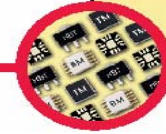




## GaAs MMIC Power Amplifier



**AM143440WM-BM-R**

**AM143440WM-FM-R**

December 2009

### DESCRIPTION

AMCOM's AM143440WM-BM-R and AM143440WM-FM-R are part of the GaAs HiFET MMIC power amplifier series. These high efficiency MMICs are 2-stage GaAs pHEMT power amplifiers biased at 10 - 14V. The input and inter-stage matching networks cover 1.4 to 3.4GHz. These MMICs require output external matching to your band of interest between 1.4GHz to 3.4 GHz to provide maximum bandwidth flexibility. As an example, one of the available evaluation boards has over 20 dB gain, 8 watts (39dBm) saturated output power over the 1.5 to 1.8GHz band at 12V. The other evaluation board at 2.0 to 3.0 GHz achieved 19dB gain and 39dBm output power at 12V. The BM package RF and DC leads are coplanar with the bottom level of the package, which serves as ground, to facilitate low-cost SMT assembly to the PC board. Because of high DC power dissipation, we strongly recommend to mount this device directly on a metal heat sink. The FM package is the BM package mounted on a copper flange carrier. There are two screw holes on the flange to facilitate screwing on to a metal heat sink. Both MMICs are RoHS compliant.

### FEATURES

- Frequency applications from 1.4 to 3.4 GHz
- High output power, P1dB = 39 dBm
- High gain > 20 dB
- Input matched from 1.4GHz to 3.4GHz
- High efficiency > 40%

### APPLICATIONS

- PCS Base Station
- GPS Applications
- MMDS
- WLAN Repeaters
- 14V Applications

### TYPICAL PERFORMANCE\*

#### a) TEST BOARD FOR 1.5 to 1.8 GHz

Performance at  $V_{dd} = +12V$ ,  $V_{gs} = -0.9V$ ,  $I_{dq} = 1300mA$ ,  $T_a = 25^\circ C$

Parameters	Minimum	Typical	Maximum
Frequency	-	1.5 – 1.8 GHz	
Small Signal Gain	18 dB	20.5 dB	
Gain Ripple	-	± 1.5 dB	± 2.0 dB
P1dB	36.5 dBm	38.5 dBm	-
Psat	-	39.0 dBm	-
IP3	-	44 dBm	-
Efficiency @ P1dB	-	35 %	
Input Return Loss	15 dB	20dB	
Output Return Loss	3 dB	5dB	
Thermal Resistance		5 °C/W	

\*Specifications subject to change without notice.

### Typical Performance at $V_{dd} = 10V, 12V \text{ \& } 14V, I_{dq} = 1300mA, T_a = 25^\circ C$

Parameters	$V_{dd} = +10V$	$V_{dd} = +12V$	$V_{dd} = +14V$
Frequency	1.5 – 1.8 GHz	1.5 – 1.8 GHz	1.5 – 1.8 GHz
Small Signal Gain	21 dB	20.5 dB	20 dB
Gain Ripple	$\pm 1.2$ dB	$\pm 1.2$ dB	$\pm 1.2$ dB
P1dB	37.5 dBm	38.5 dBm	39.0 dBm
Psat	38.0 dBm	39.0 dBm	39.5 dBm
IP3	44 dBm	44 dBm	44 dBm
Efficiency @ P1dB	35%	35 %	30 %
Input Return Loss	20dB	20dB	20dB
Output Return Loss	5dB	5dB	5dB
Thermal Resistance	5 °C/W	5 °C/W	5 °C/W

### b) TEST BOARD FOR 2.0 to 3.0 GHz

#### Performance at $V_{dd} = +12V, V_{gs} = -0.9V, I_{dq} = 1300mA, T_a = 25^\circ C$

Parameters	Minimum	Typical	Maximum
Frequency	-	2.0 – 3.0 GHz	-
Small Signal Gain	17 dB	20 dB	
Gain Ripple	-	$\pm 1.5$ dB	$\pm 3.0$ dB
P1dB	37.0 dBm	38.5 dBm	-
Psat	-	39.0dBm	-
IP3	-	43 dBm	-
Efficiency @ P1dB	-	30 %	
Input Return Loss	10 dB	12dB	
Output Return Loss	7 dB	10dB	
Thermal Resistance		5 °C/W	

