Features

- Cascadable 50 Ω Gain Block
- 3dB Bandwidth: DC to 2.5 GHz
- Gain: 9 dB @ 1 GHz
- Unconditionally Stable (k>1)
- 370 x 370 x 120 µm
- RoHS* Compliant

Applications

- Narrow and Wide Band IF and RF Amplifiers
- Industrial
- Military

Description

The MAAM-011004 is a high performance silicon bipolar MMIC chip. This amplifier is ideally suited for use where a general purpose 50 Ω gain block is required. Typical applications include narrow and wide band IF and RF amplifiers in industrial and military applications.

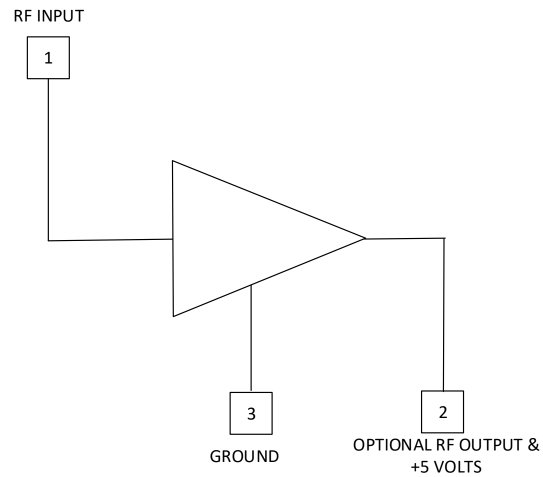
The MAAM-011004 is fabricated using a 10 GHz fT silicon bipolar technology that features gold metallization and IC passivation for increased performance and reliability.

Ordering Information

Part Number	Package
MAAM-011004-DIE	Gel Pack[1]

1. Die quantity varies.

Functional Schematic



Pad Configuration

Pad #	Function	Comment
1	RF Input	—
2	RF Output and Bias[2]	Optional RF Output and +5 Volts
3	Ground	—

2. RF output contact & +DC voltage Is normally made on the backside of the chip at die attach.

* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

Electrical Specifications: T_A = 25°C, I_D = 50 mA, Z_0 = 50 Ω

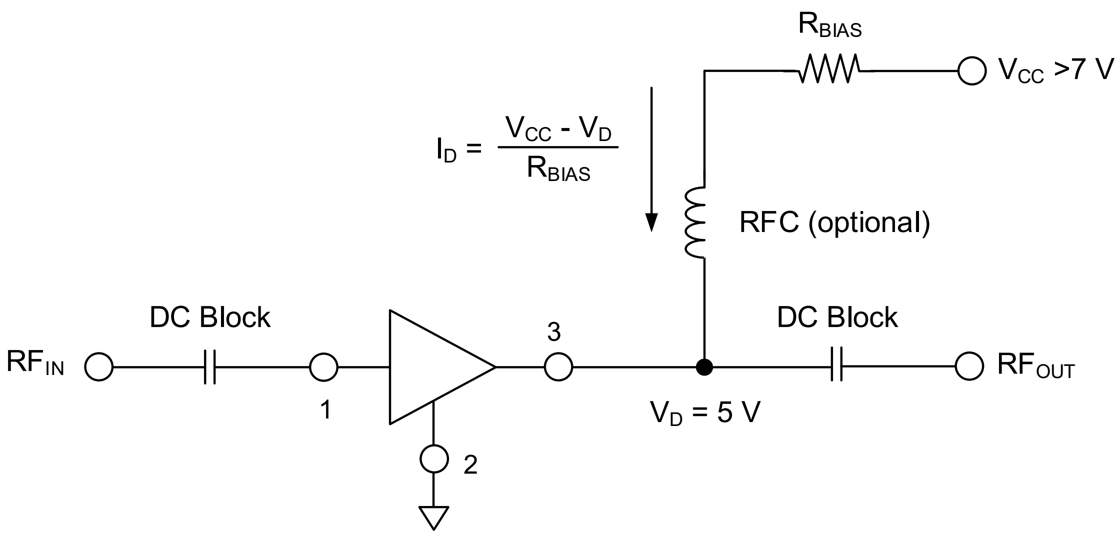
Parameter	Freq	Units	Min.	Typ.	Max.
Power Gain ($\|S_{21}\|^2$)	0.1 GHz	dB	—	9	—
Gain Flatness	0.1 - 2.0 GHz	dB	—	±0.8	—
3 dB Bandwidth	—	GHz	—	2.5	—
Input Return Loss	0.1 - 3.0 GHz	dB	—	12	—
Output Return Loss	0.1 - 3.0 GHz	dB	—	12	—
Power Output at 1 dB Gain Compression	1 GHz	dBm	—	12.5	—
Noise Figure	1 GHz, 50 Ω	dB	—	6	—
Third Order Intercept Point	1 GHz	dBm	—	23	—
Group Delay	1 GHz	ps	—	135	—
Device Voltage	—	V	4.30	5.3	6.15
Device Voltage Temperature Coefficient	—	mV/°C	—	-8.0	—

