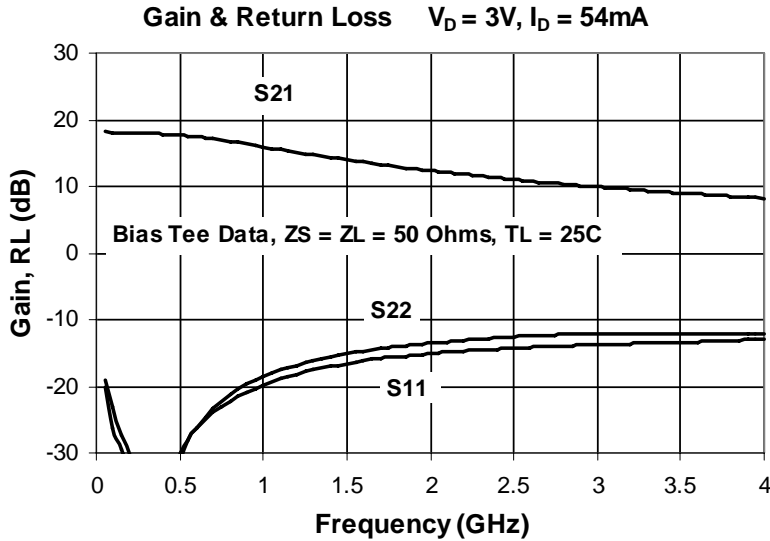




Product Description

Sirenza Microdevices' SGC-4386Z 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-4386Z does not require a dropping resistor as compared to typical Darlington amplifiers. The SGC-4386Z 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-4386Z

50-4000 MHz Active Bias Silicon Germanium Cascadable Gain Block



Product Features

- Single Fixed 3V Supply
- No Dropping Resistor Required
- Patented Self-Bias Circuitry
- $P_{1dB} = 12.7 \text{ dBm}$ at 1950 MHz
- $OIP_3 = 27 \text{ dBm}$ 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	15.2	16.7	18.2
			1950 MHz	11.2	12.7	14.2
			2400 MHz		10.9	
P_{1dB}	Output Power at 1dB Compression	dBm	850 MHz		13.4	
			1950 MHz	11.7	12.7	
			2400 MHz		11.8	
OIP_3	Output Third Order Intercept Point	dBm	850 MHz		29.5	
			1950 MHz	25.0	27.0	
			2400 MHz		26.0	
IRL	Input Return Loss	dB	1950 MHz	11	15.0	
ORL	Output Return Loss	dB	1950 MHz	9.5	13.5	
NF	Noise Figure	dB	1930 MHz		3.7	4.7
V_D	Device Operating Voltage	V			3	
I_D	Device Operating Current	mA		48	54	60
$R_{th, j-l}$	Thermal Resistance (junction to lead)	$^{\circ}C/W$			145	
Test Conditions: $V_D = 3.0V$ $I_D = 54mA$ Typ. $T_L = 25^{\circ}C$ OIP_3 Tone Spacing = 1MHz						
Bias Tee Data $Z_S = Z_L = 50 \text{ Ohms}$ $T_L = 25^{\circ}C$ Pout per tone = -5 dBm						

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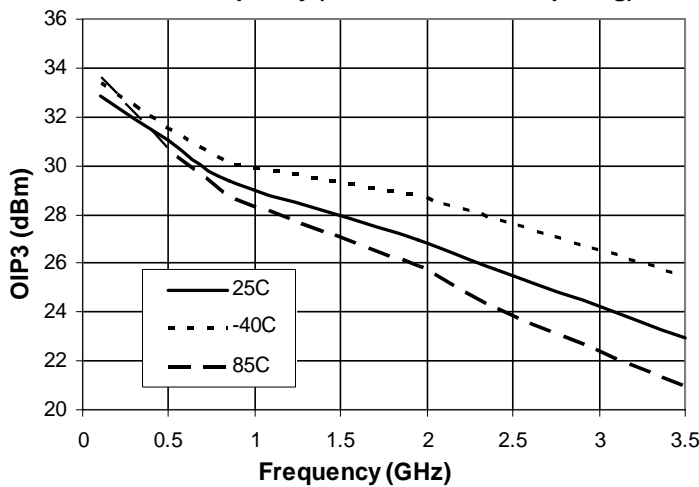
Typical RF Performance at Key Operating Frequencies (Bias Tee)

