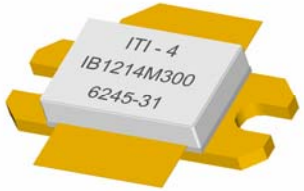
Part Number: IB1214M300

Integra
TECHNOLOGIES, INC.

L-Band Radar Transistor

The high power pulsed radar transistor device part number IB1214M300 is designed for L-Band radar systems operating over the instantaneous bandwidth of 1.215-1.400 GHz. While operating in class C mode this common base device supplies a minimum of 300 watts of peak pulse power under the conditions of 100μs pulse width and 10% duty cycle. All devices are 100% screened for large signal RF parameters.



- Silicon Bipolar
  - Ultra-high f_T
- Class C Operation
  - High Efficiency
- Common Base Configuration
  - Single Power Supply
- Gold Metal
  - Maximum Reliability
- Emitter Ballasting
  - Optimum Thermal Distribution
- Internal Impedance Matching
  - Ease of Use
  - Ultra-low Loss Design
- Be0 Package
  - Unmatched Thermal Reliability
- RF Test Fixture
  - Broadband
  - Matched to 50Ω
  - Long-term Correlation
  - 100% Device RF Screening
  - No External Tuning Allowed

TYPICAL DATA TYPICAL DATA TYPICAL DATA TYPICAL DATA

Lot / SN	Freq (MHz)	Pout (W)	Pin (W)	Ic (A)	RL (dB)	Nc (%)	Gain (dB)	dG (dB)	VSWR 1.5:1	VSWR 2:1	dlp bin
508513-17	1215	300	30.8	15.00	15	50.0	9.89		S	P	
	1300	300	34.4	14.19	14	52.9	9.41	1.12	S	P	
	1400	300	39.9	13.51	14	55.5	8.76		S	P	-3
508921-1	1215	300	35.7	14.60	14	51.4	9.24		S	P	
	1300	300	39.0	14.21	11	52.8	8.86	0.70	S	P	
	1400	300	42.0	13.46	20	55.7	8.54		S	P	-1

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321 CORAL CIRCLE
EL SEGUNDO, CA 90245-4620

MAXIMUM RATINGS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Collector-Emitter Voltage	V_{CES}	--	75	V	V_{BE}=0V.
BD	Emitter-Base Voltage	V_{EBO}	--	2	V	--
BD	Storage Temperature Range	T_{STG}	-55	+150	°C	--
BD	Operating Junction Temperature Range	T_J	-55	+200	°C	--
Note	Screen 'BD' = parameter qualified By Design.					

THERMAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Thermal Resistance	$R_{TH(JC)}$	--	0.15	°C/W	V_{CC}=V1, PW=PW1, DF=DF1, T_F=25±5°C, P_{OUT}= 300W.
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	Max	Units	Test Conditions
100%	Collector-Emitter Breakdown Voltage	BV_{CES}	75	--	V	I_C=40mA, V_{BE}=0V, T_F=25±5°C.
100%	Zero Base Voltage Collector Leakage Current	I_{CES}	--	10.0	mA	V_{CE}=40V, V_{BE}=0V, T_F=25±5°C.
100%	DC Current Gain	H_{FE}	20	95	--	V_{CE}=5V, I_C=0.5A, T_F=25±5°C.

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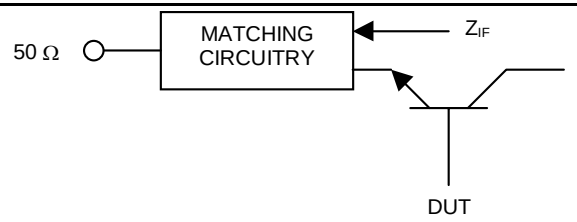
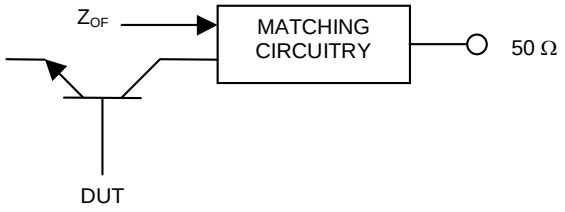
RF ELECTRICAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Input Return Loss	IRL	10	--	dB	V_{CC}=V1, PW=PW1, DF=DF1, T_F=25±5°C, P_{OUT}=P_{OUT1}, P_{OUT2}, P_{OUT3}, F=F1, F2, F3.
100%	Input Power	P_{IN}	--	60	W	V_{CC}=V1, PW=PW1, DF=DF1, T_F=25±5°C, P_{OUT}=P_{OUT1}, P_{OUT2}, P_{OUT3}, F=F1, F2, F3.
100%	Collector Efficiency ($P_O/I_C/V_{CC}$)	N_C	45	--	%	V_{CC}=V1, PW=PW1, DF=DF1, T_F=25±5°C, P_{OUT}=P_{OUT1}, P_{OUT2}, P_{OUT3}, F=F1, F2, F3.
100%	Pulse Amplitude Droop	D	--	0.5	dB	V_{CC}=V1, PW=PW1, DF=DF1, T_F=25±5°C, P_{OUT}=P_{OUT1}, P_{OUT2}, P_{OUT3}, F=F1, F2, F3.
100%	Gain Flatness	GF	--	1.5	dB	Calculate from Gain at each frequency F.
100%	Stability into 1.5:1 VSWR with +0.75dB overdrive	VSWR-S	--	--	--	Repeat P_O with P_{IN} increased by 0.75dB. Rotate 1.5:1 output VSWR through 360° phase. No oscillatory or pulse break-up characteristics allowed on detected output pulse.
100%	2:1 Load Mismatch Tolerance	LMT	--	--	--	V_{CC}=V1, PW=PW1, DF=DF1, T_F=25±5°C, P_{OUT}=P_{OUT1}, P_{OUT2}, P_{OUT3}, F=F1, F2, F3. Rotate 2:1 output VSWR through 360° phase. Post test P_O = Pre test P_O±10W.
100%	Insertion Phase	IP	-20	20	DEG	V_{CC}=V1, PW=PW1, DF=DF1, T_F=25±5°C, P_{OUT}= P_{OUT3}, F= F3. Measure at middle of pulse with respect to phase reference marked in groups of 5 degree margin.
BD	Pulse Risetime	RT	--	80	ns	Vcc=V1, PW=PW1, DF=DF1, T_F =25±5°C, P_{OUT}=P_{OUT1}, P_{OUT2}, P_{OUT3}, F=F1, F2, F3.
Note	V1 = 40V; PW1 = 100µs; DF1 = 10%; P_{OUT1} = P_{OUT2} = P_{OUT3} = 300W; F1 = 1.215 GHz, F2 = 1.300 GHz, F3 = 1.400 GHz.					
Note	T_F = Device flange temperature.					
Note	Screen 'BD' = parameter qualified By Design.					

