



Package: 10-Pin, 4.0mmx4.0mmx0.975mm

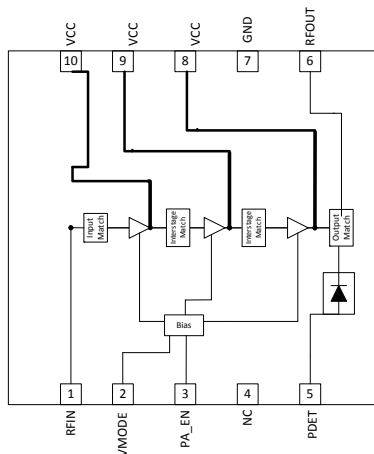


### Features

- 32dB Typical Gain Across Frequency Band
- LTE UL  $P_{OUT}=27\text{dBm}$
- LTE DL  $P_{OUT}=18\text{dBm}$
- WiMAX  $P_{OUT}=25\text{dBm}$
- 2.5GHz to 2.7GHz Frequency Range
- Integrated Power Detector
- Integrated Input/Output Matched to  $50\Omega$

### Applications

- LTE UL for Handset and Data Cards
- Mobile WiMAX Data Cards
- Commercial and Consumer Systems
- Portable Battery-Powered Equipment



Functional Block Diagram

### Product Description

The RF5612 is a linear power amplifier IC designed specifically for medium power applications. The device is manufactured on an advanced BiFET Heterojunction Bipolar Transistor (HBT) process, and has been designed for use as the final RF amplifier in LTE Up Link (UL) mobile and Data Cards and 802.11e mobile applications. The device is provided in a 4 mmx4 mmx0.975 mm, 10-Pin, leadless chip carrier with a backside ground. The RF5612 is designed to maintain linearity over a wide range of supply voltages and power outputs.

### Ordering Information

RF5612-410	RF5612 Eval Board
RF5612SB	5-Piece bag
RF5612SR	100-Piece reel
RF5612TR7	2500-Piece reel
RF5612SQ	25-Piece bag

### Optimum Technology Matching® Applied

<input type="checkbox"/> GaAs HBT	<input type="checkbox"/> SiGe BiCMOS	<input type="checkbox"/> GaAs pHEMT	<input type="checkbox"/> GaN HEMT
<input type="checkbox"/> GaAs MESFET	<input type="checkbox"/> Si BiCMOS	<input type="checkbox"/> Si CMOS	<input type="checkbox"/> BiFET HBT
<input checked="" type="checkbox"/> InGaP HBT	<input type="checkbox"/> SiGe HBT	<input type="checkbox"/> Si BJT	<input type="checkbox"/> LDMOS

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## Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage (RF Applied)	-0.5 to +4.5	V
Supply Voltage (No RF Applied)	-0.5 to +6.0	V
DC Supply Current	600	mA
Input RF Power	+10*	dBm
Operating Ambient Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C
Moisture Sensitivity	TBD	

\*Note: Maximum input power with a 50Ω load.



**Caution!** ESD sensitive device.

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

RoHS status based on EUDirective2002/95/EC (at time of this document revision).

