

GENERAL DESCRIPTION

The 0912GN-250V is an internally matched, COMMON SOURCE, class AB GaN on SiC HEMT transistor capable of providing over 18dB gain, 250 Watts of pulsed RF output power at 128 μ s pulse width, 10% duty factor across the 960 to 1215 MHz band. The transistor has internal pre-match for optimal performance. This transistor can be used for broadband avionics data link applications. It utilizes gold metallization and eutectic attach to provide highest reliability and superior ruggedness.

ABSOLUTE MAXIMUM RATINGS

Maximum Power Dissipation

Device Dissipation @ 85°C 700 W

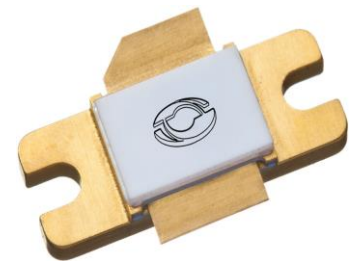
Maximum Voltage and Current

Drain-Source Voltage (V_{DS}) 65 V
Gate-Source Voltage (V_{GS}) -8 to -2 V

Maximum Temperatures

Storage Temperature (T_{STG}) -65 to +150 °C
Operating Junction Temperature +225 °C

CASE OUTLINE Common Source



ELECTRICAL CHARACTERISTICS @ 25°C

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Units
P_{OUT}	Output Power	Freq=960, 1090, 1215 MHz	250			W
G_P	Power Gain	Pout=250W, Freq=960, 1090, 1215 MHz		18.5		dB
η_D	Drain Efficiency	Pout=250W, Freq=960, 1090, 1215 MHz		60		%
D_r	Droop	Pout=250W, Freq=960, 1090, 1215 MHz			0.5	dB
VSWR-T	Load Mismatch Tolerance	Pout=250W, Freq= 1215MHz			10:1	
Θ_{JC}	Thermal Resistance	Pulse Width=128uS, Duty=10%			0.23	°C/ W

- Bias Condition: $V_{DD}=+50V$, $I_{DQ}=60mA$ average current ($V_{GS} = -2.0 \sim -4.5V$) with constant gate bias

FUNCTIONAL CHARACTERISTICS @ 25°C

$I_{D(OFF)}$	Drain leakage current	$V_{GS} = -8V$, $V_D = 50V$			12	mA
$I_{G(OFF)}$	Gate leakage current	$V_{GS} = -8V$, $V_D = 0V$			2	mA

Export Classification: EAR-99



0912GN-250V

250 Watts • 50 Volts • 128 μ S, 10%
960 - 1215 MHz Broadband Datalink

TYPICAL BROAD BAND PERFORMANCE DATA

Frequency	P _{IN} (W)	P _{OUT} (W)	I _D (A)	IRL (dB)		η D (%)	G _P (dB)	Droop (dB)
960 MHz	4.5	280	0.88	-9.6		67.0	18.5	0.4
1090 MHz	4.5	310	0.96	-13.2		67.1	15.5	0.4
1215 MHz	4.5	270	0.94	-11.0		60.9	18.4	0.3

CORRECT BIAS SEQUENCING

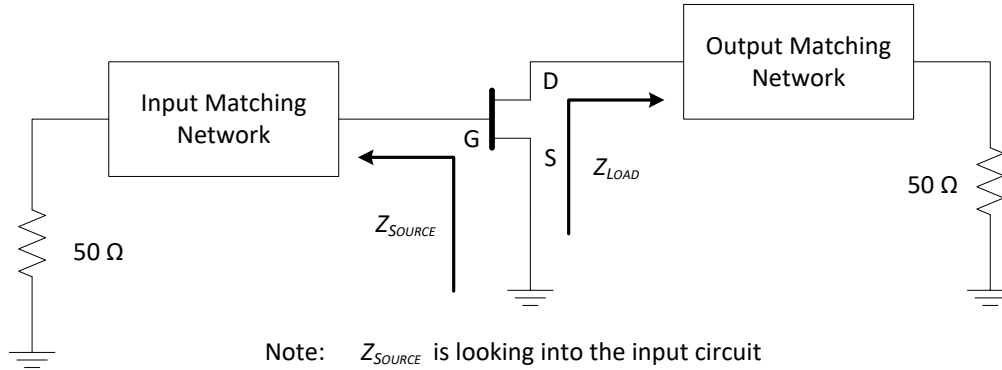
Turning the device ON

1. Set V_{GS} to the pinch-off (V_P), typically -5 V.
2. Turn on V_{DS} to nominal voltage (50 V).
3. Increase V_{GS} until the I_{DS} current is reached.
4. Apply RF power to desired level.

