SST11CP22

5.1-5.9 GHz 802.11ac WLAN Power Amplifier

Features

- 50Ω input and output match including DC blocks
- Integrated harmonic filter
- Operating voltage: V_{CC} = 5.0V
- Operating frequency: 5.1 to 5.9 GHz
- High linear output power, typical performance:
  - 802.11a OFDM Spectrum mask compliant up to 24 dBm
  - 802.11n HT40 OFDM Spectrum mask compliant up to 23 dBm
  - 3% EVM up to 20 dBm for 802.11a, 54 Mbps signal
  - 2.5% EVM up to 19 dBm for 802.11n, HT40
  - 1.8% EVM up to 18 dBm for 802.11ac, MCS9, 80 MHz BW (bandwidth) signal
- Gain: Typically 31 dB gain across 5.1–5.9 GHz
- Idle current: Typically ~320 mA I_{CQ}
- High-speed power-up/down
  - Turn on/off time (10%-90%) <100 ns
- Shut-down current (~2 µA)
- On-chip power detection
  - >20 dB linear dynamic range
  - VSWR insensitive
- All devices are RoHS compliant

Applications

- WLAN (IEEE 802.11a/n/ac)
- HyperLAN2
- Multimedia

Product Description

SST11CP22 is a 50Ω, RF-matched Power Amplifier Module (PAM) with a FCC-compliant, harmonic filter that is based on the highly-reliable InGaP/GaAs HBT technology.

Operating over the 5.1–5.9 GHz frequency band, SST11CP22 meets 802.11a spectrum mask requirements up to 24 dBm and 802.11n HT40 spectrum mask at 23 dBm. With 802.11a modulation, this PA typically provides up to 20.5 dBm with 3% EVM, and provides 18 dBM with less than 1.8% dynamic EVM using 802.11ac modulation, MCS9, 80 MHz bandwidth.

This power amplifier module also features easy board-level operation, with a simple application circuit requiring only four external components. With its high-speed power-up/-down control, SST11CP22 is controllable directly from the baseband chip.

SST11CP22 also features a wide dynamic-range, linear power detector that is temperature-stable and VSWR-insensitive.

SST11CP22 is offered in 20-contact QFN package. See Figure 2-1 for pin assignments and Table 2-1 for pin descriptions.

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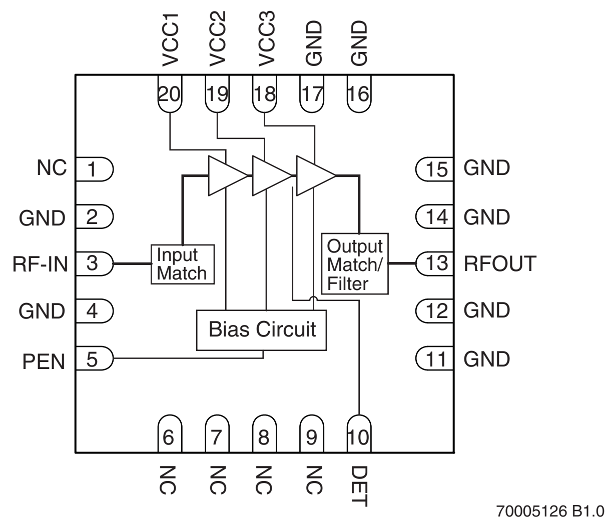
1.0 FUNCTIONAL BLOCKS

