

DESCRIPTION

AMCOM's AM012535MM-BM-R is part of the GaAs MMIC power amplifier series. It has 20 dB gain, 33 dBm output power over most of the 0.03 to 2.5 GHz band. This MMIC is in a ceramic package with both RF and DC leads at the bottom level of the package to facilitate low-cost SMT assembly to the PC board. AM012535MM-FM-R is AM012535MM-BM-R assembled on a copper flange carrier for screwing on to a metal heat sink. Both parts are RoHS compliant.

FEATURES

- Wide bandwidth from 0.03 to 2.5 GHz
- High output power, P_{1dB} = 33 dBm
- High gain, 20dB
- Input & output 50-ohm impedance

APPLICATIONS

- Software Radio
- Instrumentation
- Gain block

TYPICAL PERFORMANCE*

(V_{dd} = +20V, I_{dd1} = 150mA, I_{dd2} = 400mA, V_{gg1} = -2.8V**, V_{gg2} = -0.9V** T_a = 25°C)

| Parameters | Minimum | Typical | Maximum |
|--------------------------------|--------------|---------------|----------|
| Frequency | 0.1 – 2.0GHz | 0.03 – 2.5GHz | - |
| Small Signal Gain | 18 dB | 20 dB | - |
| Gain Ripple | - | ± 1.0 dB | ± 2.0 dB |
| P _{1dB} (0.1 to 2GHz) | 32.0 dBm | 33.0 dBm | - |
| P _{sat} (0.1 to 2GHz) | - | 33.5 dBm | - |
| Efficiency @ P _{1dB} | - | 20 % | |
| IP3 @ 1GHz | - | 45 dBm | |
| Input Return Loss | 10 dB | 15dB | |
| Output Return Loss | 6 dB | 10dB | |
| Thermal Resistance | | 8 °C/W | |

*Specifications subject to change without notice.

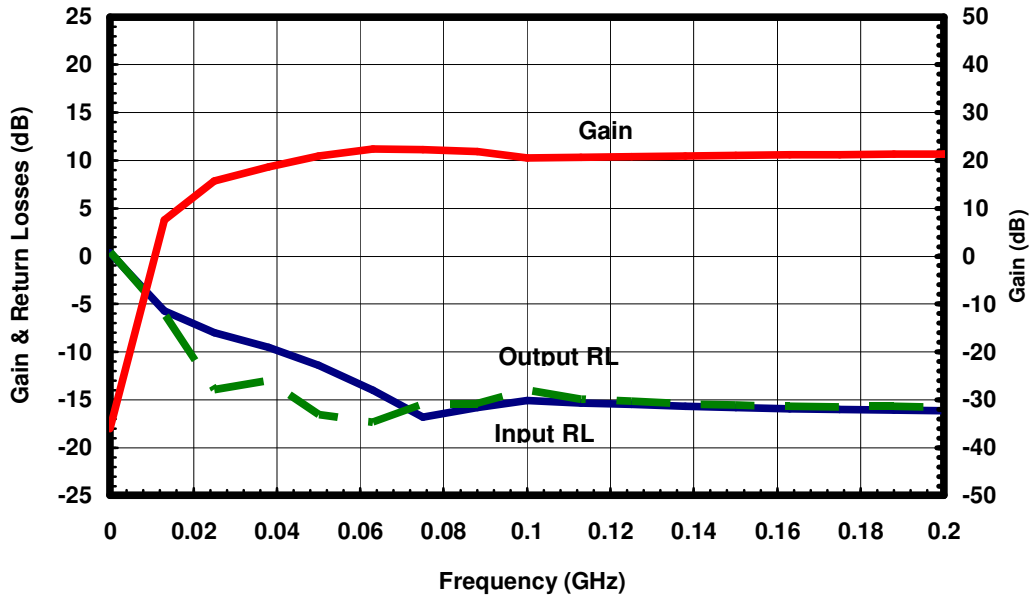
** V_{gg1} & V_{gg2} may vary from lot to lot

