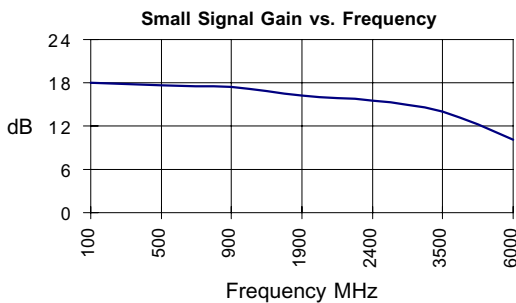


## Product Description

Stanford Microdevices' SGA-2363 is a high performance cascadeable 50-ohm amplifier designed for operation from a 2.7-volt supply. This RFIC uses the latest Silicon Germanium Heterostructure Bipolar Transistor (SiGe HBT) process featuring 1 micron emitters with  $F_T$  up to 50 GHz.

This circuit uses a darlington pair topology with resistive feedback for broadband performance as well as stability over its entire temperature range. Internally matched to 50 ohm impedance, the SGA-2363 requires only DC blocking and bypass capacitors for external components.



Preliminary

## SGA-2363

### DC-2800 MHz Silicon Germanium HBT Cascadeable Gain Block



### Product Features

- DC-2800 MHz Operation
- 2.7V Single Voltage Supply
- High Output Intercept: +20.0dBm typ. at 850 MHz
- Low Noise Figure: 2.9 dB typ. at 850 MHz

### Applications

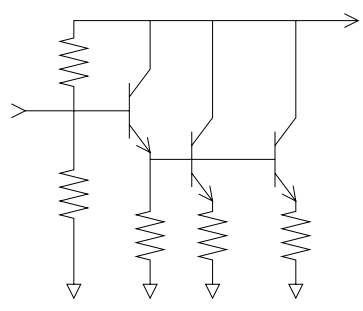
- Broadband Gain Blocks
- Cordless Phones
- IF/ RF Buffer Amplifier
- Drivers for CATV Amplifiers

Symbol	Parameters: Test Conditions: $Z_0 = 50 \text{ Ohms}$ , $I_d = 20 \text{ mA}$ , $T = 25^\circ\text{C}$		Units	Min.	Typ.	Max.
$P_{1dB}$	Output Power at 1dB Compression	$f = 850 \text{ MHz}$ $f = 1950 \text{ MHz}$	dBm dBm		8.2 7.2	
$S_{21}$	Small Signal Gain	$f = \text{DC} - 1000 \text{ MHz}$ $f = 1000 - 2000 \text{ MHz}$ $f = 2000 - 2800 \text{ MHz}$	dB dB dB	15.7	17.5 16.7 15.5	
$S_{12}$	Reverse Isolation	$f = \text{DC} - 1000 \text{ MHz}$ $f = 1000 - 2000 \text{ MHz}$ $f = 2000 - 2800 \text{ MHz}$	dB dB dB		20.9 21.3 21.2	
$S_{11}$	Input VSWR	$f = \text{DC} - 2000 \text{ MHz}$ $f = 2400 - 2800 \text{ MHz}$	-		1.4:1 1.5:1	
$S_{22}$	Output VSWR	$f = \text{DC} - 2000 \text{ MHz}$ $f = 2000 - 2800 \text{ MHz}$	-		1.3:1 1.2:1	
$IP_3$	Third Order Intercept Point Power out per Tone = -10 dBm	$f = 850 \text{ MHz}$ $f = 1950 \text{ MHz}$	dBm dBm		19.4 20.4	
NF	Noise Figure	$f = \text{DC} - 1000 \text{ MHz}$ $f = 1000 - 2400 \text{ MHz}$	dB dB		2.9 3.4	
$T_D$	Group Delay	$f = 1000 \text{ MHz}$	pS		107	
$V_D$	Device Voltage		V	2.4	2.7	3.0

