Preliminary

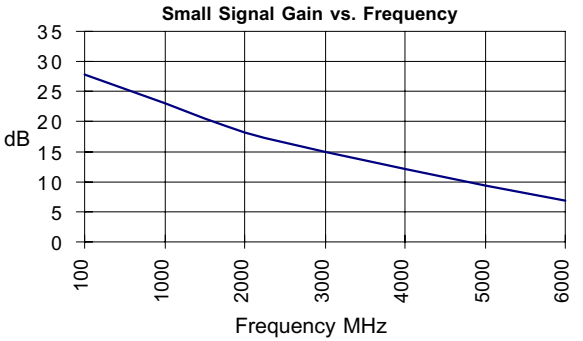
SGA-6586

DC-2500 MHz Silicon Germanium HBT Cascadeable Gain Block

Product Description

Stanford Microdevices' SGA-6586 is a high performance cascadeable 50-ohm amplifier housed in an low-cost surface-mountable plastic package. Designed for operation at voltages as low as 5.0V, 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-6586 requires only DC blocking and bypass capacitors for external components.



Product Features

- **DC-2500 MHz Operation**
- **Single Voltage Supply**
- **High Output Intercept: +34.0 dBm typ. at 850 MHz**
- **High Output Power : 21.5 dBm typ. at 850 MHz**
- **High Gain : 24.0 dB typ. at 850 MHz**
- **Internally Matched to 50 Ohms Input & Output**

Applications

- **Oscillator Amplifiers**
- **Final PA for Low Power Applications**
- **IF/ RF Buffer Amplifier**
- **Drivers for CATV Amplifiers**

Symbol	Parameters: Test Conditions: Z0 = 50 Ohms, Id = 80 mA, T = 25°C		Units	Min.	Typ.	Max.
P_{1dB}	Output Power at 1dB Compression	f = 850 MHz f = 1950 MHz	dBm dBm		21.5 18.1	
S_{21}	Small Signal Gain	f = DC - 1000 MHz f = 1000 - 2000 MHz f = 2000 - 2500 MHz	dB dB dB		25.6 20.3 17.2	
S_{12}	Reverse Isolation	f = DC - 1000 MHz f = 1000 - 2000 MHz f = 2000 - 2500 MHz	dB dB dB		27.8 23.3 20.2	
S_{11}	Input VSWR	f = DC - 2500 MHz	-		1.1:1	
S_{22}	Output VSWR	f = DC - 2500 MHz	-		1.2:1	
IP_3	Third Order Intercept Point Power out per tone = 3 dBm	f = 850 MHz f = 1950 MHz	dBm dBm		33.8 32.5	
NF	Noise Figure	f = DC - 1000 MHz f = 1000 - 2500 MHz	dB dB		2.6 3.4	
T_D	Group Delay	f = 1000 MHz	pS		163	
V_D	Device Voltage		V	4.6	5.0	5.4

