

## DESCRIPTION

AMCOM's AM011037WM-BM-R and AM011037WM-FM-R are part of the GaAs pHEMT MMIC power amplifier series. These high efficiency MMICs are 2-stage GaAs pHEMT power amplifiers biased at +8V. The input and inter-stage matching networks cover 0.1 to 1GHz. These MMICs require output external matching to your band of interest between 0.1GHz to 1GHz to provide maximum bandwidth flexibility. As an example, one of the available evaluation boards has over 30dB gain, 6 watts (38dBm) saturated output power over the 0.2 to 0.3GHz band. 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 0.1 to 1GHz
- High output power, P1dB = 37 dBm
- High gain > 30 dB
- Input matched from 0.1GHz to 1GHz
- High efficiency > 40%

## APPLICATIONS

- Cellular & PCS Base Station
- 0.1 to 1GHz Applications
- Radio Service
- Broadcasting

## TYPICAL PERFORMANCE\*

### a) TEST BOARD FOR 0.2 to 0.3 GHz

Performance at  $V_{dd} = +8V$ ,  $V_{gs} = -0.66V^{**}$ ,  $I_{dq} = 1.4A$ ,  $T_a = 25^{\circ}C$

Parameters	Minimum	Typical	Maximum
Frequency	-	0.2 – 0.3 GHz	
Small Signal Gain	29 dB	31 dB	
Gain Ripple	-	± 1.0 dB	± 2.0 dB
P1dB	36.0 dBm	37.0dBm	-
Psat	-	37.5 dBm	-
IP3	-	46 dBm	-
Efficiency @ P1dB	-	40 %	
Input Return Loss	8 dB	10dB	
Output Return Loss	10 dB	12dB	
Thermal Resistance		5 °C/W	

\*Specifications subject to change without notice.

\*\*  $V_{gs}$  may vary from lot to lot. Adjust  $V_{gs}$  to get  $I_{dq}$  recommended value

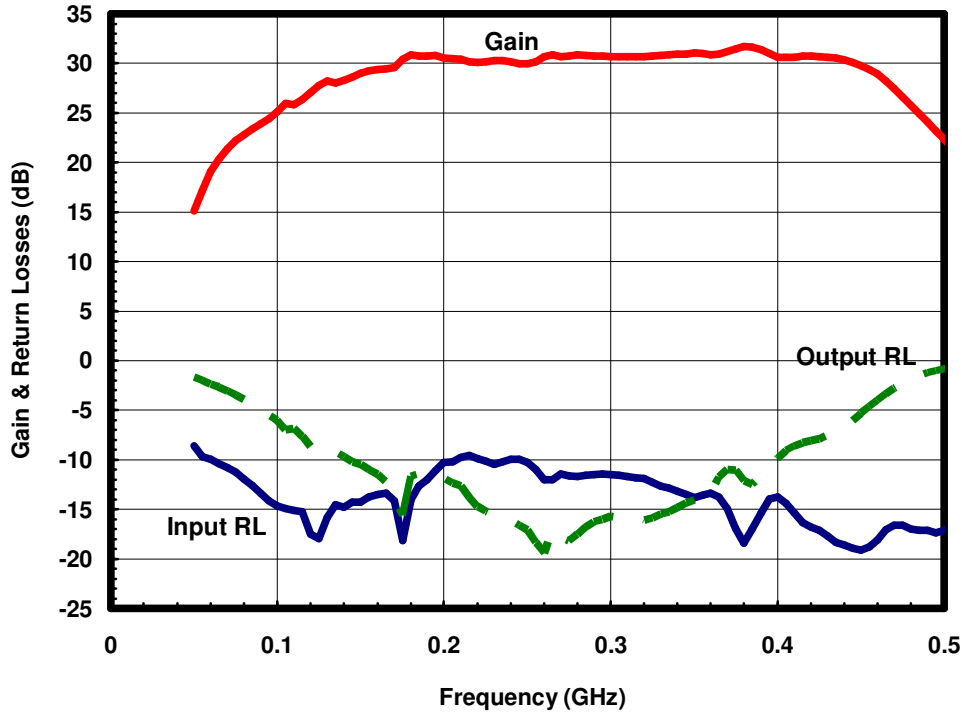
**b) TEST BOARD FOR 0.8 to 1.0 GHz****Performance at  $V_{dd} = +8V$ ,  $V_{gs} = -0.66V^{**}$ ,  $I_{dq} = 1.4A$ ,  $T_a = 25^{\circ}C$** 

Parameters	Minimum	Typical	Maximum
Frequency	-	0.8 – 1.0 GHz	-
Small Signal Gain	28 dB	30 dB	
Gain Ripple	-	$\pm 1.0$ dB	$\pm 2.0$ dB
P1dB	36.0 dBm	37.0 dBm	-
Psat	-	37.5dBm	-
IP3	-	46 dBm	-
Efficiency @ P1dB	-	35 %	
Input Return Loss	7 dB	10dB	
Output Return Loss	5 dB	8dB	
Thermal Resistance		5 $^{\circ}C/W$	

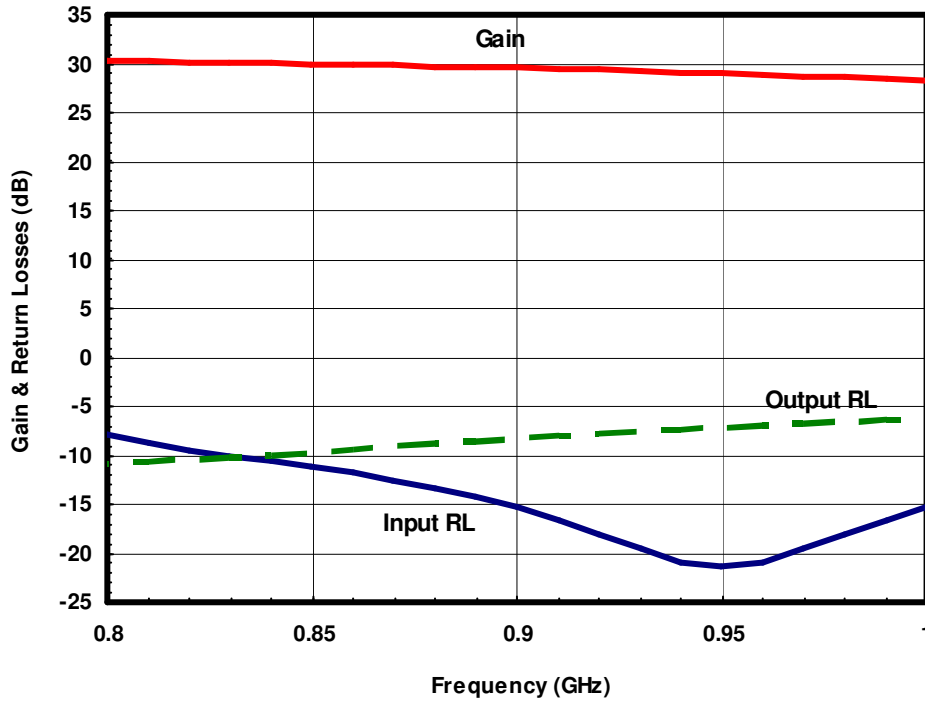
**\*\*  $V_{gs}$  may vary from lot to lot****ABSOLUTE MAXIMUM RATING**

Parameter	Symbol	Rating
Drain source voltage	$V_{dd}$	10 V
Gate source voltage	$V_{gs}$	-3 V
Drain source current	$I_{dd}$	1.5 A
Continuous dissipation at room temperature	$P_t$	15 W
Channel temperature	$T_{ch}$	175 $^{\circ}C$
Storage temperature	$T_{sto}$	-55 $^{\circ}C$ to +135 $^{\circ}C$

