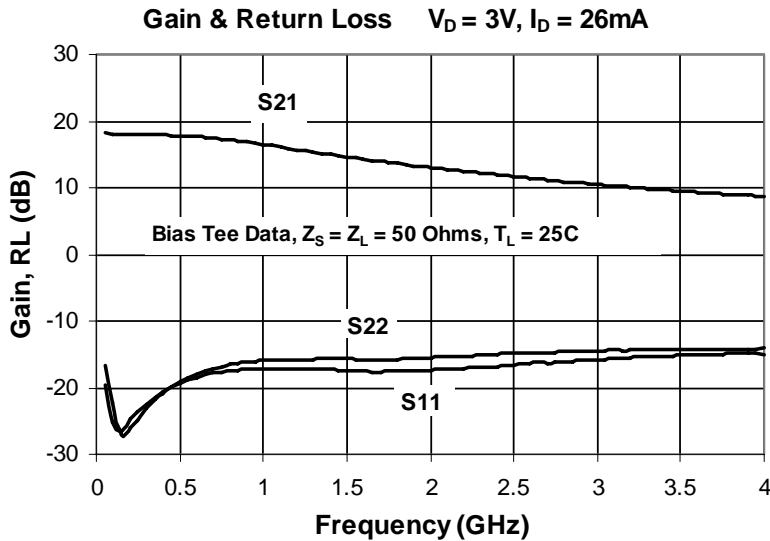




## Product Description

Sirenza Microdevices' SGC-2363Z is a high performance SiGe HBT MMIC amplifier utilizing a Darlington configuration with a patented active-bias network. The active bias network provides stable current over temperature and process Beta variations. Designed to run directly from a 3V supply, the SGC-2363Z does not require a dropping resistor as compared to typical Darlington amplifiers. The SGC-2363Z is designed for high linearity 3V gain block applications that require small size and minimal external components. It is internally matched to 50 ohms.



# SGC-2363Z

## 50-4000 MHz Active Bias Silicon Germanium Cascadable Gain Block



### Product Features

- Single, Fixed 3V Supply
- No Dropping Resistor Required
- Patented Self-Bias Circuitry
- P1dB = 10.1 dBm at 1950 MHz
- OIP3 = 23 dBm at 1950 MHz
- Robust 1000V ESD, Class 1C HBM

### Applications

- PA Driver Amplifier
- Cellular, PCS, GSM, UMTS, WCDMA
- IF Amplifier
- Wireless Data, Satellite

Symbol	Parameters	Units	Frequency	Min.	Typ.	Max.
G	Small Signal Gain	dB	850 MHz	15.5	17.0	18.5
			1950 MHz	11.6	13.1	14.6
			2400 MHz		12.3	
P <sub>1dB</sub>	Output Power at 1dB Compression	dBm	850 MHz		10.4	
			1950 MHz	9.1	10.1	
			2400 MHz		9.6	
OIP <sub>3</sub>	Output Third Order Intercept Point	dBm	850 MHz		23.0	
			1950 MHz	21	23.0	
			2400 MHz		24.0	
IRL	Input Return Loss	dB	1950 MHz	12.0	15.0	
ORL	Output Return Loss	dB	1950 MHz	10.5	14.5	
NF	Noise Figure	dB	1930 MHz		3.7	4.8
V <sub>D</sub>	Device Operating Voltage	V			3	
I <sub>D</sub>	Device Operating Current	mA		22	26	30
R <sub>th, j-l</sub>	Thermal Resistance (junction to lead)	°C/W			255	
<b>Test Conditions:</b> $V_D = 3.0V$ $I_D = 26mA$ $T_L = 25^\circ C$ OIP <sub>3</sub> Tone Spacing = 1MHz						
Bias Tee Data $Z_S = Z_L = 50 \text{ Ohms}$ Pout per tone = -5 dBm						