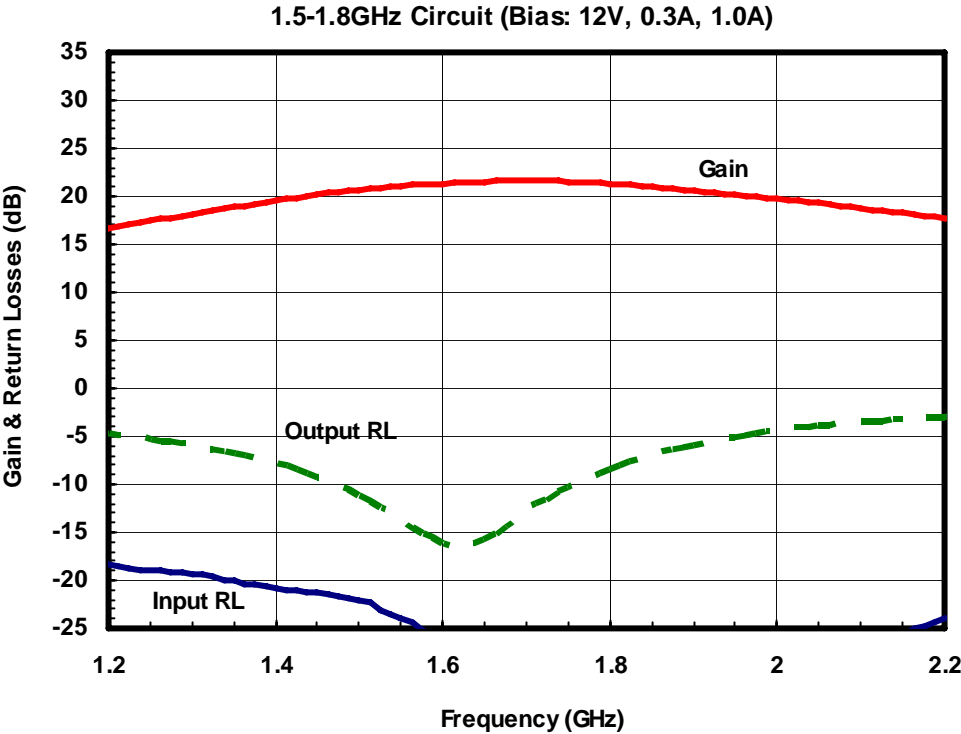
### Typical Performance at $V_{dd} = 10V, 12V \text{ \& } 14V, I_{dq} = 1300mA, T_a = 25^\circ C$

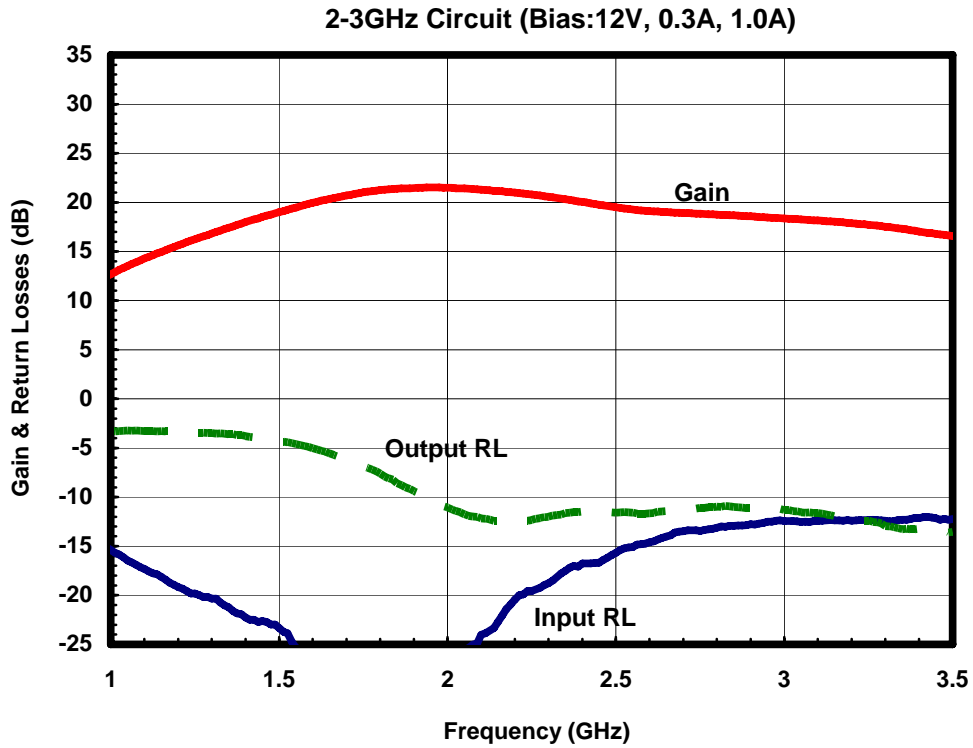
Parameters	$V_{dd} = +10V$	$V_{dd} = +12V$	$V_{dd} = +14V$
Frequency	2.0 – 3.0 GHz	2.0 – 3.0 GHz	2.0 – 3.0 GHz
Small Signal Gain	21 dB	20 dB	19 dB
Gain Ripple	$\pm 1.5$ dB	$\pm 1.5$ dB	$\pm 1.5$ dB
P1dB	37.0 dBm	38.5 dBm	39.0 dBm
Psat	37.5 dBm	39.0 dBm	39.5 dBm
IP3	43 dBm	43 dBm	43 dBm
Efficiency @ P1dB	30 %	30 %	30 %
Input Return Loss	15dB	15dB	15dB
Output Return Loss	10dB	10dB	10dB
Thermal Resistance	5 °C/W	5 °C/W	5 °C/W