**SMALL SIGNAL DATA**

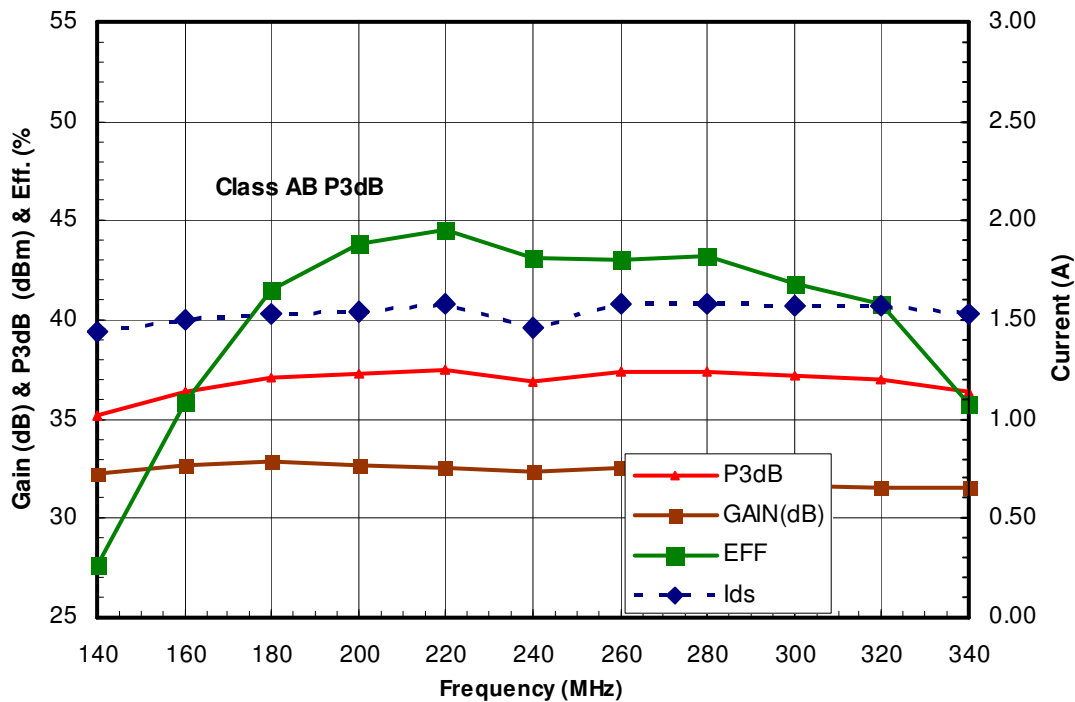
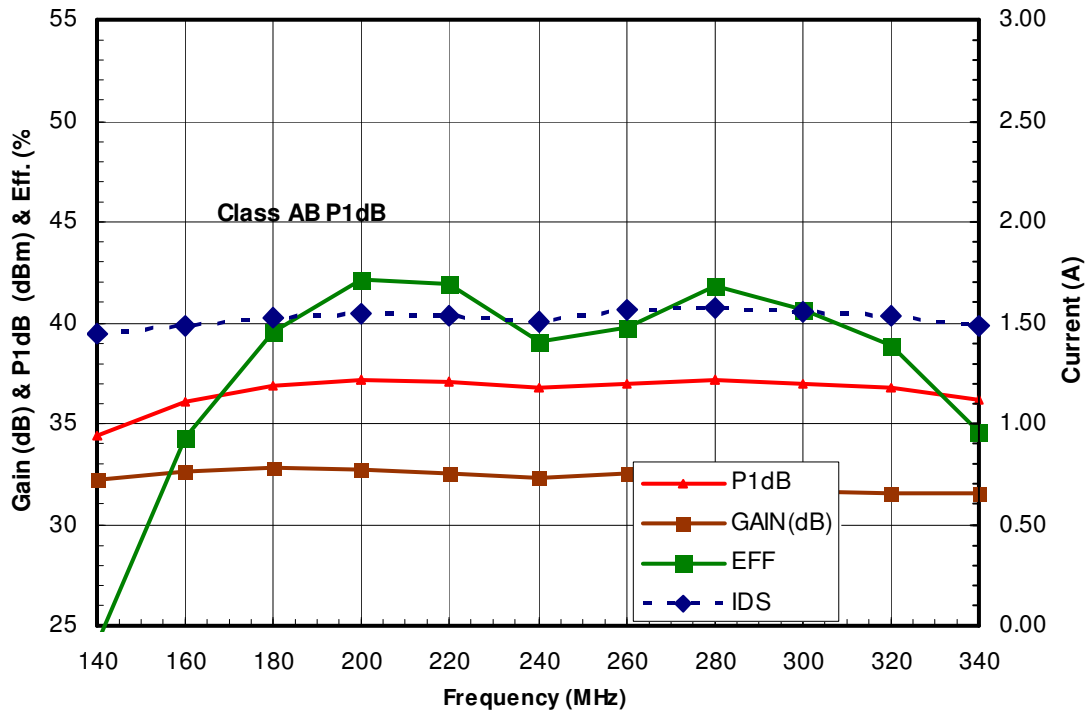


**Gain & Return Losses for 0.2 to 0.3GHz Matching Circuit**

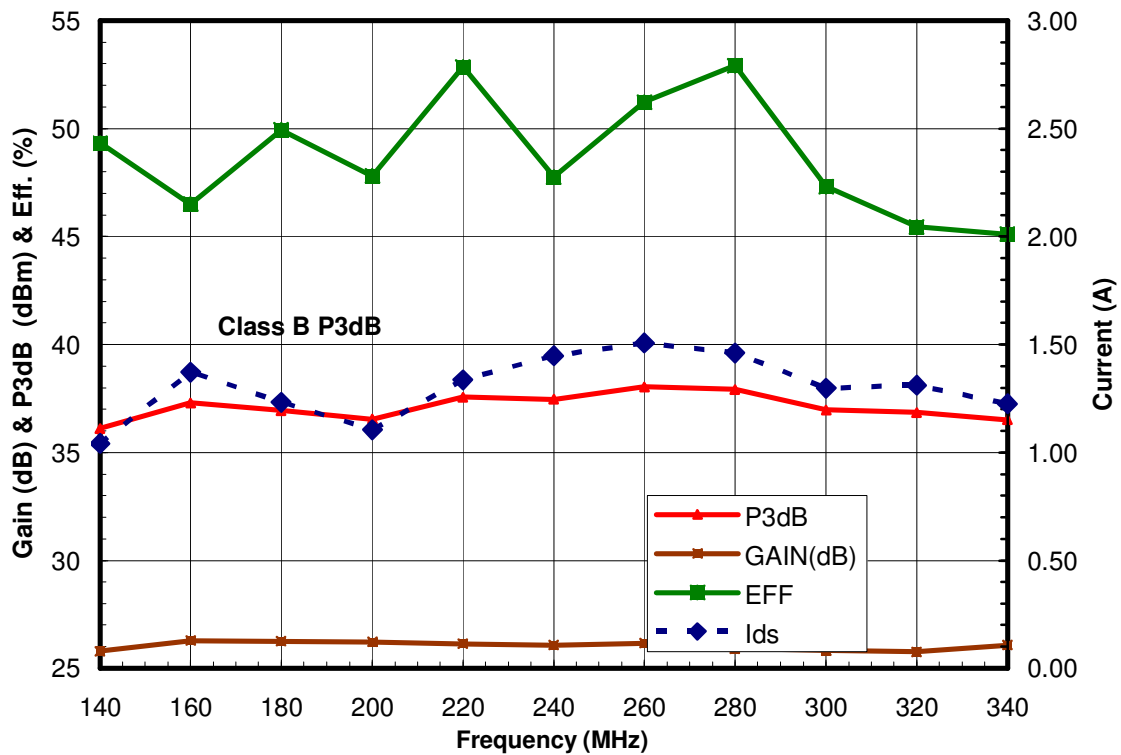
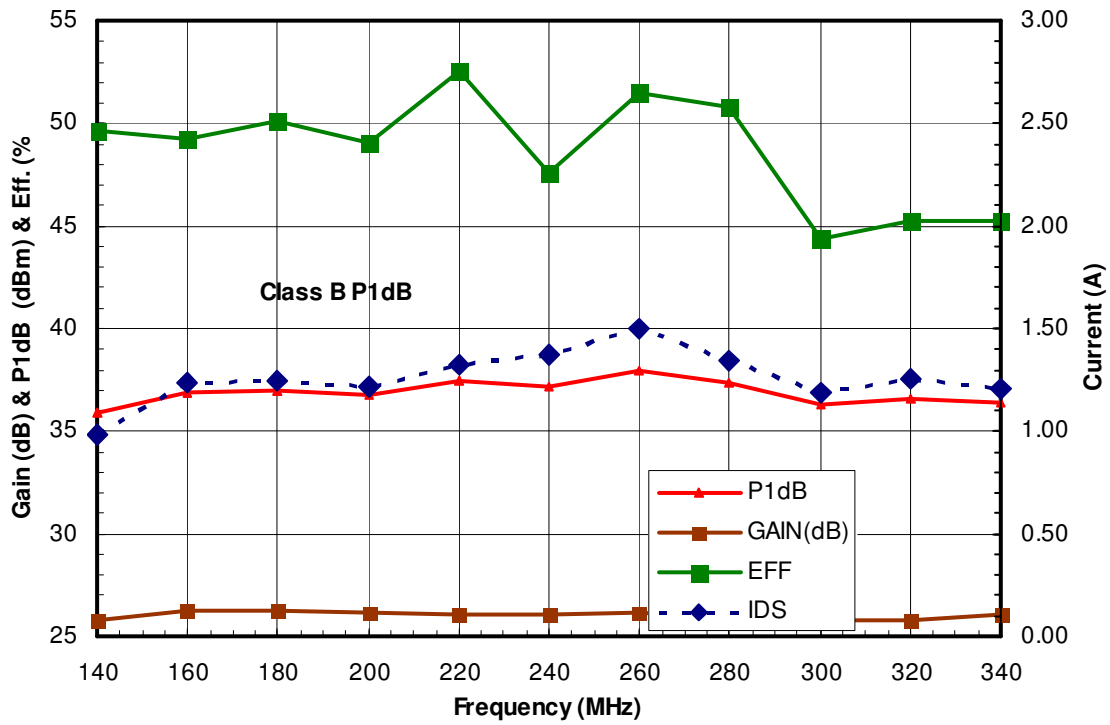


