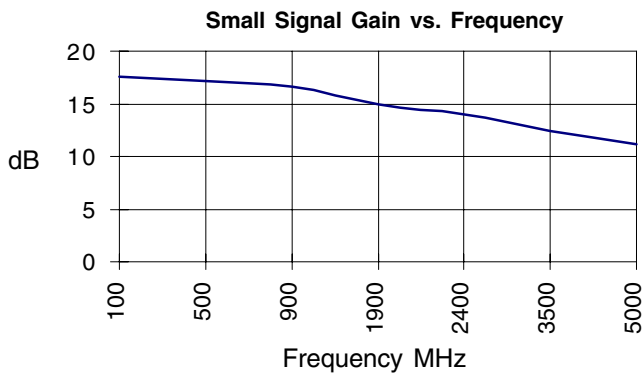


Product Description

Stanford Microdevices' SGA-5386 is a high performance cascadeable 50-ohm amplifier designed for operation at voltages as low as 3.6V. This RFIC uses the latest Silicon Germanium Heterostructure Bipolar Transistor (SiGe HBT) process featuring 1 micron emitters with F_T up to 65 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-5386 requires only DC blocking and bypass capacitors for external components.



Electrical Specifications at $T_a = 25^\circ\text{C}$

Symbol	Parameters: Test Conditions: $Z_0 = 50 \text{ Ohms}$, $f = \text{DC-3200MHz}$		Units	Min.	Typ.	Max.
P_{1dB}	Output Power at 1dB Compression	$f = 850 \text{ MHz}$ $f = 1950 \text{ MHz}$	dBm dBm		17.0 14.7	
S_{21}	Small Signal Gain	$f = \text{DC-1000 MHz}$ $f = 1000\text{-}2000 \text{ MHz}$ $f = 2000\text{-}5000 \text{ MHz}$	dB dB dB	15.0	17.2 16.6 15.5	
S_{12}	Reverse Isolation	$f = \text{DC-1000 MHz}$ $f = 1000\text{-}2000 \text{ MHz}$ $f = 2000\text{-}5000 \text{ MHz}$	dB dB dB		20.8 21.2 21.2	
VSWR	Input VSWR	$f = \text{DC-5000 MHz}$	-		1.25:1	
VSWR	Output VSWR	$f = \text{DC-5000 MHz}$	-		1.25:1	
IP_3	Third Order Intercept Point	$f = 850 \text{ MHz}$ $f = 1950 \text{ MHz}$	dBm dBm		31.0 29.0	
NF	Noise Figure	$f = \text{DC-1000 MHz}$ $f = 1000\text{-}2400 \text{ MHz}$	dB dB		3.5 4.0	
T_D	Group Delay	$f = 1000 \text{ MHz}$	pS		112.0	
V_D	Device Voltage		V	3.1	3.6	4.1
I_D	Device Current		mA		60.0	

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SGA-5386

DC-3200 MHz Silicon Germanium HBT Cascadeable Gain Block



Product Features

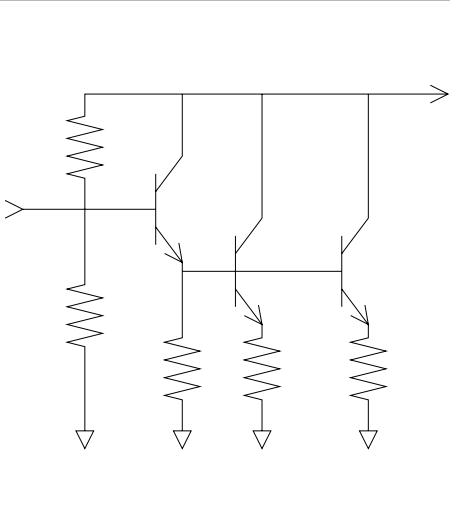
- DC-3200 MHz Operation
- Single Voltage Supply
- High Output Intercept: +31dBm typ. at 850 MHz
- Low Current Draw: 60mA at 3.6V typ.
- Low Noise Figure: 3.5dB typ. at 850 MHz

