

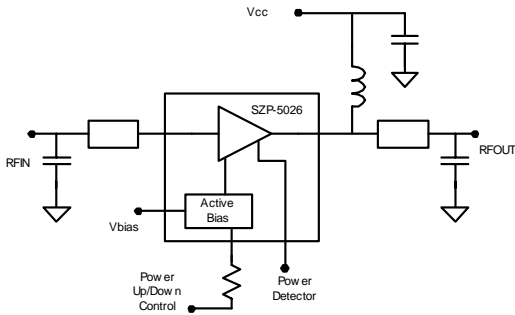


Product Description

Sirenza Microdevices' SZP-5026Z is a high linearity single stage class AB Heterojunction Bipolar Transistor (HBT) amplifier housed in a proprietary surface-mountable plastic encapsulated package. This HBT amplifier is made with InGaP on GaAs device technology and fabricated with MOCVD for an ideal combination of low cost and high reliability.

This product is specifically designed as a flexible final or driver stage for 802.16 equipment in the 4.9-5.9GHz bands. It can run from a 3V to 5V supply. It is internally prematched on the input and output to achieve broadband performance and ease of matching at the board level. It features an on chip input power detector, on/off power control, ESD protection, excellent overall robustness and a proprietary hand reworkable and thermally enhanced SOF-26 package. This product is RoHS and WEEE Compliant with a matte tin finish.

Functional Block Diagram



Key Specifications

Symbol	Parameters: Test Conditions, 5.7-5.9GHz App Circuit $Z_0 = 50\Omega$, $V_{CC} = 5.0V$, $I_q = 602mA$, $T_{BP} = 30^\circ C$	Unit	Min.	Typ.	Max.
f_O	Frequency of Operation	MHz	4900		5900
P_{1dB}	Output Power at 1dB Compression – 5.9GHz	dBm		32.5	
S_{21}	Small Signal Gain – 5.9GHz	dB		8.8	
EVM	EVM at 25dBm Output Power (802.11a 54Mb/s) - 5.9GHz	%		2.5	
IM3	Third Order Suppression ($P_{out}=23dBm$ per tone) - 5.9GHz	dBc		-45	
NF	Noise Figure at 5.9GHz	dB		5.4	
IRL	Worst Case Input Return Loss 5.7-5.9GHz	dB		19	
ORL	Worst Case Output Return Loss 5.7-5.9GHz			13	
Vdet Range	Output Voltage Range for $P_{out}=10dBm$ to $33dBm$	V		0.8 to 2.0	
I_{oq}	Quiescent Current ($V_{CC} = 5V$)	mA		602	
I_{VPC}	Power Up Control Current ($V_{PC}=5V$)	mA		2.7	
I_{leak}	V_{CC} Leakage Current ($V_{CC} = 5V$, $V_{PC} = 0V$)	μA			100
$R_{th, j-l}$	Thermal Resistance (junction - lead)	$^\circ C/W$		14	

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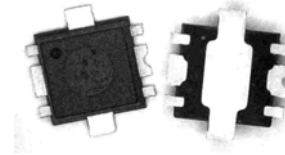
Phone: (800) SMI-MMIC

<http://www.sirenza.com>
EDS-105366 Rev B

Preliminary

SZP-5026Z

4.9-5.9GHz 2W InGaP Amplifier



Proprietary SOF-26 Package

Product Features

- $P_{1dB} = 32.5dBm @ 5V$
- 802.11a 54Mb/s Class AB Performance
 $P_{out} = 25dBm @ 2.5\% EVM, 5.9GHz, V_{CC} 5V, 670mA$
- On-chip Input Power Detector
- Internally Prematched Input and Output
- Proprietary Low Thermal Resistance Package
Hand Solderable and Easy Rework
- Power up/down control $< 1\mu s$

Applications

- 802.16 WiMAX Driver or Output Stage
- 5GHz 802.11 WLAN and ISM Applications



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SZP-5026Z 4.9-5.9GHz 2W Power Amp

Typical 5V Performance with Appropriate Application Circuit (Vcc=5V, Icq=602mA, * 802.11a 54Mb/s)

Parameter	Units	5.15GHz	5.35GHz	5.7GHz	5.9GHz
Gain @ Pout=26dBm	dB	8.8	9.0	9.4	8.8
P1dB	dBm	32.7	32.2	33.2	31.7
Pout @ 2.5% EVM*	dBm	25.3	25.1	25.3	25.1
Current @ Pout 2.5% EVM*	mA	632	631	670	670
Input Return Loss	dB	10	13	19	19
Output Return Loss	dB	15	13	15	13

Pin Out Description

Pin #	Function	Description
1	VBIAS	This is the supply voltage for the active bias circuit.
2	RFIN	This is the RF input pin and has a DC voltage present. An external DC block is required.
3	VPC	Power up/down control pin. The voltage on this pin should never exceed the voltage on pin 3 by more than 0.5V unless the supply current from pin 3 is limited < 10mA.
4	VDET	This is the output port for the power detector. It samples the power at the input of the amplifier.
5	RFOUT/VCC	This is the RF output pin and DC connection to the collector.
6	NC	This pin is not connected internal to the package. Buss it to pin 5 as shown on the appropriate app circuit to achieve the specified performance.
GND	GND	These pins are DC connected to the backside paddle. They provide good thermal connection to the backside paddle for hand soldering and rework. Many thermal and electrical GND vias are recommended as shown in the landing pattern.

Absolute Maximum Ratings

Parameters	Value	Unit
VC1 Collector Bias Current (I _{VC1})	1500	mA
Device Voltage (V _{cc})	6.0	V
Power Dissipation	6	W
Operating Lead Temperature (T _L)	-40 to +85	°C
**Max RF output Power for 50 ohm continuous long term operation	30	dBm
Max Modulated(***)OFDM RF Input Power for 50 ohm output load	28	dBm
Max Modulated(***)OFDM RF Input Power for 10:1 VSWR output load	21	dBm
Storage Temperature Range	-40 to +150	°C
Operating Junction Temperature (T _J)	150	°C
ESD Human Body Model	1000	V
Moisture Sensitivity Level	MSL1	

Operation of this device beyond any one of these limits may cause permanent damage. For reliable continuous operation the device voltage and current must not exceed the maximum operating values specified in the table on page one.