Symbol	Parameter	Unit	Frequency (MHz)					
			100	500	850	1950	2400	3500
G	Small Signal Gain	dB	18.1	17.6	16.7	12.7	10.9	8.6
OIP ₃	Output Third Order Intercept Point	dBm	32.5	31.0	29.5	27.0	26.0	23.0
P _{1dB}	Output Power at 1dB Compression	dBm	15.1	14.0	13.4	12.7	11.8	10.2
IRL	Input Return Loss	dB	29.0	24.0	24.5	15.0	14.5	13.0
ORL	Output Return Loss	dB	27.0	24.0	22.5	13.5	13.0	12.0
S ₁₂	Reverse Isolation	dB	20.0	21.5	21.5	19.5	19.0	18.0
NF	Noise Figure	dB	2.9	3.0	3.4	3.7	4.1	5.0

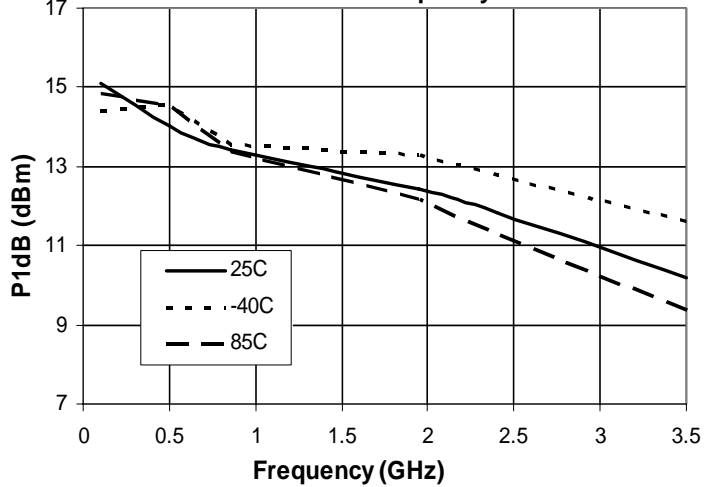
Test Conditions: V_D = 3V I_D = 54mA OIP₃ Tone Spacing = 1MHz, Pout per tone = -5 dBm
 T_L = 25°C Z_S = Z_L = 50 Ohms

Typical Performance with Bias Tee, V_D = 3V, I_D = 54mA

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



P1dB vs. Frequency



Absolute Maximum Ratings

Parameter	Absolute Limit
Max Device Current (I _{CE})	110 mA
Max Device Voltage (V _{CE})	4.5 V
Max. RF Input Power* (See Note)	+18 dBm
Max. Junction Temp. (T _J)	+150°C
Operating Temp. Range (T _L)	-40°C to +85°C
Max. Storage Temp.	+150°C

*Note: Load condition, Z_L = 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:

