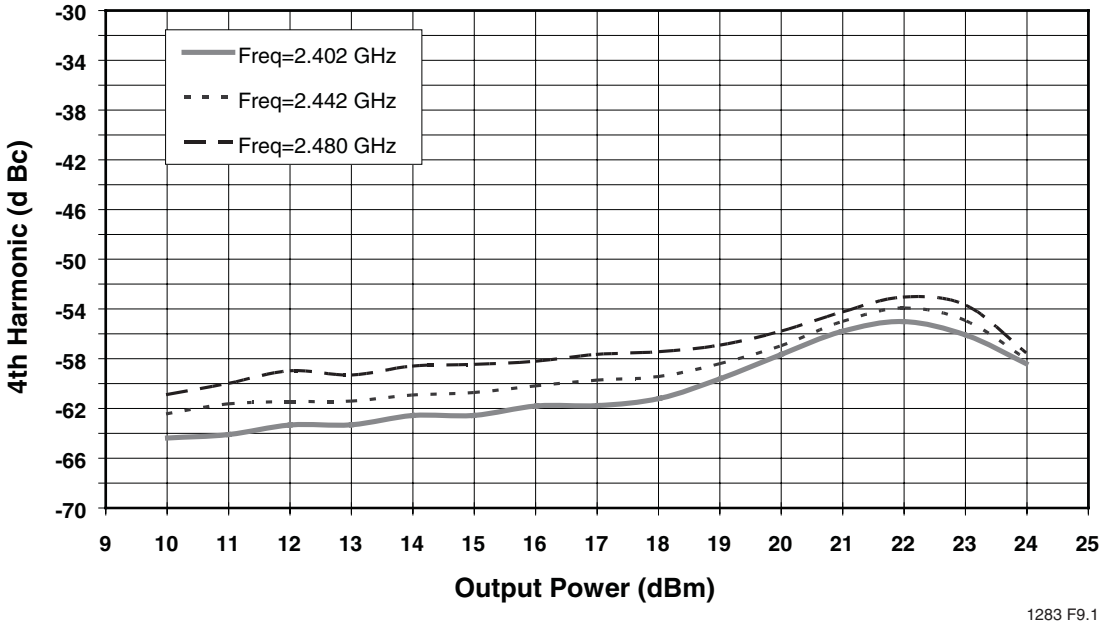


FIGURE 10: 4th Harmonic versus Output Power

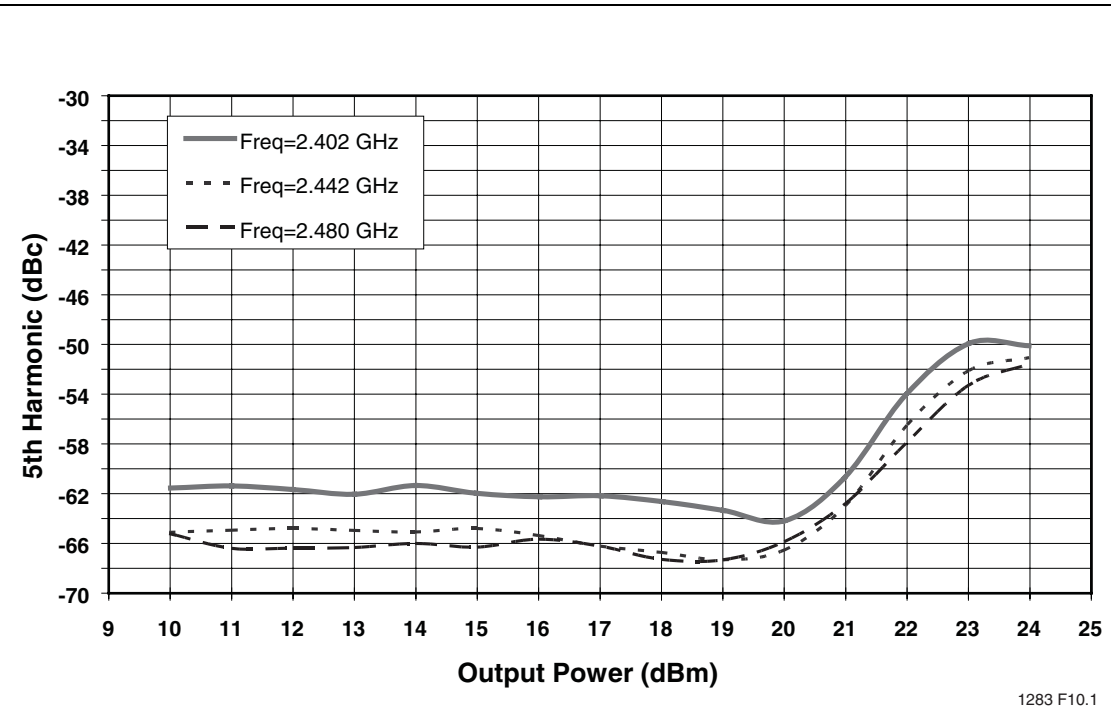


