

# 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.

## CASE OUTLINE 55-KR Common Source

## ABSOLUTE MAXIMUM RATINGS

### Maximum Power Dissipation

Device Dissipation @ 25°C 1200 W

### Maximum Voltage and Current

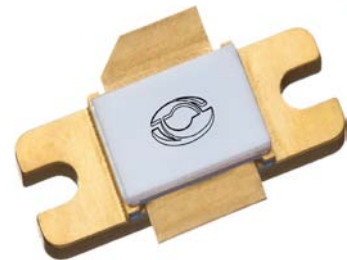
Drain-Source Voltage ( $V_{DSS}$ ) 150 V

Gate-Source Voltage ( $V_{GS}$ ) -8 to +0 V

### Maximum Temperatures

Storage Temperature ( $T_{STG}$ ) -65 to +200 °C

Operating Junction Temperature +250 °C



## 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
$\eta_d$	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	
$\Theta_{jc}$	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)

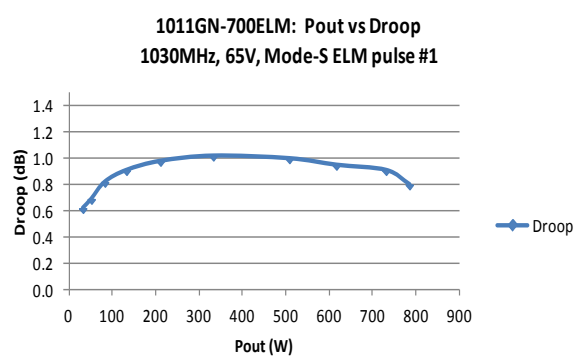
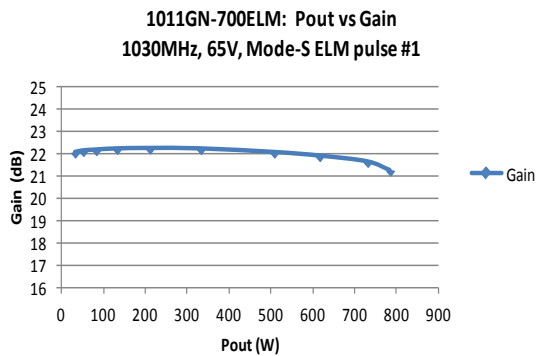
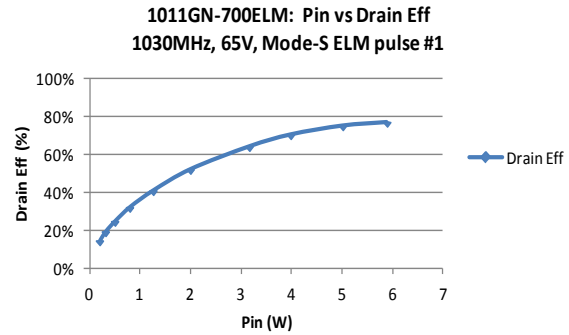
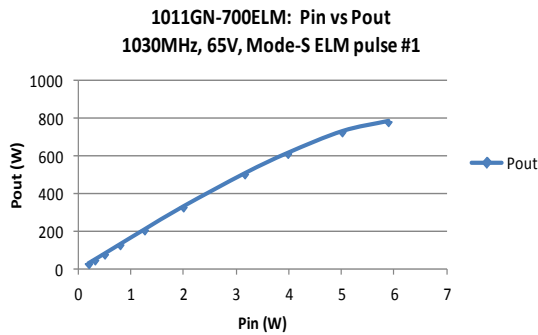
## FUNCTIONAL CHARACTERISTICS @ 25°C

$I_{D(Off)}$	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 <sub>DSS</sub>	Drain-source breakdown voltage	$V_{gs} = -8V, I_D = 10mA$	250			V

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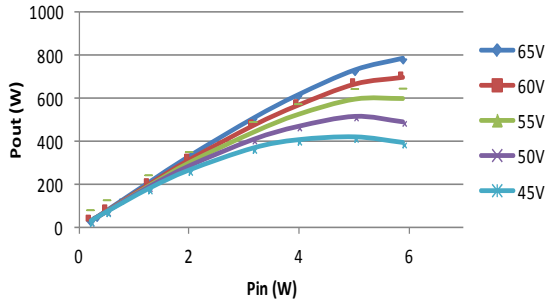
## TYPICAL RF PERFORMANCE DATA

