1011GN-1200V/VEL

1200 Watts • 50 Volts • 32us, 2%
L-Band Avionics 1030/1090 MHz

GENERAL DESCRIPTION

The 1011GN-1200V/VEL are internally matched, COMMON SOURCE, class AB, GaN on SiC HEMT transistors capable of providing over 18.5 dB gain, 1200 Watts of pulsed RF output power at 32us, 2% duty cycle pulse format across the 1030 to 1090 MHz band and can also transmit Mode-S ELM pulse format. The transistor has an internal pre-match for optimal performance and uses gold metallization to provide highest reliability and superior ruggedness.

ABSOLUTE MAXIMUM RATINGS

Maximum Power Dissipation

Device Dissipation @ 25°C 2400W

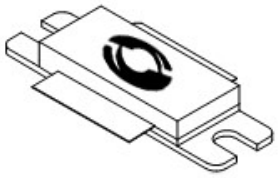
Maximum Voltage and Current

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

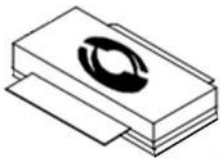
Maximum Temperatures

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

CASE OUTLINES
Common Source
55-Q03



55-Q03P



ELECTRICAL CHARACTERISTICS @ 25°C

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Units
P_{IN}	Input Power	P_{OUT}=1200W, Freq=1030,1090 MHz		10.5	15	W
G_P	Power Gain	P_{OUT} =1200W, Freq=1030,1090 MHz	18.5	20		dB
η_D	Drain Efficiency	P_{OUT} =1200W, Freq=1030,1090 MHz		75		%
Dr	Droop	P_{OUT} =1200W, Freq=1030,1090 MHz			0.3	dB
VSWR-T	Load Mismatch Tolerance	P_{OUT} =1200W, Freq= 1030MHz			3:1	
Θ_{JC}	Thermal Resistance	32us, 2% duty cycle			0.25	°C/W

- **Bias Condition: Vdd=+50V, Idq=150mA average 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

