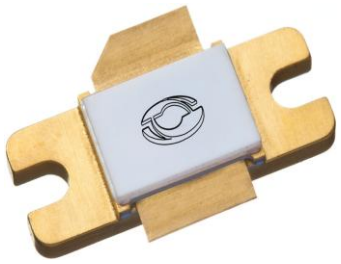
2731GN-400V

400 Watts - 52 Volts, 100 μs, 10%
S-Band Radar 2700 - 3100 MHz

GENERAL DESCRIPTION

For S-band pulsed radar applications, with typically over 10.5dB gain, the 2731GN-400V is an internally matched, common source, class AB, GaN on SiC HEMT transistor capable of delivering more than 400 Watts of pulsed RF output power under 100uS, 10% pulsing across the 2700 to 3100 MHz band. Proprietary state of the art GaN on SiC semiconductor technology, internal pre-matching, hermetic seal, all gold metallization, and eutectic attachment result in a device that delivers the highest reliability and excellent ruggedness while making the 2731GN-400V the best choice to gain superior performance in the most demanding system designs.

CASE OUTLINE
55-QP
Common Source



ABSOLUTE MAXIMUM RATINGS

Maximum Power Dissipation

Device Dissipation @ 25°C	1170	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=36W Freq=2700,2900,3100 MHz	400	415		W
Gp	Power Gain	Pin=36W Freq=2700,2900,3100 MHz	10.5	10.6		dB
ηd	Drain Efficiency	Pin=36W Freq=2700,2900,3100 MHz	37	40		%
Dr	Droop	Pin=36W Freq=2700,2900,3100 MHz			1.0	dB
VSWR-T	Load Mismatch Tolerance	Pout=400W, Freq= 2700MHz			3:1	
Θjc	Thermal Resistance	Pulse Width=100uS, Duty=10%			0.18	°C/W

- **Bias Condition: Vdd=+52V, Idq=100mA constant current (Vgs= -2.0 ~ -4.5V typical)**

FUNCTIONAL CHARACTERISTICS @ 25°C

$I_{D(Off)}$	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

Export Classification: EAR-99

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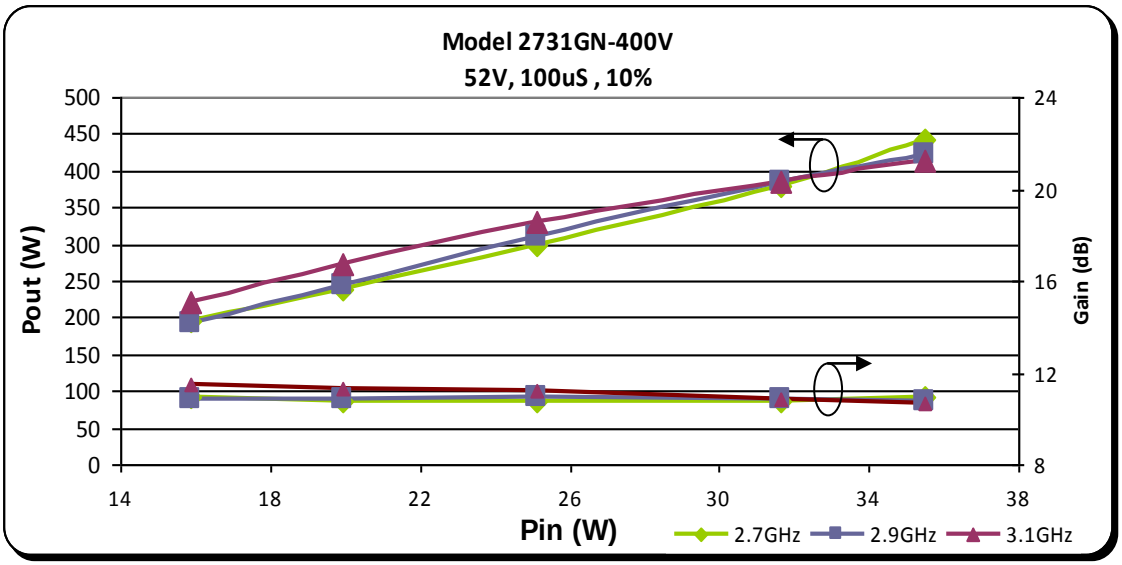
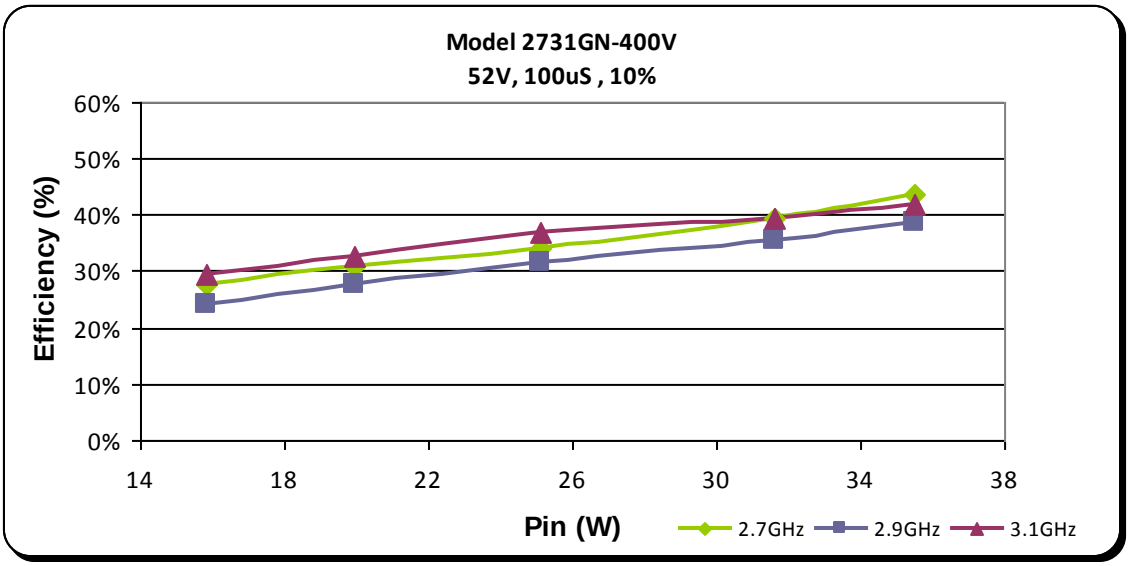
TYPICAL BROAD BAND PERFORMACE DATA