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

Reliability & Qualification Information

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

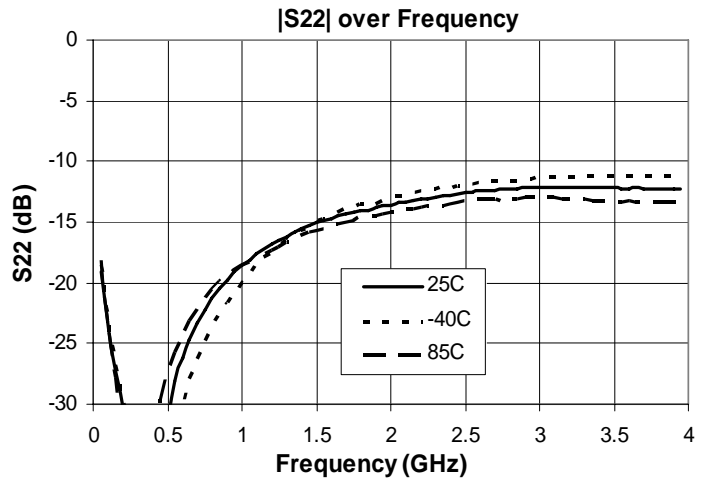
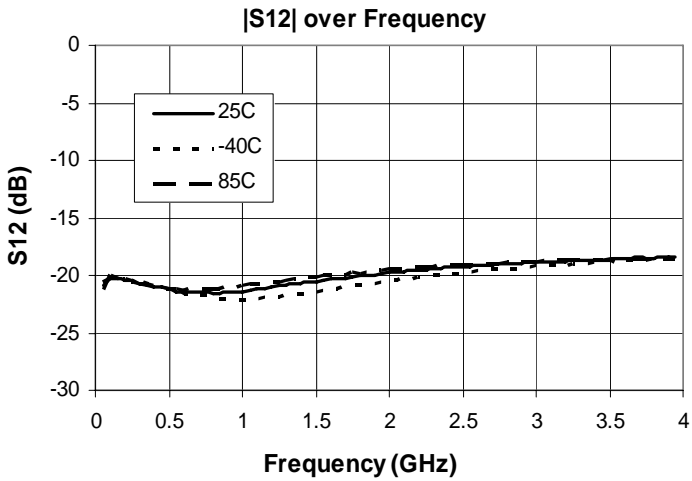
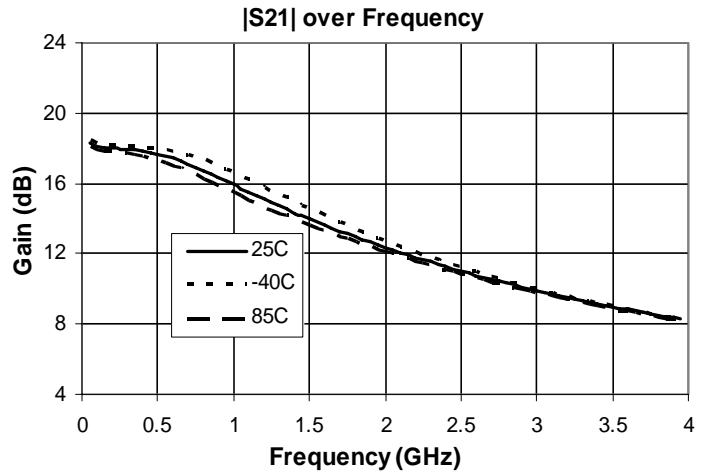
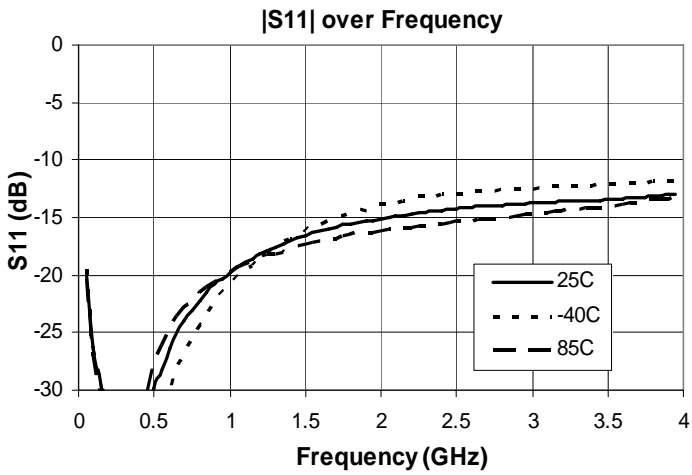
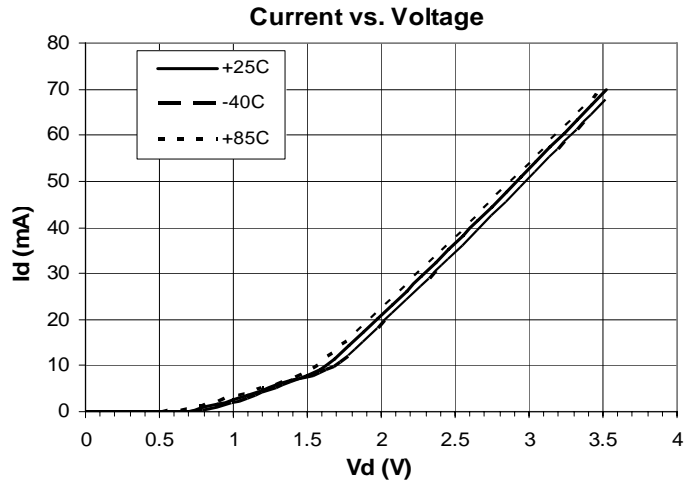
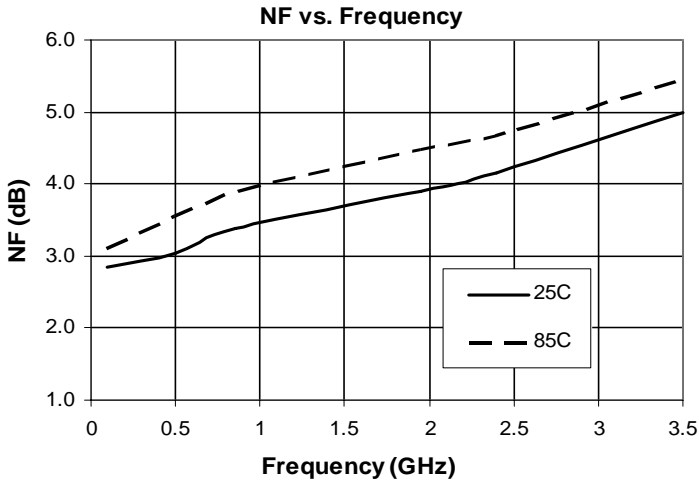
This product qualification report can be downloaded at www.sirenza.com

