1214GN-280LV

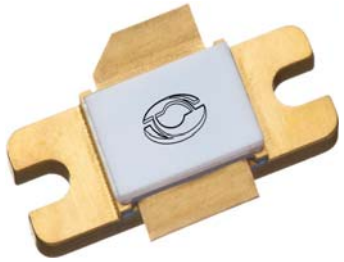
280 Watts - 50 Volts, 200 µs, 20%
L-Band Radar 1200 - 1400 MHz

GENERAL DESCRIPTION

The 1214GN-280LV is an internally matched, COMMON SOURCE, class AB, GaN on SiC HEMT transistor capable of providing over 16.5dB gain, 280 Watts of pulsed RF output power at 200µs pulse width, 20% duty factor across the 1200 to 1400 MHz band.

Market Application – 1214GN-280LV is designed for L-Band Pulsed Radar

CASE OUTLINE
55-KR
Common Source



ABSOLUTE MAXIMUM RATINGS

Maximum Power Dissipation

Device Dissipation @ 25°C 600 W

Maximum Voltage and Current

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

Maximum Temperatures

Storage Temperature (T_{STG}) -55 to +125° C
Operating Junction Temperature +250 °C

ELECTRICAL CHARACTERISTICS @ 25°C

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Units
Pout	Output Power	Pin=6.3W Freq=1200,1300,1400 MHz	280	300		W
Gp	Power Gain	Pin=6.3W Freq=1200,1300,1400 MHz	16.45	16.7		dB
ηd	Drain Efficiency	Pin=6.3W Freq=1200,1300,1400 MHz	50	60		%
Dr	Droop	Pin=6.3W Freq=1200,1300,1400 MHz			1.0	dB
VSWR-T	Load Mismatch Tolerance	Pout=280W, Freq= 1300MHz			3:1	
Θjc	Thermal Resistance	Pulse Width=200uS, Duty=20%			0.35	°C/W

- **Bias Condition: Vdd=+50V, Idq=270mA constant current (Vgs= -2.0 ~ -4.5V typical)**

FUNCTIONAL CHARACTERISTICS @ 25°C

$I_{D(Off)}$	Drain leakage current	V_{gS} = -8V, V_D = 48V			15	mA
$I_{G(Off)}$	Gate leakage current	V_{gS} = -8V, V_D = 0V			8	mA
BV_{DSS}	Drain-source breakdown voltage	V_{gs} =-8V, I_D = 25mA	150			V

