

## Broadband Transistor

IGN0110UM100 is a dual gallium nitride (GaN) high electron mobility transistor (HEMT). This device is designed for Broadband applications operating over the 100MHz – 1GHz instantaneous frequency band. Under CW conditions it supplies a minimum of 100 watts of output power with 12dB gain. Specified operation is with Class AB bias. It is also operable under a wide range of pulse widths and duty factors. It operates with spectral purity into all phases of 3:1 output load VSWR. All devices are 100% screened for large signal RF parameters in a fixed tuned broadband matching circuit / test fixture. The use of external tuners is not allowed during screening.



### GaN on Silicon Carbide FET

- High Power Gain
- Excellent Thermal Stability
- Gold Metal

### Depletion Mode Device

- Negative Gate Voltage to Bias
- Bias Sequencing Required
- See App Note to Prevent Damage

### Gold Metal System

- Complete Gold System
- Gold Bond Wires
- Gold Package Metal
- Maximum Reliability

### Class AB

- Specified with AB bias

### Metal - Ceramic

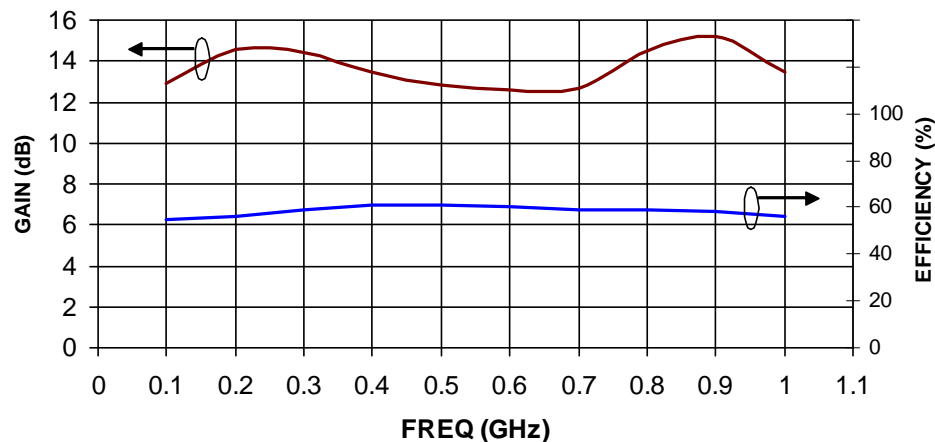
- Metal Based
- Epoxy Seal

### High Power RF Test / Fixture

- Broadband
- Matched to 50  $\Omega$  (ohms)
- Long-term Correlation
- 100% Device RF Screening
- No External Tuning required

## BROADBAND RF DATA

Output Power = 100W CW  
Vdd = 28V, Idq = 480mA



**MAXIMUM RATINGS**

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Drain-Source Voltage	$V_{DS}$	--	60	V	--
BD	Gate-Source Voltage	$V_{GS}$	-10	0	V	--
BD	Storage Temperature Range	$T_{STG}$	-55	+150	°C	--
BD	Operating Junction Temperature Range	$T_J$	-55	+200	°C	--
Note	Screen 'BD' = parameter qualified By Design.					

**THERMAL CHARACTERISTICS**

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Thermal Resistance	$R_{TH(JC)}$	--	0.50	°C/W	$V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=25\pm5^\circ C, P_{OUT}=100W$
Note	Screen 'BD' = parameter qualified By Design.					

**PROCESSING SPECIFICATIONS**

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	DC Wafer Probe	--	--	--	--	Per Integra specification.
Q1	Wafer DC and RF Qualification	--	--	--	--	Per Integra specification.
LM	Wire Bond Strength	--	--	--	--	Line monitor per Integra specification.
100%	Pre-cap visual inspection	--	--	--	--	Per Integra specification
100%	Gross leak test	--	--	--	--	MIL-STD-750D, Method 1071.6, Test Condition C
Note	Screen 'Q1' = parameter is qualified by assembly and test of 3 pieces minimum per wafer.					
Note	Screen 'LM' = parameter is qualified by assembly line monitor.					