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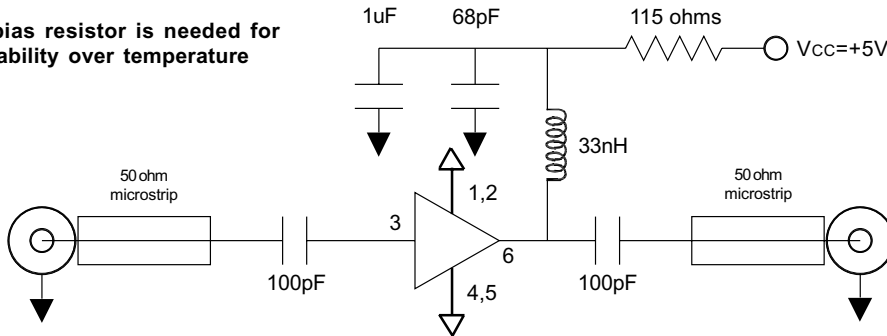
Parameter	Specification			Unit	Test Condition
	Min	Typ.	Max.		
<b>Bandwidth</b> Frequency Range	DC		2800	MHz	T= 25C
<b>Device Bias</b> Operating Voltage Operating Current		2.7 20		V mA	T= 25C
<b>500 MHz</b> Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		17.7 2.9 20.5 8.2 16.4 21.3		dB dB dBm dBm dB dB	T= 25C
<b>850 MHz</b> Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		17.4 2.9 19.4 8.2 15.7 21.3		dB dB dBm dBm dB dB	T= 25C
<b>1950 MHz</b> Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		16.1 3.3 20.4 7.2 13.3 21.6		dB dB dBm dBm dB dB	T= 25C
<b>2400 MHz</b> Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		15.6 3.6 19.2 6.8 12.3 21.6		dB dB dBm dBm dB dB	T= 25C

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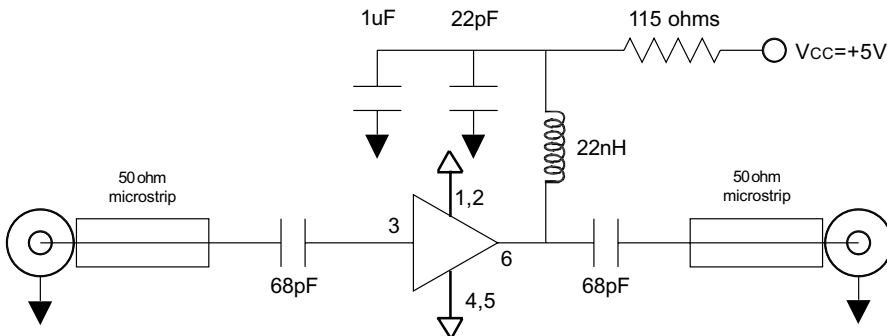
Pin #	Function	Description	Device Schematic
1	GND	Connection to ground. Use via holes for best performance to reduce lead inductance as close to ground leads as possible.	
2	GND	Sames as Pin 1	
3	RF IN	RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation.	
4	GND	Sames as Pin 1	
5	GND	Sames as Pin 1	
6	RF OUT	RF output and bias pin. DC voltage is present on this pin, therefore a DC blocking capacitor is necessary for proper operation.	