FIGURE 1-1: FUNCTIONAL BLOCK DIAGRAM



2.0 PIN ASSIGNMENTS

FIGURE 2-1: PIN ASSIGNMENTS FOR 20-CONTACT UQFN

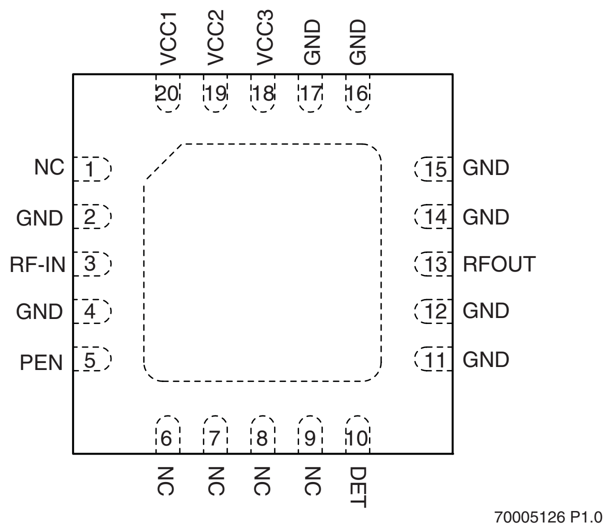


TABLE 2-1: PIN DESCRIPTION

Symbol	Pin No.	Pin Name	Function
GND	0	Center ground contact	The center pad should be connected to RF ground with several low inductance, low resistance vias.
NC	1	No Connection	Unconnected, no internal connection
GND	2	Ground	
RFIN	3	RF input	RF input port
GND	4	Ground	
PEN	5	PA enable	PA enable control input
NC	6	No Connection	Unconnected, no internal connection
NC	7	No Connection	Unconnected, no internal connection
NC	8	No Connection	Unconnected, no internal connection
NC	9	No Connection	Unconnected, no internal connection
DET	10	TX detector output	TX detector output
GND	11	Ground	
GND	12	Ground	
RF OUT	13	RF Out	RF Output port
GND	14	Ground	
GND	15	Ground	
GND	16	Ground	
GND	17	Ground	
VCC3	18	PA supply	PA Supply
VCC2	19	PA supply	PA Supply
VCC1	20	PA supply	PA Supply

3.0 ELECTRICAL SPECIFICATIONS

The AC and DC specifications for the power amplifier interface signals. Refer to Table 3-2 for the DC voltage and current specifications. Refer to Figures 4-1 through 4-7 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 18, 19, and 20 (V_{CC}) . . . . -0.3V to +6.5V
Supply voltage to pins 5, 6, and 7 (V_{PEN}) . . . . -0.3V to +3.6V
DC supply current (I_{CC}) . . . . 600 mA
Operating Temperature (T_A) . . . . -20ºC to +85ºC
Storage Temperature (T_{STG}) . . . . -40ºC to +120ºC
Maximum Junction Temperature (T_J) . . . . +150ºC
Maximum Output Power . . . . 26 dBm
Surface Mount Solder Reflow Temperature . . . . 260°C for 10 seconds

TABLE 3-1: OPERATING RANGE

Range	Ambient Temp	V_{CC}
Industrial	-10°C to +85°C	5.0V-6.0V

TABLE 3-2: DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Min.	Typ	Max.	Unit
V_{CC}	Supply Voltage		5.0	6.0	V
I_{CC}	Supply Current @ P_{OUT} = 20 dBm		370		mA
I_{CQ}	V_{CC} Quiescent Current		320		mA
I_{OFF}	Shutdown Current		2		µA
V_{PEN}	Recommended Enable Voltage		2.85		V
I_{PEN}	Total Enable Current		8		mA
V_{DET}	RF Power Detector Voltage Output Range, 0 to 23 dBm	0.15		1.0	V
	Voltage at 20 dBm		0.75		V

TABLE 3-3: AC ELECTRICAL CHARACTERISTICS FOR CONFIGURATION V_{CC} = 5.0V, V_{PEN}=2.85V, 25 °C UNLESS OTHERWISE SPECIFIED

Symbol	Parameter	Min.	Typ	Max.	Unit
F_{L-U}	Frequency range	5.1		5.9	GHz
Linear Power	Output power at 3% EVM at 54 Mbps OFDM signal, 802.11a		20.5		dBm
	Output power at 2.5% dynamic EVM 802.11n HT40		19		dBm
	Output power 1.8% dynamic EVM MCS9 80 MHz BW		18		dBm
	$ACPR_A$ output power level with 802.11a mask compliance @ 6Mbps OFDM		24		dBm
	$ACPR_{N40}$ output power level with 802.11n HT40 mask compliance		23		dBm
G	Power gain from 5.18-5.9 GHz		31		dB
RL	RF input return loss		10		dB
$2f_0$	Second harmonic power density at 24 dBm		-45		dBm/MHz
$3f_0$	Third harmonic power density at 24 dBm		-50		dBm/MHz

4.0 TYPICAL PERFORMANCE CHARACTERISTICS

Test Conditions: V_{CC} = 5.0V, T_A = 25°C, V_{PEN} = 2.85V, 802.11a 54 Mbps OFDM Modulation, 50% Duty Cycle, 25°C Unless otherwise specified