Export Classification: EAR 99

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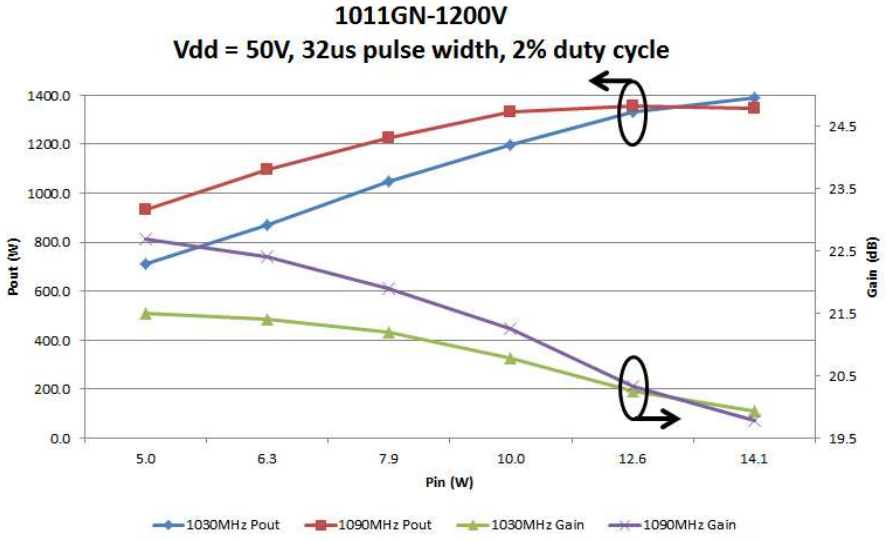
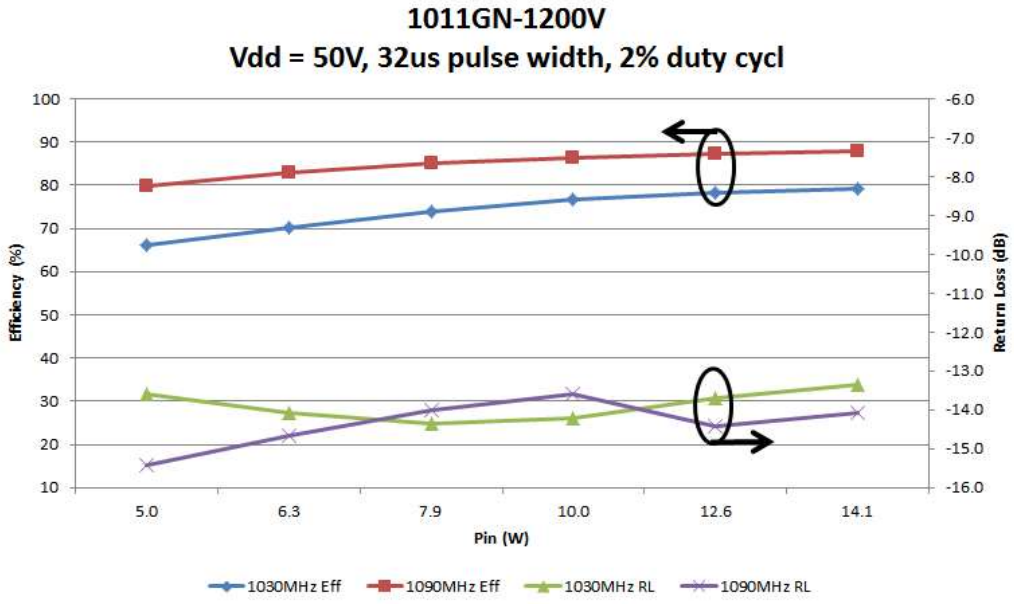
TYPICAL BROAD BAND PERFORMACE DATA

	1030 MHz			1090 MHz		
P_{IN} (W)	P_{OUT} (W)	IRL (dB)	Eff (%)	P_{OUT} (W)	IRL (dB)	Eff (%)
7.9	1045	-14	74	1220	-14	84
10.0	1200	-14	76	1330	-14	86
12.6	1330	-13	78	1360	-14	87
14.1	1390	-13	79	1350	-14	87