**ABSOLUTE MAXIMUM RATING**

Parameter	Symbol	Rating
Drain source voltage	$V_{dd}$	14 V
Gate source voltage	$V_{gs}$	-3 V
Drain source current	$I_{dd}$	4 A
Continuous dissipation at room temperature	$P_t$	56 W
Channel temperature	$T_{ch}$	175 °C
Storage temperature	$T_{sto}$	-55°C to +135°C

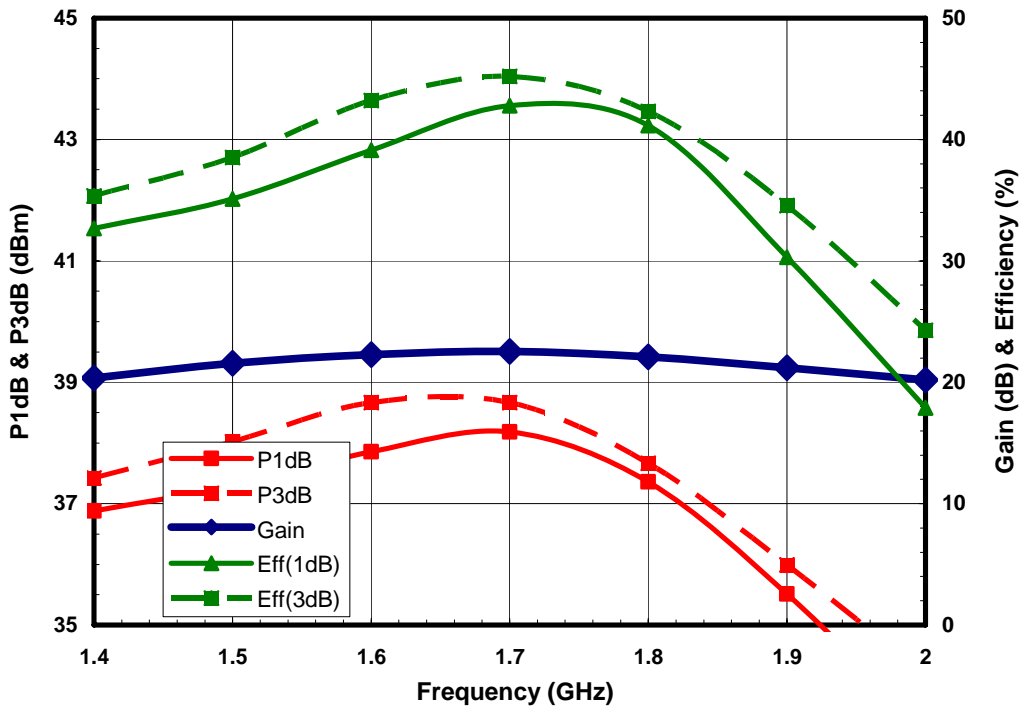
**SMALL SIGNAL DATA**



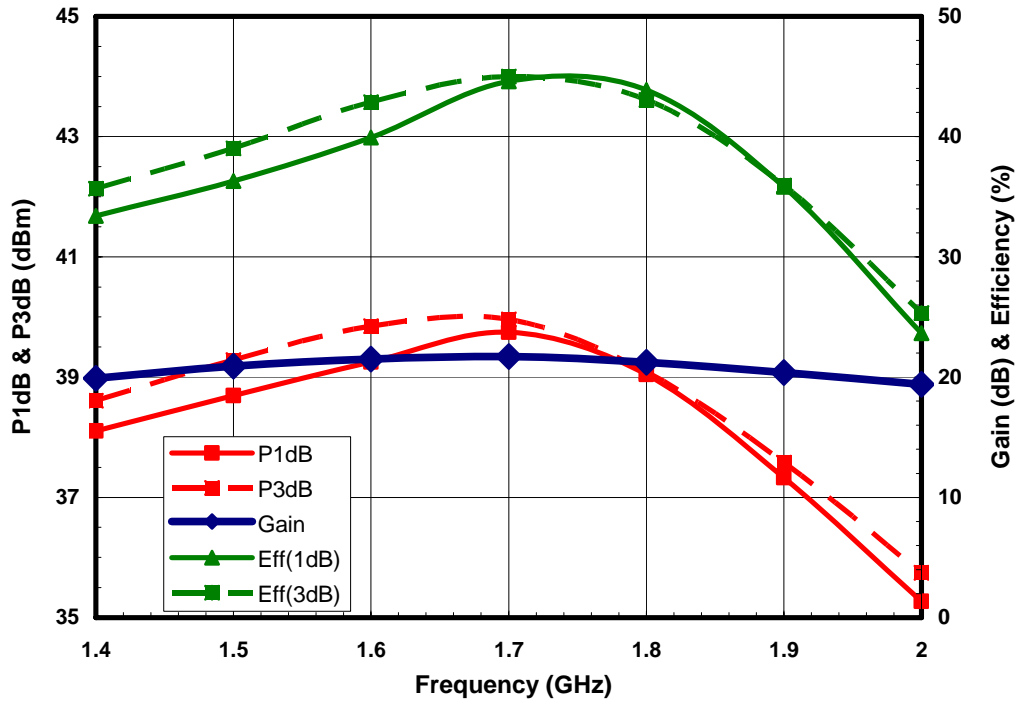


**POWER DATA of 1.5 to 1.8 GHz TEST BOARD**

$V_{dd}=+10V, I_{dd1}=0.3A, I_{dd2}=1.0A$

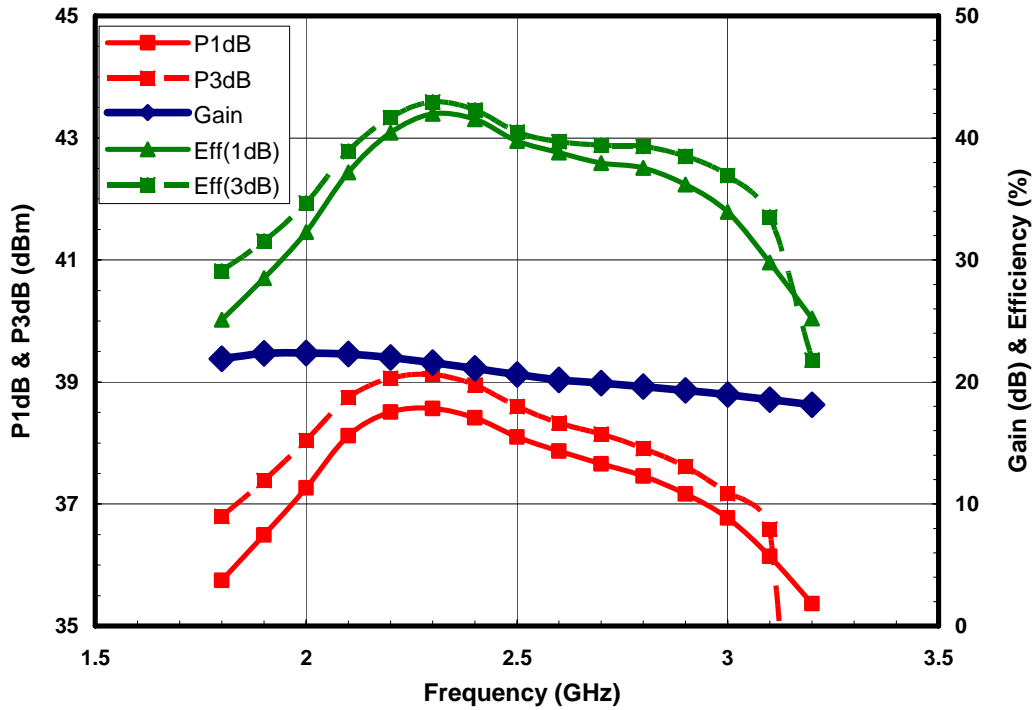


