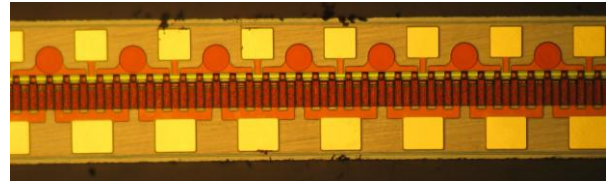


DESCRIPTION

AMCOM's AM100WN-00-R is a discrete GaN/SiC HEMT that has a total gate width of 10mm (Eight 1.25mm FETs in parallel). It is a bare die which can be operated up to 15 GHz. It can provide a typically saturated power of 46.1 dBm. This part is RoHS compliant.



FEATURES

- High Frequency Operation up to 15GHz
- Gain=19dB
- PAE=50%
- $P_{5dB}=46.1$ dBm

APPLICATIONS

- Cellular Radio base stations
- WLAN, Repeaters
- C-Band VSAT
- Radar
- Test Instrumentation
- Military

TYPICAL RF PERFORMANCE (CW)

FREQUENCY	2 (GHz)	10 (GHz)
P_{5dB} (dBm)	46.1	45.7
PAE @ P_{5dB}	50%	40%
Small Signal Gain (dB)	19	10
Load Reflection Coeff. (Per 1.25mm cell)	$0.19 \angle 101^\circ$	$0.61 \angle 141^\circ$

*($V_{ds} = 28V$, $I_{ds} = 1.5A$)

**Bond wires are not included and the reference line is 75 microns from the edge of the bonding pads towards the device.

ABSOLUTE MAXIMUM RATING

Parameters	Symbol	Rating
Drain-Source Voltage (V)	V_{ds}	40
Gate-Source Voltage (V)	V_{gs}	-6
Drain Current (mA)	I_{ds}	4000
Continuous Dissipation At Room Temp. (W)	P_t	165.1
Operating Temp. ($^\circ C$)	T_A	-55 to +85
Max. Channel Temp. ($^\circ C$)	T_{ch}	+200

DC PARAMETERS

Parameters	Conditions	MIN	TYP	MAX
Saturation Current I_{dss} (mA)	$V_{ds}=10V$, $V_{gs}=0V$	5000	8000	11400
Pinch-off Voltage V_p (V)	$V_{ds}=10V$, $I_{ds}=2.5\% I_{dss}$	-3.9	-2.9	-1.9
Drain to Gate Breakdown Voltage BV_{gd} (V)	$I_{dg} = 1$ mA/mm	90	120	-
Thermal Resistance ($^\circ C/W$)		-	1.06	-

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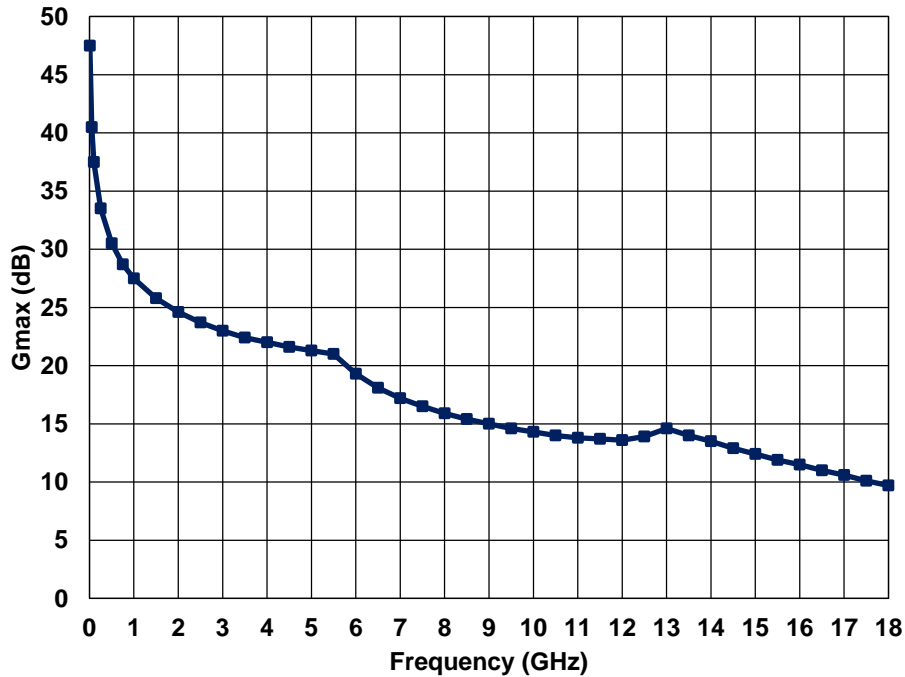
SMALL SIGNAL MEASUREMENTS *S-Parameters for AM100WN-00-R. $V_{ds} = 28V$, $V_{gs} = -2.35V$, $I_{ds} = 1.5A^*$