**DC ELECTRICAL CHARACTERISTICS**

Screen	Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
100%	Drain Leakage Current	$I_{D-OFF}$	--	0.6	--	mA	$V_{GS} = -8V, V_{DS} = 28V, T_F = 25\pm5^\circ C, \text{Per Side}$
100%	Gate Threshold Voltage	$V_{GS-TH}$	--	-3.5	--	V	$V_{DS} = 5V, I_D = 480mA, T_F = 25\pm5^\circ C, \text{Per Side}$

**RF ELECTRICAL CHARACTERISTICS**

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Input Return Loss	RL	-18	-5	dB	$V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{OUT}=P_{OUT1}, F=F1, F2, F3.$
100%	Input Power	$P_{IN}$	2.5	6.3	W	$V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{OUT}=P_{OUT1}, F=F1, F2, F3.$
100%	Drain Efficiency	$\eta_D$	50	75	%	$V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{OUT}=P_{OUT1}, F=F1, F2, F3.$
100%	Power Gain	Gp	12	16	dB	$V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{OUT}=P_{OUT1}, F=F1, F2, F3.$
100%	3:1 Load Mismatch Stability	VSWR-S	S	--	--	$V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{OUT}=P_{OUT1}, F=F1, F2, F3.$ Rotate 3:1 output VSWR through 360° phase. No oscillatory or pulse break-up characteristics allowed on detected output pulse. All non-harmonically related signals must be at least -65 dBc.
Note 1	$V1 = 28V; I_{DQ1} = 480mA; PW1 = CW; DF1 = CW$					
Note 2	Output Power Test Levels: $P_{OUT1} = 100W$					
Note 3	Test Frequencies: $F1 = 0.1 \text{ GHz}, F2 = 0.6 \text{ GHz}, F3 = 1.0 \text{ GHz}.$					
Note 4	$T_{F1} = 25 \pm 5^\circ C =$ Device flange temperature.					
Note 5	Screen 'BD' = parameter qualified By Design.					

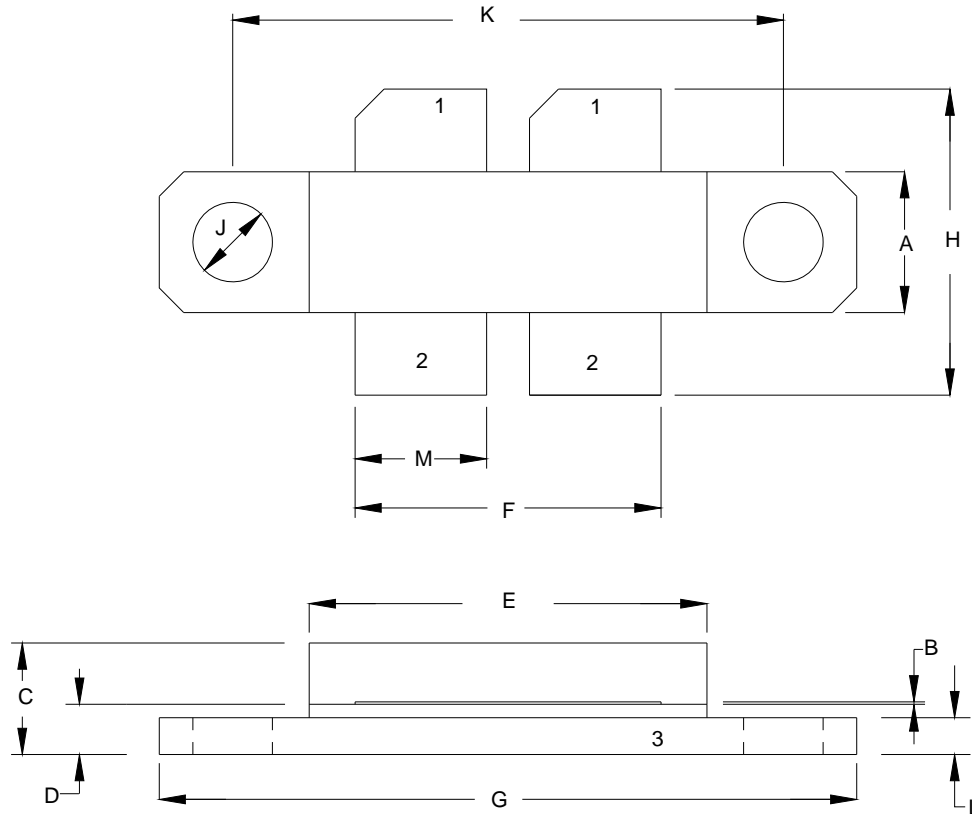
**RF TEST FIXTURE IMPEDANCE CHARACTERISTICS**

