

GENERAL DESCRIPTION

The 1030/1090MHz, 50V or 52V 1011GN-1600VG is an internally matched, common source, class AB, GaN on SiC HEMT transistor capable of providing greater than 1600 Watts of pulsed output power with over 18.6 dB gain and greater than 70% drain efficiency at both 32us pulse width, 2% duty cycle, Mode-S ELM, and IFF pulse formats. The transistor is internally pre-matched for optimal performance and utilizes gold metallization and eutectic attach to provide highest reliability and superior ruggedness. Best Size, Weight, and Power (SWaP) output stage designs can be achieved by taking advantage of the small footprint single-ended industry standard Gemini packaged device with single gate and drain bias feeds.

ABSOLUTE MAXIMUM RATINGS

Maximum Power Dissipation

Device Dissipation @ 25°C 2500W

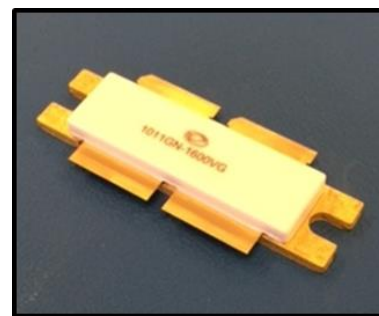
Maximum Voltage and Current

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

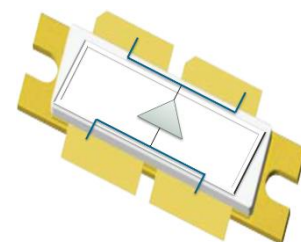
Maximum Temperatures

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

CASE OUTLINE 55-Q11A Common Source



0.400"x1.610"



Single-Ended

ELECTRICAL CHARACTERISTICS @ 25°C, 50V, 32μs Pulse Width, 2% Duty Cycle

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Units
P_{IN}	Input Power	$P_{IN} = 22.4W$, Freq=1030MHz			22.4	W
G_P	Power Gain	$P_{IN} = 22.4W$, Freq=1030MHz		18.6	20.2	dB
η_D	Drain Efficiency	$P_{IN} = 22.4W$, Freq=1030MHz	70			%
Dr	Droop	$P_{IN} = 22.4W$, Freq=1030MHz			0.3	dB
VSWR-T	Load Mismatch Tolerance	$P_{IN} = 22.4W$, Freq=1030MHz			3:1	
Θ_{JC}	Thermal Resistance	32μs, 2% duty cycle			0.18	°C/W

- Bias Condition: $V_{DD}=+50V$, $I_{DQ}=200mA$ average current ($V_{GS}=-2.0 \sim -4.5V$ typical)

FUNCTIONAL CHARACTERISTICS @ 25°C

$I_{D(OFF)}$	Drain leakage current	$V_{GS} = -8V$, $V_D = 150V$			128	mA
$I_{G(OFF)}$	Gate leakage current	$V_{GS} = -8V$, $V_D = 0V$			40	mA