Freq(GHz)	MAG(S11)	ANG(S11)	MAG(S21)	ANG(S21)	MAG(S12)	ANG(S12)	MAG(S22)	ANG(S22)
0.01	0.988	-11.582	58.138	168.36	0.001	80.229	0.477	-172.06
0.1	0.951	-90.78	40.095	131.21	0.007	43.564	0.649	-166.16
0.5	0.941	-157.58	10.966	94.685	0.01	9.36	0.768	-174.73
1	0.943	-168.51	5.522	84.048	0.01	1.667	0.779	-175.65
1.5	0.945	-172.16	3.641	77.041	0.01	-2.324	0.787	-175.3
2	0.948	-173.96	2.68	71.093	0.009	-5.15	0.797	-174.74
2.5	0.95	-175.03	2.094	65.709	0.009	-7.266	0.807	-174.2
3	0.952	-175.76	1.696	60.738	0.009	-8.779	0.819	-173.77
3.5	0.955	-176.31	1.408	56.118	0.008	-9.695	0.831	-173.45
4	0.958	-176.74	1.191	51.82	0.008	-9.987	0.843	-173.24
4.5	0.96	-177.11	1.021	47.822	0.007	-9.609	0.855	-173.14
5	0.962	-177.43	0.885	44.103	0.007	-8.505	0.865	-173.12
5.5	0.965	-177.72	0.775	40.645	0.006	-6.615	0.876	-173.18
6	0.967	-177.99	0.683	37.43	0.006	-3.882	0.885	-173.28
6.5	0.968	-178.25	0.607	34.439	0.005	-0.266	0.893	-173.42
7	0.97	-178.49	0.543	31.654	0.005	4.234	0.901	-173.6
7.5	0.972	-178.73	0.488	29.06	0.005	9.55	0.908	-173.79
8	0.973	-178.95	0.441	26.64	0.005	15.527	0.915	-173.99
8.5	0.974	-179.17	0.4	24.381	0.005	21.917	0.92	-174.21
9	0.975	-179.38	0.365	22.271	0.005	28.413	0.925	-174.42
9.5	0.976	-179.59	0.334	20.296	0.005	34.711	0.93	-174.64
10	0.977	-179.79	0.307	18.449	0.005	40.57	0.934	-174.86
10.5	0.978	-179.98	0.283	16.718	0.005	45.842	0.938	-175.07
11	0.979	-179.82	0.262	15.096	0.005	50.47	0.941	-175.28
11.5	0.979	-179.63	0.243	13.576	0.006	54.465	0.945	-175.49
12	0.98	-179.45	0.226	12.152	0.006	57.879	0.947	-175.69
12.5	0.98	-179.26	0.211	10.817	0.006	60.78	0.95	-175.89
13	0.981	-179.08	0.198	9.568	0.007	63.239	0.952	-176.08
13.5	0.981	-178.9	0.185	8.399	0.007	65.323	0.954	-176.26
14	0.981	-178.72	0.174	7.308	0.008	67.093	0.956	-176.44
14.5	0.982	-178.55	0.164	6.29	0.008	68.598	0.958	-176.62
15	0.982	-178.37	0.155	5.343	0.009	69.883	0.96	-176.79
15.5	0.982	-178.19	0.147	4.464	0.009	70.982	0.961	-176.95
16	0.982	-178.02	0.139	3.652	0.01	71.926	0.962	-177.12
16.5	0.983	-177.84	0.132	2.905	0.01	72.74	0.964	-177.27
17	0.983	-177.67	0.125	2.221	0.011	73.445	0.965	-177.43
17.5	0.983	-177.49	0.119	1.6	0.012	74.057	0.966	-177.58
18	0.983	-177.31	0.114	1.04	0.012	74.59	0.967	-177.72