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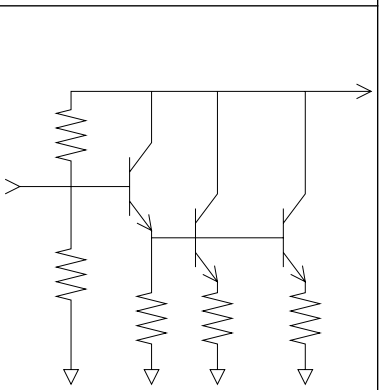
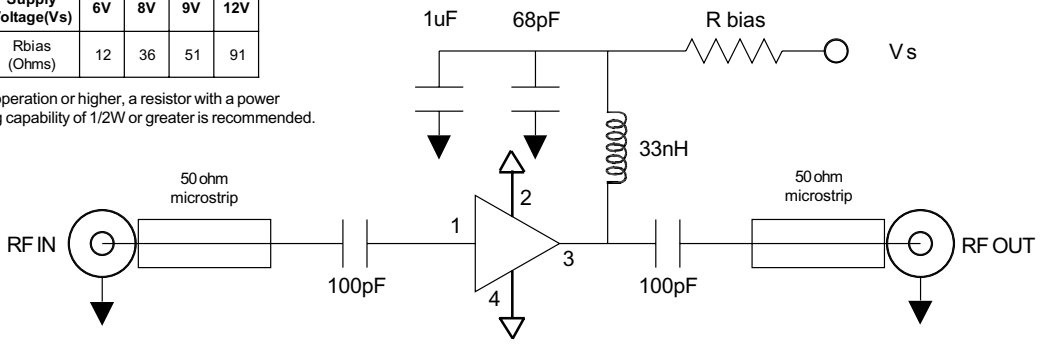
Parameter	Specification				Test Condition
	Min	Typ.	Max.	Unit	
Device Bias					T= 25C
Operating Voltage	4.6	5.0	5.4	V	
Operating Current		80.0		mA	
500 MHz					T= 25C
Gain	21.5	25.8		dB	
Noise Figure		2.5		dB	
Output IP3		32.2		dBm	
Output P1dB		20.9		dBm	
Input Return Loss		19.9		dB	
Isolation		28.0		dB	
850 MHz					T= 25C
Gain		23.8		dB	
Noise Figure		2.7		dB	
Output IP3		33.8		dBm	
Output P1dB		21.5		dBm	
Input Return Loss		23.3		dB	
Isolation		26.5		dB	
1950 MHz					T= 25C
Gain		18.4		dB	
Noise Figure		3.1		dB	
Output IP3		32.2		dBm	
Output P1dB		18.0		dBm	
Input Return Loss		23.7		dB	
Isolation		21.4		dB	
2400 MHz					T= 25C
Gain		16.7		dB	
Noise Figure		3.7		dB	
Output IP3		30.2		dBm	
Output P1dB		16.8		dBm	
Input Return Loss		18.2		dB	
Isolation		19.7		dB	

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

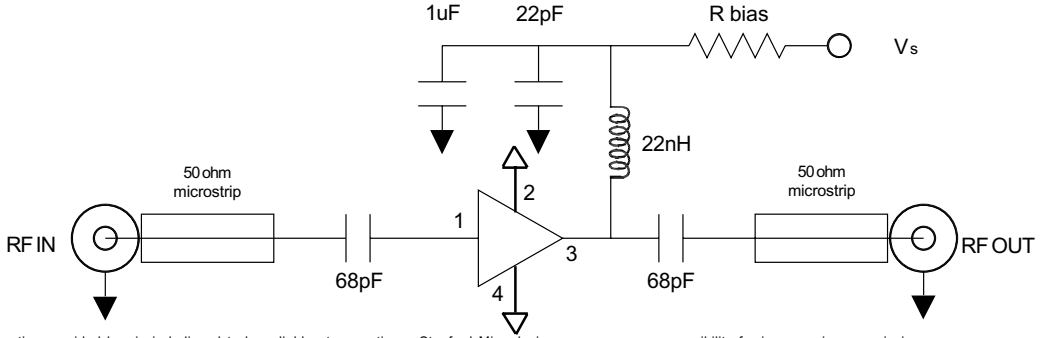
Application Schematic for Operation at 900 MHz

Recommended Bias Resistor Values				
Supply Voltage(Vs)	6V	8V	9V	12V
Rbias (Ohms)	12	36	51	91

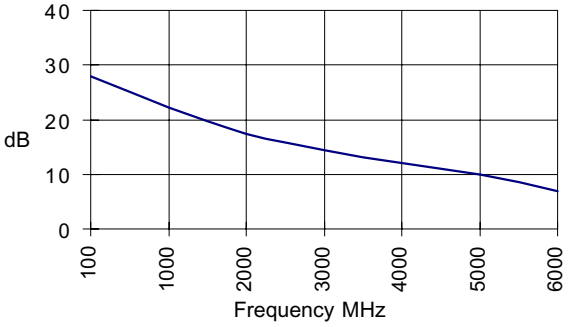
For 8V operation or higher, a resistor with a power handling capability of 1/2W or greater is recommended.