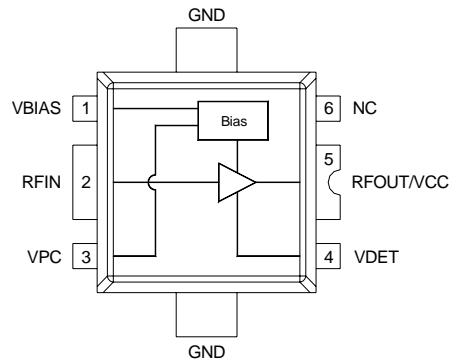
Bias conditions should also satisfy the following expression:

$$I_D V_D < (T_J - T_L) / R_{TH} \text{ } ^\circ\text{C/W}$$

** With specified application circuit.

*** Modulation schemes include 802.11a/g, 802.16

Simplified Device Schematic



Caution: ESD Sensitive

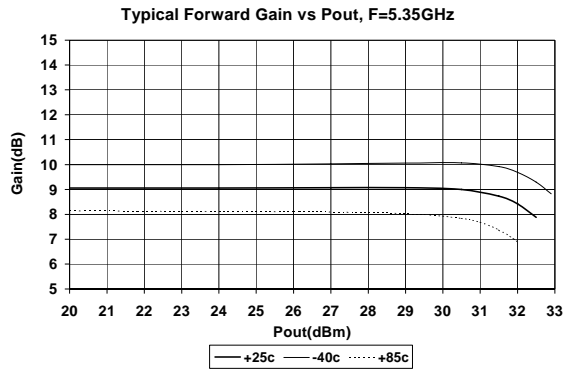
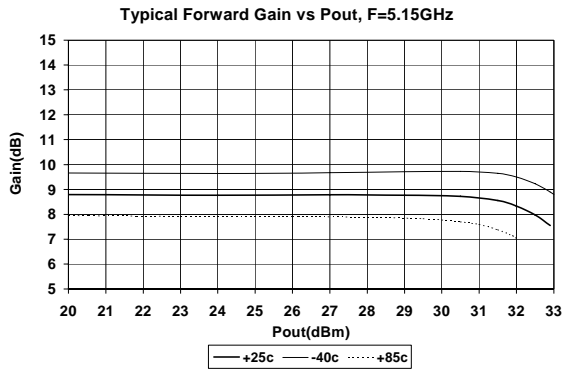
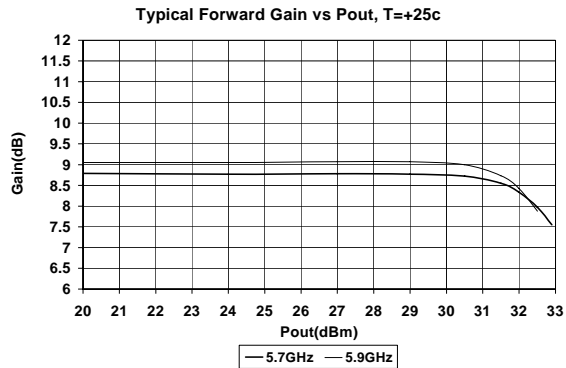
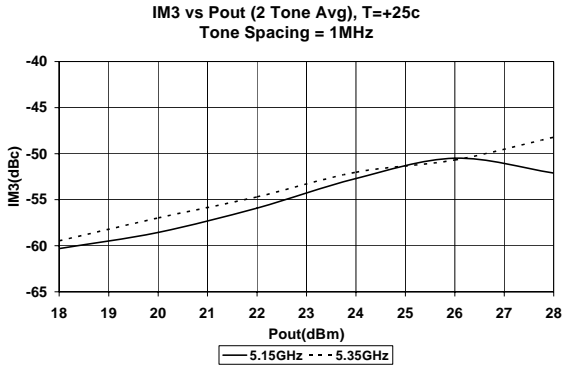
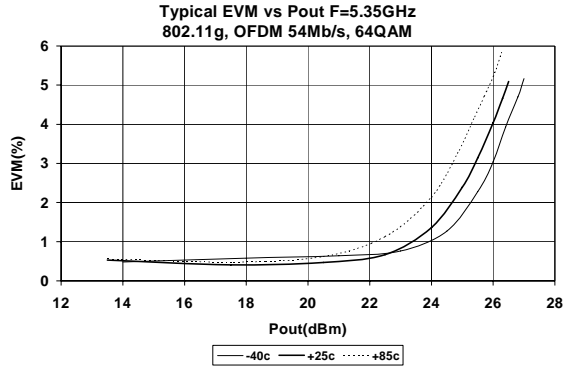
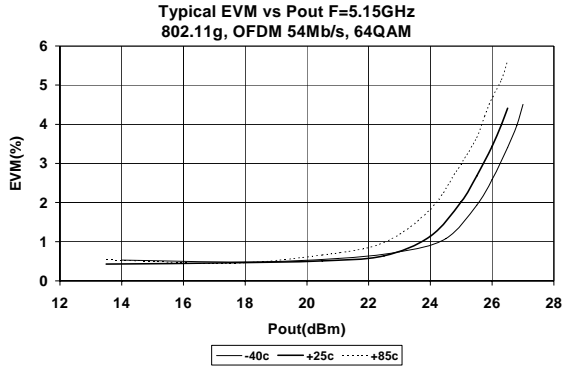
Appropriate precaution in handling, packaging and testing devices must be observed.