**Gain & Return Losses for 0.8 to 1.0GHz Matching Circuit**

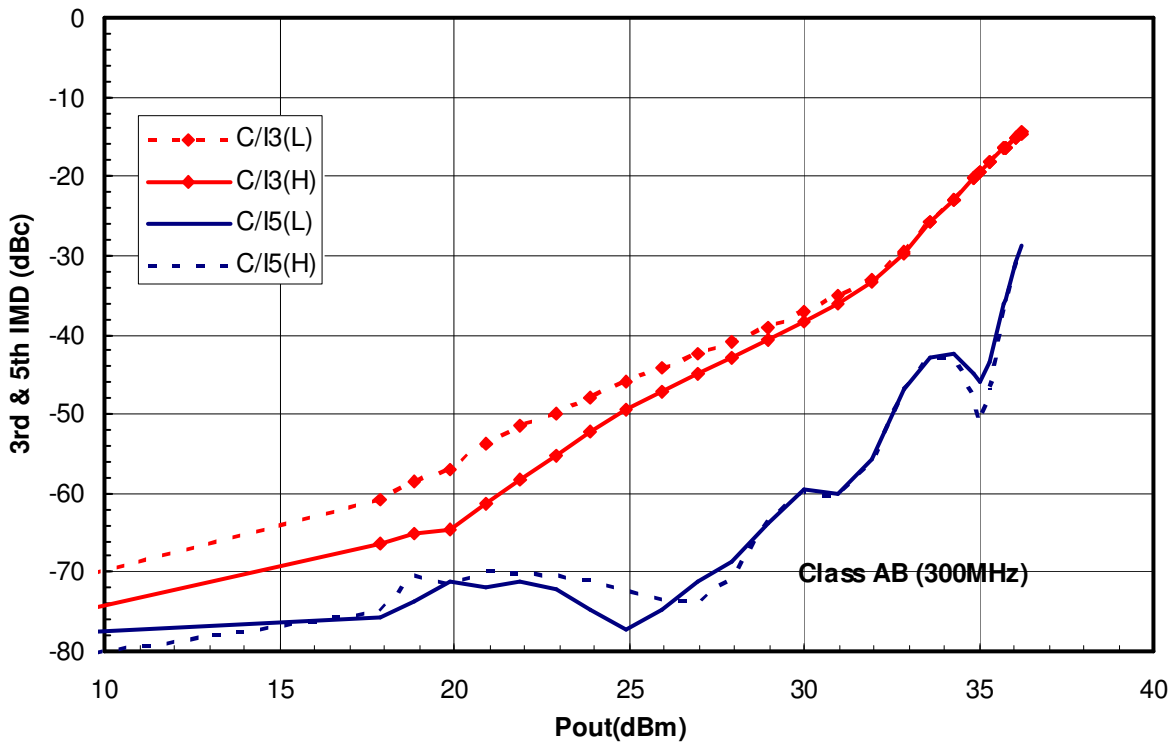
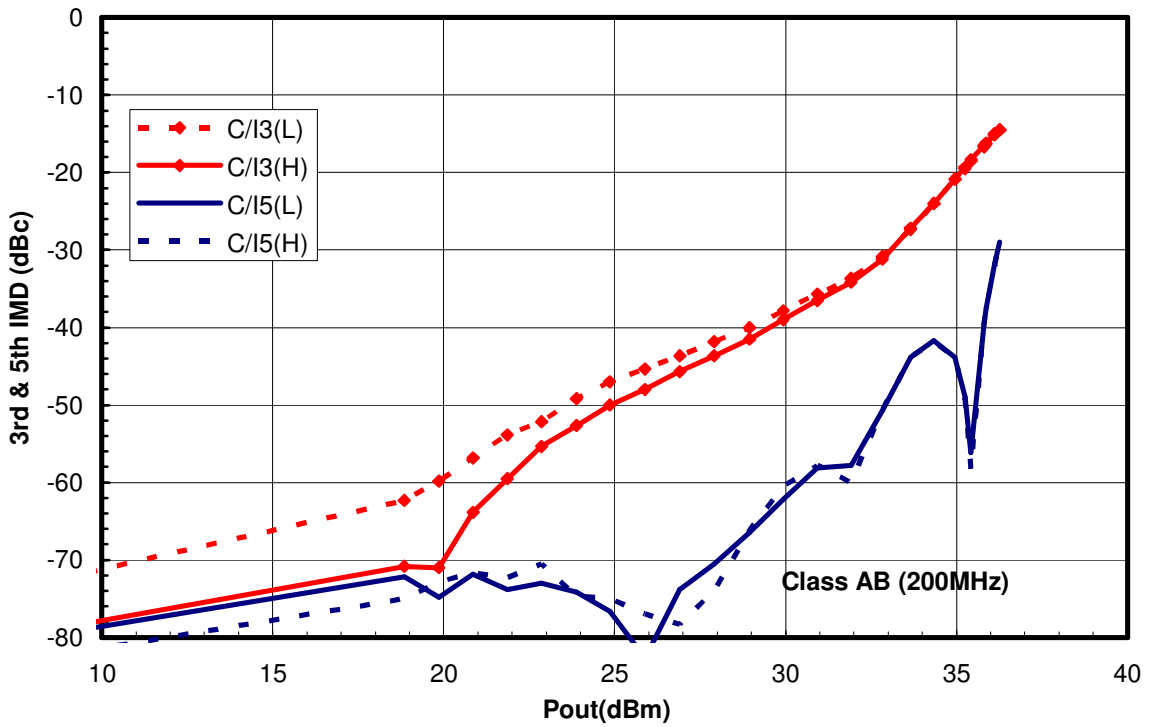
**POWER DATA of 0.2 to 0.3 GHz TEST BOARD**