Frequency	Pin (W)	Pout (W)	Id (A)	RL (dB)	ηd (%)	Gp (dB)	Droop (dB)
2700 MHz	36	442	2.04	-7.2	44	10.95	0.6
2900 MHz	36	422	2.20	-15.5	39	10.75	0.5
3100 MHz	36	415	2.01	-9.2	42	10.68	0.4





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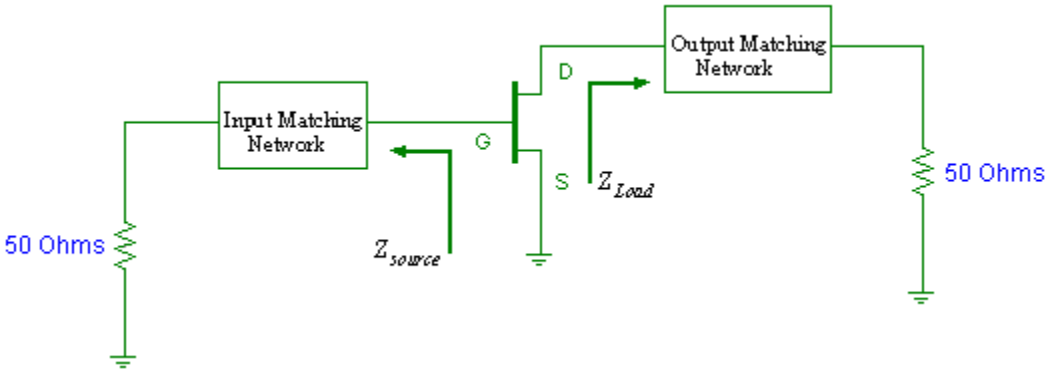
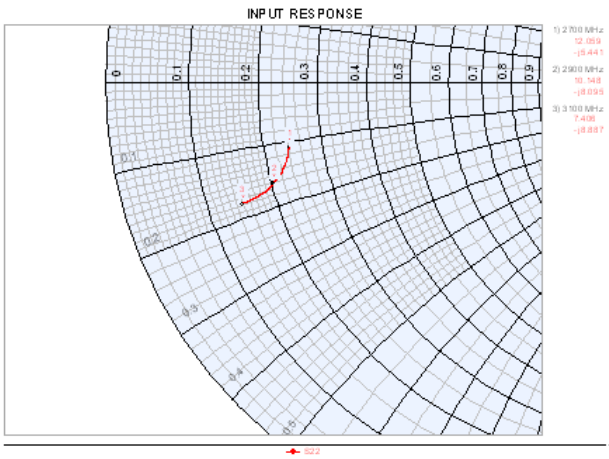
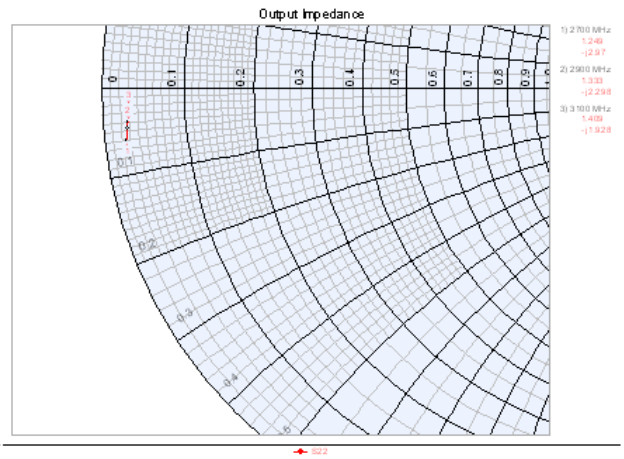
TRANSISTOR IMPEDANCE INFORMATION