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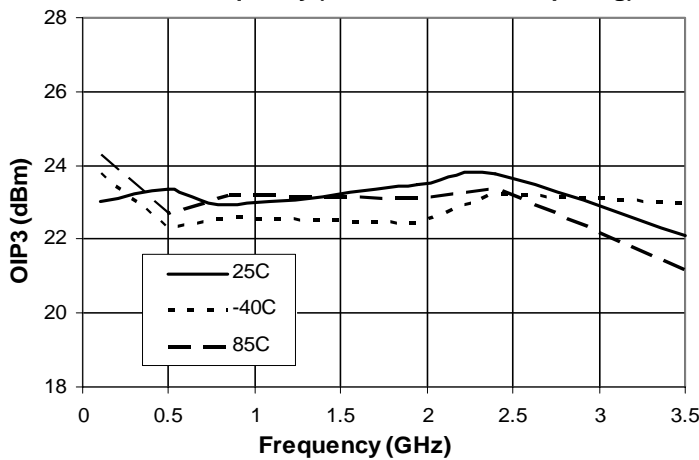
**Typical RF Performance at Key Operating Frequencies (Bias Tee)**

Symbol	Parameter	Unit	Frequency (MHz)					
			100	500	850	1950	2400	3500
G	Small Signal Gain	dB	18.4	18.1	17.0	13.1	12.3	9.8
OIP <sub>3</sub>	Output Third Order Intercept Point	dBm	23.0	23.5	23.0	23.0	24.0	22.0
P <sub>1dB</sub>	Output Power at 1dB Compression	dBm	12.1	11.0	10.4	10.1	9.6	8.3
IRL	Input Return Loss	dB	23.5	19.0	18.0	15.0	16.5	14.0
ORL	Output Return Loss	dB	22.5	18.5	16.5	14.5	13.0	12.5
S <sub>12</sub>	Reverse Isolation	dB	20.5	21.5	22.0	20.5	20.0	19.0
NF	Noise Figure	dB	2.9	3.0	3.3	3.7	3.9	4.7

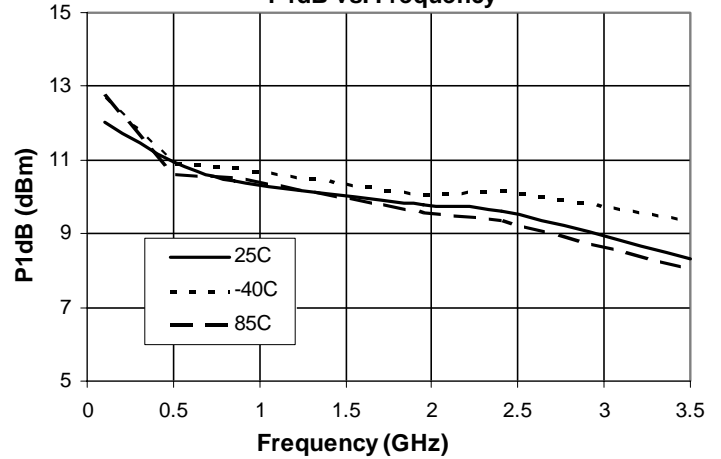
**Test Conditions:** V<sub>D</sub> = 3V I<sub>D</sub> = 26mA Typ. OIP<sub>3</sub> Tone Spacing = 1MHz, Pout per tone = -5 dBm  
 T<sub>L</sub> = 25°C Z<sub>S</sub> = Z<sub>L</sub> = 50 Ohms

**Typical Performance with Bias Tee, V<sub>D</sub> = 3V, I<sub>D</sub> = 26mA**

**OIP3 vs. Frequency (-5dBm/tone, 1MHz spacing)**



**P1dB vs. Frequency**



**Absolute Maximum Ratings**

Parameter	Absolute Limit
Max Device Current (I <sub>CE</sub> )	55 mA
Max Device Voltage (V <sub>CE</sub> )	4.5 V
Max. RF Input Power* (See Note)	+18 dBm
Max. Junction Temp. (T <sub>J</sub> )	+150°C
Operating Temp. Range (T <sub>L</sub> )	-40°C to +85°C
Max. Storage Temp.	+150°C

