

## DESCRIPTION

AMCOM's AM002535MM-BM-R is part of the GaAs MMIC power amplifier series. It has 24 dB gain, 34 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. AM002535MM-FM-R is AM002535MM-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<sub>1dB</sub> = 34 dBm
- High gain, 24dB
- Input & output 50-ohm impedance

## APPLICATIONS

- Software Radio
- Instrumentation
- Gain block

## TYPICAL PERFORMANCE\*

(V<sub>dd</sub> = +20V, I<sub>dd1</sub> = 150mA, I<sub>dd2</sub> = 400mA, V<sub>gs1</sub> = -0.9V\*\*, I<sub>gg1</sub> < 1mA, V<sub>gs2</sub> = -0.9V\*\*, I<sub>gg2</sub> < 2mA, T<sub>a</sub> = 25°C)

Parameters	Minimum	Typical	Maximum
Frequency	0.1 – 2.0GHz	0.03 – 2.5GHz	-
Small Signal Gain	20 dB	24 dB	28 dB
Gain Ripple	-	± 1.0 dB	± 2.0 dB
P <sub>1dB</sub> (0.1 to 2GHz)	32.5 dBm	34 dBm	-
P <sub>sat</sub> (0.1 to 2GHz)	33.5 dBm	35 dBm	-
Efficiency @ P <sub>sat</sub>	-	25 %	
IP3 @ 1GHz	-	45 dBm	
Input Return Loss	10 dB	15dB	
Output Return Loss	6 dB	8dB	
Thermal Resistance		8 °C/W	

\*Specifications subject to change without notice. \*\* V<sub>gs1</sub> & V<sub>gs2</sub> may vary from lot to lot.

## ABSOLUTE MAXIMUM RATING

Parameter	Symbol	Rating
Drain source voltage	V <sub>dd</sub>	24 V
Gate source voltage	V <sub>gg1</sub> , V <sub>gg2</sub>	-5 V
Drain source current	I <sub>dd1</sub> + I <sub>dd2</sub>	0.8 A
Continuous dissipation at room temperature	P <sub>t</sub>	18 W
Channel temperature	T <sub>ch</sub>	175 °C
Storage temperature	T <sub>sto</sub>	-55°C to +135°C

