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POWER PRODUCTS GROUP

1011GN-700ELM

700 Watts – 70% Efficiency
Mode-S ELM, Avionics 1030 MHz

GENERAL DESCRIPTION

The 1011GN-700ELM is a common source, class AB, GaN on SiC HEMT power transistor specifically designed for Mode-S ELM Applications. It is capable of delivering 700 Watts of pulsed peak power under Mode-S ELM pulse format and over 21dB Power Gain with greater than 70% efficiency at 1030 MHz. The transistor is internally pre-matched for optimal performance**.** This hermetically sealed transistor can also be used for TCAS, IFF, and standard Mode-S Avionics applications. It utilizes gold metallization and eutectic attach to provide highest reliability and superior ruggedness.

ABSOLUTE MAXIMUM RATINGS

Maximum Power Dissipation

Device Dissipation @ 25°C 1200 W

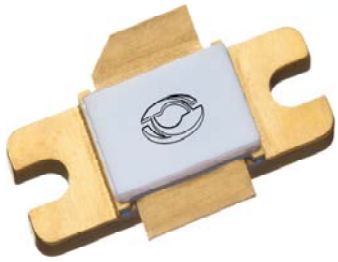
Maximum Voltage and Current

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

Maximum Temperatures

Storage Temperature (T_{STG}) -65 to +200 °C
Operating Junction Temperature +250 °C

CASE OUTLINE
55-KR
Common Source



ELECTRICAL CHARACTERISTICS @ 25°C

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Units
Pout	Output Power	Pin=5W, Freq=1030MHz, Mode-S ELM	700	730		W
Gp	Power Gain	Pin=5W, Freq=1030MHz	21.5			dB
ηd	Drain Efficiency	Pin=5W, Freq=1030MHz	65	75		%
R/L	Input Return Loss	Pin=5W, Freq=1030MHz	-10			dB
VSWR-T	Load Mismatch Tolerance	Pout=700W, Freq= 1030MHz			3:1	
Θjc	Thermal Resistance	Pulse Width=100uS, Duty=10%			0.25	°C/W

- **Mode-S ELM pulse format – 32us (on) / 18us (off) x 48, Period = 24ms, LTDF=6.4%**
- **Data taken at pulse #1**
- **Bias Condition: Vdd=+65V, Idq=1000mA peak current (Vgs= -2.0 ~ -4.5V typical)**

FUNCTIONAL CHARACTERISTICS @ 25°C

$I_{D(Off)}$	Drain leakage current	V_{gS} = -8V, V_D = 65V			10	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 = 10mA	250			V

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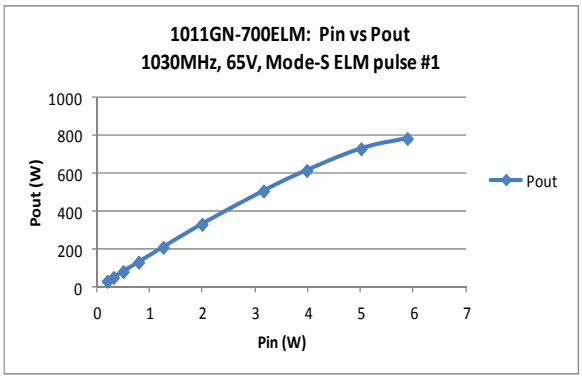
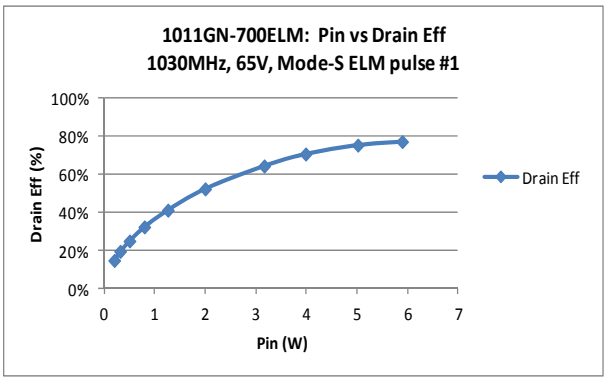
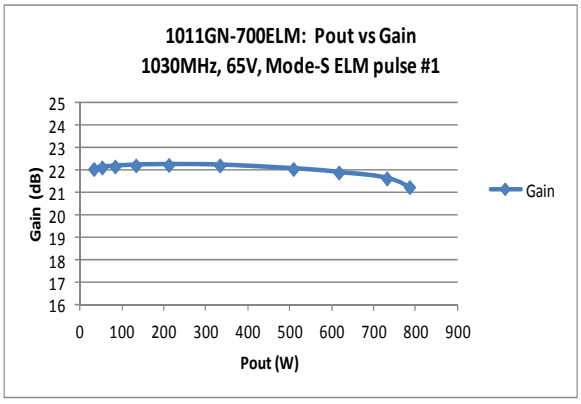
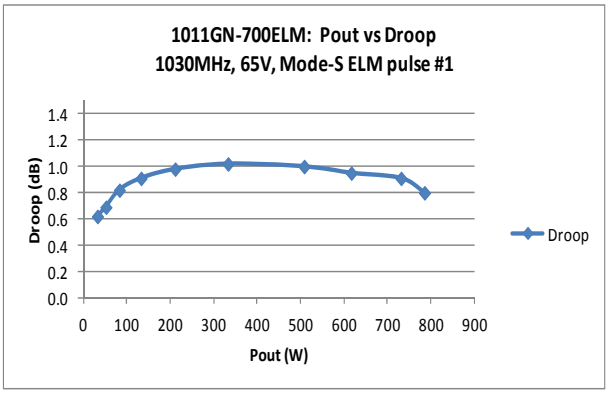
Typical RF Performance Data