FIGURE 4-1: S-PARAMETERS

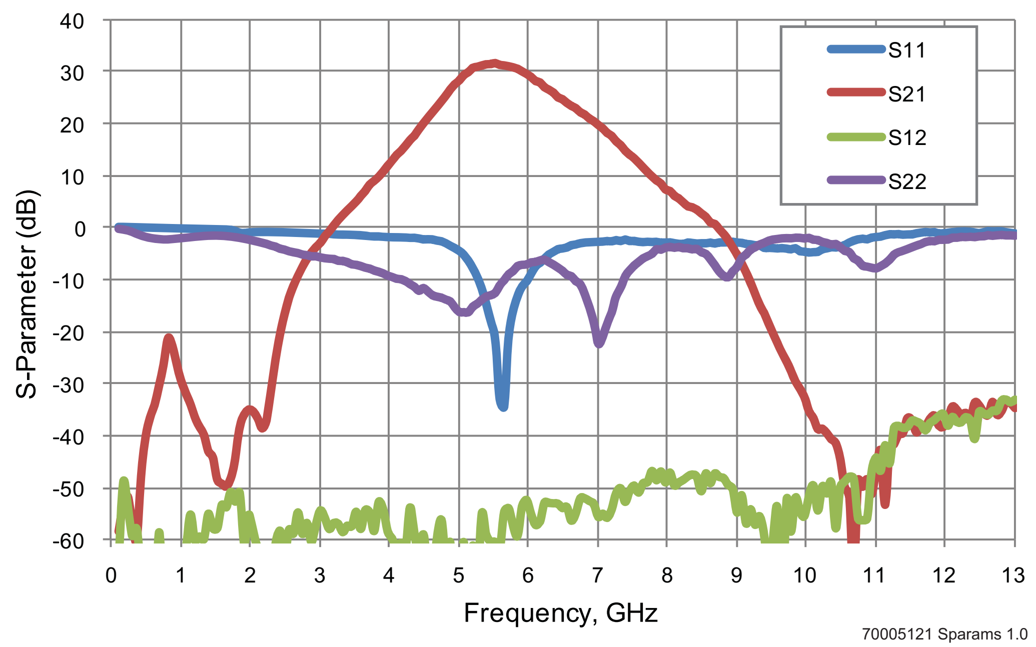


FIGURE 4-2: DYNAMIC EVM VERSUS OUTPUT POWER, 802.11a 54 Mbps, 50% DUTY CYCLE, V_{PEN}=2.85V

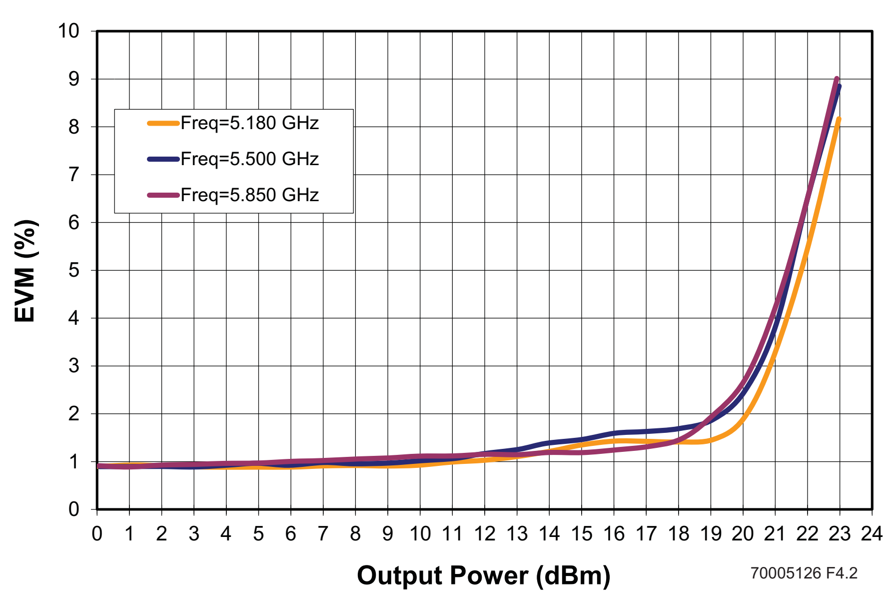


FIGURE 4-3: DYNAMIC EVM VERSUS OUTPUT POWER, 802.11n MCS7-HT40, 40 MHz, 50% DUTY CYCLE, V_{PEN}=2.85V