Absolute Maximum Ratings[3,4]

Parameter	Absolute Maximum
Device Current	100 mA
Junction Temperature[5,6]	+200°C
Storage Temperature	-65°C to +150°C
Power Dissipation[7]	650 mW
RF Input Power	+13 dBm

3. Exceeding any one or combination of these limits may cause permanent damage to this device.
4. MACOM does not recommend sustained operation near these survivability limits.
5. Operating at nominal conditions with $T_J \leq$ +150°C will ensure MTTF > 1 x 10^6 hours.
6. Junction Temperature (T_J) = T_C + Ɵjc * (V * I)
   Typical thermal resistance (Ɵjc) = 128 °C/W.
   a) For T_C = +25°C,
      T_J = 92.2 °C @ 5.25 V, 100 mA
   b) For T_C = +100°C,
      T_J = 167.2 °C @ 5.25 V, 100 mA
7. Derate at 7.8 mW/°C for T_C > 117 °C

Typical Bias Configuration



Handling Procedures

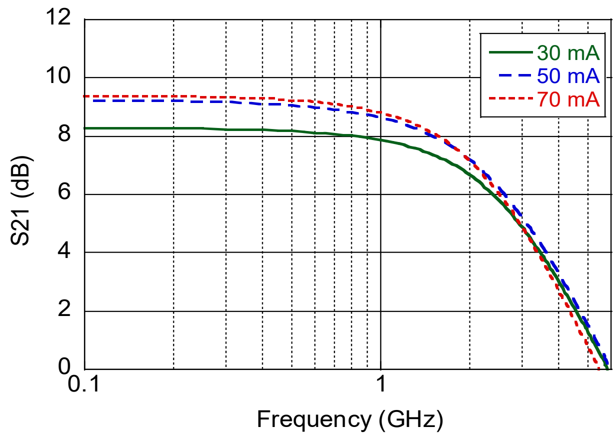
Please observe the following precautions to avoid damage:

Static Sensitivity

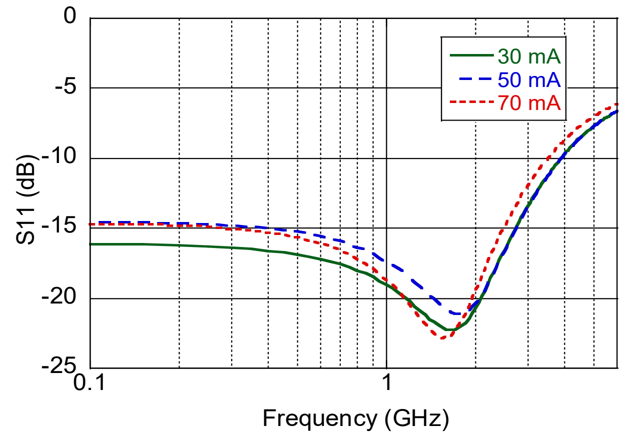
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these Class 1B (500 V) HBM devices.

