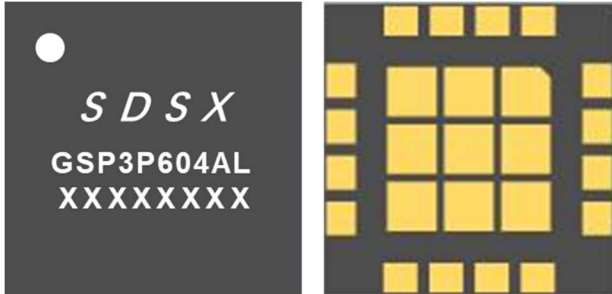


GSP3P604AL

3.3–3.6 GHz 4 W Power Amplifier



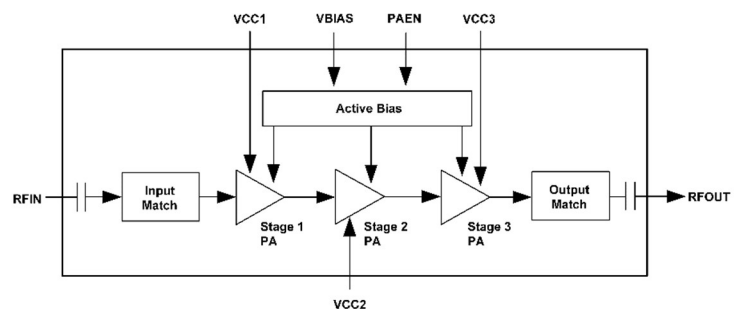
Description

The GSP3P604AL is a high-gain power amplifier (PA) with wide instantaneous bandwidth, high power added efficiency (PAE) and linearity. The product is fully input and output matched to 50 Ω system. The compact 5X5 mm PA is designed for FDD and TDD 4G LTE and 5G systems operating from 3.3 to 3.6 GHz. The active biasing circuitry is integrated to compensate PA.

Features

- Wide instantaneous signal bandwidth: 100 MHz
- High efficiency: PAE = 25% @ +28 dBm
- High linearity: +28 dBm with < -55 dBc linearized ACPR (20 MHz LTE, 8.5 dB PAR signal)
- High gain: 43 dB @ +28 dBm
- Excellent input and output return loss
- Integrated enable On/Off function: PAEN = 2 V
- On chip ESD protection
- Compact package: 16-pin, 5 x 5 x 0.85 mm

Functional Block Diagram



Applications

- 5G and 4G FDD and TDD systems
- Supports 3GPP and 5G bands 22, 42, n77, n78
- Driver amplifier for micro-base and macro-base stations
- Enterprise small cell and massive MIMO

Ordering Information

- GSP3P604AL

GSP3P604AL

3.3–3.6 GHz 4 W Power Amplifier



Recommended Operating Conditions

Parameter	Units	Min	Typ	Max
Supply voltage (VCC1, VCC2, VCC3, VBIAS)	V	4.75	5	5.25
PA enable (PAEN):				
ON	V	1.7	2.0	2.5
OFF	V	0	0	0.5
PA enable current	μA	—	1	—
Operating frequency	MHz	3300	—	3600
Operating temperature	°C	-40	+25	+85
RF turn-on/turn-off time	μs	—	1	—

Absolute Maximum Ratings

Parameter	Units	Min	Typ	Max
RF input power (CW, 50 Ω load, T=25°C)	dBm	—	—	+10
Supply voltage (VCC1, VCC2, VCC3, VBIAS)	V	—	—	5.5
PA enable	V	—	—	3
Operating temperature	°C	-40	—	+100
Storage temperature	°C	-55	—	+125
Junction temperature	°C	—	—	+150
Power dissipation @ +28 dBm output power	W	—	—	TBD
Device thermal resistance @ +28 dBm output power	°C/W	—	—	TBD
ESD Rating	HBM	V	—	1000
	CDM	V	—	500

GSP3P604AL

3.3–3.6 GHz 4 W Power Amplifier



Electrical Specifications

Test Conditions: 50 Ω system, VCC1 = VCC2 = VCC3 = VBIAS = 5 V, PAEN = 2.0 V, f = 3450 MHz, TC = +25°C.