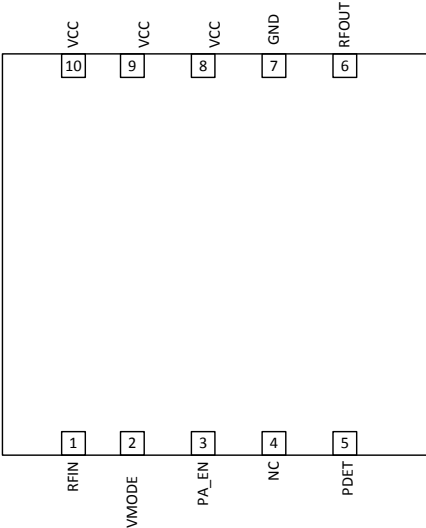
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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>Typical Conditions</b>					T = 25 °C, V <sub>CC</sub> = 3.3V, PA_EN = 2.85V
<b>Compliance</b>					LTE Uplink; using a 10MHz, LTE UL SC-OFMA waveform, unless other-wise noted.
Frequency	2500		2570	MHz	LTE Band 7
Output Power		27		dBm	
ACP (adjacent Channel)			-33	dBc	At rated P <sub>OUT</sub>
EVM		2.5	3	%	V <sub>CC</sub> = 3.3V at rated P <sub>OUT</sub>
Operating Current		425		mA	V <sub>CC</sub> = 3.3V at rated P <sub>OUT</sub>
Quiescent Current		200		mA	V <sub>CC</sub> = 4.2V, V <sub>MODE</sub> = 0V, RF = OFF
Frequency	2570		2620	MHz	LTE Band 38
Output Power		28		dBm	
ACP (adjacent Channel)			-33	dBc	At rated P <sub>OUT</sub>
EVM		2.5	3	%	V <sub>CC</sub> = 3.3V at rated P <sub>OUT</sub>
Operating Current		425		mA	V <sub>CC</sub> = 3.3V at rated P <sub>OUT</sub>
Quiescent Current		200		mA	
Frequency	2500		2700	MHz	LTE Band 41
Output Power		27		dBm	
ACP (adjacent Channel)			-33	dBc	At rated P <sub>OUT</sub>
EVM		2.5	3	%	V <sub>CC</sub> = 3.3V at rated P <sub>OUT</sub>
Gain	30	32		dB	
Gain Variation	-2		2	dB	
Operating Current		425		mA	V <sub>CC</sub> = 3.3V at rated P <sub>OUT</sub>
Quiescent Current		200		mA	
2nd Harmonic		TBD		dBc	Over all conditions
3rd Harmonic		TBD		dBc	Over all conditions

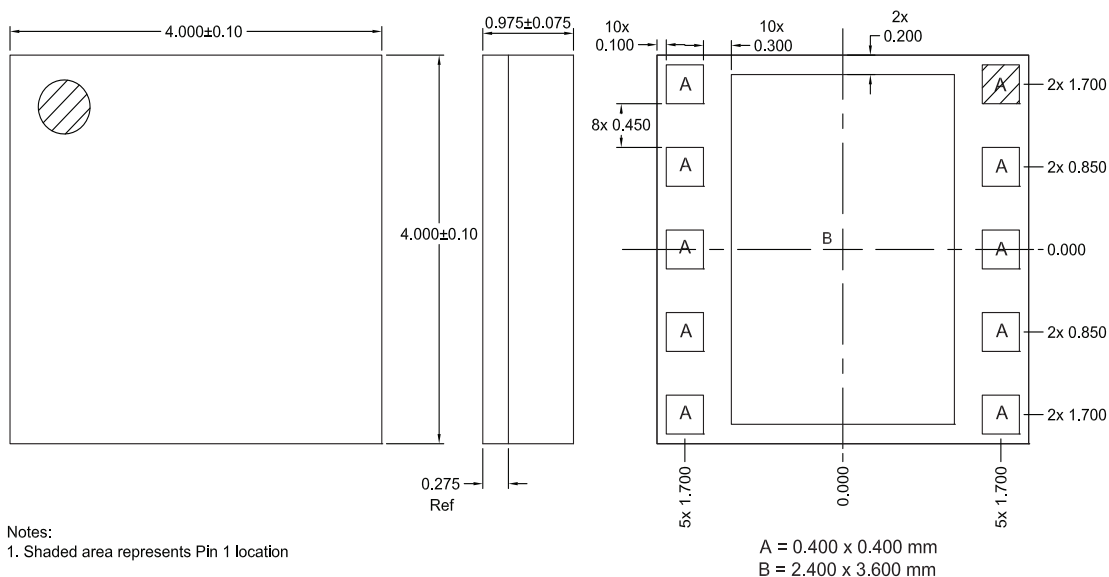
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>Compliance</b>					IEEE802.16e, using a 10MHz, IEEE802.16e waveform, unless otherwise noted.
Frequency	2500		2700	MHz	
802.16e Output Power		25		dBm	25 °C 10MHz 802.16e mask
EVM		2.5	3	%	V <sub>CC</sub> =3.3V at rated P <sub>OUT</sub>
Gain	30	32		dB	
Gain Variation	-2		2	dB	
Gain in Low Gain/Power Mode	5	7		dB	At V <sub>MODE</sub> =3.0V
Operating Current		425		mA	V <sub>CC</sub> =3.3V at rated P <sub>OUT</sub>
Quiescent Current		200		mA	
2nd Harmonic		-50	-40	dBc	Over all conditions
3rd Harmonic		-50	-40	dBc	Over all conditions
<b>General Spec</b>					
Input Return Loss	10	15		dB	In specified frequency band
Gain in Low Gain/Power Mode	5	7		dB	At V <sub>MODE</sub> =3.0V
Operating Voltage	3.0	3.3	4.2	V	
V <sub>MODE</sub>	2.5	3.00	3.3	V	
Operating Current - Low Gain/Power Mode		50		mA	0dBm P <sub>OUT</sub> , V <sub>MODE</sub> =3.0V
Power Detect Range	0.2		1	V	
P <sub>DOWN</sub> Current			5	μA	PA_EN=0V, V <sub>MODE</sub> =2.85V, V <sub>CC</sub> =3.3V
Leakage Current		0.5	5	μA	V <sub>CC</sub> =4.2V, V <sub>MODE</sub> =2.85V, P <sub>DOWN</sub> =0V
Turn-on Time			1	μsec	Output stable to within 90% of final gain
Stable into Output VSWR			4:1		No spurs above -47 dBm P <sub>OUT</sub> =0 dBm to 29 dBm
No Damage into Output VSWR			10:1		50Ω load at rated P <sub>OUT</sub>
Max Pin (Ruggedness - 50Ω)			10	dBm	No damage
<b>Other</b>					
Thermal Resistance R <sub>TH_I</sub>		TBD		°C/W	
ESD					
Human Body Model	TBD			V	EIA/JESD22-114A RF Pin to Ground
	TBD			V	EIA/JESD22-114A DC Pin to Ground
Charge Device Model	TBD			V	JESD22-C101C all pins to Ground