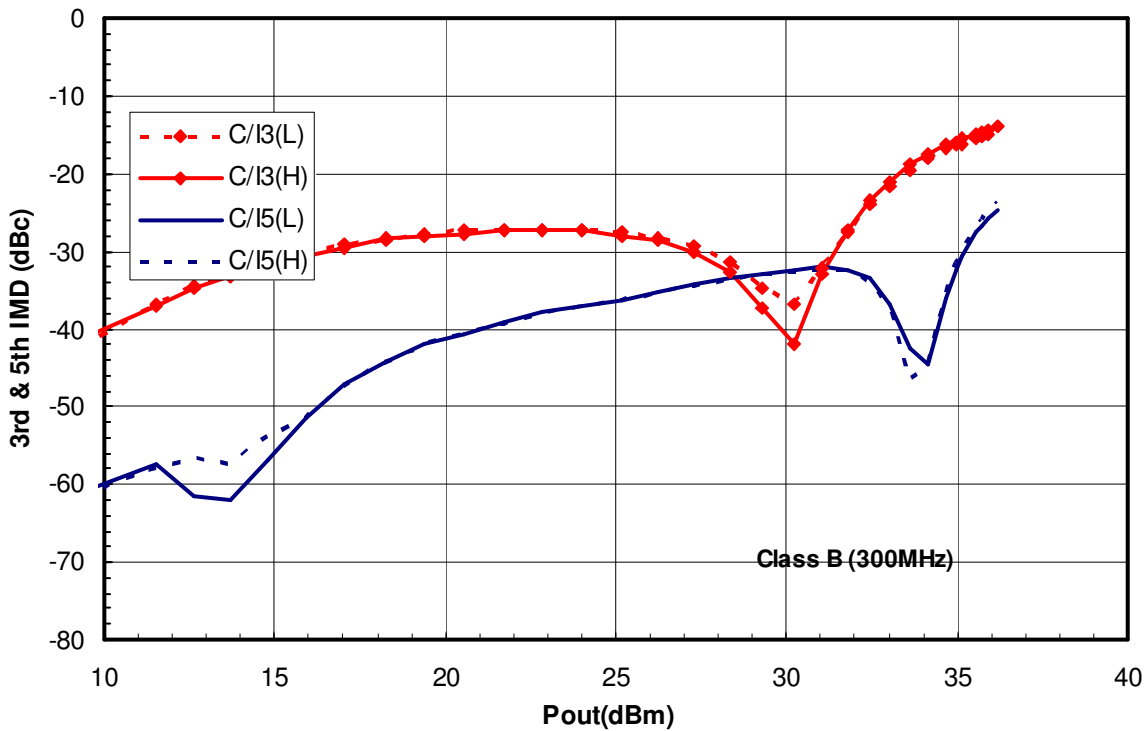
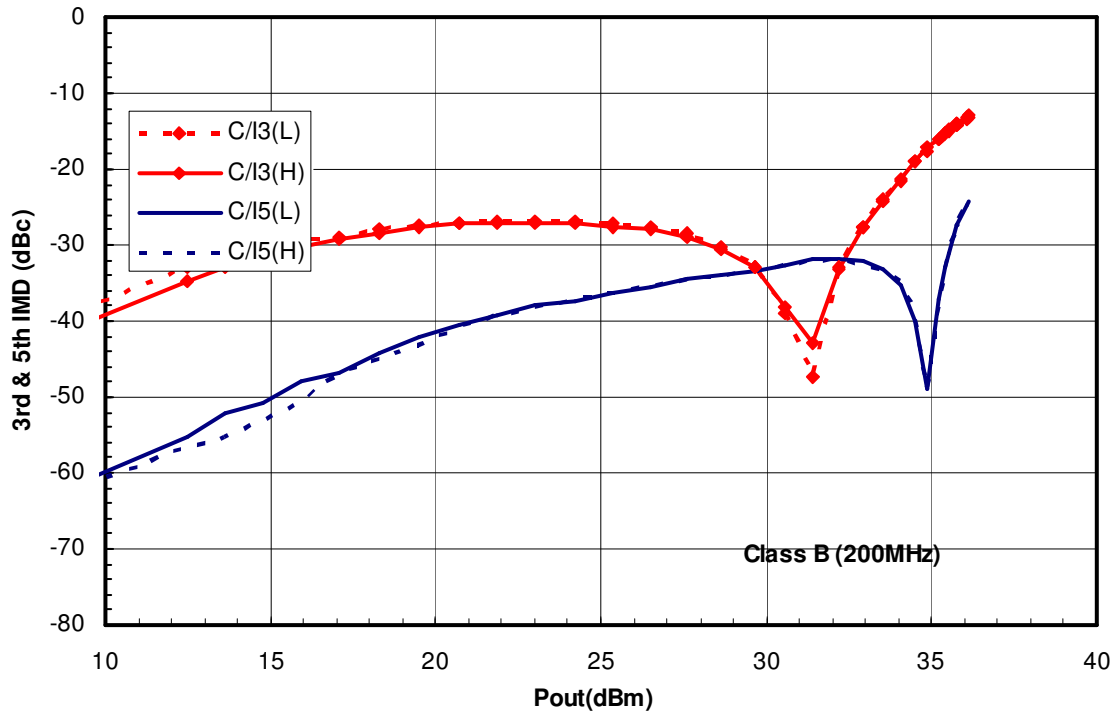
**Class AB Power ( $V_{dd}=+8V$ ,  $V_{gs}=-0.66V$ ,  $I_{ds1}=0.1A$ ,  $I_{ds2}=0.8A$ )**



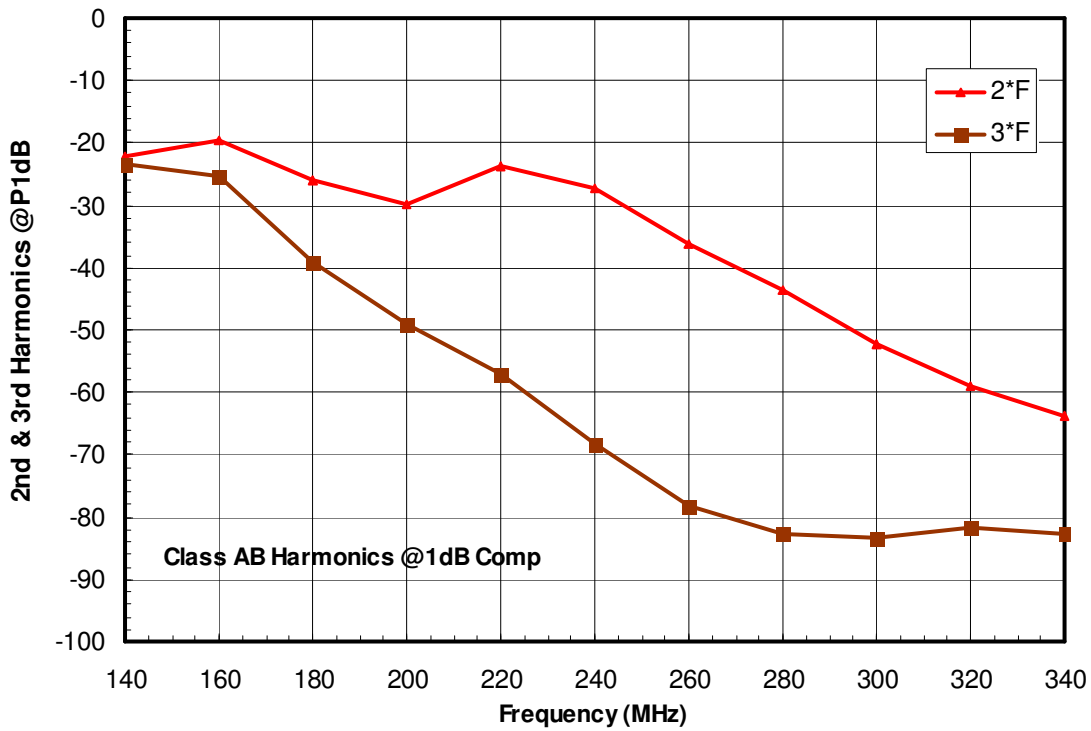
**Class B Power ( $V_{dd}=+8V$ ,  $V_{gs1}=-0.93V$ ,  $V_{gs2}=-1.55V$ ,  $I_{ds1}=0.1A$ ,  $I_{ds2}=0.04A$ )**



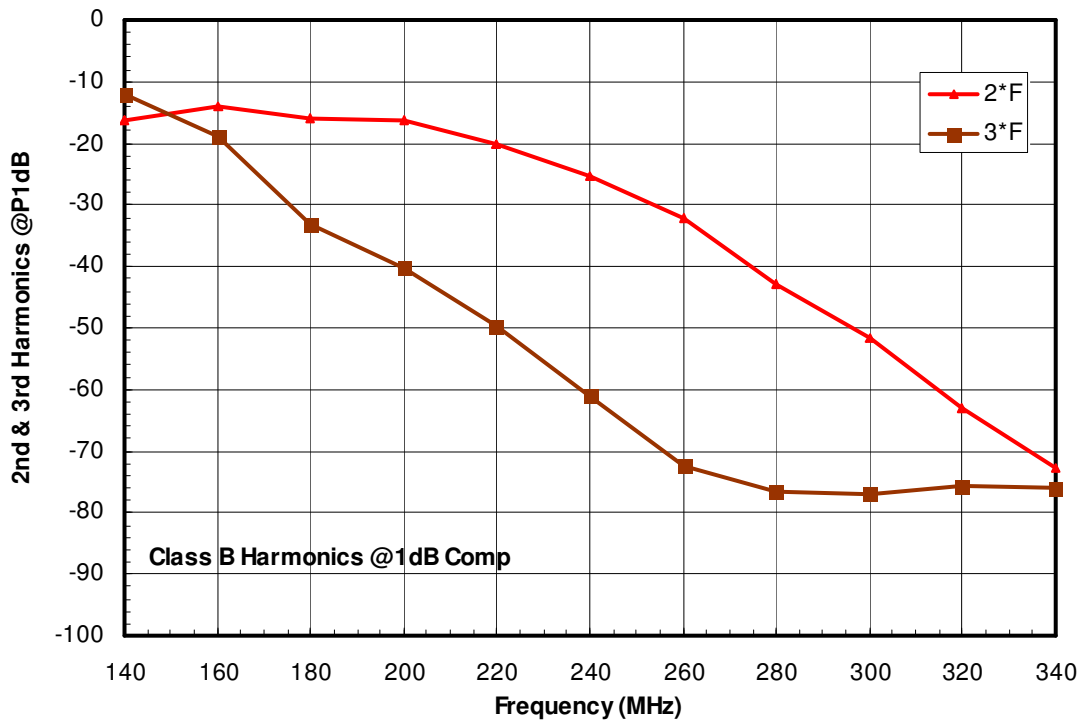
Class AB 3<sup>rd</sup> & 5<sup>th</sup> Order IMD at 200 & 300MHz