Typical S-Parameters: T_A = 25°C, Z_0 = 50 Ω

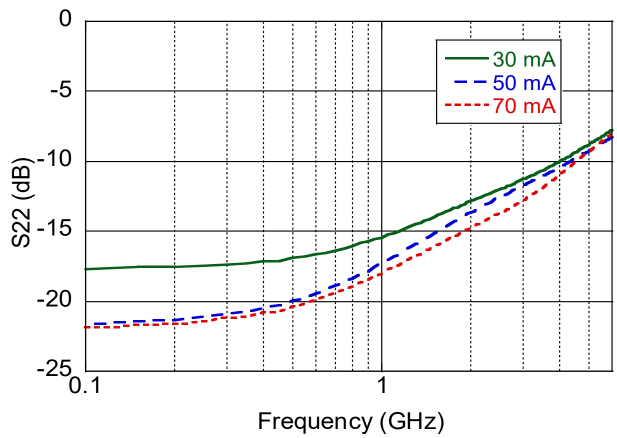
Gain



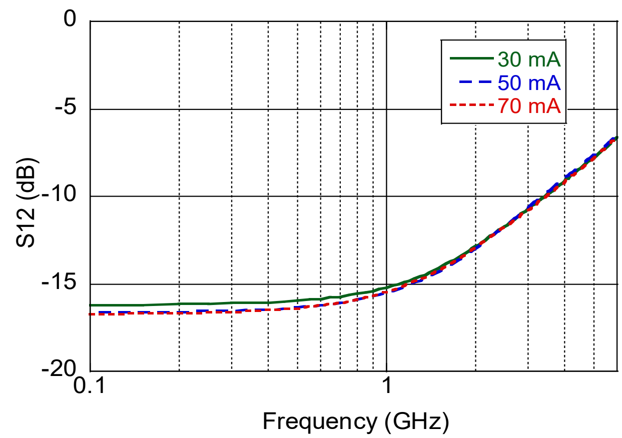
Input Return Loss



Output Return Loss

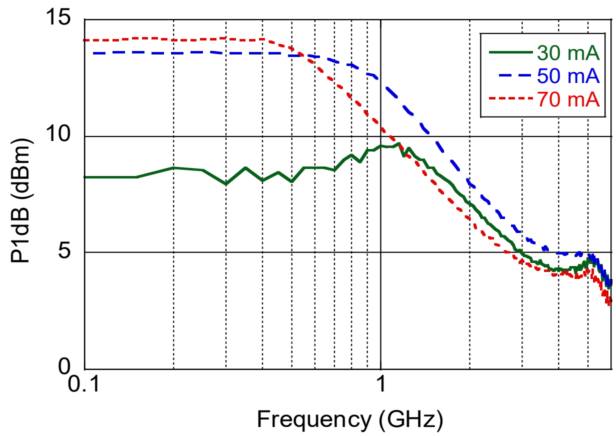


Reverse Isolation

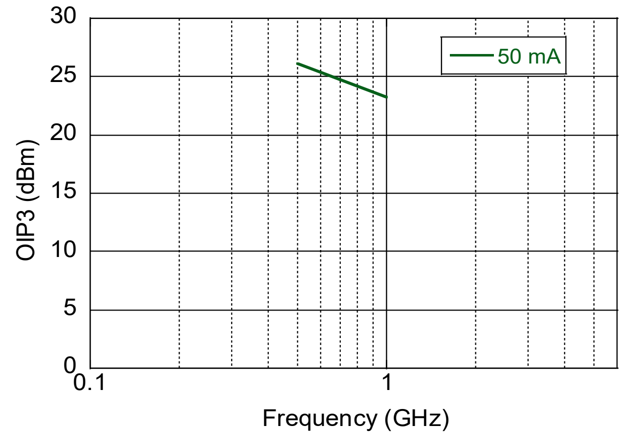