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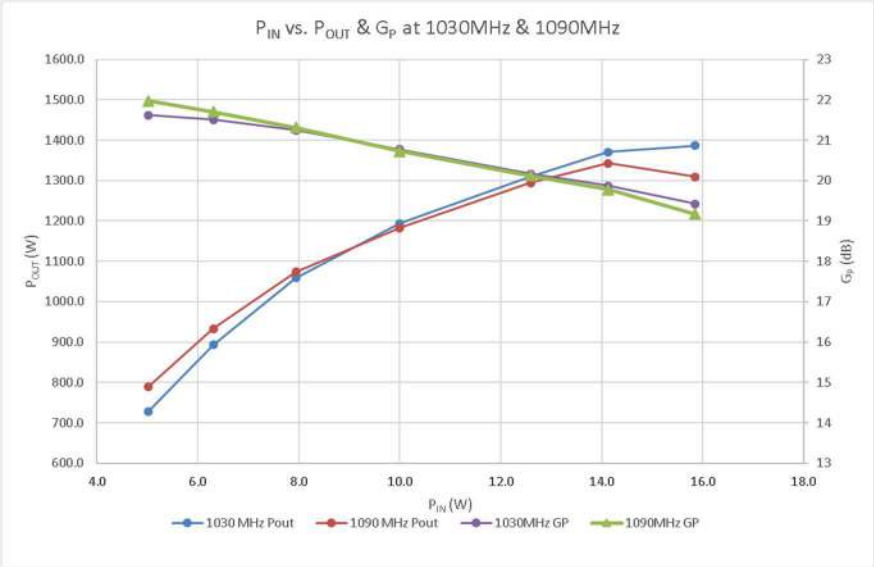
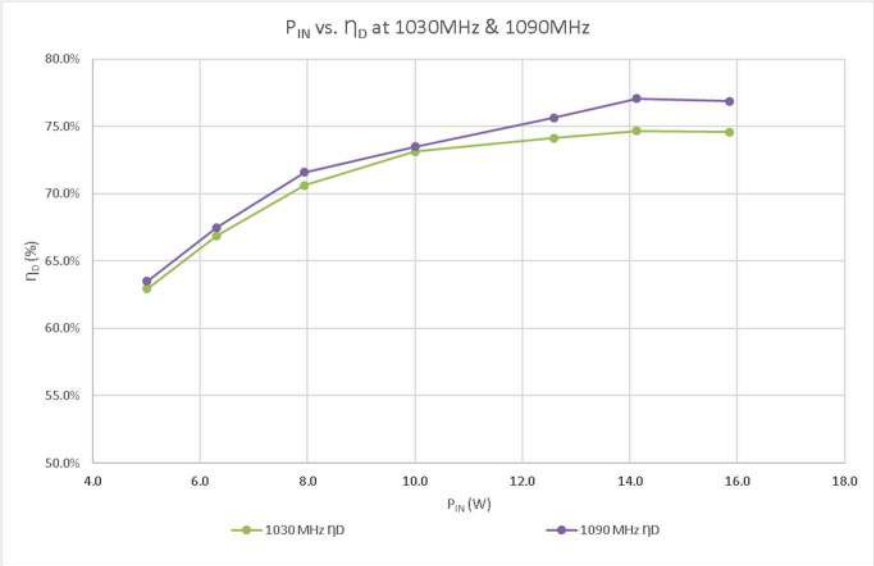
TYPICAL 1030/1090MHz PERFORMACE DATA – V_{DD}=50V, I_{DQ}=150mA
Mode-S ELM Pulsing: 32us ON/18us OFF x48, Long Term Duty Cycle=6.4%

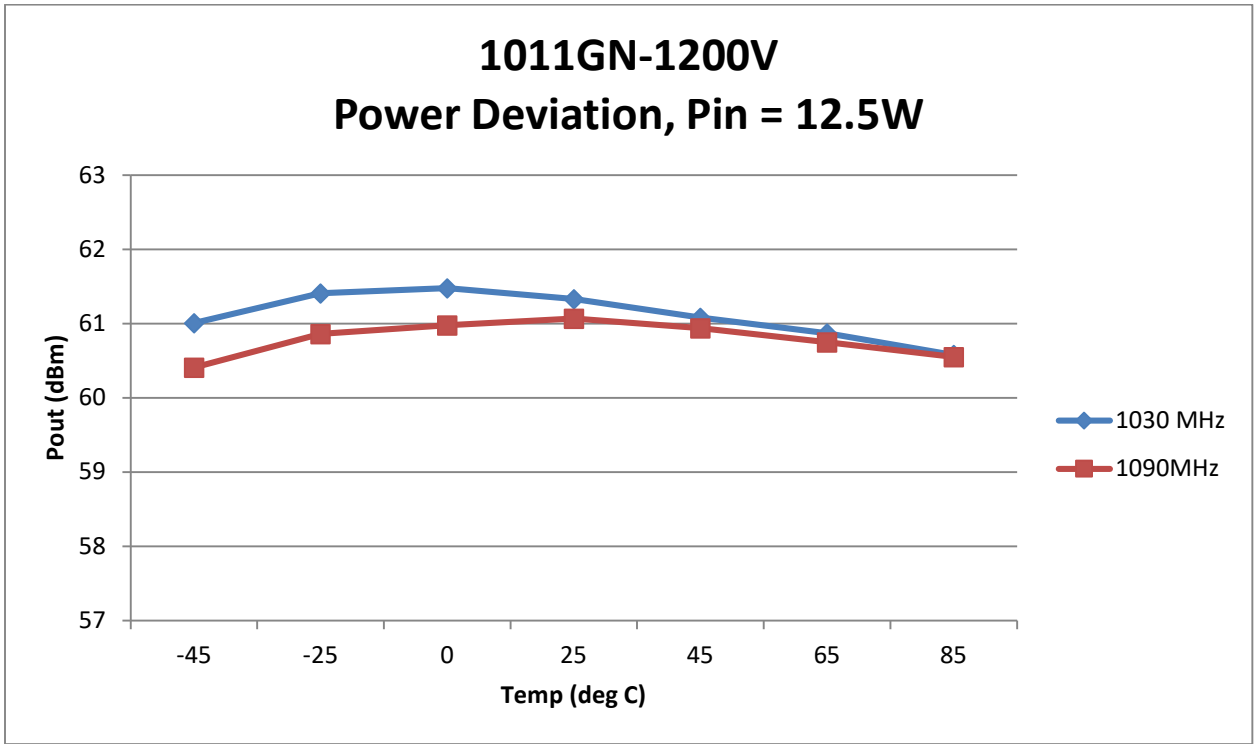
Freq	Pulse 1					Pulse 48		
	P_{IN} (W)	P_{OUT} (W)	G_P (dB)	IRL (dB)	η_D (%)	Pout(W)	G_P (dB)	Droop
1030 MHz	14.1	1370.9	19.87	-15.5	74.7%	1096.5	18.9	0.97
1090 MHz	14.1	1342.8	19.78	-8.5	77.1%	1096.5	18.9	0.88