FIGURE 11: 5th Harmonic versus Output Power

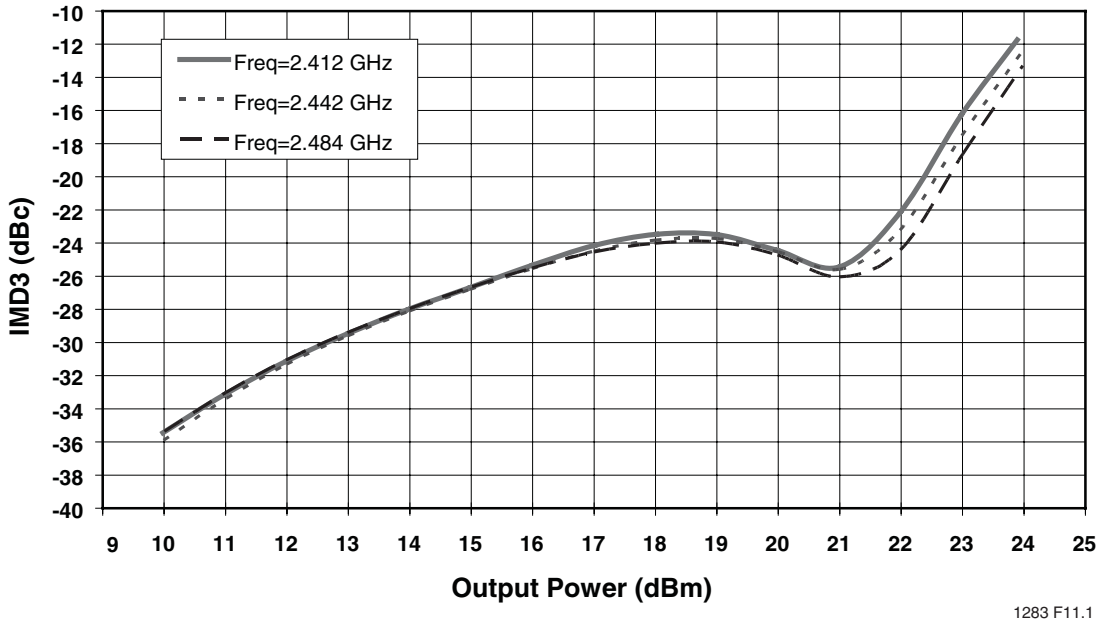
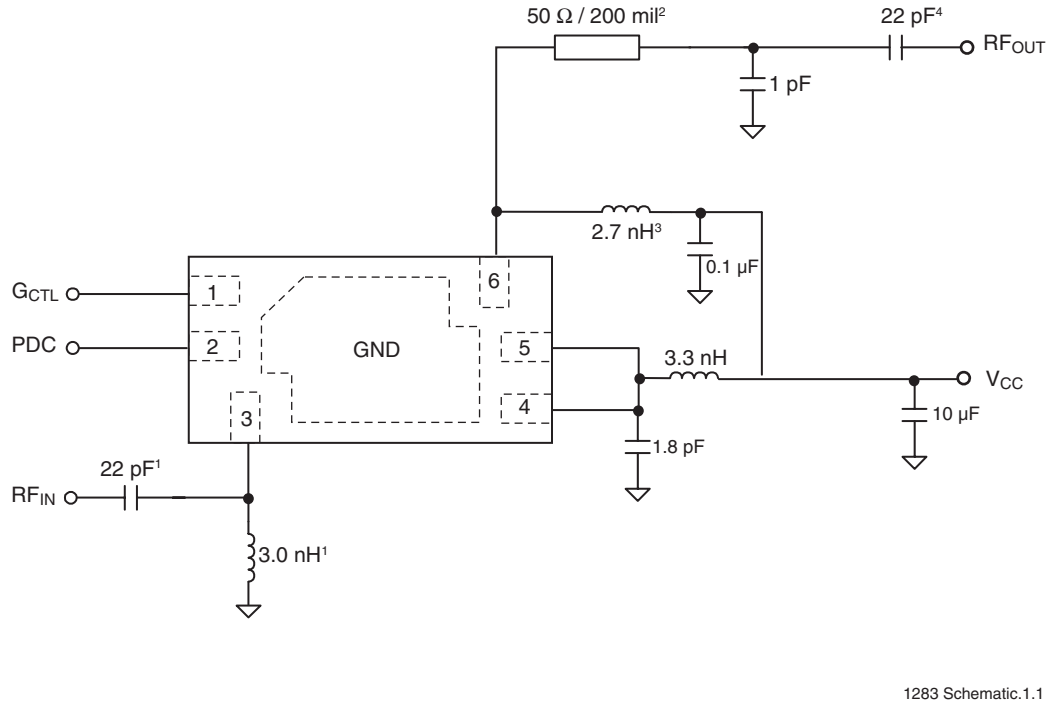