### Application Schematic for +5V Operation at 900 MHz

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

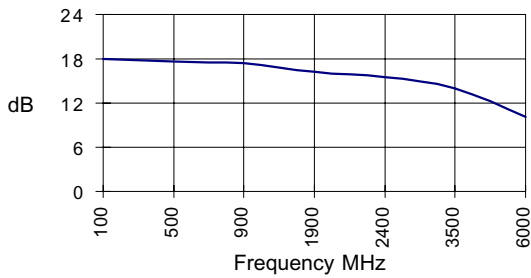


### Application Schematic for +5V Operation at 1900 MHz

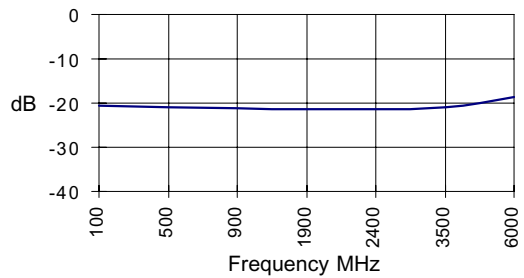


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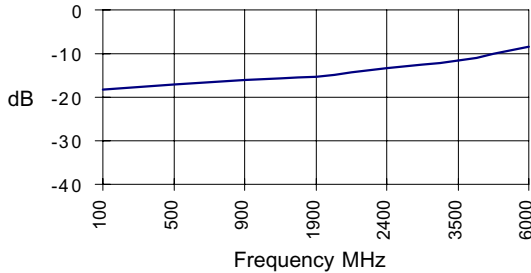
S21, Id =20mA, T=+25C