ABSOLUTE MAXIMUM RATING

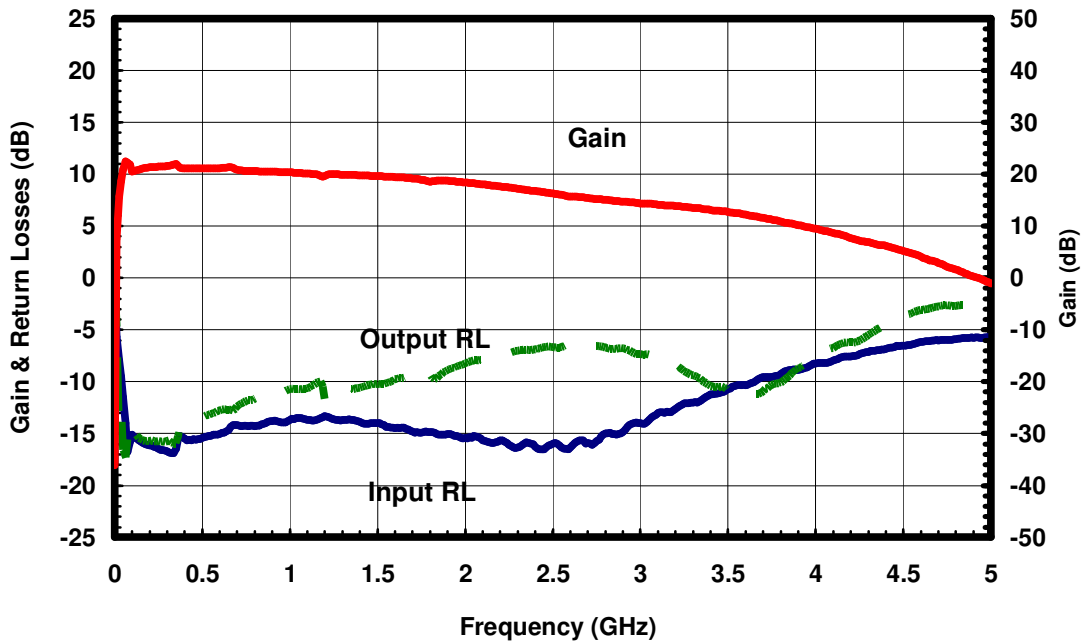
| Parameter | Symbol | Rating |
|--|-------------------------------------|-----------------|
| Drain source voltage | V _{dd} | 24 V |
| Gate source voltage | V _{gg1} , V _{gg2} | -8 V |
| Drain source current | I _{dd1} + I _{dd2} | 0.8 A |
| Continuous dissipation at room temperature | P _t | 18 W |
| Channel temperature | T _{ch} | 175 °C |
| Storage temperature | T _{sto} | -55°C to +135°C |