Parameter	Conditions ⁽¹⁾	Units	Min	Typ	Max
Frequency		MHz	3300		3600
Small signal gain	PIN = -30 dBm	dB	—	40	—
Gain @ +28 dBm	POUT = +28 dBm	dB	—	43	—
Input return loss	PIN = -30 dBm	dB	—	-20	—
Output return loss	PIN = -30 dBm	dB	—	-9	—
OP1dB	100 μ s/1 ms, 10% duty cycle	dBm	—	37.5	—
Saturated Output Power	100 μ s/1 ms, 10% duty cycle	dBm	—	38	—
Power Added efficiency	POUT = +28 dBm	%	—	25	—
ACPR(Uncorrected) ⁽²⁾	POUT = +28 dBm	dBc	—	-32	—
ACPR(Uncorrected) ⁽³⁾	POUT = +28 dBm	dBc	—	-22	—
ACPR(Corrected) ⁽²⁾	POUT = +28 dBm	dBc	—	-55	—
Quiescent current	No RF signal	mA	—	115	—
2nd harmonic	CW, POUT = +28 dBm	dBc	—	-36	—
3rd harmonic	CW, POUT = +28 dBm	dBc	—	-51	—

Notes:

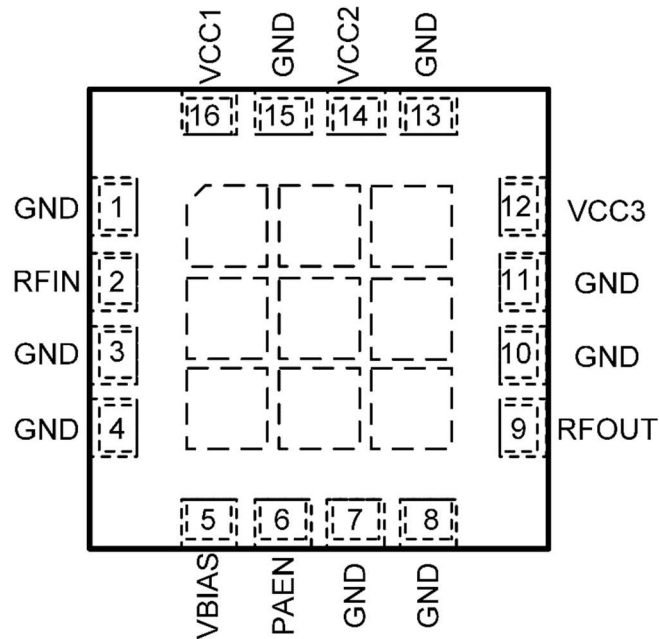
1. Test conditions unless otherwise noted: All VCC & VBIAS = +5.0 V, PAEN = +2 V, Temp = +25 °C, 50 Ω system, f = 3450MHz
2. LTE, 20 MHz E-UTRA Test Model 1.1 or 3.1, PAR = 8.5 dB
3. LTE, 20 MHz x 5 E-UTRA Test Model 1.1 or 3.1, PAR = 8.5 dB.

GSP3P604AL

3.3–3.6 GHz 4 W Power Amplifier



Pin Assignments and Description



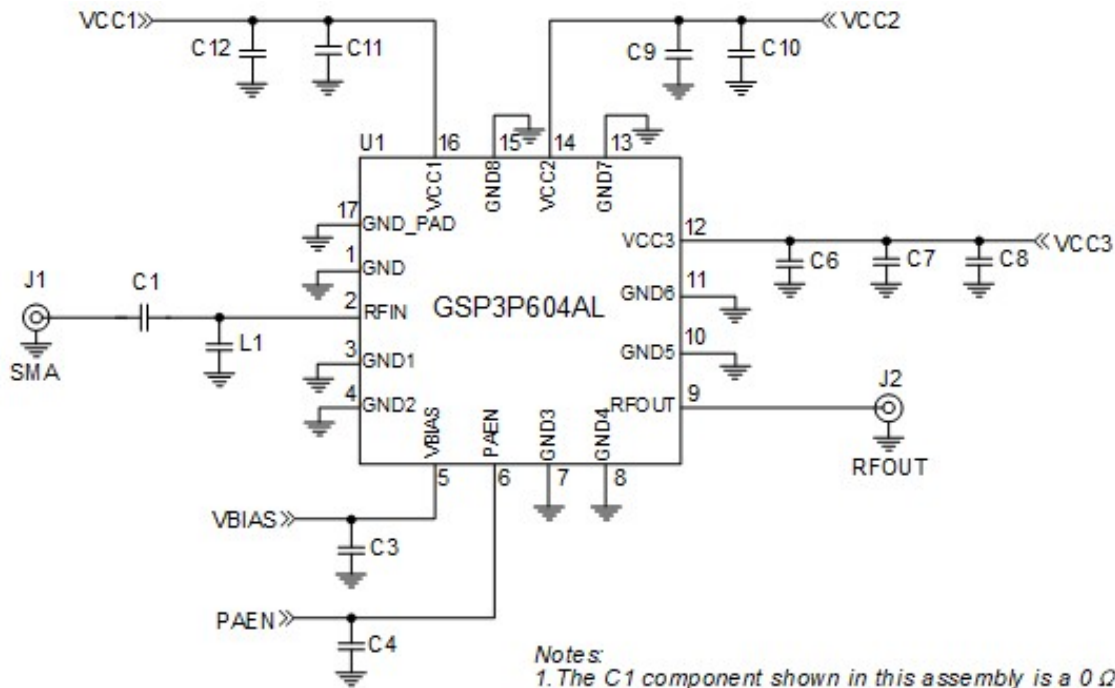
Pin	Name	Description
1	GND	Ground
2	RFIN	RF input port
3	GND	Ground
4	GND	Ground
5	VBIAS	Bias voltage
6	PAEN	PA enable
7	GND	Ground
8	GND	Ground
9	RFOUT	RF output port
10	GND	Ground
11	GND	Ground
12	VCC3	Stage 3 collector voltage
13	GND	Ground
14	VCC2	Stage 2 collector voltage
15	GND	Ground
16	VCC1	Stage 1 collector voltage