Applications

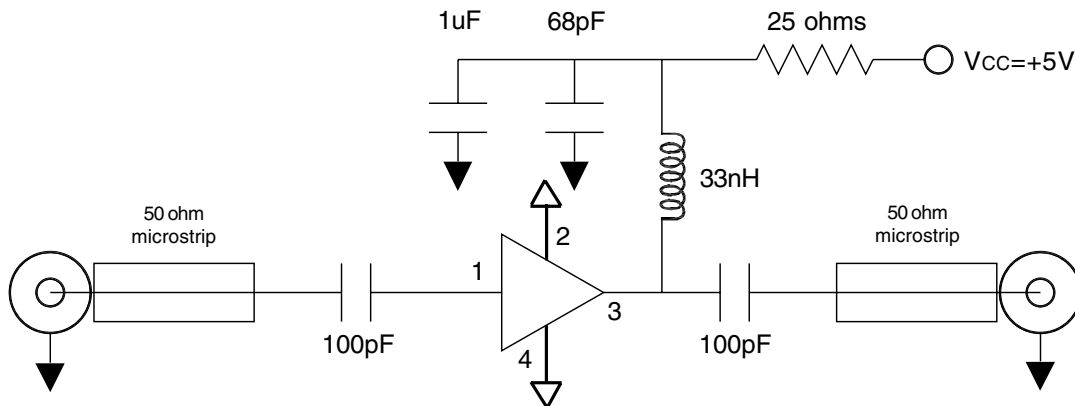
- Oscillator Amplifiers
- PA for Low Power Applications
- IF/ RF Buffer Amplifier
- Drivers for CATV Amplifiers

Parameter	Specification				Test Condition
	Min	Typ.	Max.	Unit	
Bandwidth Frequency Range	DC		3200	MHz	T= 25C
Device Bias Operating Voltage Operating Current		3.6 60.0		V mA	T= 25C
500 MHz Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		17.2 3.4 32.0 17.0 19.6 20.8		dB dB dBm dBm dB dB	T= 25C
850 MHz Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		16.6 3.5 32.0 17.0 16.9 21.1		dB dB dBm dBm dB dB	T= 25C
1950 MHz Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		14.9 4.0 29.0 14.7 18.0 21.3		dB dB dBm dBm dB dB	T= 25C
2400 MHz Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		14.0 4.1 27.0 13.6 15.8 21.2		dB dB dBm dBm dB dB	T= 25C

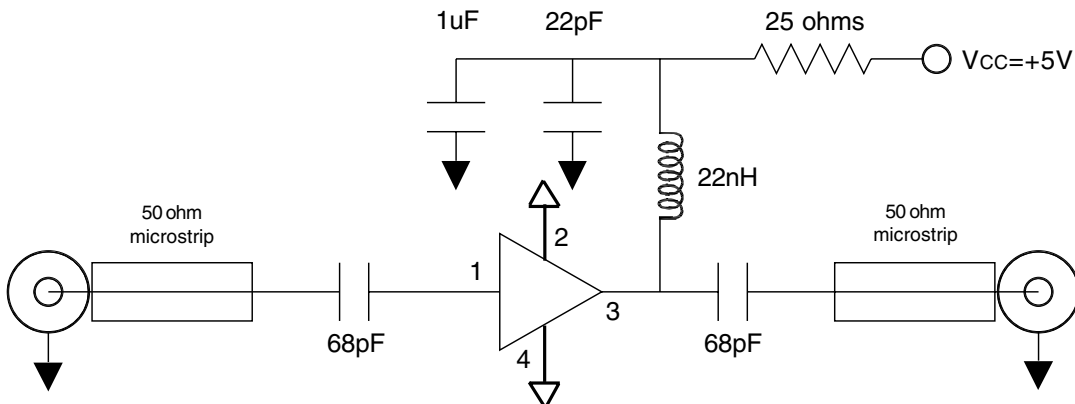
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Pin #	Function	Description	Device Schematic
1	RF IN	RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation.	
2	GND	Connection to ground. Use via holes for best performance to reduce lead inductance 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	

