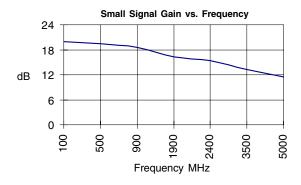




Product Description

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 Ta = 25C

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

| Symbol | Parameters: Test Conditions: Z ₀ = 50 Ohms, f = DC-2400 MHz | | Units | Min. | Тур. | Max. |
|------------------|---------------------------------------------------------------------------|-----------------------------------------------------------|----------------|------|----------------------|------|
| P _{1dB} | Output Power at 1dB Compression | f = 850 MHz f = 1950 MHz | dBm dBm | | 17.0 15.0 | |
| S ₂₁ | Small Signal Gain | f = DC-1000 MHz f = 1000-2000 MHz f = 2000-5000 MHz | dB dB dB | 17.5 | 19.7 17.3 13.5 | |
| S ₁₂ | Reverse Isolation | f = DC-1000 MHz f = 1000-2000 MHz f = 2000-5000 MHz | dB dB dB | | 22.5 23.0 18.0 | |
| S ₁₁ | Input VSWR | f = DC-5000 MHz | ı | | 1.50:1 | |
| S ₂₂ | Output VSWR | f = DC-5000 MHz | - | | 1.50:1 | |
| IP ₃ | Third Order Intercept Point | f = 850 MHz f = 1950 MHz | dBm dBm | | 32.0 28.0 | |
| NF | Noise Figure | f = DC-1000 MHz f = 1000-2400 MHz | dB dB | | 3.0 3.5 | |
| T _D | Group Delay | f = 1000 MHz | pS | | 121.0 | |
| V _D | Device Voltage | | ٧ | 3.1 | 3.5 | 3.9 |
| I _D | Device Current | | mA | | 60.0 | · |

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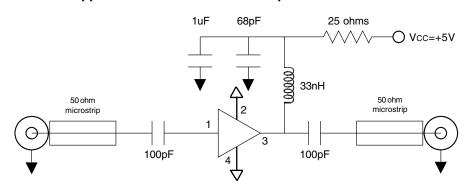


| | Test | | | | |
|-------------------|------|------|------|------|-----------|
| Parameter | Min | Тур. | Max. | Unit | Condition |
| Bandwidth | | | | | T= 25C |
| Frequency Range | DC | | 2400 | MHz | |
| Device Bias | | | | | T= 25C |
| Operating Voltage | | 3.5 | | V | |
| Operating Current | |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

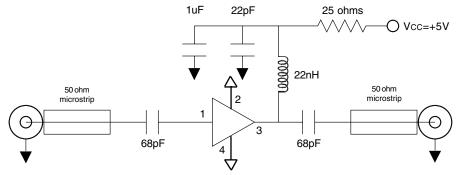


| Pin # Function | | Description | Device Schematic | | |
|----------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------|------------------|--|--|
| 1 | RF IN | RF input pin. This pin requires the use 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 +5V Operation at 900 MHz



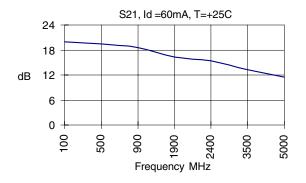
Application Schematic for +5V Operation at 1900 MHz

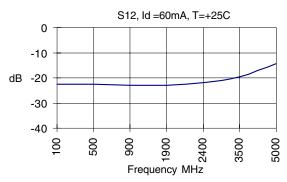


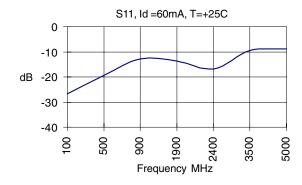
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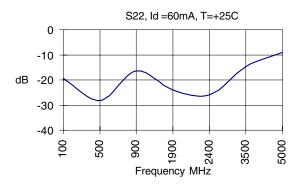