**SMALL SIGNAL DATA\***

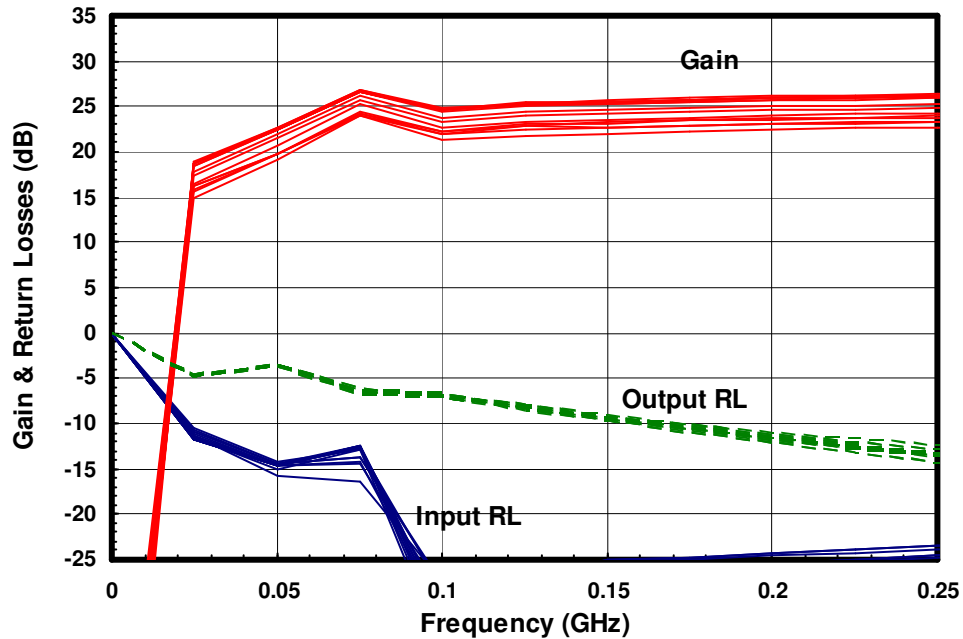


Figure 1: Gain and input/output return loss at low frequency

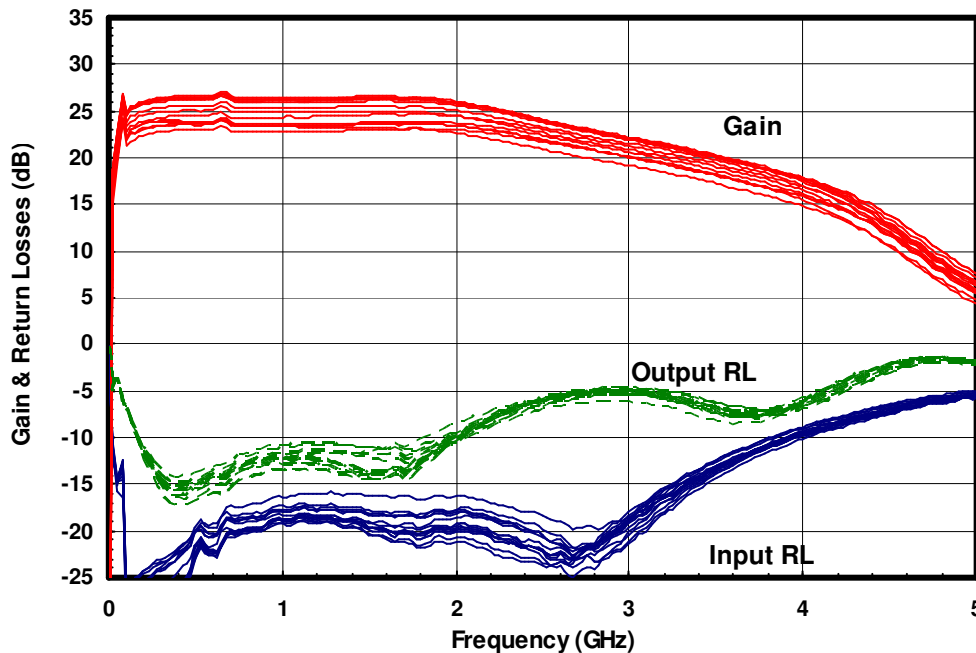


Figure 2: Gain and input/output return loss at RF & microwave frequencies

\*Measurements performed with bias tee on multiple MMICs. (Bias:  $V_{dd1} = V_{dd2} = 20V$ ,  $I_{dd1} = 0.15A$ ,  $I_{dd2} = 0.4A$ )

