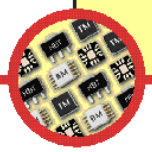
AMCOM COMMUNICATIONS
The RF Power House

# GaAs MMIC Power Amplifier

**AM254540WM-BM-R**
**AM254540WM-FM-R**
Aug 2010
Rev 0



## DESCRIPTION

AMCOM's AM254540WM-BM/FM-R is part of the GaAs HiFET MMIC power amplifier series. This high efficiency MMIC is a 2-stage GaAs pHEMT power amplifier biased at 10 to 13V. The input and inter-stage matching networks cover 2.5 to 4.5GHz. This MMIC requires output external matching to your band of interest between 2.5GHz to 4.5GHz to provide maximum bandwidth flexibility. As an example, one of the available evaluation boards has over 17dB gain, 10 watts (40dBm) saturated output power over the 3.4 to 3.6GHz band at 12V.

This MMIC is in a ceramic package with both RF and DC leads at the lower level of the package to facilitate low-cost SMT assembly to the PC board. When mounting directly to PCB, please see application note AN700 for instructions. Because of high DC power dissipation, we strongly recommend to mount these devices directly on a metal heat sink. The AM254540WM-FM-R is the AM254540WM-BM-R mounted on a gold plated copper flange carrier. There are two screw holes on the flange to facilitate screwing on to a metal heat sink. This MMIC is RoHS compliant.

## FEATURES

- Frequency applications from 2.5 to 4.5GHz
- High output power, P1dB = 38dBm
- High gain > 17dB
- Input matched from 2.5 to 4.5GHz
- High efficiency > 35%

## APPLICATIONS

- WiMAX
- MMDS
- WLAN Repeaters
- 12V Applications

## TYPICAL PERFORMANCE FOR 3.2 to 3.8 GHz TEST FIXTURE*

### Performance at $V_{dd}$ = +12V, , $V_{gs}$=-0.97V**, $I_{dq}$ = 1300mA, $T_a$ = 25°C

| Parameters | Minimum | Typical | Maximum |
|---|---|---|---|
| Frequency | 3.4 – 3.6GHz | 3.2 – 3.8GHz | |
| Small Signal Gain | 15dB | 17dB | |
| Gain Ripple | | ± 1.0dB | ± 2.0dB |
| P1dB | 37dBm | 38dBm | |
| Psat | | 39dBm | |
| IP3 | | 45dBm | |
| Efficiency @ P1dB | | 35% | |
| Input Return Loss | 8dB | 10dB | |
| Output Return Loss | | 5dB | |
| Thermal Resistance | | 5°C/W | |

* Specifications subject to change without notice.

** $V_{gs}$ may vary from lot to lot

Email: info@amcomusa.com
Website: www.amcomusa.com
Tel. (301) 353-8400 Fax. (301) 353-8401
401 Professional Drive, Gaithersburg, MD 20879

