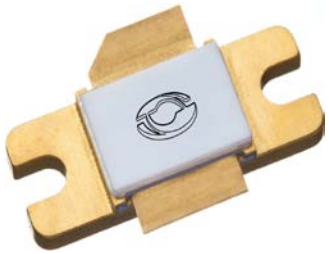
1012GN-800V

800 Watts - 54 Volts, 20us, 6%
1025-1150 MHz

GENERAL DESCRIPTION

The 1012GN-800V is an internally matched, COMMON SOURCE, class AB GaN on SiC high power transistor specifically designed for 20us, 6% duty cycle radar systems. It is capable of providing over 19dB gain, 800 Watts of pulsed RF output power using 20us, 6% pulse format at 1025-1150MHz. The transistor has internal pre-match for optimal performance. This transistor is specifically designed for Avionics applications. It utilizes gold metallization and eutectic attach to provide highest reliability and superior ruggedness.

CASE OUTLINE
55-KR
Common Source



ABSOLUTE MAXIMUM RATINGS

Maximum Power Dissipation

Device Dissipation @ 25°C 1550 W

Maximum Voltage and Current

Drain-Source Voltage (V_{DSS}) 150 V
Gate-Source Voltage (V_{GS}) -8 to +0V

Maximum Temperatures

Storage Temperature (T_{STG}) -55 to +125°C
Operating Junction Temperature +200°C

ELECTRICAL CHARACTERISTICS @ 25°C

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Units
Pout	Output Power	Freq=1025-1150 MHz, 20us, 6%	800	825		W
Gp	Power Gain	Freq=1025-1150 MHz, 20us, 6%	18.5	19.3		dB
□d	Drain Efficiency	Freq=1025-1150 MHz, 20us, 6%	53	58		%
R/L	Input Return Loss	Freq=1025-1150 MHz, 20us, 6%	-7	-8		dB
VSWR-T	Load Mismatch Tolerance	Pout=800W, Freq= 1150MHz			3:1	
Θjc	Thermal Resistance	Pulse Width=20uS, Duty=6%			0.16	°C/W

- **Bias Condition: Vdd=+54V, Idq=120 mA (Vgs= -2.0 ~ -4.8V) with constant gate bias**

FUNCTIONAL CHARACTERISTICS @ 25°C

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Units
$I_{D(Off)}$	Drain leakage current	V_{gS} = -8V, V_D = 150V			64	mA
$I_{G(Off)}$	Gate leakage current	V_{gS} = -8V, V_D = 0V			20	mA
BV_{DSS}	Drain-source breakdown voltage	V_{gs} =-8V, I_D = 64mA	150			V