$V_{dd}=+12V, I_{dd1}=0.3A, I_{dd2}=1.0A$

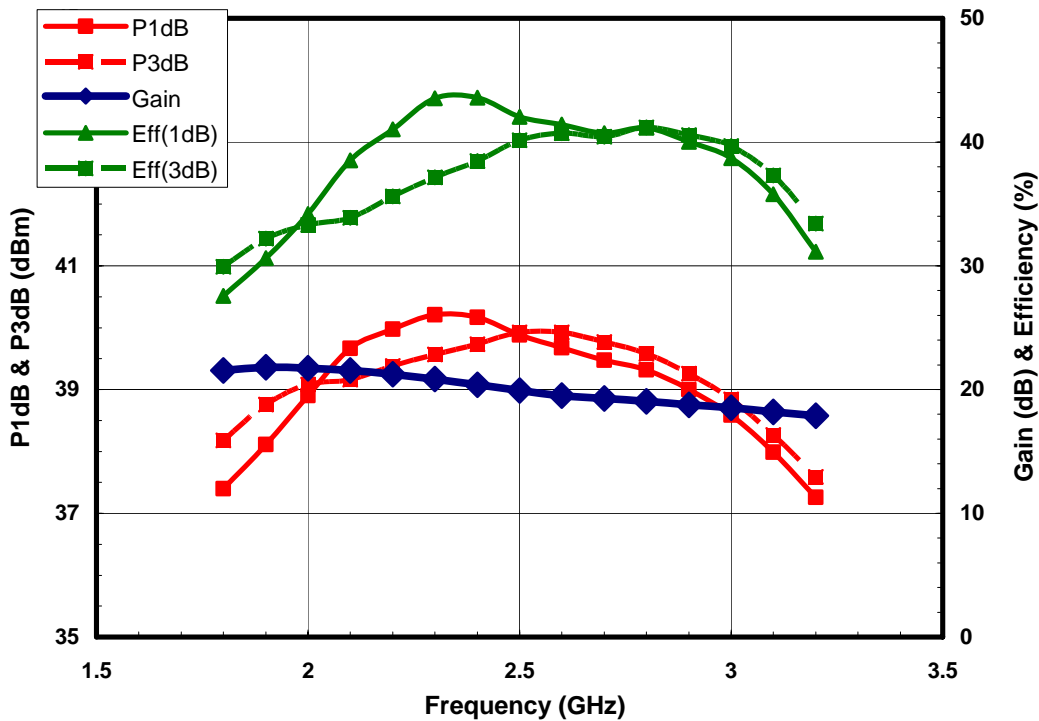


**POWER DATA of 2.0 to 3.0 GHz TEST BOARD**

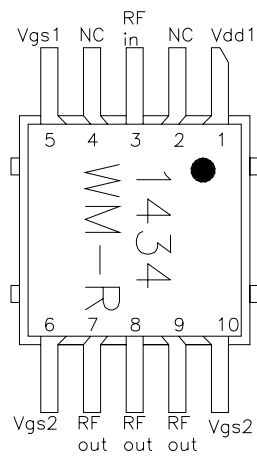
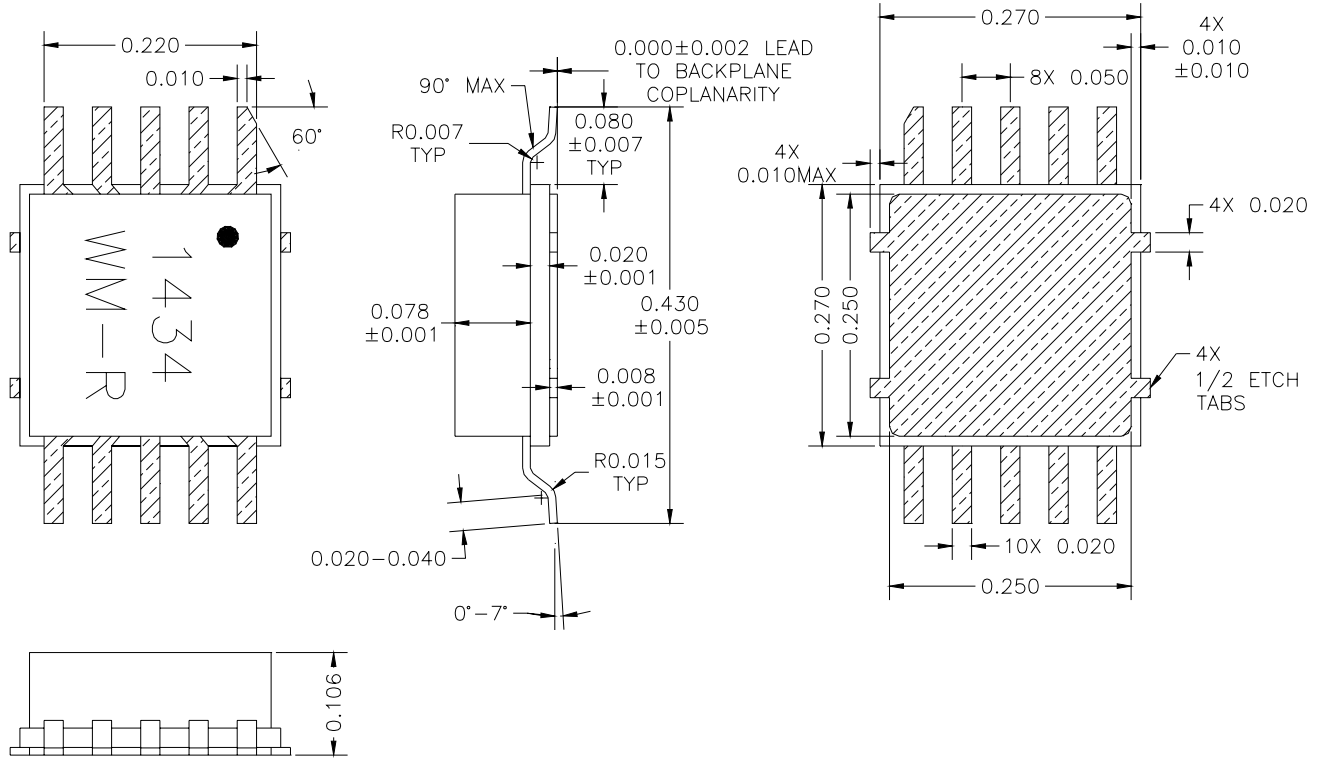
$V_{dd}=+10V, I_{dd1}=0.3A, I_{dd2}=1.0A$