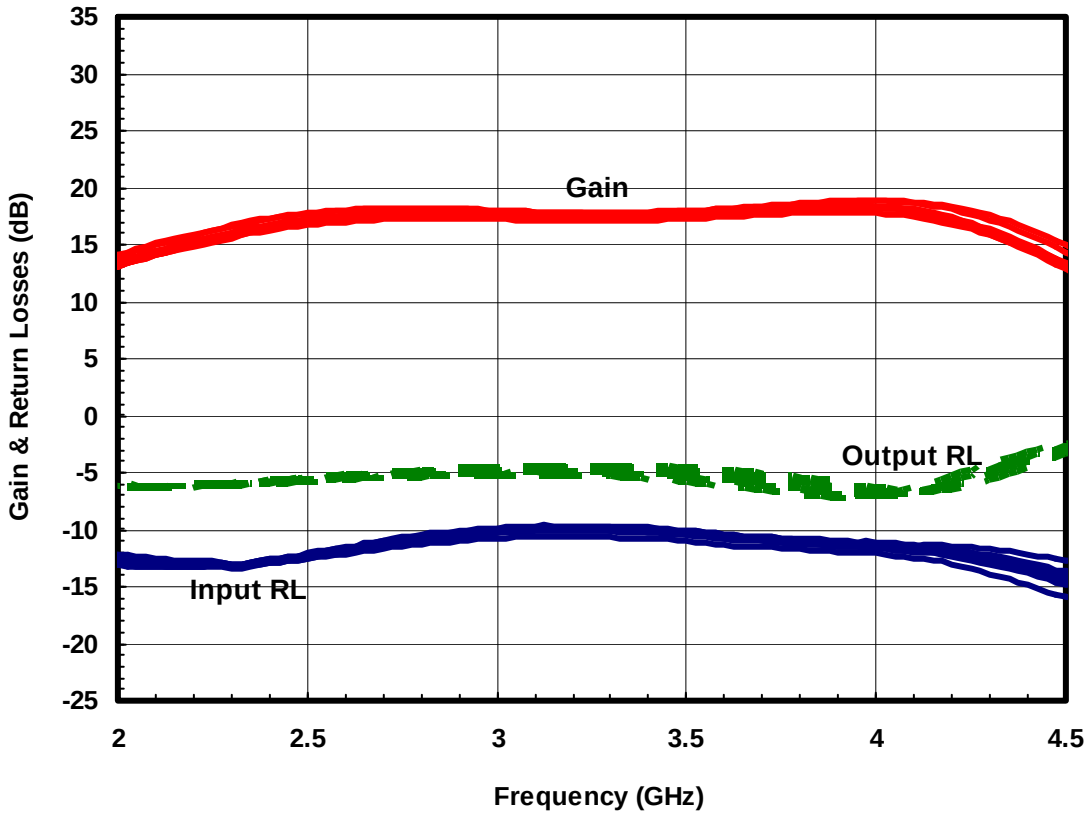
## ABSOLUTE MAXIMUM RATING

| Parameters | Symbol | Rating |
|---|---|---|
| Drain source voltage | $V_{dd}$ | 13V |
| Gate source voltage | $V_{gs}$ | -3V |
| Drain source current | $I_{dd}$ | 1.5A |
| Continuous dissipation at room temperature | $P_t$ | 25W |
| Channel temperature | $T_{ch}$ | 175°C |
| Storage temperature | $T_{sto}$ | -55°C to +135°C |