TYPICAL OVER TEMPERATURE PERFORMANCE

Pulsing=32us-2%, V_{DD}=50V, I_{DQ}=150mA



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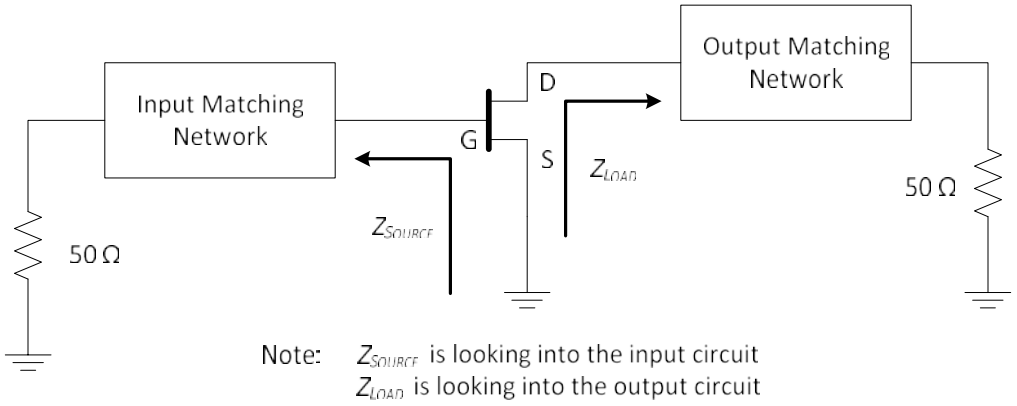
TRANSISTOR IMPEDANCE INFORMATION



Note: Z_{SOURCE} is looking into the input circuit
Z_{LOAD} is looking into the output circuit

Frequency	Z_{SOURCE}	Z_{LOAD}
1030 MHz	1.32-j0.37 Ω	0.86-j1.1 Ω
1060 MHz	1.38-j0.2 Ω	0.80-j0.94 Ω
1090 MHz	1.46-j0.08 Ω	0.74-j0.82 Ω

