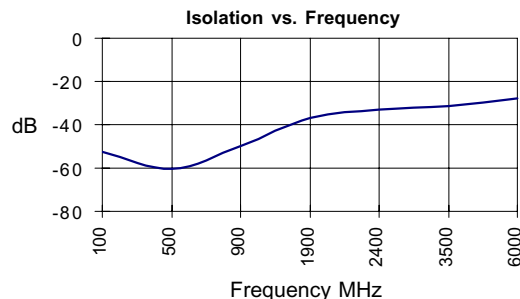


Product Description

Stanford Microdevices' SGA-1263 is a Silicon Germanium HBT Heterostructure Bipolar Transistor (SiGe HBT) amplifier that offers excellent isolation and flat gain response for applications to 4 GHz.

This RFIC is a 2-stage design that provides high isolation of up to 40dB at 2 GHz and is fabricated using the latest SiGe HBT 50 GHz F_T process, featuring 1 micron emitters with $V_{ceo} > 7V$.

These unconditionally stable amplifiers have less than 1dB gain drift over 125°C operating range (-40C to +85C) and are ideal for use as buffer amplifiers in oscillator applications covering cellular, ISM and narrowband PCS bands.



Preliminary

SGA-1263

DC-4000 MHz Silicon Germanium HBT Cascadeable Gain Block



Product Features

- DC-4000 MHz Operation
- Single Supply Voltage
- Excellent Isolation, >50 dB at 900 MHz
- 50 Ohms In/Out, Broadband Match for Operation from DC-4 GHz
- Unconditionally Stable

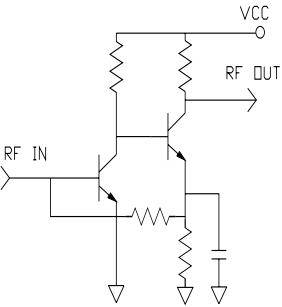
Applications

- Buffer Amplifier for Oscillator Applications
- Broadband Gain Blocks
- IF Amp

Symbol	Parameters: Test Conditions: $Z_0 = 50 \text{ Ohms}$, $I_d = 8 \text{ mA}$, $T = 25^\circ\text{C}$		Units	Min.	Typ.	Max.
P_{1dB}	Output Power at 1dB Compression	$f = 850 \text{ MHz}$ $f = 1950 \text{ MHz}$	dBm dBm		-7.8 -7.4	
S_{21}	Small Signal Gain	$f = \text{DC} - 1000 \text{ MHz}$ $f = 1000 - 2000 \text{ MHz}$ $f = 2000 - 4000 \text{ MHz}$	dB dB dB	14.3	15.9 15.2 12.3	
S_{12}	Reverse Isolation	$f = \text{DC} - 1000 \text{ MHz}$ $f = 1000 - 2000 \text{ MHz}$ $f = 2000 - 4000 \text{ MHz}$	dB dB dB		56.3 40.6 30.8	
S_{11}	Input VSWR	$f = \text{DC} - 2400 \text{ MHz}$ $f = 2400 - 4000 \text{ MHz}$	-		1.8:1 1.3:1	
S_{22}	Output VSWR	$f = \text{DC} - 2400 \text{ MHz}$ $f = 2400 - 4000 \text{ MHz}$	-		1.8:1 1.9:1	
IP_3	Third Order Intercept Point Power out per Tone = -20 dBm	$f = 850 \text{ MHz}$ $f = 1950 \text{ MHz}$	dBm dBm		2.6 2.8	
NF	Noise Figure	$f = \text{DC} - 1000 \text{ MHz}$ $f = 1000 - 2400 \text{ MHz}$	dB dB		2.7 2.9	
T_D	Group Delay	$f = 1000 \text{ MHz}$	pS		82	
V_D	Device Voltage		V	2.5	2.8	3.1