**POWER DATA\***

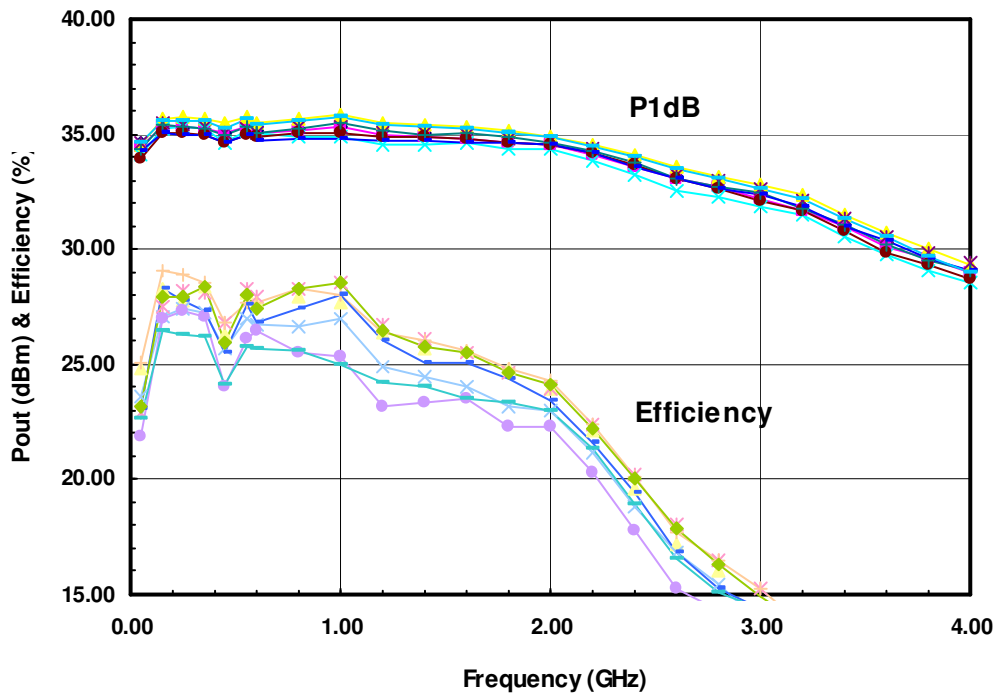


Figure3: P<sub>1dB</sub> and efficiency versus frequency

