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SGL-0263(Z)

1400MHz to 2500MHz SILICON GERMANIUM CASCADABLE LOW NOISE AMPLIFIER

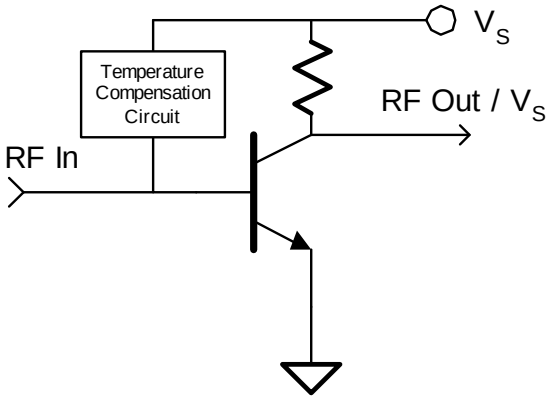
RFMD Green, RoHS Compliant, Pb-Free (Z Part Number)
Package: SOT-363

Product Description

The SGL-0263 is a high performance SiGe HBT MMIC low noise amplifier featuring 1 micron emitters with F_T up to 50GHz. This device has an internal temperature compensation circuit permitting operation directly from supply voltages as low as 2.5V. The SGL-0263 has been characterized at V_D=3V for low power and 4V for medium power applications. Only two DC-blocking capacitors, 2 input matching components, a bias resistor, and an optional RF choke are required for operation from 1400MHz to 2500MHz.

Optimum Technology Matching® Applied

- ☐ GaAs HBT
- ☐ GaAs MESFET
- ☐ InGaP HBT
- ☐ SiGe BiCMOS
- ☐ Si BiCMOS
- ☑ SiGe HBT
- ☐ GaAs pHEMT
- ☐ Si CMOS
- ☐ Si BJT
- ☐ GaN HEMT
- ☐ InP HBT



Features

- High Input/Output Intercept
- Low Noise Figure: 1.3dB typ. at 1900MHz
- Low Power Consumption
- Single Voltage Supply Operation
- Internal Temperature Compensation

Applications

- Receivers, GPS, RFID
- Cellular, Fixed Wireless, Land Mobile

Parameter	Specification (V_S=3V)			Specification (V_S=4V)			Unit	Condition
	Min.	Typ.	Max.	Min.	Typ.	Max.		
Small Signal Gain	12.1	13.4	14.7		13.8		dB	1900MHz
		12.5			12.9		dB	2100MHz
		10.8			11.3		dB	2400MHz
Output Power at 1dB Compression	3.5	5.5			11.4		dBm	1900MHz
		6.8			12.3		dBm	2100MHz
		7.9			12.8		dBm	2400MHz
Input Third Order Intercept Point Tone Spacing=1MHz, P_{OUT} per tone=-13dBm	7.5	9.5			15.1		dBm	1900MHz
		13.5			16.8		dBm	2100MHz
		15.5			18.4		dBm	2400MHz
Noise Figure		1.3	1.7		1.9		dB	1900MHz, Z_S=50Ω
		1.5			2.1		dB	2100MHz, Z_S=50Ω
		2.0			2.8		dB	2400MHz, Z_S=50Ω
Input Return Loss	10.0	13.3			21.9		dB	1900MHz
Output Return Loss	10.0	12.9			17.4		dB	1900MHz
Reverse Isolation		20.7			21.0		dB	1900MHz
Device Current	9.0	12.5	15.0		23.0		mA	
Thermal Resistance (Junction to Lead)		255					°C/W	

Test Conditions: 1400MHz to 2500MHz Application Circuit, T_{LEAD}=25°C, Z_0=Z_L=50Ω

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Absolute Maximum Ratings

Parameter	Rating	Unit
Max Device Current (I_D)	45	mA
Max Device Voltage (V_D)	5	V
Max RF Input Power	+10	dBm
Max Junction Temp (T_J)	+150	°C
Operating Temp Range (T_L)	-40 to +85	°C
Max Storage Temp	+150	°C
ESD	1A	Class
MSL	1	

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:

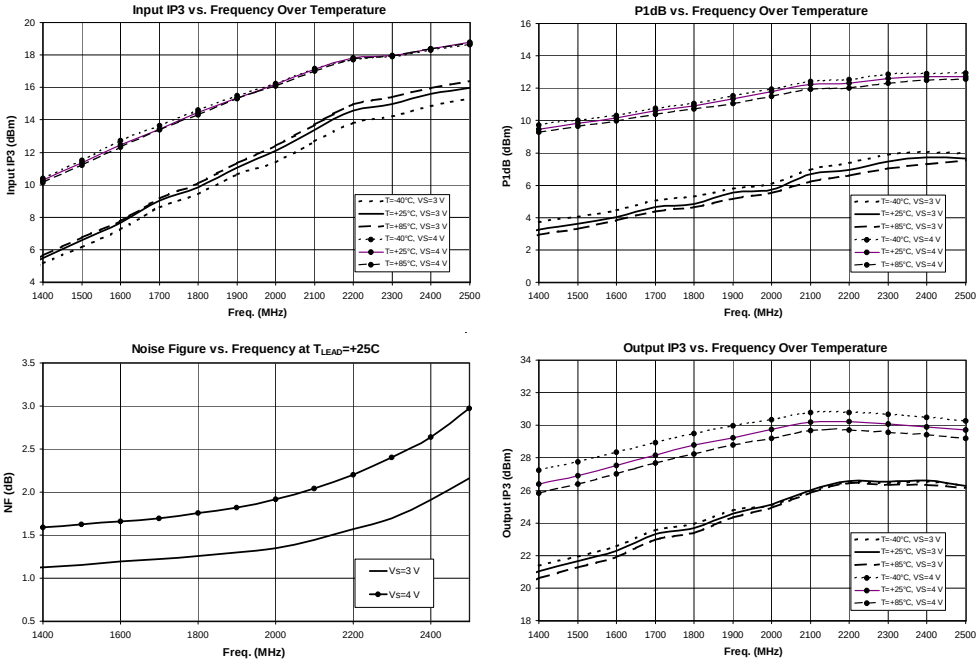
$I_D V_D < (T_J - T_L) / R_{TH, j-l}$

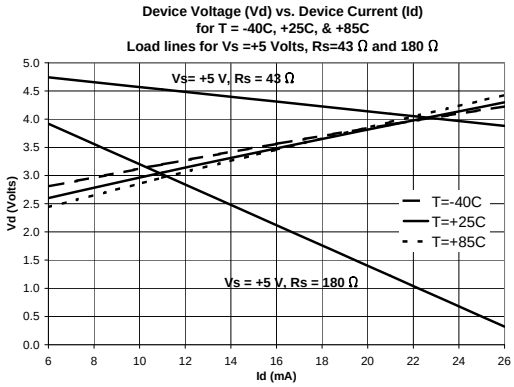
Caution! ESD sensitive device.

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).

Typical RF Performance Over Lead Temperature at 3 V and 4 V -- 1400-2500 MHz Evaluation Board