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Issue June 2013

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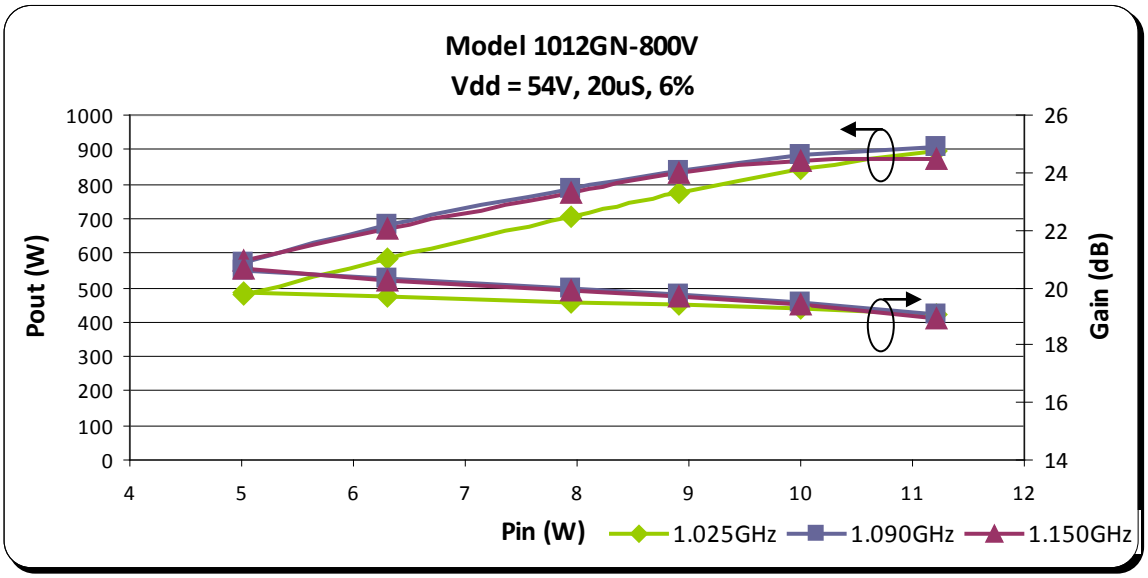
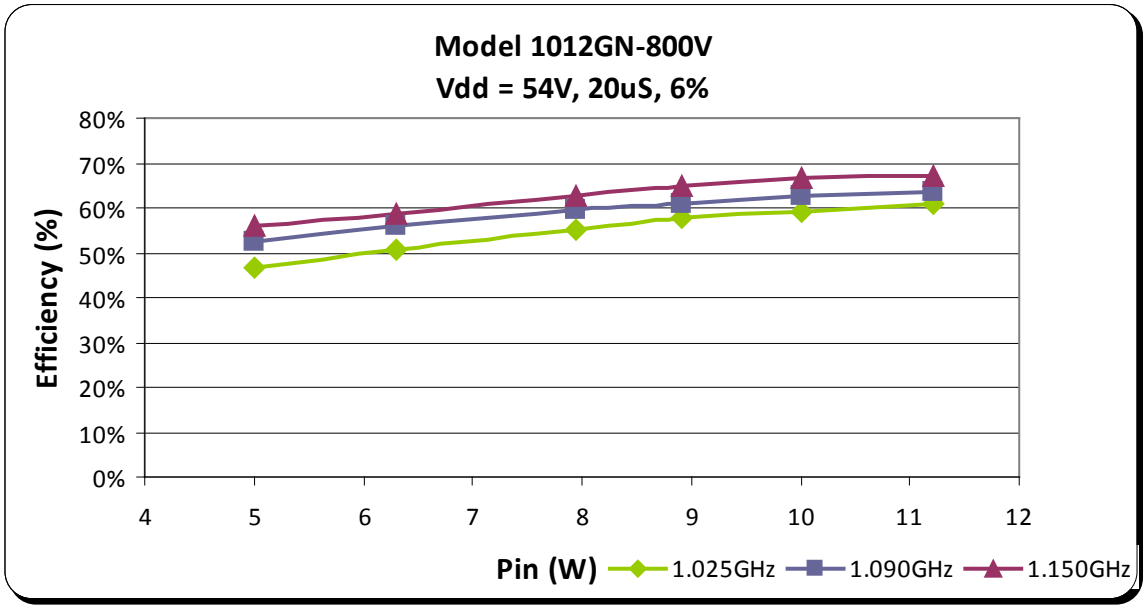
TYPICAL RF PERFORMACE DATA

Frequency	Pin (W)	Pout (W)	Id (A)	RL (dB)	Nd (%)	G (dB)	Droop (dB)
1025 MHz	10	841	1.65	-8.5	59.3	19.25	0.2
1090 MHz	10	885	1.64	-14	62.5	19.47	0.2
1150 MHz	10	869	1.52	-8.9	66.7	19.39	0.2