Application Schematic for Operation at 1900 MHz



S21, Id =80mA, T=25C



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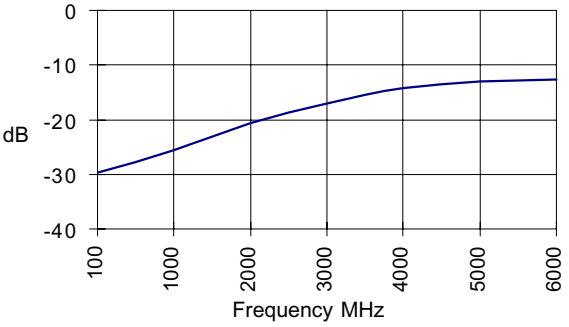
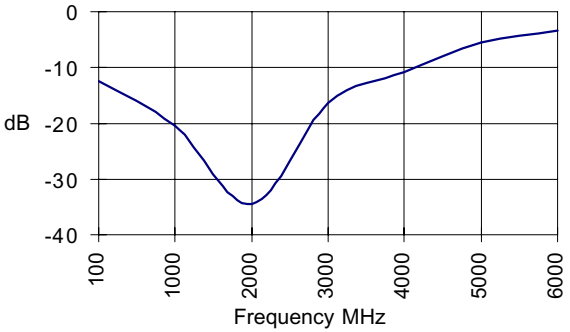


S11, Id =80mA, T=25C



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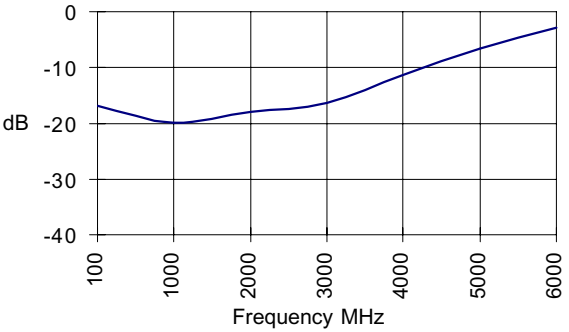
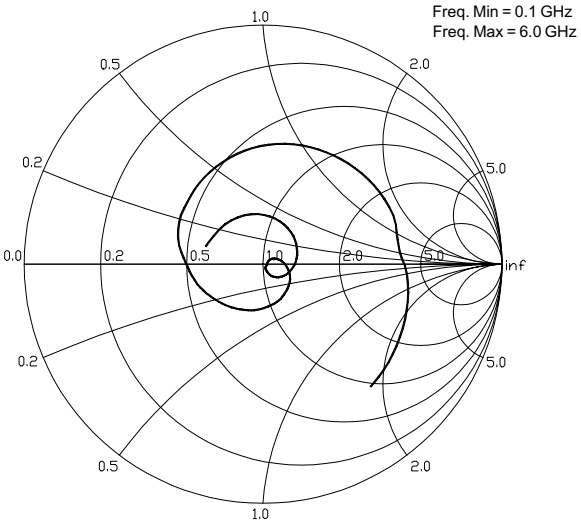


