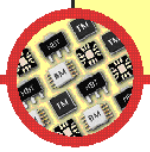
Gallium Nitride MMIC 5W DC – 10.0 GHz Power Amplifier

AM00010037WN-00
AM00010037WN-SN-R
July 2017
Preliminary



DESCRIPTION

AMCOM's AM00010037WN-SN-R is a broadband GaN MMIC power amplifier. It has 13dB gain, and 37 dBm output power over the DC to 10GHz band. The AM00010037WN-SN-R is in a ceramic package with a flange and straight RF and DC leads for drop-in assembly. Because of high DC power dissipation, good heat sinking is required. The package is RoHS compliant. This MMIC is matched to 50 Ohms. AM000100WN-00 is the chip form of this MMIC.

FEATURES

- Ultra-Broadband from DC to 10GHz
- Saturated output power P_{sat} is 37dBm
- Gain, 13dB
- Input & output matched to 50 Ohms

APPLICATIONS

- Instrumentation
- Commercial telecom transmission equipment
- Fixed microwave backhaul

TYPICAL PERFORMANCE * (Recommended bias condition)

Bias Conditions: V_{ds}= 28V, I_{ds} =300mA, V_{gs} =-2V**

Parameters	Minimum	Typical **	Maximum
Frequency	0.1 – 10 GHz	DC – 10 GHz	
Small Signal Gain	10dB	13dB	
Gain Ripple		± 1.5dB	± 3.0dB
P1dB	-	30dBm	
P5dB	35dBm	37dBm	
P5dB PAE		23%	
P5dB Drain Efficiency		26%	
IP3		TBD	
Input Return Loss		9dB	
Output Return Loss		7dB	
Thermal Resistance		TBD	

TYPICAL PERFORMANCE* (Different Vds bias conditions),

Frequency= (0.1-10 GHz), I_{ds} =300mA, V_{gs} =-2V

Parameters	28V	24V	20V	15V
Small Signal Gain	13	13	12	12
P5dB	37dBm	36dBm	35dBm	33dBm

* Specifications subject to change without notice

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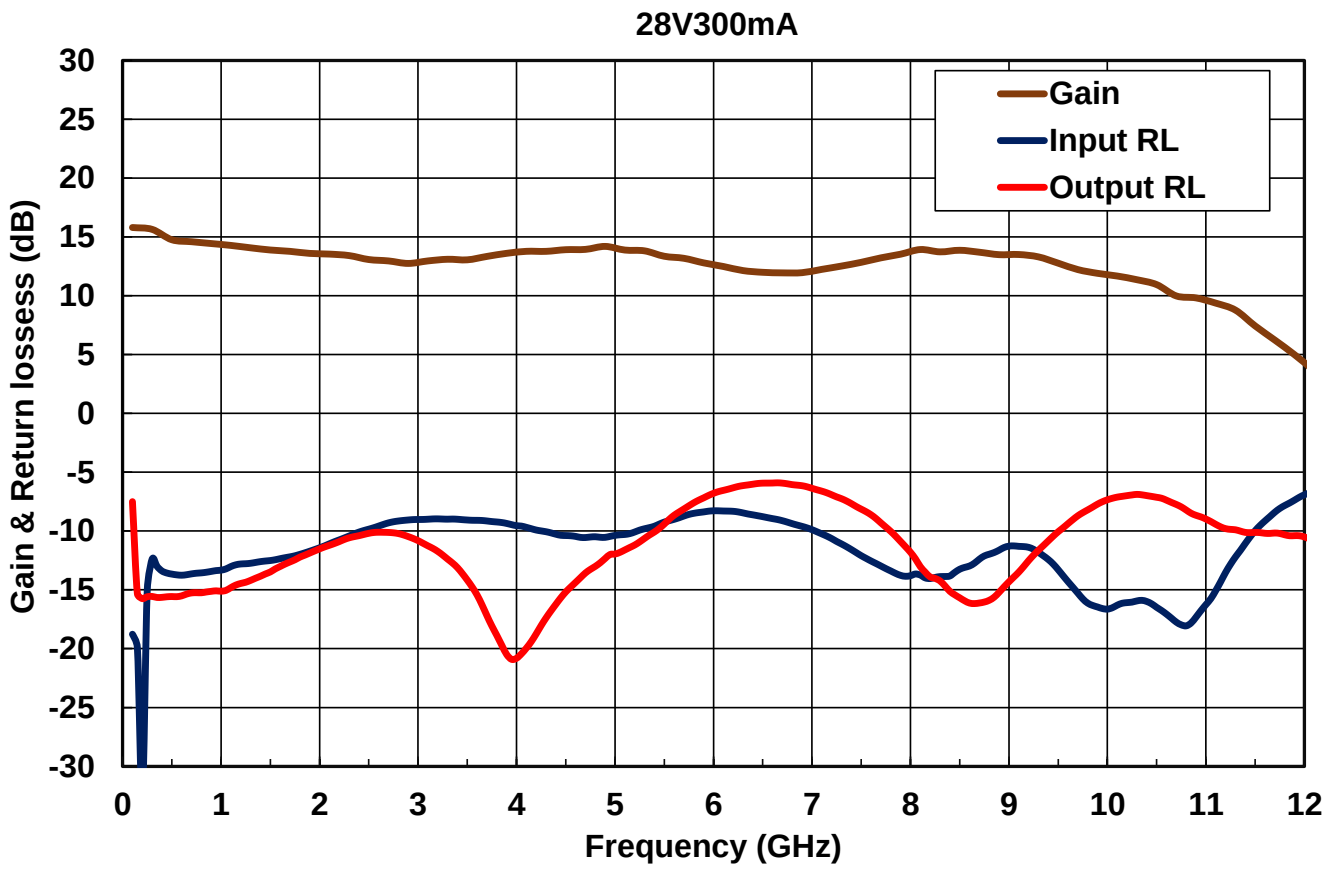
ABSOLUTE MAXIMUM RATING