GSP3P604AL

3.3–3.6 GHz 4 W Power Amplifier



PCB Evaluation Board Schematic



Evaluation Board BOM

Reference Des.	Value	Manuf.	Part Num.
PCB	N/A	SDSX	GSP3P604AL-EVB
Q1	N/A	SDSX	GSP3P604AL
C1 ⁽¹⁾	0 Ω	Murata	0402
C3, C6	1 μF	Murata	0402
C4, C7	3300 pF	Murata	0402
C9	470 nF	Murata	0402
C11	100 nF	Murata	0402
C8, C10, C12	10 μF	Murata	1206
L1		DNI	

Notes:

1. The C1 component shown in this assembly is a 0 Ω resistor.

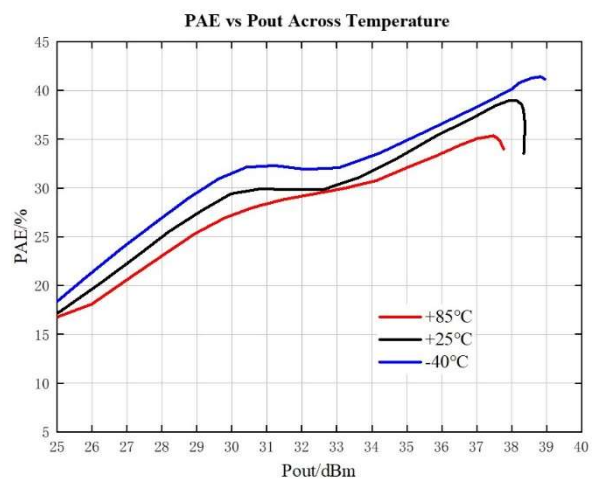
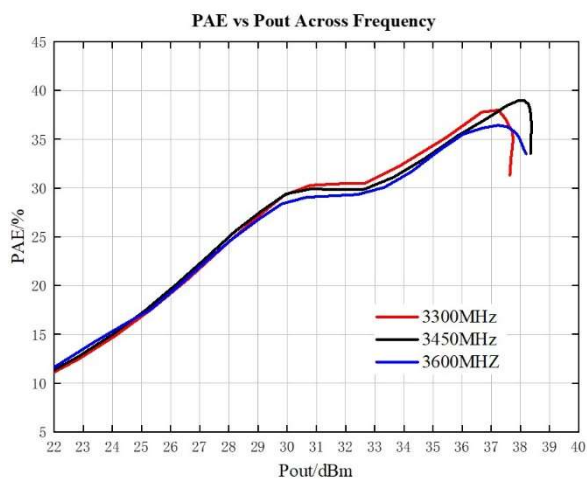
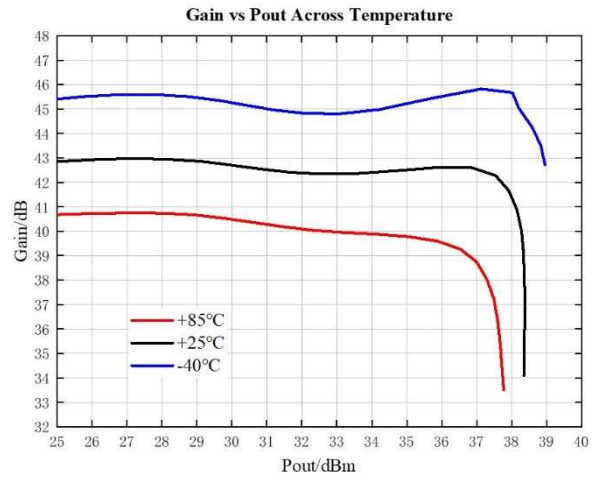
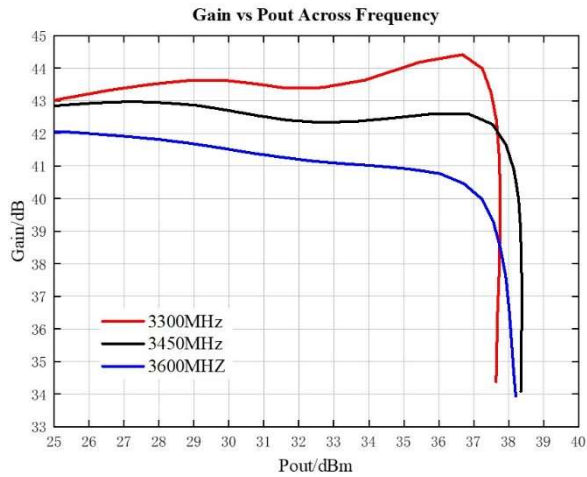
GSP3P604AL

