

## DESCRIPTION

AMCOM's AM003044SD-2H is an ultra-broadband GaN MMIC power amplifier. It has 23dB gain, and >43dBm output power over the 0.03 to 3GHz band. The AM003044SD-2H is a drop-in carrier to be screwed to a metal heat sink. This part is RoHS compliant.

## FEATURES

- Ultra wide bandwidth from 30MHz to 3GHz
- Saturated output power Psat > 43dBm
- High small signal gain, 23dB
- Input matched to 50 Ohms

## APPLICATIONS

- Software Radio, ECM
- Instrumentation
- Gain block

## TYPICAL PERFORMANCE \*

(Bias Conditions\*\*:  $V_{ds1} = +25V$ ,  $I_{dq1} = 400mA$ ,  $V_{dd2} = +60V$ ,  $I_{dq2} = 1000mA$ , 100 $\mu$ s pulse, 10% duty cycle)

Parameters	Minimum	Typical **	Maximum
Frequency	0.05 – 3GHz	0.03 – 3GHz	
Small Signal Gain	17dB	23dB	25dB
Gain Ripple		$\pm 1dB$	$\pm 3.0dB$
P1dB @ 0.5GHz	40dBm	42dBm	
P1dB @ 3.0GHz	39dBm	41dBm	
Psat @ 0.5GHz	43dBm	45dBm	
Psat @ 3.0GHz	41dBm	43dBm	
Psat Efficiency @ 0.5GHz		50%	
Psat Efficiency @ 3.0GHz		37%	
Noise Figure		TBD	
IP3		TBD	
Input Return Loss	15dB	17dB	
Output Return Loss		5dB	
Thermal Resistance		TBD	

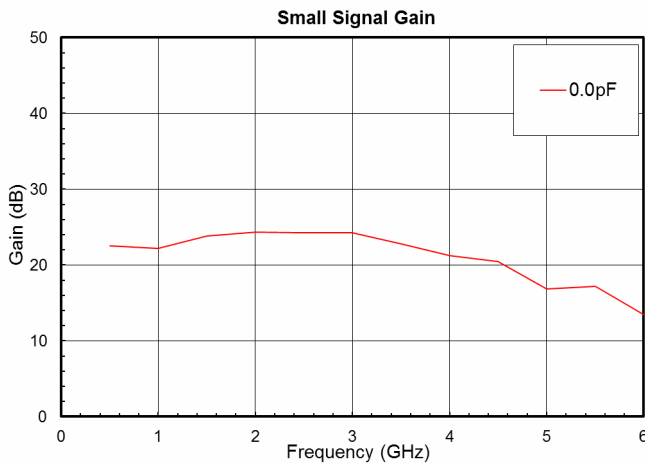
\* Specifications subject to change without notice.

\*\* Data obtained using test fixture shown in this datasheet. Gate biases corresponding to above currents are  $V_{gs1} = -3.75V$ ,  $V_{gs2} = -3.75V$ , and may vary from lot to lot.

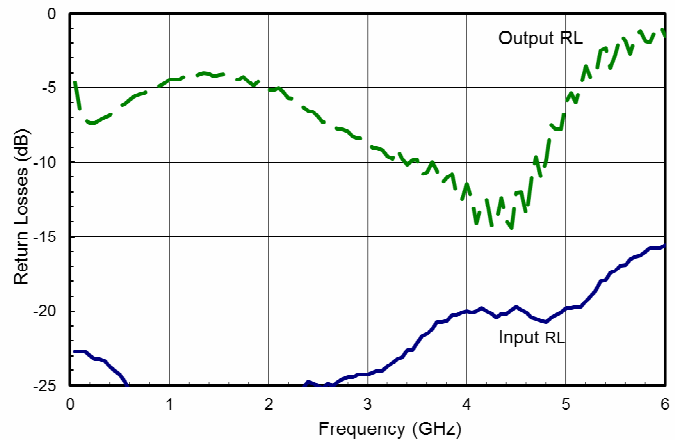
### ABSOLUTE MAXIMUM RATING (10% Pulse)

Parameters	Symbol	Rating
First stage drain voltage	$V_{ds1}$	35V
Second stage drain source voltage	$V_{dd2}$	70V
Gate source voltage	$V_{gs1}$ & $V_{gs2}$	-6V
Drain source current	$I_{dq1}$	0.7A
Drain source current	$I_{dq2}$	1.75A
Continuous dissipation at 25°C	$P_t$	40W
Channel temperature	$T_{ch}$	175°C
Operating temperature	$T_{op}$	-55°C to +85°C
Storage temperature	$T_{sto}$	-55°C to +135°C