**Class B 3<sup>rd</sup> & 5<sup>th</sup> Order IMD at 200 & 300MHz**

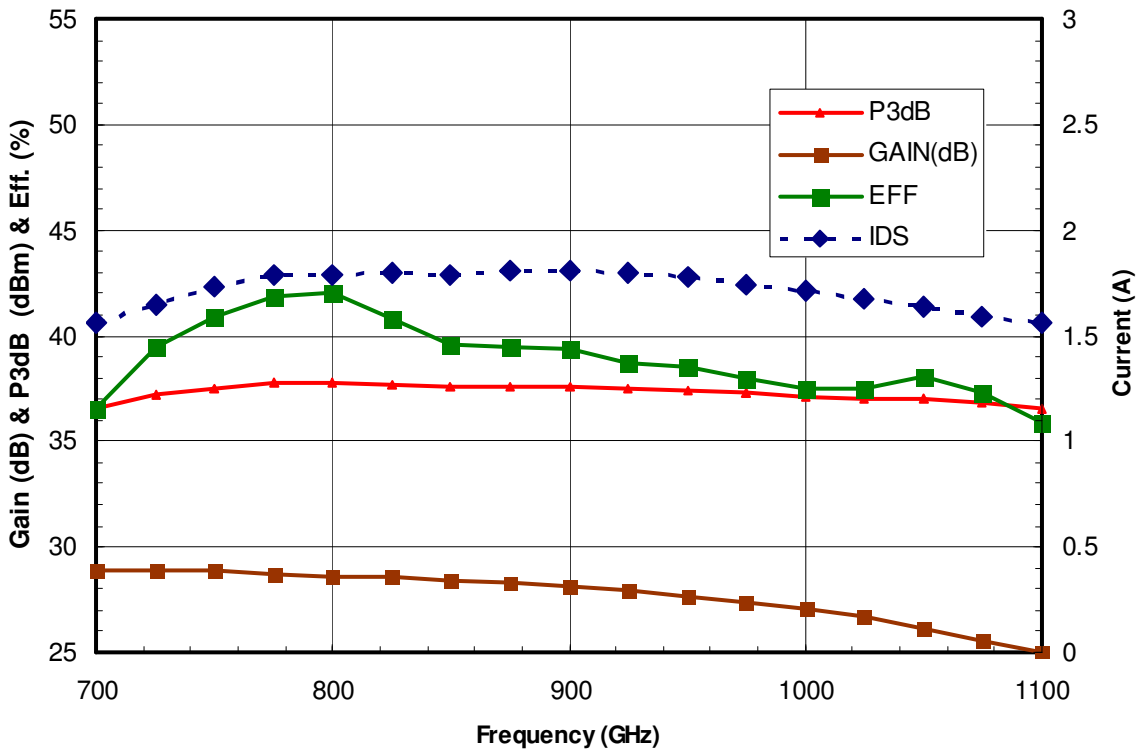
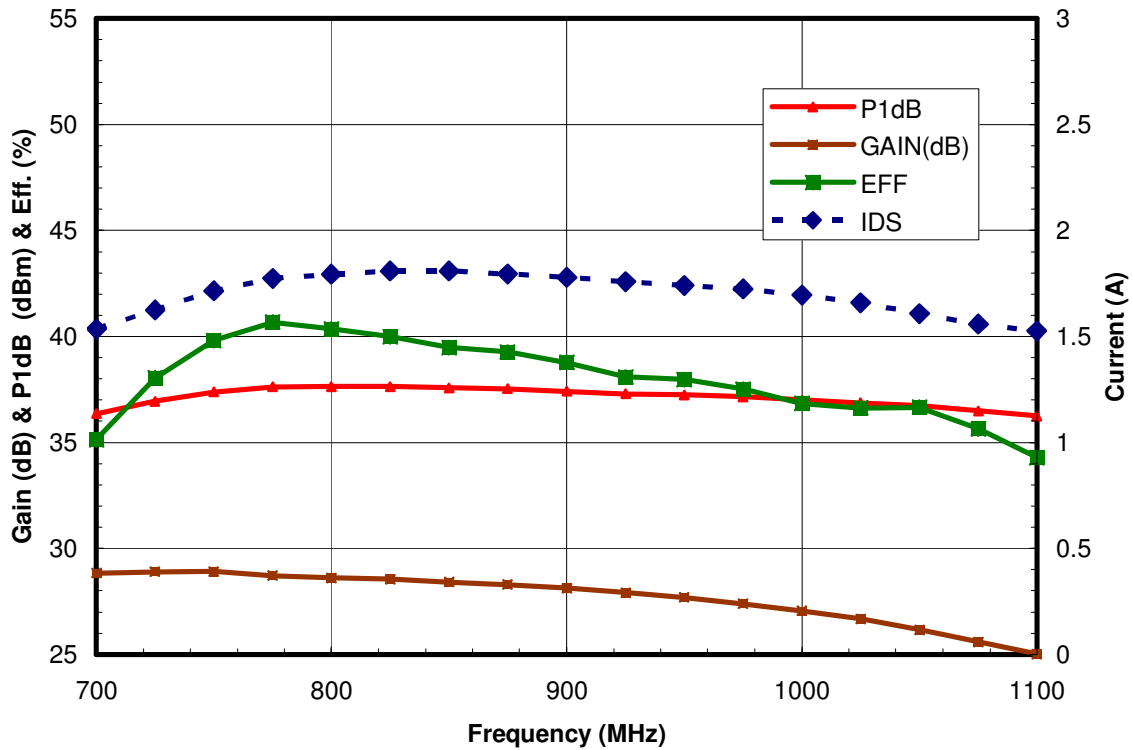


