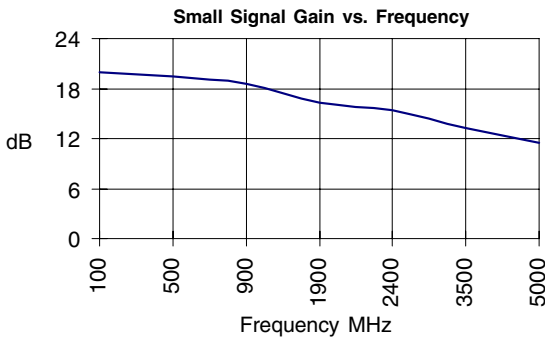


## Product Description

Stanford Microdevices' SGA-5486 is a high performance cascadeable 50-ohm amplifier designed for operation at voltages as low as 3.5V. 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-5486 requires only DC blocking and bypass capacitors for external components.



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

Symbol	Parameters: Test Conditions: $Z_0 = 50 \text{ Ohms}$ , $f = \text{DC-2400 MHz}$	Units	Min.	Typ.	Max.
$P_{1dB}$	Output Power at 1dB Compression	$f = 850 \text{ MHz}$ $f = 1950 \text{ MHz}$	dBm dBm		17.0 15.0
$S_{21}$	Small Signal Gain	$f = \text{DC-1000 MHz}$ $f = 1000\text{-}2000 \text{ MHz}$ $f = 2000\text{-}5000 \text{ MHz}$	dB dB dB	17.5	19.7 17.3 13.5
$S_{12}$	Reverse Isolation	$f = \text{DC-1000 MHz}$ $f = 1000\text{-}2000 \text{ MHz}$ $f = 2000\text{-}5000 \text{ MHz}$	dB dB dB		22.5 23.0 18.0
$S_{11}$	Input VSWR	$f = \text{DC-5000 MHz}$	-		1.50:1
$S_{22}$	Output VSWR	$f = \text{DC-5000 MHz}$	-		1.50:1
$IP_3$	Third Order Intercept Point	$f = 850 \text{ MHz}$ $f = 1950 \text{ MHz}$	dBm dBm		32.0 28.0
NF	Noise Figure	$f = \text{DC-1000 MHz}$ $f = 1000\text{-}2400 \text{ MHz}$	dB dB		3.0 3.5
$T_D$	Group Delay	$f = 1000 \text{ MHz}$	pS		121.0
$V_D$	Device Voltage		V	3.1	3.5 3.9
$I_D$	Device Current		mA		60.0

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## SGA-5486

### DC-2400 MHz Silicon Germanium HBT Cascadeable Gain Block



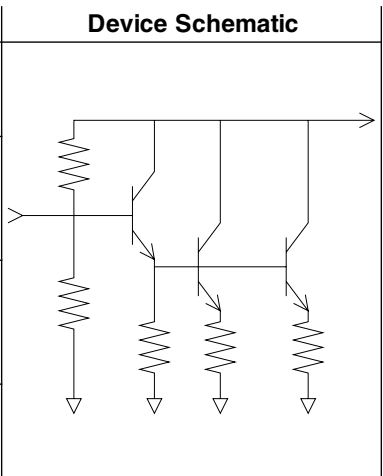
### Product Features

- DC-2400 MHz Operation
- Single Voltage Supply
- High Output Intercept: +32.0dBm typ. at 850 MHz
- Low Current Draw: 60mA at 3.5V typ.
- Low Noise Figure: 3.0dB typ. at 850 MHz