S11, Id=80mA, Ta=25C



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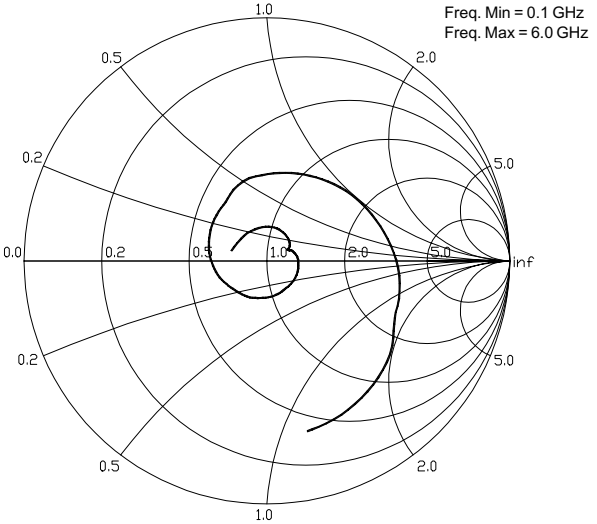

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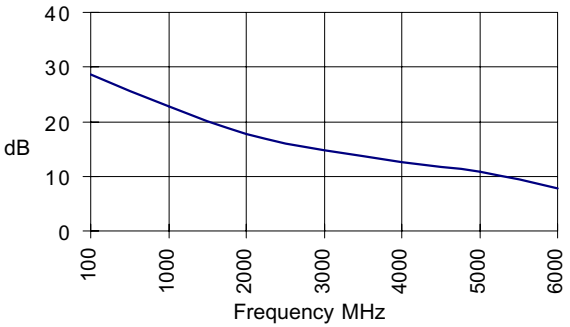

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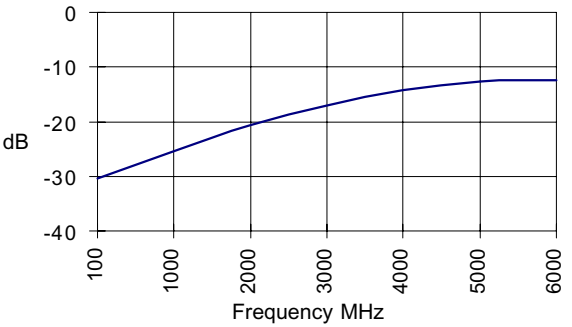

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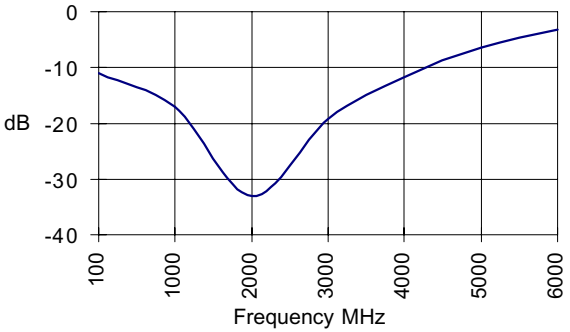

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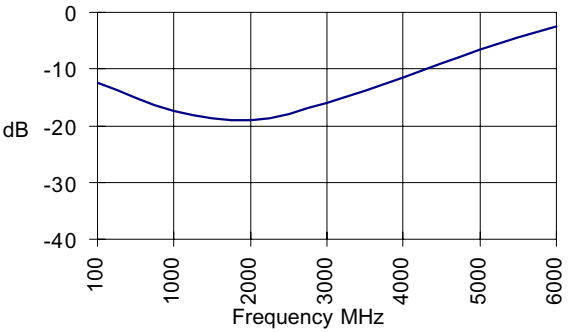

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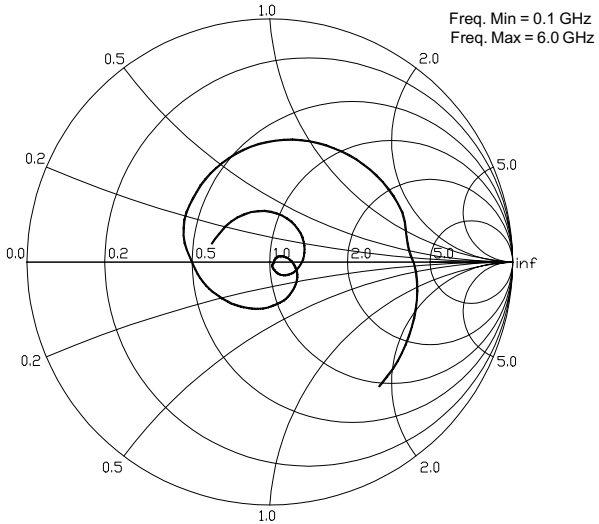