SMALL SIGNAL DATA*

Vdd=+20V, I_{ds1}=150mA, I_{ds2}=400mA



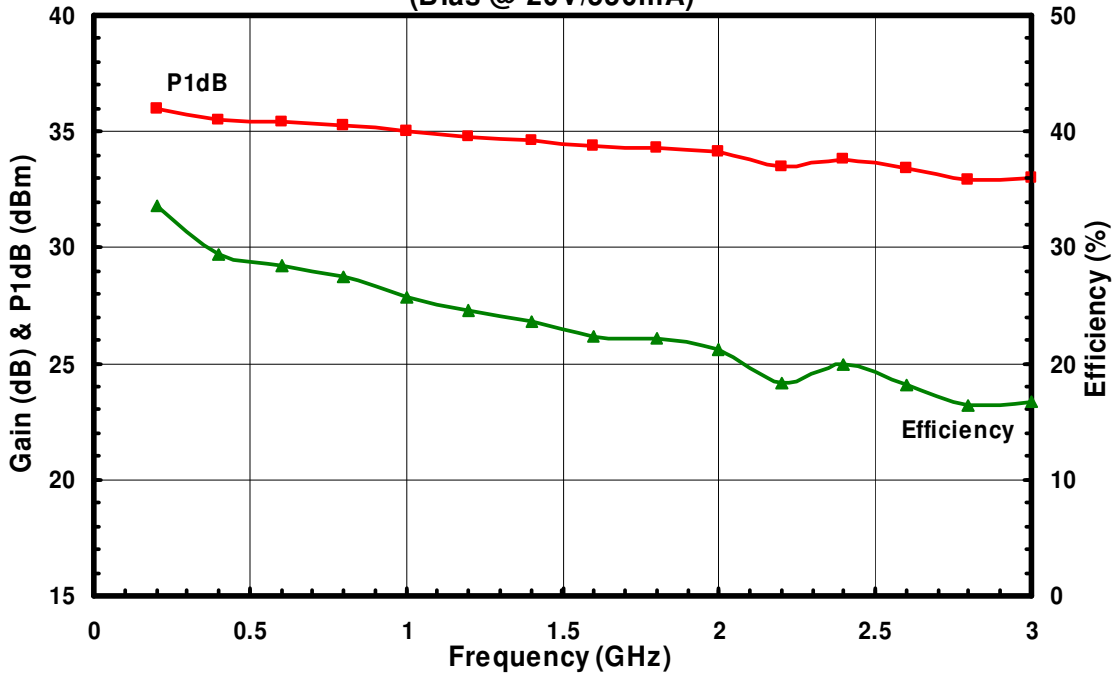
Vdd=+20V, I_{ds1}=150mA, I_{ds2}=400mA



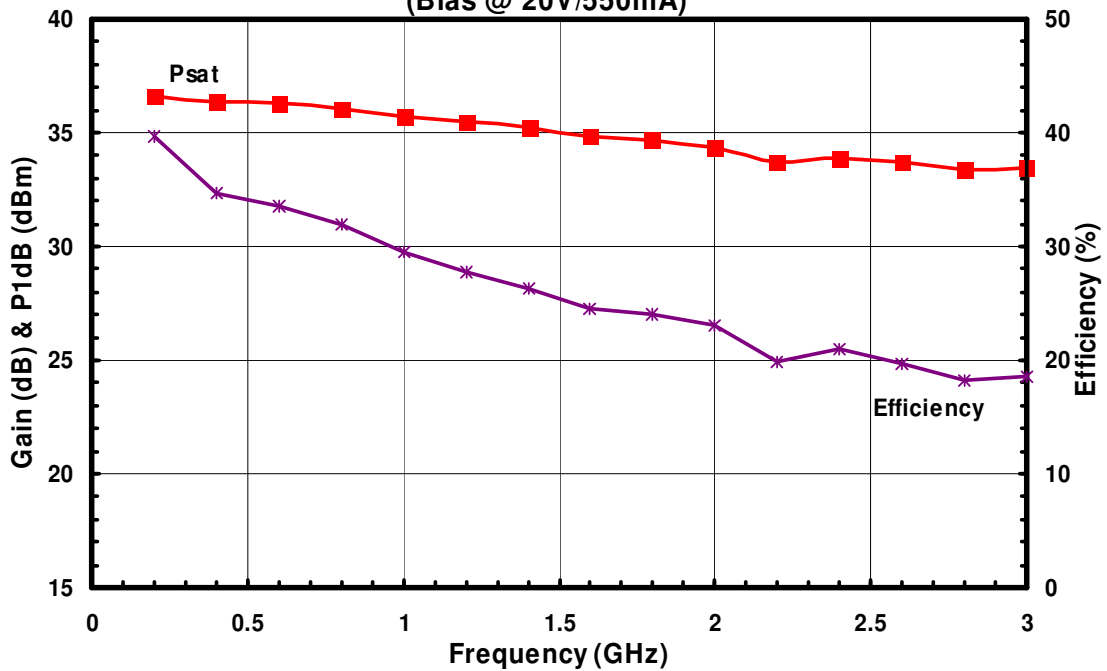
*Measurements performed with test fixture