3.3–3.6 GHz 4 W Power Amplifier



Typical Performance Characteristic

Test Conditions: VCC1 = VCC2 = VCC3 = VBIAS = 5 V, PAEN = 2 V, f = 3450 MHz, T = +25 °C,
Input/Output Load = 50 Ω, Unless Otherwise Noted.



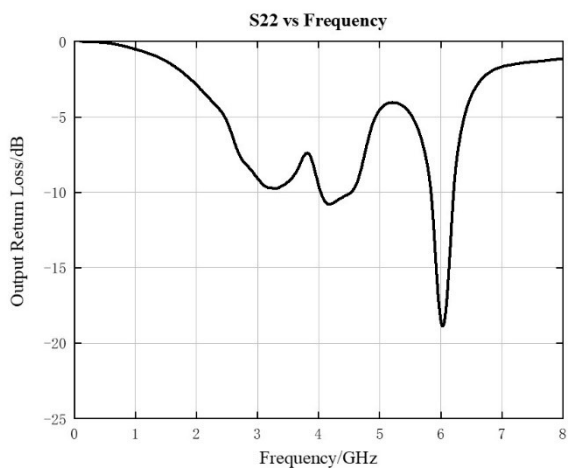
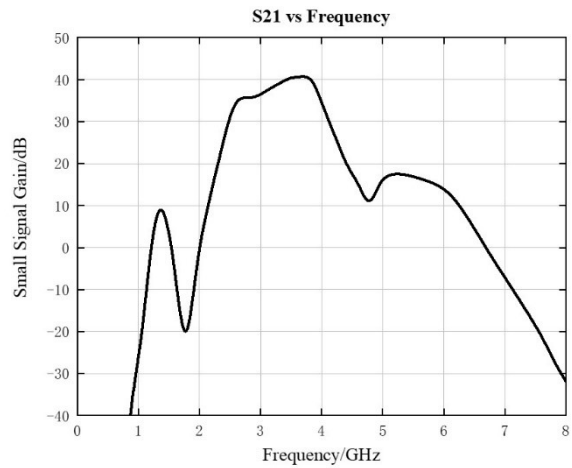
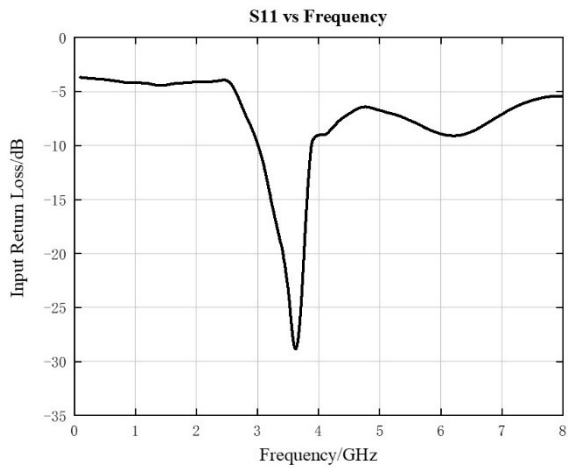
GSP3P604AL

3.3–3.6 GHz 4 W Power Amplifier



Typical Performance Characteristic

Test Conditions: $V_{CC1} = V_{CC2} = V_{CC3} = V_{BIAS} = 5\text{ V}$, $PAEN = 2\text{ V}$, $f = 3450\text{ MHz}$, $T = +25\text{ }^{\circ}\text{C}$,
Input/Output Load = $50\ \Omega$, Unless Otherwise Noted.