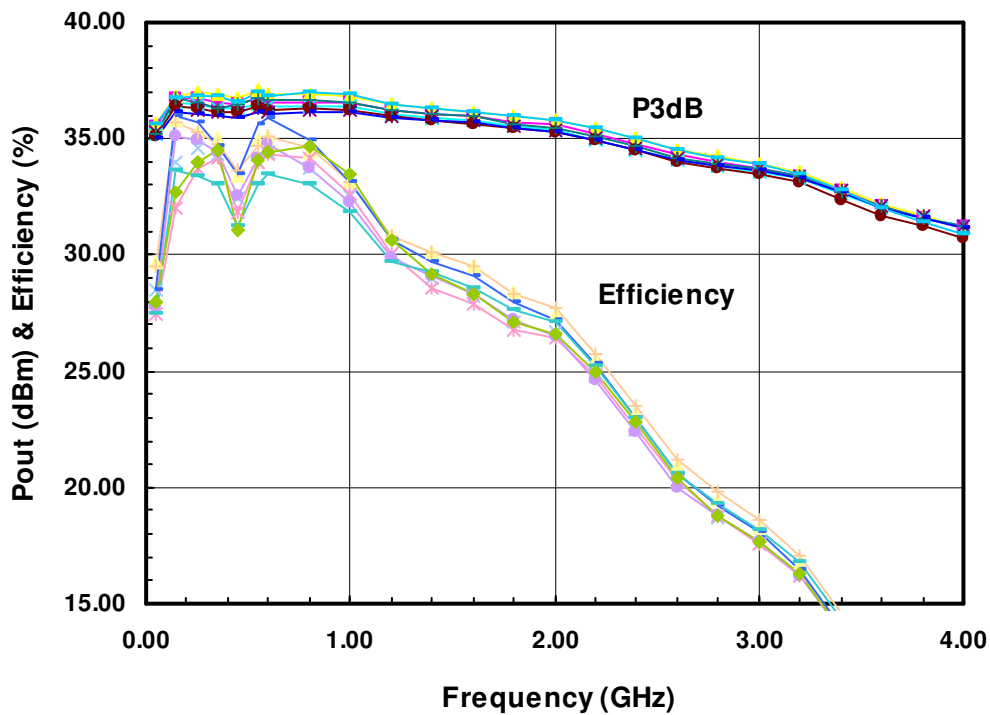


Figure4: P<sub>3dB</sub> and efficiency versus frequency

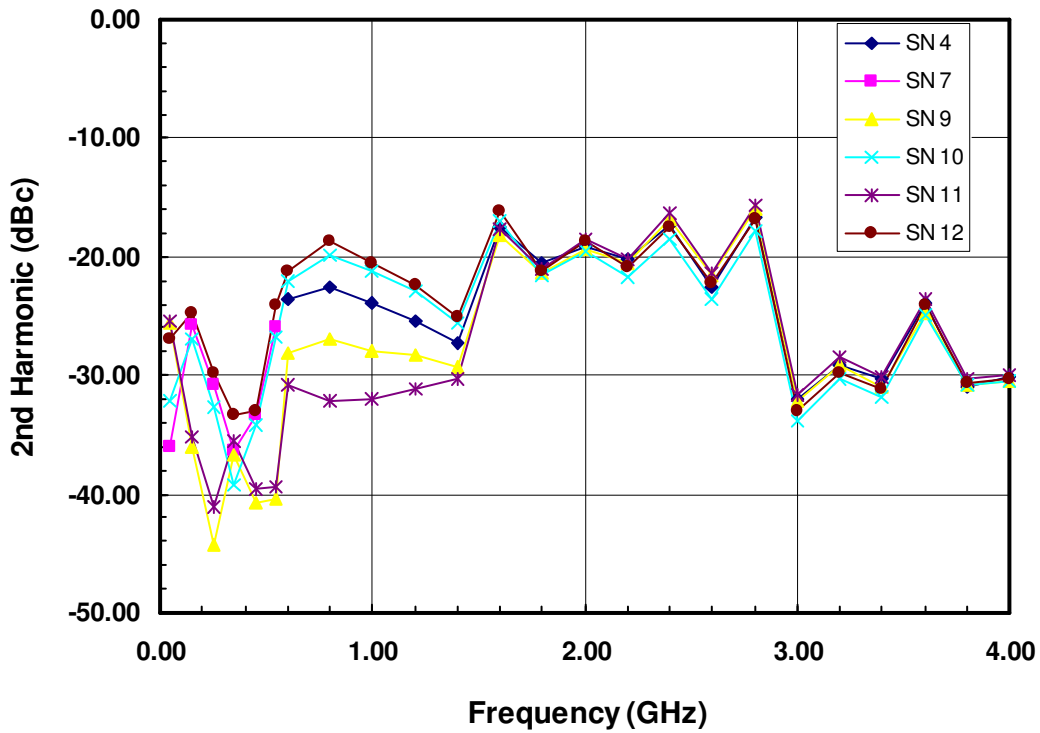