POWER DATA*

**P1dB & Efficiency vs Frequency
(Bias @ 20V/550mA)**

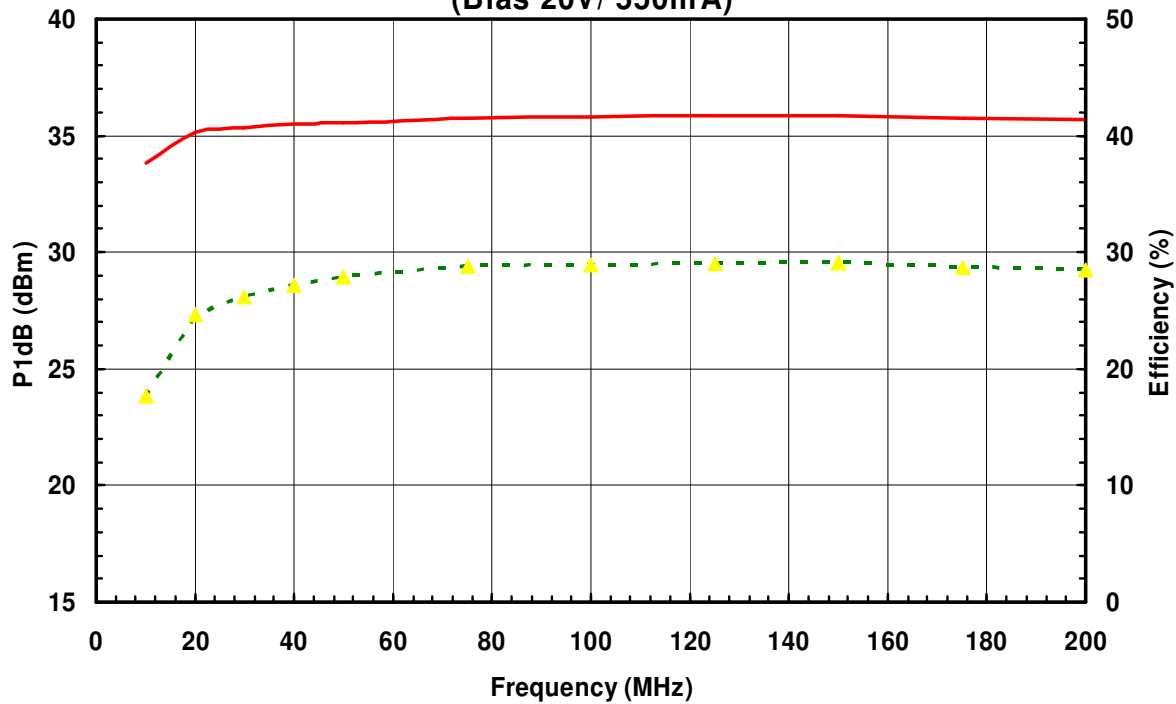


**Psat & Efficiency vs Frequency
(Bias @ 20V/550mA)**

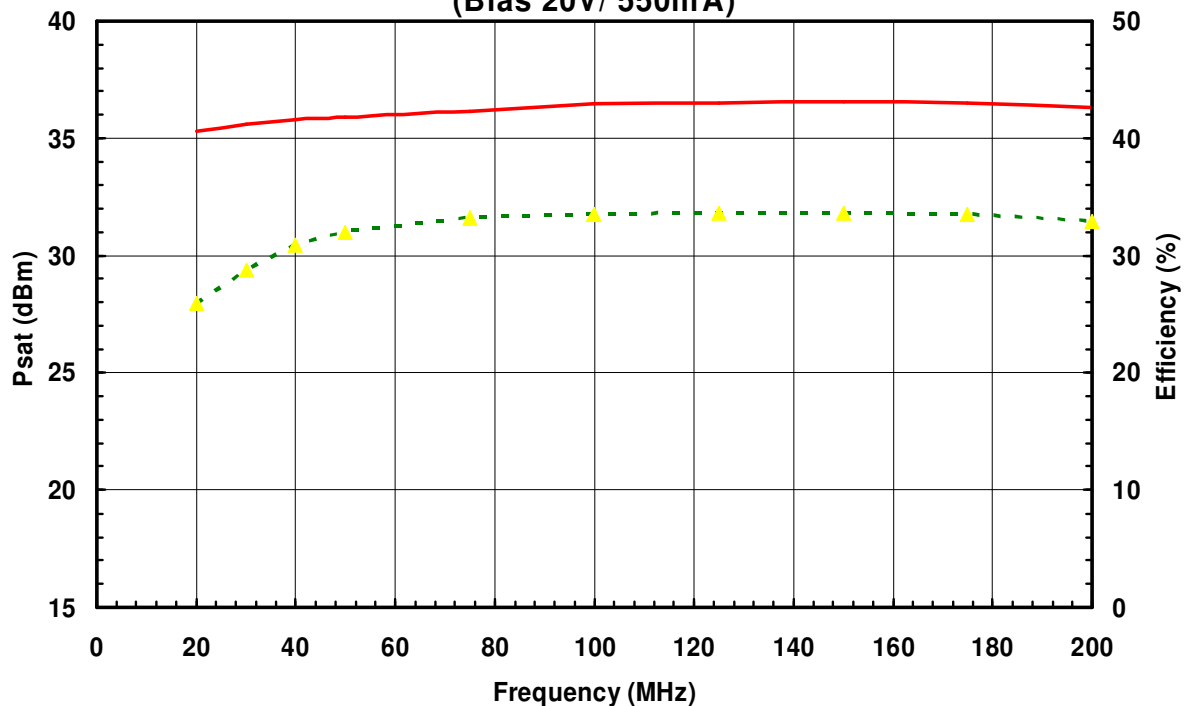