**Class AB 2<sup>nd</sup> & 3<sup>rd</sup> Harmonics at P1dB**

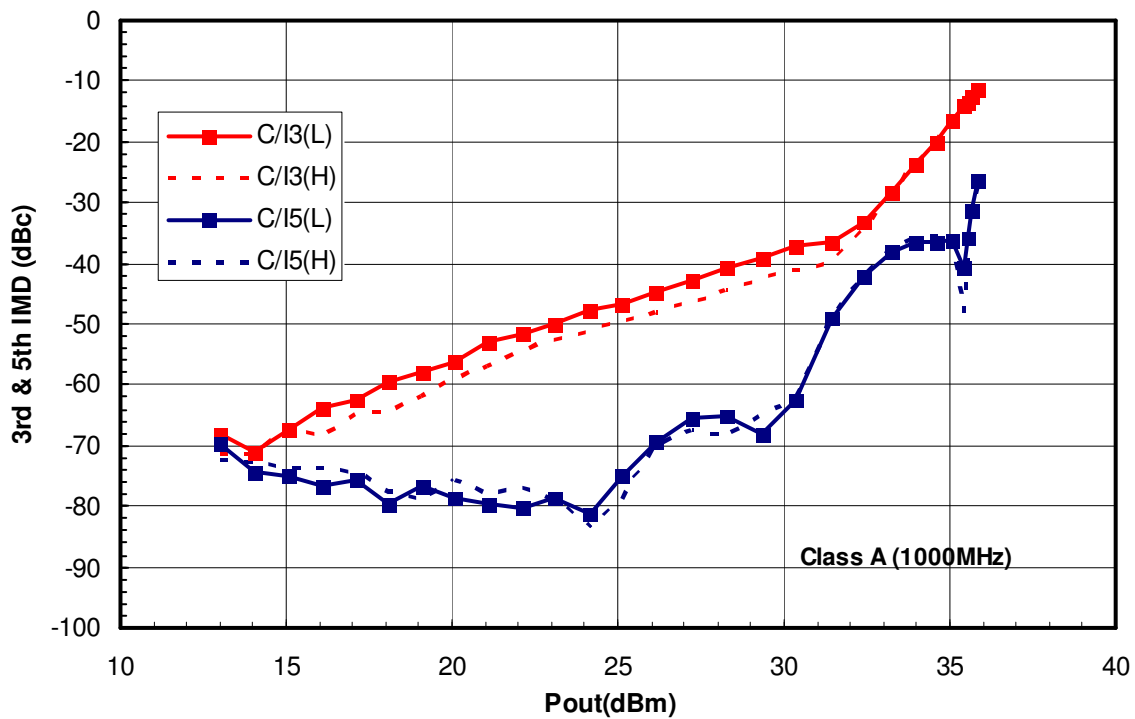
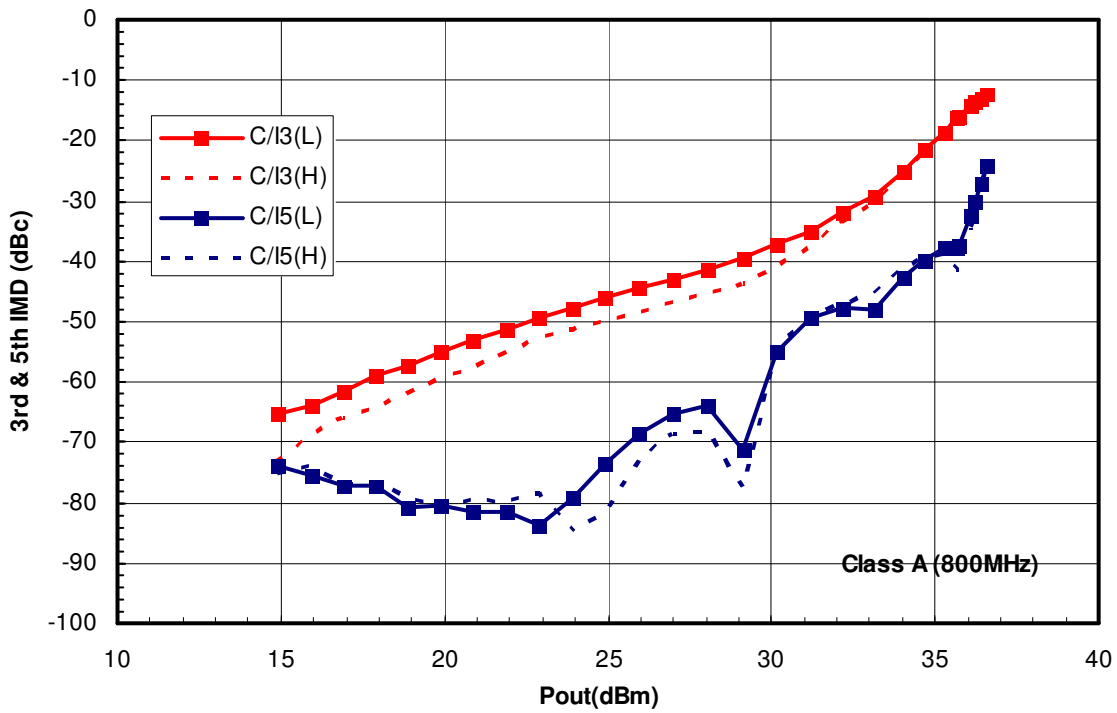


**Class B 2<sup>nd</sup> & 3<sup>rd</sup> Harmonics at P1dB**

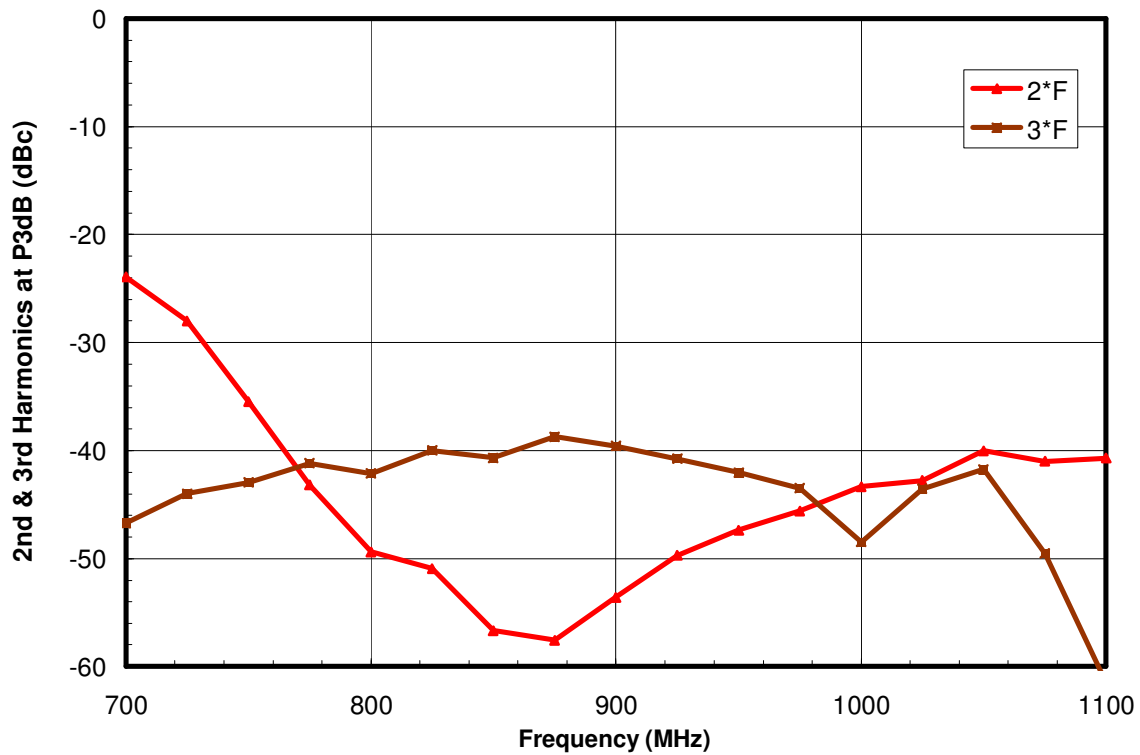
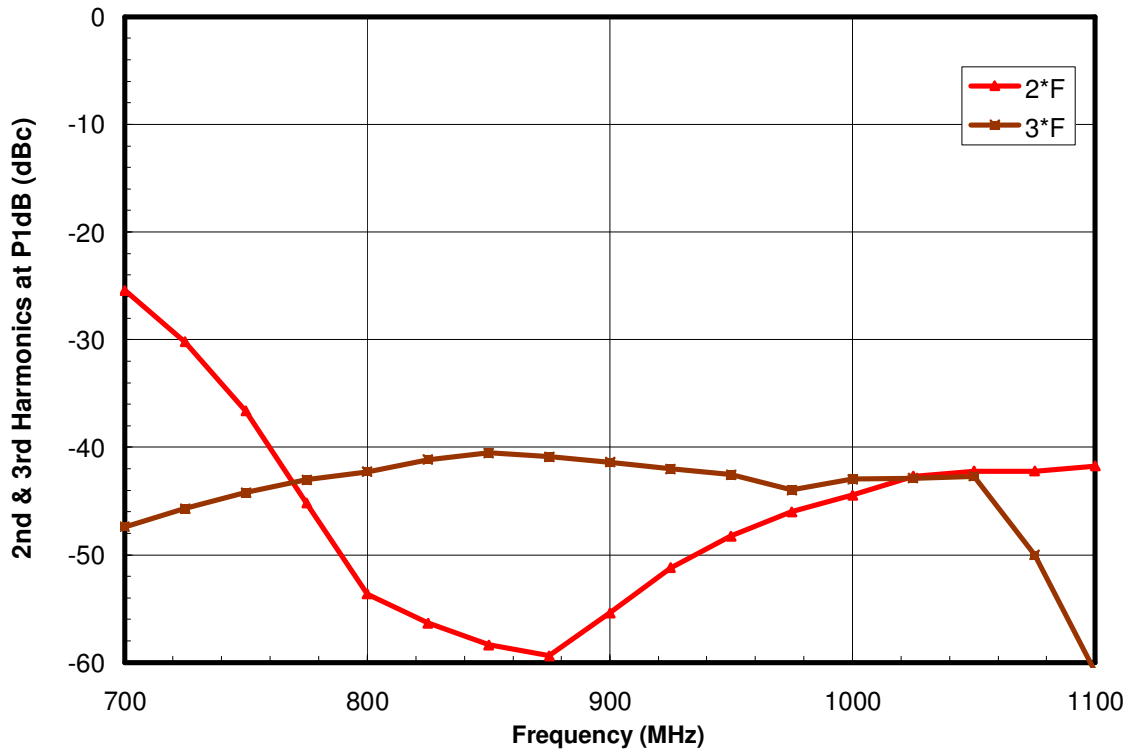
**POWER DATA of 0.8 to 1.0 GHz TEST BOARD**