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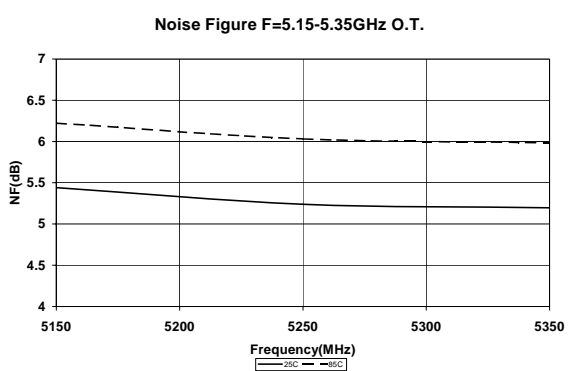
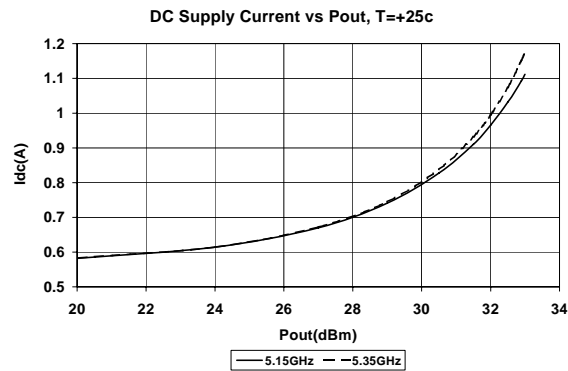
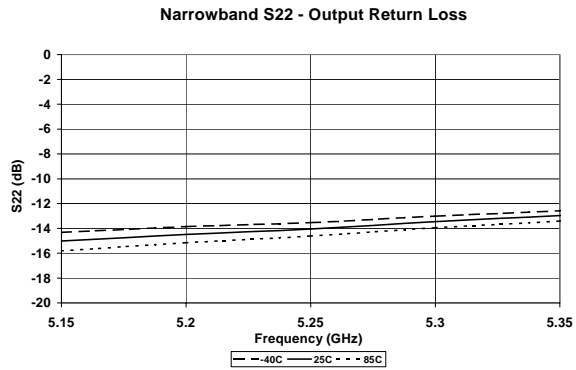
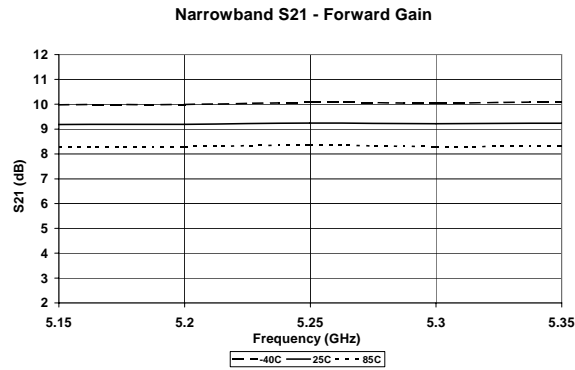
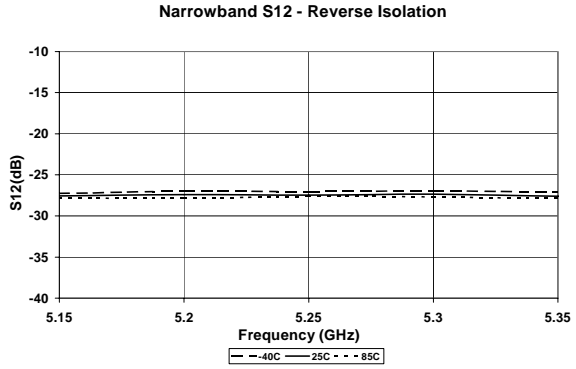
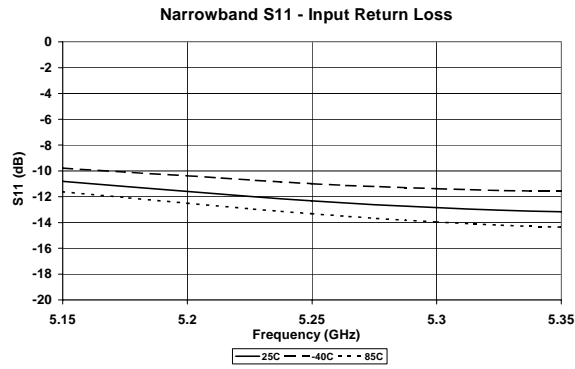
Measured 5.15-5.35 GHz Application Circuit Data ($V_{CC} = V_{PC} = 5.0V, I_q = 563mA, T=25C$)

Source EVM = 0.6%, not deembedded from data.