Export Classification: EAR 99



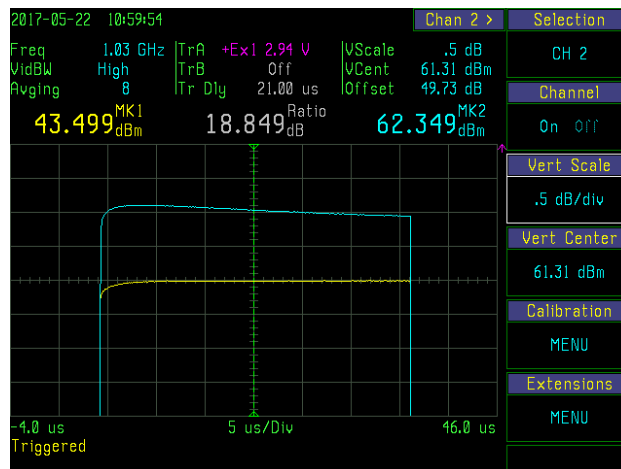
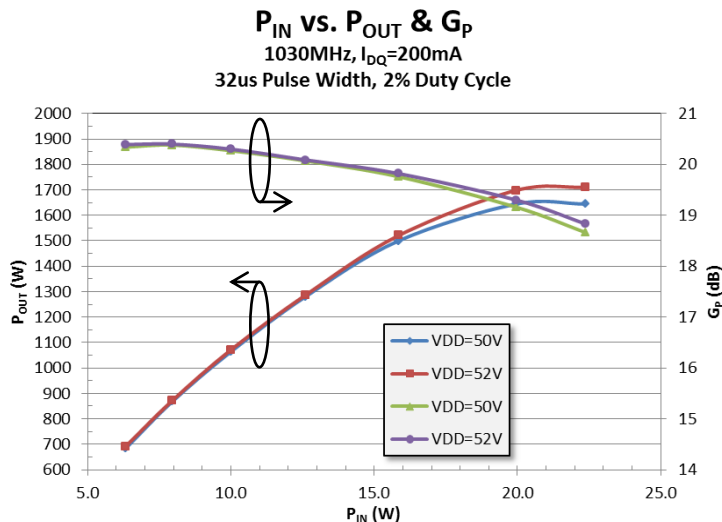
1011GN-1600VG

1600 Watts • 50/52 Volts • 32us, 2%
L-Band Avionics 1030/1090 MHz

TYPICAL BROAD BAND PERFORMANCE DATA

32μs Pulse Width, 2% Duty Cycle Pulsing • Idq = 200mA

Freq (Mhz)	V _{DD} (V)	P _{IN} (dBm)	P _{IN} (W)	P _{OUT} (dBm)	P _{OUT} (W)	G _P (dB)	IRL (dB)	Id (A)	Eff (%)	Drop (dB)
1030	50	43.5	22.4	62.2	1644	18.7	-18.0	0.95	71%	0.15
1030	52	43.5	22.4	62.3	1710	18.8	-18.0	0.97	72%	0.15





1011GN-1600VG

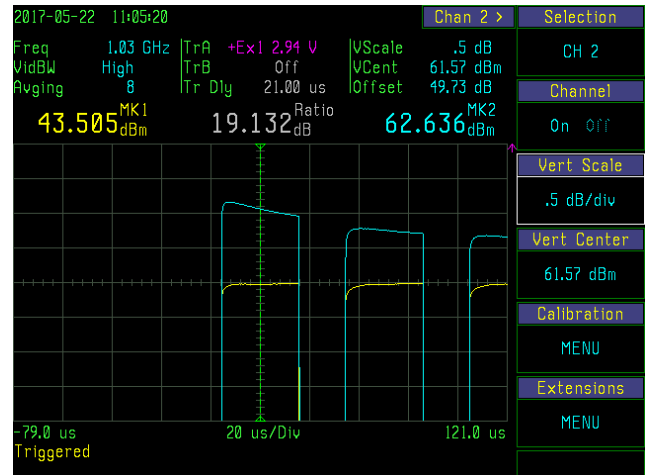
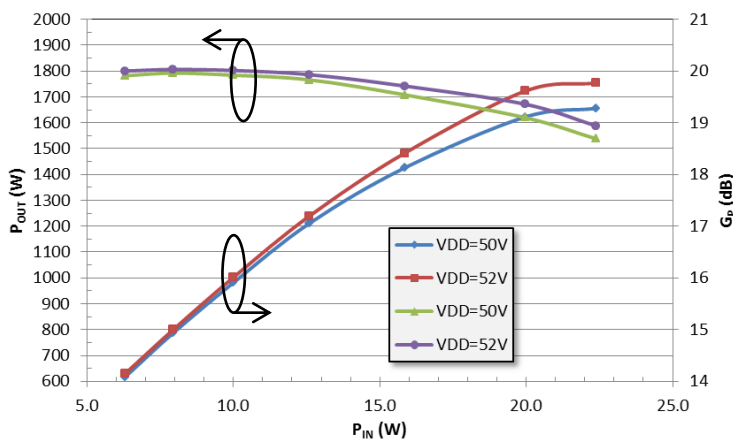
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Mode-S ELM Pulsing: 32 μ s ON/18 μ s x N=48 pulses, Long Term Duty Cycle 6.4%