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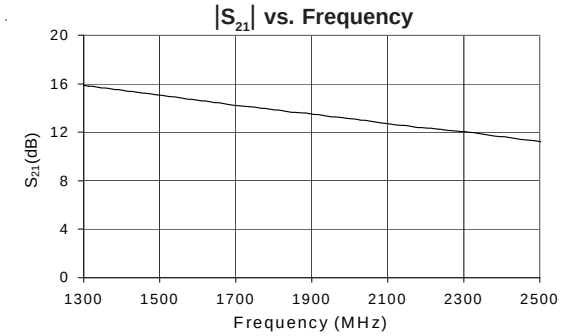
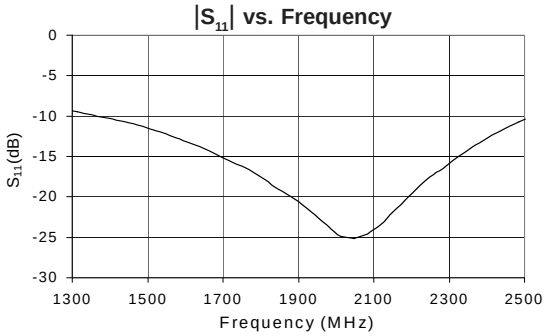
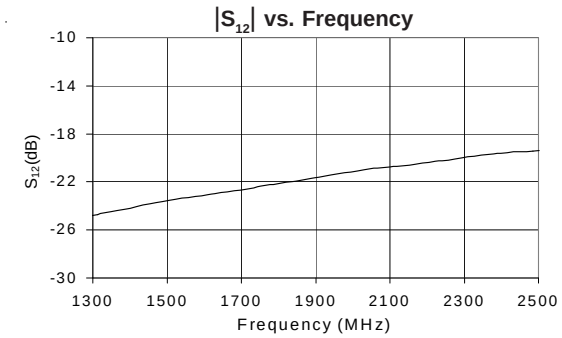
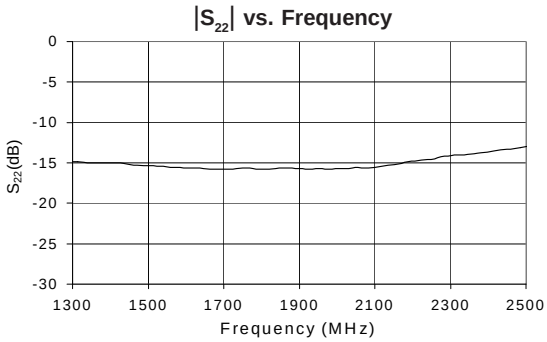
Typical RF Performance at V_S = 3 V -- 1400-2500 MHz Evaluation Board -- T_{LEAD}=+25°C

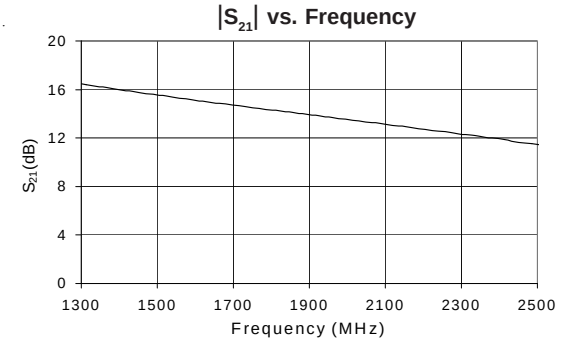


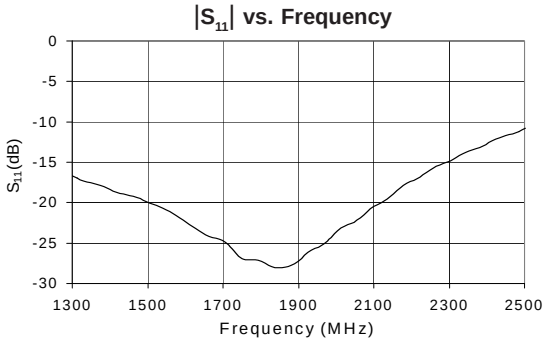


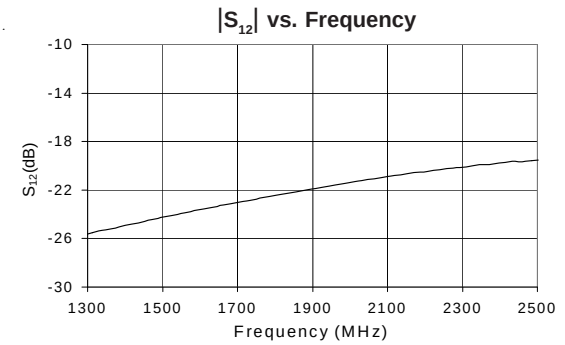


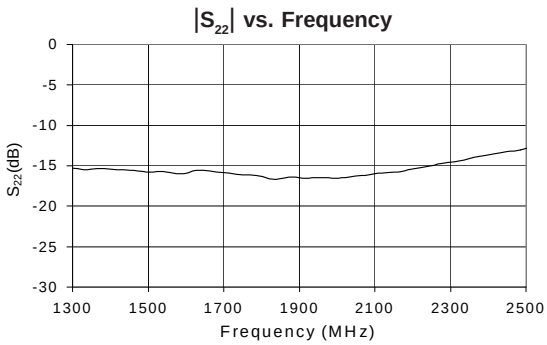


Typical RF Performance at V_S = 4 V -- 1400-2500 MHz Evaluation Board -- T_{LEAD}=+25°C



