C-Band Radar Transistor - GaN

- GaN on SiC HEMT Technology
- P_{OUT-PK} = 10W @ 300us/10%/36V; (P_{AVG} = 1W)
- 5.2-5.9GHz Instantaneous Operating Frequency Range
- Internal Impedance Pre-matched Device
- Depletion Mode Device
- Negative Gate Voltage and Bias Sequencing Required
- Specified For Use Under Class AB Operation
- Metal Based Package Sealed With Ceramic-Epoxy Lid
- Gold Metallization System: Chip - Wire Bond - Package
- Package Size: W=0.800″ (20.32mm), L=0.230″ (5.84mm)
- 100% High Power RF Tested in Broadband RF Test Fixture

PARAMETER	SYM	MIN	TYP	MAX	UNITS	TEST CONDITIONS
DC ELECTRICAL SPECIFICATIONS						
Drain Leakage Current	I_{D-OFF}	--	0.5	1.0	mA	V_{DS}=36V, V_{GS}=-6V, T_{F1}, S1
Gate Threshold Voltage	V_{GS-TH}	--	-4.0	--	V	V_{DS}=5V, I_D=10mA, T_{F1}, BD
RF ELECTRICAL SPECIFICATIONS						
Input Return Loss	IRL	-18	-12	-7	dB	POUT1, V1, I_{DQ1}, PW1, DF1, F1, F2, F3, T_{F1}, S1
Power Input	PIN	0.32	0.50	0.80	W	POUT1, V1, I_{DQ1}, PW1, DF1, F1, F2, F3, T_{F1}, S1
Power Gain	Gp	10.97	12.50	14.95	dB	POUT1, V1, I_{DQ1}, PW1, DF1, F1, F2, F3, T_{F1}, S1
Drain Efficiency	N_D	48	55	75	%	POUT1, V1, I_{DQ1}, PW1, DF1, F1, F2, F3, T_{F1}, S1
Pulse Amplitude Droop	D	-0.50	-0.10	+0.30	dB	POUT1, V1, I_{DQ1}, PW1, DF1, F1, F2, F3, T_{F1}, S1
Delta Inter-pulse Insertion Phase	DIP	-30	--	+30	DEG	POUT1, V1, I_{DQ1}, PW1, DF1, F3, T_{F1}, S1
Load Mismatch Stability	VSWR-S	3:1	--	--	--	POUT1, V1, I_{DQ1}, PW1, DF1, F1, F2, F3, T_{F1}, S1
DC & RF TEST CONDITIONS						
Output Power 1	POUT1	--	10	--	W	--
Drain Supply Voltage 1	V1	--		36.0	V	--
Quiescent Drain Current 1	I_{DQ1}	--		10	mA	--
Pulse Width 1	PW1	--		300	us	--
Duty Factor 1	DF1	--		10	%	--
Frequency 1	F1	--	5.20	--	GHz	--
Frequency 2	F2	--	5.55	--	GHz	--
Frequency 3	F3	--	5.90	--	GHz	--
Flange Temperature 1	T_{F1}	25	30	35	°C	--
Screening Level 1	S1	100	--	--	%	--

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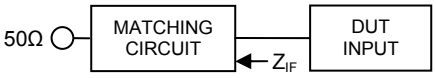
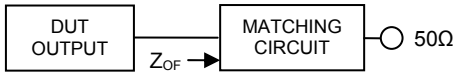
PARAMETER	SYM	MIN	MAX	UNITS	SCREEN	CONDITIONS
MAXIMUM RATINGS						
Drain-Source Voltage	V_{DS}	--	36	V	BD	T_F = 25°C
Gate-Source Voltage	V_{GS}	-10	0	V	BD	T_F = 25°C
Storage Temperature Range	T_{STG}	-55	+150	°C	BD	--
Operating Junction Temperature	T_J	-55	+200	°C	BD	--
PROCESS SPECIFICATIONS						
DC Wafer Probe	--	--	--	--	100%	Per Integra Spec
Wafer DC, RF Qualification	--	--	--	--	Q1	Per Integra Spec
Wire Bond Strength	--	--	--	--	LM	Per Integra Spec
Pre-cap Visual Inspection	--	--	--	--	100%	Per Integra Spec
Gross Leak Test – MIL-STD-750D	--	--	--	--	100%	Method 1071.6 C
THERMAL RESISTANCE						
Peak Thermal Resistance Per Rated RF Specification	$R_{TH(JC)}$	--	2.25	°C/W	BD	T_F = 25°C
SCREENING LEVELS						
Parameter Qualified By Design	BD	--	--	--	--	--
Parameter Qualified By 3 Pieces (min) Per Wafer	Q1	--	--	--	--	--
Parameter Qualified By Assembly Line Monitor	LM	--	--	--	--	--

RF TEST FIXTURE – BROADBAND

► Broadband RF Test Fixture. Provides Device Impedance Matching to 50Ω Across the Rated Operating Frequency Range.

► Electronic CAD Drawing File Available Upon Request. Includes Circuit Dimensions and Parts List.

► Reference Design PCB: Rogers RO4350B-03011, DK=3.48.

FREQUENCY (GHz)	Z_{IF}(Ω)	Z_{OF}(Ω)
5.20	7.7 – j18.1	12.5 – j4.8
5.55	9.6 – 16.3	13.4 – j0.6
5.90	8.8 + j14.2	12.3 + j4.0
Impedance Definition		

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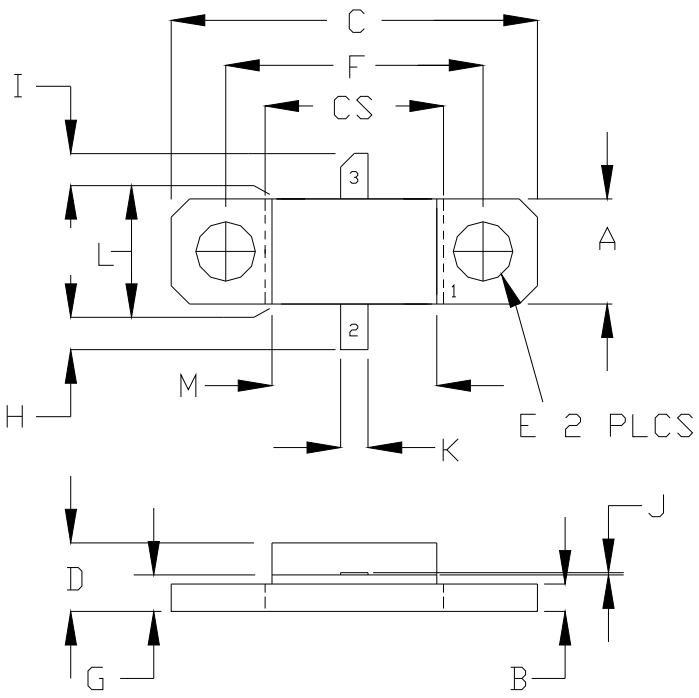
PACKAGE OUTLINE DRAWING



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

	INCHES		MILLIMETERS	
DIM	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

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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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