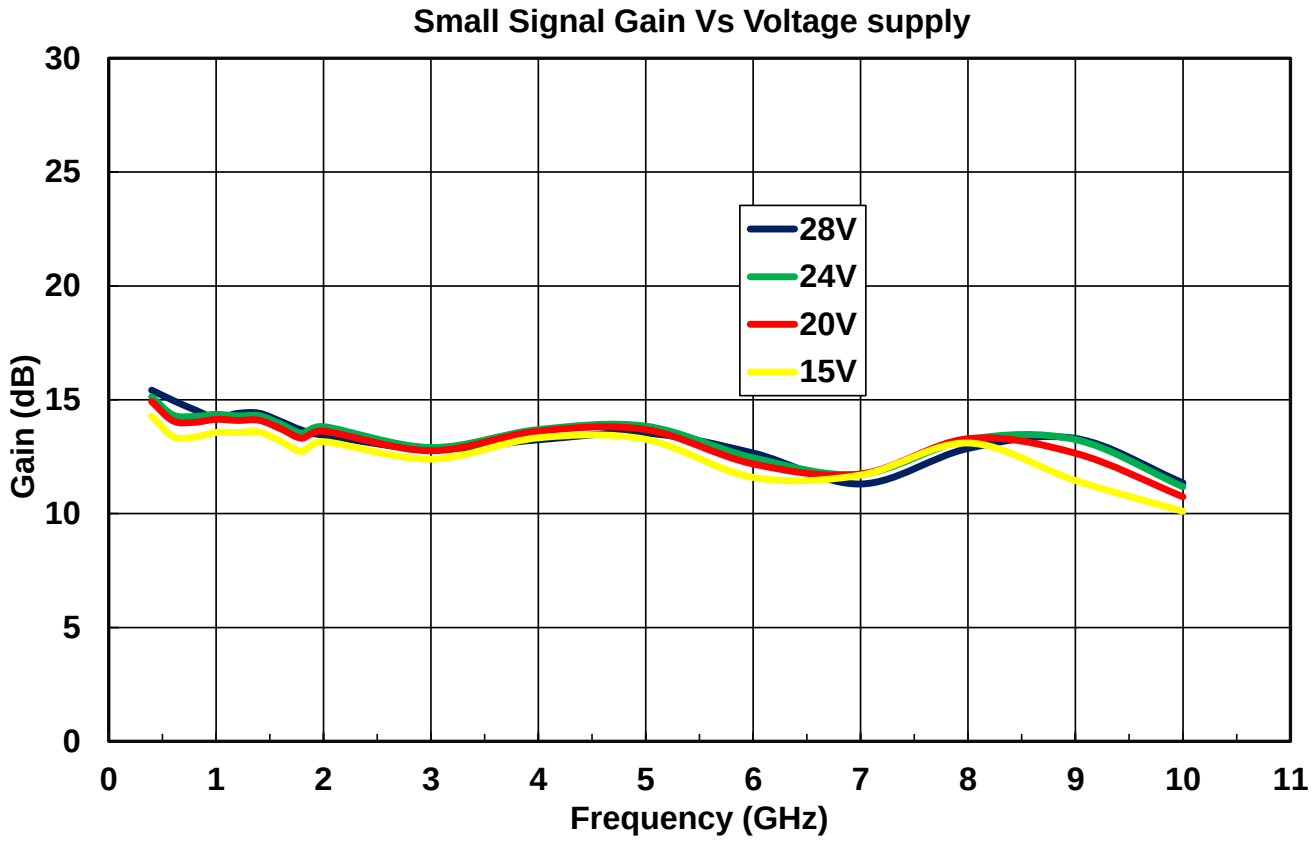
Parameters	Symbol	Rating
Drain voltage	V_{ds1}	35V
Gate voltage	V_{gs}	-6V
Drain source current	I_{dsq}	0.4A
Continuous dissipation at 25ºC	P_t	20W
Channel temperature	T_{ch}	200°C
Operating temperature	T_{op}	-55°C to +85°C
Storage temperature	T_{sto}	-55°C to +135°C

SMALL SIGNAL DATA*

A) Packaged MMIC S-Parameters (AM00010037WN-SN-R)