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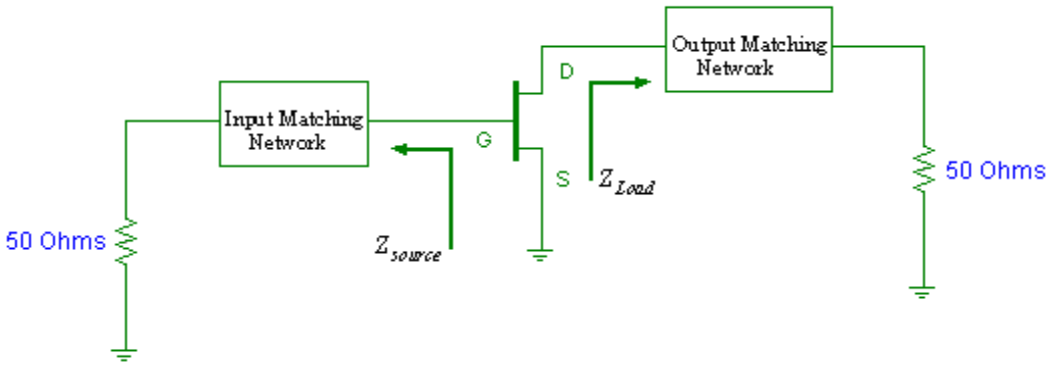
Transistor Impedance Information



Note: Z_{Source} is looking into the input circuit;
Z_{Load} is looking into the output circuit.

Impedance Data		
Freq (GHz)	**Zs**	**Zl**
1.025	1.72 - j1.54	1.24 – j1.31
1.090	1.50 - j1.42	1.11 – j1.09
1.150	1.24 - j1.23	0.97 - j0.85

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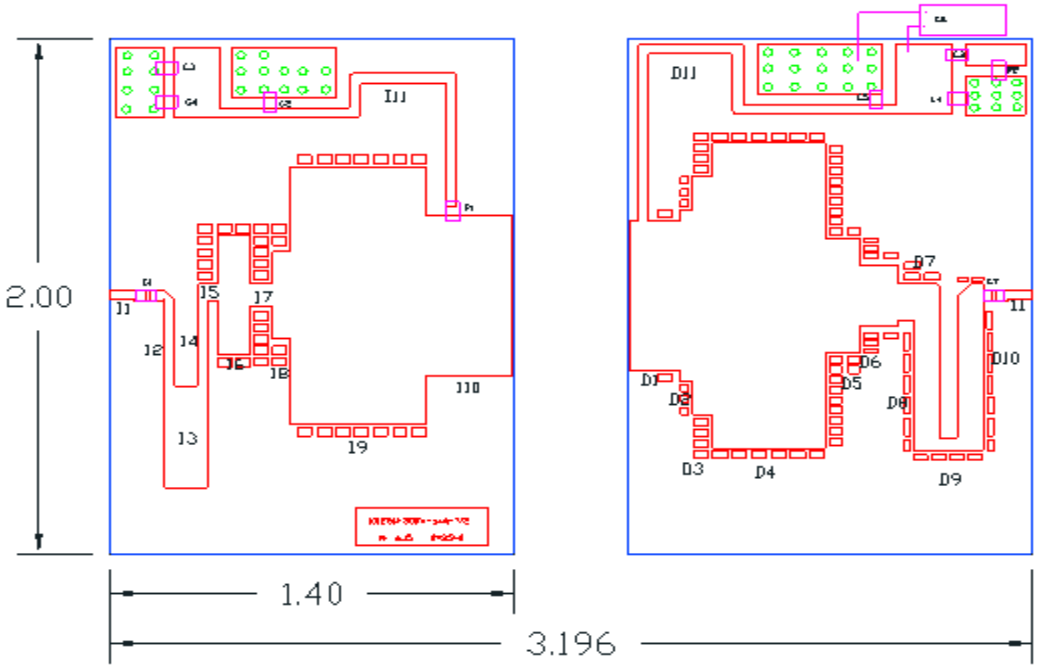
Test Circuit Diagram



Board Material: Roger Duriod 6006 @ 25 Mil Thickness, Er=6.15

Component List				Input layout				Output layout		
Item	Description	Value		Item	W(mil)	L(mil)		Item	W(mil)	L(mil)
C1	ATC 800A	100pF		I1	36	85		D1	580	178
C2	ATC 100B	100PF		I2	370	36		D2	666	42
C3	ATC 100B	10000pF		I3	395	152		D3	928	69
C4	ATC 100B	1000pF		I4	336	36		D4	1198	390
C5	ATC 100B	91PF		I5	64	66		D5	450	120
C6	Elyctrylic Capacitor (160V)	1000UF		I6	462	114		D6	240	135
C7	ATC 600S	68PF		I7	90	65		D7	140	140
R1	0805	10 ohm		I8	340	60		D8	462	90
R2	0805	2.2ohm		I9	1012	468		D9	48	242
note	C3, C4 X2			I10	620	305		D10	603	90
C6 can be replace by large capacitor such as 6800uF (63V)				I11	36	1315		D11	36	1380-1600