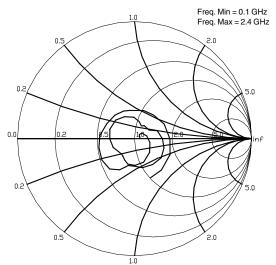




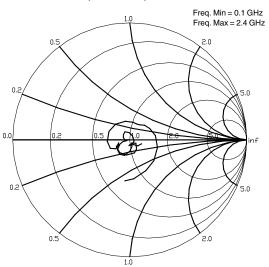








S22, Id=60mA, Ta=25C

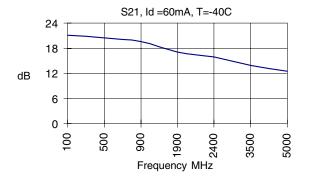


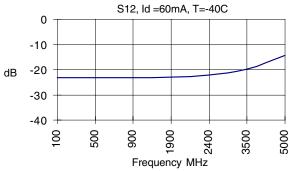
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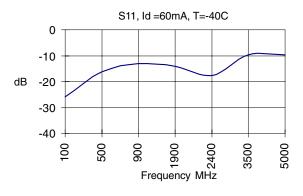
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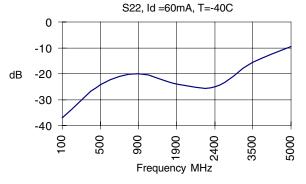


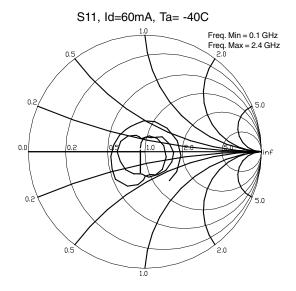


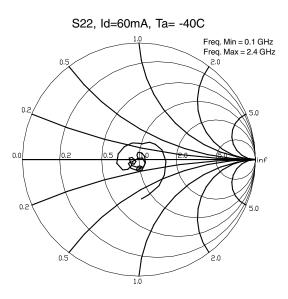










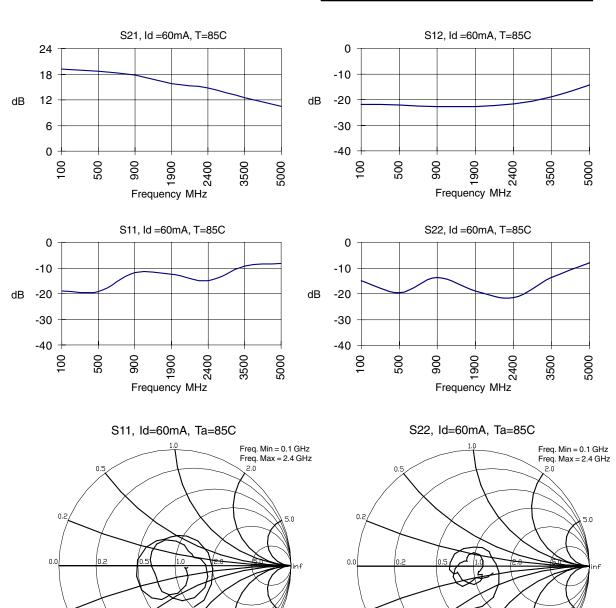


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Phone: (800) SMI-MMIC

0.5

2.0

2.0





Absolute Maximum Ratings

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

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

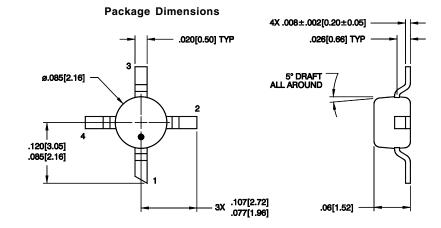
Part Number Ordering Information

| Part Number | Reel Size | Devices/Reel | | |
|--------------|-----------|--------------|--|--|
| SGA-5486-TR1 | 7" | 1000 | | |
| SGA-5486-TR2 | 13" | 3000 | | |

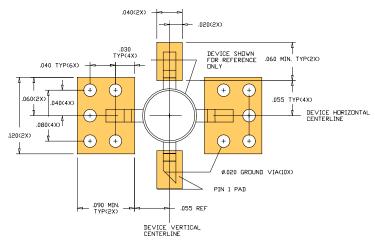
| Recommended Bias Resistor Values | | | | | |
|----------------------------------|----|----|------|----|-----|
| Supply Voltage(Vs) | 4V | 5V | 7.5V | 9V | 12V |
| Rbias (Ohms) | 8 | 25 | 67 | 92 | 142 |

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

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



PCB Pad Layout



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