B) Small Signal Gain Variation Vs Vds



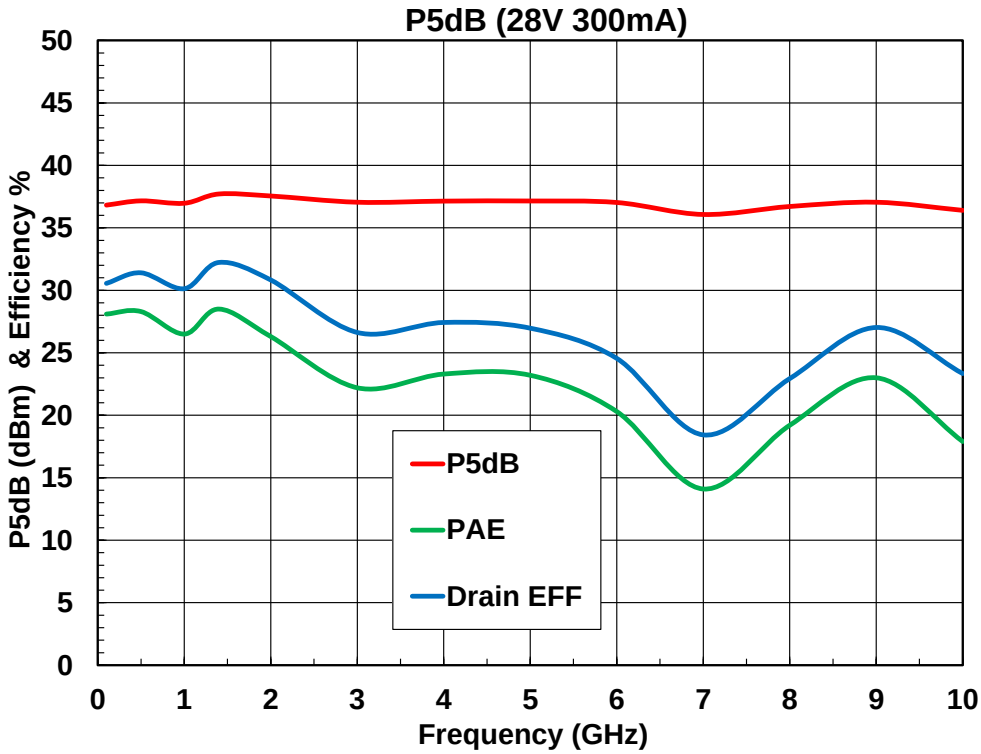
***Ids = 300mA, Vgs=-2V**

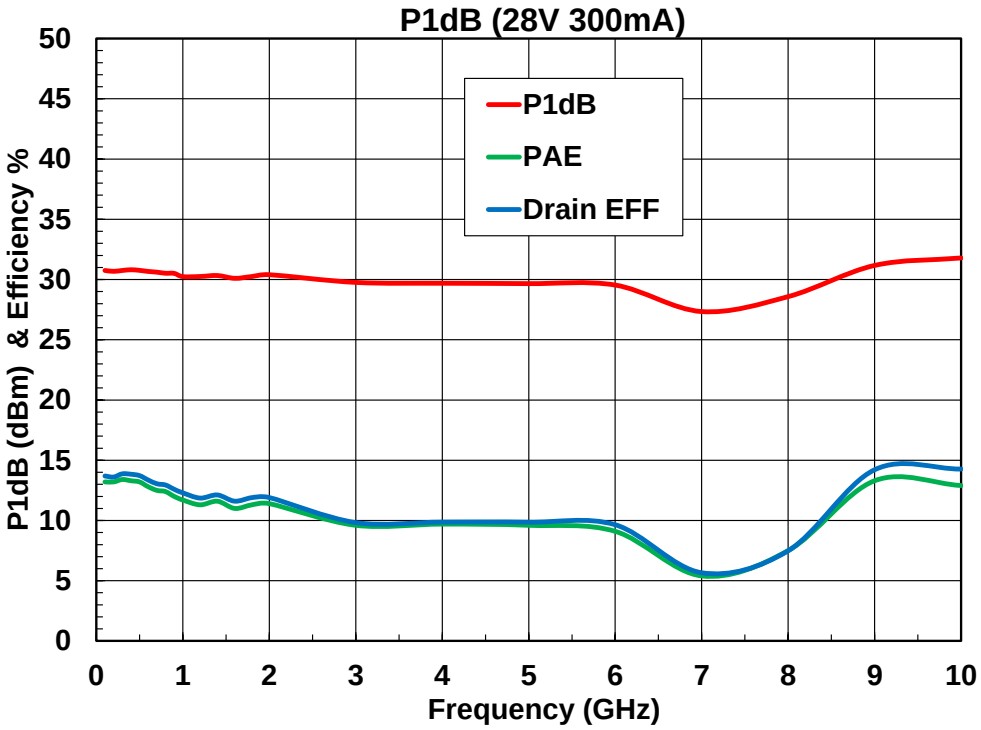
NOISE DATA

TBD

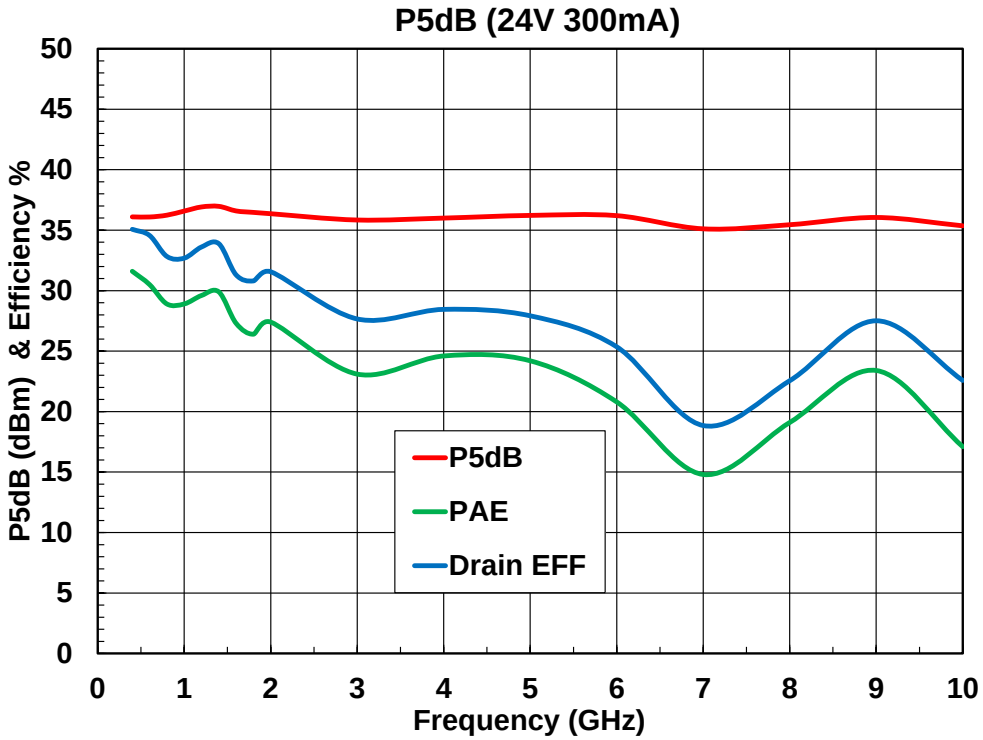
POWER DATA (Measured using Type 1 Test fixture (Shown on page 10))