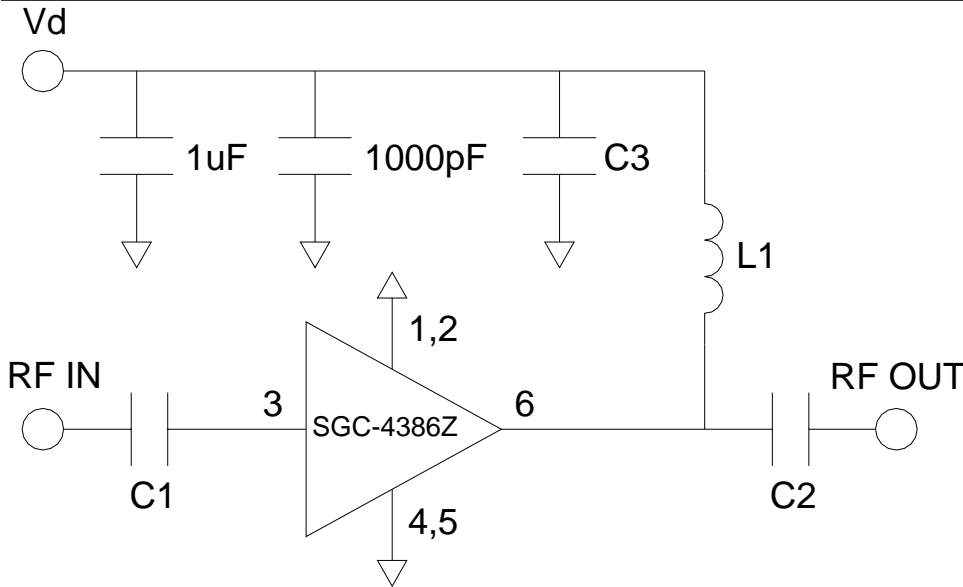


Caution: ESD sensitive

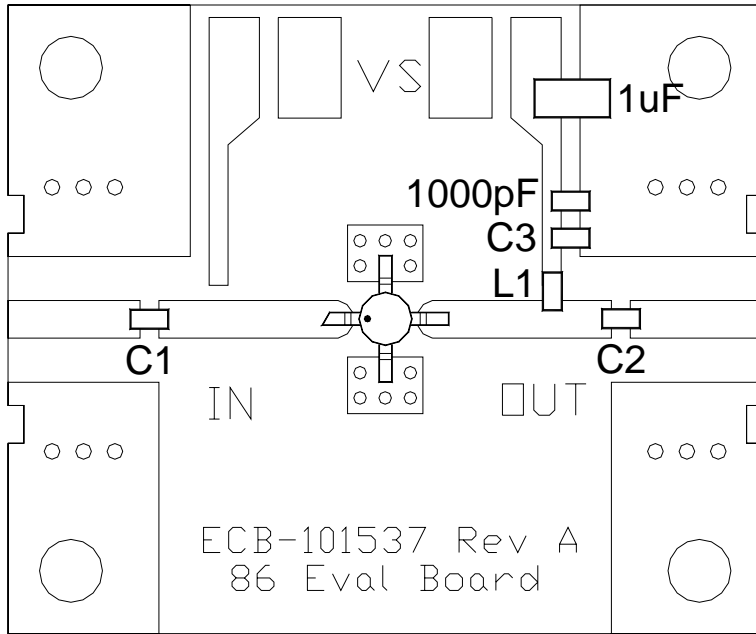
Appropriate precautions in handling, packaging and testing devices must be observed.