FIGURE 12: IMD3 versus Output Power

Preliminary Specifications

TYPICAL APPLICATION



1. Optional and only necessary for achieving high input return loss.
2. Replaceable by 1 nH (0402) inductor for compactness.
3. Shunt capacitor can be added to the inductor to lower the 2nd harmonic.
4. LC low-pass filter can be added to lower the 2nd harmonic.

FIGURE 13: Typical Application Schematic (Top View)

PRODUCT ORDERING INFORMATION

SST12LP 00 - QV6 E
SST12LP XX - XXX X

Environmental Attribute
E[1] = non-Pb contact (lead) finish
F[2] = non-Pb/non-Sn contact (lead) finish

Package Modifier
6 = 6 contact

Package Type
QV = VQFN
QU = UQFN

Product Family Identifier

Product Type
P = Power Amplifier

Voltage
L = 3.0-3.6V

Frequency of Operation
2 = 2.4 GHz

Product Line
1 = SST Communications

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

Valid combinations for SST12LP00

SST12LP00-QV6E SST12LP00-QU6F

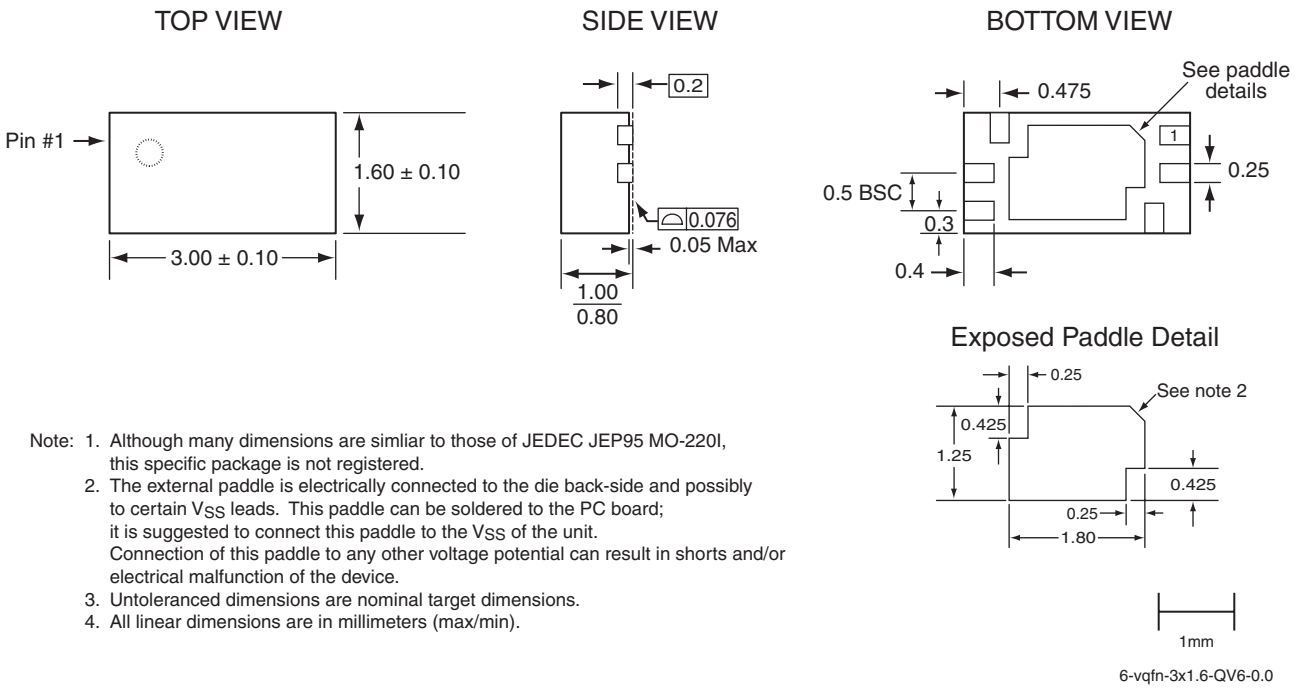
SST12LP00 Evaluation Kits

