

C-Band Radar Transistor

Available in a bolt down flanged version as IGN5259M20 or in a solder mount earless version IGN5259M20S. Available both in IGN5259M20 is an internally pre-matched, gallium nitride (GaN) high electron mobility transistor (HEMT). This part is designed for C-Band radar applications operating over the 5.2 – 5.9 GHz instantaneous frequency band. Under 300us / 10% pulse conditions it supplies a minimum of 20 watts of peak output power with 12dB gain typically. Specified operation is with Class AB bias. When appropriately rated, it is operable under a wide range of pulse widths and duty factors. It operates with spectral purity into all phases of 3:1 output load VSWR. All devices are 100% screened for large signal RF parameters in a fixed tuned broadband matching circuit / test fixture. This device is rated for a peak output power level of $P_{PEAK} = 20W$ @ 10% duty factor. This corresponds to an average power $P_{AVG} = 2.0W$.



GaN on Silicon Carbide FET

- High Power Gain
- Excellent thermal stability

Depletion Mode Device

- Negative Gate Voltage to Bias
- Bias Sequencing Required
- See App Note to Prevent Damage

Gold Metal System

- Complete Gold System
- Gold Bond Wires
- Gold Package Metal
- Maximum Reliability

Class AB

- Specified with AB bias

Internal Impedance Matching

- Input and Output Pre-matched

Metal - Ceramic Package

- Metal Based
- Epoxy Seal
- Available in Bolt Down or Earless Version

High Power 50Ω RF Test / Fixture

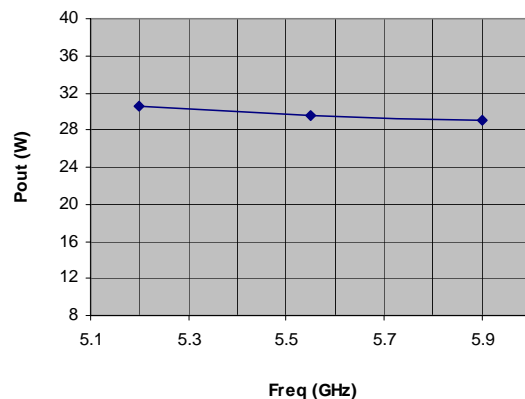
- Broadband
- Long-term Correlation
- 100% Device RF Screening
- No External Tuning required

Patent Issued

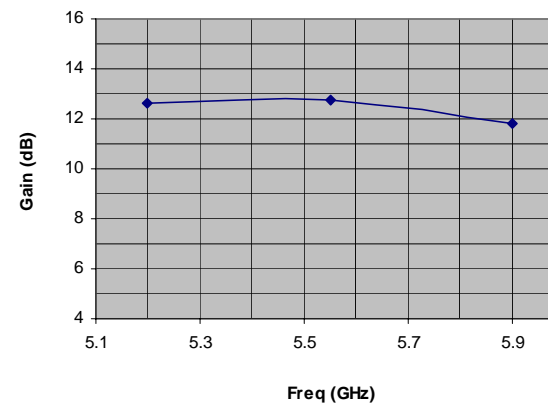
- US 8,299,857 B2

DEVELOPMENT DATA

Pout
300uS, 10%, 36V, 20mA



Gain
300uS, 10%, 36V, 20mA



MAXIMUM RATINGS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Drain-Source Voltage	V_{DS}	--	40	V	--
BD	Gate-Source Voltage	V_{GS}	-12	0	V	--
BD	Storage Temperature Range	T_{STG}	-55	+150	°C	--
BD	Operating Junction Temperature Range	T_J	-55	+200	°C	--
BD	CW operation	--	--	---	--	Not rated for CW operation
Note	Screen 'BD' = parameter qualified By Design.					

THERMAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Thermal Resistance	$R_{TH(JC)}$	--	1.06	°C/W	$V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=25\pm5^\circ C, P_{OUT}=15W, N_D=45\%$
Note	Screen 'BD' = parameter qualified By Design.					