**Class A Power ( $V_{dd}=+8V$ ,  $V_{gs1}=-0.66V$ ,  $V_{gs2}=-0.66V$ ,  $I_{ds1}=0.15A$ ,  $I_{ds2}=1.2A$ )**

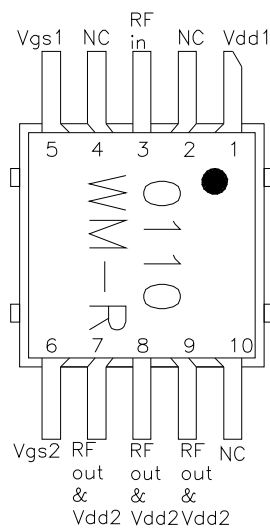
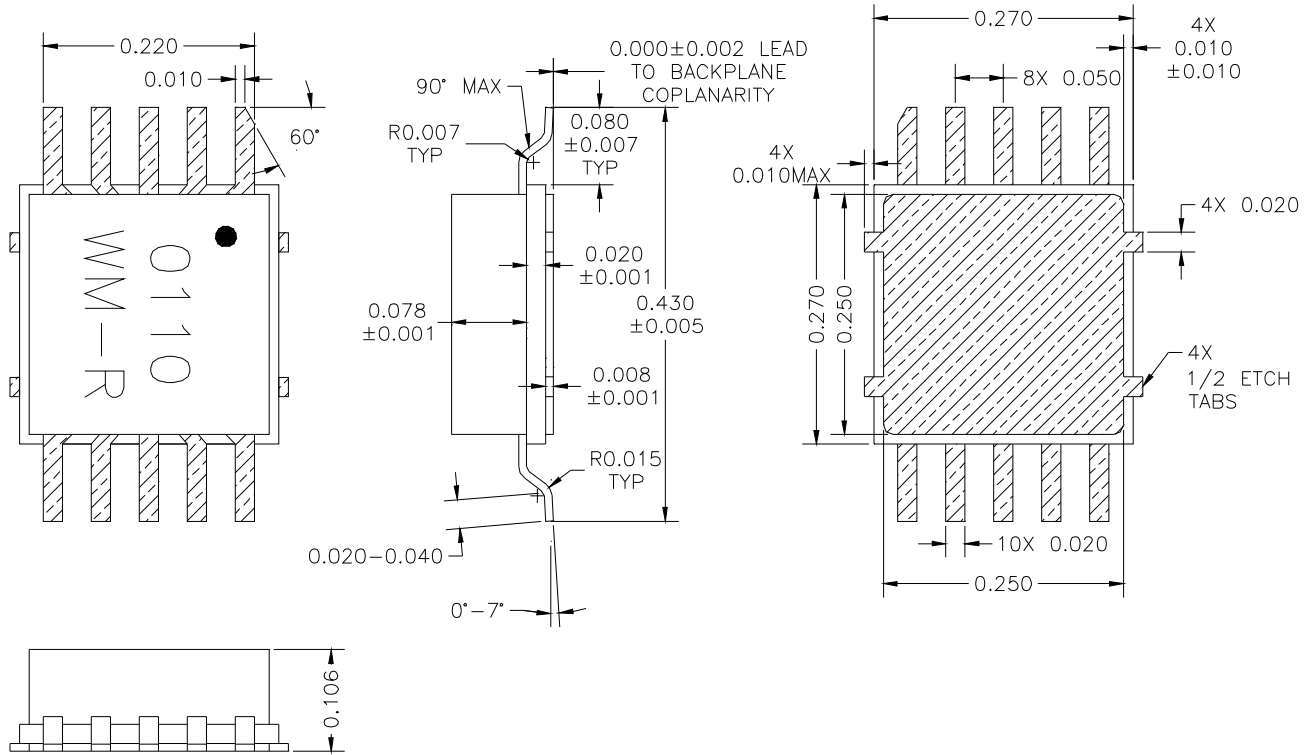


2<sup>nd</sup> & 3<sup>rd</sup> Order IMD ( $V_{dd}=+8V$ ,  $V_{gs1}=-0.66V$ ,  $V_{gs2}=-0.66V$ ,  $I_{ds1}=0.15A$ ,  $I_{ds2}=1.2A$ )



2<sup>nd</sup> & 3rd Harmonics ( $V_{dd}=+8V$ ,  $V_{gs1}=-0.66V$ ,  $V_{gs2}=-0.66V$ ,  $I_{ds1}=0.15A$ ,  $I_{ds2}=1.2A$ )

**PACKAGE OUTLINE (BM)**

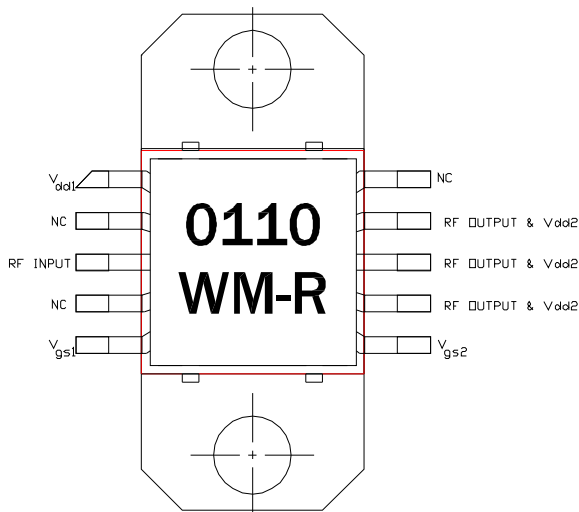
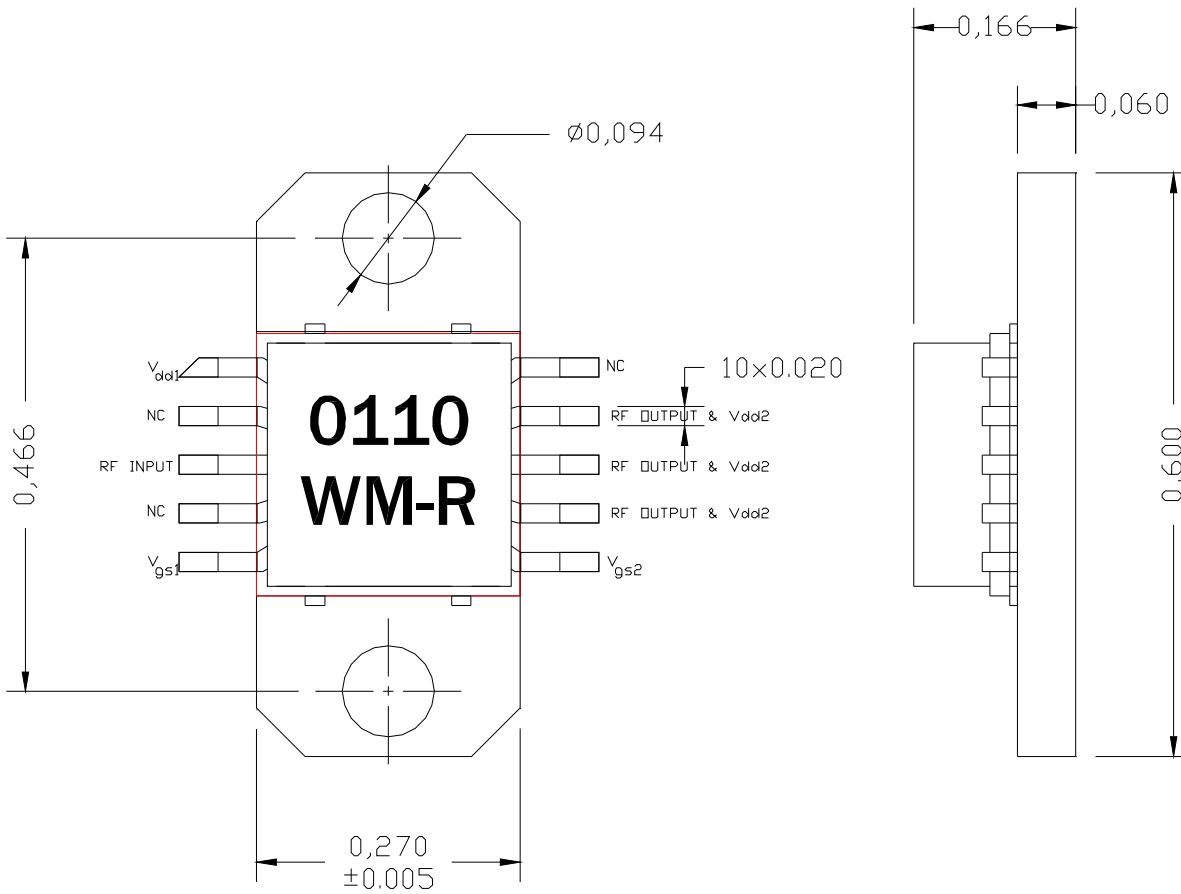