Figure 5: Second harmonic at P<sub>1dB</sub> versus frequency

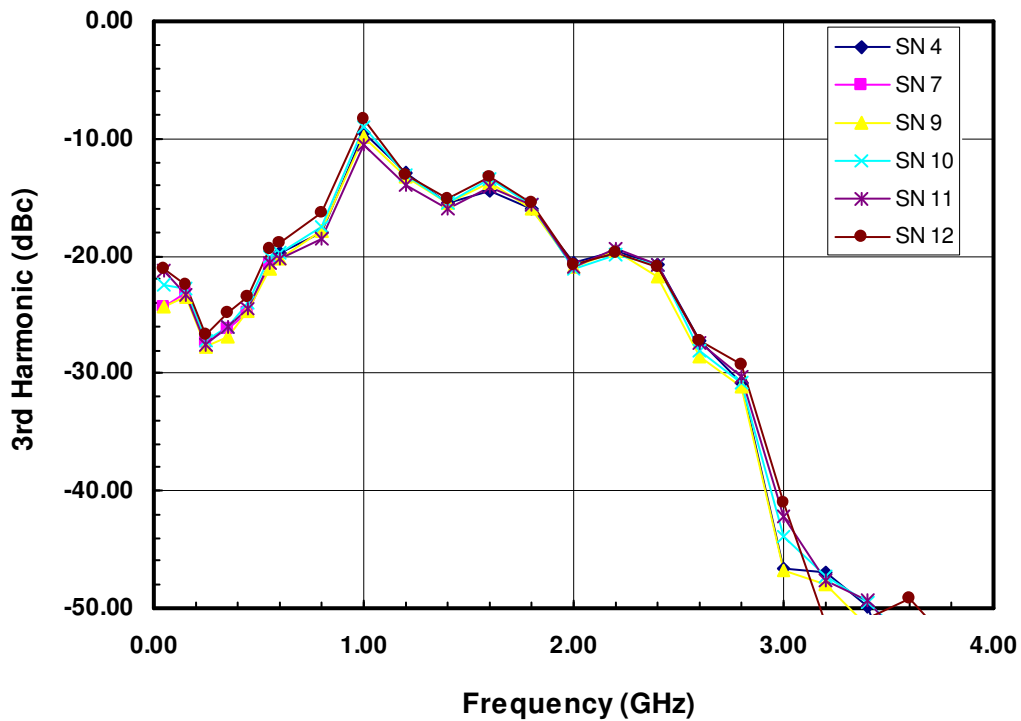


Figure 6: Third harmonic at P<sub>1dB</sub> versus frequency