Frequency (GHz)	$Z_{IF} (\Omega)$	$Z_{OF} (\Omega)$
0.1	10.2 + j 0.6	11.3 - j 2.7
0.3	13.5 - j 1.1	10.8 - j 4.7
0.6	8.1 - j 6.2	7.8 - j 7.2
0.8	6.2 - j 4.8	4.3 - j 9.2
1.0	6.3 - j 12.3	1.3 - j 8.3
Differential Impedance Definition		

**S PARAMETERS (ONE HALF DEVICE) 28V, 480mA**

FREQ MHz	S11		S21		S12		S22	
	Mag (dB)	Ang (deg)	Mag (dB)	Ang (deg)	Mag (dB)	Ang (deg)	Mag (dB)	Ang (deg)
100	-0.40	-158.94	25.73	97.66	-39.96	9.86	-2.39	-172.72
200	-0.38	-170.47	19.82	88.45	-40.01	6.07	-2.29	-176.26
300	-0.40	-175.00	16.27	83.45	-39.94	3.78	-2.26	-177.48
400	-0.39	-177.61	13.78	79.30	-40.01	4.18	-2.25	-178.31
500	-0.40	-179.43	11.85	75.58	-39.92	2.93	-2.24	-179.11
600	-0.40	179.13	10.27	72.08	-40.03	2.87	-2.23	-179.97
700	-0.39	177.90	8.94	68.65	-39.92	4.24	-2.19	178.97
800	-0.41	176.72	7.75	65.11	-39.89	3.86	-2.16	177.59
900	-0.41	175.75	6.68	61.73	-40.02	3.87	-2.18	176.05
1000	-0.41	174.72	5.65	58.46	-40.15	5.42	-2.25	174.47
1100	-0.40	173.83	4.68	55.76	-40.53	6.68	-2.34	173.55
1200	-0.40	173.01	3.81	53.62	-40.45	8.19	-2.42	173.17