Export Classification: EAR-99

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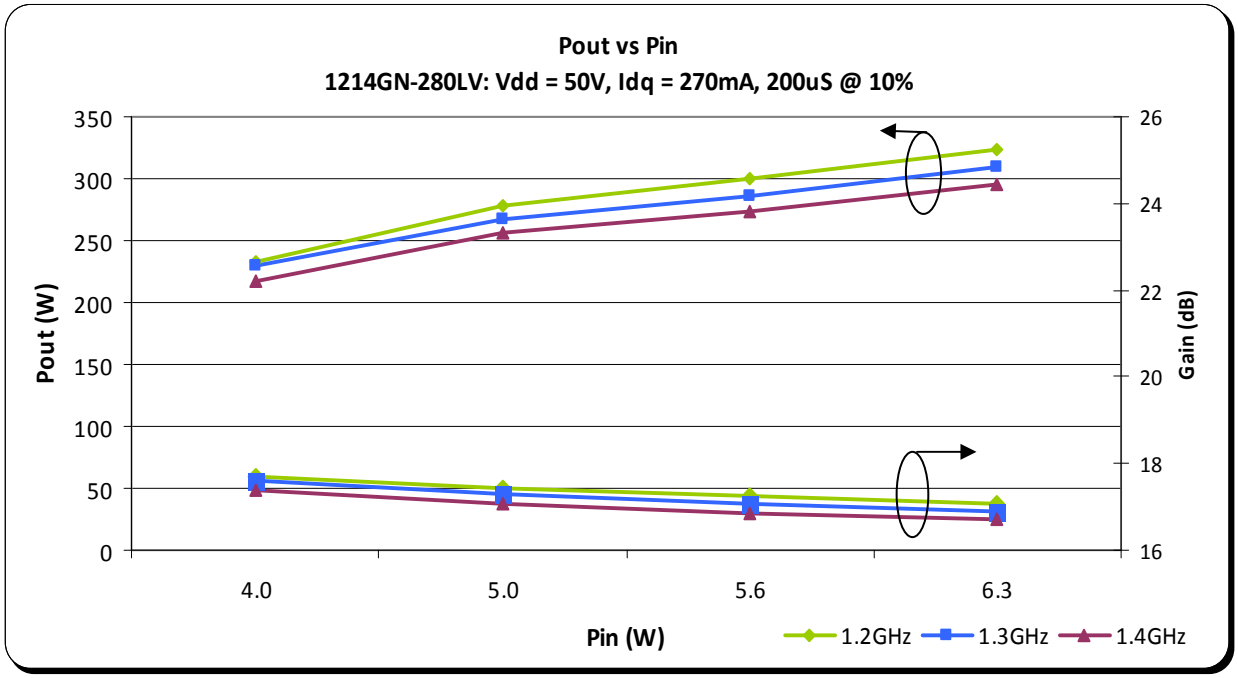
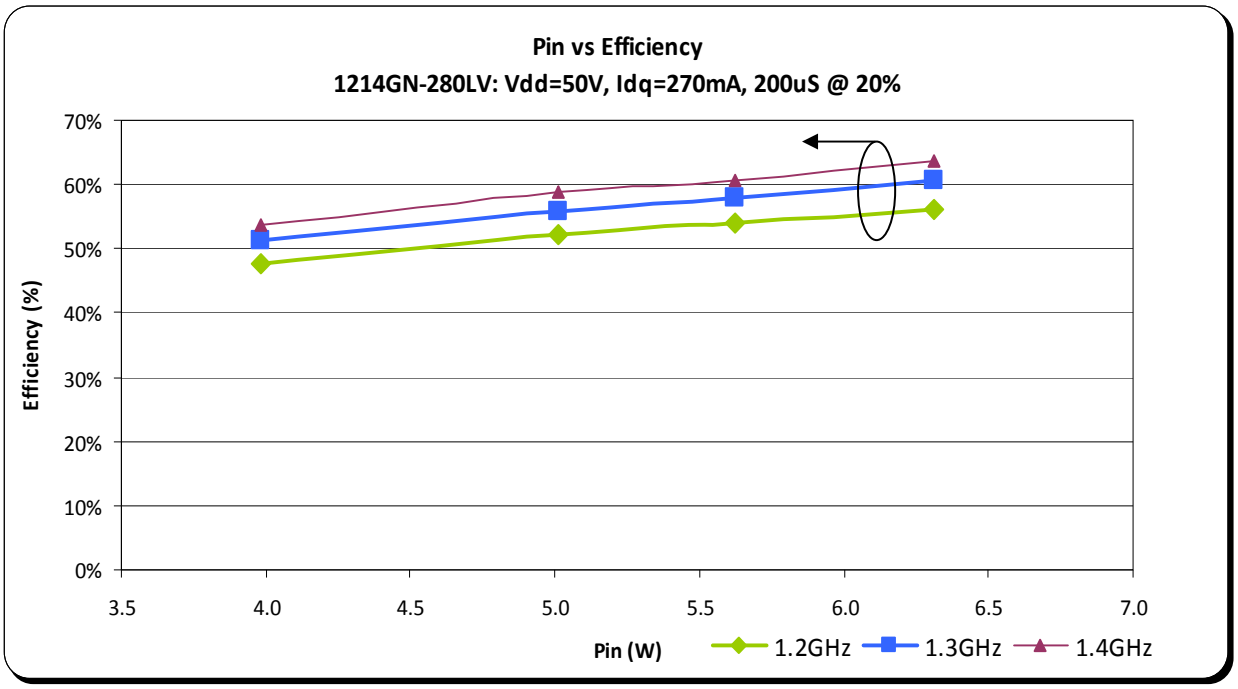
TYPICAL BROAD BAND PERFORMACE DATA

Frequency	Pin (W)	Pout (W)	Id (A)	RL (dB)	Nd (%)	G (dB)	Droop (dB)
1200 MHz	6.3	322	2.3	-15	56	17.09	0.7
1300 MHz	6.3	309	2.04	-11	61	16.9	0.5
1400 MHz	6.3	295	1.85	-10	64	16.7	0.4




Pin vs Efficiency
1214GN-280LV: Vdd=50V, Idq=270mA, 200uS @ 20%
Efficiency (%)
70%
60%
50%
40%
30%
20%
10%
0%
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
Pin (W)
1.2GHz
1.3GHz
1.4GHz