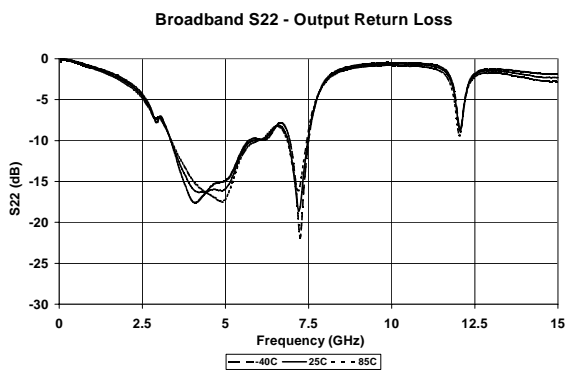
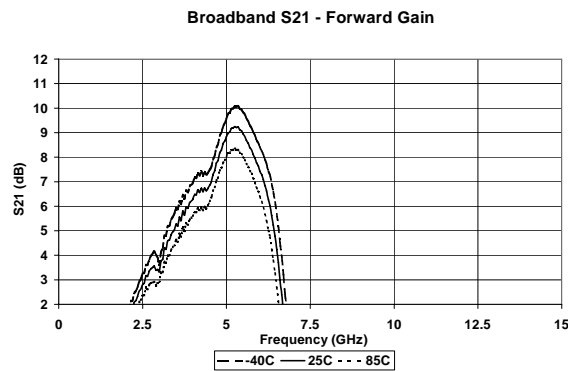
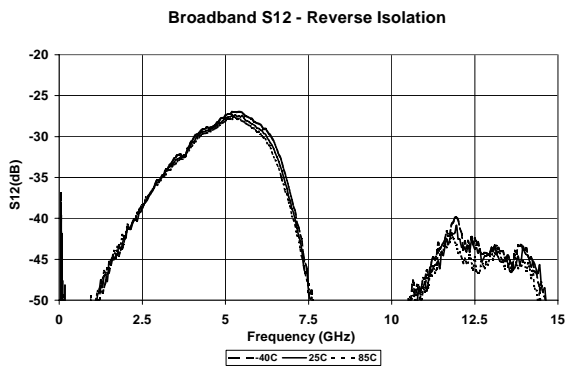
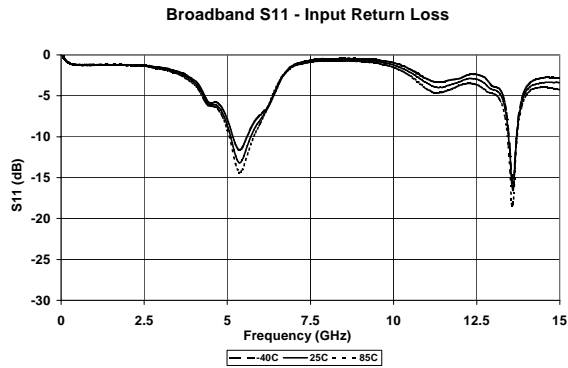
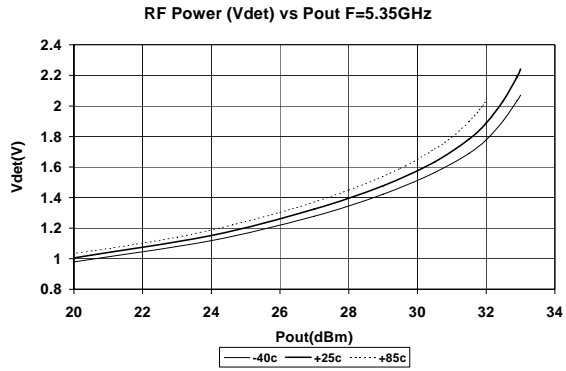
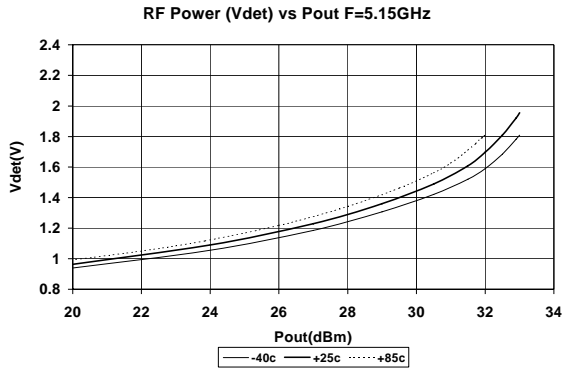
Measured 5.15-5.35 GHz Application Circuit Data ($V_{CC} = V_{PC} = 5.0V$, $I_q = 563mA$, $T=25C$)





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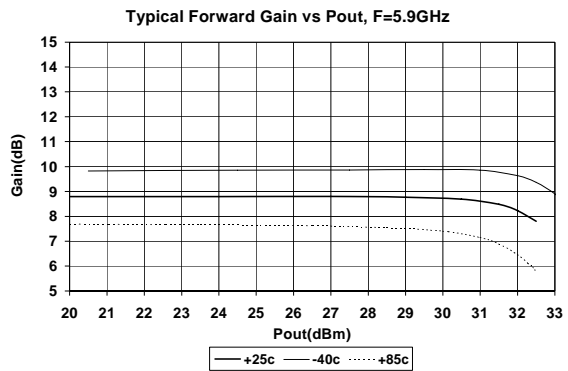
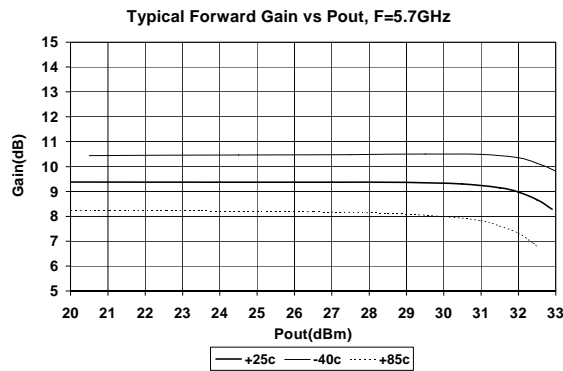
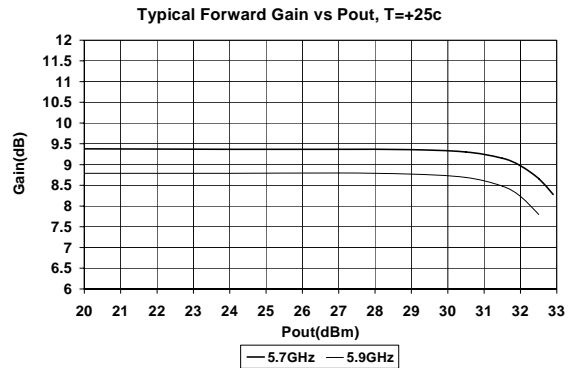
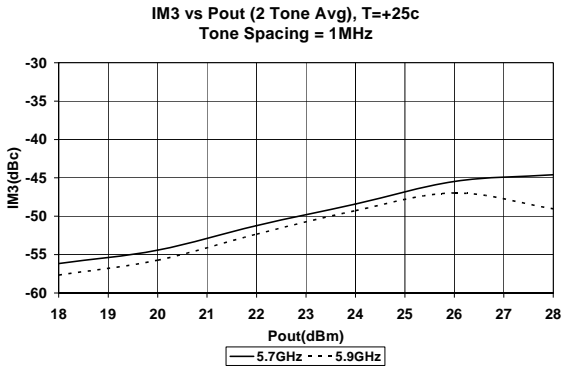
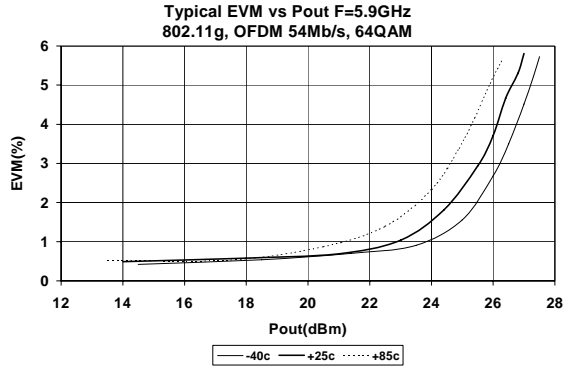
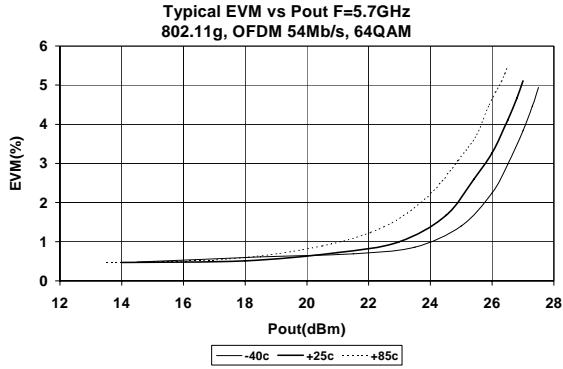
Measured 5.15-5.35 GHz Application Circuit Data ($V_{CC} = V_{PC} = 5.0V$, $I_q = 563mA$, $T=25C$)