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

Impedance Data		
Freq (GHz)	**Z_{source}**	**Z_{load}**
2.7	12.06 – j5.44	1.25 – j2.97
2.9	10.14 – j8.09	1.33 – j2.29
3.1	7.40 – j8.88	1.40 – j1.92





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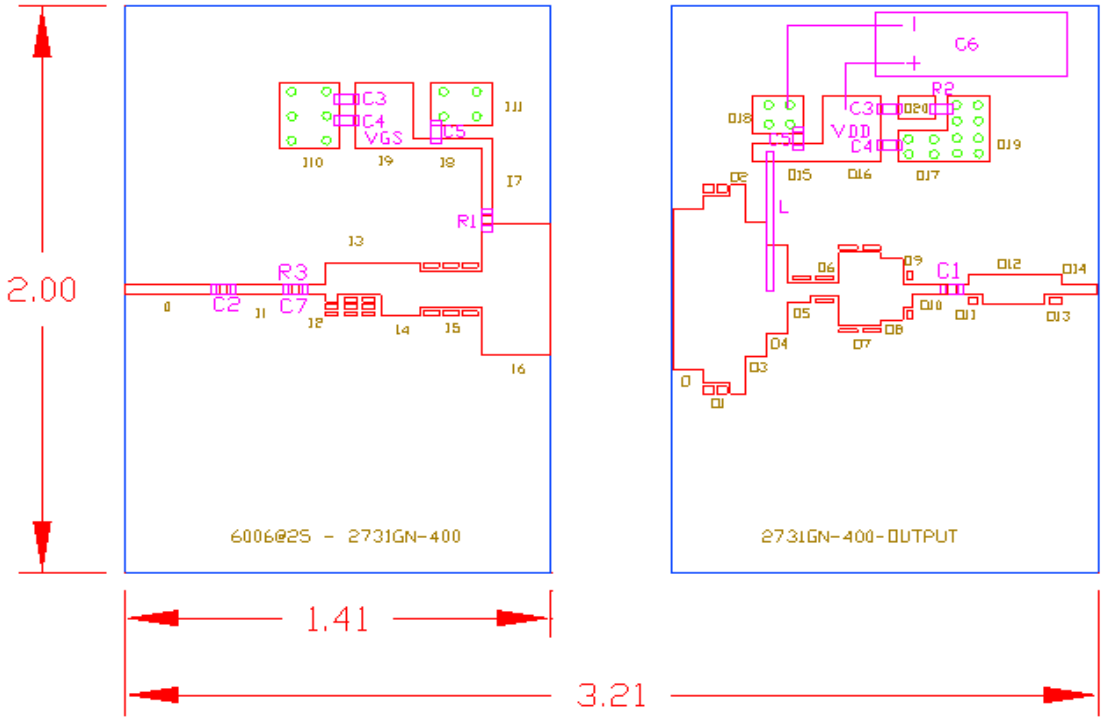
TEST CIRCUIT DIAGRAM