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



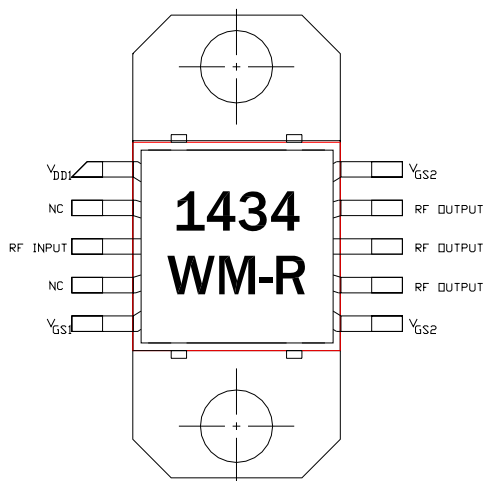
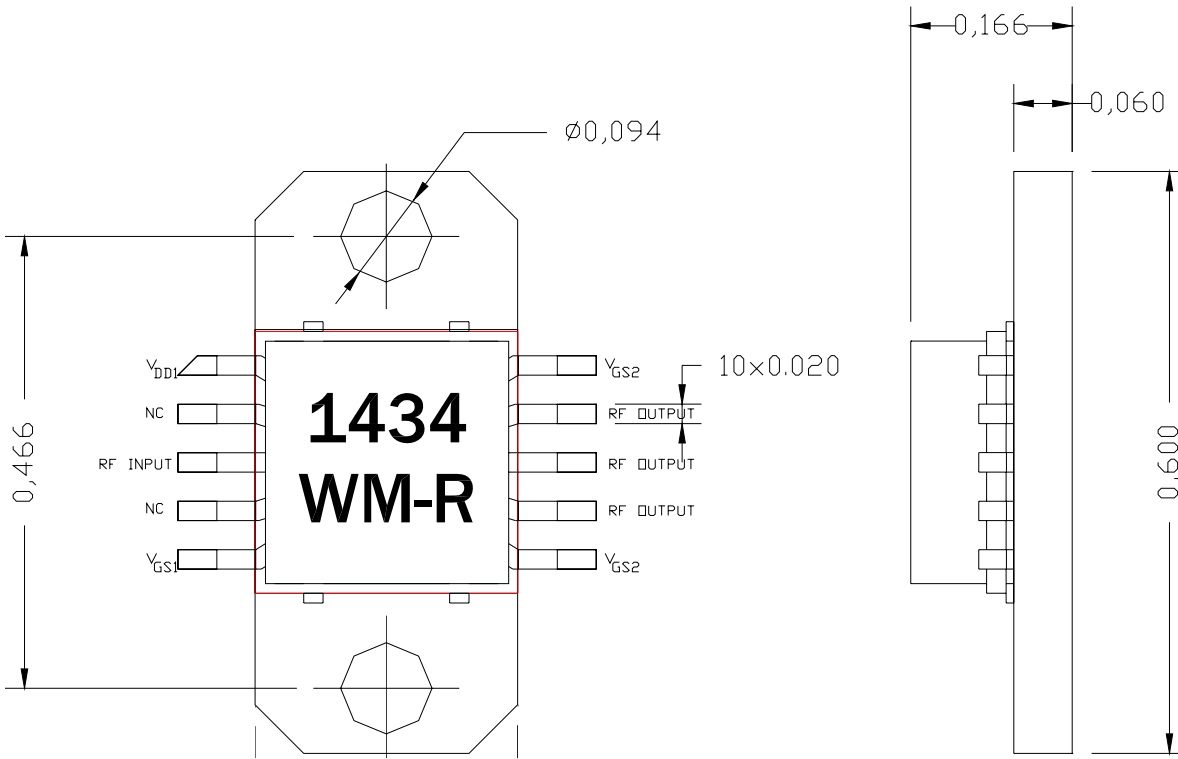
**PACKAGE OUTLINE (BM)**



Pin No.	Function	Bias
1	Vdd1	+12V
2	NC	
3	RF in	
4	NC	
5	Vgs1	-0.9V
6	Vgs2	-0.9V
7	RF out	+12V
8	RF out	+12V
9	RF out	+12V
10	Vgs2	-0.9V