Frequency	Pin (W)	Pout (W)	Id (A)	RL (dB)	Nd (%)	G (dB)	Trise(ns)	Tfall(ns)
1030 MHz	5	730	0.95	-15	75	21.6	25	20









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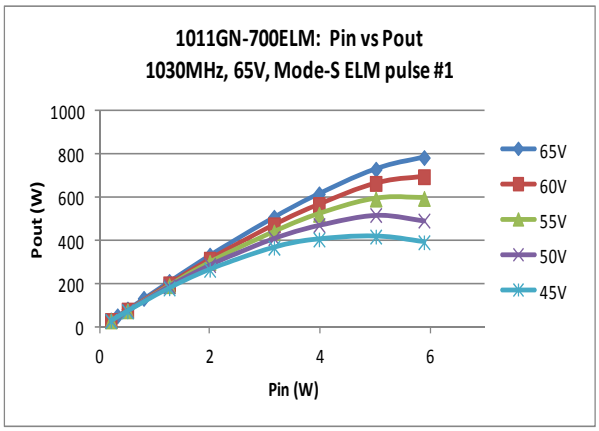
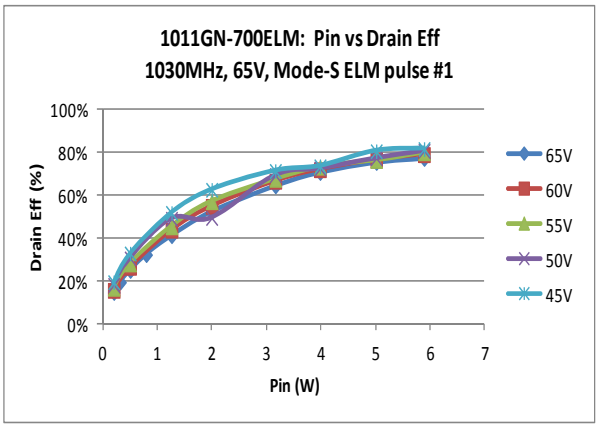
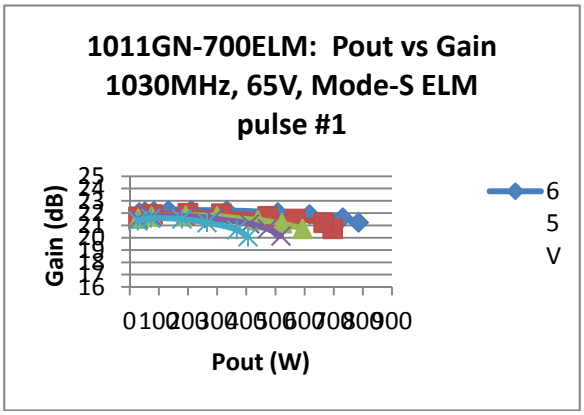
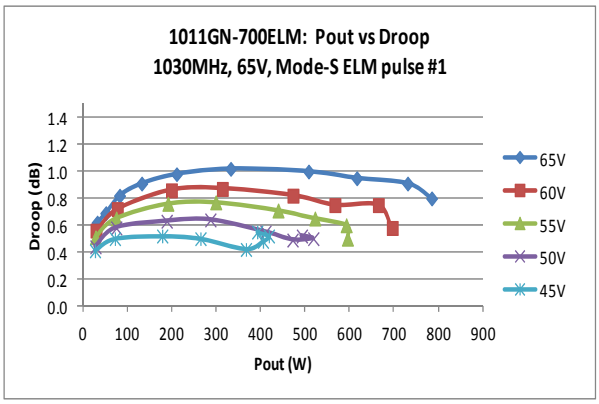
Typical RF Performance Plots