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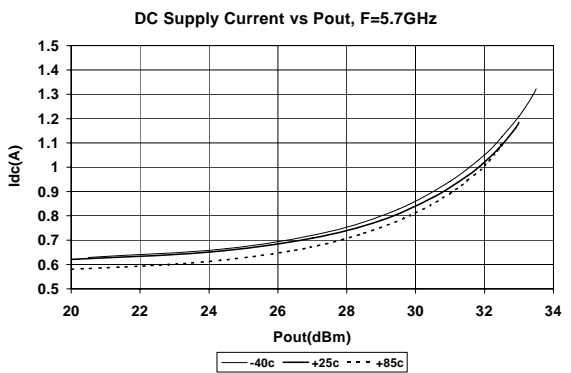
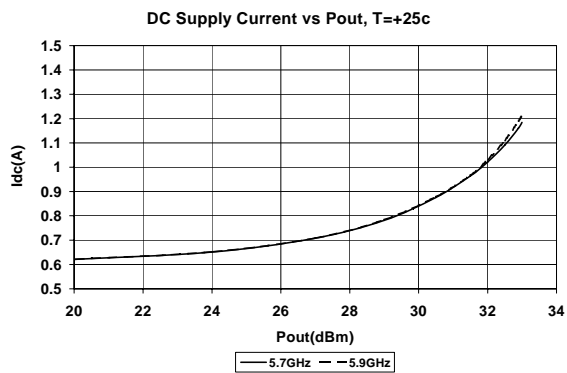
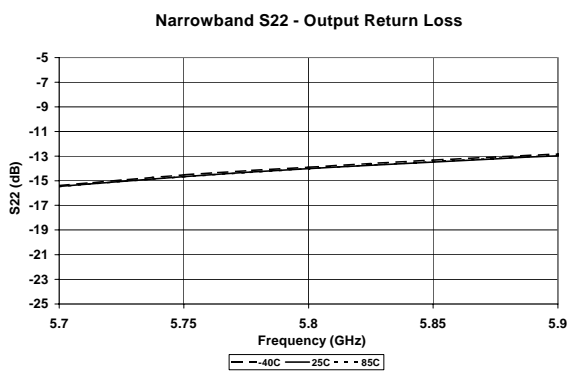
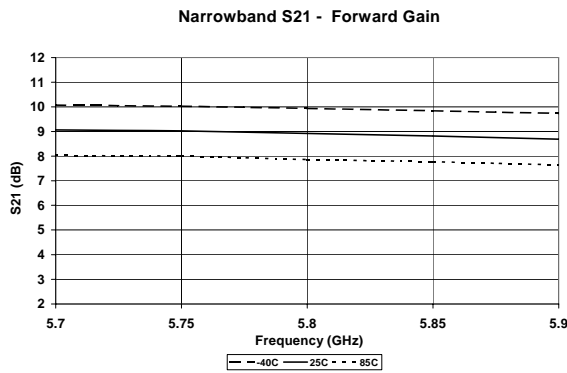
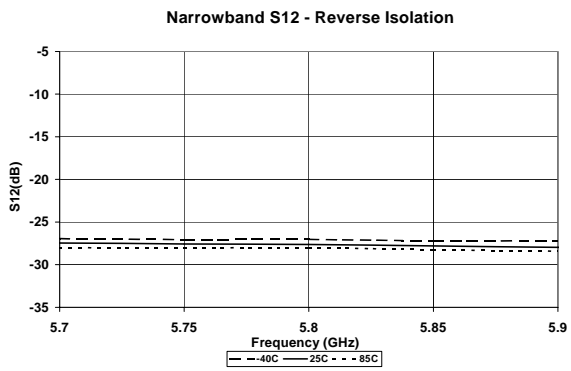
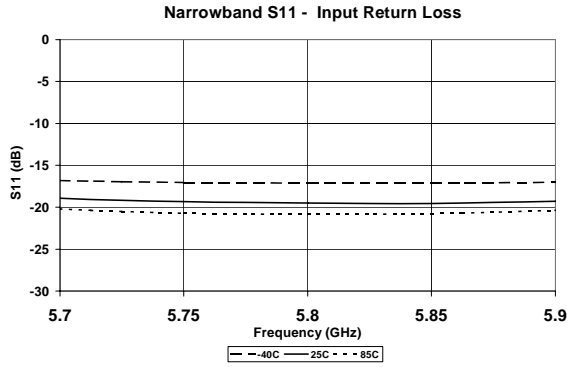
Measured 5.7-5.9 GHz Application Circuit Data ($V_{cc} = V_{pc} = 5.0V$, $I_q = 602mA$, $T=25C$)





