S-Band Radar 50Ω Transistor - GaN

- GaN on SiC HEMT Technology
- P_{OUT-PK} = 130W @ 300us/10%/50V
- 2.7-3.1GHz Instantaneous Operating Frequency Range
- 50Ω Internally Impedance Matched Device
- Depletion Mode Device
- Negative Gate Voltage and Bias Sequencing Required
- Metal Based Package Sealed With Ceramic-Epoxy Lid
- Gold Metallization System: Chip - Wire Bond - Package
- Package Size Bolt Down: W=0.800″(20.32mm), L=0.400″(10.16mm)
- Package Size S(earless): W=0.400″(10.16mm), L=0.400″(10.16mm)
- 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}	--	--	2	mA	V_{DS}=50V, V_{GS}= -6V, T_{F1}, S1
Gate Threshold Voltage	V_{GS-TH}	-3.3	-2.3	-1.5	V	V_{DS}=50V, I_D=25mA, T_{F1}, S1
RF ELECTRICAL SPECIFICATIONS						
Input Return Loss	IRL	-18	-10	-7	dB	POUT1, V1, I_{DQ1}, PW1, DF1, F1, F2, F3, T_{F1}, S1
Power Gain	Gp	14.0	16.0	20.0	dB	POUT1, V1, I_{DQ1}, PW1, DF1, F1, F2, F3, T_{F1}, S1
Drain Efficiency	N_D	45	50	75	%	POUT1, V1, I_{DQ1}, PW1, DF1, F1, F2, F3, T_{F1}, S1
Pulse Amplitude Droop	D	-0.80	-0.40	+0.20	dB	POUT1, V1, I_{DQ1}, PW1, DF1, F1, F2, F3, T_{F1}, S1
Delta Inter-pulse Insertion Phase-Note1	DIP	-30	--	+30	DEG	POUT1, V1, I_{DQ1}, PW1, DF1, F3, T_{F1}, S1
Load Mismatch Stability	VSWR-S	2:1	--	--	--	POUT1, V1, I_{DQ1}, PW1, DF1, F1, F2, F3, T_{F1}, S1
Load Mismatch Tolerance	VSWR-T	3:1	--	--	--	POUT1, V1, I_{DQ1}, PW1, DF1, F1, F2, F3, T_{F1}, S1

DC & RF TEST CONDITIONS	SYM	MIN	NOM	MAX	UNITS	TEST CONDITIONS
Output Power 1	POUT1	--	130	--	W	--
Drain Supply Voltage 1	V1	--	50.0	--	V	--
Quiescent Drain Current 1	I_{DQ1}	20	25	30	mA	--
Pulse Width 1	PW1	--	300	--	us	--
Duty Factor 1	DF1	--	10	--	%	--
Frequency 1	F1	--	2.7	--	GHz	--
Frequency 2	F2	--	2.9	--	GHz	--
Frequency 3	F3	--	3.1	--	GHz	--
Flange Temperature 1	T_{F1}	20	25	30	°C	--

www.integratech.com
PHONE: 310-606-0855
FAX: 310-606-0865

INTEGRA TECHNOLOGIES, INC.
321 CORAL CIRCLE
EL SEGUNDO, CA 90245-4620

PARAMETER	SYM	MIN	MAX	UNITS	SCREEN	CONDITIONS
MAXIMUM RATINGS						
Drain-Source Voltage	V_{DS}	60	--	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	$R_{TH(JC)}$	--	TBD	°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	--	--	--	--	--
Screening Level 1	S1	--	--	--	100%	--
NOTES						
	N1	All devices are marked with delta insertion phase dash numbers, as INTEGRA-XX, with "XX" from -1 thru -12 indicating 5° variations between -30° to +30° from reference.				

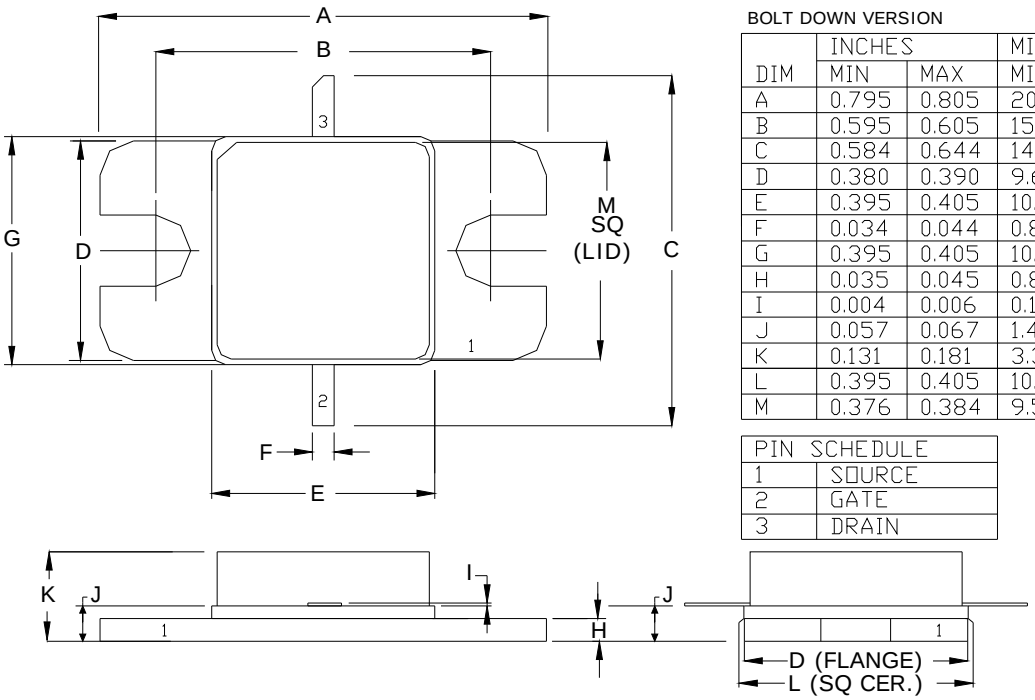
RF TEST FIXTURE – 50Ω BROADBAND
► Broadband RF Test Fixture. Provides 50Ω Impedance To the Device Across the Rated Operating Frequency Range.
► Electronic CAD Drawing File Available Upon Request. Includes Circuit Dimensions and Parts List.
► Reference Design PCB: Rogers RO4350B-03011, DK=3.48.