*Notes:

- 1) Bond wires are not included and the reference line is 75 microns from the edge of the bonding pads towards the device.
- 2) S2P file downloadable from the web : <http://www.amcomusa.com/products/rftrans.html>

MAXIMUM AVAILABLE GAIN (Gmax) 28V/1.5A



POWER DATA (CW)

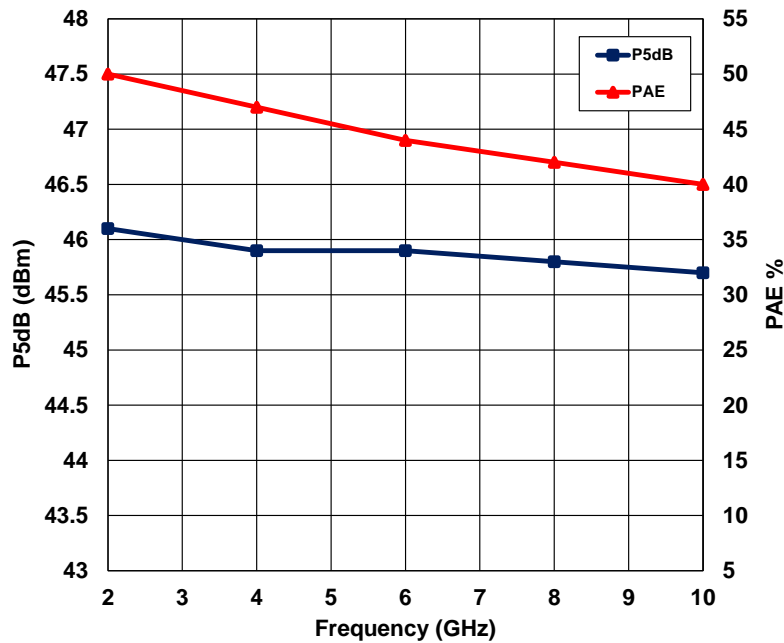
1) Optimum P_{SAT} tune (V_{ds} = 28V, I_{ds} = 1.5A)*

Frequency	SOURCE Γ (per 1.25 mm cell)	LOAD Γ (per 1.25 mm cell)	Gain (dB)	P _{1dB} (dBm)	P _{5dB} (dBm)	PAE @ P _{5dB}
2 GHz	0.8 \angle 101°	0.19 \angle 101°	19	44.5	46.1	50%
4 GHz	0.8 \angle 131°	0.36 \angle 113°	18	43.4	45.9	47%
6 GHz	0.81 \angle 141°	0.44 \angle 125°	12.5	42.9	45.9	44%
8 GHz	0.8 \angle 165°	0.54 \angle 138°	12	42.6	45.8	42%
10 GHz	0.75 \angle 170°	0.61 \angle 141°	10	41.6	45.7	40%

*Notes:

- 1) Source tuning has effect on P_{1dB} & small signal gain, and the source points in this table is a compromise between high gain and high P_{1dB} at that frequency.
- 2) Bond wires are not included and the reference line is 75 microns from the edge of the bonding pads towards the device.
- 3) AM100WN-00-R is 10mm device which consists of eight 1.25mm cells in parallel.

Optimum P_{SAT} tune (28V/ 1.5 A)



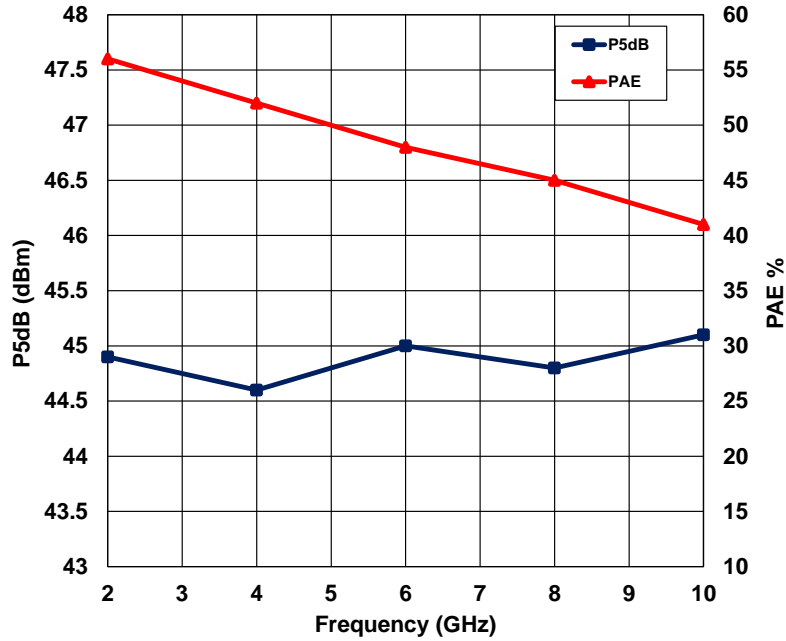
2) Optimum PAE tune (V_{ds} =28V, I_{ds} = 1.5A)*