Turning the device OFF

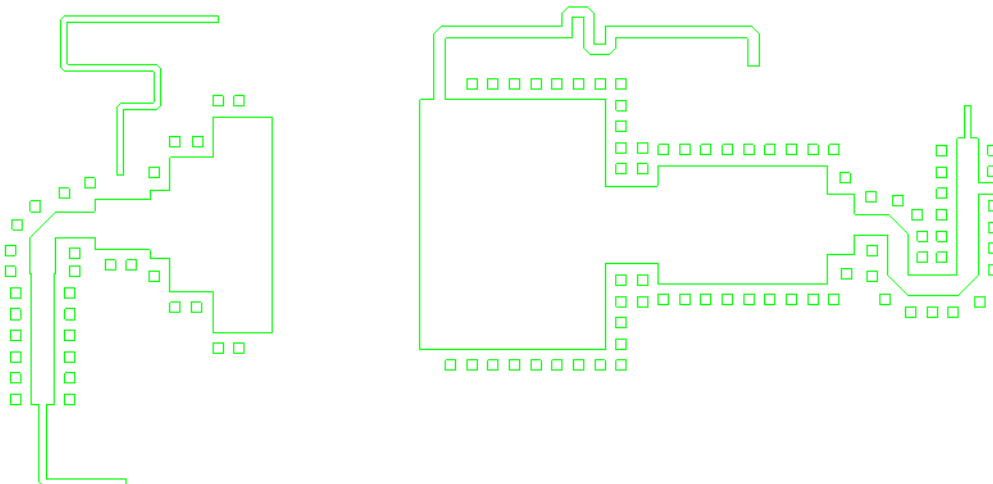
1. Turn the RF power off.
2. Decrease V_{GS} down to V_P.
3. Decrease V_{DS} down to 0 V.
4. Turn off V_{GS}

TRANSISTOR IMPEDANCE INFORMATION



Impedance Data		
Freq	Z_{SOURCE}	Z_{LOAD}
960 MHz	2.55 – j6.1	4.1 + j0.1
1090 MHz	2.83 – j4.0	3.7 – j0.4
1215 MHz	2.89 – j3.2	3.6 - j0.45

TEST FIXTURE ARTWORK (Contact Factory for Details)





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TRANSISTOR PERFORMANCE INFORMATION

Vdd=50V, Pulse Width=128 μ S, Duty=10%, Temp =25 Degs

Freq (GHz)	Pin(watt)	Pin (dBm)	Pout (dBm)	Pout (W)	Gain(dB)	Idd(A)		RTL(dB)	Eff (%)	Droop(dB)	Max Gp(dB)
960	2.51	34	53.98	250	19.98	0.829	23.85	-10.15	0.64	0.3	
	3.89	35.9	54.48	281	18.58	0.896	26.3	-9.6	0.66	0.35	21.18
	4.27	36.3	54.47	280	18.17	0.887	27.3	-9	0.67	0.4	
	4.90	36.9	54.42	277	17.52	0.865	28.9	-8	0.68	0.4	
1030	2.63	34.2	53.98	250	19.78	0.868	19.8	-14.4	0.61	0.25	
	3.98	36	54.81	303	18.81	0.951	22.6	-13.4	0.67	0.35	20.6
	4.47	36.5	54.73	297	18.23	0.935	24.1	-12.4	0.67	0.4	
	5.13	37.1	54.56	286	17.46	0.904	25.7	-11.4	0.67	0.45	
1090	2.75	34.4	53.99	251	19.59	0.874	20.1	-14.3	0.61	0.35	
	4.37	36.4	54.95	313	18.55	0.976	23.2	-13.2	0.67	0.4	20.62
	5.01	37	54.81	303	17.81	0.947	23.8	-13.2	0.67	0.45	
	5.62	37.5	54.61	289	17.11	0.91	24.5	-13	0.67	0.45	
1150	3.16	35	54	251	19	0.881	24.5	-10.5	0.60	0.3	
	4.90	36.9	54.85	305	17.95	0.977	27	-9.9	0.66	0.35	20.35
	5.62	37.5	54.71	296	17.21	0.941	27.3	-10.2	0.66	0.5	
	6.31	38	54.53	284	16.53	0.906	27.9	-10.1	0.66	0.5	
1215	3.55	35.5	53.98	250	18.48	0.889	24.5	-11	0.59	0.25	
	5.25	37.2	54.69	294	17.49	0.972	26.6	-10.6	0.64	0.35	20.08
	5.89	37.7	54.63	290	16.93	0.951	26.6	-11.1	0.64	0.45	
	6.61	38.2	54.46	279	16.26	0.913	26.3	-11.9	0.65	0.5	