PROCESSING SPECIFICATIONS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	DC Wafer Probe	--	--	--	--	Per Integra specification.
Q1	Wafer DC and RF Qualification	--	--	--	--	Per Integra specification.
LM	Wire Bond Strength	--	--	--	--	Line monitor per Integra specification.
100%	Pre-cap visual inspection	--	--	--	--	Per Integra specification
100%	Gross leak test	--	--	--	--	MIL-STD-750D, Method 1071.6, Test Condition C
Note	Screen 'Q1' = parameter is qualified by assembly and test of 3 pieces minimum per wafer.					
Note	Screen 'LM' = parameter is qualified by assembly line monitor.					



DC ELECTRICAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
100%	Drain Leakage	I_{D-off}	--	0.2	--	mA	$V_{DS} = 80V, V_{GS} = -8V, T_F = 25\pm5^\circ C$
100%	Threshold Voltage	V_{GS-TH}	--	-3.5	--	V	$V_{DS} = 36V, I_D = 0.100A, T_F = 25\pm5^\circ C$

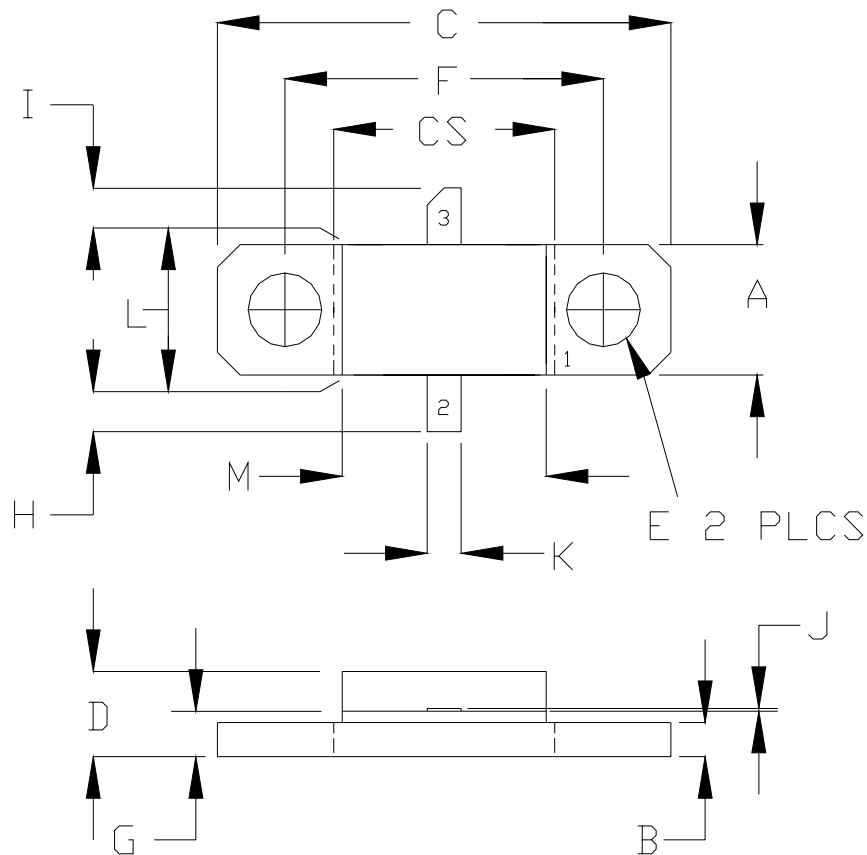
RF ELECTRICAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Input Return Loss	RL	-18	-7	dB	$V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{IN}=P_{IN1}, F=F1, F2, F3.$
100%	Output Power	P_o	20	30	W	$V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{IN}=P_{IN1}, F=F1, F2, F3.$
100%	Drain Current – Peak	I_D	0.85	1.3	A	$V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{IN}=P_{IN1}, F=F1, F2, F3.$
100%	Pulse Amplitude Droop	Droop	0.5	-0.5	dB	$V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{IN}=P_{IN1}, F=F1, F2, F3.$
100%	Power Gain	G_p	11	14	dB	$V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{IN}=P_{IN1}, F=F1, F2, F3.$
100%	3:1 Load Mismatch Stability	VSWR-S	S	--	--	$V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{out}=20W, F=F1, F2, F3.$ Rotate 3:1 output VSWR through 360° phase. No oscillatory or pulse break-up characteristics allowed on detected output pulse. All non-harmonically related signals must be at least -65 dBc.
Note 1	$V1 = 36V; I_{DQ1} = 20mA; PW1 = 300us; DF1 = 10%$					
Note 2	Input Power Test Levels: $P_{IN1} = 1.0W$					
Note 3	Test Frequencies: $F1 = 5.20\text{ GHz}, F2 = 5.55\text{ GHz}, F3 = 5.90\text{ GHz}.$					
Note 4	$T_{F1} = 25\pm5^\circ\text{C}$ = Device flange temperature.					
Note 5	Screen 'BD' = parameter qualified By Design.					