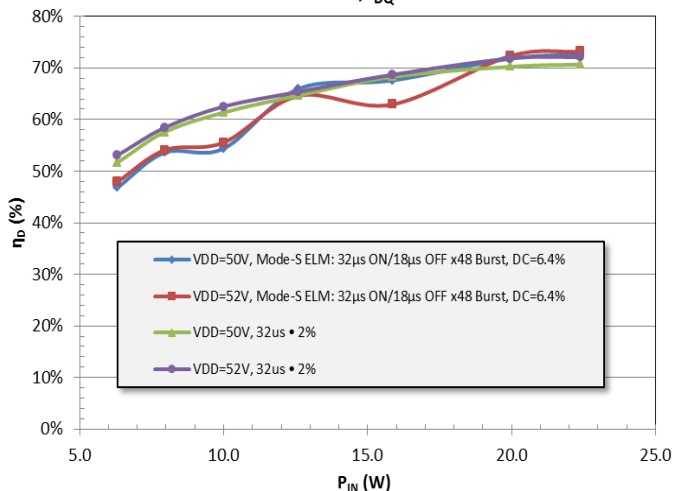
Freq (Mhz)	V _{DD} (V)	P _{IN} (dBm)	P _{IN} (W)	Pulse 1								Pulse 48		Droop (dB)
				P _{OUT} (dBm)	P _{OUT} (W)	G _P (dB)	IRL (dB)	G _{P-max} (dB)	I _D (A)	Eff (%)	G _P (dB)	P _{OUT} (dBm)	P _{OUT} (W)	
1030	50	43.5	22.4	62.19	1656	18.7	-18	20.2	2.92	72.6%	18.2	61.7	1466	0.53
1030	52	43.5	22.4	62.44	1754	18.9	-18	20.1	2.95	73.2%	18.4	61.9	1535	0.58