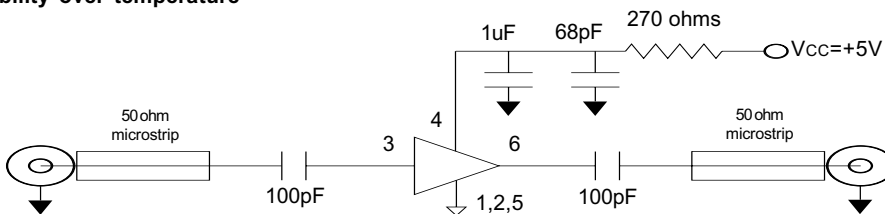
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Parameter	Specification			Unit	Test Condition
	Min	Typ.	Max.		
Bandwidth Frequency Range	DC		4000	MHz	T= 25C
Device Bias Operating Voltage Operating Current		2.8 8		V mA	T= 25C
500 MHz Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		16.0 2.7 4.0 -6.9 8.5 61.6		dB dB dBm dBm dB dB	T= 25C
850 MHz Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		15.7 2.7 2.6 -7.8 8.9 48.4		dB dB dBm dBm dB dB	T= 25C
1950 MHz Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		14.7 3.0 2.8 -7.4 8.8 35.6		dB dB dBm dBm dB dB	T= 25C
2400 MHz Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		14.2 2.8 0.2 -7.0 8.4 33.6		dB dB dBm dBm dB dB	T= 25C

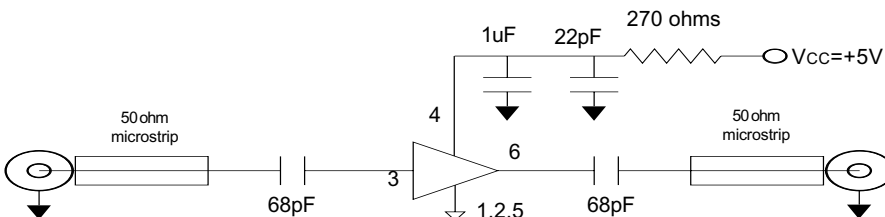
Pin #	Function	Description	Device Schematic
1	GND	Connection to ground. Use via holes for best performance to reduce lead inductance as close to ground leads as possible.	
2	GND	Sames as Pin 1	
3	RF IN	RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation.	
4	Vcc	Supply Connection. This pin should be bypassed with a suitable capacitor(s).	
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

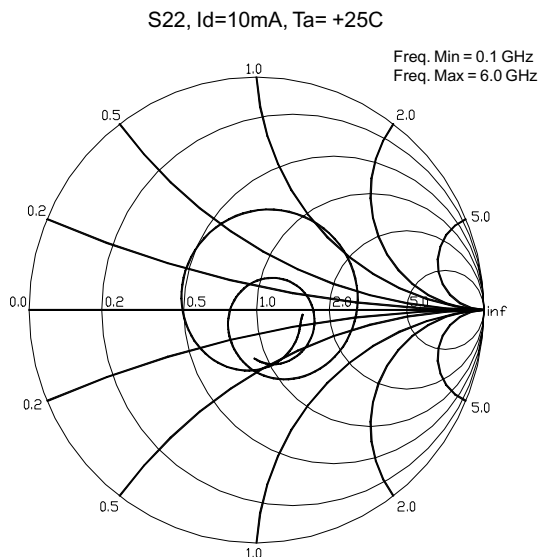
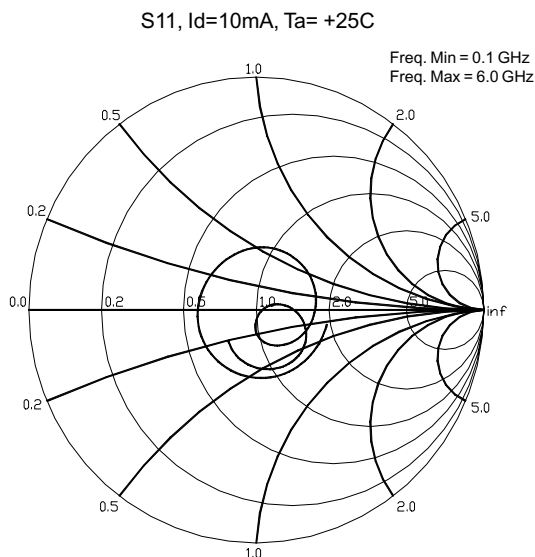
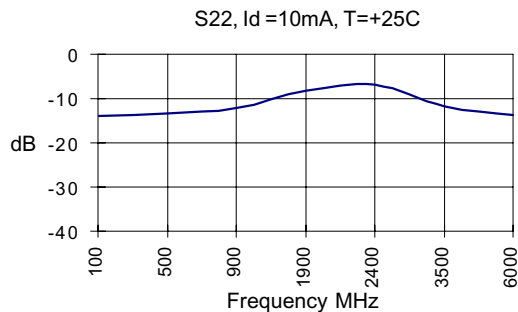
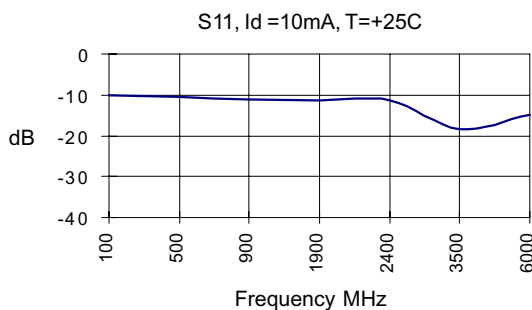
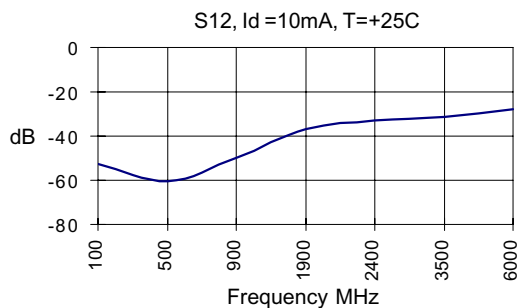
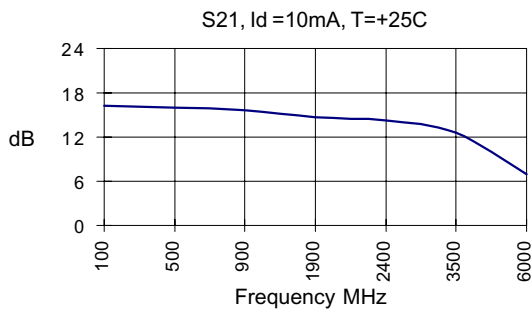
Note: A bias resistor is needed for stability over temperature