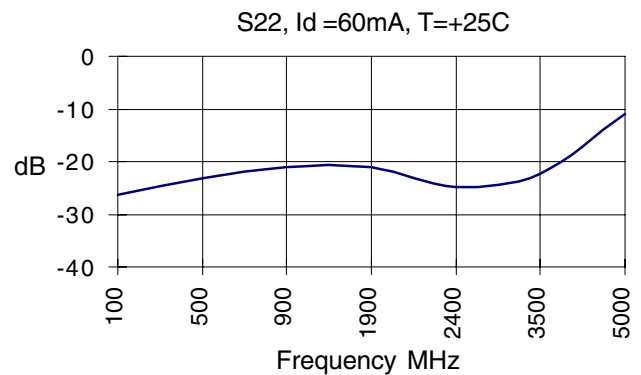
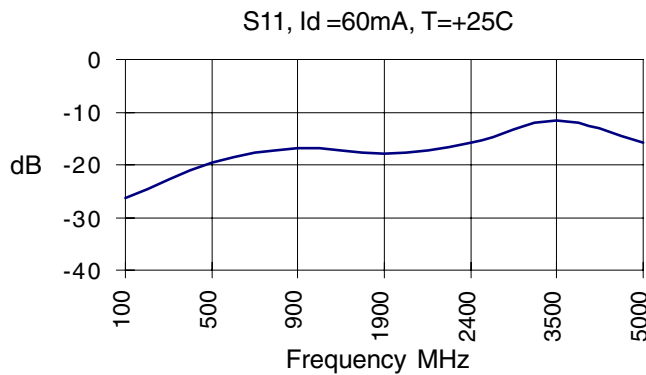
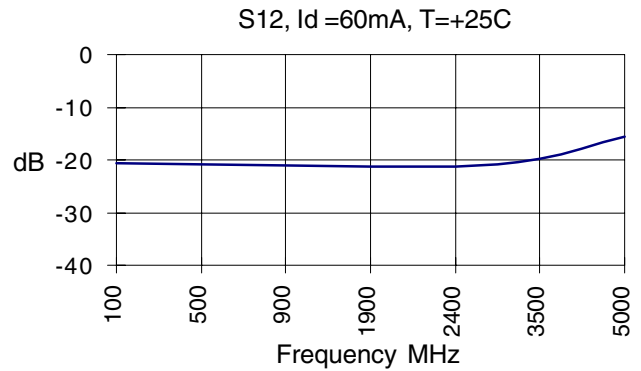
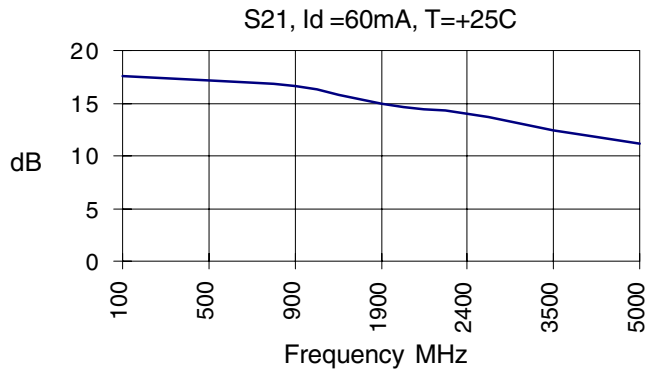
Application Schematic for +5V Operation at 900 MHz



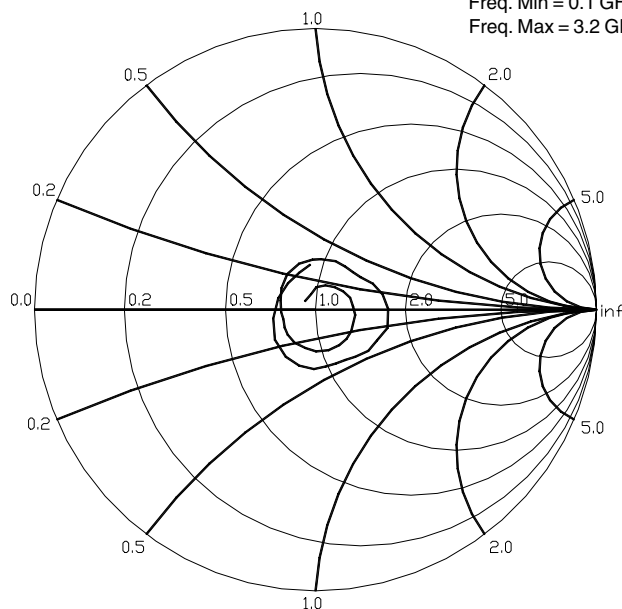
Application Schematic for +5V Operation at 1900 MHz



