



Package: SOT-363

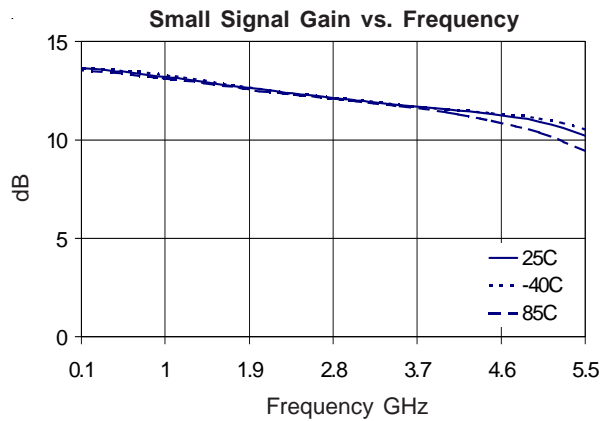


Product Description

The SGA-5263 is a high performance SiGe HBT MMIC Amplifier. A Darlington configuration featuring one-micron emitters provides high F_T and excellent thermal performance. The heterojunction increases breakdown voltage and minimizes leakage current between junctions. Cancellation of emitter junction non-linearities results in higher suppression of intermodulation products. Only two DC-blocking capacitors, a bias resistor, and an optional RF choke are required for operation.

Optimum Technology Matching® Applied

- GaAs HBT
- GaAs MESFET
- InGaP HBT
- SiGe BiCMOS
- Si BiCMOS
- SiGe HBT
- GaAs pHEMT
- Si CMOS
- Si BJT
- GaN HEMT
- RF MEMS



Features

- Available in Pb-Free, RoHS Compliant, and RFMD Green (Z Part Number)
- DC to 4500MHz Operation
- Single Voltage Supply
- Low Current Draw: 60mA at 3.4V Typ.
- High Output Intercept: 29dBm Typ. at 1950MHz

Applications

- Oscillator Amplifiers
- Broadband Gain Block
- IF/RF Buffer Amplifiers

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Small Signal Gain		13.3		dB	850MHz
		12.6		dB	1950MHz
		12.3		dB	2400MHz
Output Power at 1dB Compression		16.3		dBm	850MHz
		15.0		dBm	1950MHz
		14.0		dBm	2400MHz
Third Order Intercept Point		32.5		dBm	850MHz, P _{OUT} per tone=-10dBm
		29.3		dBm	1950MHz, P _{OUT} per tone=-10dBm
		27.3		dBm	2400MHz, P _{OUT} per tone=-10dBm
S ₁₁ , S ₂₂		4500		MHz	Minimum 10dB Return Loss (typ.)
Input VSWR		1.2:1			1950MHz
Output VSWR		1.4:1			1950MHz
Reverse Isolation		18.3		dB	850MHz
		19.2		dB	1950MHz
		19.5		dB	2400MHz
Noise Figure		4.0		dB	1950MHz
Device Operating Voltage		3.4		V	
Device Operating Current	54	60	66	mA	
Thermal Resistance (Junction - Lead)		255		°C/W	

Test Conditions: Z₀=50Ω, I_D=60mA, T=25°C

Absolute Maximum Ratings

Parameter	Rating	Unit
Max Device Current (I_D)	120	mA
Max Device Voltage (V_D)	6	V
Max RF Input Power	+16	dBm
Max Junction Temp (T_J)	+150	°C
Operating Temp Range (T_L)	-40 to +85	°C
Max Storage Temp	+150	°C



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 EU Directive 2002/95/EC (at time of this document revision).