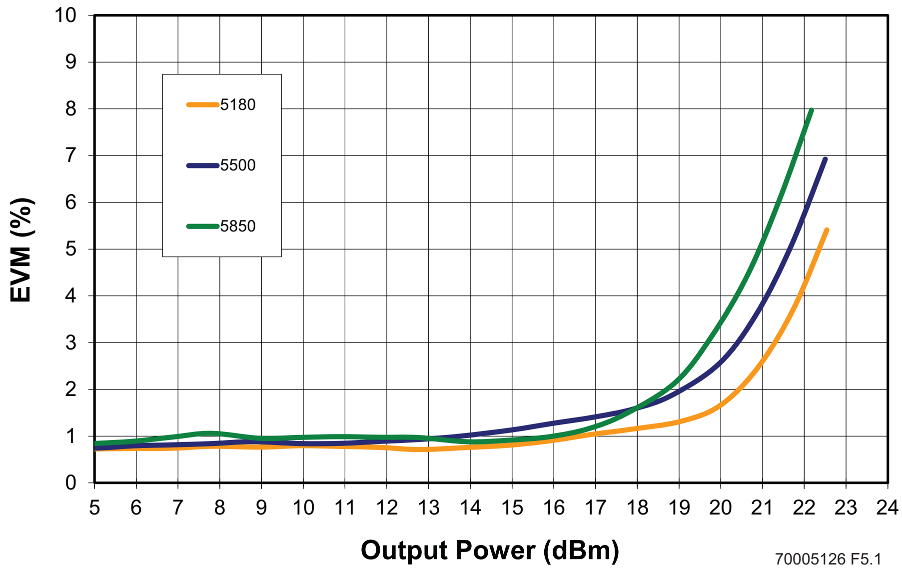


FIGURE 4-4: DYNAMIC EVM VERSUS OUTPUT POWER, 802.11ac MCS9, 80 MHz, 60 µS PULSE, 50% DUTY CYCLE, V_{PEN}=2.85V

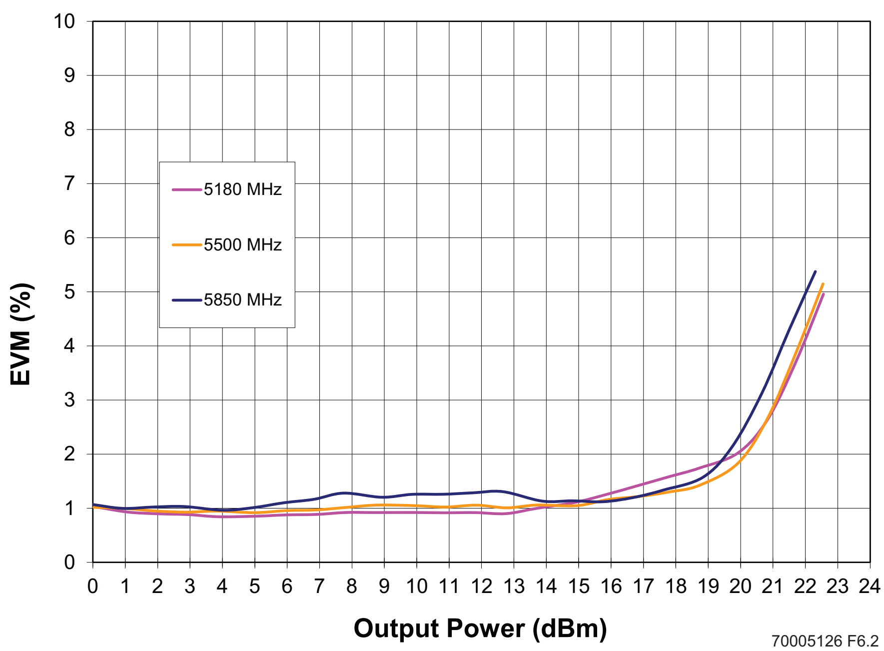


FIGURE 4-5: INSTANTANEOUS POWER SUPPLY CURRENT VERSUS OUTPUT POWER, V_{CC}=5.0V, 802.11ac MCS9, 80 MHz, 60 µs PULSE, 50% DUTY CYCLE V_{PEN}=2.85V