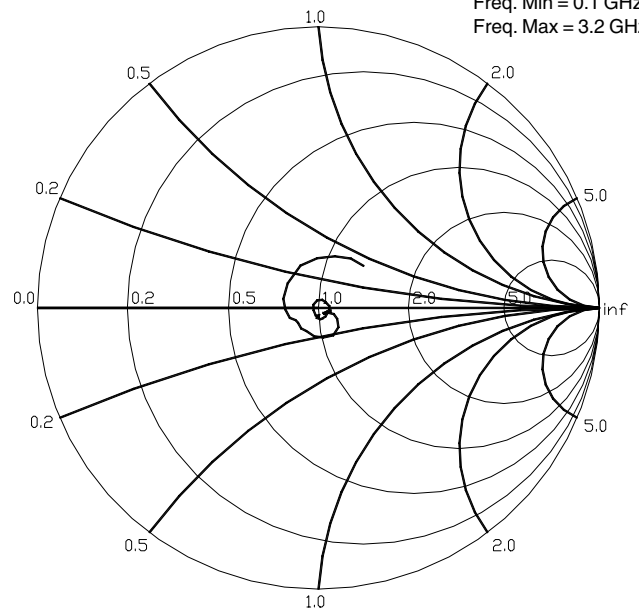
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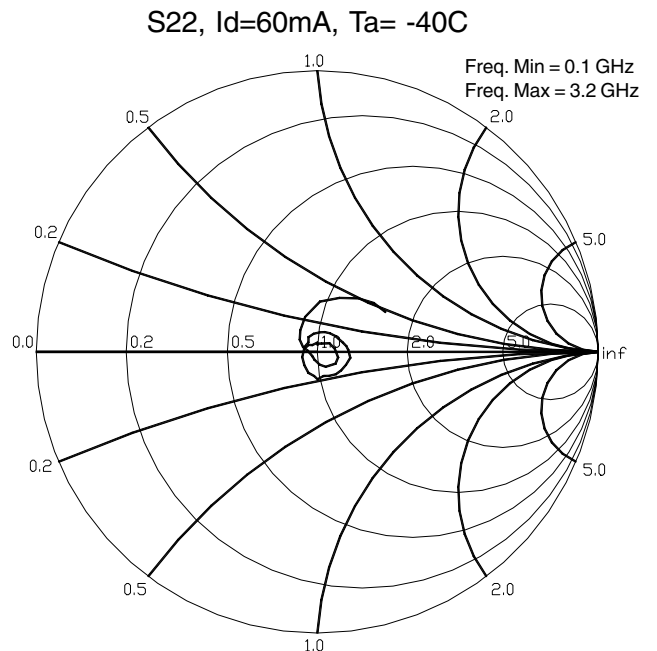
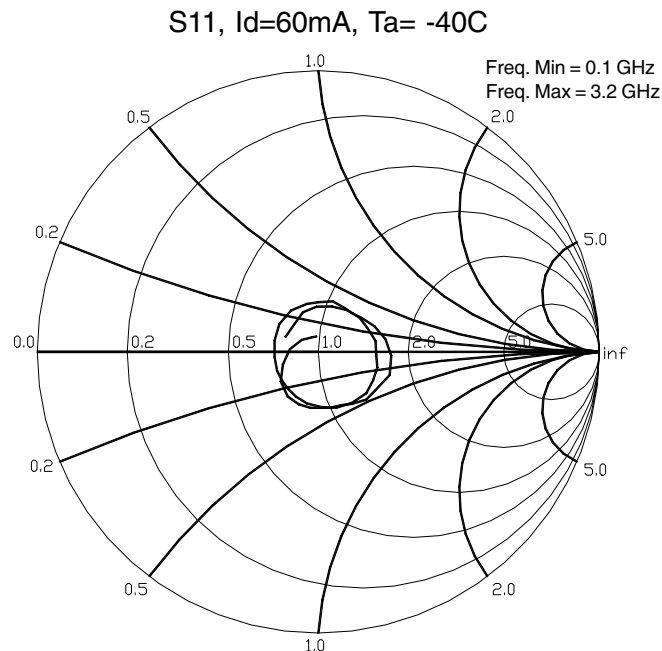
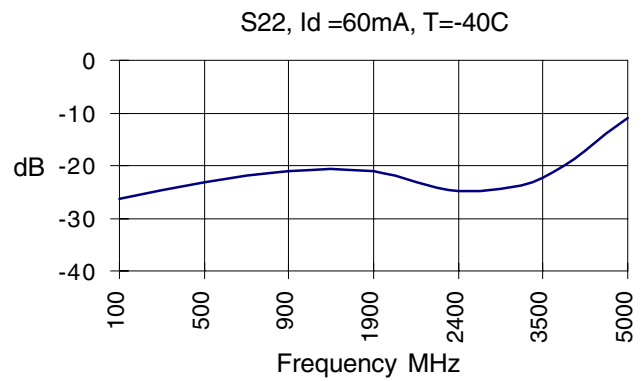
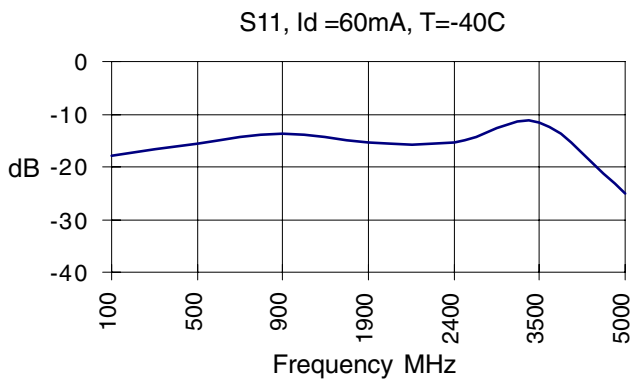
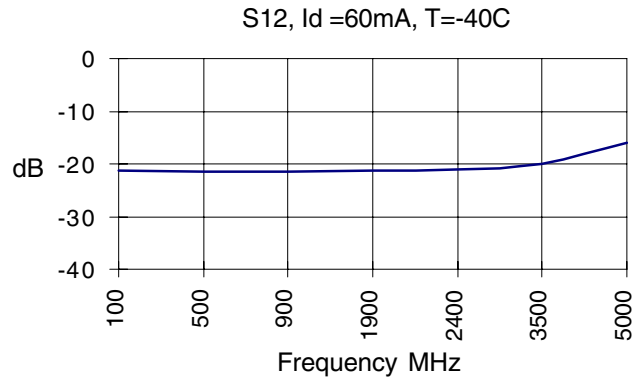
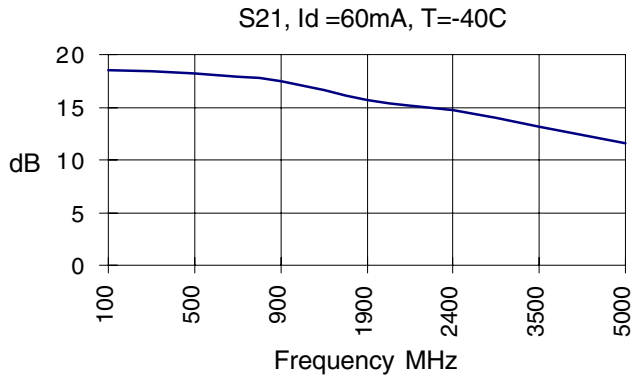
S11, Id=60mA, Ta= +25C
Freq. Min = 0.1 GHz
Freq. Max = 3.2 GHz