### SMALL SIGNAL DATA



a) Gain with 10% Pulse duty cycle



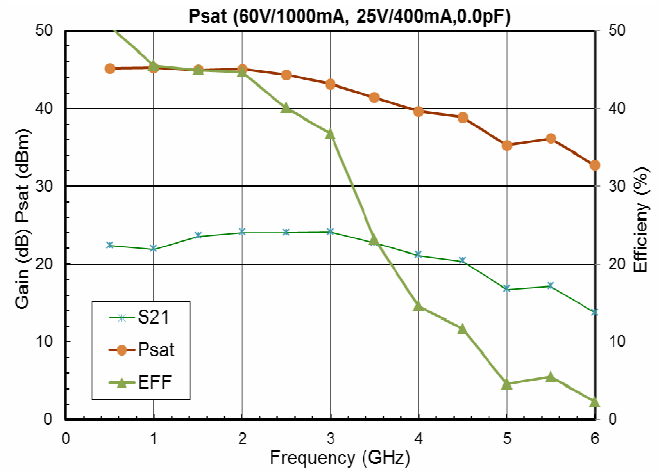
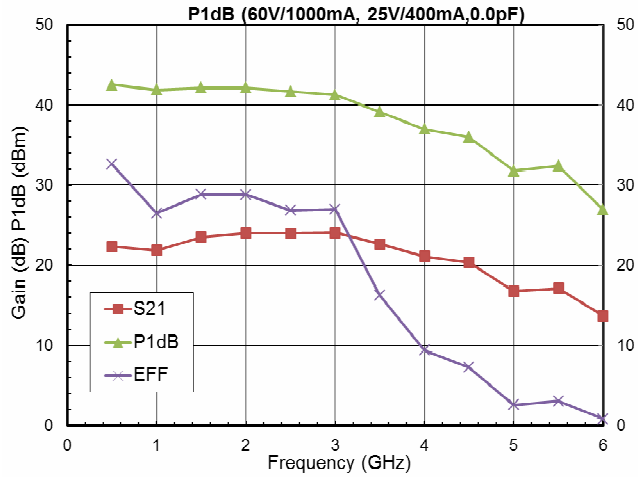
b) S-parameters under CW condition\*

\* S-Parameters measured under CW using bias tee and a matching circuit for 1 to 5GHz band. Bias is  $V_{ds1}=25V$  ,  $V_{dd2}=30V$  ,  $I_{dq1}=200mA$  ,  $I_{dq2}=300mA$  ,  $V_{gs1}=-3.75V$  ,  $V_{gs2}=-3.75V$ .

### NOISE DATA

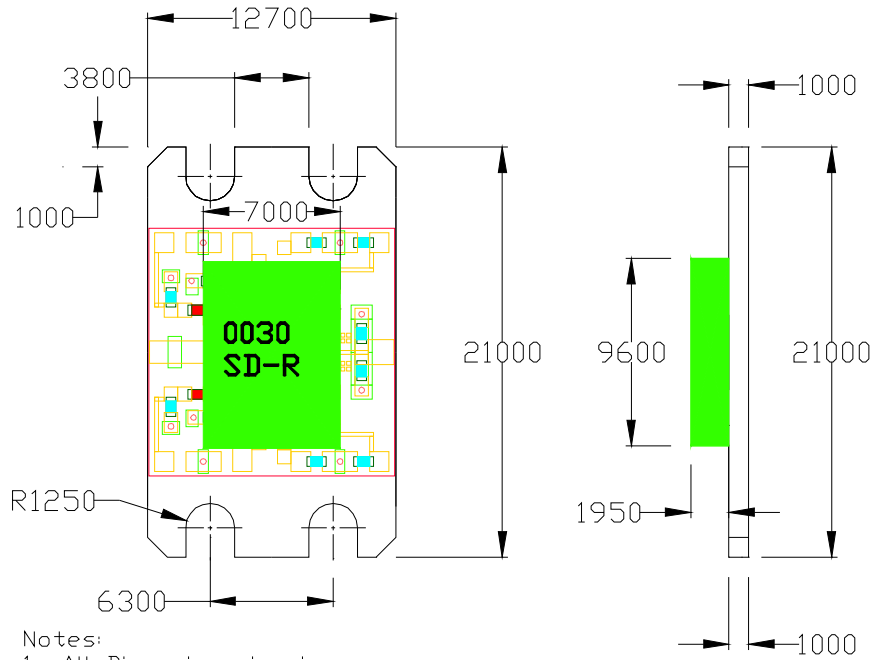
(TBD)

**PULSED POWER DATA\***



\* Power measured using test fixture shown in this datasheet under pulse conditions. Pulse is 100µsec with 10% duty cycle. Bias is  $V_{ds1}=25V$  ,  $V_{dd2}=60V$  ,  $I_{dq1}=400mA$  ,  $I_{dq2}=1000mA$