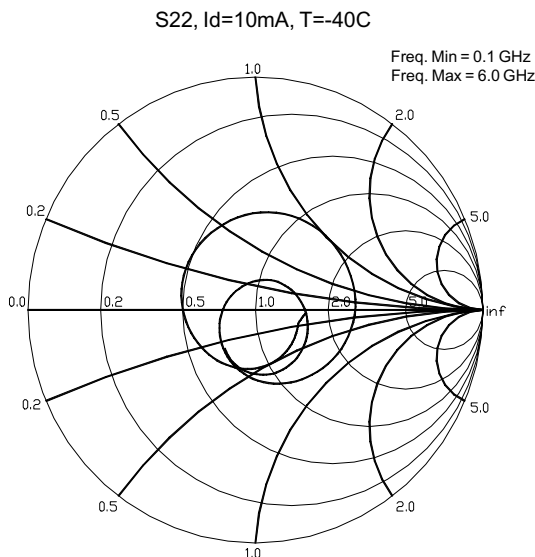
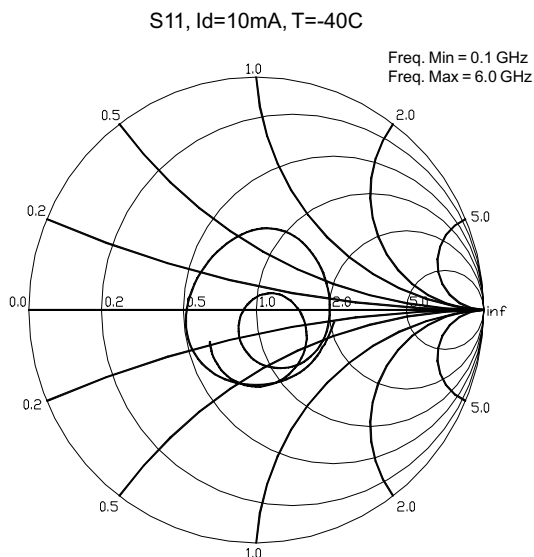
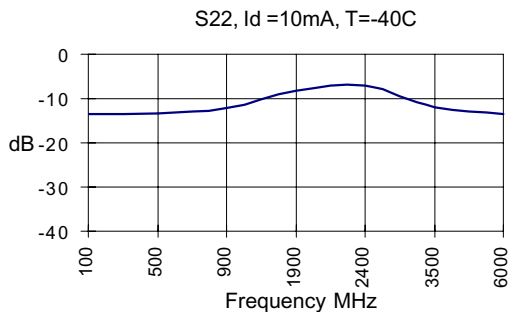
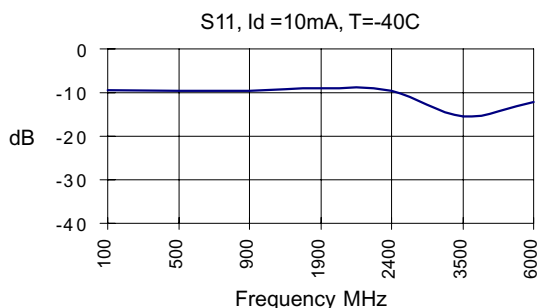
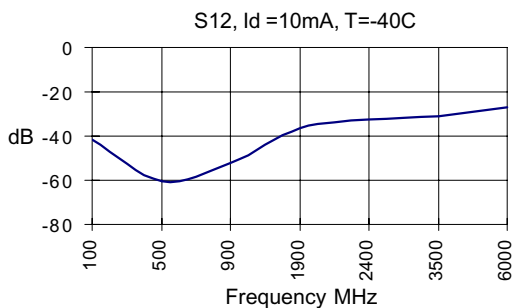
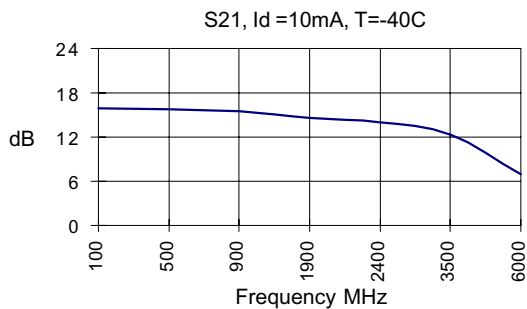
Application Schematic for +5V Operation at 1900 MHz