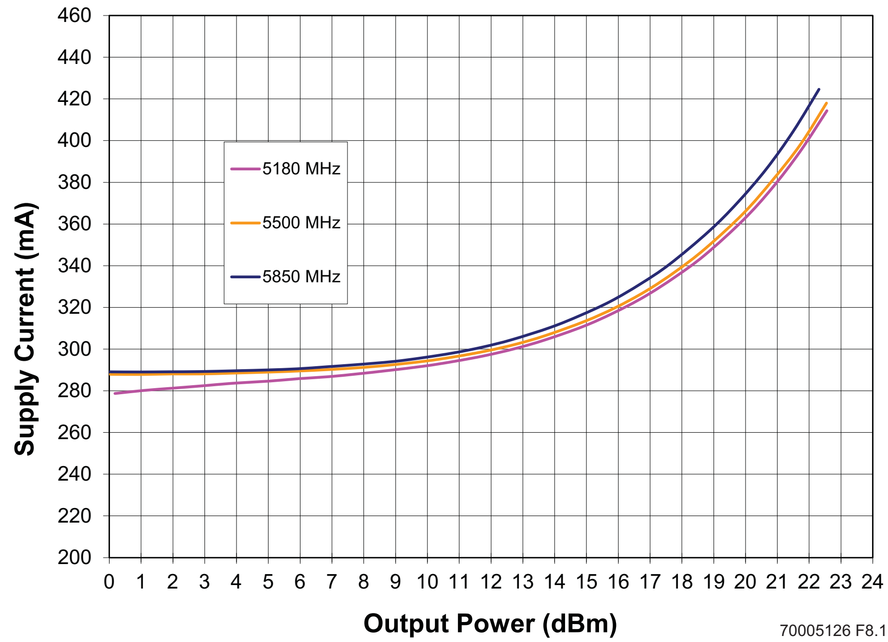


FIGURE 4-6: POWER GAIN VERSUS OUTPUT POWER

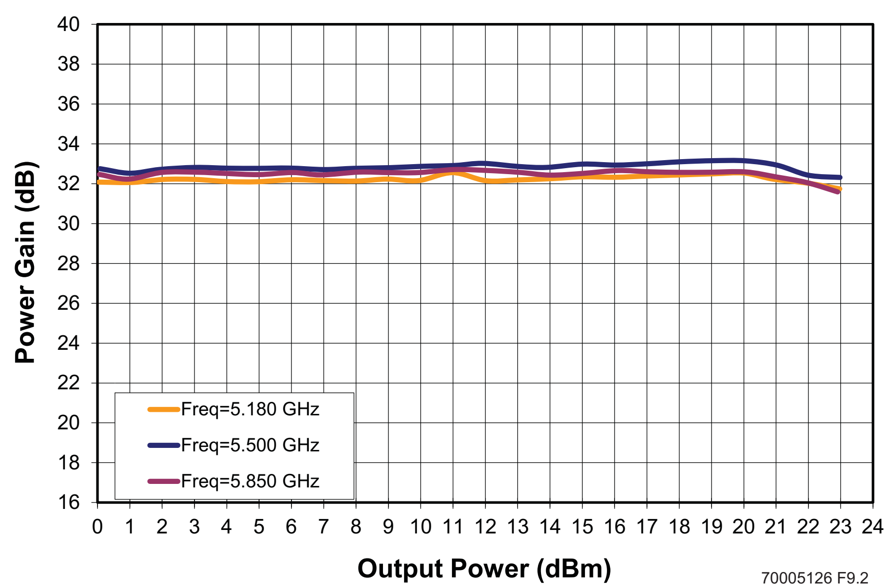