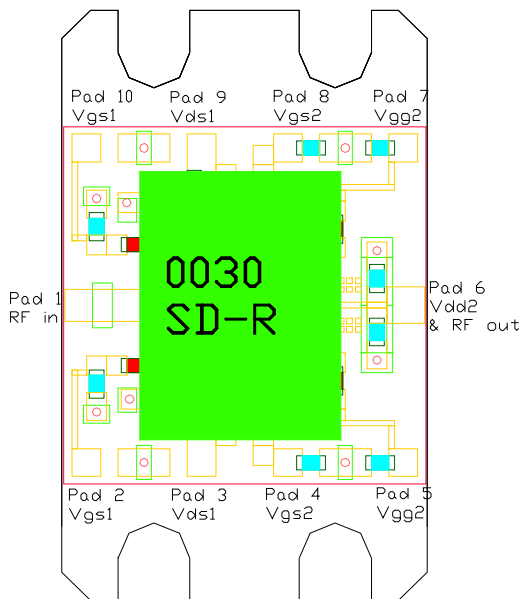
**CARRIER OUTLINE (AM003044SD-2H)**



- Notes:
- 1- All Dimensions in microns
  - 2- Material: Copper Tungsten
  - 3- Tolerance < 0.003
  - 4- Finish: Plate Au 3um min per ASTM-B-488-95 Type III Class B

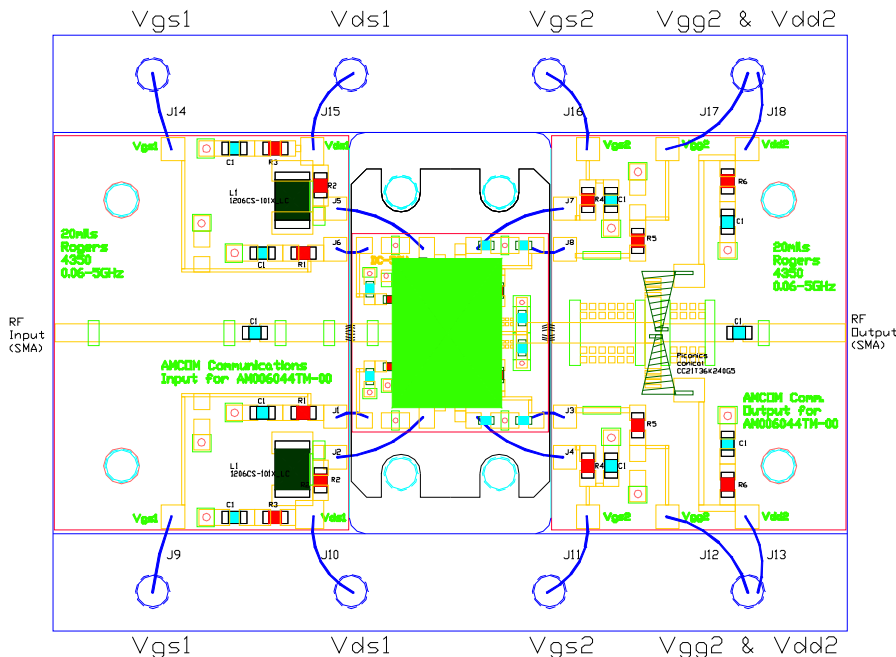
- Gate biases are for reference only and may vary from lot to lot

**Pin Layout**



Pin No.	Function	Bias
1	RF in	
2	Vgs1	-3.75V
3	Vds1	+25V
4	Vgs2	-3.75V
5	Vgg2	+60V
6	Vdd2 & RF out	+60V
7	Vgg2	+60V
8	Vgs2	-3.75V
9	Vds1	+25V
10	Vgs2	-3.75V

TEST CIRCUIT for 0.03 – 3GHz



- Notes:
- 1- 20mils Rogers 4350 Material epoxied
  - 2- Ckt is for AM006044TM-00 MMIC
  - 3- C1=1000pF,  
R1=100 Ohms, R2=170 Ohms, R3=18 Ohms ,  
R4=75 & R5=200 Ohms , R6=25 Ohms
  - 4- All Caps & Resistors are 0603 size
  - 5- Inductors are coilcraft 1206CS-101X\_LC  
& L2= 11nH (0603CS-11NXJLU)

**Important Notes:**

- 1- The +60V 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 pulsed current biases are 400mA and 1000mA for the first stage and second stage respectively. Gate biases of -3.75V are for reference only.  $V_{gs1}$  &  $V_{gs2}$  could be adjusted to vary the currents going thru the first stage ( $V_{ds1}$  pin) and the second stage ( $V_{dd2}$  pin) respectively.
- 3- Do not apply  $V_{ds1}$  &  $V_{dd2}$  without proper negative voltages on  $V_{gs1}$  &  $V_{gs2}$ . Otherwise MMIC would fail due to excess heat.