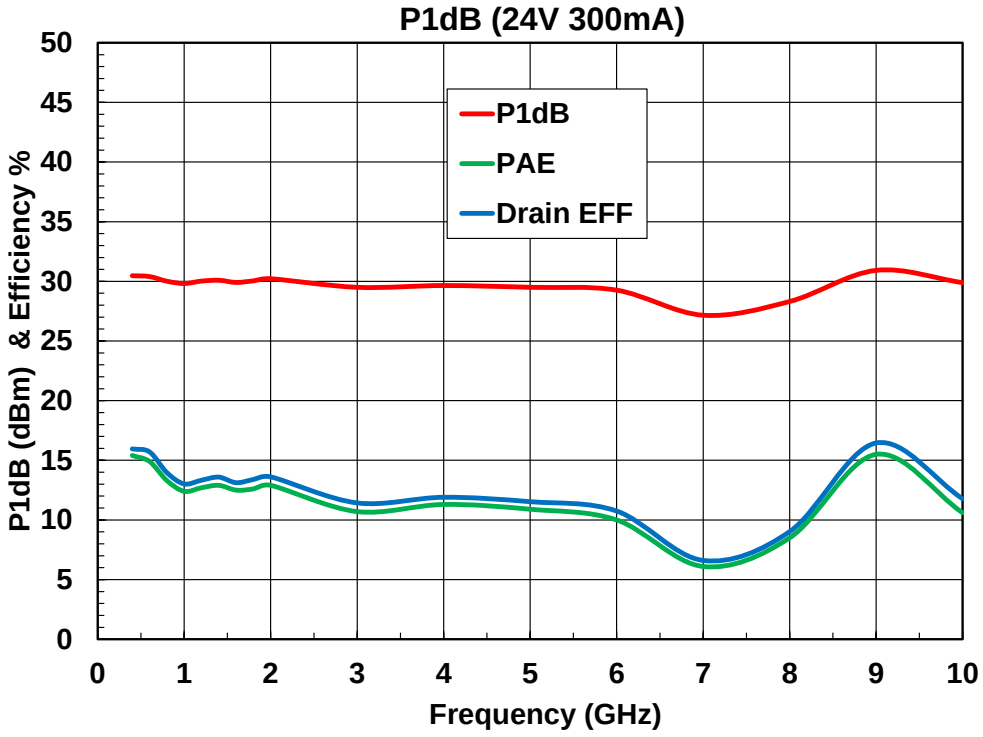
A) Vds = +28V, Ids = 0.3A, Vgs = -2V



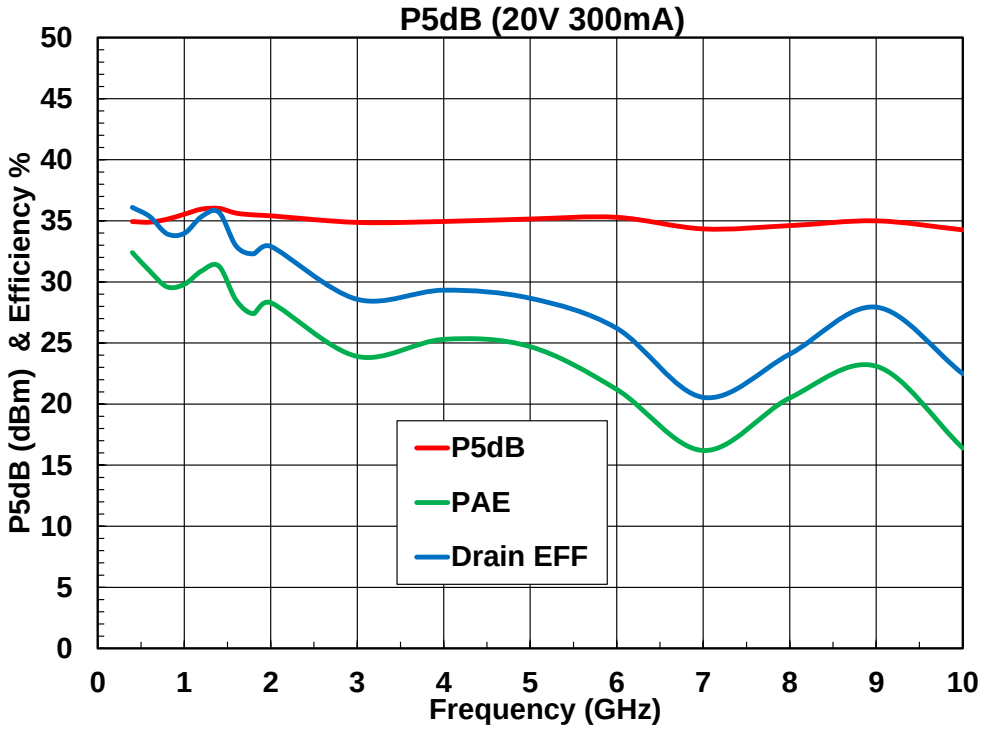


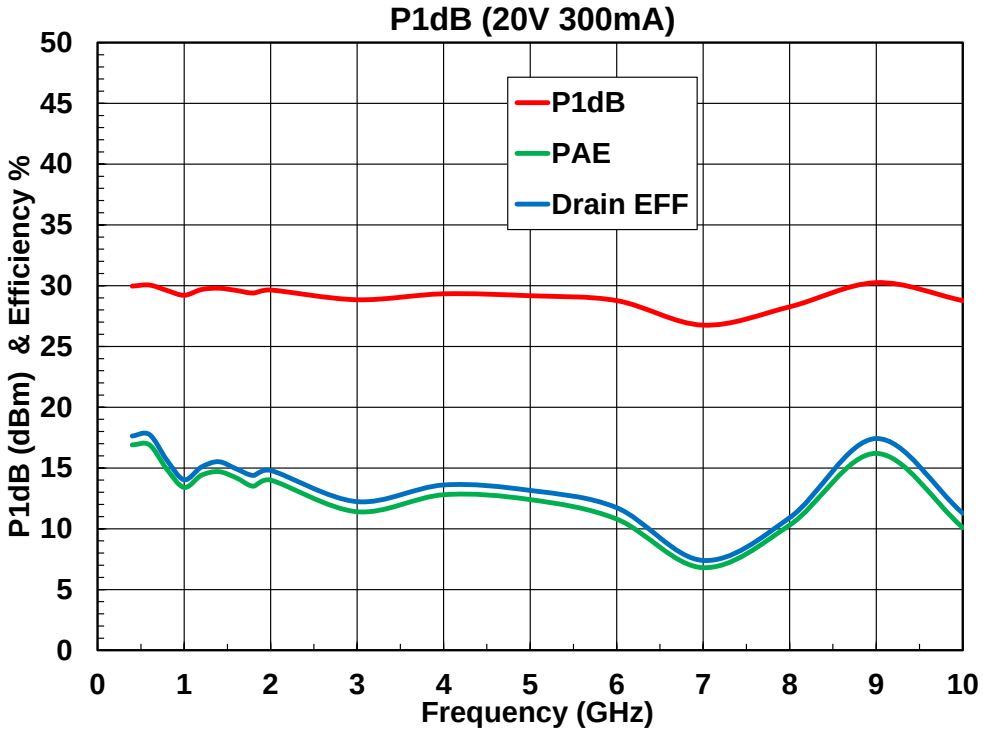
B) Vds = +24V, Ids = 0.3A, Vgs = -2V



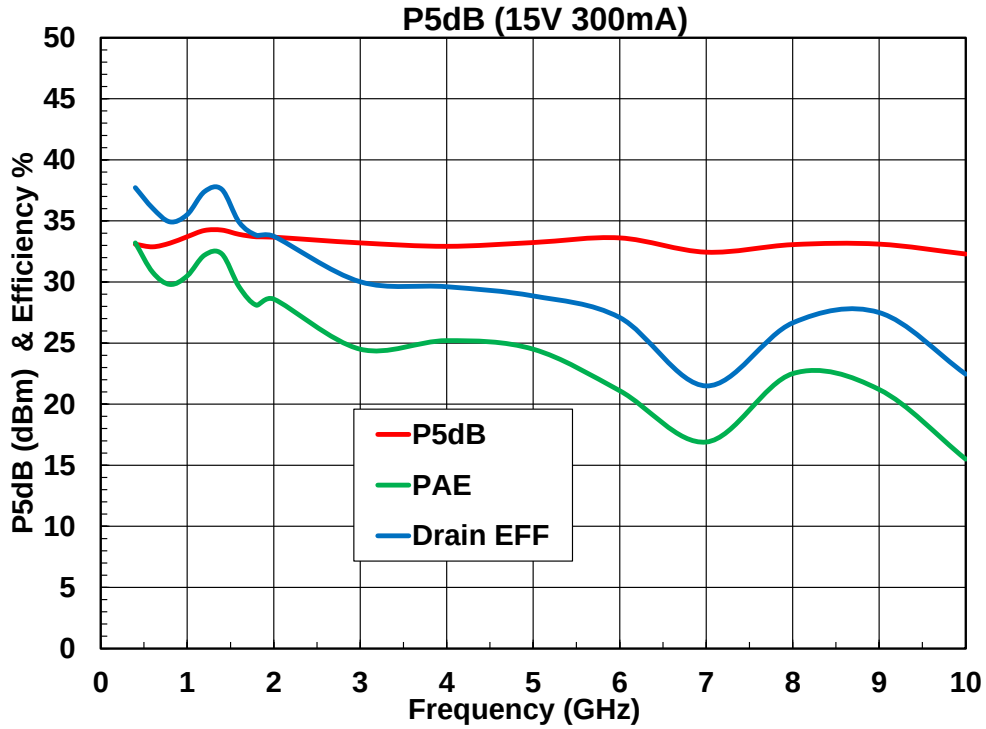


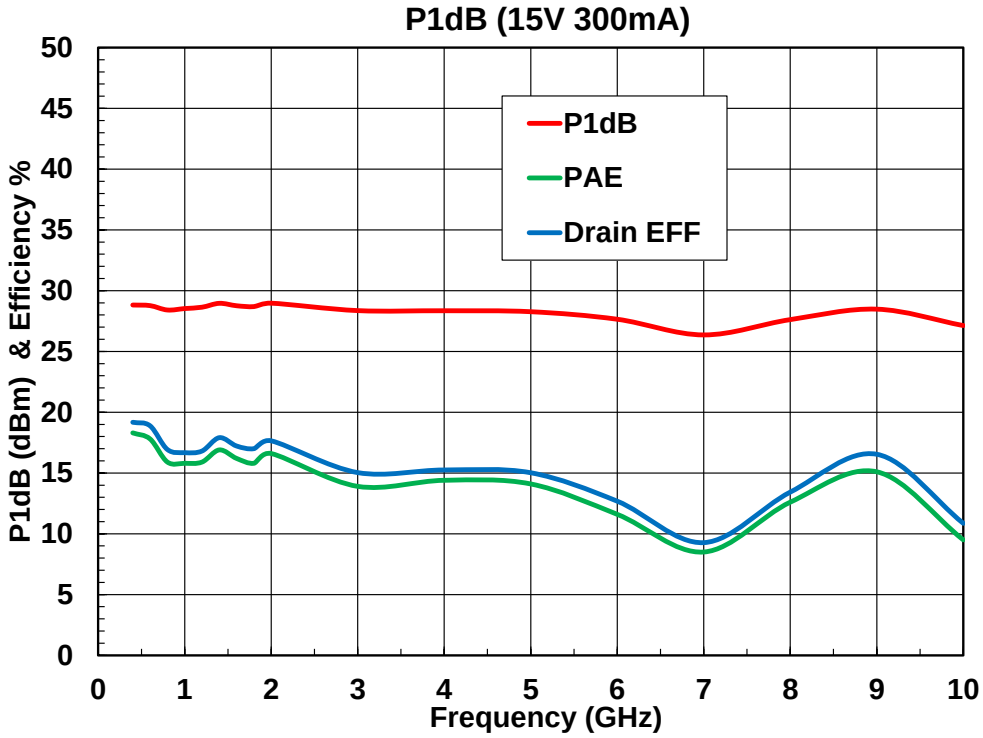