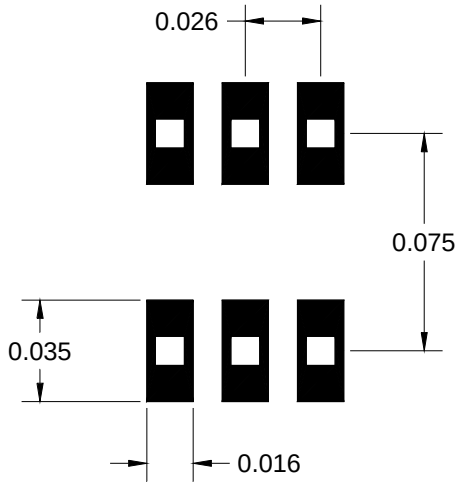






Pin	Function	Description
1	N/C	No electrical connection. Provide an isolated (ungrounded) solder pad for mounting integrity.
3	RF IN	RF input pin. This pin requires the use of an external DC-blocking capacitor chosen for the frequency of operation.
4	DC BIAS	Voltage supply connection. Bypass with suitable capacitors.
2, 5	GND	Connection to ground. Provide via holes as close to ground leads as possible to reduce ground inductance and schieve optimum RF performance.
6	RF OUT/BIAS	RF output and voltage supply. DC voltage is present on this pin, therefore a DC-blocking capacitor is necessary for proper operation.

Suggested Pad Layout

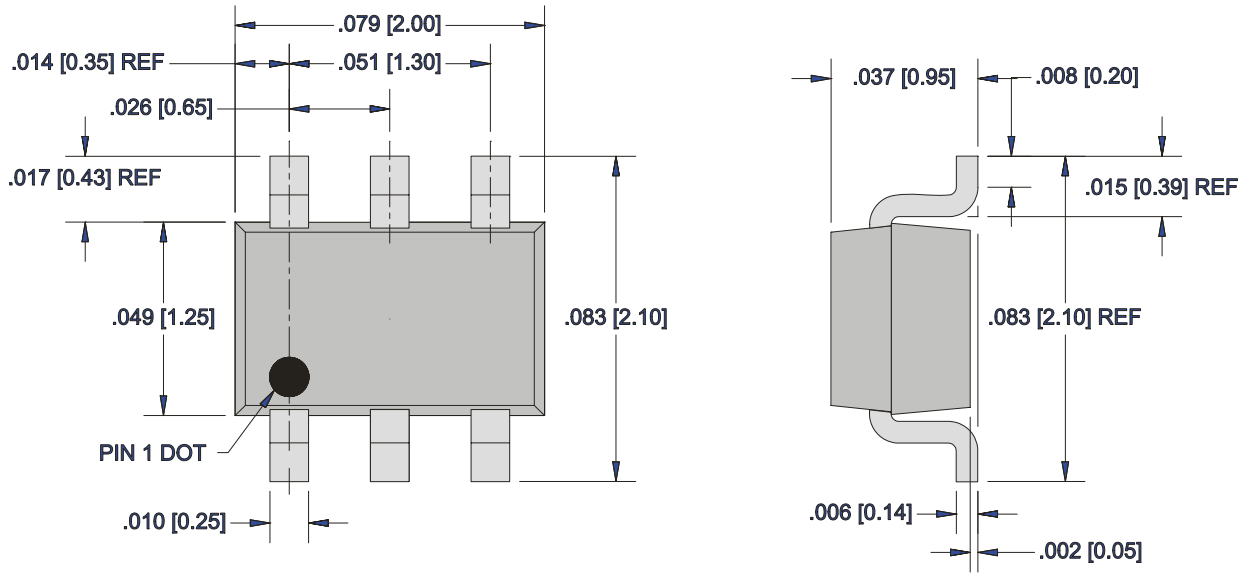


Notes:

1. Provide a ground pad area under device pins 2 & 5 with plated via holes to the PCB ground plane.
2. 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.