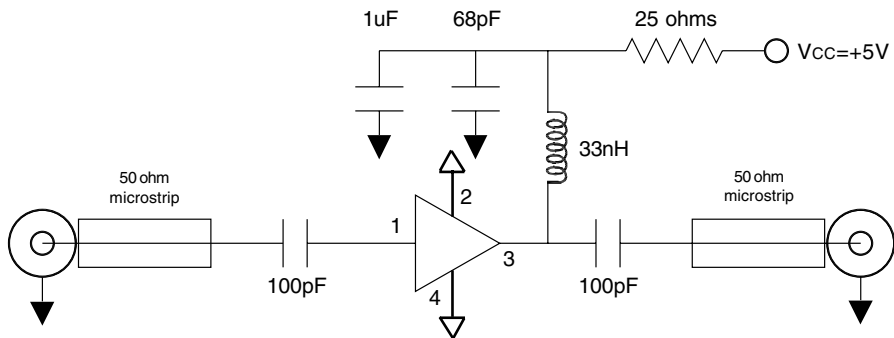
### Applications

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

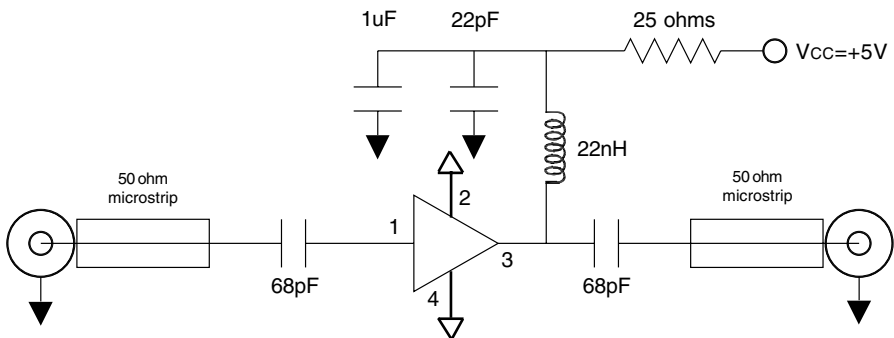
Parameter	Specification				Test Condition
	Min	Typ.	Max.	Unit	
<b>Bandwidth</b> Frequency Range	DC		2400	MHz	T= 25C
<b>Device Bias</b> Operating Voltage Operating Current		3.5 60.0		V mA	T= 25C
<b>500 MHz</b> Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		19.5 3.0 31.6 17.0 19.5 22.6		dB dB dBm dBm dB dB	T= 25C
<b>850 MHz</b> Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		18.8 3.1 32.0 17.0 13.3 22.9		dB dB dBm dBm dB dB	T= 25C
<b>1950 MHz</b> Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		16.3 3.6 28.0 15.0 13.7 22.9		dB dB dBm dBm dB dB	T= 25C
<b>2400 MHz</b> Gain Noise Figure Output IP3 Output P1dB Input Return Loss Isolation		15.4 3.7 26.0 13.6 16.8 22.0		dB dB dBm dBm dB dB	T= 25C