Frequency	SOURCE Γ (per 1.25 mm cell)	LOAD Γ (per 1.25 mm cell)	Gain (dB)	P _{1dB} (dBm)	P _{5dB} (dBm)	PAE @ P _{5dB}
2 GHz	0.8 \angle 101°	0.54 \angle 67°	20	43.7	44.9	56%
4 GHz	0.8 \angle 131°	0.63 \angle 92°	15	42.4	44.6	52%
6 GHz	0.81 \angle 141°	0.65 \angle 108°	12	42.3	45	48%
8 GHz	0.8 \angle 165°	0.7 \angle 131°	12	41.9	44.8	45%
10 GHz	0.75 \angle 170°	0.72 \angle 134°	10	41.6	45.1	41%

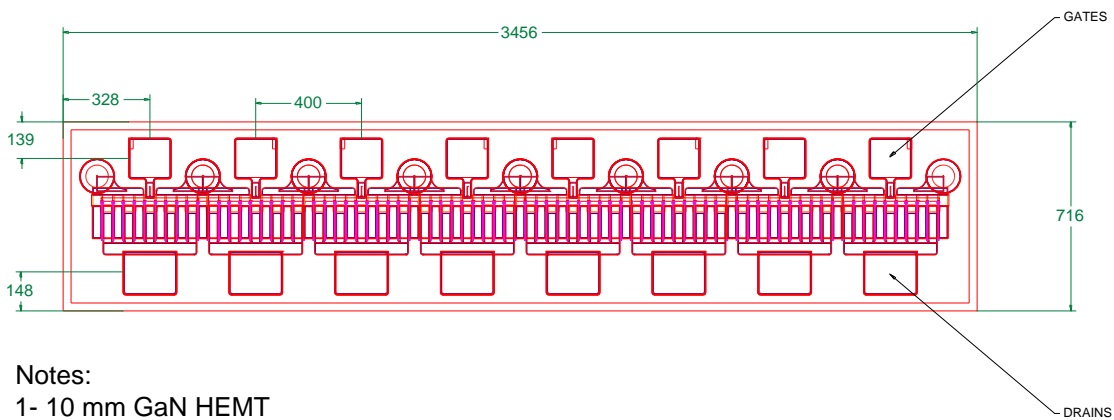
*Notes:

- 1) Source tuning has effect on P_{1dB} & small signal gain, and the source points in this table is a compromise between high gain and high P_{1dB} at that frequency.
- 2) Bond wires are not included and the reference line is 75 microns from the edge of the bonding pads towards the device.
- 3) AM100WN-00-R is 10mm device which consists of eight 1.25mm cells in parallel.

Optimum PAE tune (28V/ 1.5 A)