P_{IN} vs. P_{OUT} & G_P
1030MHz, I_{DQ}=200mA

Mode-S ELM: 32 μ s ON/18 μ s OFF x48 Burst, LTDC=6.4%



P_{IN} vs. Drain Efficiency (η_D)
1030MHz, I_{DQ}=200mA

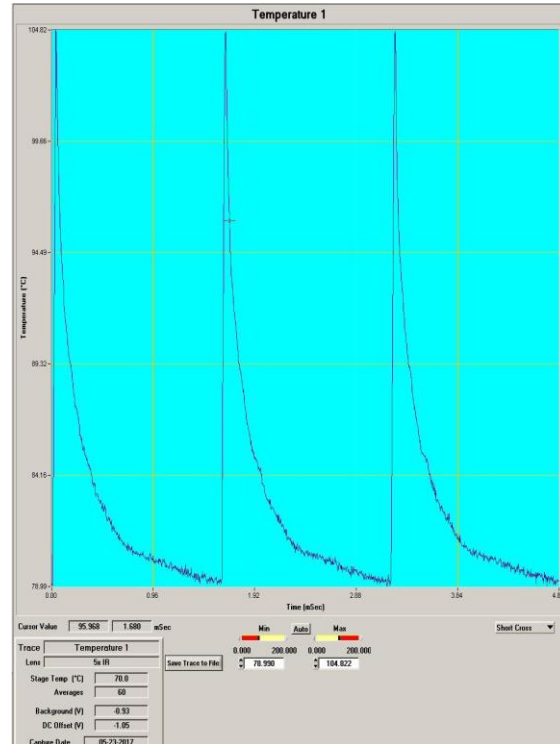
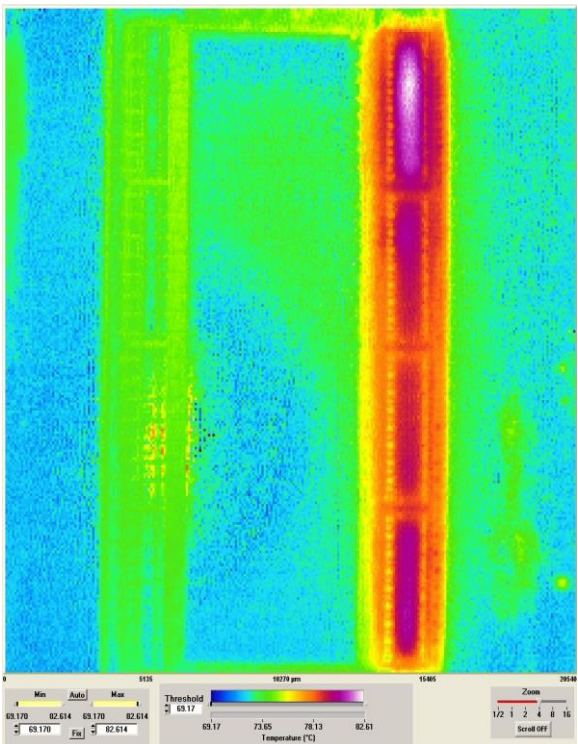
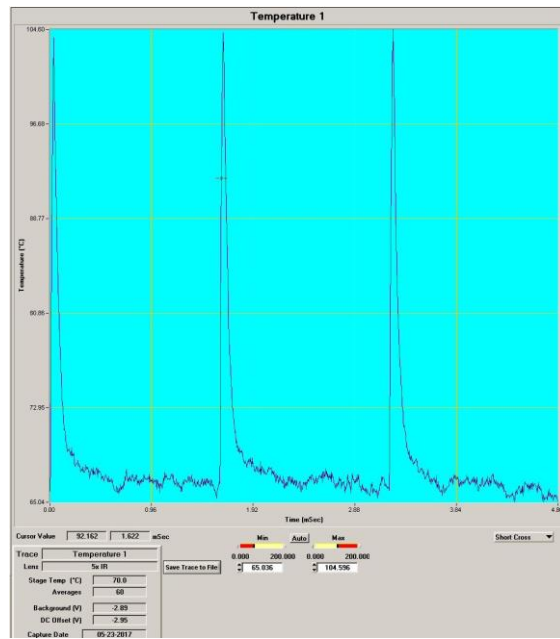
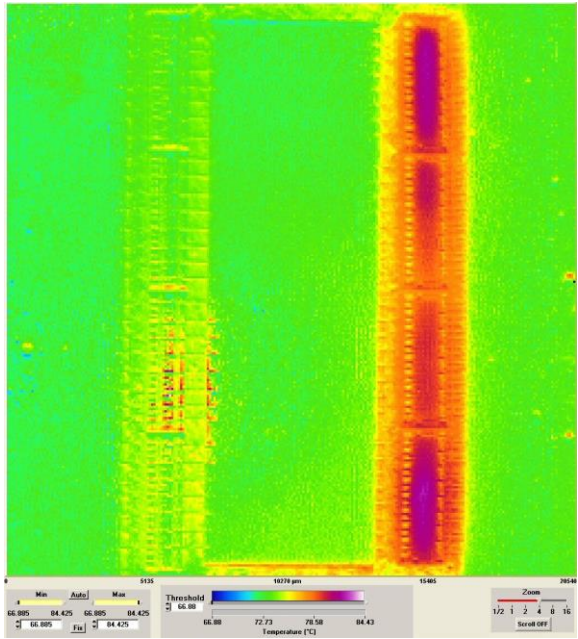