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	

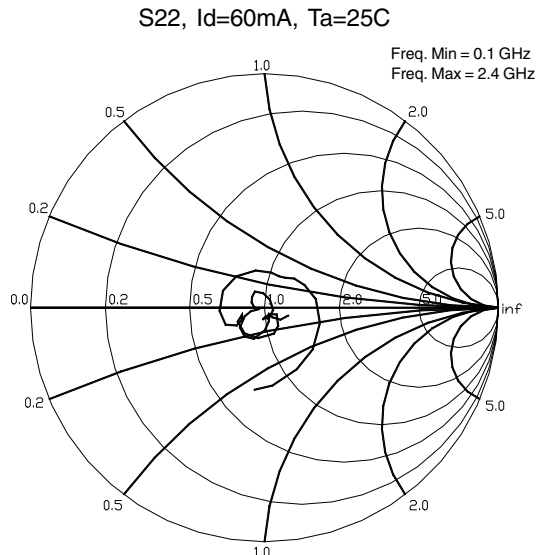
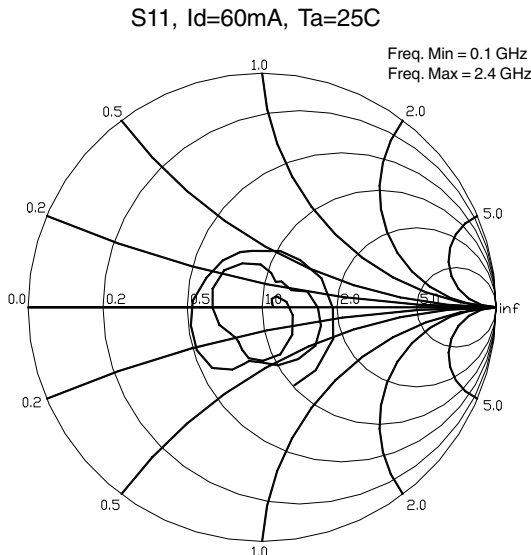
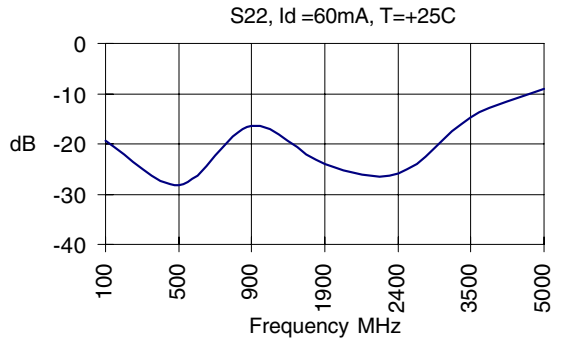
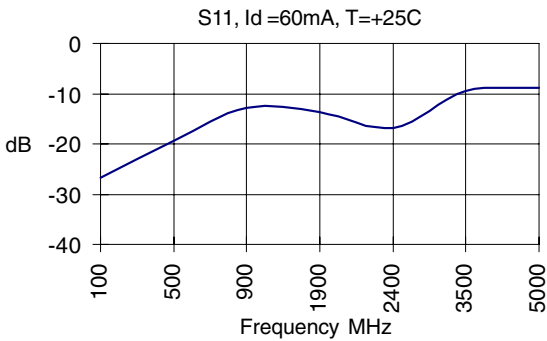
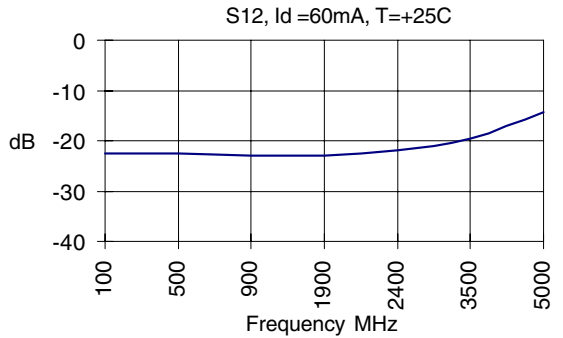
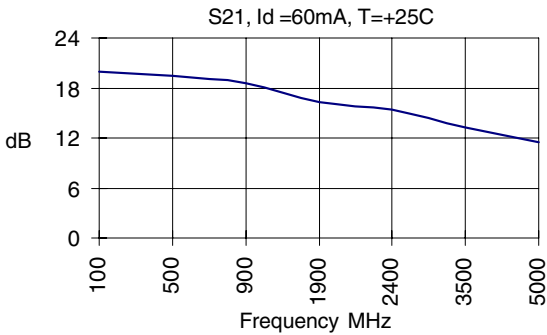
**Application Schematic for +5V Operation at 900 MHz**