## SMALL SIGNAL DATA

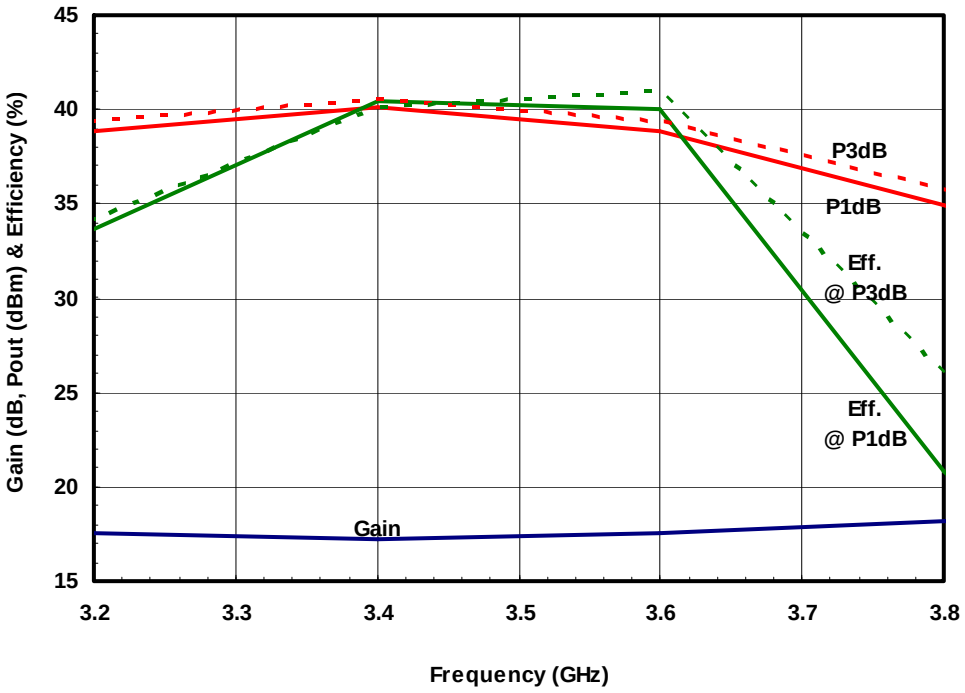
**3.2 – 3.8GHz Matching Circuit**

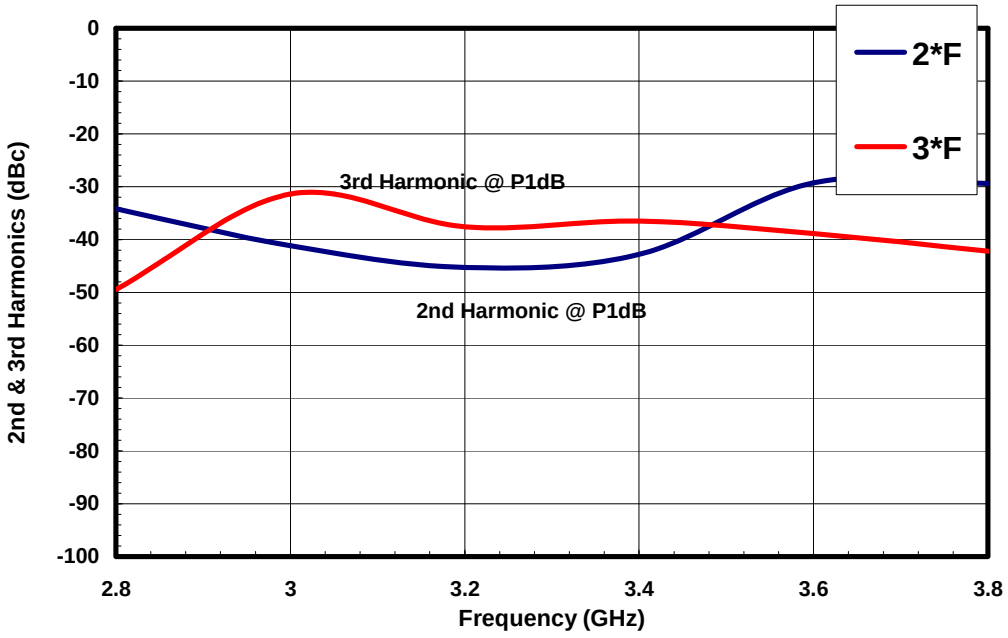
**MMIC Bias: $V_{dd}$=+12V, $I_{dd}$= 1.3A, $V_g$s=-0.97V**



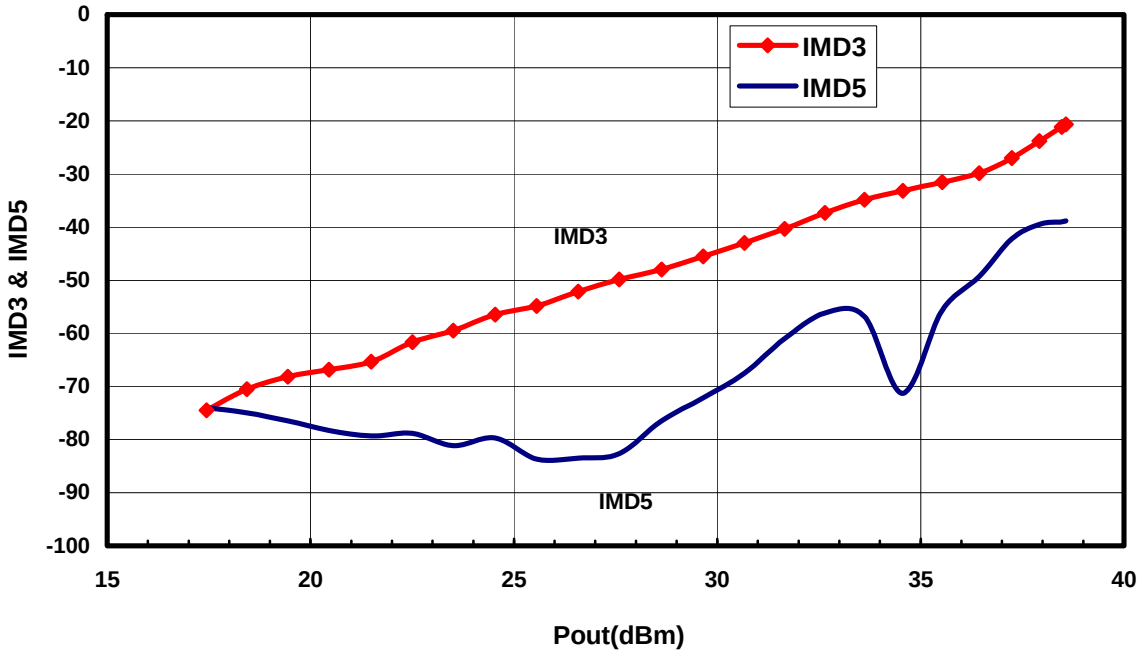
## POWER DATA of 3.2 to 3.8GHz TEST BOARD