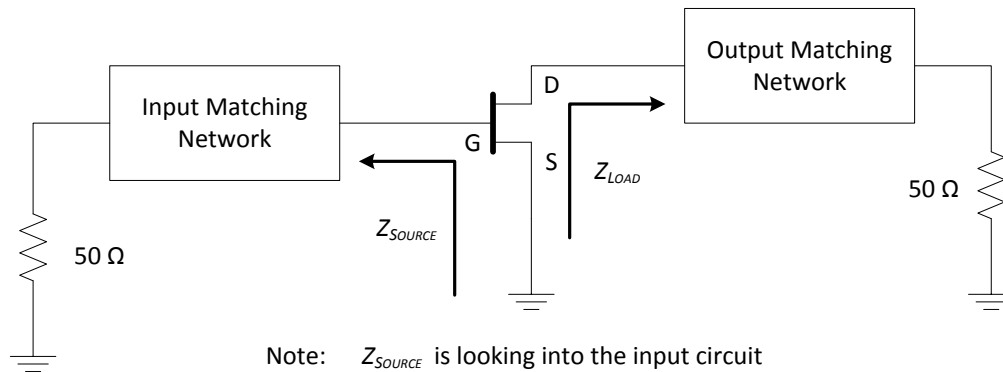
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1600 Watts • 50/52 Volts • 32 μ s, 2%
L-Band Avionics 1030/1090 MHz

TYPICAL OVER TEMPERATURE PERFORMANCE 50V, 32 μ s, 2% PULSING Top & Bottom, Standard Temperature Map & Hot Spot Transient



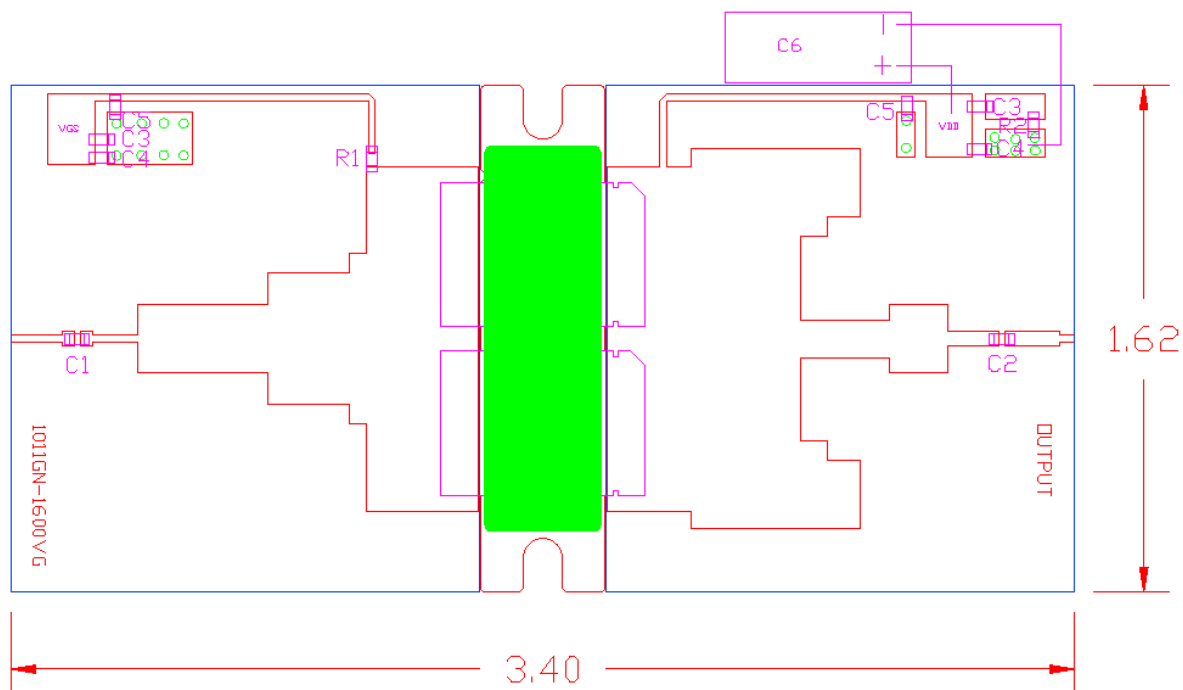
TRANSISTOR IMPEDANCE INFORMATION



Frequency	Z_{SOURCE}	Z_{LOAD}
1030 MHz	Contact Factory	Contact Factory

TEST CIRCUIT (inches)