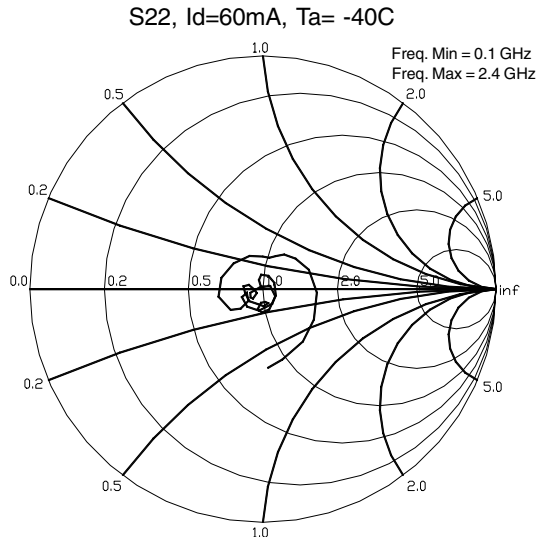
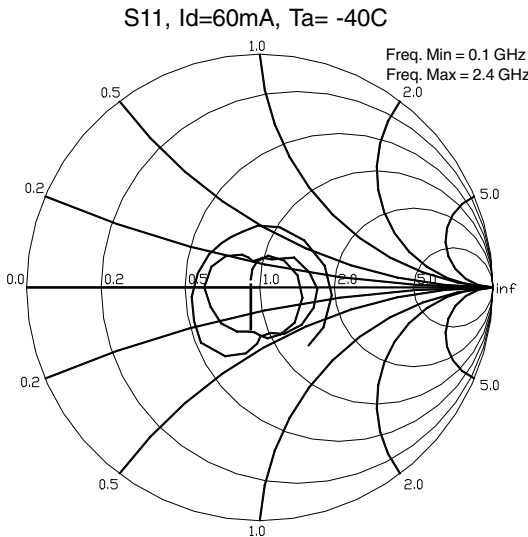
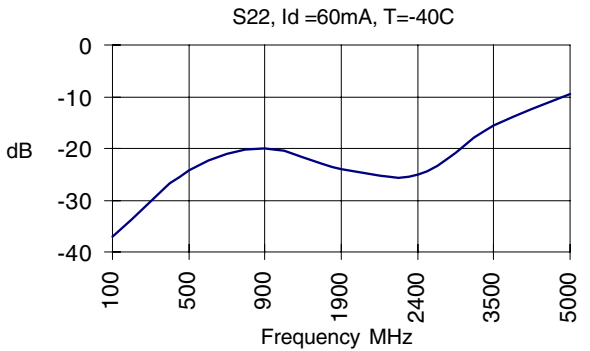
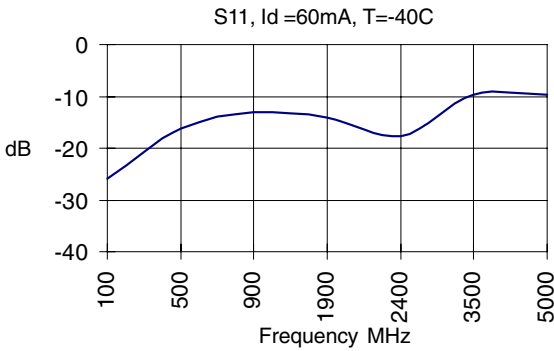
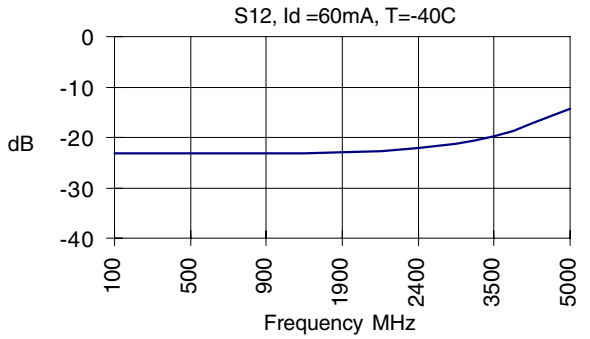
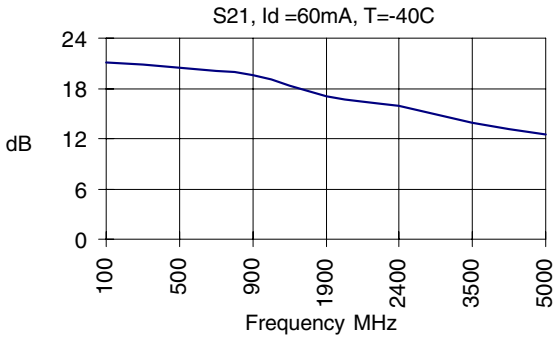
**Application Schematic for +5V Operation at 1900 MHz**