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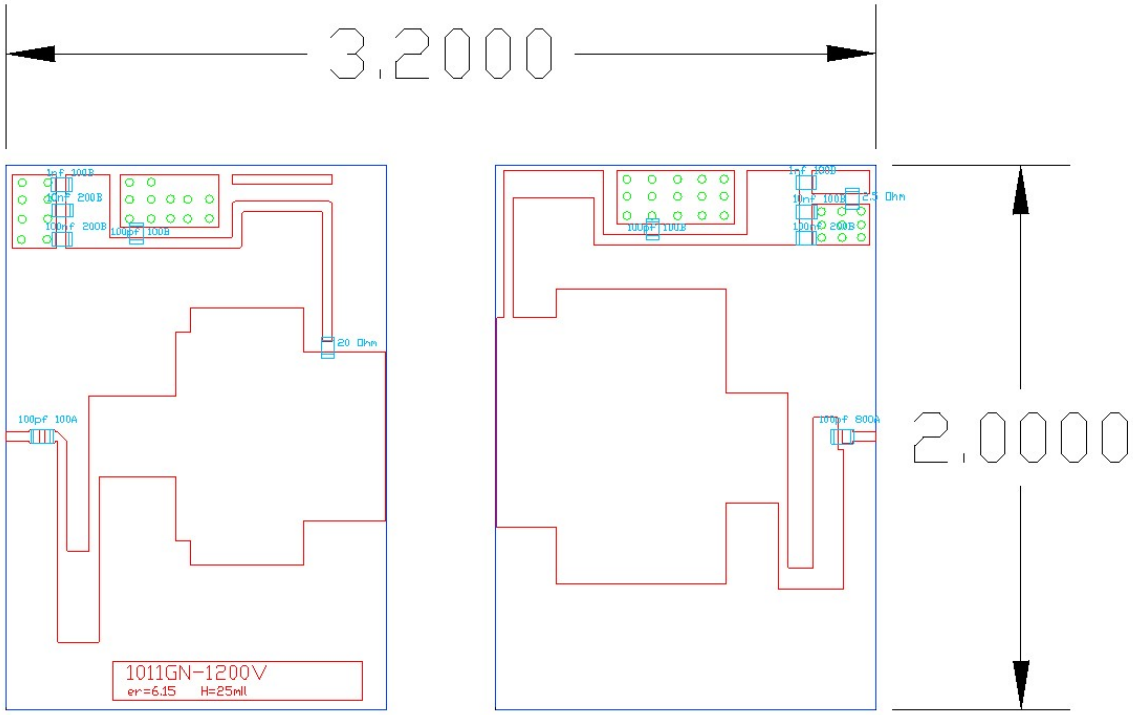
TEST CIRCUIT (inches)



- **Board Material: Roger Duroid 6006 @ H=25 mils, Er=6.15**
- **DXF file available upon request**

BILL OF MATERIALS

Item	Description	Value
C1	ATC 100A	100pF
C2	ATC 800A	100pF
C3	ATC 100B	100pF
C4	ATC 100B	1nF
C5	ATC 200B	10nF
C6	ATC 200B	100nF
R1	0805	20Ω
R2	0805	2.5Ω

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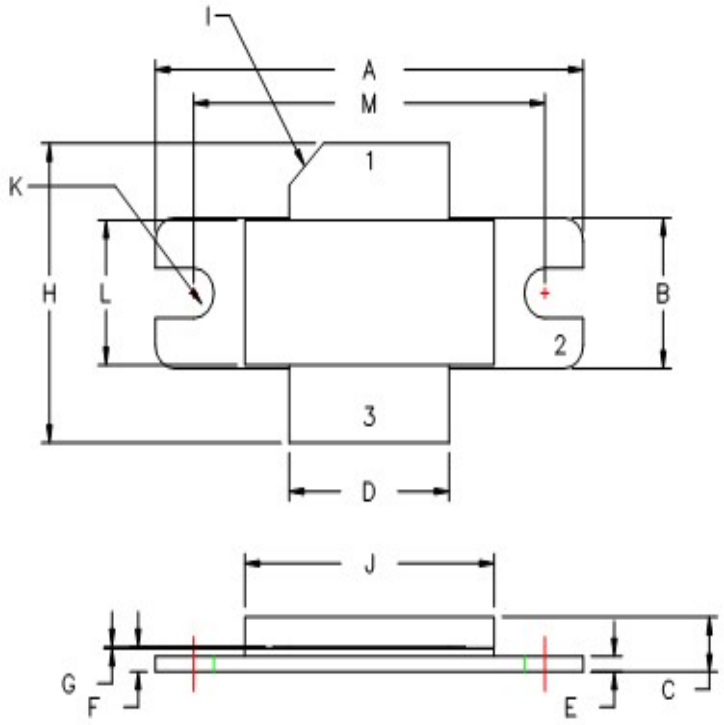
1011GN-1200V 55-Q03 Package