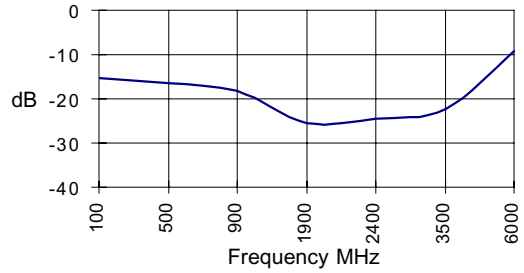
S12, Id =20mA, T=+25C



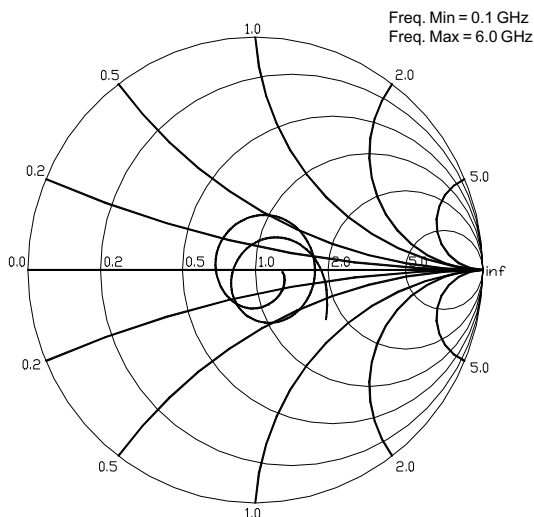
S11, Id =20mA, T=+25C



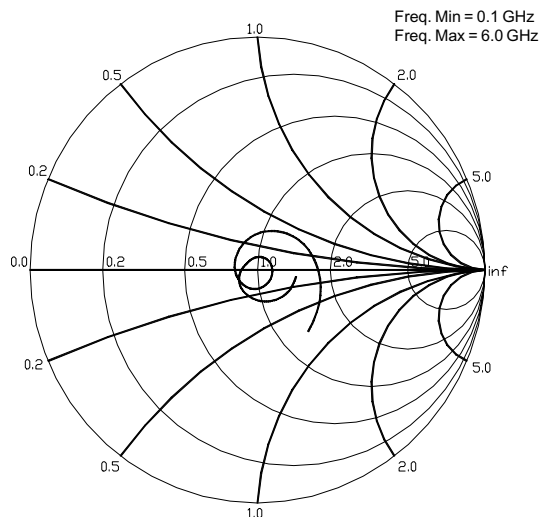
S22, Id =20mA, T=+25C



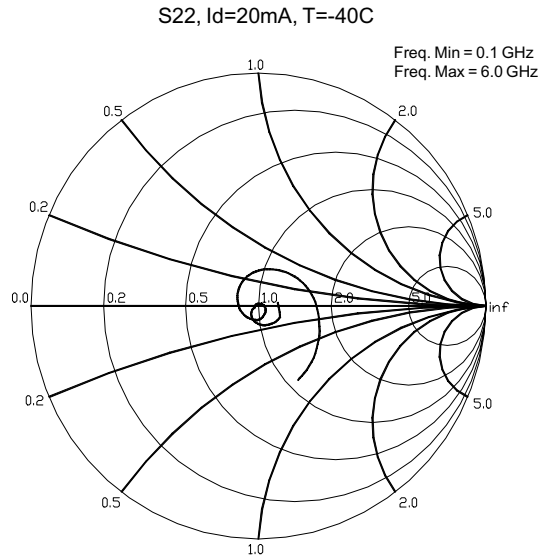
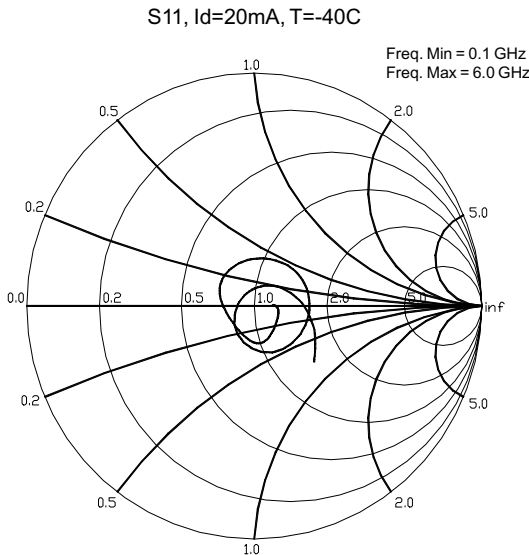
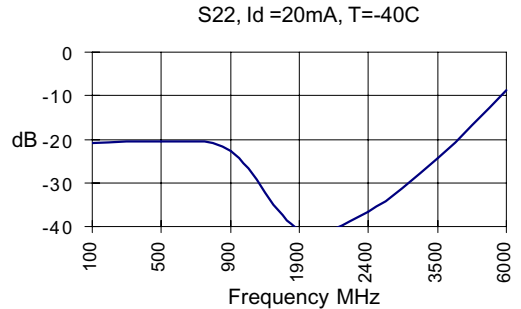
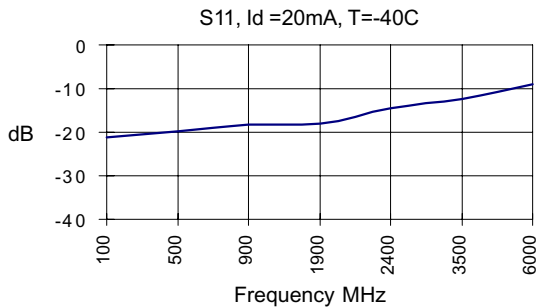
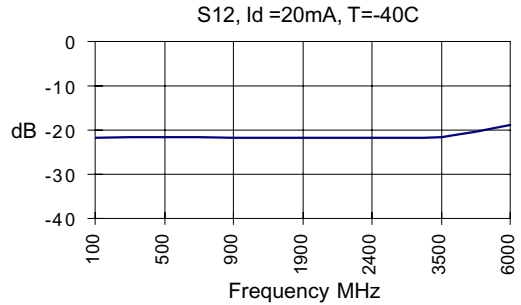
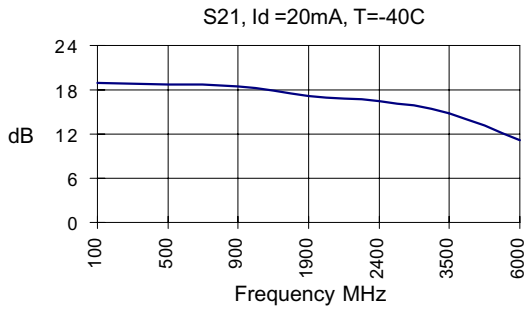
S11, Id=20mA, Ta= +25C