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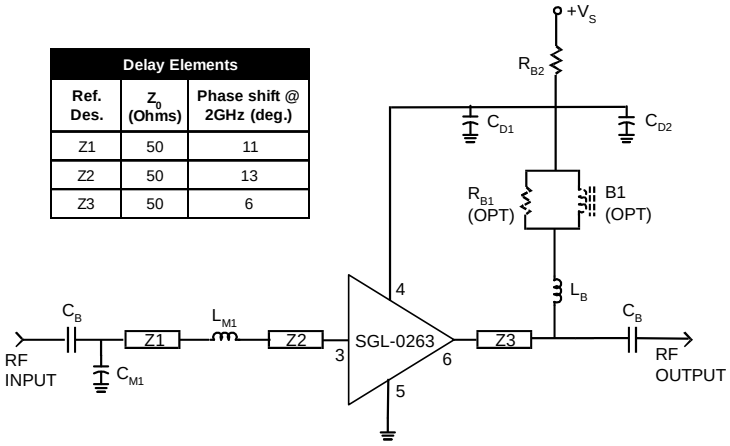
1400MHz to 2500MHz Application Circuit

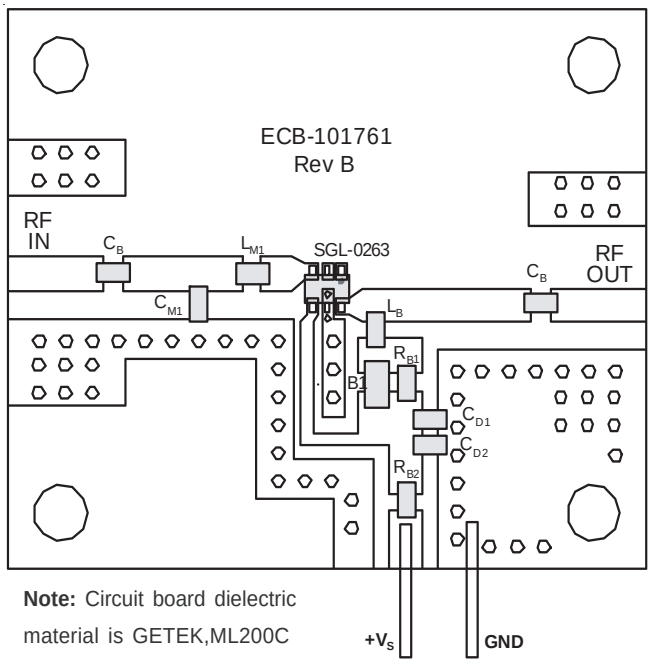


Delay Elements		
Ref. Des.	Z_0 (Ohms)	Phase shift @ 2GHz (deg.)
Z1	50	11
Z2	50	13
Z3	50	6

Application Circuit Element Values		
Reference Designator	Value	Manufacturer & Part No.
L_B	27 nH	TOKO LL1608-FS27NJ
L_{M1}	1.2 nH	TOKO LL1608-FS1R2NJ
B1 [1]	1500 Ohms @100 MHz	FAIR-RITE 2508051527y0 Ferrite Bead
C_B, C_{D1}	0.1 uF	SAMSUNG CL10B103KBNC
C_{D2}	22 pF	ROHM MCH185AA220DJK
C_{M1}	1.0 pF	ROHM MCH185A1R0CK
R_{B1} [1]	47 Ohms	PHILLIPS 9C06031A47R0 JL HFT
R_{B2} [2]	0 Ohms	PHILLIPS 9C06031A0R00 JL HFT

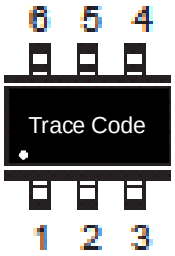
Notes:
1. B1 and R_{B1} provide improved K-factor but are optional.
2. R_{B2} may be introduced as a voltage dropping resistor for use with supply voltages greater than the desired device bias voltage.

Evaluation Board Layout



Note: Circuit board dielectric material is GETEK,ML200C

Alternate Marking with Trace Code Only



Ordering Information

Part Number	Description	Reel Size	Devices/Reel
SGL-0263	Tn-Lead	7”	3000
SGL-0263Z	RoHS Compliant	7”	3000
SGL-0263Z-EVB1	1400-2500 MHz Application Circuit	N/A	N/A

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