DC BIAS SEQUENCING	
Turn ON GaN Device	**Turn OFF GaN Device**
1. RF Power OFF 2. Set VGS = -5V (Negative Voltage to pinch off) 3. Measure VDS impedance, should be pinched off. 4. Turn ON VDD voltage. 5. Slowly increase VGS until bias current IDQ is set. 6. Turn ON RF Power	1. Turn OFF RF Power 2. Turn OFF VDD voltage 3. After VDD is discharged, set VGS = -5V 4. Turn OFF VGS voltage.

www.integratech.com
PHONE: 310-606-0855
FAX: 310-606-0865

INTEGRA TECHNOLOGIES, INC.
321 CORAL CIRCLE
EL SEGUNDO, CA 90245-4620

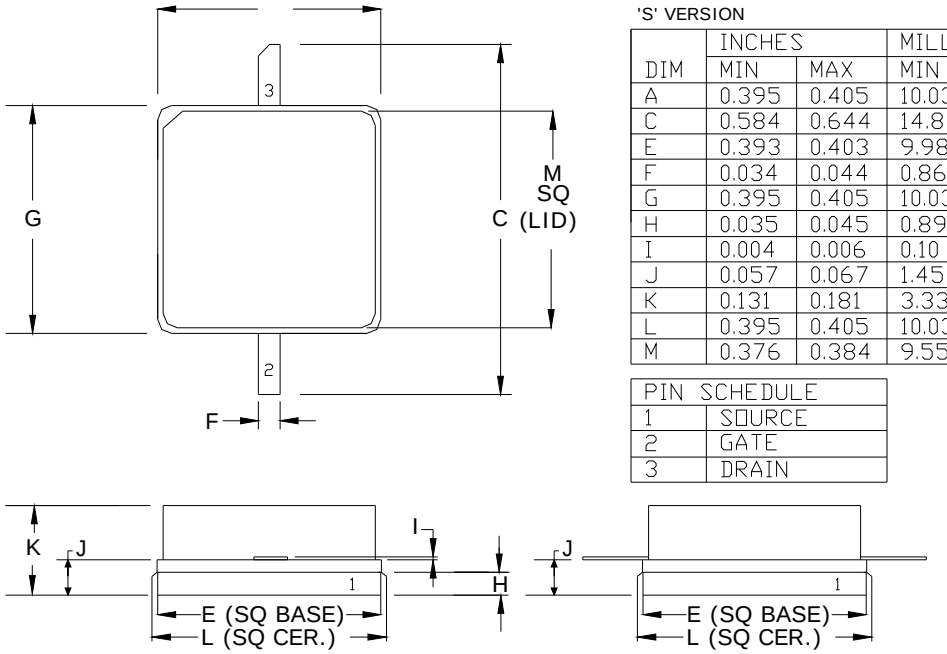
PACKAGE OUTLINE DRAWING



BOLT DOWN VERSION

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.795	0.805	20.19	20.45
B	0.595	0.605	15.11	15.37
C	0.584	0.644	14.83	16.36
D	0.380	0.390	9.65	9.91
E	0.395	0.405	10.03	10.29
F	0.034	0.044	0.86	1.12
G	0.395	0.405	10.03	10.29
H	0.035	0.045	0.89	1.14
I	0.004	0.006	0.10	0.15
J	0.057	0.067	1.45	1.70
K	0.131	0.181	3.33	4.60
L	0.395	0.405	10.03	10.29
M	0.376	0.384	9.55	9.75

PIN	SCHEDULE
1	SOURCE
2	GATE
3	DRAIN



'S' VERSION

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.395	0.405	10.03	10.29
C	0.584	0.644	14.83	16.36
E	0.393	0.403	9.98	10.24
F	0.034	0.044	0.86	1.12
G	0.395	0.405	10.03	10.29
H	0.035	0.045	0.89	1.14
I	0.004	0.006	0.10	0.15
J	0.057	0.067	1.45	1.70
K	0.131	0.181	3.33	4.60
L	0.395	0.405	10.03	10.29
M	0.376	0.384	9.55	9.75

PIN	SCHEDULE
1	SOURCE
2	GATE
3	DRAIN

www.integratech.com
PHONE: 310-606-0855
FAX: 310-606-0865

INTEGRA TECHNOLOGIES, INC.
321 CORAL CIRCLE
EL SEGUNDO, CA 90245-4620

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.	

DISCLAIMER
Integra Technologies Inc. makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Integra Technologies Inc. assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. Integra Technologies Inc. products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Integra Technologies Inc. customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Integra Technologies Inc. for any damages resulting from such improper use or sale.

www.integratech.com
PHONE: 310-606-0855
FAX: 310-606-0865

INTEGRA TECHNOLOGIES, INC.
321 CORAL CIRCLE
EL SEGUNDO, CA 90245-4620