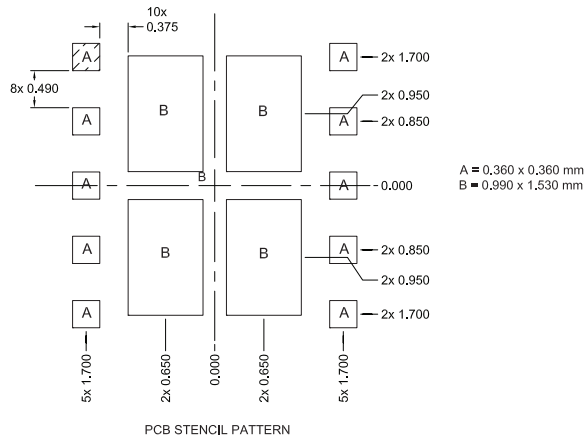
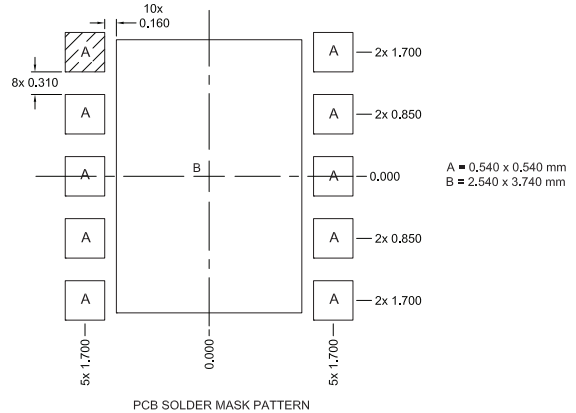
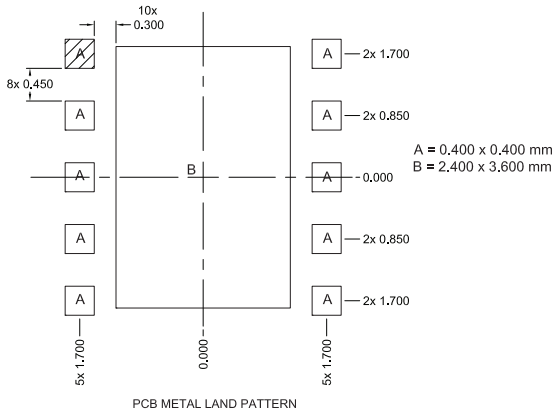
Pin	Function	Description
1	RFIN	RF input is internally matched to 50Ω and DC blocked.
2	VMODE	Bias control pin
3	PA_EN	Power down pin. Apply <0.6VDC to power down the three power amplifier stages. Apply 1.75VDC to 5.0VDC to power up.
4	NC	No connection
5	PDET	Power detector provides an output voltage proportional to RF output power. level May need external decoupling capacitor for module stability. May need external circuitry to bring output voltage to desired level.
6	RFOUT	RF Output is internally matched to 50Ω and DC blocked.
7	GND	Ground connection
8	VCC	This pin is connected internally to the collector of the 3rd stage RF device. To achieve specified performance, the layout of these pins should match the Recommended Land Pattern.
9	VCC	This pin is connected internally to the collector of the 2nd stage RF device. To achieve specified performance, the layout of these pins should match the Recommended Land Pattern.
10	VCC	This pin is connected internally to the collector of the 1st stage RF device. To achieve specified performance, the layout of these pins should match the Recommended Land Pattern.
Pkg Base	GND	Ground connection. The backside of the package should be connected to the ground plane through as short a connection as possible (e.g.: PCB vias under the device are recommended.)