Pin No.	Function	Bias*
1	Vdd1	+8V
2	NC	
3	RF in	
4	NC	
5	Vgs1	-0.93V
6	Vgs2	-0.93V
7	RF out & Vdd2	+8V
8	RF out & Vdd2	+8V
9	RF out & Vdd2	+8V
10	NC	

**Pin Layout**

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

**PACKAGE OUTLINE (FM)**

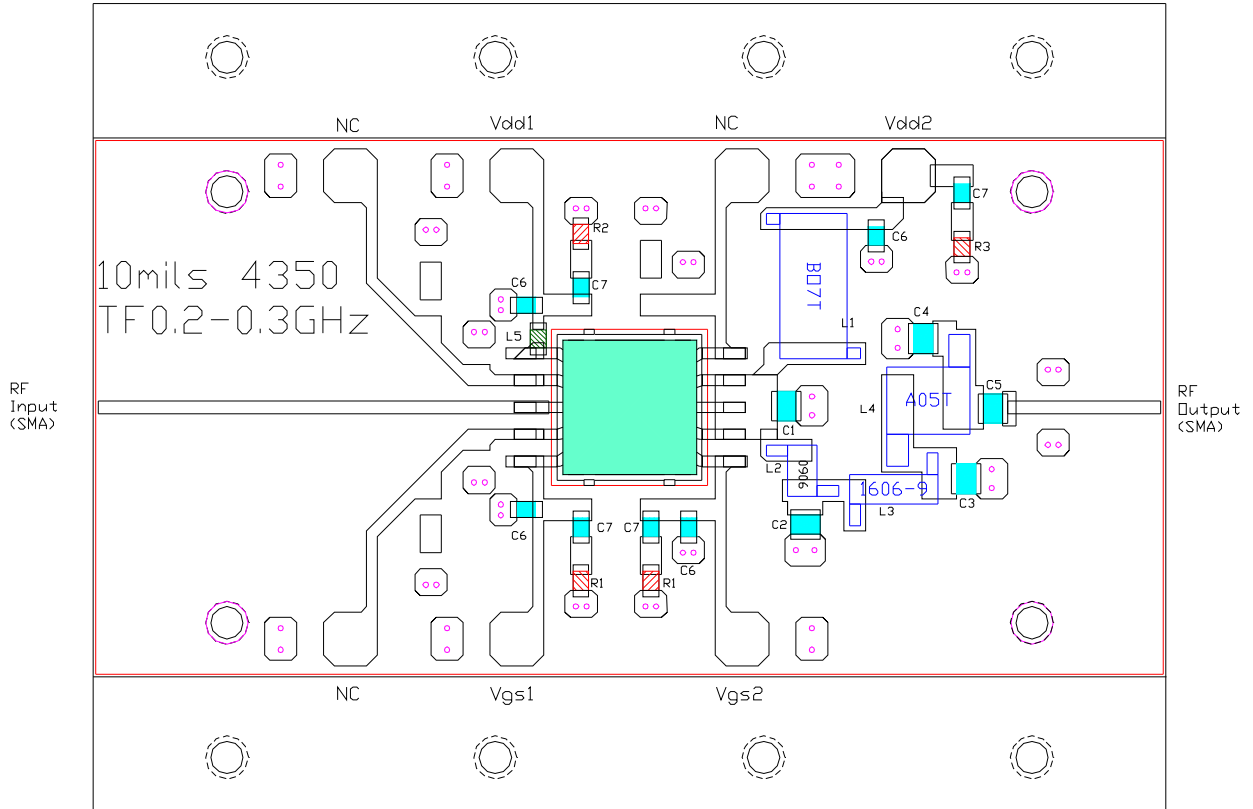


Pin No.	Function	Bias*
1	Vdd1	+8V
2	NC	
3	RF in	
4	NC	
5	Vgs1	-0.93V
6	Vgs2	-0.93V
7	RF out & Vdd2	+8V
8	RF out & Vdd2	+8V
9	RF out & Vdd2	+8V
10	NC	

**Pin Layout**

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

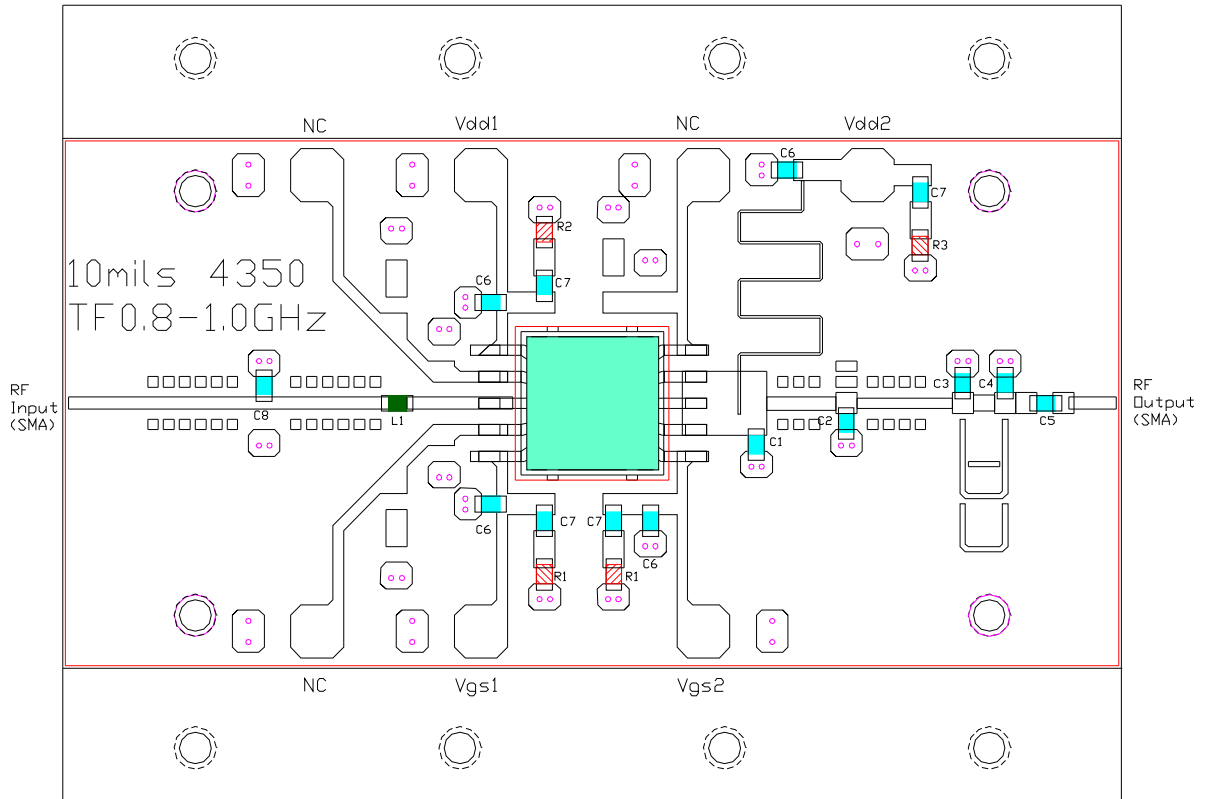
**0.2 to 0.3GHz TEST CIRCUIT**



Notes:

- 1- 10mils Rogers 4350 Material epoxied to TF
- 2- Ckt is for un-matched MMICs at 0.2 to 0.3GHz
- 3- C1=30pF, C2=51pF, C3=27pF, C4=10pF  
C5=100pF, C6=20pF, C7=1000pF,  
R1=50ohms, R2=10ohms, R3=50ohms,  
L1=22nH (B07T), L2=3.85nH (0906-4),  
L3=9.85nH (1606-9), L4=18.5nH (A05T), L5=100nH
- 4- C1, C2, C3, C4 & C5 are ATC 100A size
- 5- All other Caps & Resistors are 0603 size

**0.8 to 1.0GHz TEST CIRCUIT**



Notes:

- 1- 10mils Rogers 4350 Material epoxied to TF
- 2- Ckt is for un-matched MMICs at 0.8 to 1.0GHz
- 3- C1=8.2pF, C2=10pF, C3=5.1pF, C4=2pF, C5=51pF, C6=20pF, C7=1000pF, C8=4.7pF, L1=2.7nH  
R1=50ohms, R2=10ohms, R3=50ohms
- 4- C1, C2, C3, C4 & C5 are ATC 600S series
- 5- All other Caps & Resistors are 0603 size