FIGURE 4-7: DETECTOR VOLTAGE VERSUS OUTPUT POWER, V_{PEN}=2.85V

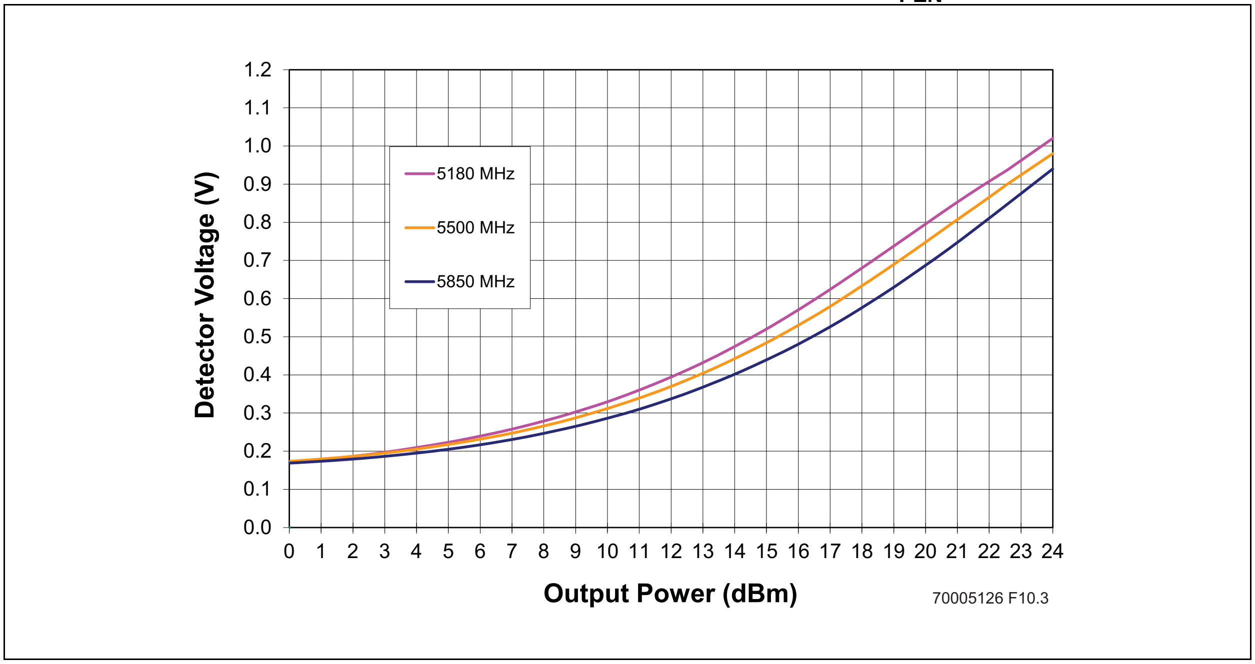
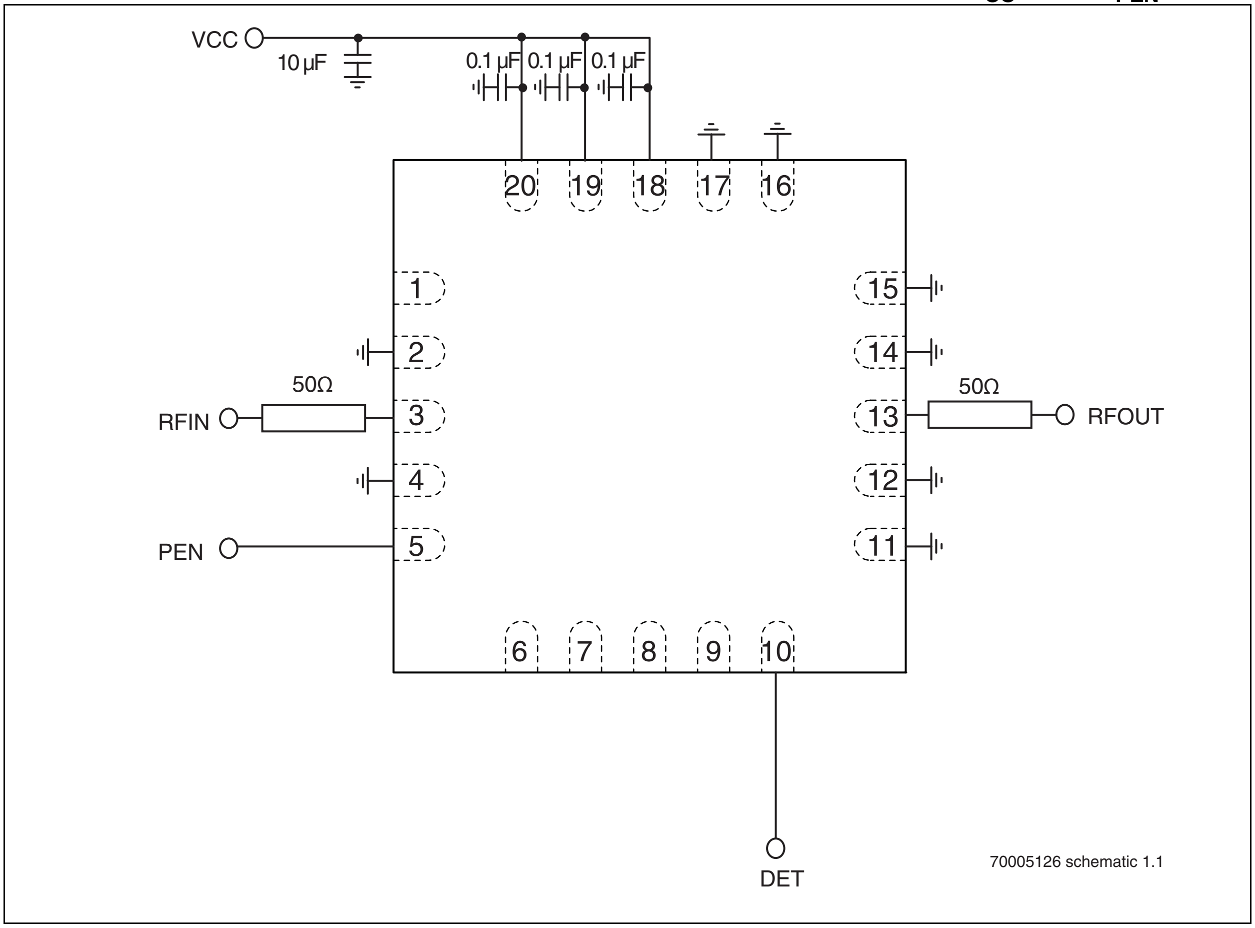