C) Vds = +20V, Ids = 0.3A, Vgs = -2V



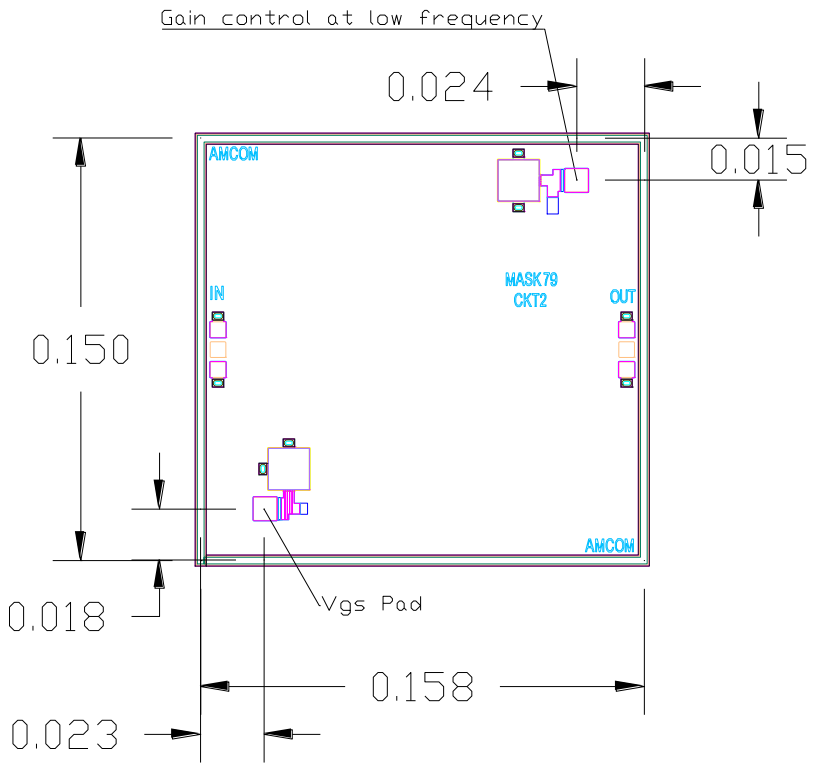


D) Vds = +15V, Ids = 0.3A, Vgs = -2V





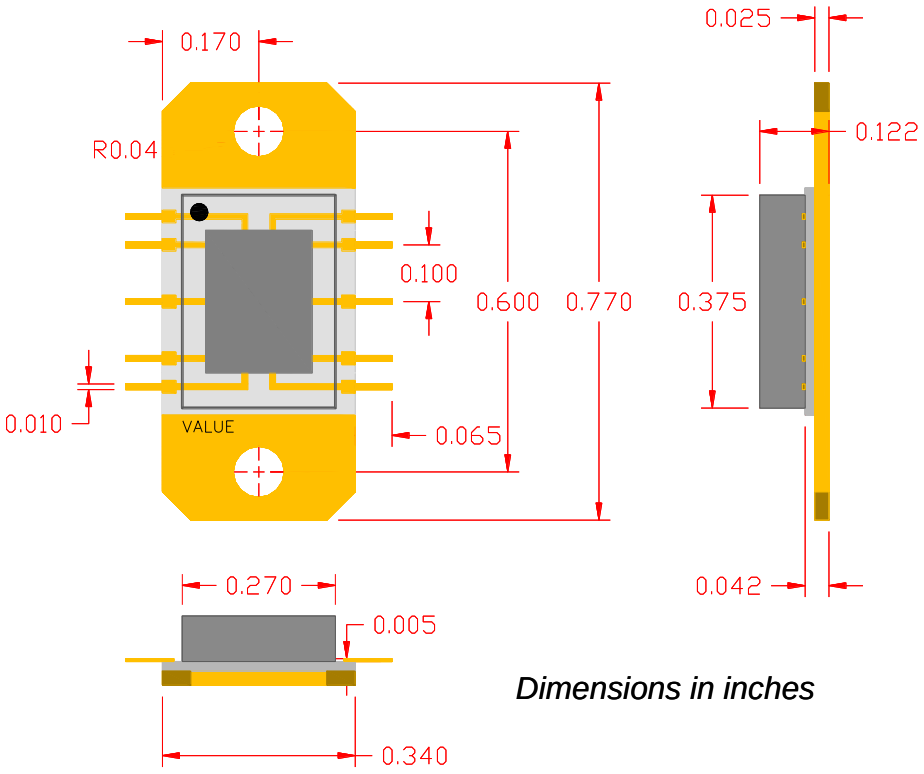
CHIP OUTLINE



Notes:

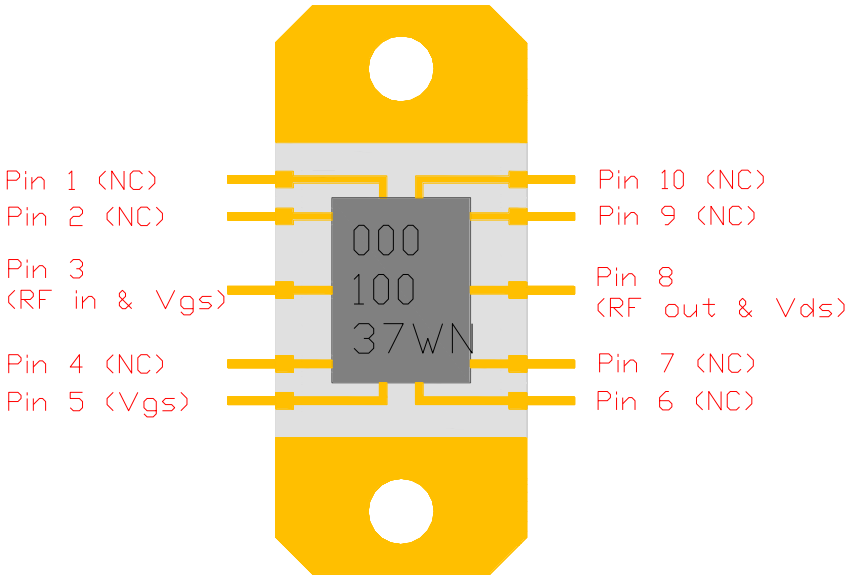
1- Dimensions in inches
2- RF in & RF out pads are 6x6 mils
3- Vgs & Gain control pads are 8x8 mils
4- Gate bias could be supplied either from the RF in pad(using a bias tee) or from the V_{gs} pad, however if biased only from Vgs pad an external DC blocking capacitor should be added at the RF input port.
5- V_{dd} bias should be supplied from RF out pad only.
6- Use eutectic perform for chip assembly.