## Pin Out



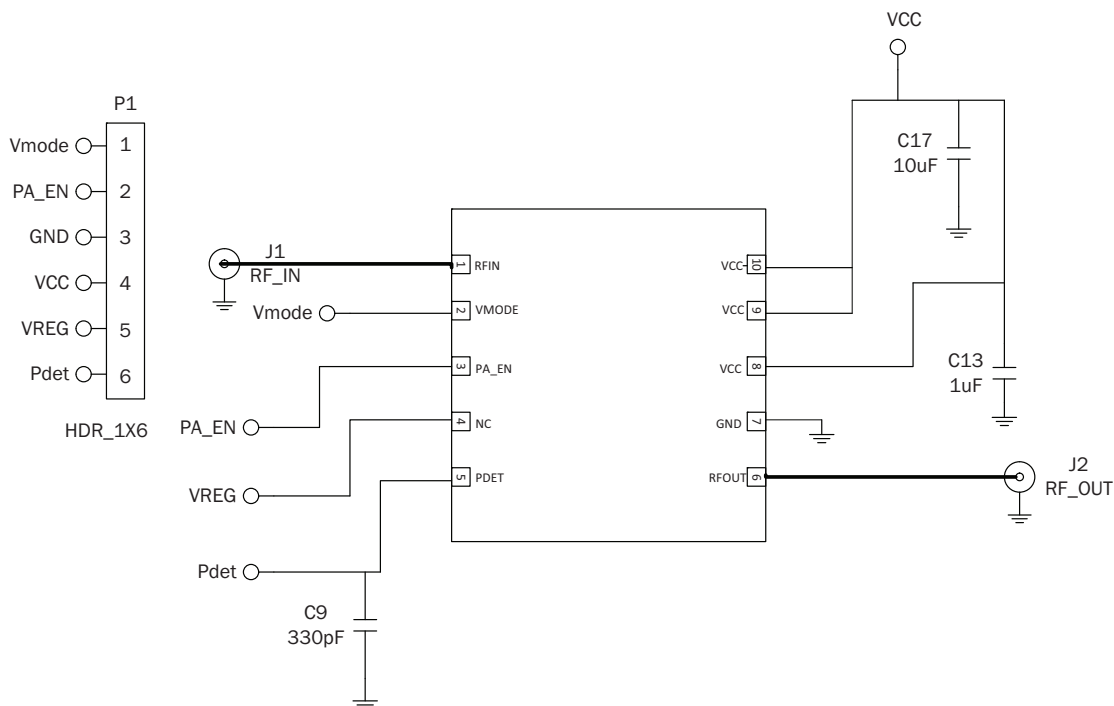
## Package Drawing





Note: Thermal vias for center slug "B" should be incorporated into the PCB design. The number and size of thermal vias will depend on the application. Example of the number and size of vias can be found on the RFMD evaluation board layout.

## Evaluation Board Schematic



## Evaluation Board Layout