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

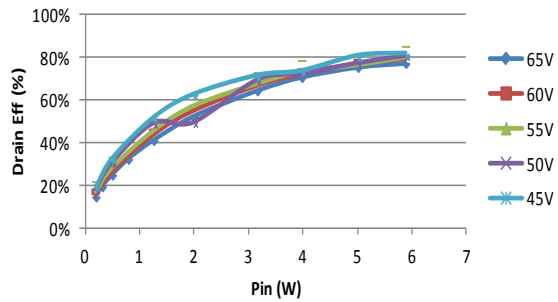


## TYPICAL RF PERFORMANCE PLOTS

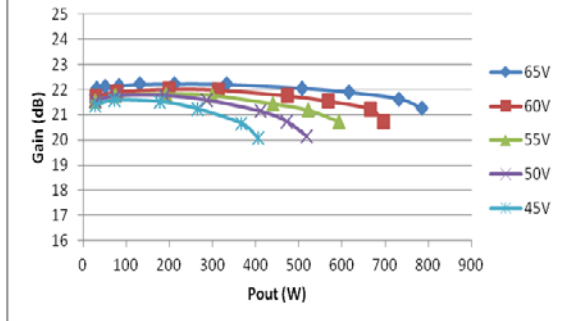
**1011GN-700ELM: Pin vs Pout**  
1030MHz, 65V, Mode-S ELM pulse #1



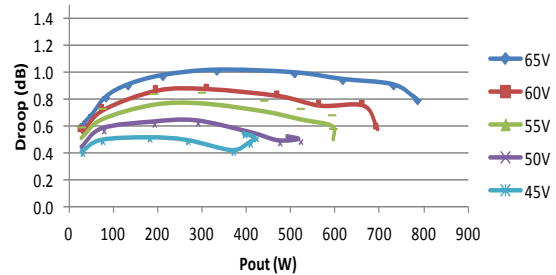
**1011GN-700ELM: Pin vs Drain Eff**  
1030MHz, 65V, Mode-S ELM pulse #1



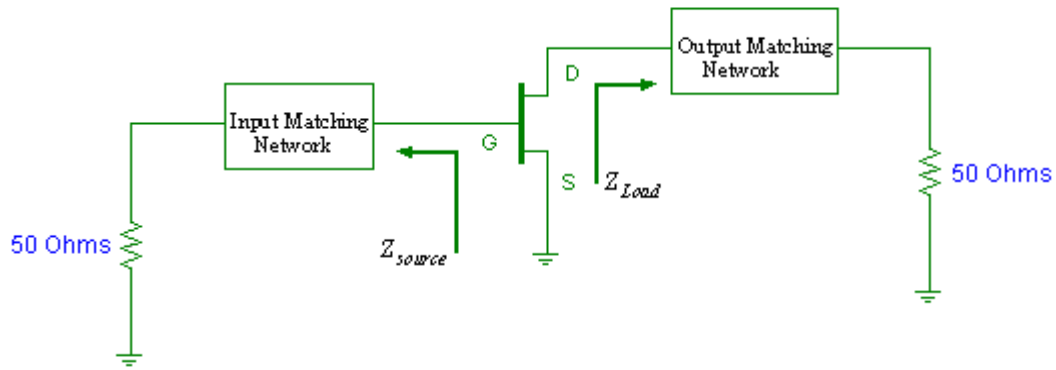
**1011GN-700ELM: Pout vs Gain**  
1030MHz, 65V, Mode-S ELM pulse #1