DIM	MILLIMETER	TOL	INCHES	TOL
A	34.03	.25	1.340	.010
B	9.78	.25	.385	.010
C	3.55	.19	.140	.007
D	12.70	.13	.500	.005
E	1.02	.13	.040	.005
F	1.65	.13	.065	.005
G	0.13	.03	.005	.001
H	19.43	.76	.765	.030
I	45°	5°	45°	5°
J	19.81	.25	.780	.030
K	3.30 DIA	.13	.130 DIA	.005
L	9.40	.13	.370	.005
M	27.94	MAX	1.100	MAX

PIN 1 = DRAIN
PIN 2 = SOURCE
PIN 3 = GATE

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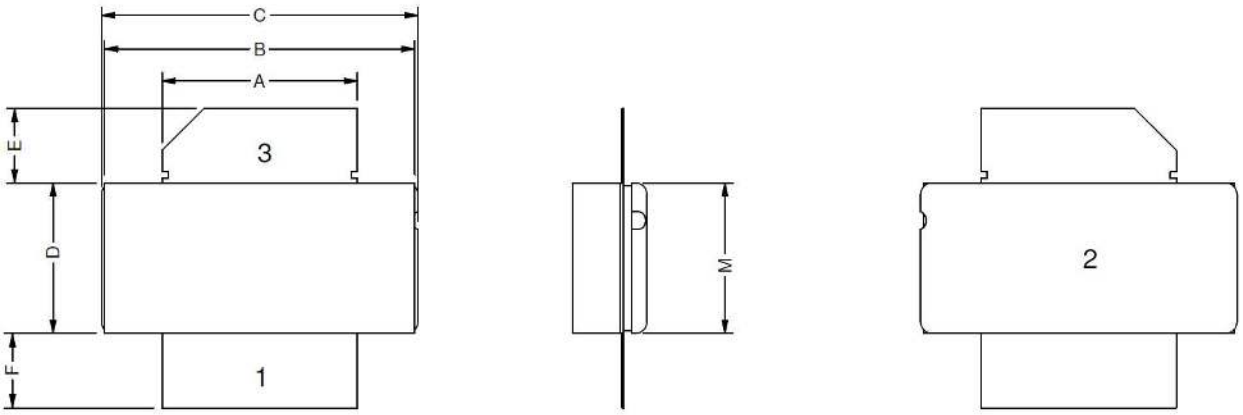
1011GN-1200V 55-Q03P Package



Dimension	Min(in.)	Max (in.)
A	.495	.505
B	.795	.805
C	.805	.815
D	.380	.390
E	.170	.210
F	.170	.210
G	.035	.045
H	.003	.006
J	.057	.067
K	.066	.076
L	.18	.20
M	.380	.390

NOTES
1 = GATE
2 = SOURCE
3 = DRAIN

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About Microsemi

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Revision History

Revision Level / Date	Para. Affected	Description
06 / March 20, 2015	-	Initial Preliminary Release
08 / August 22, 2017	Typical Data	Added Mode-S ELM data and charts
09 / February 25, 2018		Added VEL 55-Q03P packaged device