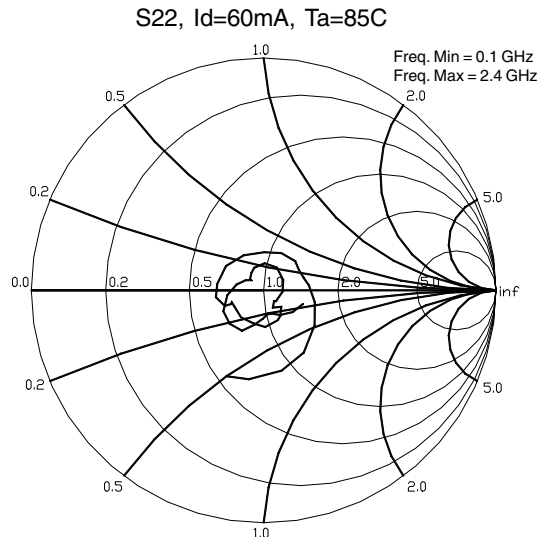
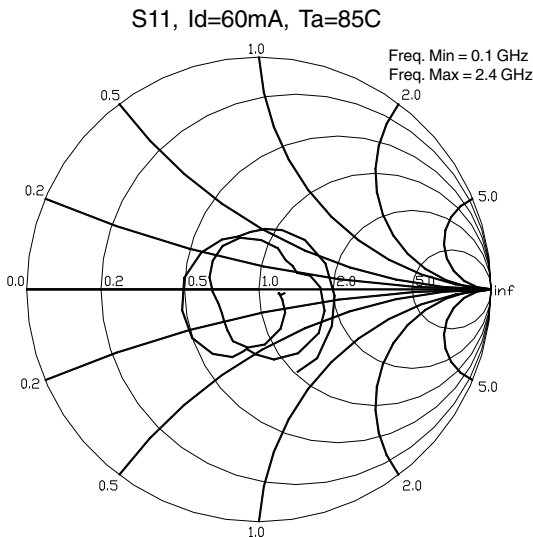
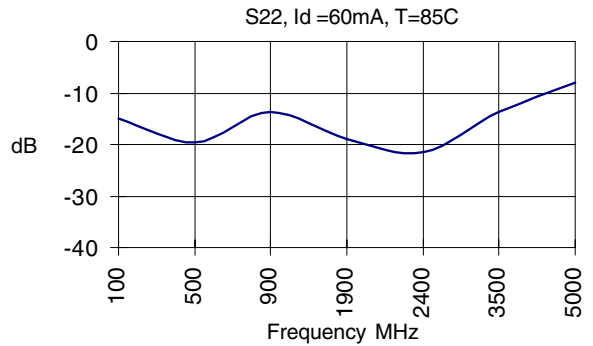
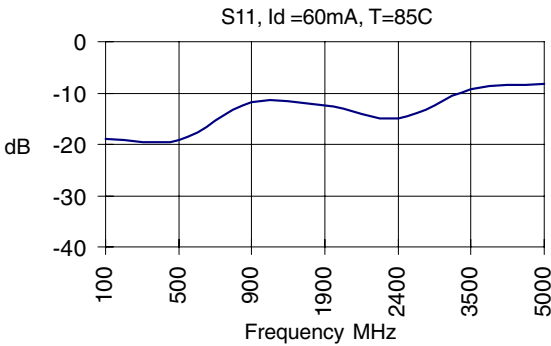
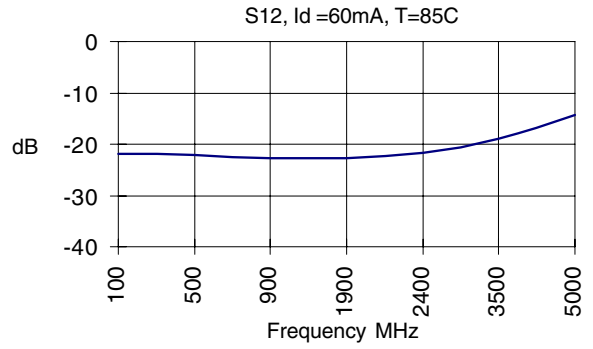
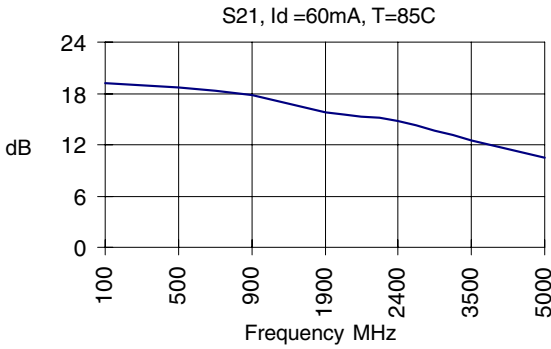
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### Absolute Maximum Ratings