\*Note: Load condition, Z<sub>L</sub> = 50 Ohms

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:

$$I_D V_D < (T_J - T_L) / R_{TH}, \text{ where } T_L = T_{LEAD}$$

**Reliability & Qualification Information**

Parameter	Rating
ESD Rating - Human Body Model (HBM)	Class 1C
Moisture Sensitivity Level	MSL 1

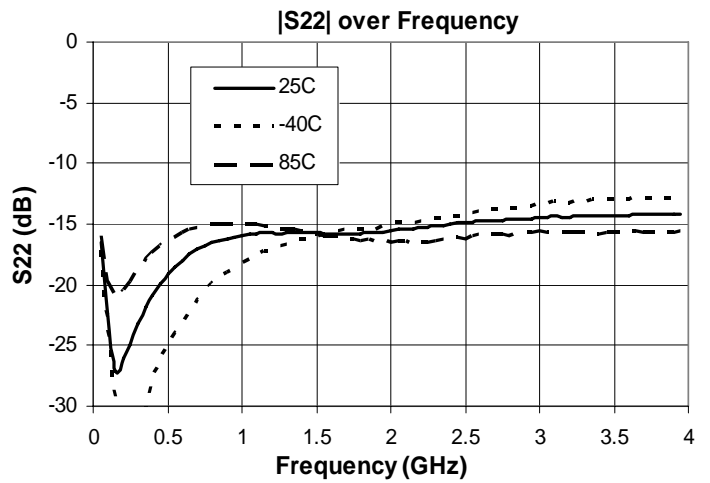
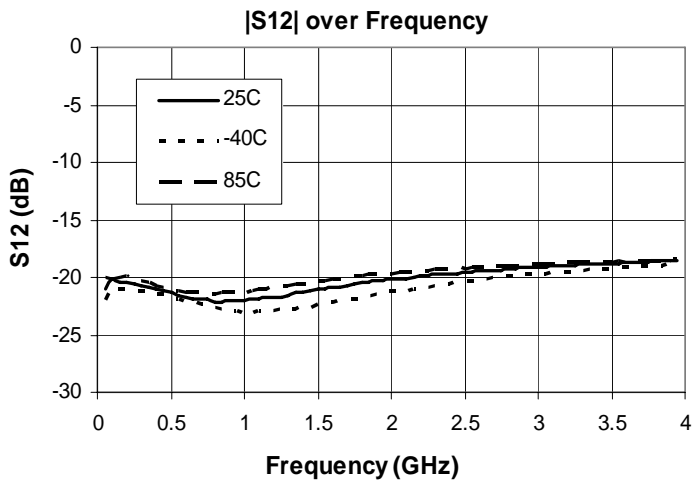
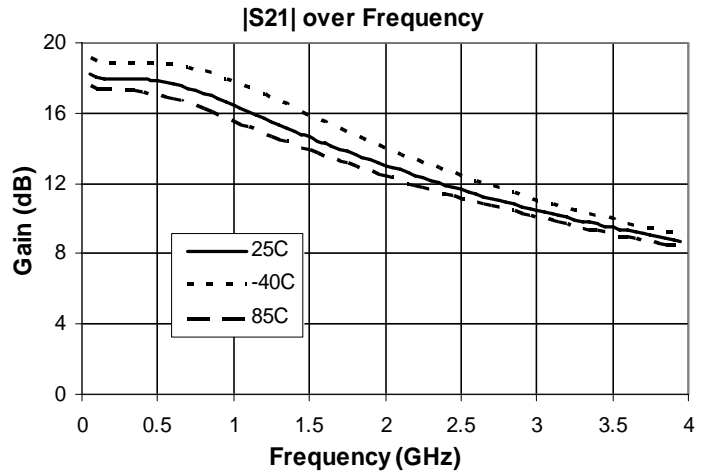
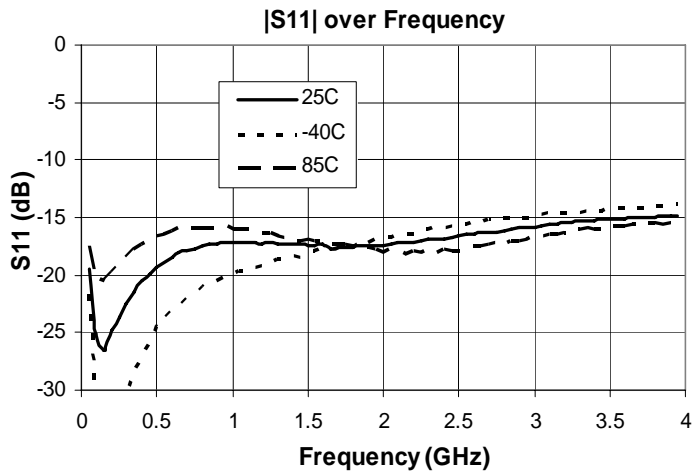
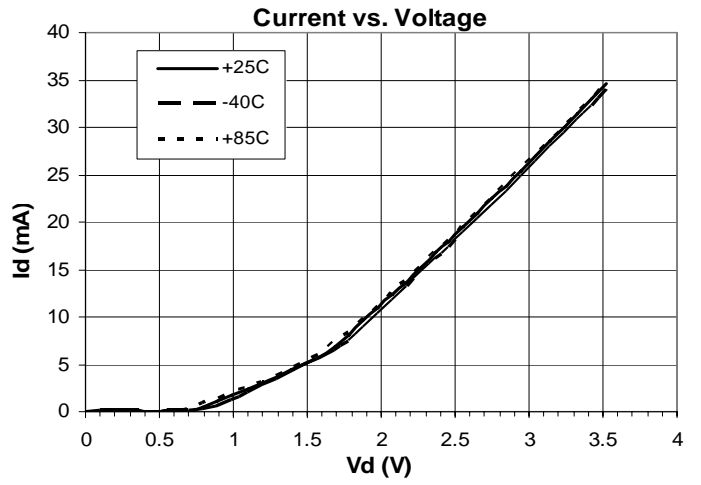
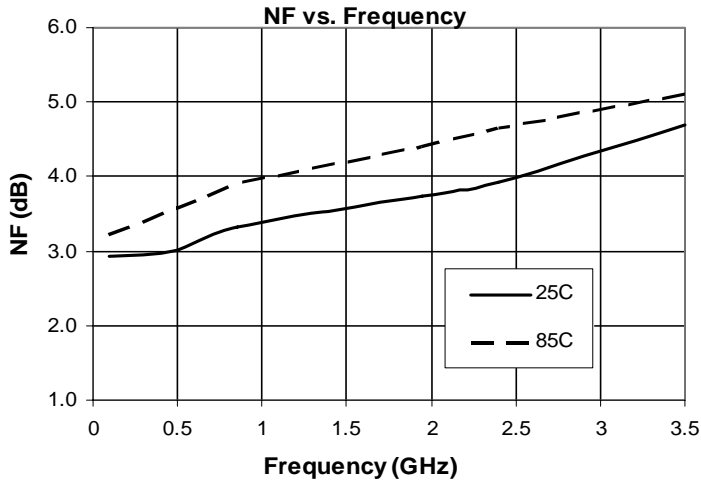
This product qualification report can be downloaded at [www.sirenza.com](http://www.sirenza.com)