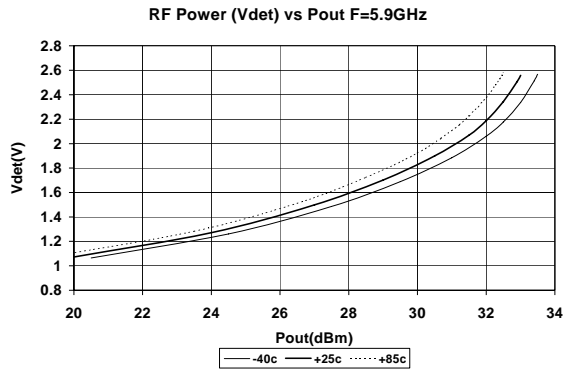
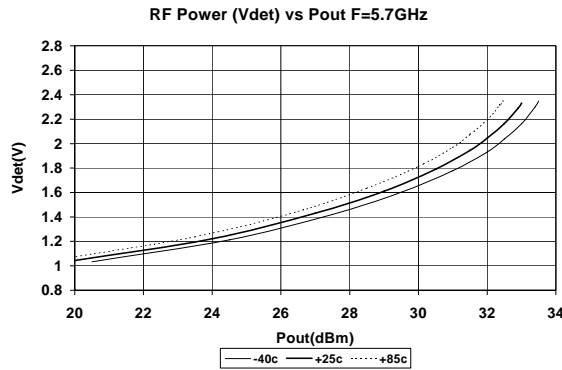
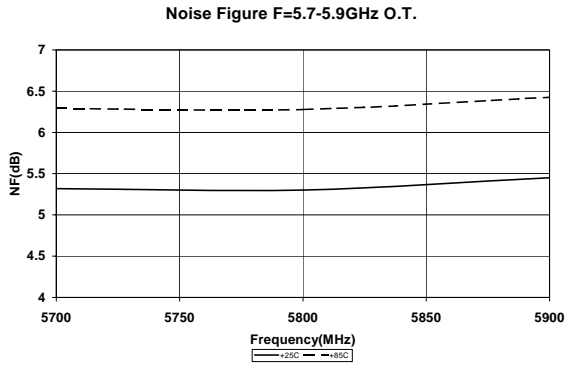
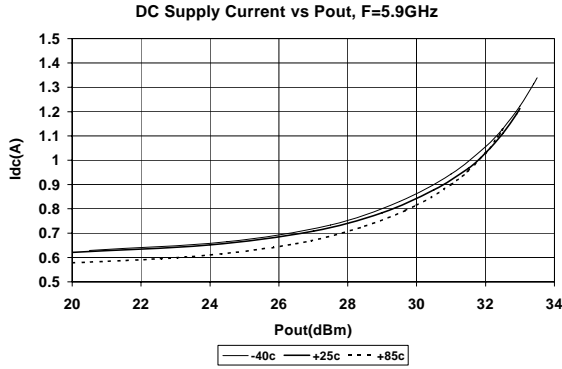
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SZP-5026Z 4.9-5.9GHz 2W Power Amp

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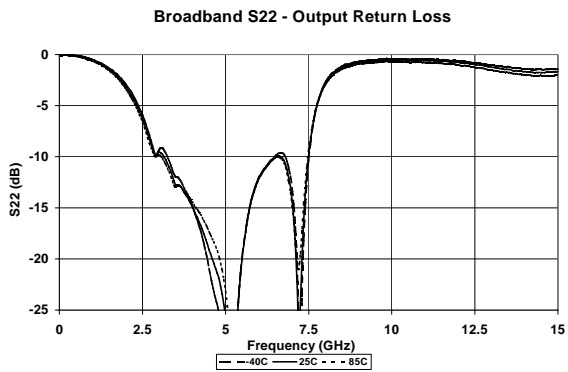
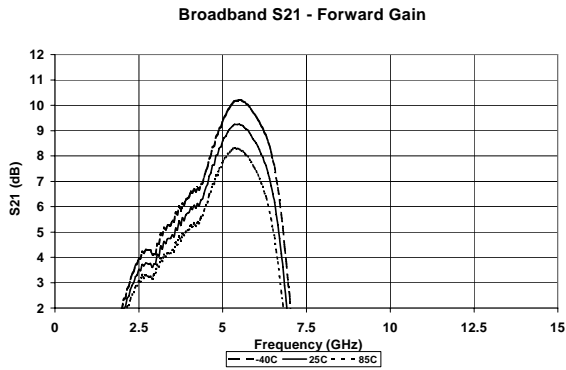
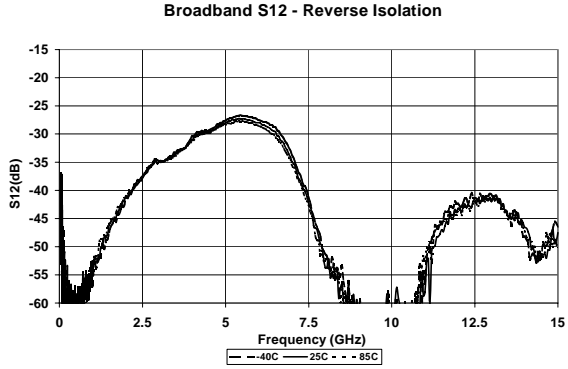
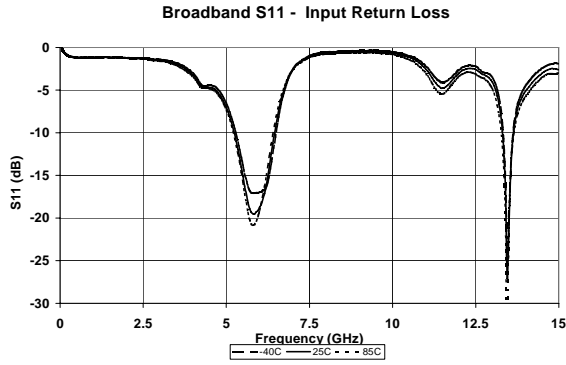
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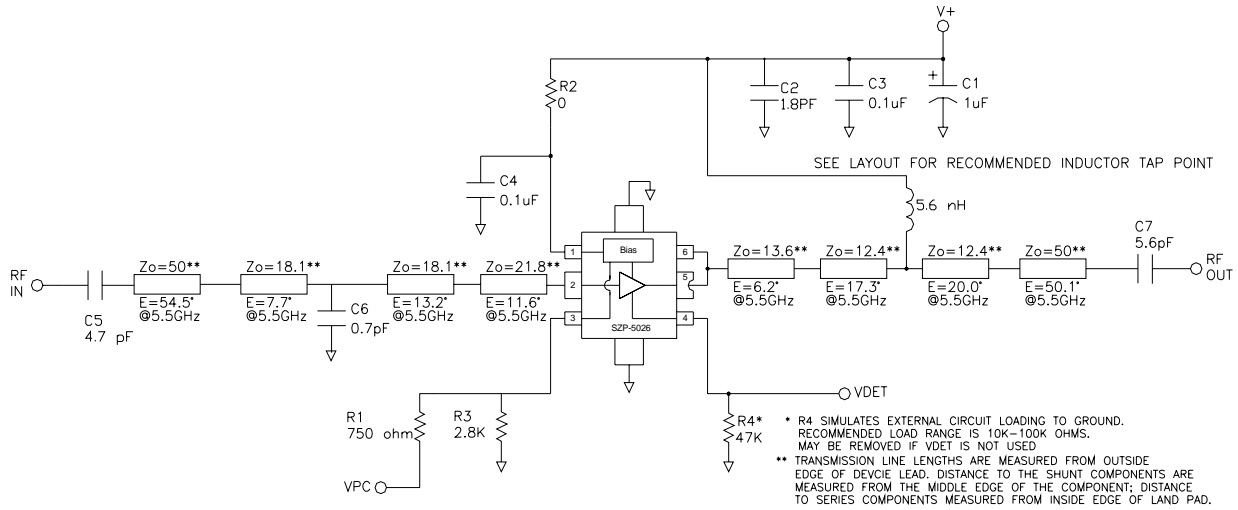