GSP3P604AL

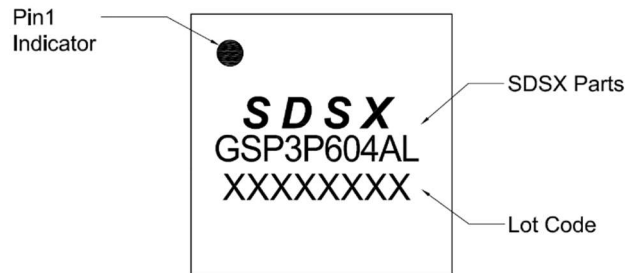
3.3–3.6 GHz 4 W Power Amplifier



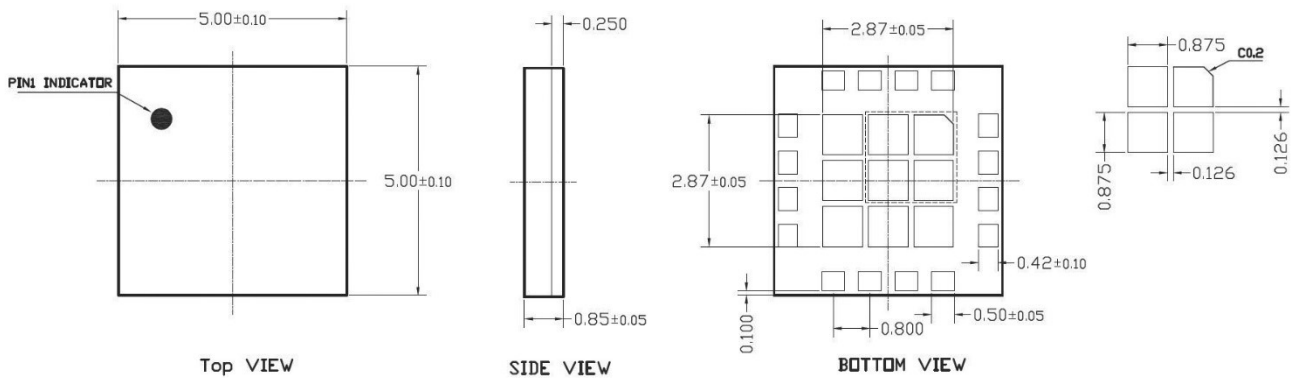
Package Marking and Dimensions

Marking: Pin 1 Indicator and SDSX Parts

Lot code – XXXXXXXX



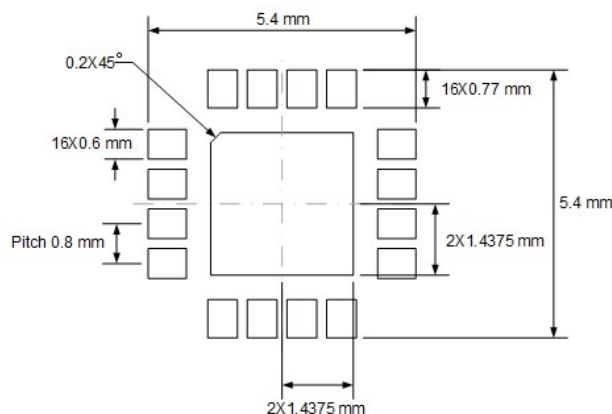
Typical Part Markings (Top View)



Package Dimensions

- Notes:
1. All dimensions are in millimeters.
 2. Coplanarity applies to the exposed heat sink slug as well as the terminals.
 3. LGA 16 pin 5x5x0.85mm Package.

PCB Mounting Pattern



PCB Layout Footprint (Top View)

Notes: All dimensions are in millimeters.

GSP3P604AL

3.3–3.6 GHz 4 W Power Amplifier



Handling Precaution

ESD countermeasure methods should be developed and used to control potential ESD damage during handling in a factory environment at each manufacturing site.

Solderability

Compatible with lead-free (260 °C maximum reflow temperature) soldering processes.

RoHS Compliance

This product is compliant with the EU RoHs2.0, EU Directive 2015/863.

Contact Information

Tel: 86-(0)755-82522200

Email: sales@sdsxchip.com

Address: #318, Floor 3, Block A, SDCIC Mansion, 6 Guanglan Rd,
Futian Free Trade Zone, Futian Dist., Shenzhen

Website: www.sdsxchip.com