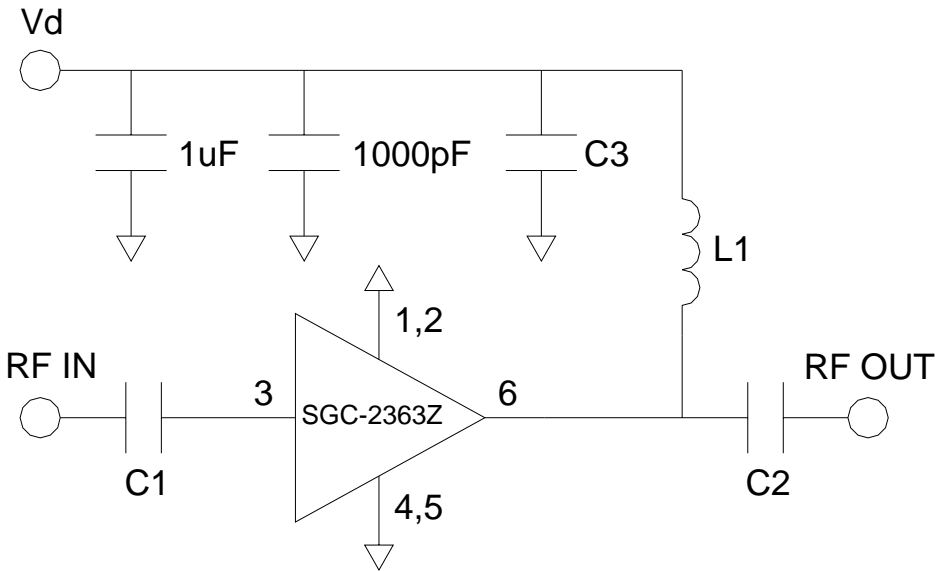


**Caution: ESD sensitive**

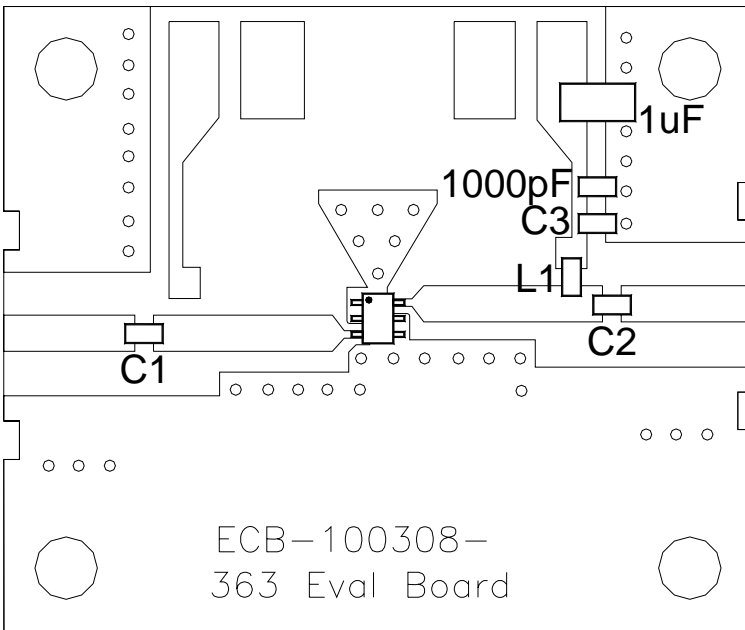
Appropriate precautions in handling, packaging and testing devices must be observed.

**Typical Performance with Bias Tee,  $V_D = 3V$ ,  $I_D = 26mA$**

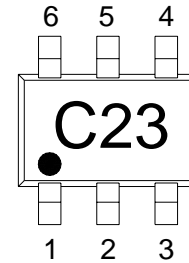




Application Circuit Element Values		
Reference Designator	100-2000MHz	2000-4000MHz
C1	1000pF	2.7pF
C2	100pF	6.8pF
C3	100pF	6.8pF
L1	150nH	39nH