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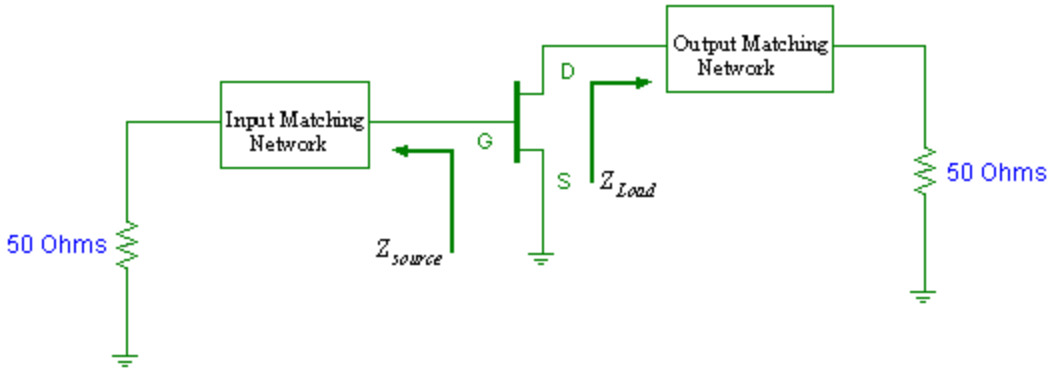
TRANSISTOR IMPEDANCE INFORMATION



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

Impedance Data		
Freq (GHz)	**Zs**	**Zl**
1.2	2.29 – j2.52	3.18 – j2.32
1.3	2.32 – j1.47	3.61 – j1.43
1.4	2.44 – j.40	4.29 – j.56

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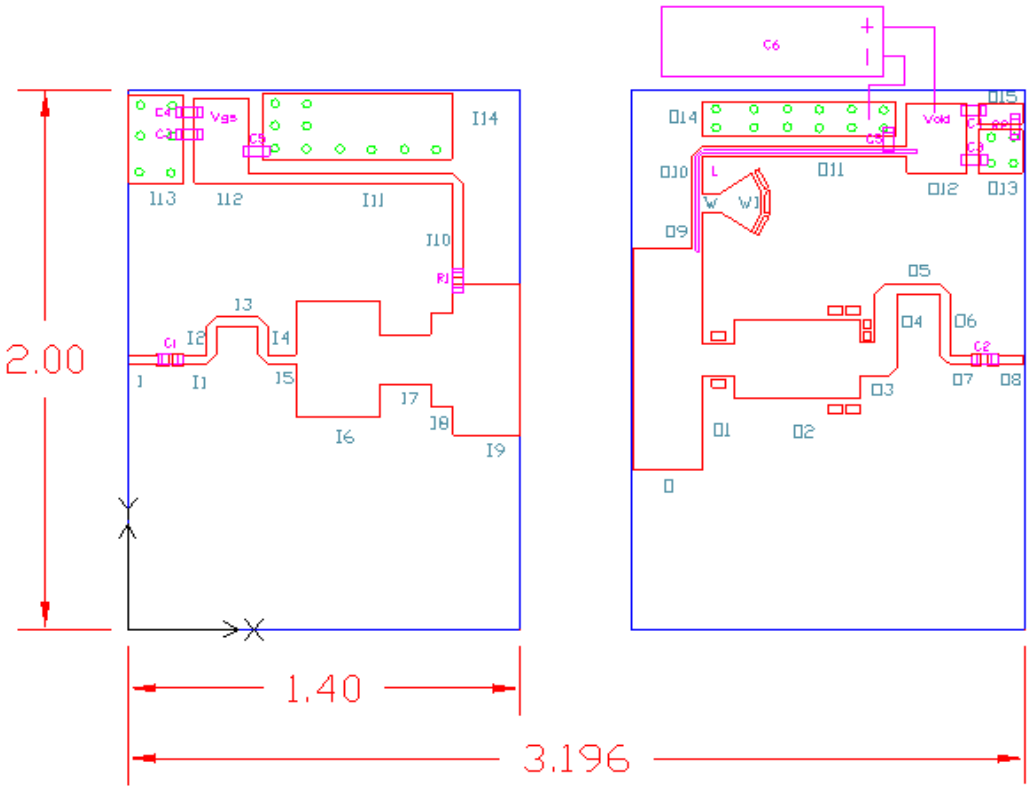
TEST CIRCUIT DIAGRAM