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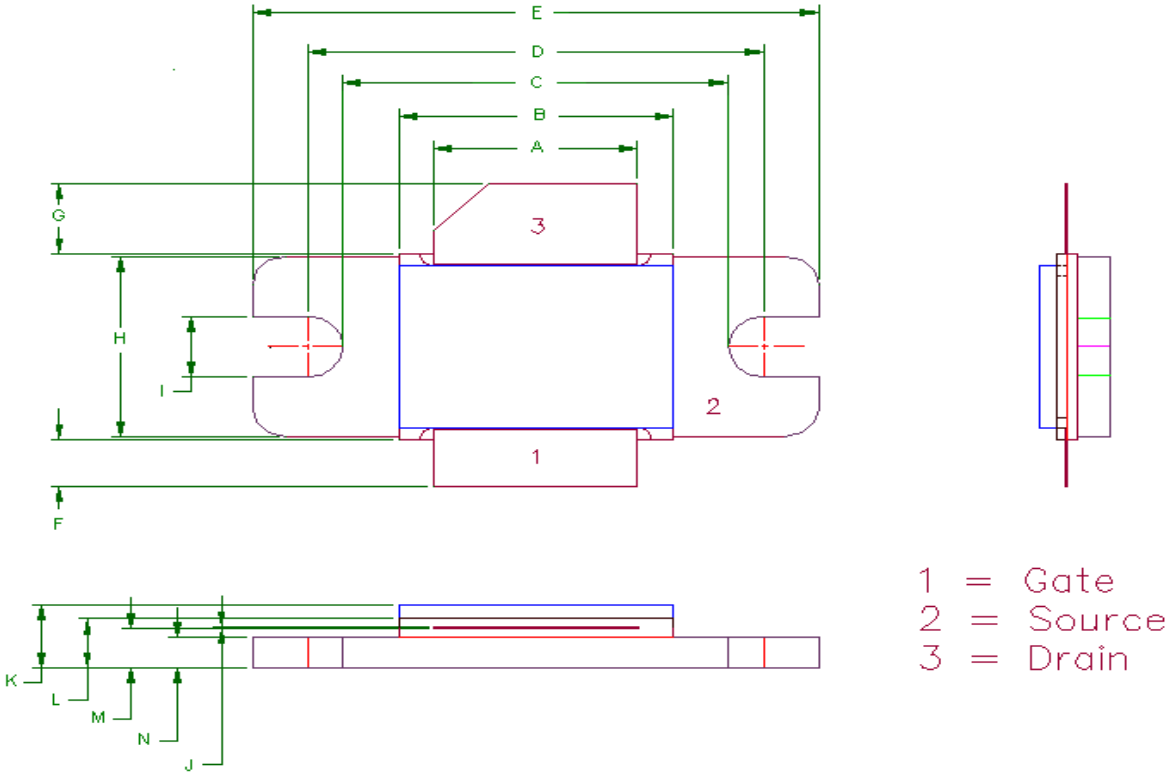
55-KR Package Dimension



Dimension	Min (mil)	Min (mm)	Max (mil)	Max (mm)
A	370	9.40	372	9.44
B	498	12.65	500	12.7
C	700	17.78	702	17.83
D	830	21.08	832	21.13
E	1030	26.16	1032	26.21
F	101	2.56	102	2.59
G	151	3.84	152	3.86
H	385	9.78	387	9.83
I	130	3.30	132	3.35
J	003	.076	004	0.10
K	135	3.43	137	3.48
L	105	2.67	107	2.72
M	085	2.16	86	2.18
N	065	1.65	66	1.68

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Revision History

Revision Level / Date	Para. Affected	Description
0.1 / April 2013	-	Initial Preliminary Release