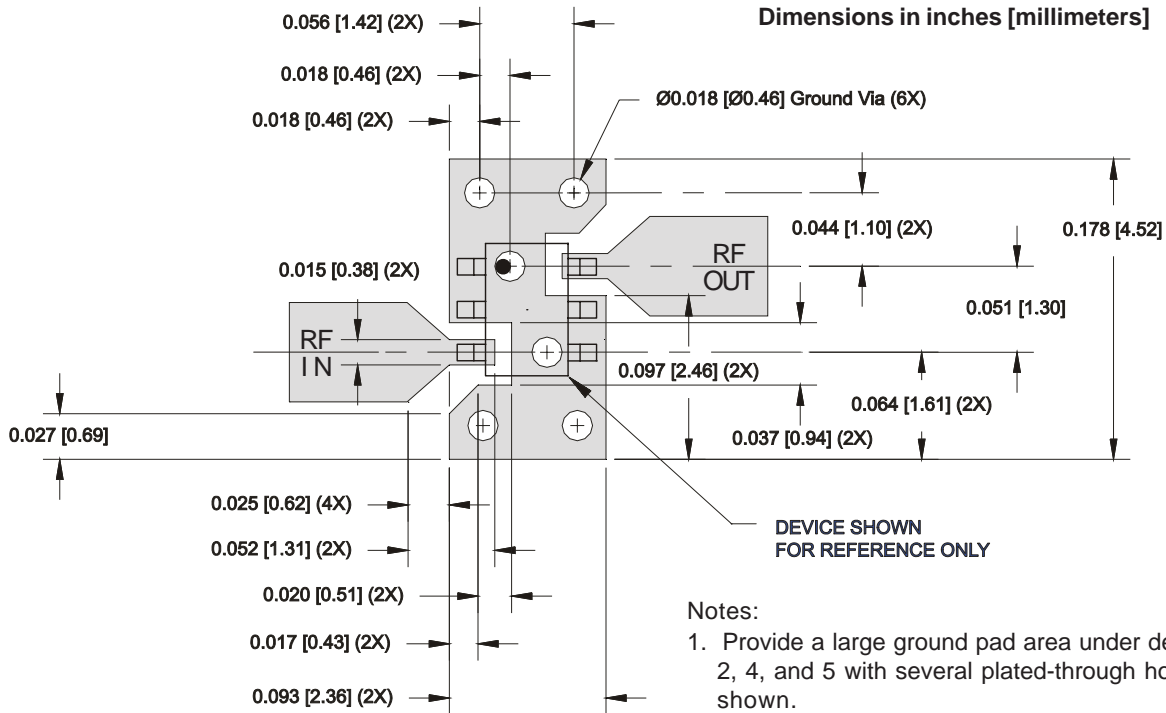
Part Identification Marking & Pinout



Pin #	Function	Description	Part / Evaluation Board Ordering Information			
3	RF IN	RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation	Part Number	Description	Reel Size	Devices / Reel
1,2,4,5	GND	Connection to ground. Use via holes as close to the device ground leads as possible to reduce ground inductance and achieve optimum RF performance	SGC-2363Z	Lead Free, RoHs Compliant	7"	3000
6	RF OUT / DC BIAS	RF output and bias pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation.	SGC-2363Z-EVB1	100-2000 MHz Evaluation Board	N/A	N/A
			SGC-2363Z-EVB2	2000-4000 MHz Evaluation Board	N/A	N/A

**SOT-363 PCB Pad Layout**

Dimensions in inches [millimeters]



Notes:

1. Provide a large ground pad area under device pins 1, 2, 4, and 5 with several plated-through holes placed as shown.
2. 1-2 ounce finished copper thickness is recommended.
3. RF I/O lines are 50Ω

**SOT-363 Nominal Package Dimensions**

Dimensions in inches [millimeters]

A link to the SOT-363 package outline drawing with full dimensions and tolerances may be found on the product web page at [www.sirenza.com](http://www.sirenza.com).