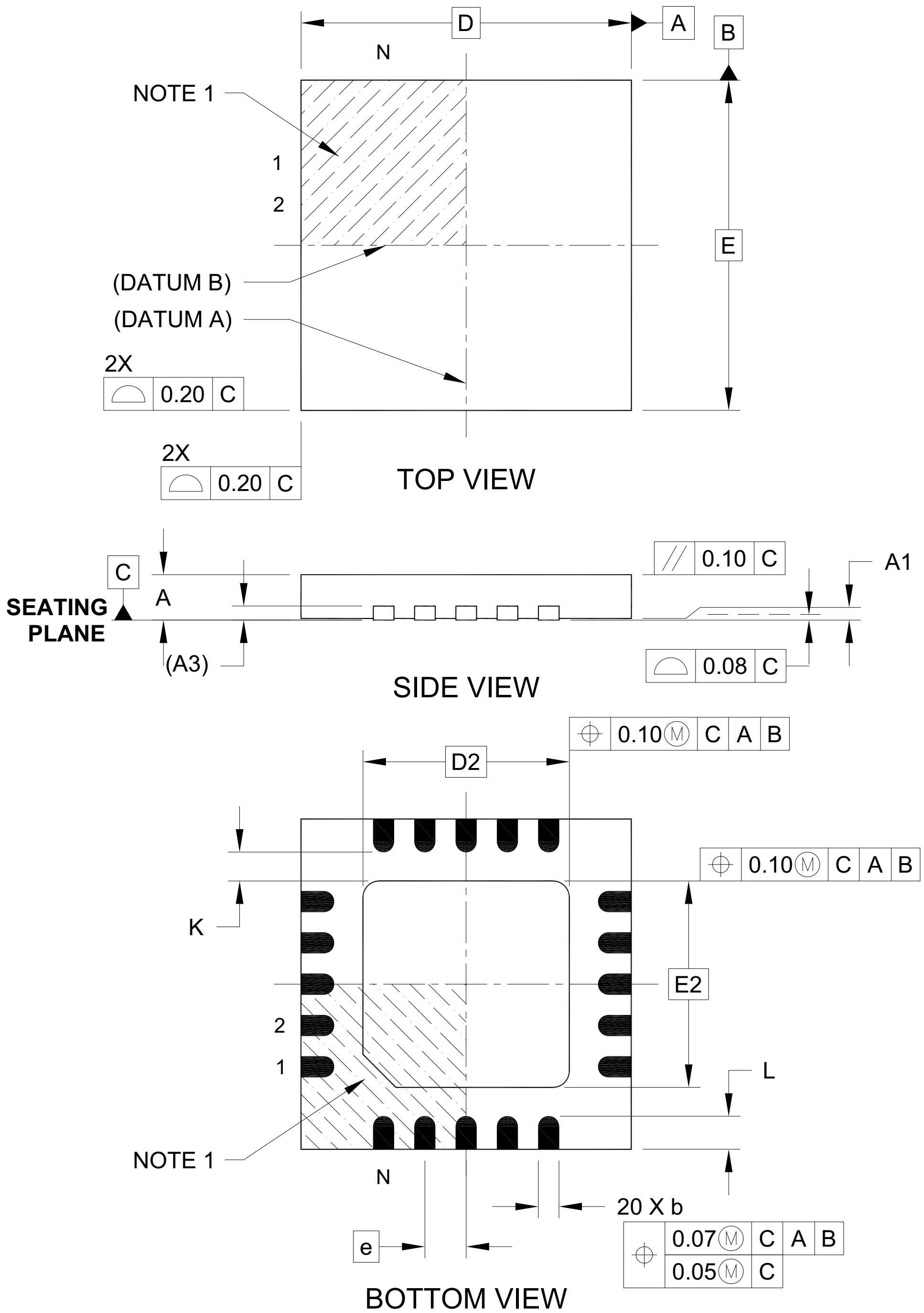
FIGURE 4-8: TYPICAL SCHEMATIC FOR 802.11a/n/ac APPLICATIONS, V_{CC}=5.0V, V_{PEN}=2.85V