*Measurements performed with bias tee

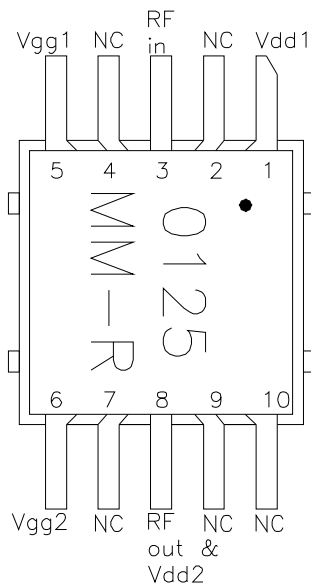
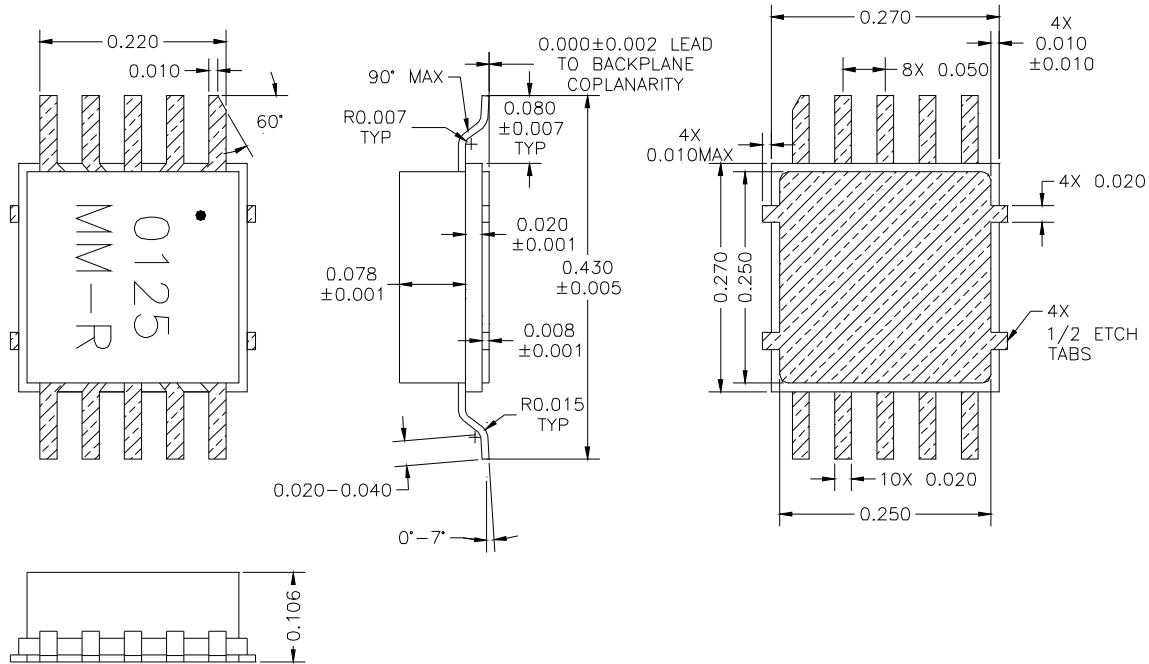
**P1dB & Efficiency at Low Frequency
(Bias 20V/ 550mA)**