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SZP-5026Z 4.9-5.9GHz 2W Power Amp

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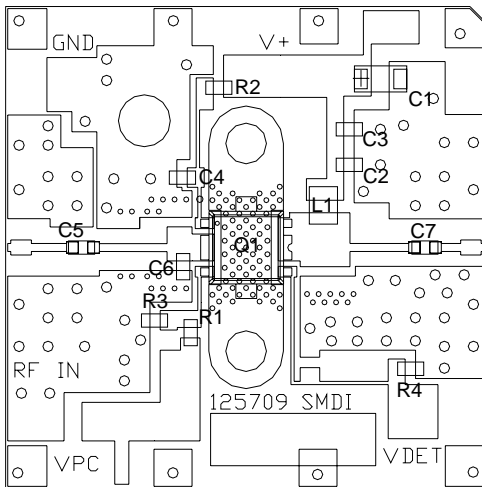


5.15-5.35GHz Evaluation Board Schematic For V+ = Vcc = Vpc = 5.0V, Iq=563mA



5.15-5.35GHz Evaluation Board Layout For V+ = Vcc = Vpc = 5.0V, Iq=563mA

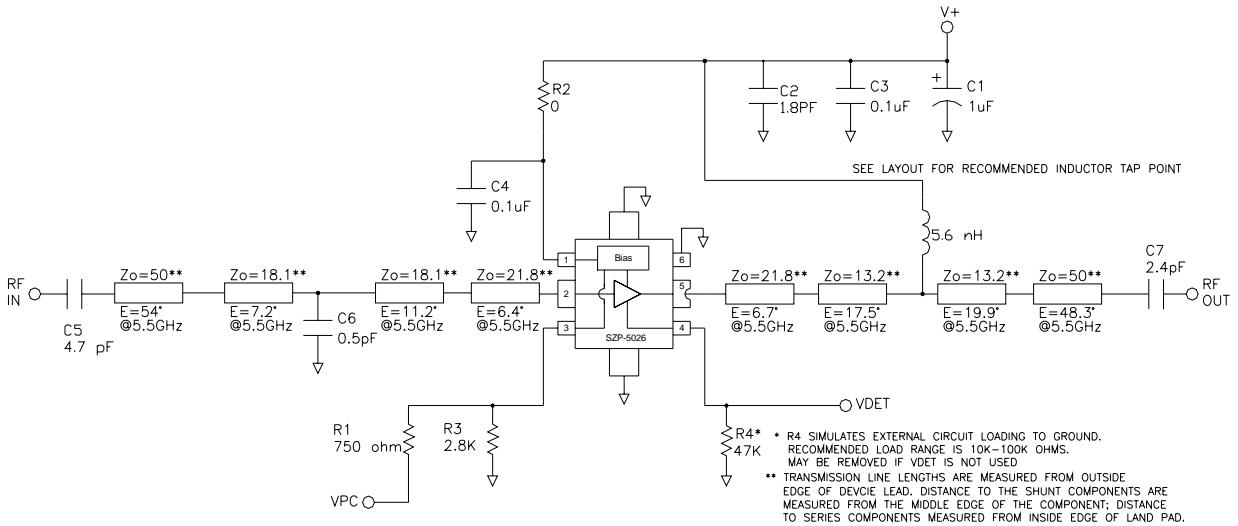
Board material GETEK, 10mil thick, Dk=3.9, 2 oz. copper