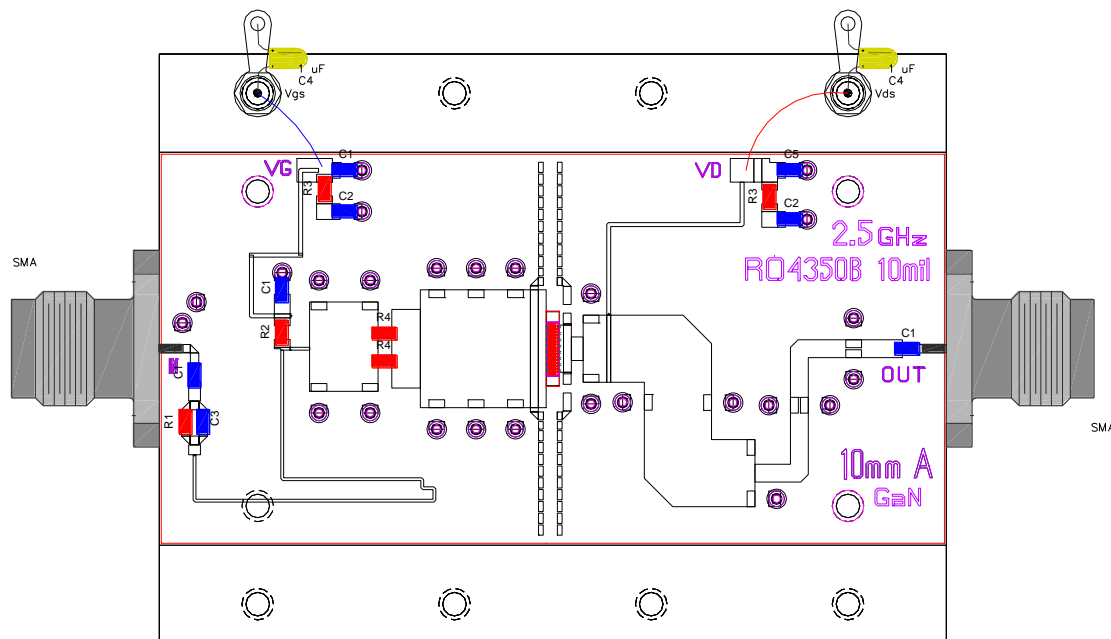
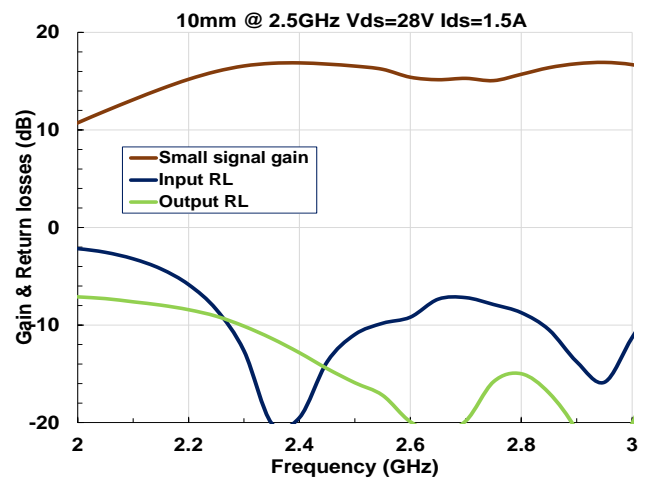
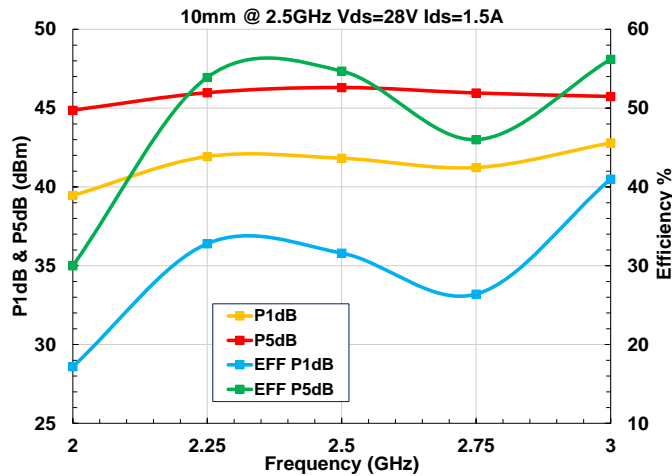
CHIP OUTLINE



- Notes:
- 1- 10 mm GaN HEMT
 - 2- Chip is 100 μm thick
 - 3- Dimensions in microns
 - 4- Use eutectic bonding Au85Sn15 at 290°C

TEST CIRCUIT

28V/1500mA



Notes:

- 1- 10mils Rogers 4350 Material (LoPro)
- 2- Ckt is for 10mm mask71 @ 2.5GHz
- 3- C1=100pF, C2=1000pF, C3=5.6pF, C4=1uF, C5=47pF
R1=1ohm, R2=470ohms, R3=22ohms, R4=3ohms
- 4- All Caps & Resistors are 0603 size