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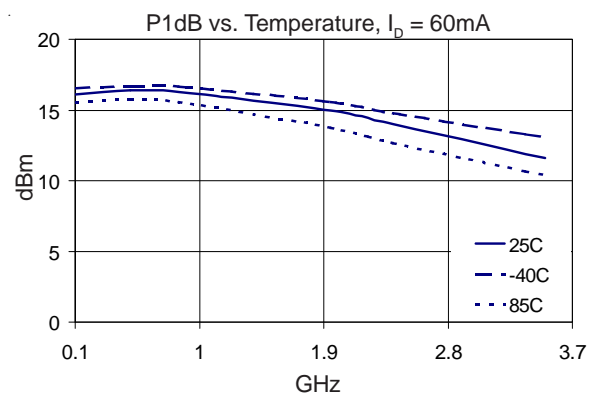
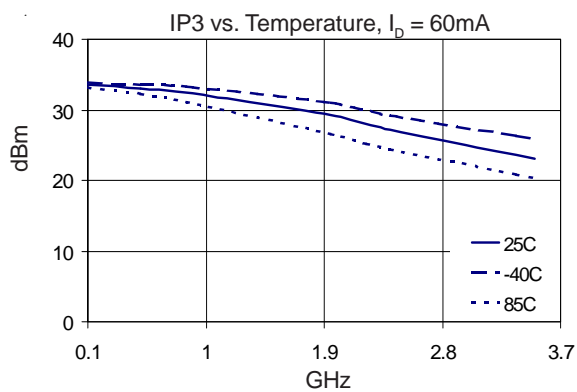
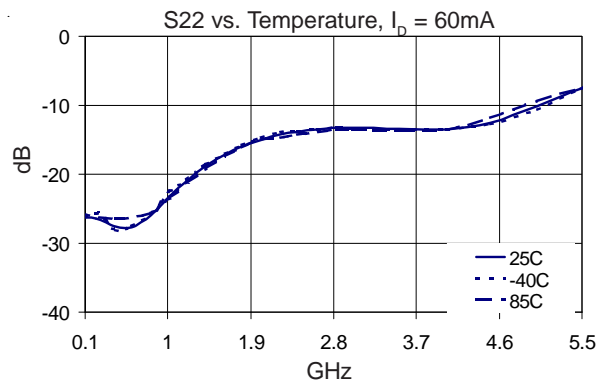
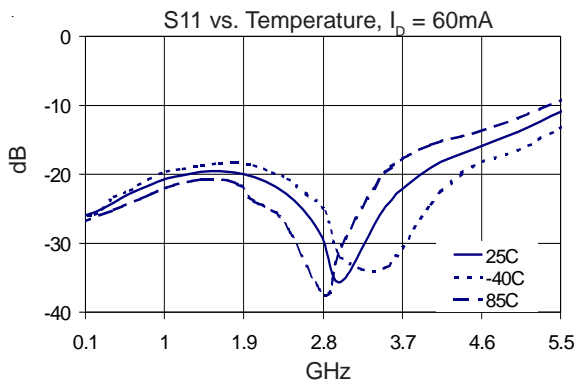
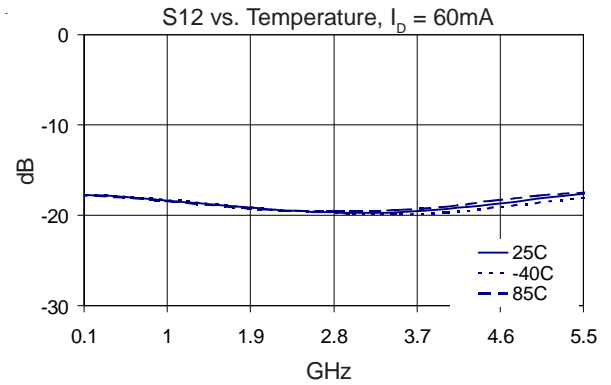
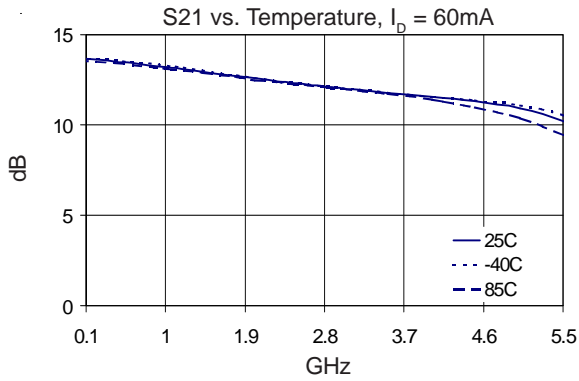
Operation of this device beyond any one of these limits may cause permanent damage. For reliable continuous operation, the device voltage and current must not exceed the maximum operating values specified in the table on page one.

Bias Conditions should also satisfy the following expression:

$$I_D V_D < (T_J - T_L) / R_{TH, j-l}$$

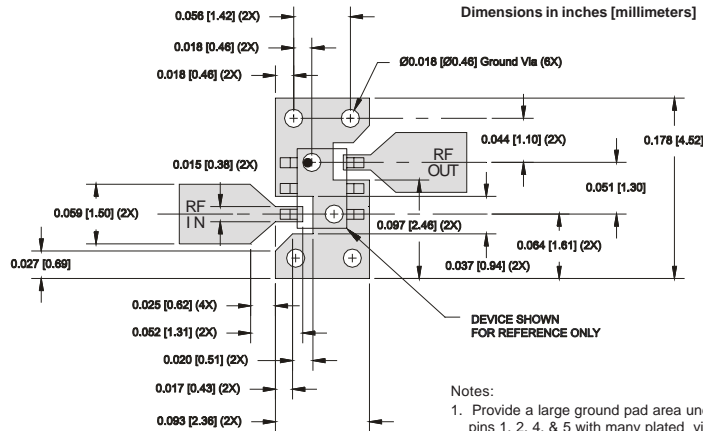
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Gain		13.6		dB	100MHz
		13.5		dB	500MHz
		13.3		dB	850MHz
		12.6		dB	1950MHz
		12.3		dB	2400MHz
Output IIP ₃		11.8		dB	3500MHz
		33.6		dBm	100MHz, Tone spacing=1MHz, P _{OUT} per tone=-10dBm
		33.0		dBm	500MHz, Tone spacing=1MHz, P _{OUT} per tone=-10dBm
		32.5		dBm	850MHz, Tone spacing=1MHz, P _{OUT} per tone=-10dBm
		29.3		dBm	1950MHz, Tone spacing=1MHz, P _{OUT} per tone=-10dBm
Output P1dB		27.3		dBm	2400MHz, Tone spacing=1MHz, P _{OUT} per tone=-10dBm
		23.1		dBm	3500MHz, Tone spacing=1MHz, P _{OUT} per tone=-10dBm
		16.1		dBm	100MHz
		16.4		dBm	500MHz
		16.3		dBm	850MHz
Input Return Loss		15.0		dBm	1950MHz
		14.0		dBm	2400MHz
		11.6		dBm	3500MHz
		26.0		dB	100MHz
		23.5		dB	500MHz
Reverse Isolation		21.4		dB	850MHz
		20.2		dB	1950MHz
		23.0		dB	2400MHz
		24.6		dB	3500MHz
		17.7		dB	100MHz
Noise Figure		18.0		dB	500MHz
		18.3		dB	850MHz
		19.2		dB	1950MHz
		19.5		dB	2400MHz
		19.6		dB	3500MHz
Noise Figure		3.9		dB	100MHz, Z _S =50Ω
		3.9		dB	500MHz, Z _S =50Ω
		4.0		dB	850MHz, Z _S =50Ω
		4.0		dB	1950MHz, Z _S =50Ω

Test Conditions: Z₀ = 50Ω, I_D = 60mA, T = 25°C



Pin	Function	Description
1, 2, 4, 5	GND	Connection to ground. For best performance use via holes as close to ground leads as possible to reduce lead inductance.
3	RF IN	RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation.
6	RF OUT	RF output and bias pin. Bias should be supplied to this pin through an external series resistor and RF choke inductor. Because DC biasing is present on this pin, a DC-blocking capacitor should be used in most applications. (See application schematic.) The supply side of this bias network should be well bypassed.

SOT-363 PCB Pad Layout



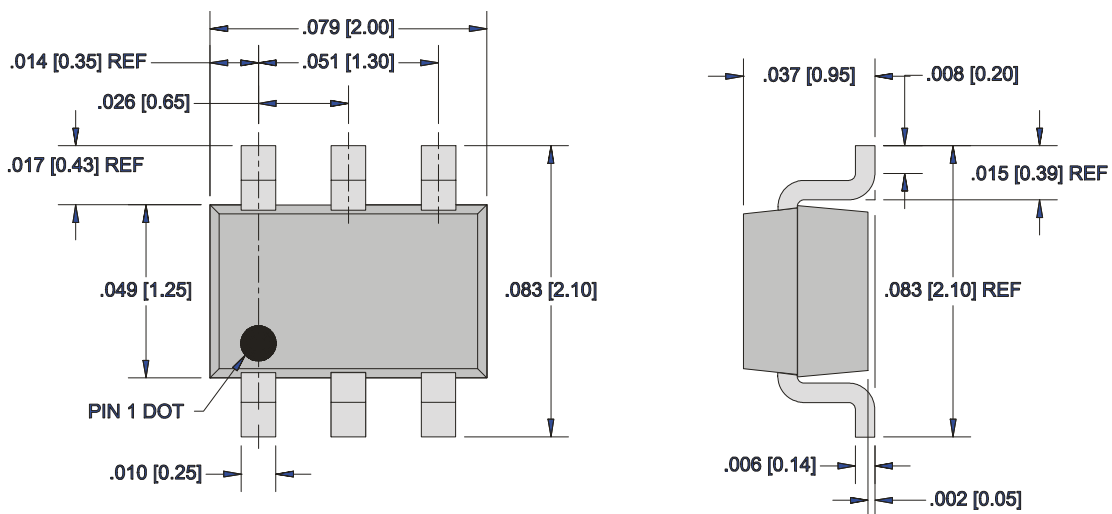
Notes:

1. Provide a large ground pad area under device pins 1, 2, 4, & 5 with many plated via holes as shown.
2. Dimensions given for 50 Ohm RF I/O lines are for 31 mil thick Getek. Scale accordingly for different board thicknesses and dielectric constants.
3. We recommend 1 or 2 ounce copper. Measurements for this data sheet were made on a 31 mil thick Getek with 1 ounce copper on both sides.