S22, Id=60mA, Ta= +25C
Freq. Min = 0.1 GHz
Freq. Max = 3.2 GHz

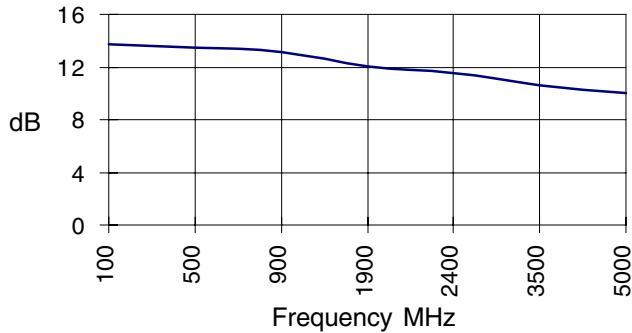


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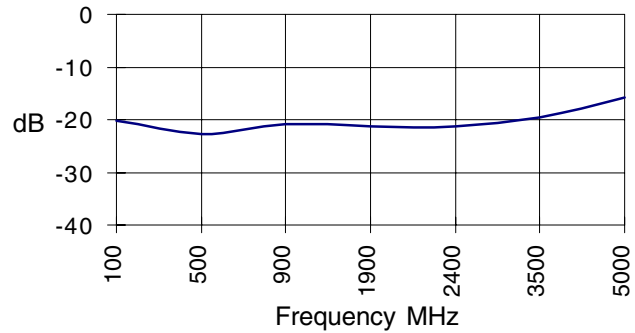