0912GN-250V

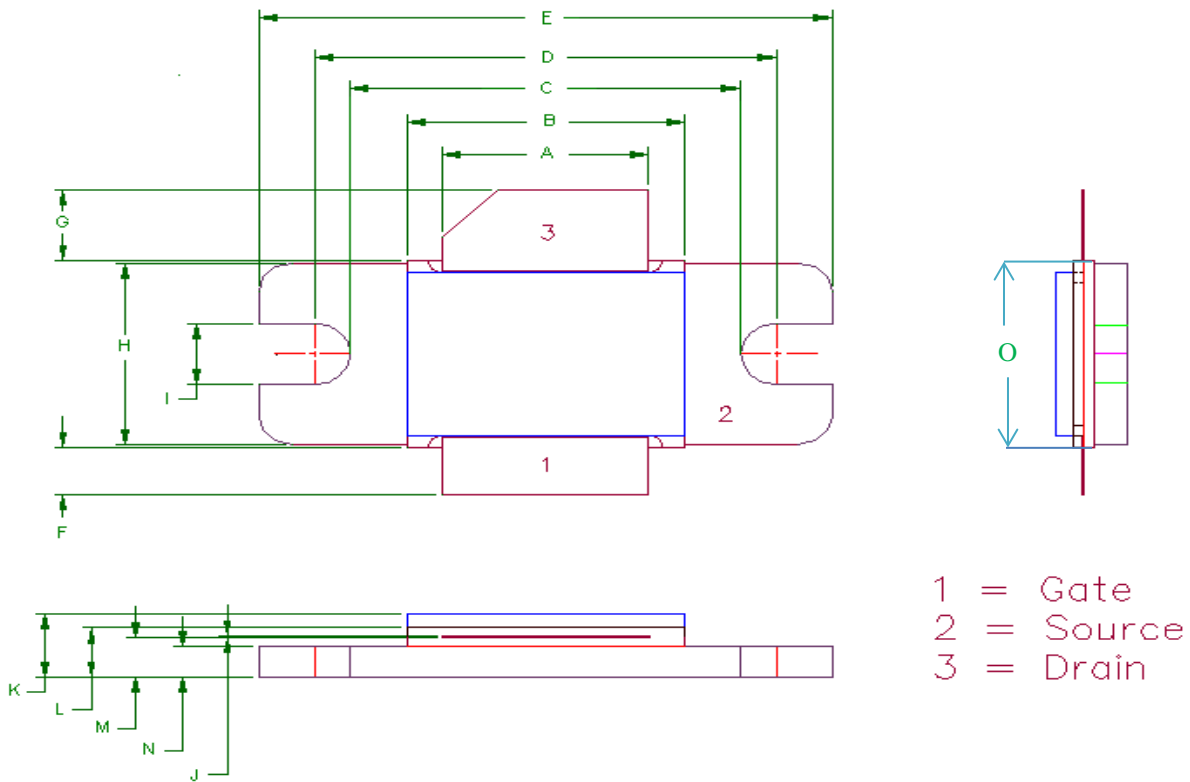
250 Watts • 50 Volts • 128 μ S, 10%
960 - 1215 MHz Broadband Datalink