Board Material: Roger Duroid 6010 @ H=25 mils, $\epsilon_r=10.2$

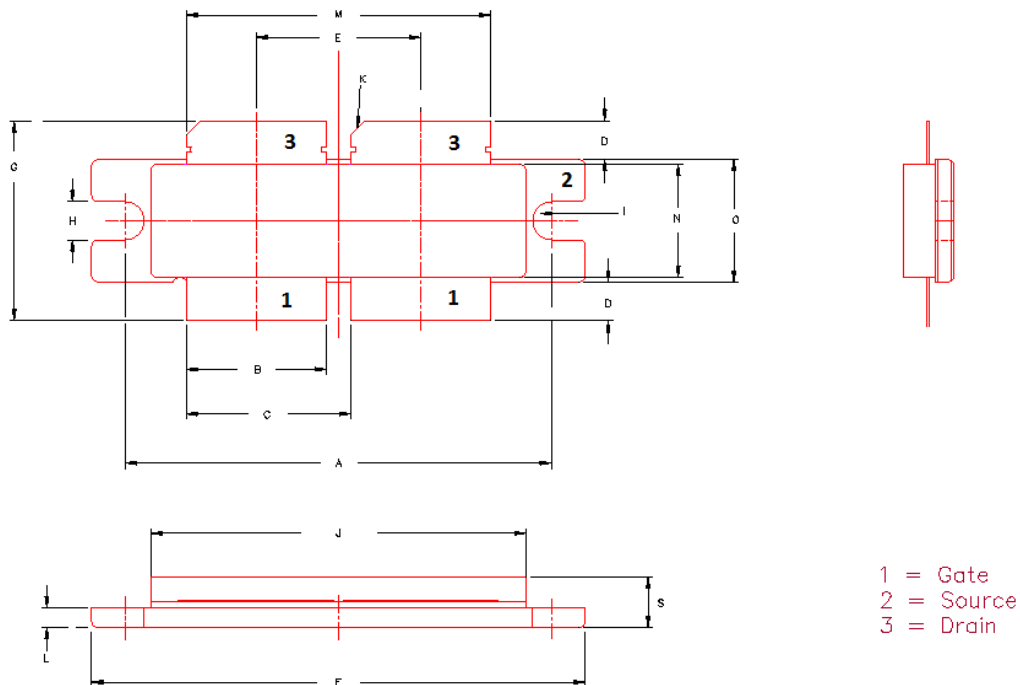


DXF file available upon request

BILL OF MATERIALS

Item	Description	Value
C1	Chip Cap A size (ATC 100A)	100 pF
C2	Chip Cap B size (ATC 800B)	100 pF
C3	Chip Cap B size (ATC)	4.7 μ F
C4	Chip Cap B size (ATC 100B)	10,000 pF
C5	Chip Cap A size (ATC 100A)	100 pF
C6	Electrolytic Cap (63V)	4700 μ F
R1	Chip Resistor size 0805	20 Ω
R2	Chip Resistor size 0805	2.2 Ω
Notes:		
1) Need 2x of C3,C4,C5		
2) Board Material: Roger Duroid 6010LM, 0.025", $\epsilon_r=10.2$		

55-Q11A PACKAGE DRAWING mm (inches)



Dimension	Min (mil)	Min (mm)	Max (mil)	Max (mm)
A	1395	35.43	1405	35.68
B	450	11.43	470	11.94
C	530	13.46	550	13.97
D	117	2.97	137	3.48
E	535	13.59	545	13.84
F	1610	40.89	1630	41.40
G	644	16.36	664	16.86
H	122	3.10	128	3.25
I	R=0.0625		R=1.59	
J	1218	30.93	1242	31.55
K	47 x 45°±5°		1.19x 4°±5°	
L	63	1.60	65	1.65
M	990	25.15	1010	25.65
N	365	9.27	375	9.53
O	398	10.11	406	10.31
S	158	4.01	172	4.37



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Revision History

Revision Level / Date	Para. Affected	Description
01 / June 20, 2017	-	Initial Preliminary Release