$V_{dd}$=+12V, $I_{dd1}$=0.3A, $I_{dd2}$=1.0A

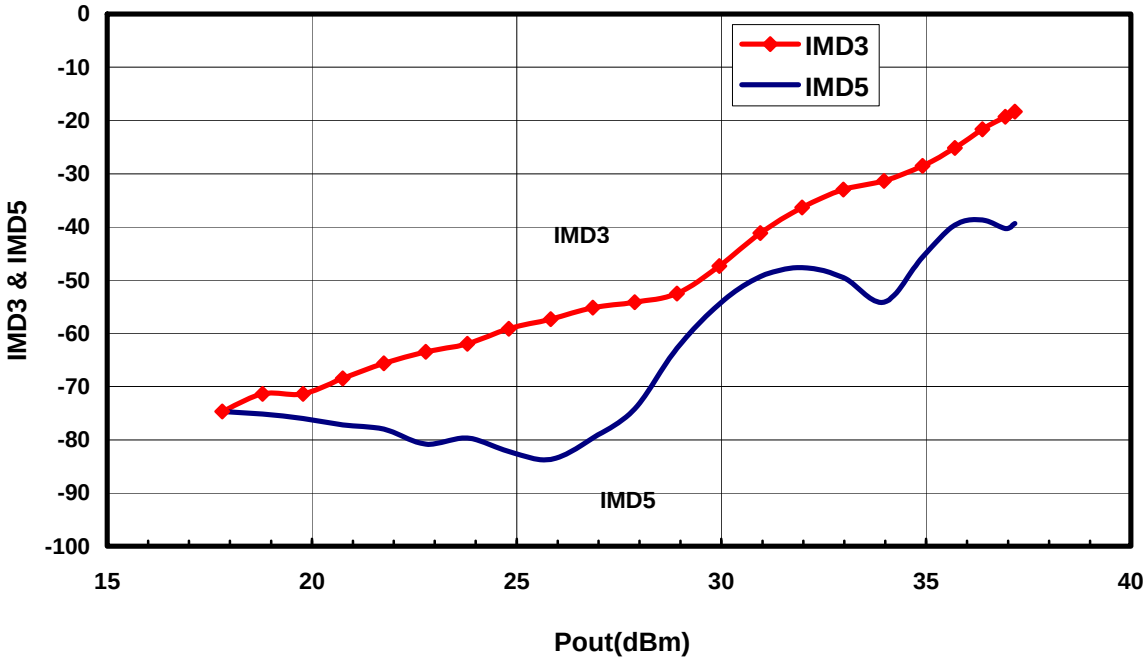


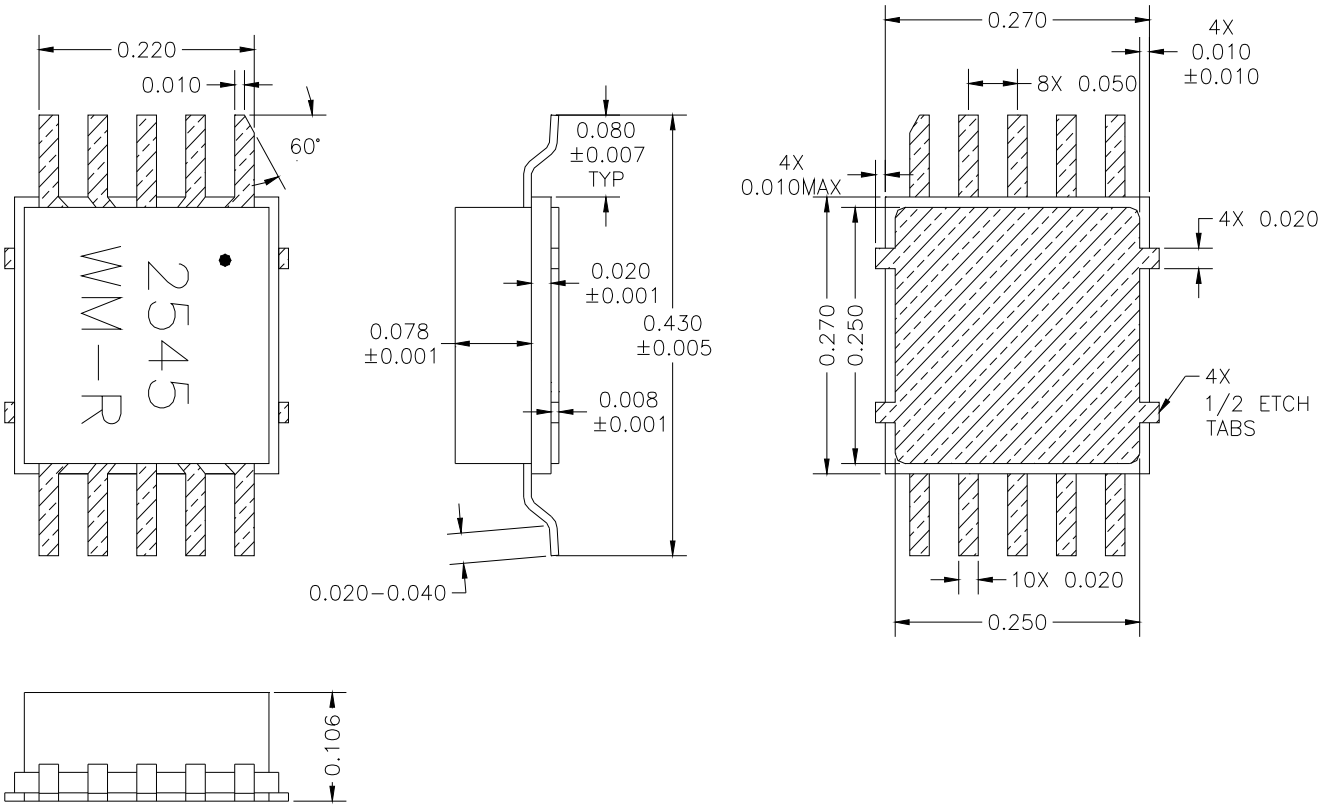
**3.4GHz**


IMD3
IMD5
IMD3
IMD5
IMD3 & IMD5
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
15
20
25
30
35
40
Pout(dBm)

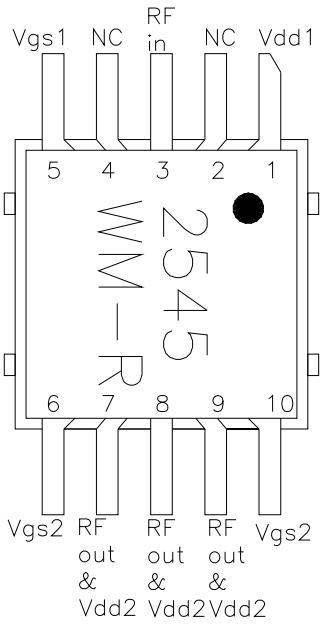
**3.6GHz**


IMD3
IMD5
IMD3
IMD5
IMD3 & IMD5
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
15
20
25
30
35
40
Pout(dBm)