PACKAGE OUTLINE



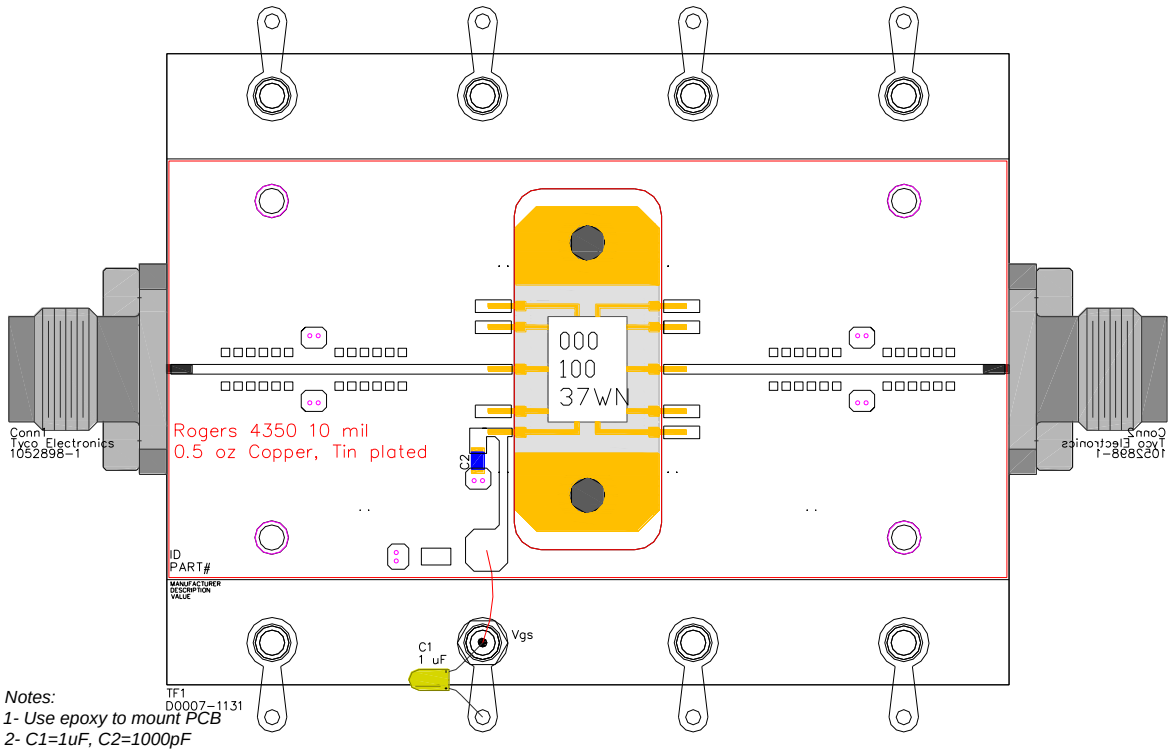
Dimensions in inches

Pin Layout



Pin No.	Function	Bias
1	NC	-
2	NC	-
3	RF in & Vgs	-2.0V
4	NC	-
5	Vgs	-2.0V
6	NC	-
7	NC	-
8	RF out & Vds	+28V
9	NC	-
10	NC	-

TEST CIRCUIT (Type 1)



Notes:
1- Use epoxy to mount PCB
2- C1=1uF, C2=1000pF
3- All SMT Caps & Resistors are 0603 size
4- Use Test Block No. D0007-1131

Important Notes:

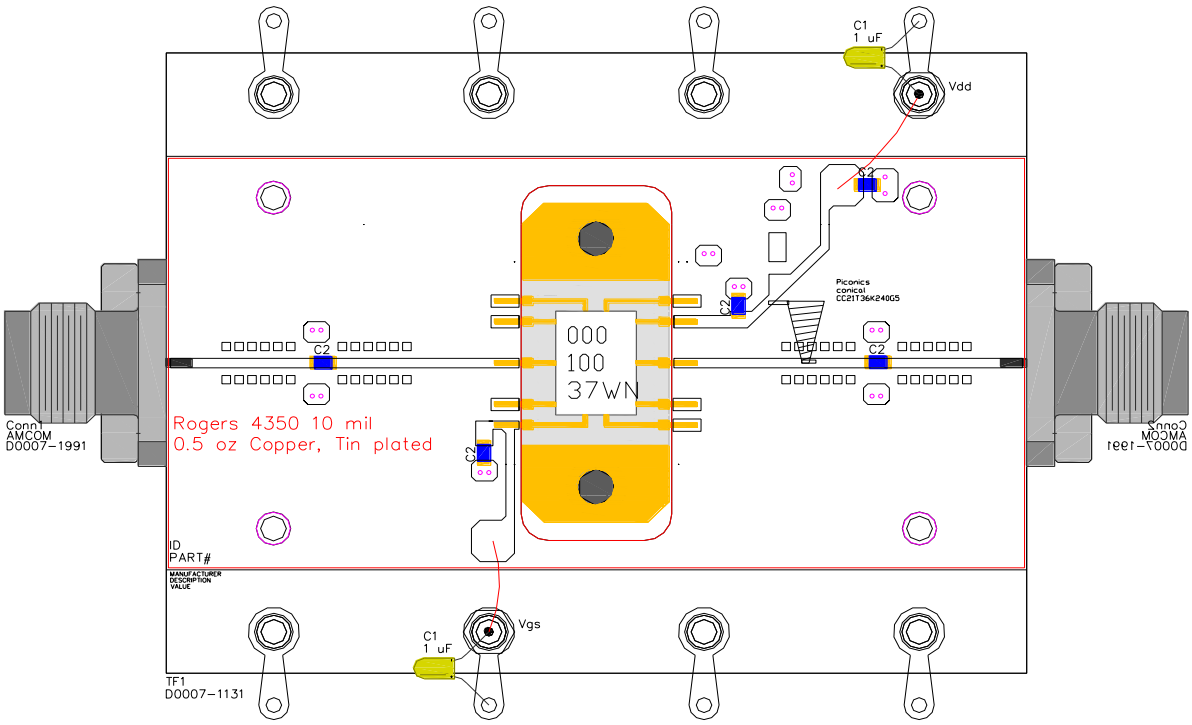
1- Recommended current bias is 300mA. Gate biases of -2V is for reference only. V_{gs} could be adjusted to vary the current going thru the MMIC.