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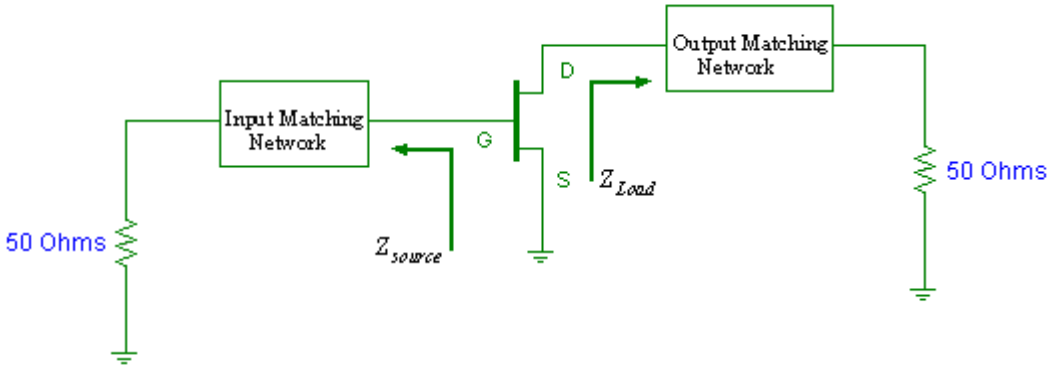
Transistor Impedance Information



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

Impedance Data		
Freq (GHz)	**Zs**	**Zl**
1.03	4.72 – j1.7	2.09 – j0.49

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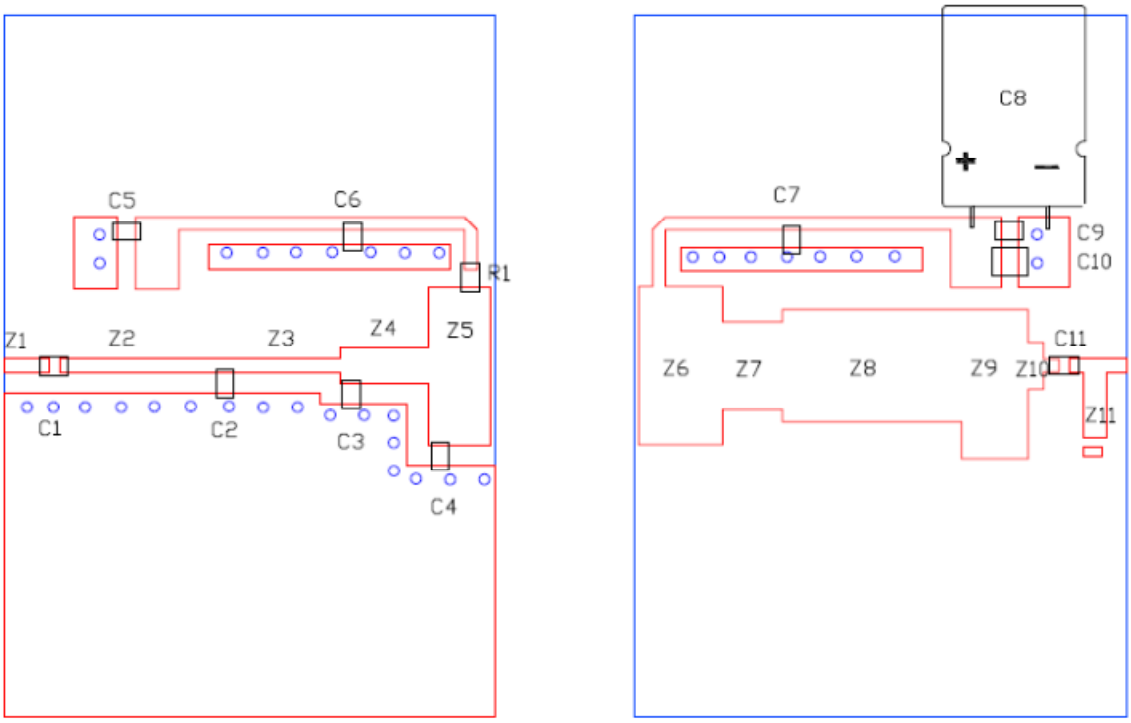
Test Circuit Diagram