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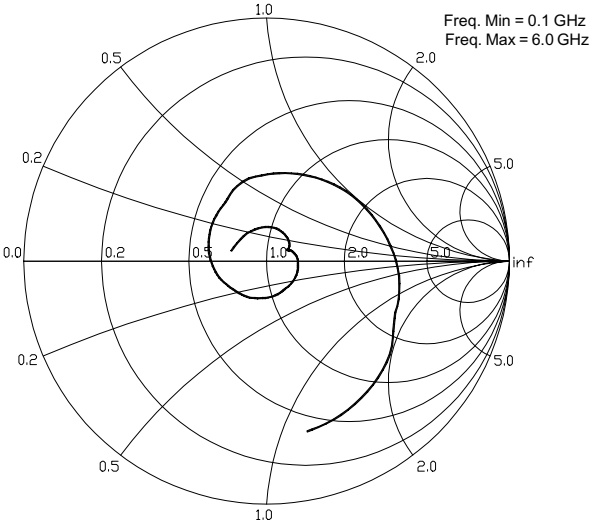

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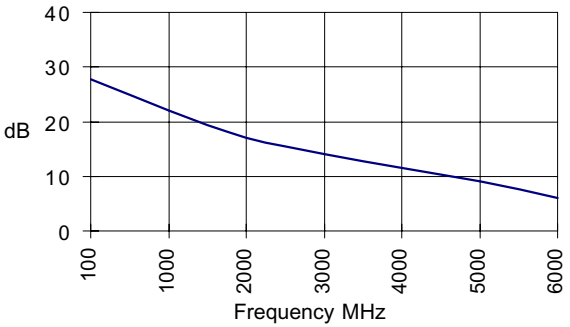

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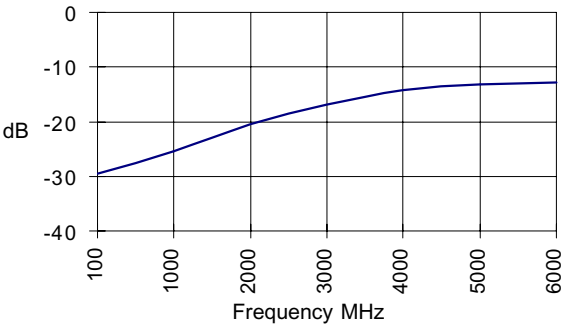

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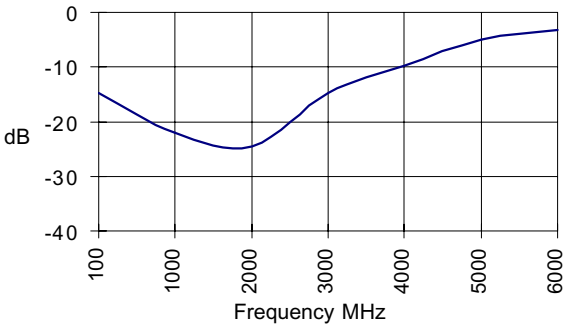

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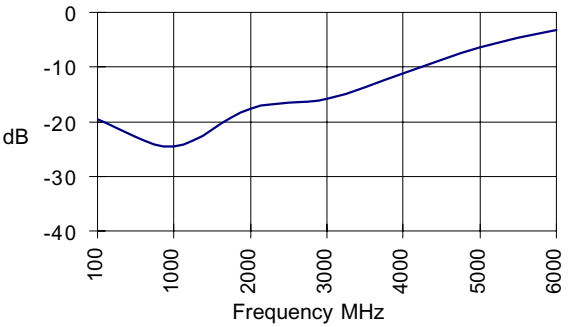