**Pin Layout**

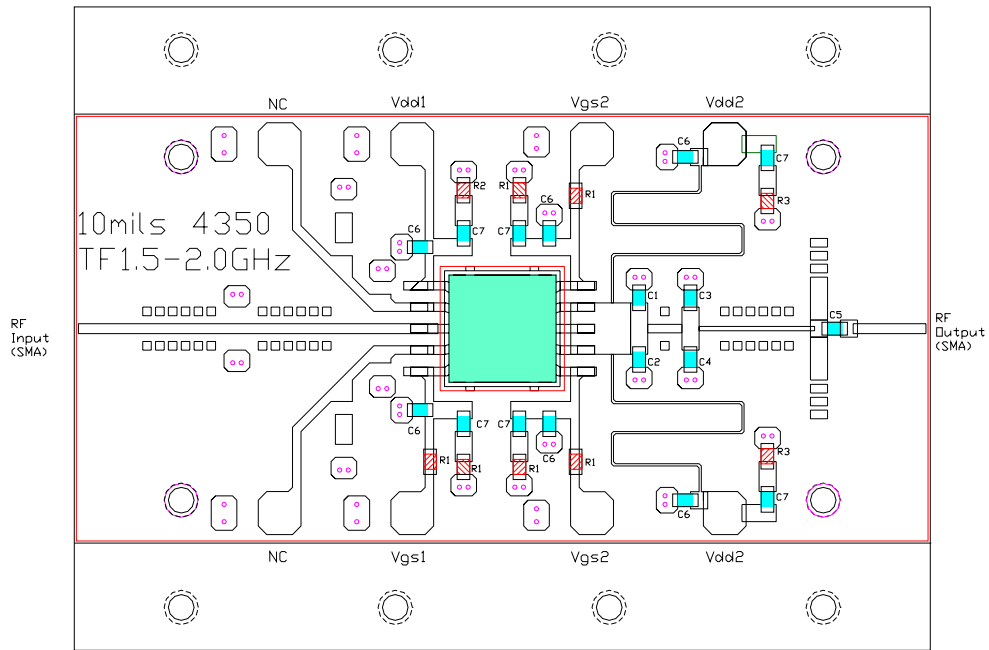
**PACKAGE OUTLINE (FM)**



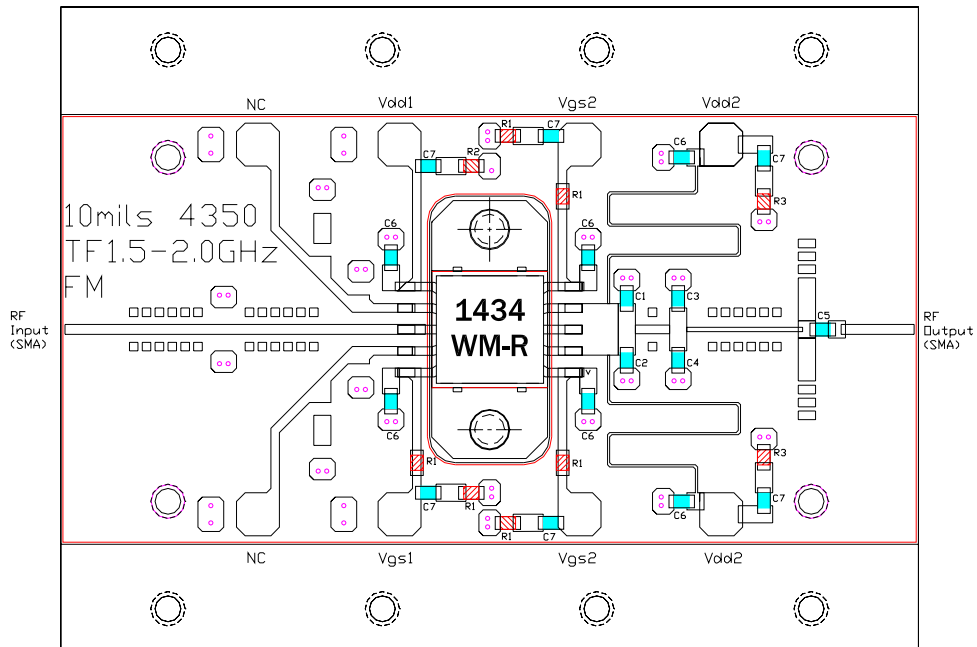
Pin No.	Function	Bias
1	Vdd1	+12V
2	NC	
3	RF in	
4	NC	
5	Vgs1	-0.9V
6	Vgs2	-0.9V
7	RF out	+12V
8	RF out	+12V
9	RF out	+12V
10	Vgs2	-0.9V