DESG	DESCRIPTION	NOTES
Q1	SZP-5026Z	S0F-26
R1	750 OHM, 0603 1%	0402 may be used
R2	0 OHM, 0603	"
R3	2.80K OHM, 0603 1%	"
R4	47K OHM, 0603	"
C1	1uF 16V MLCC CAP	Tantalum ok for EVM performance. Use MLCC type for best IM3 levels.
C2	1.8pF CAP, 0603	NPO, ROHM MCH185A1R8DK or equiv.
C3,4	0.1uF CAP, 0603	NPO, 0402 ok ROHM MCH184CN105K or equiv.
C5	4.7pF CAP, 0603	NPO, low ESR ATC 600S4R7CW250 or equiv.
C6	0.7pF CAP, 0603	NPO, low ESR ATC 600S0R7CW250 or equiv.
L1	5.6nH IND, 0805	Coilcraft 0805HQ-5N6XJBB
C7	5.6pF CAP, 0603	NPO, low ESR ATC 600S5R6CW250 or equiv.

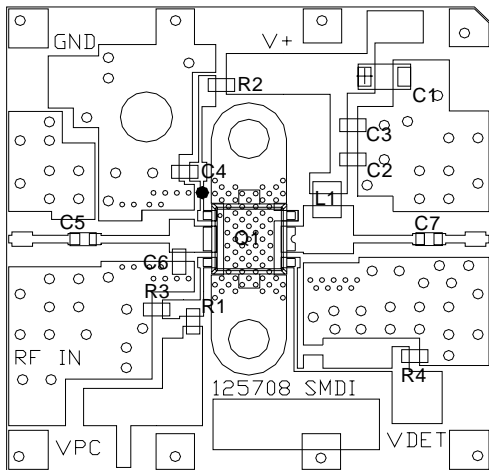
PCB NOTES: Do not use less than the recommended number of via holes under the device ground paddle.
RF Layers thicker than 0.020 inches(0.5mm) not recommended.

5.7-5.9 GHz Evaluation Board Schematic For $V_+ = V_{cc} = V_{pc} = 5.0V, I_q=602mA$



5.7-5.9GHz Evaluation Board Layout For $V_+ = V_{cc} = V_{pc} = 5.0V, I_q=602mA$

Board material GETEK, 10mil thick, Dk=3.9, 2 oz. copper



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C6	0.5pF CAP, 0603	NPO, low ESR ATC 600S0R7CW250 or equiv.
C7	2.4pF CAP, 0603	NPO, low ESR ATC 600S2R4CW250 or equiv.
L1	5.6nH IND, 0805	Coilcraft 0805HQ-5N6XJBB

PCB NOTES: Do not use less than the recommended number of via holes under the device ground paddle. RF Layers thicker than 0.020 inches(0.5mm) not recommended.



Preliminary

SZP-5026Z 4.9-5.9GHz 2W Power Amp

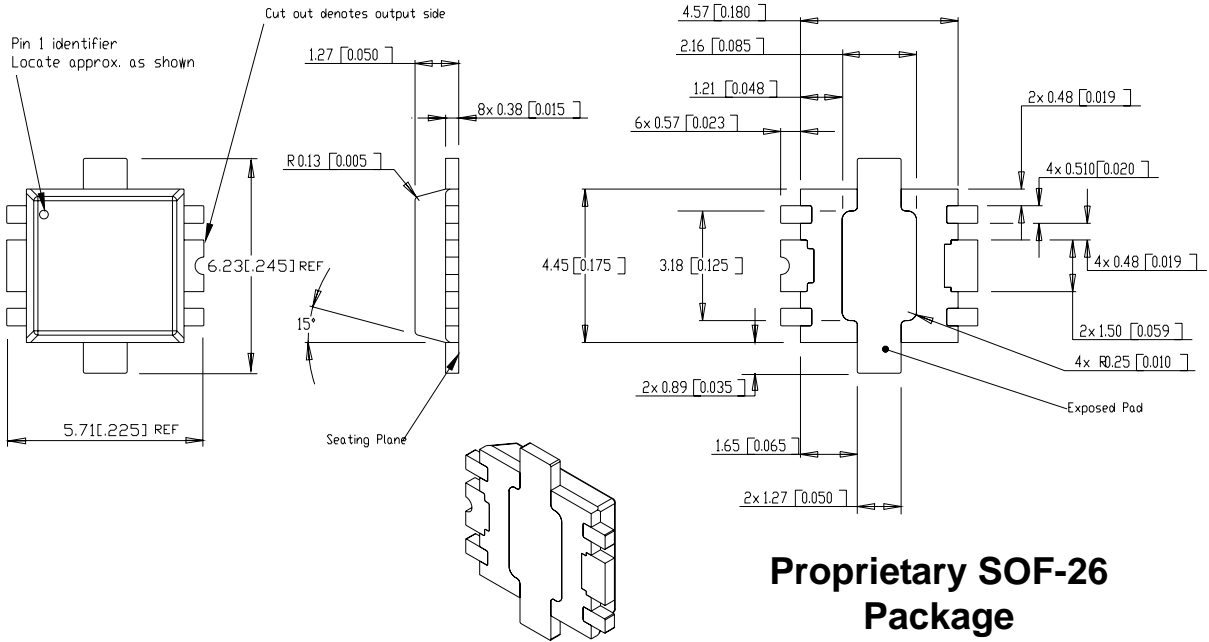
Part Number / Evaluation Board Ordering Information

Part Number	Description	Reel Size	Devices/ Reel
SZP-5026Z*	Lead Free, RoHs compliant	7"	1000
SZP-5026Z-EVB1	5.15-5.35GHz Evaluation Board	N/A	N/A
SZP-5026Z-EVB2	5.7-5.9GHz Evaluation Board	N/A	N/A

Part Symbolization

The part is symbolized with a "SZP-5026Z". Marking designator will be on the top surface of the package.

Package Outline Drawing (dimensions in mm [in])



Recommended Metal Land Pattern (dimensions in mm [in]):