2- Do not apply V_{dd} without proper negative voltages on V_{gs}. Otherwise MMIC would fail due to excess heat.

3- V_{ds} is applied through the output RF port using bias tee and similarly V_{gs} is applied using a bias tee on the input RF port. Alternatively V_{gs} could be applied on PIN 5 as shown above.

4- Need to connect Bias tee to Both Input and Output RF connectors.

TEST CIRCUIT (Type 2)



Notes:
1- Use epoxy to mount PCB
2- C1=1uF, C2=1000pF
3- All SMT Caps & Resistors are 0603 size
4- Use Test Block No. D0007-1131
5- Use AMCOM K-Connector P/N D0007-1991
6- Use Piconics conical CC21T36K240G5

Important Notes:

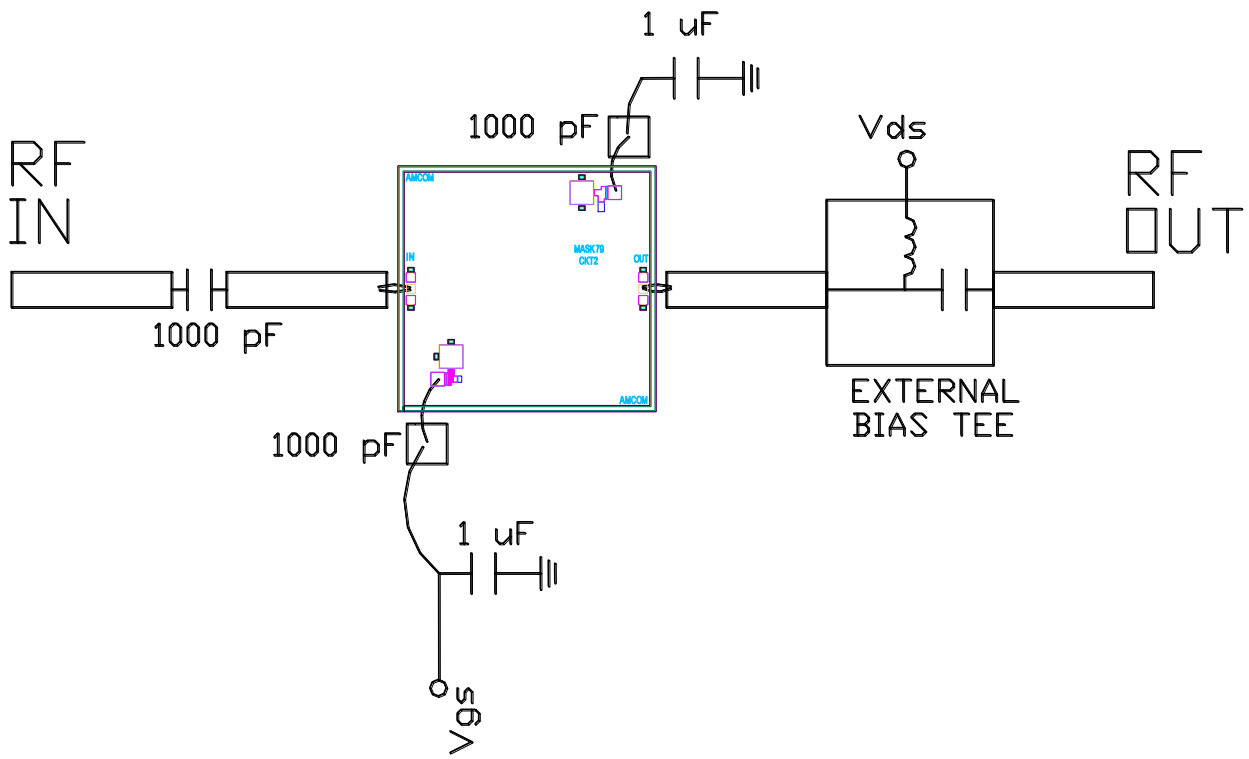
1- Recommended current bias is 300mA. Gate biases of -2V is for reference only. V_{gs} could be adjusted to vary the current going thru the MMIC.

2- Do not apply V_{dd} without proper negative voltages on V_{gs}. Otherwise MMIC would fail due to excess heat.

3- V_{ds} is applied through PIN 8 using bias tee (Conical inductor and a DC block capacitor as shown above). V_{gs} is applied on PIN 5 as shown above and DC blocking Capacitor is added.

4- No need to connect Bias tee to Both Input and Output RF connectors.

APPLICATION CIRCUIT (AM00010037WN-00 CHIP)



Notes:

1- Do not apply Vds without proper negative voltage on Vgs.

2- Gate bias could be supplied either from the RF in pad (using a bias tee) or from the V_{gs} pad, however if biased only from Vgs pad an external DC blocking capacitor should be added at the RF input port.

3- V_{dd} bias should be supplied from RF out pad only.

4- Use eutectic soldering to mount the chip