**Pin Layout**

1.5 to 1.8GHz TEST CIRCUITS

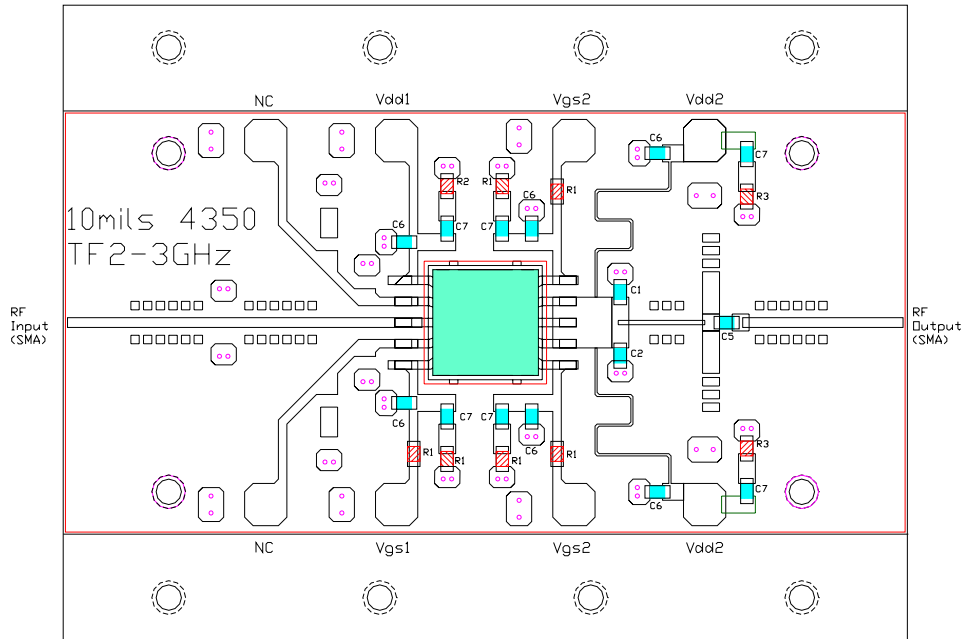


- Notes:  
 1- 10mils Rogers 4350 Material epoxied to TF  
 2- Ckt is for un-matched MMICs at 1.5-2.0GHz  
 3- C1=0.6pF, C2=0.7pF, C3=1.3pF, C4=1.8pF  
 C5=3.9pF, C6=20pF, C7=1000pF,  
 R1=50ohms, R2=10ohms, R3=50ohms  
 4- All Caps & Resistors are 0603 size

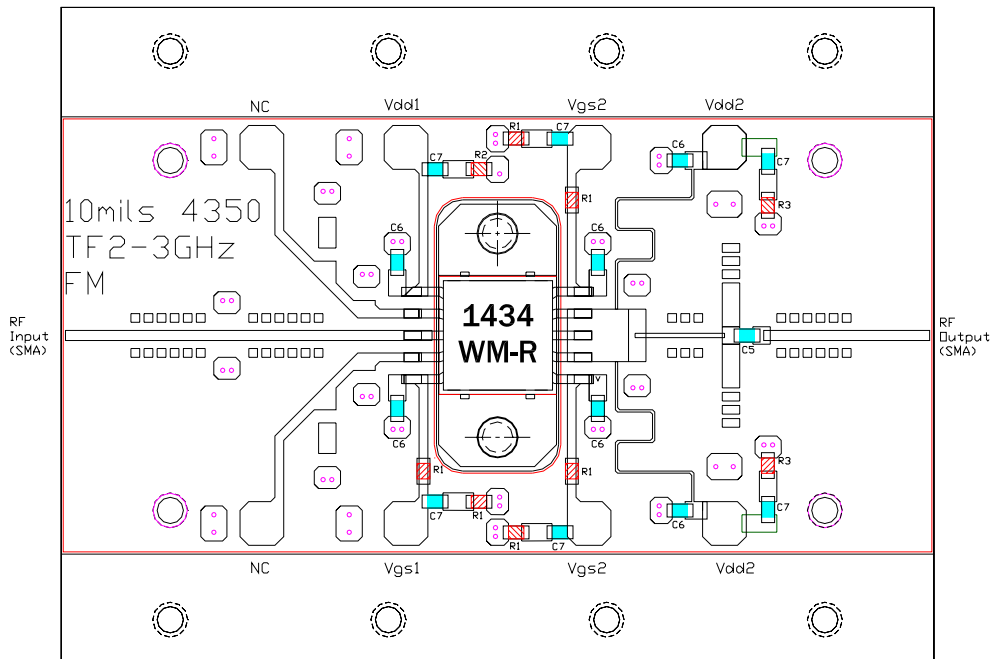


- Notes:  
 1- 10mils Rogers 4350 Material epoxied to TF  
 2- Ckt is for un-matched MMICs at 1.5-2.0GHz  
 3- C1=0.6pF, C2=0.7pF, C3=1.3pF, C4=1.8pF  
 C5=3.9pF, C6=20pF, C7=1000pF,  
 R1=50ohms, R2=10ohms, R3=50ohms  
 4- All Caps & Resistors are 0603 size

2.0 to 3.0GHz TEST CIRCUITS



- Notes:  
 1- 10mils Rogers 4350 Material epoxied to TF  
 2- Ckt is for un-matched MMICs at 2.0-3.0GHz  
 3- C1=1.2pF, C2=1.1pF, C5=3.0pF, C6=20pF, C7=1000pF,  
 R1=50ohms, R2=10ohms, R3=50ohms  
 4- All Caps & Resistors are 0603 size



- Notes:  
 1- 10mils Rogers 4350 Material epoxied to TF  
 2- Ckt is for un-matched MMICs at 2.0-3.0GHz  
 3- C1=1.2pF, C2=1.1pF, C5=3.0pF, C6=20pF, C7=1000pF,  
 R1=50ohms, R2=10ohms, R3=50ohms  
 4- All Caps & Resistors are 0603 size