## PACKAGE OUTLINE (BM)



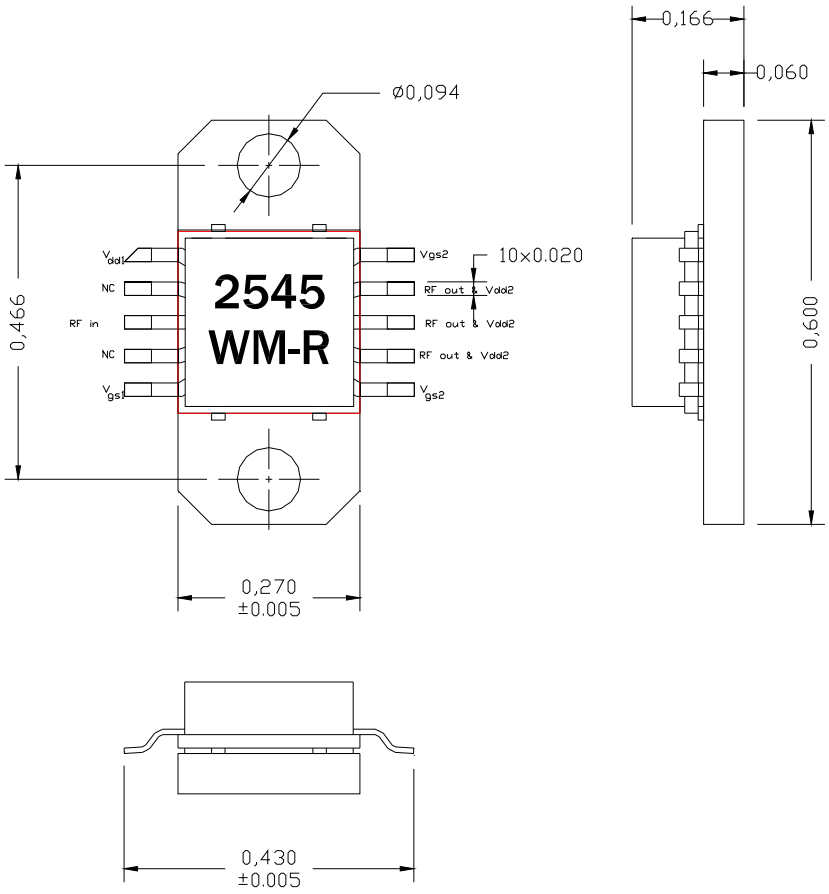

## PIN LAYOUT



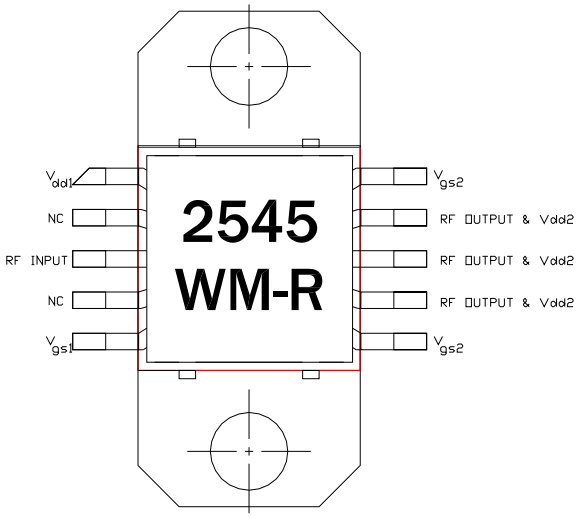

| Pin No. | Function | Bias* |
|---|---|---|
| 1 | Vdd1 | +12V |
| 2 | NC | |
| 3 | RF in | |
| 4 | NC | |
| 5 | Vgs1 | -0.97V |
| 6 | Vgs2 | -0.97V |
| 7 | RF out & Vdd2 | +12V |
| 8 | RF out & Vdd2 | +12V |
| 9 | RF out & Vdd2 | +12V |
| 10 | Vgs2 | -0.97V |