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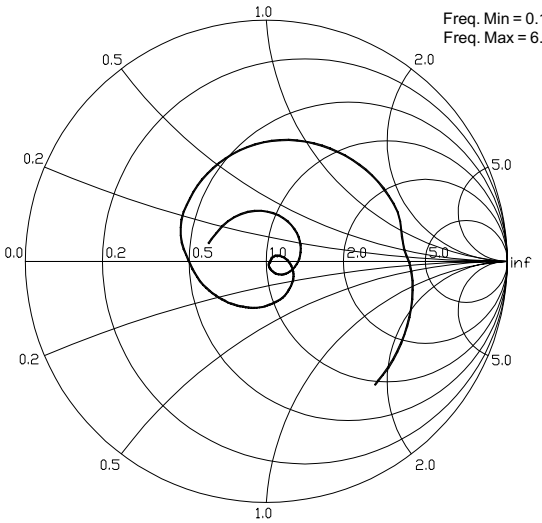

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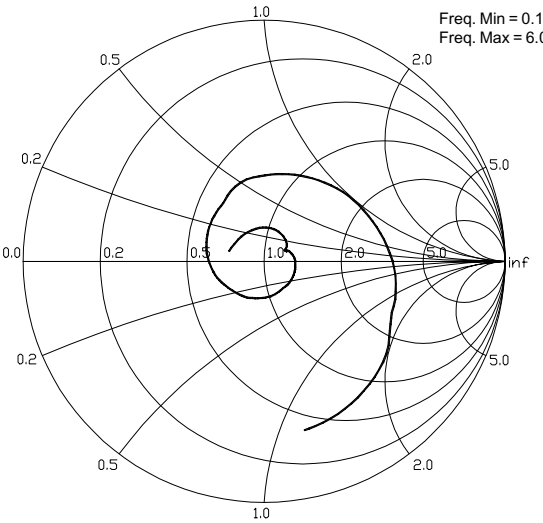


Absolute Maximum Ratings

Parameter	Value	Unit
Supply Current	160	mA
Operating Temperature	-40 to +85	C
Maximum Input Power	+6	dBm
Storage Temperature Range	-40 to +150	C
Operating Junction Temperature	+150	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.

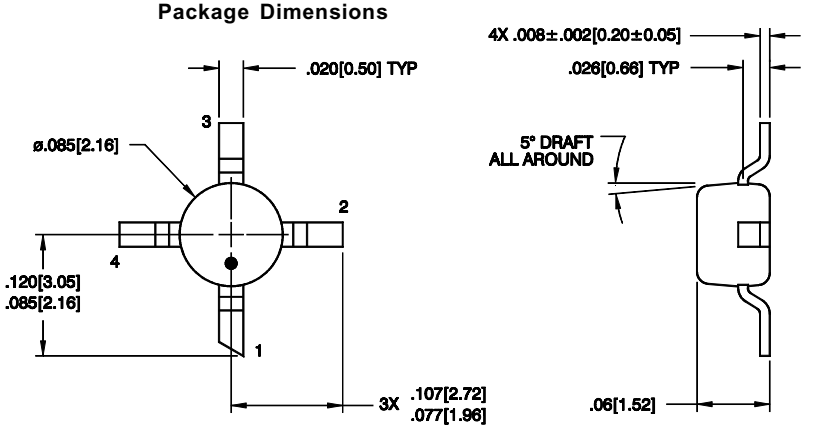
Thermal Resistance (Lead-Junction): 97° C/W

Part Number Ordering Information

Part Number	Reel Size	Devices/Reel
SGA-6586	13"	3000

Package Dimensions

Pin Designation	
1	RF in
2	GND
3	RF out and Bias
4	GND



PCB Pad Layout