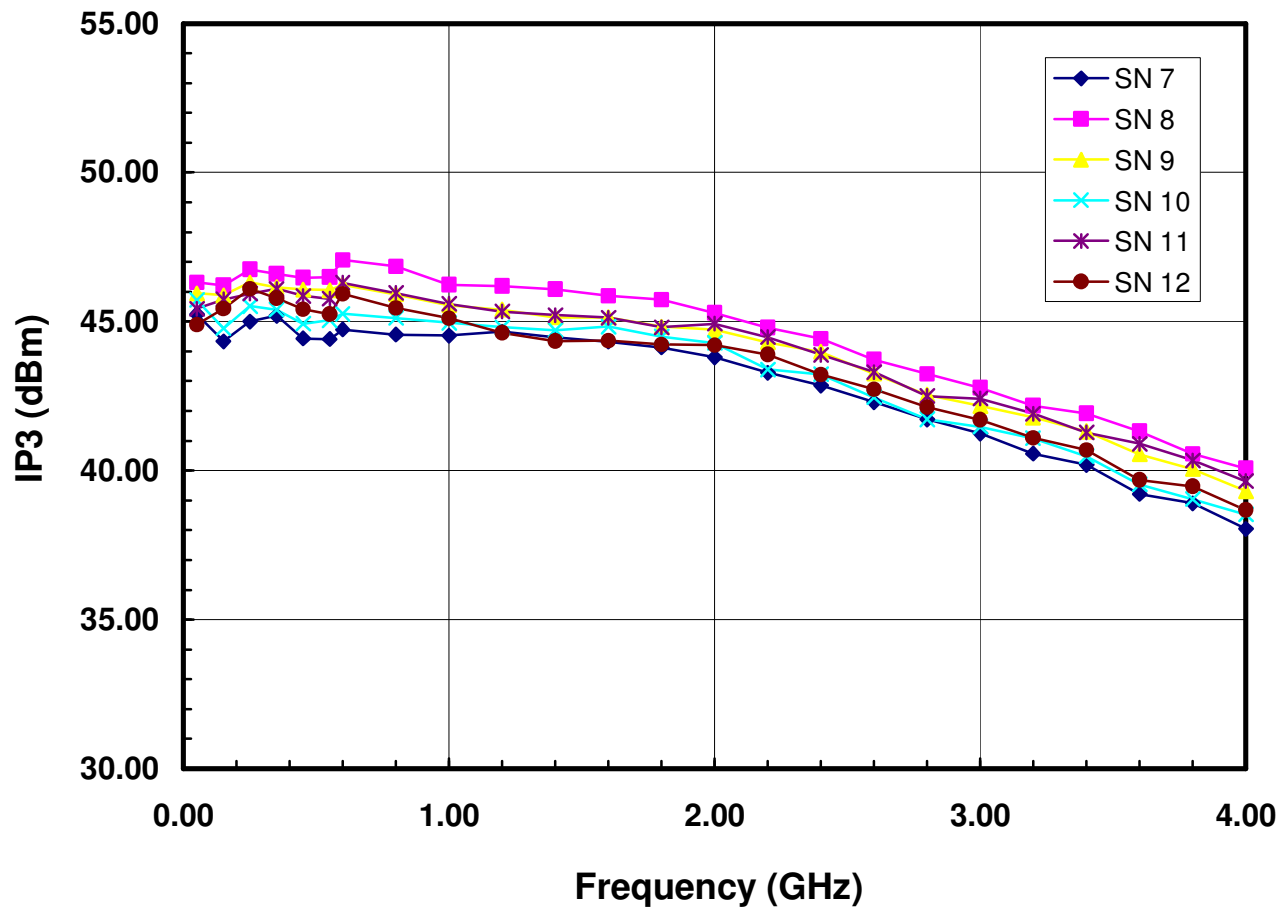
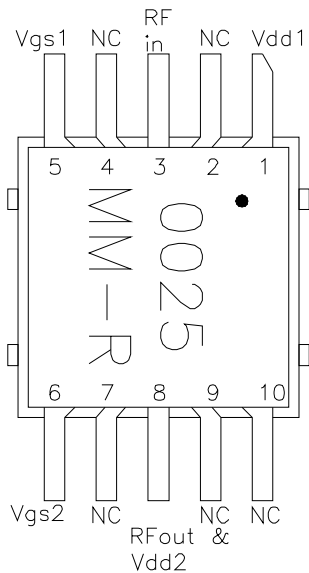
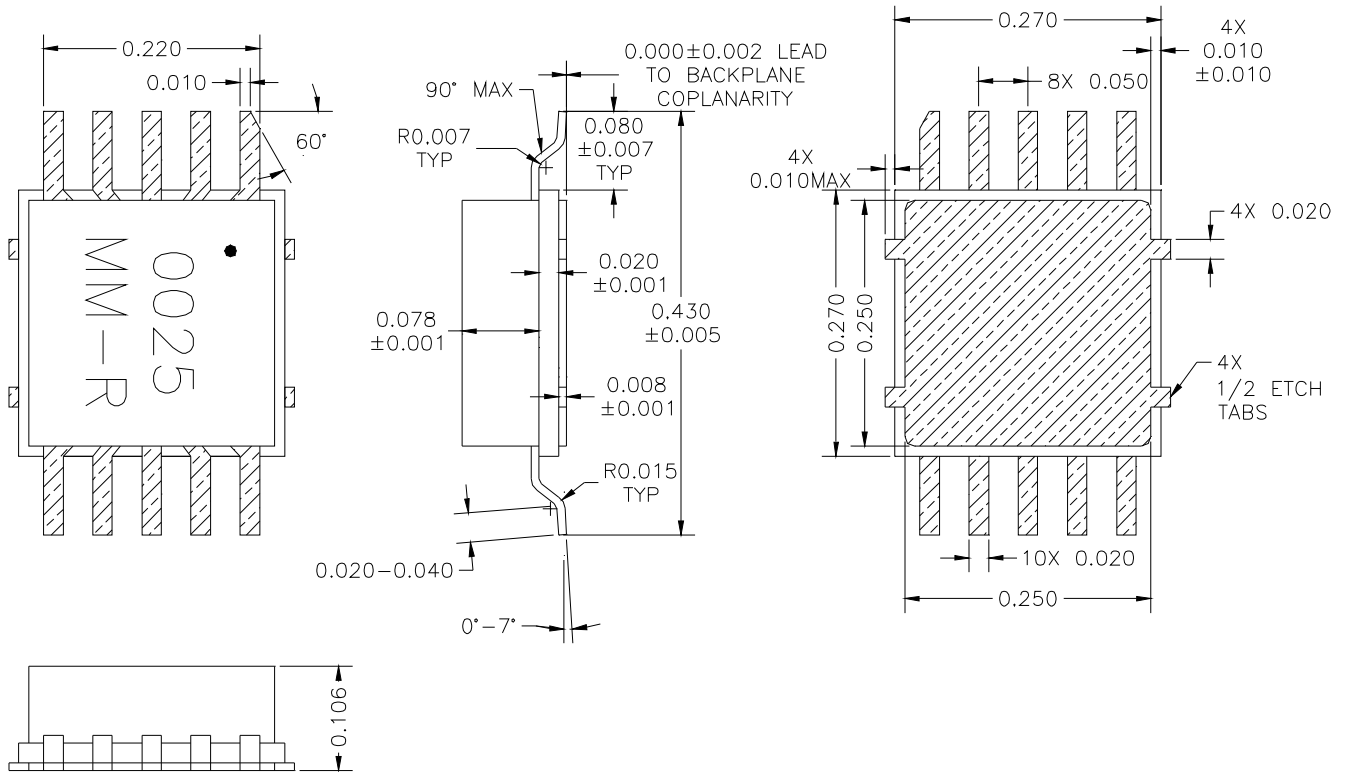