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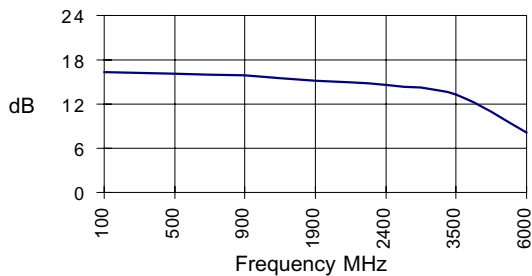


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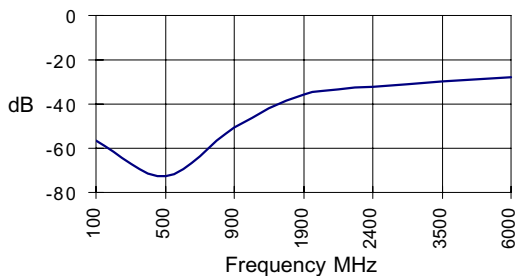


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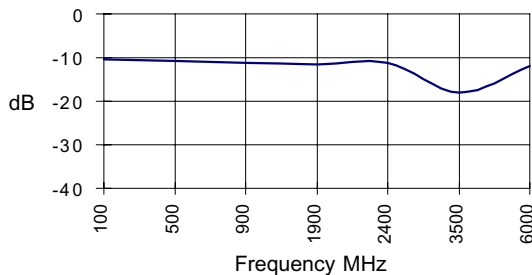
S21, Id = 10mA, T = +85C