**Psat & Efficiency at Low Frequency
(Bias 20V/ 550mA)**



PACKAGE OUTLINE (BM)

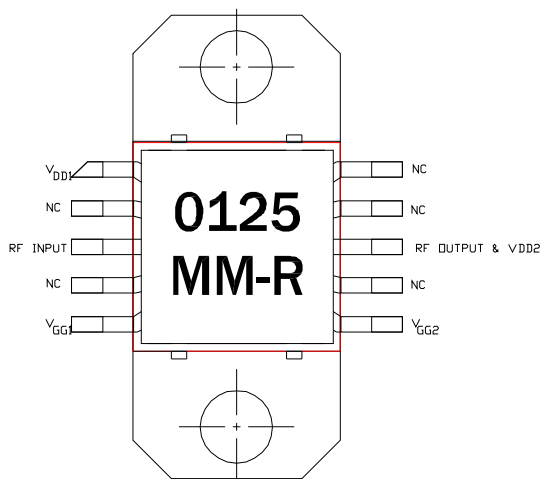
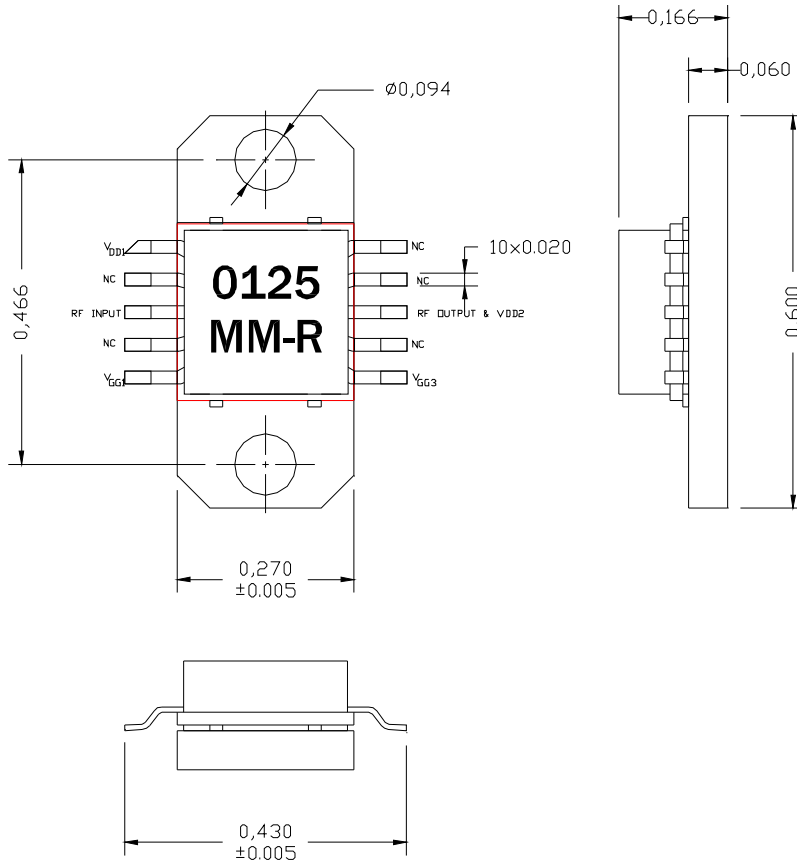


| Pin No. | Function | Bias* |
|---------|---------------|-------|
| 1 | Vdd1 | +20V |
| 2 | NC | |
| 3 | RF in | |
| 4 | NC | |
| 5 | Vgg1 | -2.8V |
| 6 | Vgg2 | -0.9V |
| 7 | NC | |
| 8 | RF out & Vdd2 | +20V |
| 9 | NC | |
| 10 | NC | |