* $V_{gs1}$, $V_{gs2}$ may vary from lot to lot

## PACKAGE OUTLINE (FM)



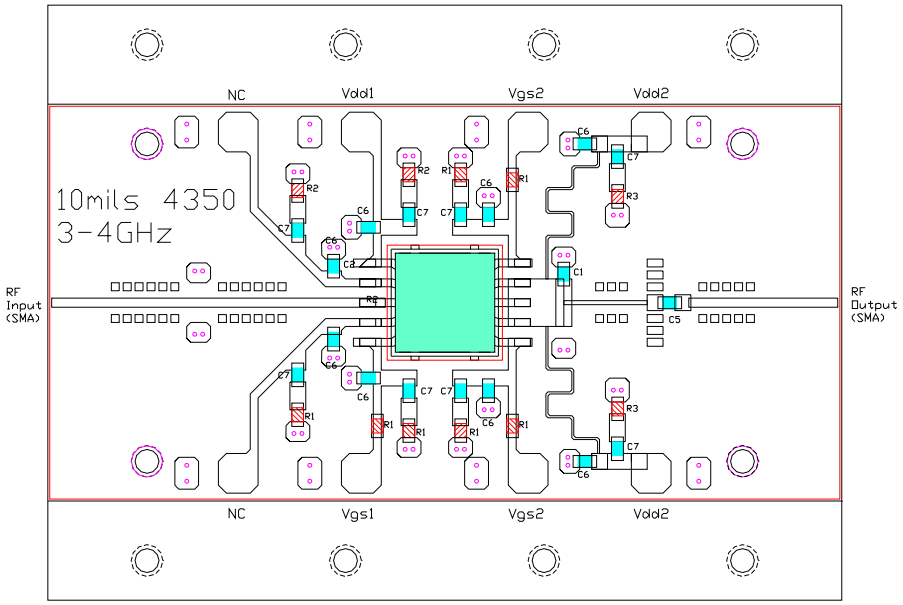

## PIN LAYOUT



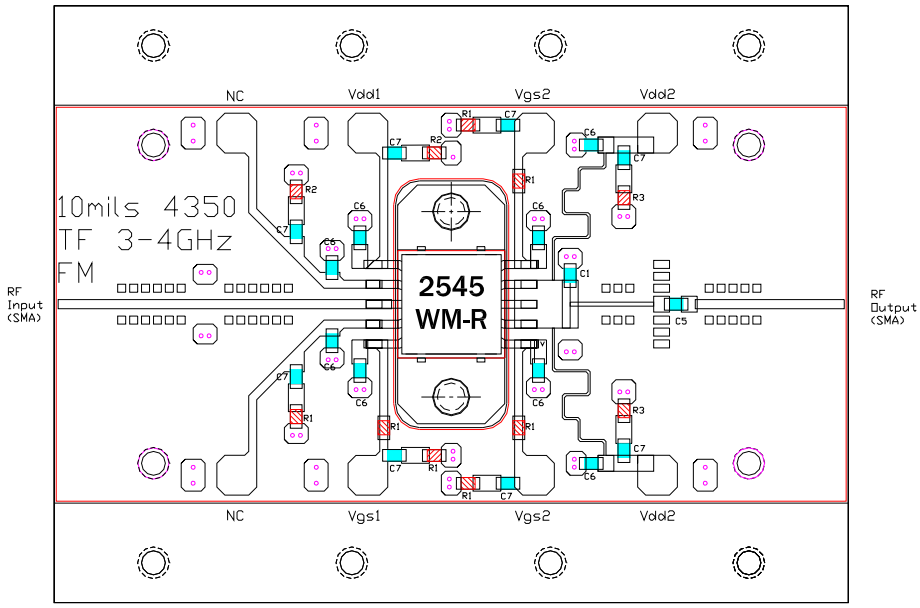

| Pin No. | Function | Bias* |
|---|---|---|
| 1 | Vdd1 | +12V |
| 2 | NC | |
| 3 | RF in | |
| 4 | NC | |
| 5 | Vgs1 | -0.97V |
| 6 | Vgs2 | -0.97V |
| 7 | RF out & Vdd2 | +12V |
| 8 | RF out & Vdd2 | +12V |
| 9 | RF out & Vdd2 | +12V |
| 10 | Vgs2 | -0.97V |

* $V_{gs1}$, $V_{gs2}$ may vary from lot to lot

## 3.2 to 3.8GHz TEST CIRCUITS




Notes:
1- 10mils Rogers 4350 Material epoxied
2- Ckt is for un-matched MMICs
3- C1=0.5pF, C5=10.0pF, C6=20pF, C7=1000pF, R1=50ohms, R2=10ohms, R3=50hms
4- All Caps & Resistors are 0603 size
5- External 1 μF dipped tantalum capacitor should be attached to Vd and Vg to decouple external bias leads.




Notes:
1- 10mils Rogers 4350 Material epoxied
2- Ckt is for 3-4GHz un-matched MMICs
3- C1=0.5pF, C5=10.0pF, C6=20pF, C7=1000pF, R1=50ohms, R2=10ohms, R3=50hms
4- All Caps & Resistors are 0603 size
5- External 1 μF dipped tantalum capacitor should be attached to Vd and Vg to decouple external bias leads.