TRANSISTOR PERFORMANCE INFORMATION

Vdd=50V, Pulse Width=128uS, Duty=10%, Over Temp – 25-95 Degs

Vgs(V)	temp	Freq (GHz)	Pin (dBm)	Pout (dBm)	Pout (W)	Gain(dB)	Idd(A)		RTL(dB)	Eff (%)	Droop(dB)	Max Gp(dB)	Idq(mA)
-3.44	95C	960	36.4	54	251	17.6	1.017	30.7	-5.7	0.57	0.35		143
-3.44	85C	960	36.1	53.99	251	17.89	1	30.5	-5.6	0.57	0.3		130
-3.44	65C	960	35.6	53.98	250	18.38	0.96	29.8	-5.8	0.58	0.25		101
-3.44	45C	960	35.2	53.97	249	18.77	0.928	29.5	-5.7	0.58	0.35		79
-3.44	25C	960	34.6	53.99	251	19.39	0.862	28.6	-6	0.61	0.4	19.75	56
Vgs(V)	temp	Freq (GHz)	Pin (dBm)	Pout (dBm)	Pout (W)	Gain(dB)	Idd(A)		RTL(dB)	Eff (%)	Droop(dB)	Max Gp(dB)	Idq(mA)
-3.44	95C	1030	35.3	54.02	252	18.72	0.958	20.4	-14.9	0.61	0.3		143
-3.44	85C	1030	35	53.99	251	18.99	0.94	20.2	-14.8	0.61	0.3		130
-3.44	65C	1030	34.7	54.02	252	19.32	0.915	20.7	-14	0.61	0.25		101
-3.44	45C	1030	34.3	53.98	250	19.68	0.883	20.9	-13.4	0.62	0.3		79
-3.44	25C	1030	33.9	54.02	252	20.12	0.831	20.65	-13.25	0.64	0.4	20.89	56
Vgs(V)	temp	Freq (GHz)	Pin (dBm)	Pout (dBm)	Pout (W)	Gain(dB)	Idd(A)		RTL(dB)	Eff (%)	Droop(dB)	Max Gp(dB)	Idq(mA)
-3.44	95C	1090	35.5	54	251	18.5	0.919	23.5	-12	0.64	0.4		143
-3.44	85C	1090	35.3	54	251	18.7	0.908	23.3	-12	0.64	0.3		130
-3.44	65C	1090	34.9	54.01	252	19.11	0.879	23	-11.9	0.64	0.3		101
-3.44	45C	1090	34.4	53.98	250	19.58	0.851	22.4	-12	0.64	0.35		79
-3.44	25C	1090	34	54.02	252	20.02	0.802	22.3	-11.7	0.67	0.35	21.16	56
Vgs(V)	temp	Freq (GHz)	Pin (dBm)	Pout (dBm)	Pout (W)	Gain(dB)	Idd(A)		RTL(dB)	Eff (%)	Droop(dB)	Max Gp(dB)	Idq(mA)
-3.44	95C	1150	36	53.97	249	17.97	0.922	22.7	-13.3	0.63	0.4		143
-3.44	85C	1150	35.8	54	251	18.2	0.913	22.6	-13.2	0.63	0.4		130
-3.44	65C	1150	35.4	54	251	18.6	0.884	22	-13.4	0.63	0.25		101
-3.44	45C	1150	34.9	53.97	249	19.07	0.856	21.3	-13.6	0.64	0.4		79
-3.44	25C	1150	34.4	54	251	19.6	0.803	20.88	-13.52	0.66	0.35	21	56
Vgs(V)	temp	Freq (GHz)	Pin (dBm)	Pout (dBm)	Pout (W)	Gain(dB)	Idd(A)		RTL(dB)	Eff (%)	Droop(dB)	Max Gp(dB)	Idq(mA)
-3.44	95C	1215	37	54	251	17	0.95	24.2	-12.8	0.61	0.4		143
-3.44	85C	1215	36.7	53.96	249	17.26	0.936	23.8	-12.9	0.61	0.4		130
-3.44	65C	1215	36.2	53.98	250	17.78	0.906	23.3	-12.9	0.61	0.35		101
-3.44	45C	1215	35.7	53.99	251	18.29	0.879	22.6	-13.1	0.62	0.4		79
-3.44	25C	1215	35.2	54	251	18.8	0.852	21.8	-13.4	0.64	0.4	20.23	56

PACKAGE DIMENSION



Dimension	Min (mil)	Min (mm)	Max (mil)	Max (mm)
A	275	6.99	285	7.24
B	395	10.03	405	10.29
C	475	12.07	485	12.32
D	595	15.11	605	15.37
E	795	20.19	805	20.45
F	92	2.34	112	2.85
G	92	2.34	112	2.85
H	380	9.65	390	9.91
I	115	2.92	125	3.18
J	4	.102	6	0.152
K	152	3.86	172	4.37
L	105	2.67	107	2.72
M	61	1.55	63	1.60
N	35	0.89	45	1.14
O	396	10.06	404	10.26

Carrier Material CPC141 and Plating is Ni/Au



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Revision History

Revision Level / Date	Para. Affected	Description
07 Oct 2019	-	Preliminary Release