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

Component List			
Item	Description		Value
C1	Chip Cap A size	ATC800A1010JT250XT	100pF
C2	Chip Cap A size	ATC800A680JT250XT	68pF
C3	Chip Cap B size	ATC200B103KW50XT	10,000pF
C4	Chip Cap B size	ATC100B102102KW50XT	1000pF
C5	Chip Cap B size	ATC100B101FW1000XT	100pF
C6	Electrolytic Cap (63V)	ANY	4700uF
R1	Chip Resistor size 0805	ANY	20.5 ohms
R2	Chip Resistor size 0805	ANY	2 ohm
L	RF Choke 20 AWG Copper wire		
	L=1350 mil solder on top of the output choke		
Note:			
	Need 2x of C3,C4,C5		

Input Physical Circuit Layout		
Item	W (mil)	L (mil)
I	35	100
I1	35	120
I2	35	106
I3	35	150
I4	35	106
I5	35	100
I6	430	300
I7	180	182
I8	346	78
I9	560	236
I10	35	355
I11	35	745
I12	315	200
I13	280	190
I14	200	670

Output Physical Circuit Layout		
Item	W (mil)	L (mil)
O	820	250
O1	116	110
O2	290	450
O3	125	135
O4	86	170
O5	35	150
O6	35	226
O7	35	110
O8	35	125
O9	35	138
O10	35	138
O11	35	730
O12	250	200
O13	160	140
O14	130	680
O15	70	140
W	70	60
W1	160	

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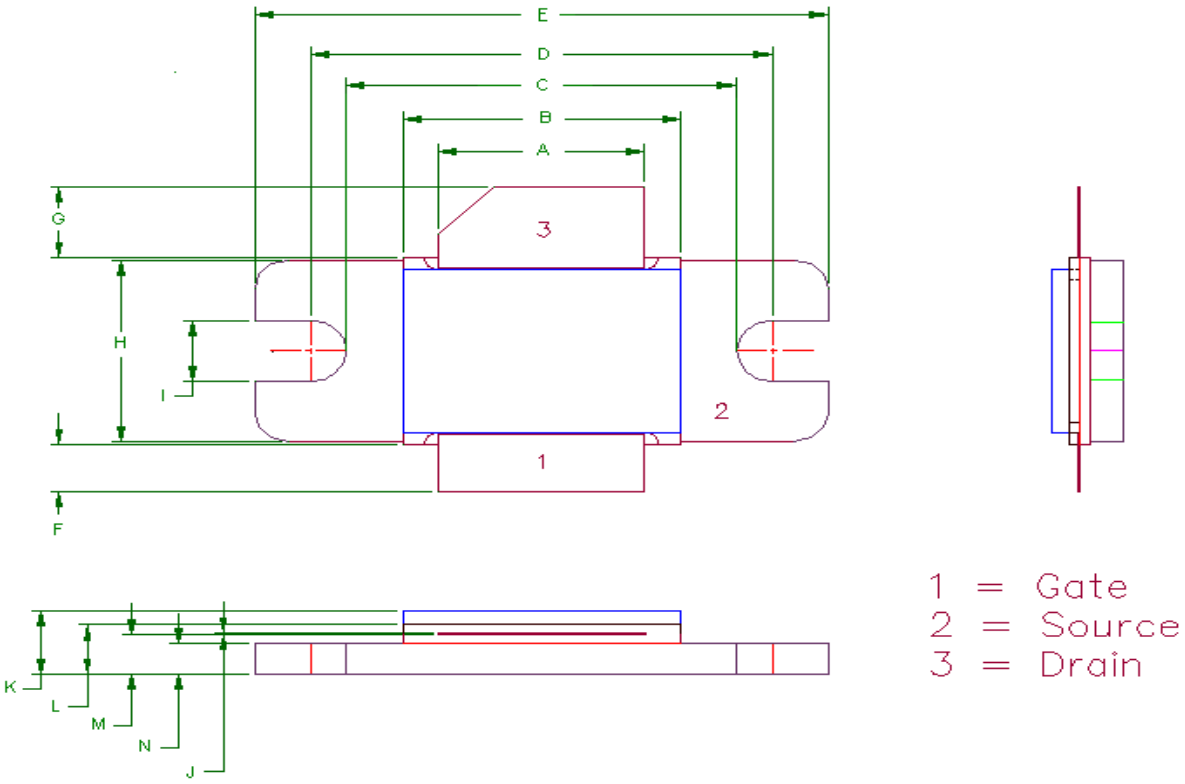
55-KR PACKAGE DIMENSION



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
0.2 / 6 March 2013	-	Initial Preliminary Release