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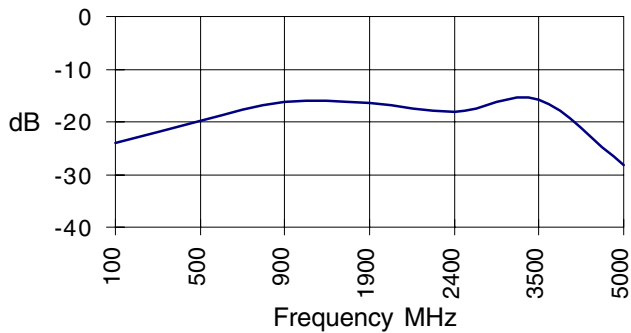
S21, Id =60mA, T=85C



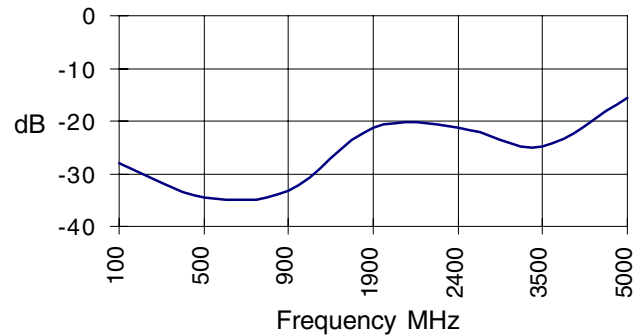
S12, Id =60mA, T=85C



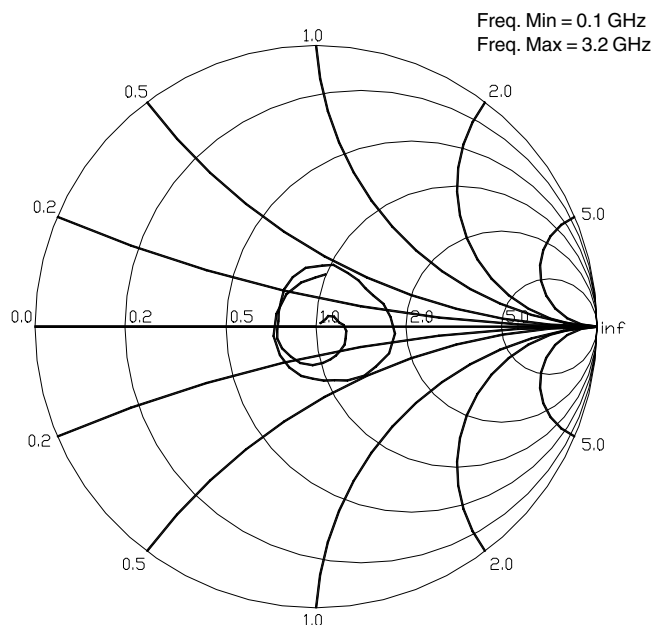
S11, Id =60mA, T=85C



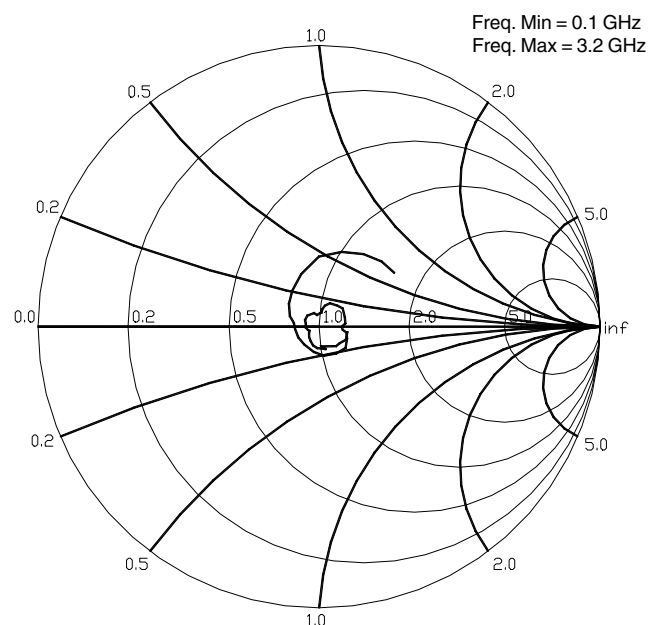
S22, Id =60mA, T=85C



S11, Id=60mA, Ta= 85C



S22, Id=60mA, Ta= 85C



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Absolute Maximum Ratings

Parameter	Value	Unit
Supply Current	120	mA
Operating Temperature	-40 to +85	C
Maximum Input Power	+10	dBm
Storage Temperature Range	-40 to +85	C
Operating Junction Temperature	+150	C