5.0 PACKAGE INFORMATION

20-Lead Ultra Thin Quad Flat Pack, No Lead (GN) - 4x4x0.55 mm Body (UQFN)

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



Microchip Technology Drawing C04-252A Sheet 1 of 2

20-Lead Ultra Thin Quad Flat Pack, No Lead (GN) - 4x4x0.55 mm Body (UQFN)

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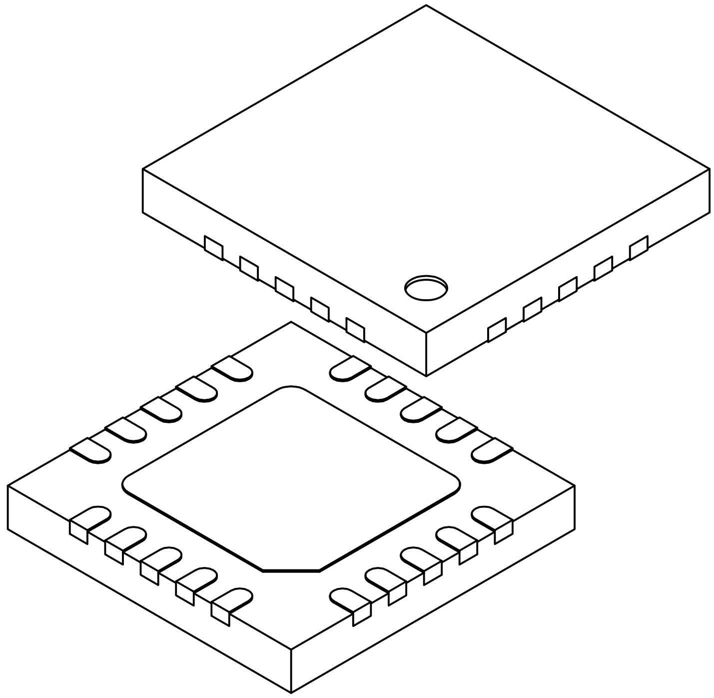

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		20	
Pitch	e		0.50 BSC	
Overall Height	A	0.50	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)		0.15 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.45	2.50	2.55
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.45	2.50	2.55
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.35	0.40	0.45
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-252A Sheet 2 of 2

TABLE 5-1: REVISION HISTORY

Revision	Description	Date
A	• Initial release of data sheet	Jul 2013
B	• Revised Product Description on page 1 • Updated Figures 4-2 to 4-8 • Updated Tables 3-2 and 3-3	Mar 2015

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6.0 PRODUCT IDENTIFICATION SYSTEM

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PART NO.	XXX
Device	Package

Device:	SST11CP22	= 51.-5.9 GHz Power Amplifier
Package:	GN	= UQFN (4mm x 4mm), 0.6 max thickness 20-contact
Evaluation Kit Flag	K	= Evaluation Kit

Valid Combinations:

SST11CP22-GN
SST11CP22-GN-K

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