Typical Performance: T_A = 25°C, Z_0 = 50 Ω

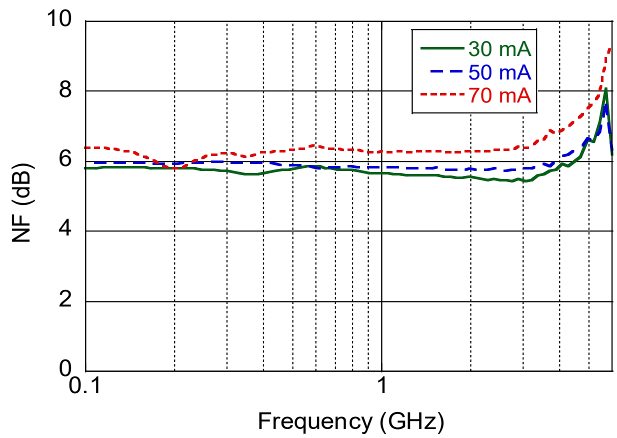
P1dB



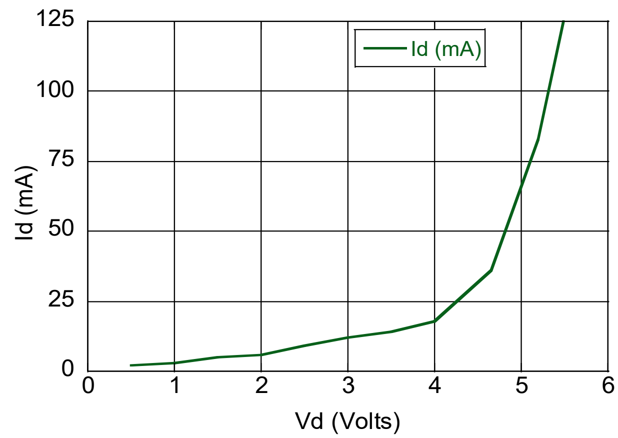
Output 3rd Order Intercept Point



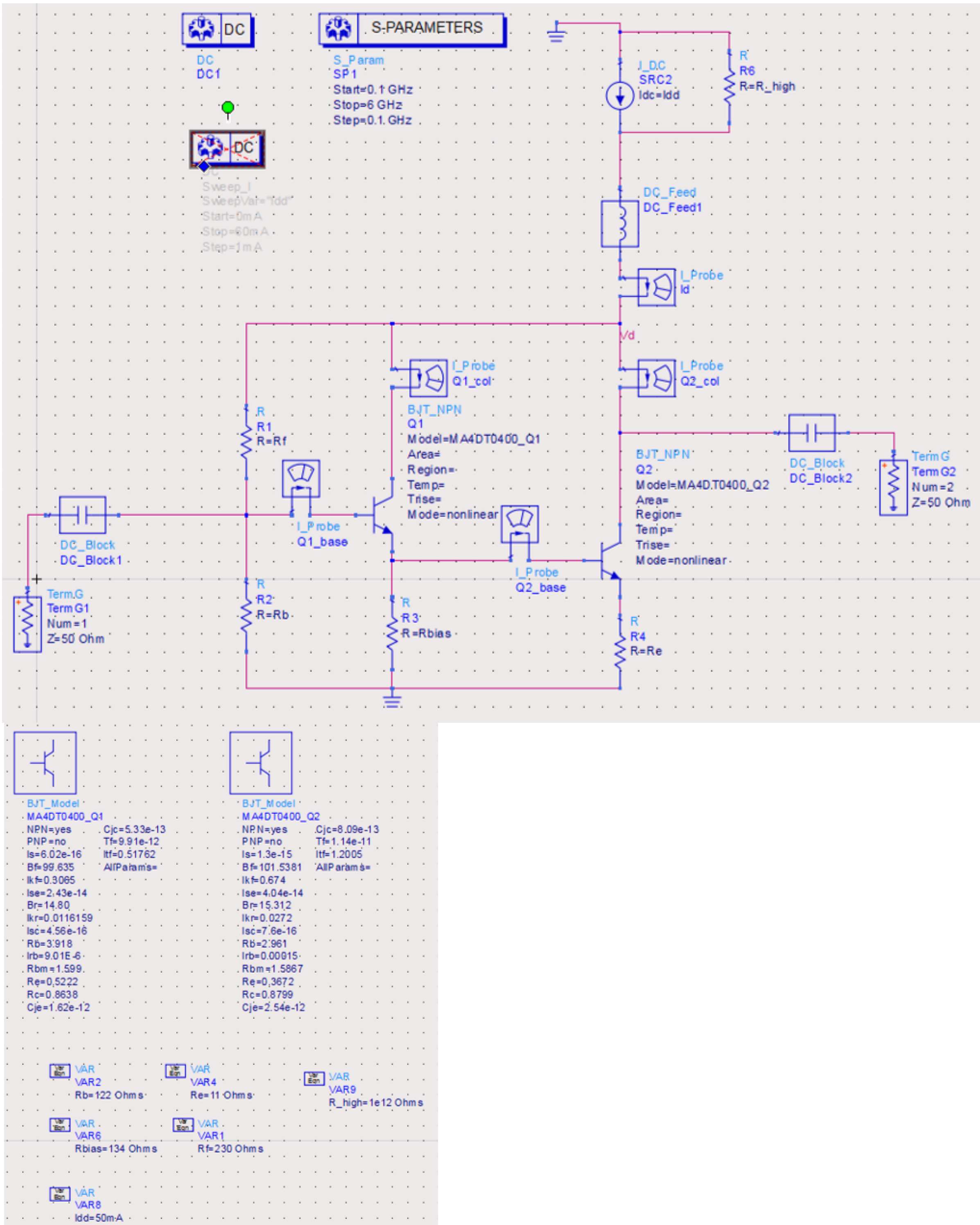
Noise Figure



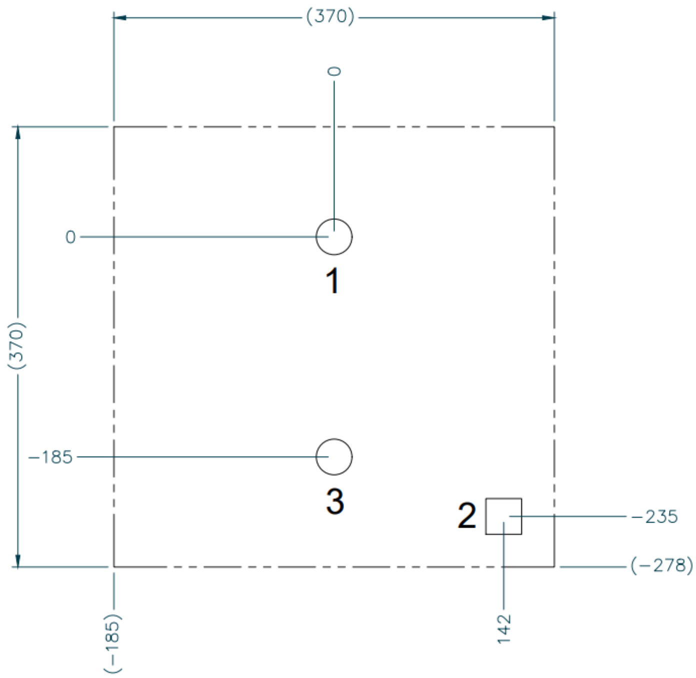
Bias Current vs Voltage



Schematic and Model



Chip Outline Drawing



BONDPAD DETAIL	
PAD	SIZE(um)
1,3	ø30
2	30x30

NOTES:
1. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS SHOWN ARE µm WITH A TOLERANCE OF ±5µm.
2. DIE THICKNESS IS 120 ±10µm
3. DIE SIZE REFLECTS FINAL DIMENSIONS.