Figure 7: Third order intercept point versus frequency

\*Measurements performed with bias tee on multiple MMICs. (Bias:  $V_{dd1} = V_{dd2} = 20V$ ,  $I_{dd1}=0.15A$ ,  $I_{dd2}=0.4A$ )

**PACKAGE OUTLINE (BM)**

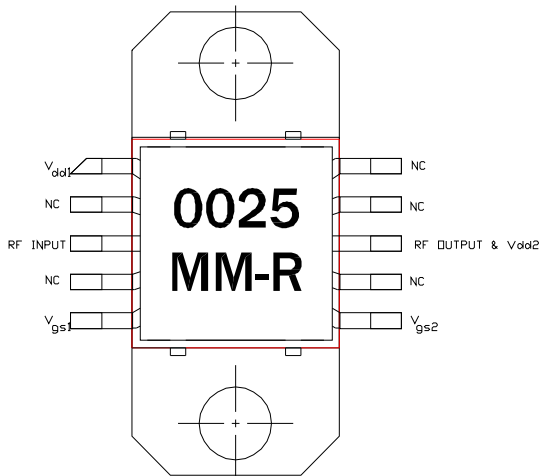
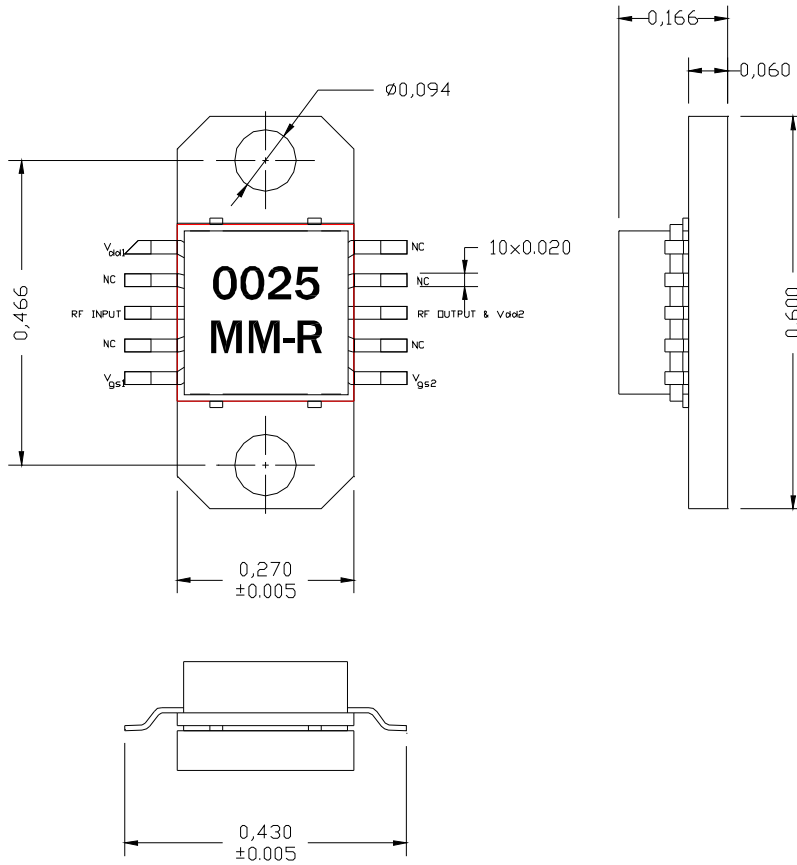