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

Component List		
Item	Description	Value
C1	Chip Cap A size	9.1pF
C2	Chip Cap A size	9.1pF
C3	Chip Cap B size	10,000pF
C4	Chip Cap B size	1000pF
C5	Chip Cap B size	100pF
C10	Electrolytic Cap (63V)	4700uF
R1	Chip Resistor size 0805	11.5 ohms
R2	Chip Resistor size 0805	2 Ohms
R3	Chip Resistor size 0805	523 ohms
C7	Chip Cap A size	6.8pF
L	Cu wire 20AWG, L=670 mil	
Board:	Duroid 6006 - 25 Mil Thick - Er = 6.15	

Input Physical Circuit Layout		
Item	W (mil)	L (mil)
I	35	312
I1	35	210
I2	35	90
I3	113	182
I4	190	128
I5	130	204
I6	460	229
I7	35	250
I8	35	245
I9	230	190
I10	230	200
I11	150	206

Output Physical Circuit Layout		
Item	W (mil)	L (mil)
O	570	99
O1	660	89
O2	736	50
O3	476	70
O4	310	70
O5	71	75
O6	45	95
O7	260	134
O8	215	74
O9	82	34
O10	35	115
O11	35	42

Output Physical Circuit Layout		
Item	W (mil)	L (mil)
O12	100	250
O13	68	57
O14	35	118
O15	64	230
O16	230	180
O17	110	160
O18	135	170
O19	230	140
O20	80	124

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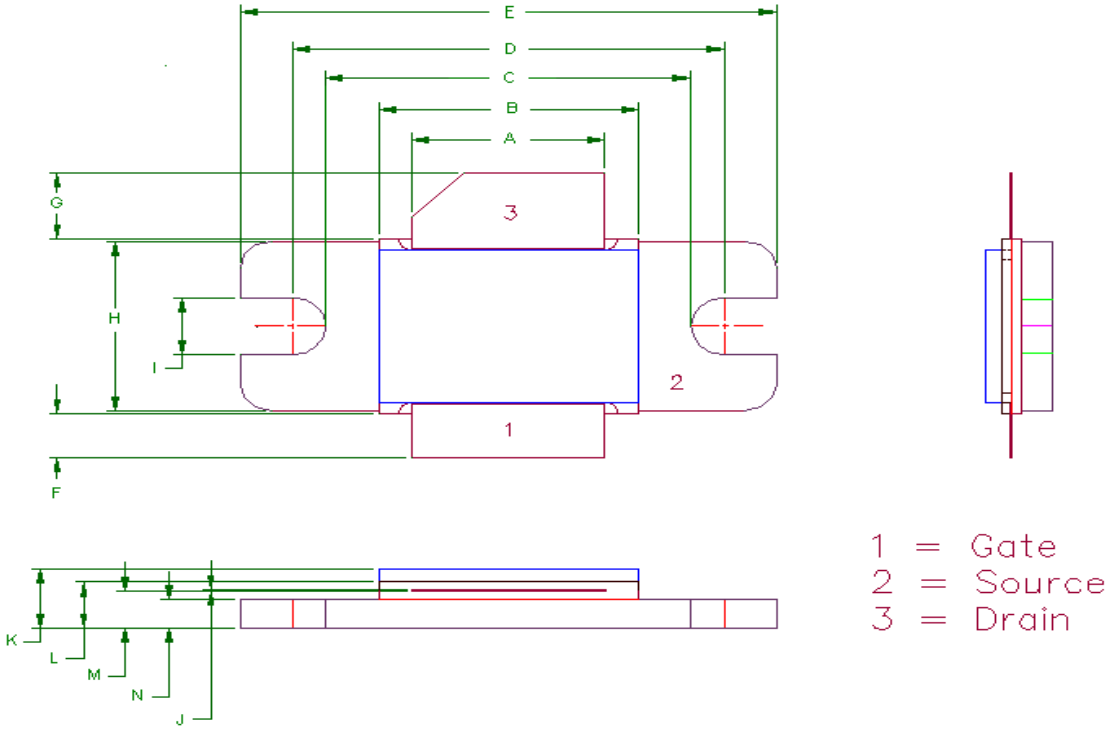
55-QP PACKAGE DIMENSION



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	Details
0.2 / 08-30-13	52V, 100us, 10% Initial Preliminary Release

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