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

Part	Description	Part	Description
C1, C5, C9, C11	56pF Chip Capacitor (ATC 100A)	Z1	36 x 132 mils (W x L)
C2	5.6pF Chip Capacitor (ATC 100A)	Z2	36 x 545 mils (W x L)
C3	2.4pF Chip Capacitor (ATC 100A)	Z3	36 x 245 mils (W x L)
C4	10pF Chip Capacitor (ATC 100A)	Z4	100 x 250 mils (W x L)
C6, C7	2pF Chip Capacitor (ATC 100A)	Z5	450 x 180 mils (W x L)
C8	1000uF 160V Electrolytic Capacitor	Z6	450 x 240 mils (W x L)
C10	1uF Chip Capacitor	Z7	250 x 170 mils (W x L)
		Z8	320 x 510 mils (W x L)
R1	10-ohm 1/4W Chip Resistor	Z9	425 x 190 mils (W x L)
		Z10	132 x 45 mils (W x L)
		Z11	65 x 185 mils (W x L)

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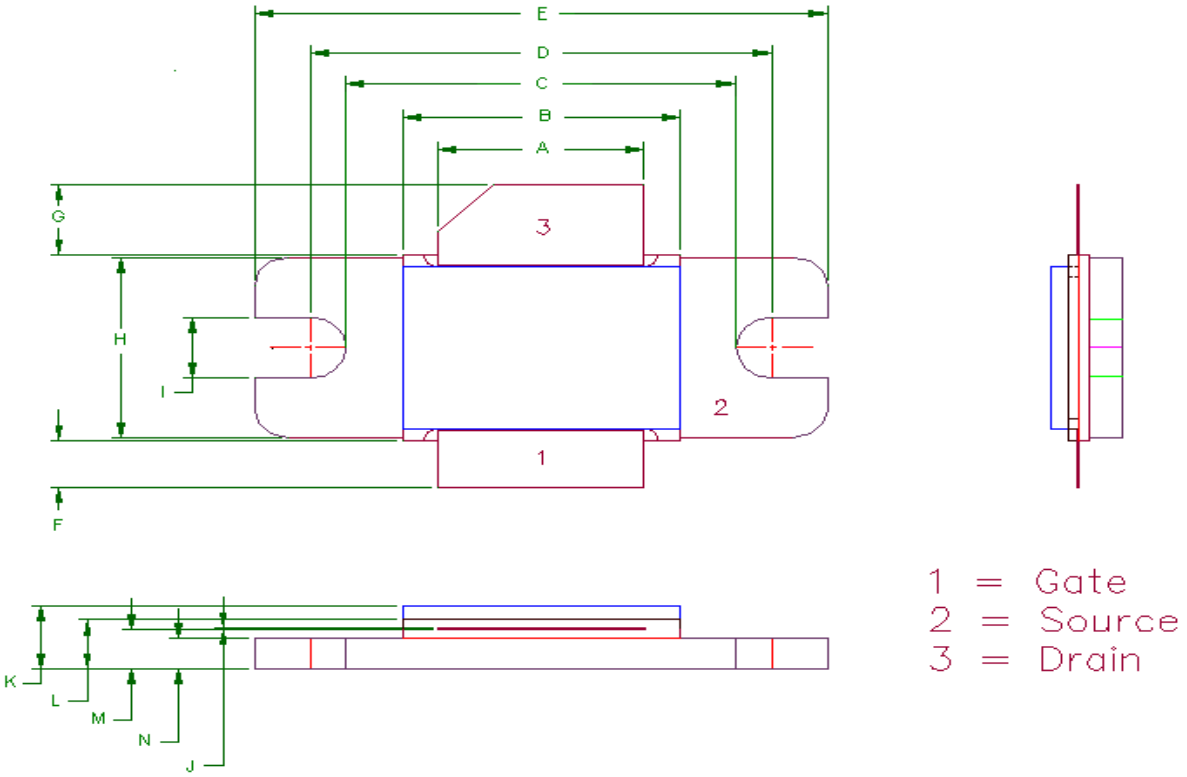
55-KR Package Dimension



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