S22, Id=20mA, Ta= +25C

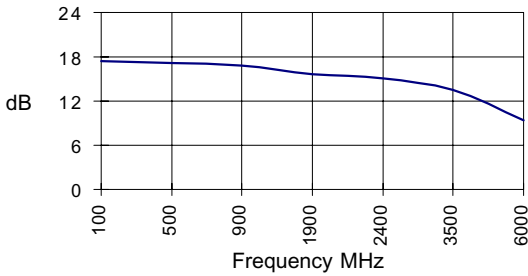


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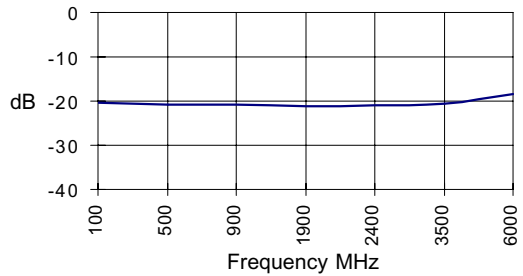


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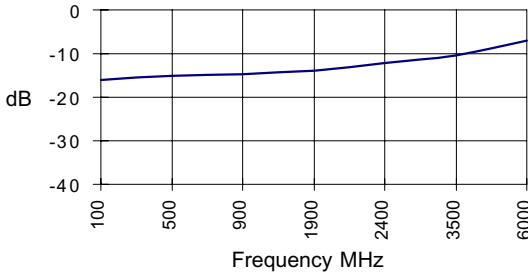
S21, Id =20mA, T=+85C



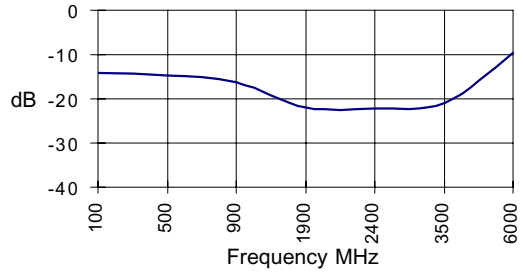
S12, Id =20mA, T=+85C



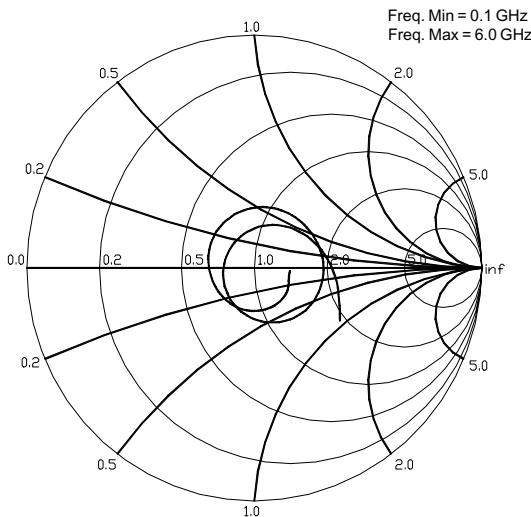
S11, Id =20mA, T=+85C



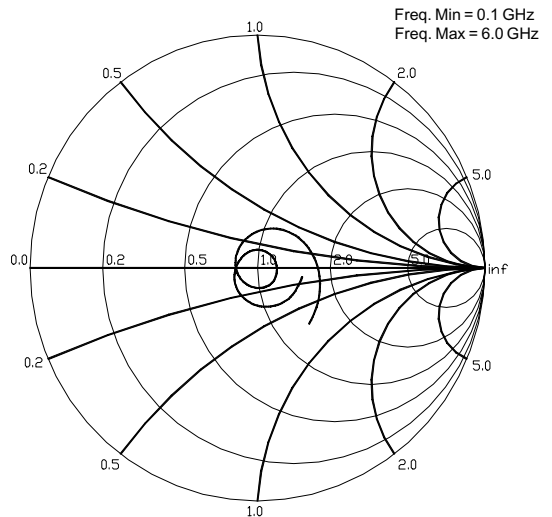
S22, Id =20mA, T=+85C



S11, Id=20mA, T=+85C



S22, Id=20mA, T=+85C



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### Absolute Maximum Ratings