Package Drawing

Dimensions in inches (millimeters)

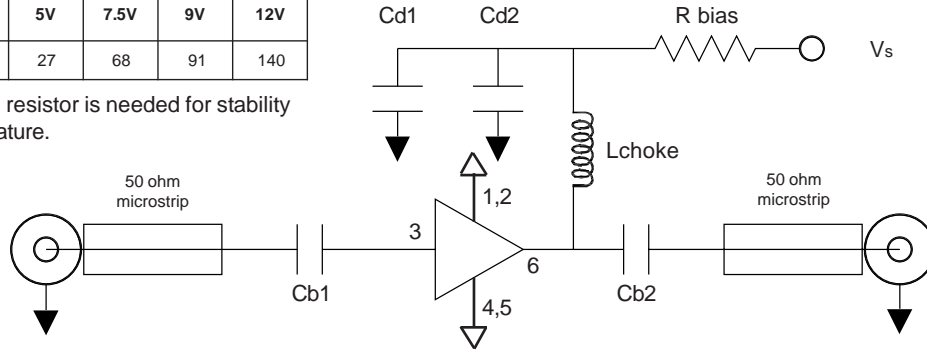
Refer to drawing posted at www.rfmd.com for tolerances.



Application Schematic

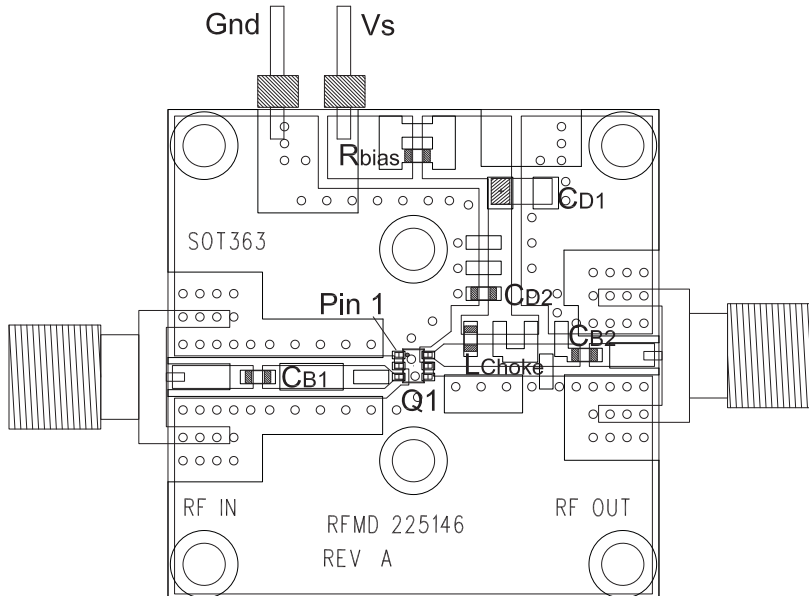
Recommended Bias Resistor Values				
Supply Voltage(Vs)	5V	7.5V	9V	12V
Rbias (Ohms)	27	68	91	140

Note: A bias resistor is needed for stability over temperature.



Reference Designator	Function	500 MHz	850 MHz	1950 MHz	2400 MHz
Cb1	DC Blocking	220 pF	100 pF	68 pF	56 pF
Cb2	DC Blocking	220 pF	100 pF	68 pF	56 pF
Cd1	Decoupling	1 uF	1 uF	1 uF	1 uF
Cd2	Decoupling	100 pF	68 pF	22 pF	22 pF
Lchoke	AC Blocking	68 nH	33 nH	22 nH	18 nH

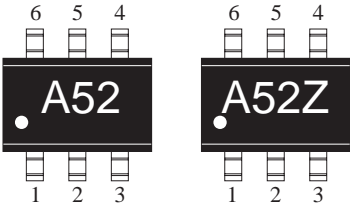
Evaluation Board Layout



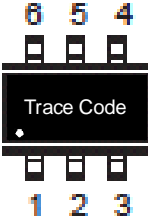
Mounting Instructions:

1. Use a large droung pad area near device pins 1, 2, 4, and 5 with plated through-holes as shown.
2. We recommend 1 or 2 ounces copper. Measurements for this data sheet were made on a 31mil thick FR-4 board with 1 ounce copper on both sides.

Part Identification Marking



Alternate Marking with Trace Code Only



Ordering Information

Part Number	Reel Size	Devices/Reel
SGA-5263	7"	3000
SGA-5263Z	7"	3000