Part Number Ordering Information

Part Number	Reel Size	Devices/Reel
SGA-5386-TR1	7"	1000
SGA-5386-TR2	13"	3000

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

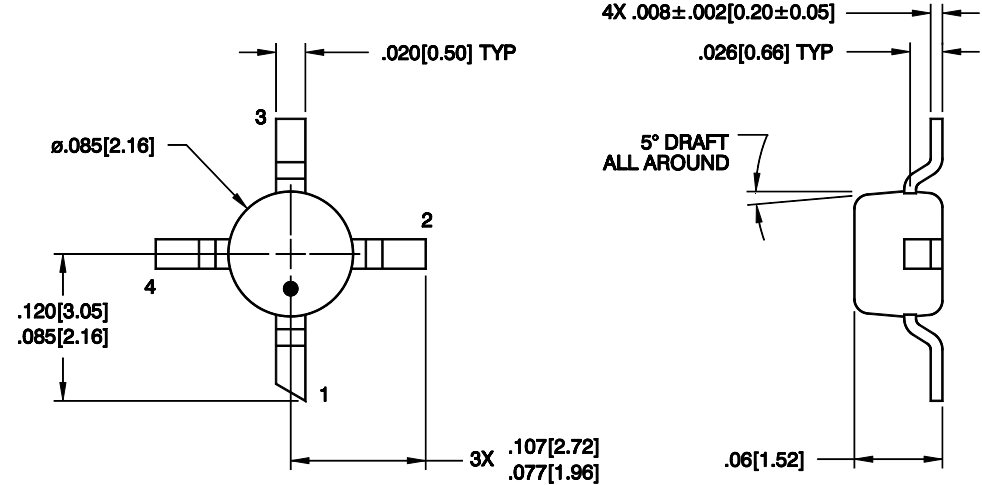
Recommended Bias Resistor Values

Supply Voltage(Vs)	4V	5V	7.5V	9V	12V
Rbias (Ohms)	8	25	67	92	142

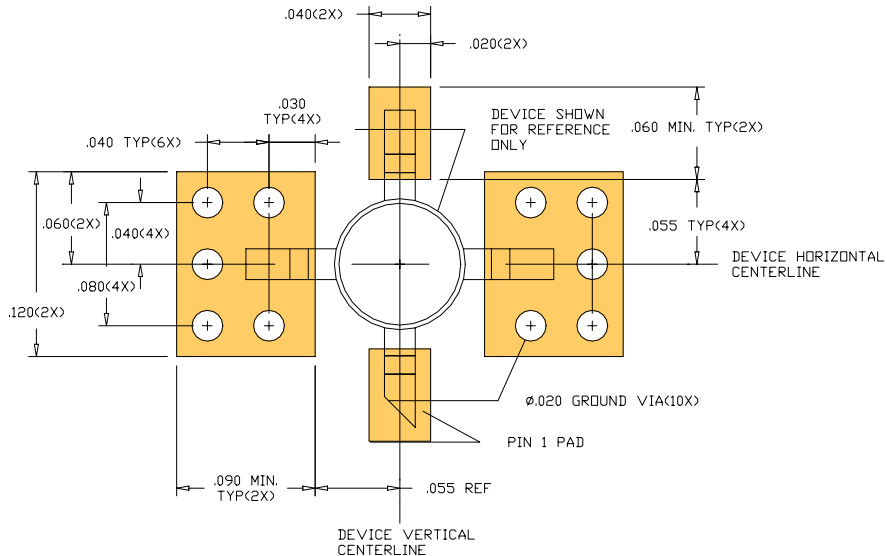
For 7.5V operation or higher, a resistor with a power handling capability of 1/2W or greater is recommended.

Package Dimensions

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



PCB Pad Layout



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