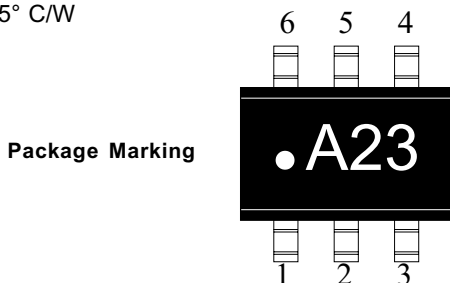
Parameter	Value	Unit
Supply Current	40	mA
Operating Temperature	-40 to +85	C
Maximum Input Power	+3	dBm
Storage Temperature Range	-40 to +85	C
Operating Junction Temperature	+125	C

#### Caution:



Operation of this device above any one of these parameters may cause permanent damage. Appropriate precautions in handling, packaging and testing devices must be observed.

Thermal Resistance (Lead-Junction):  
255° C/W



### Part Number Ordering Information

Part Number	Reel Size	Devices/Reel
SGA-2363-TR1	7"	3000

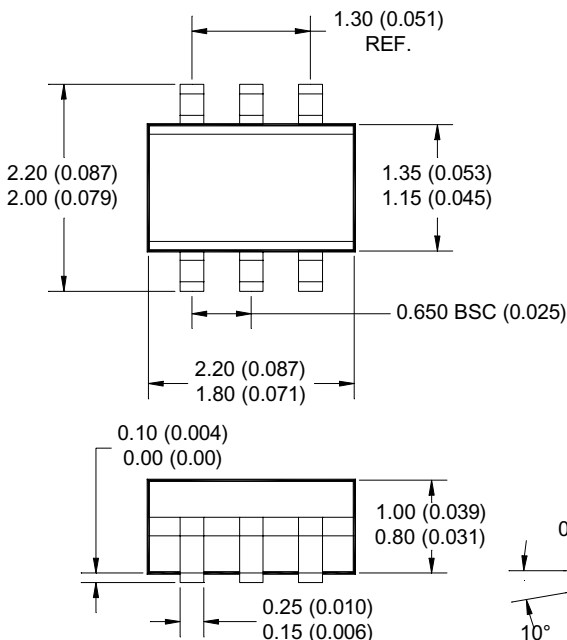
### Recommended Bias Resistor Values

Supply Voltage(Vs)	3V	5V	7.5V	9V	12V
Rbias (Ohms)	15	115	240	315	465

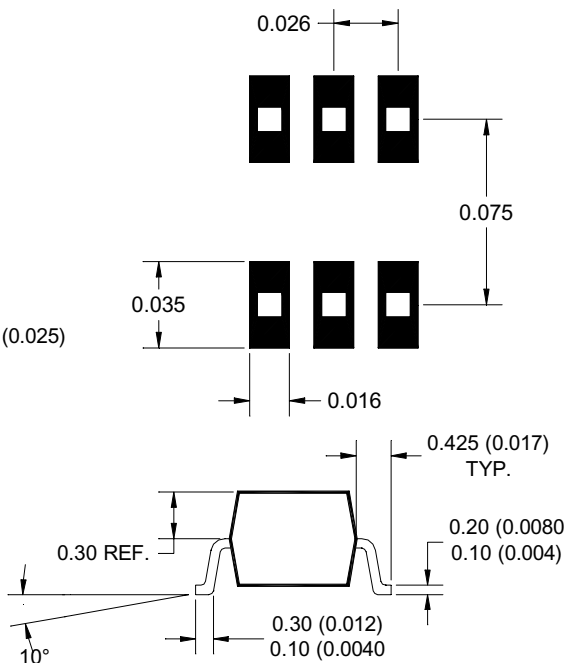
Pin Designation	
1	GND
2	GND
3	RF in
4	GND
5	GND
6	RF out

Note: Pin 1 is on lower left when you can read package marking

### Package Dimensions



### Pad Layout



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