Pin Layout

* V_{gg1} & V_{gg2} may vary from lot to lot

PACKAGE OUTLINE (FM)

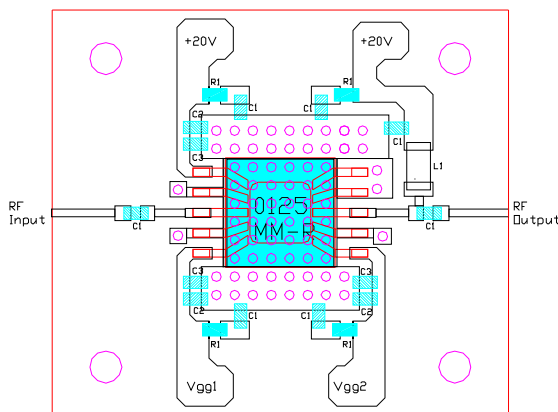
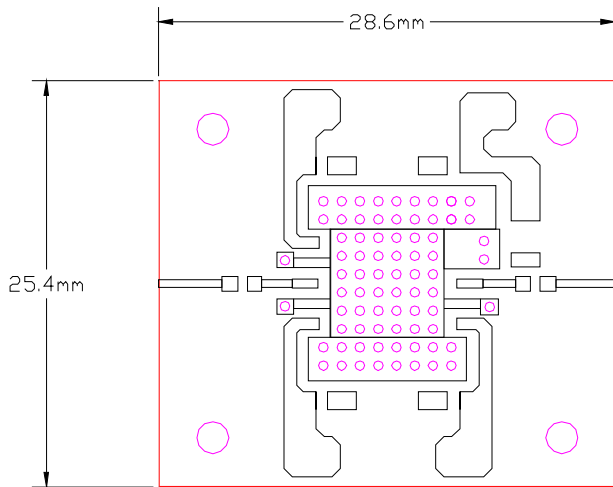


| Pin No. | Function | Bias* |
|---------|---------------|-------|
| 1 | Vdd1 | +20V |
| 2 | NC | |
| 3 | RF in | |
| 4 | NC | |
| 5 | Vgg1 | -2.8V |
| 6 | Vgg2 | -0.9V |
| 7 | NC | |
| 8 | RF out & Vdd2 | +20V |
| 9 | NC | |
| 10 | NC | |

Pin Layout

* V_{gg1} & V_{gg2} may vary from lot to lot

TEST CIRCUIT (BM)



Notes:

- 1- Material is 10mils FR4 with 1 Oz Copper
- 2- All vias are plated thru (min. via thickness = 25um)
- 3- R1=500hms, R2=00hms, C1=1000pF, C2=100pF, C3=20pF, L1=300nH
- 4- Bias could be supplied to the RF output port using a bias tee.

Important Notes:

- 1- The +20V Bias to the output port could be provided via a bias tee or suitable chokes to be soldered on the board. Inductance of choke should be large enough to have high impedance at lowest frequency of operation (300nH is adequate).
- 2- Recommended current biases are 150mA and 400mA for the first stage and second stage respectively. At V_{dd1} & $V_{dd2} = +20V$ V_{gg1} & V_{gg2} values are around -2.8V and -0.9V respectively to obtain these desired currents but may vary from lot to lot. V_{gg1} & V_{gg2} could be adjusted to vary the currents going thru the first stage (V_{dd1} pin) and the second stage (V_{dd2} pin) respectively.
- 3- Do not apply V_{dd1} & V_{dd2} without proper negative voltages on V_{gg1} & V_{gg2} .
- 4- Due to direct DC connection between V_{dd1} & V_{gg1} pins through a large resistor there is a current around 10mA flowing out of the V_{gg1} pin. The current flowing out of the V_{gg2} pin is less than 100 μ A.