RF TEST FIXTURE IMPEDANCE CHARACTERISTICS

Frequency (GHz)	Z_{IF} (Ω)	Z_{OF} (Ω)
5.20	13.6 – j19.8	12.3 – j9.6
5.55	11.6 – j14.7	12.5 – j4.7
5.90	10.6 – j10.4	14.6 – j1.2
Impedance Definition		

PACKAGE DIMENSIONAL OUTLINE DRAWING



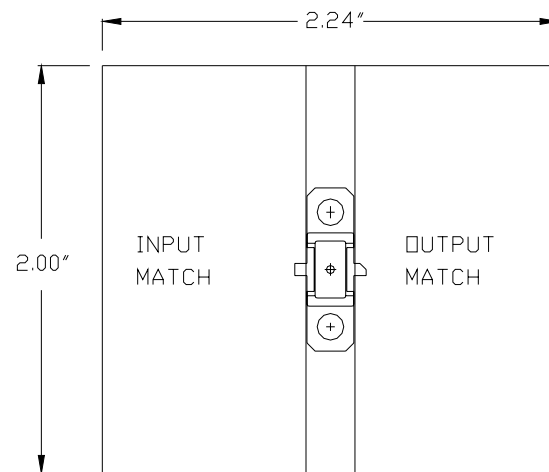
'S' VERSION USE DIM CS
NON 'S' VERSION USE DIM C

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.225	0.235	5.71	5.96
B	0.055	0.065	1.40	1.65
C	0.795	0.805	20.19	20.44
CS	0.385	0.395	9.78	10.03
D	0.140	0.160	3.55	4.06
E	0.125	0.135	3.18	3.43
F	0.557	0.567	14.14	14.40
G	0.077	0.087	1.95	2.20
H	0.093	0.107	2.36	2.72
I	0.093	0.107	2.36	2.72
J	0.004	0.006	0.10	0.15
K	0.055	0.065	1.40	1.65
L	0.225	0.235	5.71	5.96
M	0.355	0.365	9.01	9.27

PIN SCHEDULE	
1	SOURCE
2	GATE
3	DRAIN

NOTE: LID-PL32-1

RF TEST FIXTURE



CONTACT FACTORY FOR DETAILED RF TEST FIXTURE CAD DRAWING

DEFINITIONS

Data Sheet Status	
Proposed Specification	This data sheet contains proposed specifications.
Preliminary Specification	This data sheet contains specifications based on preliminary measurements and data.
Product Specification	This data sheet contains final product specifications.
Maximum Ratings	
Stress above one or more of the maximum ratings may cause permanent damage to the device. These are maximum ratings only operation of the device at these or at any other conditions above those given in the characteristics sections of the specification is not implied. Exposure to maximum values for extended periods of time may affect device reliability.	

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