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

#### 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-5486-TR1	7"	1000
SGA-5486-TR2	13"	3000

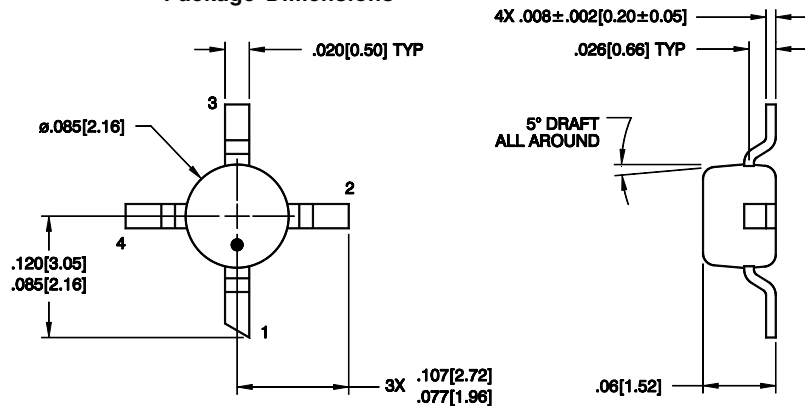
### Recommended Bias Resistor Values

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

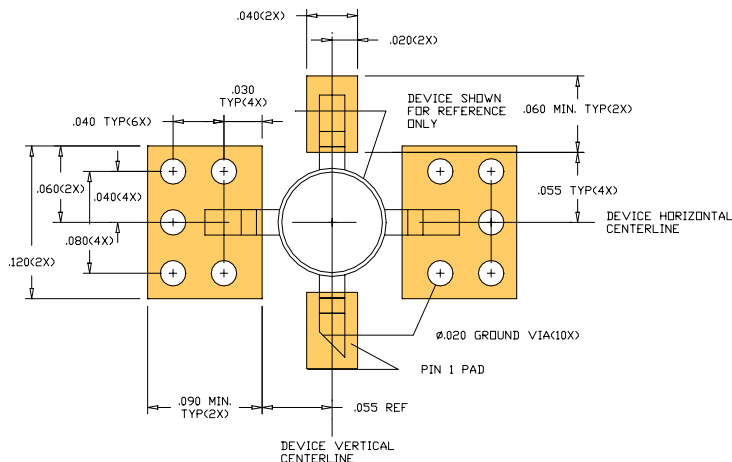
For 7.5V operation or higher, a resistor with a power handling capability of 1/2W or greater is recommended.

### Package Dimensions

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



### PCB Pad Layout



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