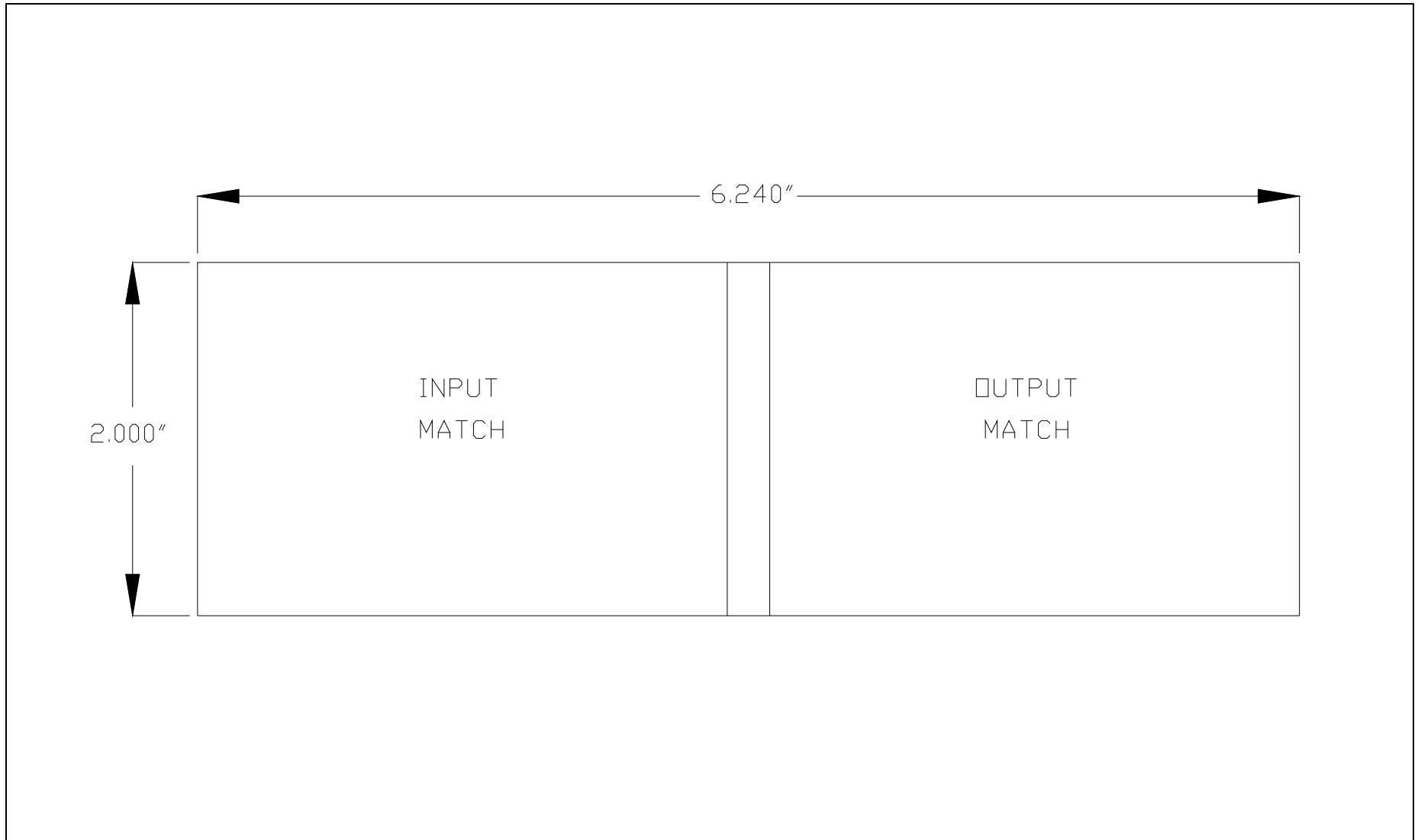
**PACKAGE DIMENSIONAL OUTLINE DRAWING**



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.225	0.235	5.72	5.97
B	0.003	0.005	0.08	0.13
C	0.177	0.187	4.50	4.75
D	0.077	0.087	1.96	2.21
E	0.645	0.655	16.38	16.64
F	0.495	0.505	12.57	12.83
G	1.135	1.145	28.83	29.08
H	0.490	0.510	12.44	12.95
J	0.128	0.132	3.25	3.35
K	0.895	0.905	22.73	22.99
L	0.055	0.065	1.40	1.65
M	0.210	0.220	5.35	5.60

PIN SCHEDULE	
1	DRAIN
2	GATE
3	SOURCE

**RF TEST FIXTURE**



**CONTACT FACTORY FOR RF TEST FIXTURE CAD DRAWING WITH CIRCUIT DIMENSIONS AND COMPONENT LIST**

**DEFINITIONS**

<b>Data Sheet Status</b>	
Proposed Specification	This data sheet contains proposed specifications.
Preliminary Specification	This data sheet contains specifications based on preliminary measurements and data.
Product Specification	This data sheet contains final product specifications.
<b>Maximum Ratings</b>	
Stress above one or more of the maximum ratings may cause permanent damage to the device. These are maximum ratings only operation of the device at these or at any other conditions above those given in the characteristics sections of the specification is not implied. Exposure to maximum values for extended periods of time may affect device reliability.	

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