**1011GN-700ELM: Pout vs Droop**  
1030MHz, 65V, Mode-S ELM pulse #1



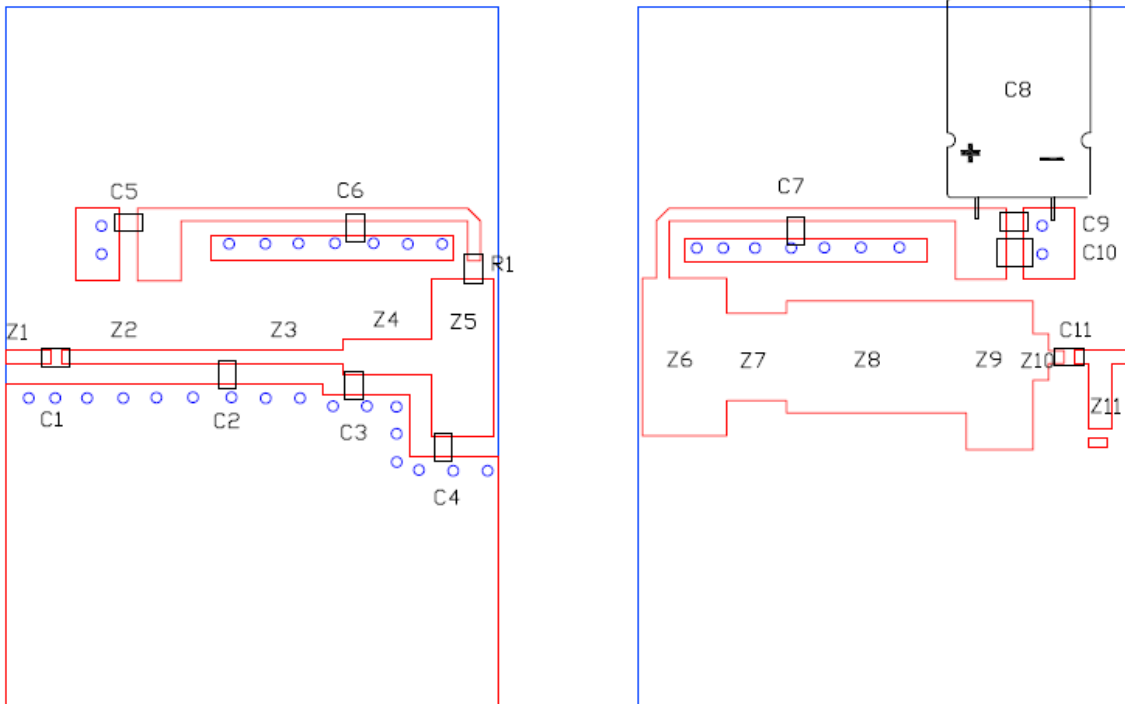
## TRANSISTOR IMPEDANCE INFORMATION



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

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

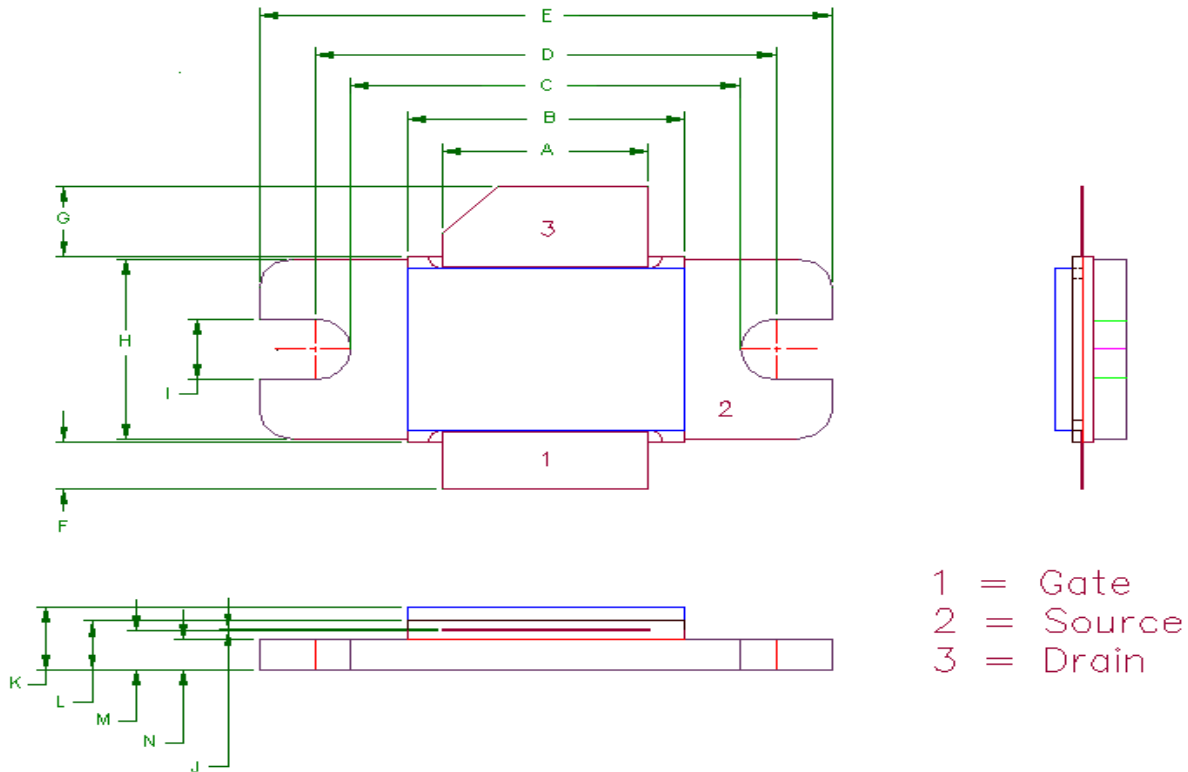
## TEST CIRCUIT DIAGRAM



**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)

## 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 / 6 August 2012	-	Initial Preliminary Release