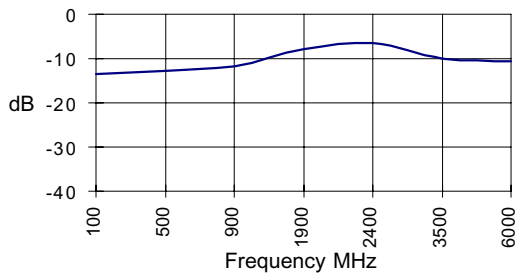
S12, Id = 10mA, T = +85C



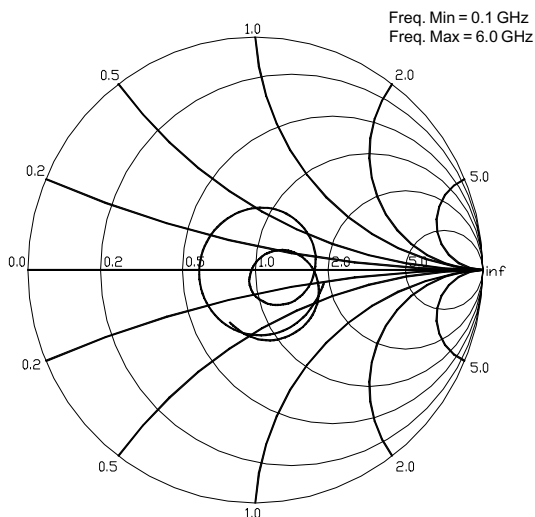
S11, Id = 10mA, T = +85C



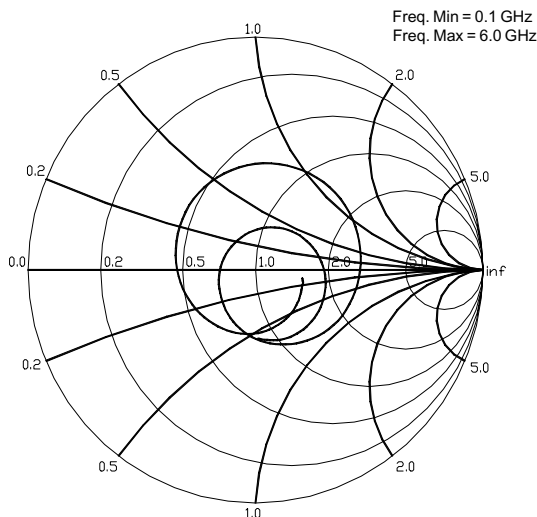
S22, Id = 10mA, T = +85C



S11, Id = 10mA, T = +85C



S22, Id = 10mA, T = +85C



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Absolute Maximum Ratings

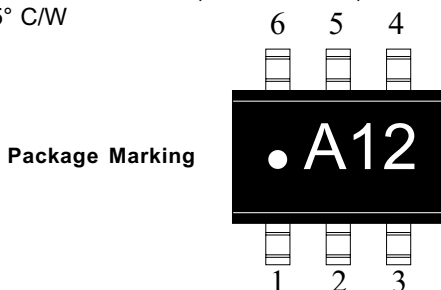
Parameter	Value	Unit
Supply Current	20	mA
Operating Temperature	-40 to +85	C
Maximum Input Power	-12	dBm
Storage Temperature Range	-40 to +85	C
Operating Junction Temperature	+125	C

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-1263-TR1	7"	3000

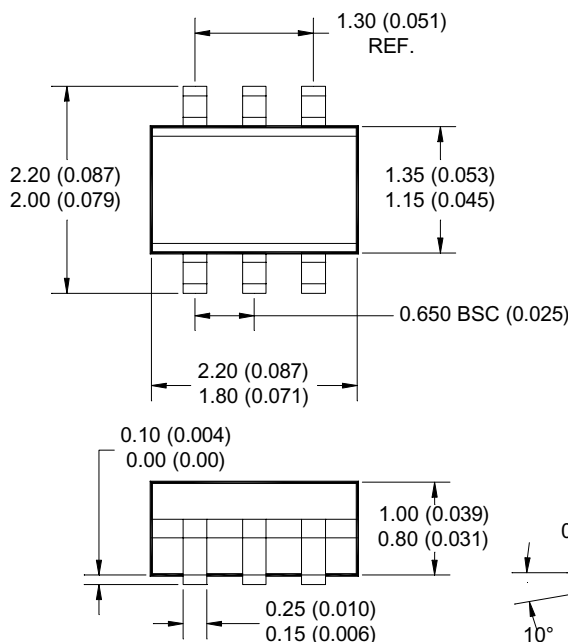
Recommended Bias Resistor Values

Supply Voltage(Vs)	3.6V	5V	7.5V	9V	12V
Rbias (Ohms)	100	275	588	775	1150

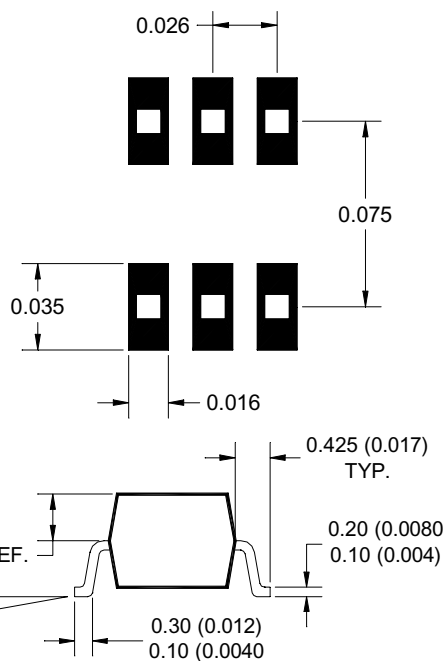
Pin Designation	
1	GND
2	GND
3	RF in
4	Vcc
5	GND
6	RF out

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

Package Dimensions



Pad Layout



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