SST12LP00-QV6E-K SST12LP00-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.

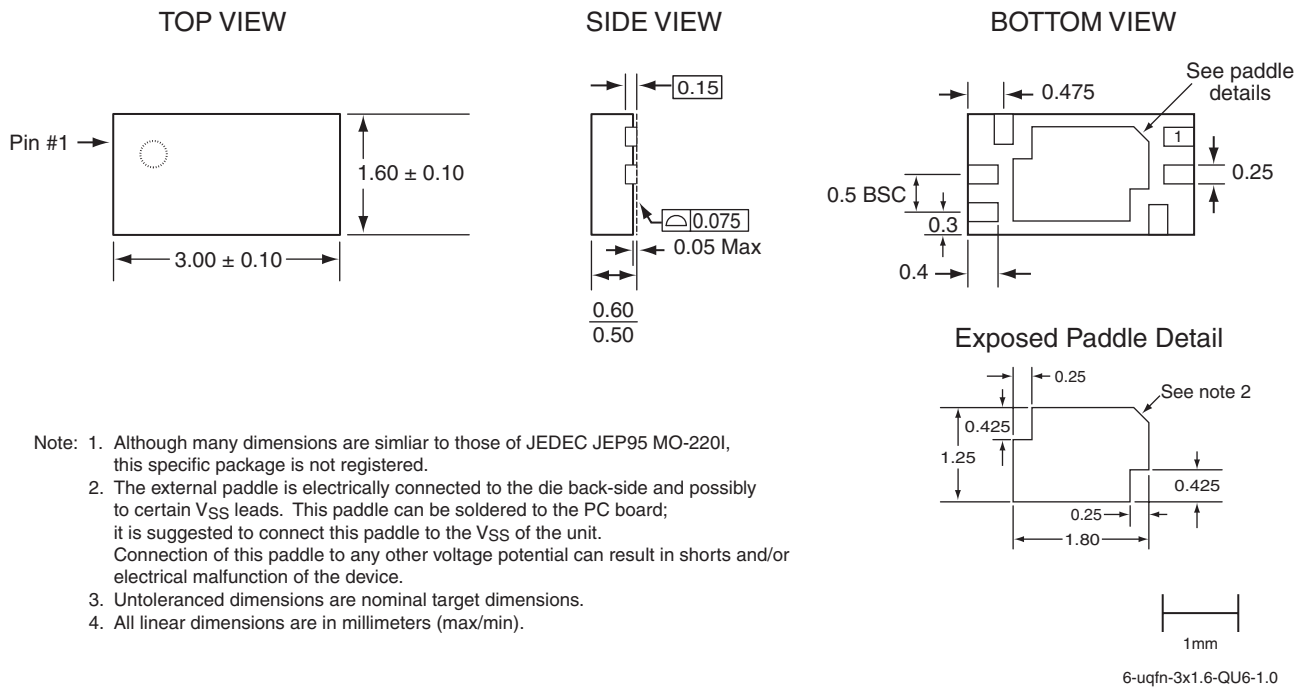
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PACKAGING DIAGRAMS



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).

FIGURE 14: 6-contact Very-thin Quad Flat No-lead (VQFN)
SST Package Code: QV6



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).

FIGURE 15: 6-contact Ultra-thin Quad Flat No-lead (UQFN)
SST Package Code: QU6

TABLE 4: Revision History

Revision	Description	Date
00	• S71283: SST conversion of data sheet GP1200	Jan 2005
01	• Made various changes to include UQFN package • Updated Information in “Features:” on page 1 • Updated “Product Description” on page 1 • Updated Table 1 on page 2 • Updated “Electrical Specifications” on page 3 • Updated Table 2 on page 3 • Updated Table 3 on page 3 • Updated Figure 13 on page 10 • Applied new formatting styles.	Mar 2006

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