Pin No.	Function	Bias**
1	Vdd1	+20V
2	NC	
3	RF in	
4	NC	
5	Vgs1	-0.9V
6	Vgs2	-0.9V
7	NC	
8	RF out & Vdd2	+20V
9	NC	
10	NC	

**Pin Layout**

\*\* V<sub>gs1</sub> & V<sub>gs2</sub> may vary from lot to lot

**PACKAGE OUTLINE (FM)**

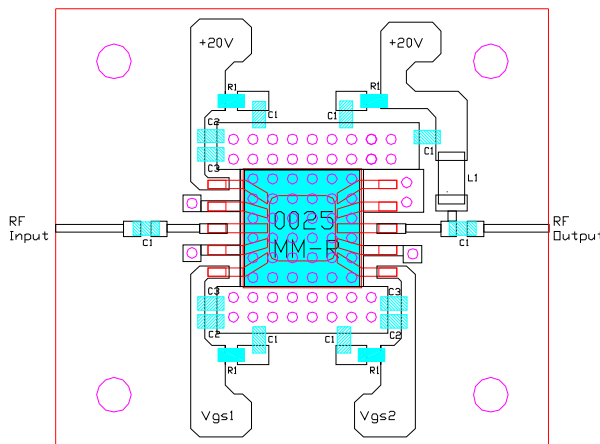
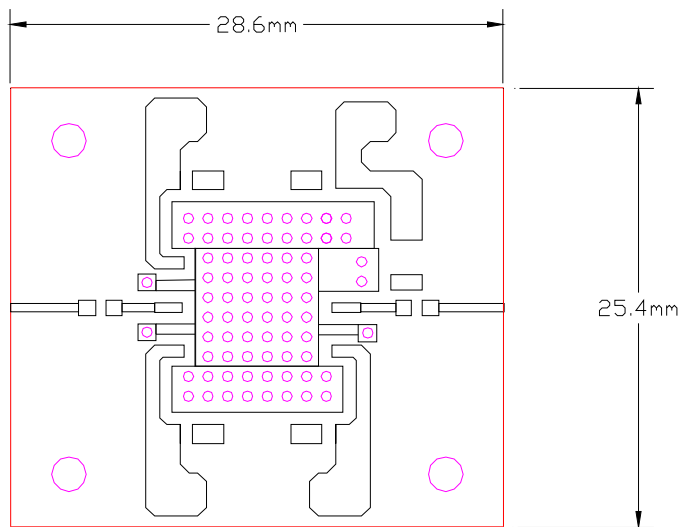


Pin No.	Function	Bias**
1	V <sub>dd1</sub>	+20V
2	NC	
3	RF in	
4	NC	
5	V <sub>gs1</sub>	-0.9V
6	V <sub>gs2</sub>	-0.9V
7	NC	
8	RF out & V <sub>dd2</sub>	+20V
9	NC	
10	NC	

**Pin Layout**

\*\* V<sub>gs1</sub> & V<sub>gs2</sub> may vary from lot to lot

**TEST CIRCUIT (BM Package)**



Notes:

- 1- Material is 10mils FR4 with 1 Oz Copper
- 2- All vias are plated thru  
MIN. via metal thickness = 25um
- 3- R1=500ohms, 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  $V_{dd1}$  &  $V_{dd2} = +20V$   $V_{gs1}$  &  $V_{gs2}$  could be adjusted to vary the currents going thru the first stage ( $V_{dd1}$  pin) and the second stage ( $V_{dd2}$  pin) respectively.  $V_{gs1}$  &  $V_{gs2}$  values could vary from lot to lot.
- 3- Do not apply  $V_{dd1}$  &  $V_{dd2}$  without proper negative voltages on  $V_{gs1}$  &  $V_{gs2}$ .
- 4- The current flowing out of the  $V_{gs1}$  &  $V_{gs2}$  pin is less than 100 & 200 $\mu$ A respectively at low power. At P<sub>1dB</sub> the currents could go up to 1mA and 2mA respectively at P<sub>1dB</sub>.