Typical Performance with Bias Tee, $V_D = 3V$, $I_D = 54mA$

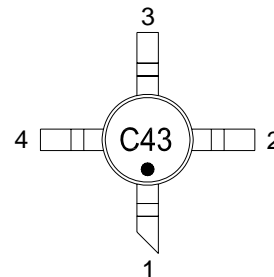




Application Circuit Element Values		
Reference Designator	100-2000MHz	2000-4000MHz
C1	1000pF	2.7pF
C2	100pF	6.8pF
C3	100pF	6.8pF
L1	120nH	39nH



Part Identification Marking & Pinout

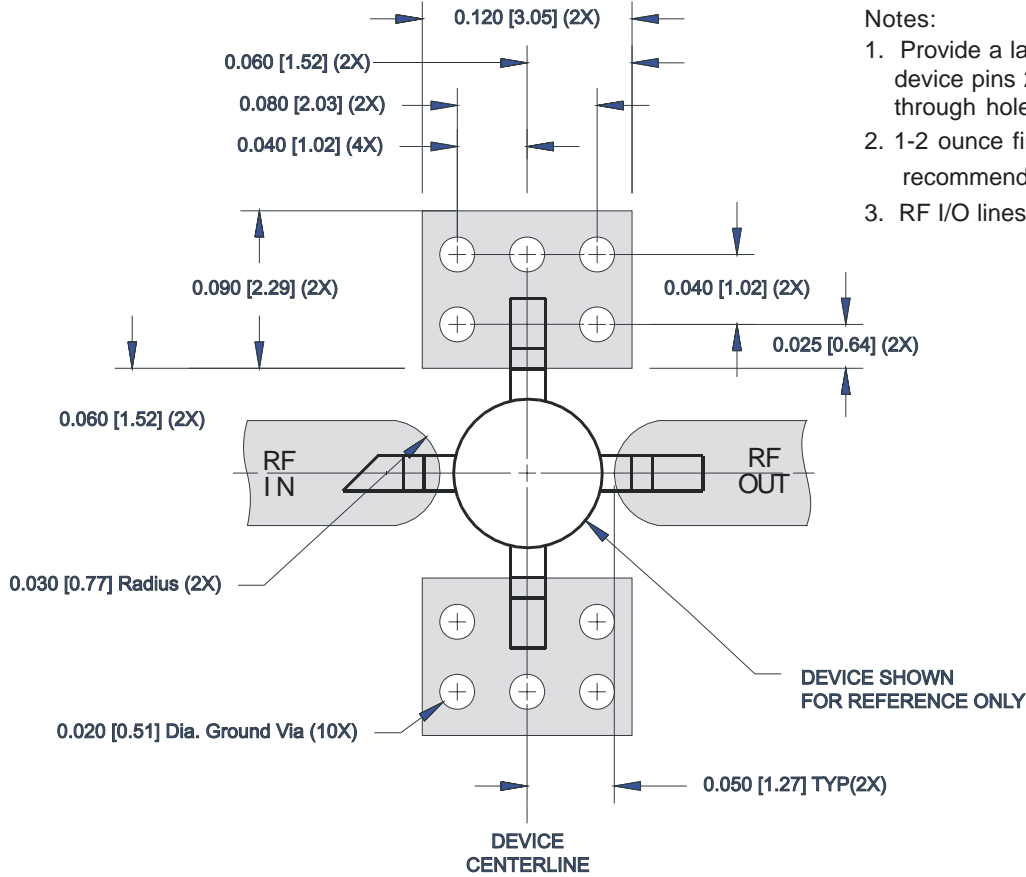


Pin #	Function	Description
1	RF IN	RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation
2,4	GND	Connection to ground. Use via holes as close to the device ground leads as possible to reduce ground inductance and achieve optimum RF performance
3	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.

Part / Evaluation Board Ordering Information				
Part Number	Description	Reel Size	Devices / Reel	
SGC-4386Z	Lead Free, RoHs Compliant	13"	3000	
SGC-4386Z-EVB1	100-2000 MHz Evaluation Board	N/A	N/A	
SGC-4386Z-EVB2	2000-4000 MHz Evaluation Board	N/A	N/A	

86 PCB Pad Layout

Dimensions in inches [millimeters]



Notes:

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

86 Nominal Package Dimensions

Dimensions in inches [millimeters]

A link to the 86 package outline drawing with full dimensions and tolerances may be found on the product web page at www.sirenza.com.