BROADBAND RF TEST FIXTURE IMPEDENCE CHARACTERISTICS

Frequency (GHZ)	Z_{IF} (Ω)	Z_{OF} (Ω)
1.215	1.17-j2.27	1.42-j1.47
1.300	1.14-j1.77	1.4-j0.81
1.400	1.1-j1.24	1.4-j0.1
Impedance Definition		

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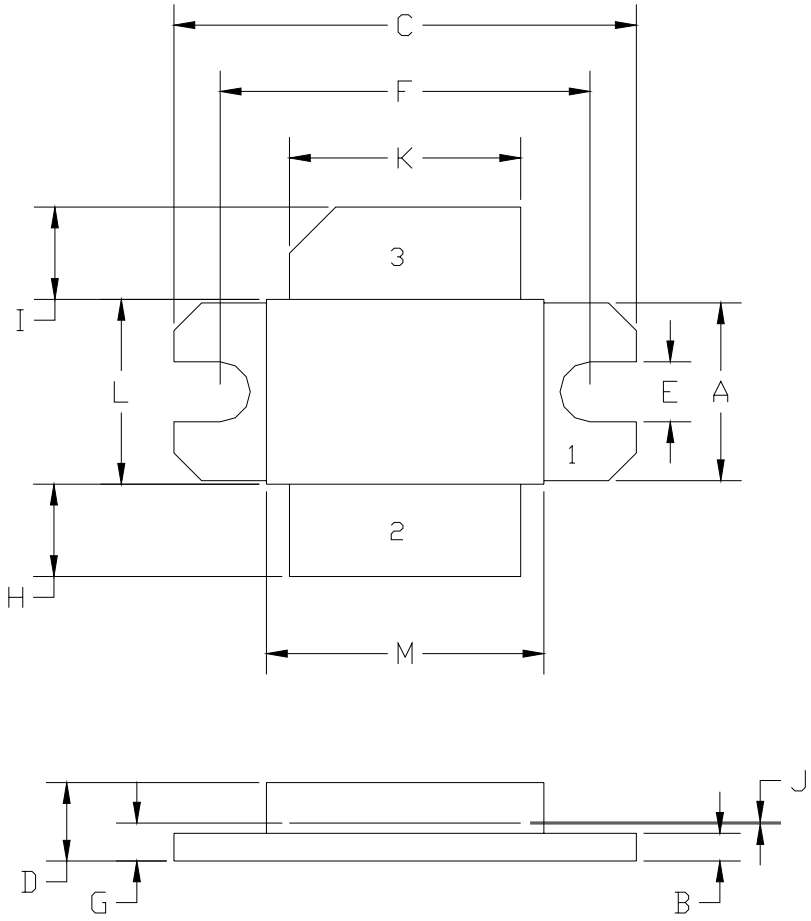
PACKAGE DIMENSIONAL OUTLINE DRAWING



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.380	0.390	9.65	9.91
B	0.055	0.065	1.40	1.65
C	0.905	1.005	22.99	25.53
D	0.178	0.188	4.52	4.78
E	0.125	0.135	3.18	3.43
F	0.795	0.805	20.19	20.45
G	0.082	0.092	2.08	2.34
H	0.185	0.215	4.70	5.46
I	0.185	0.215	4.70	5.46
J	0.002	0.004	0.05	0.10
K	0.495	0.505	12.57	12.83
L	0.395	0.405	10.03	10.29
M	0.595	0.605	15.11	15.37

PIN SCHEDULE	
1	BASE
2	EMITTER
3	COLLECTOR

DOCUMENT NUMBER:	REV:
IB1214M300	NC
SHEET NAME:	REV:
06-OUTLINE	NC

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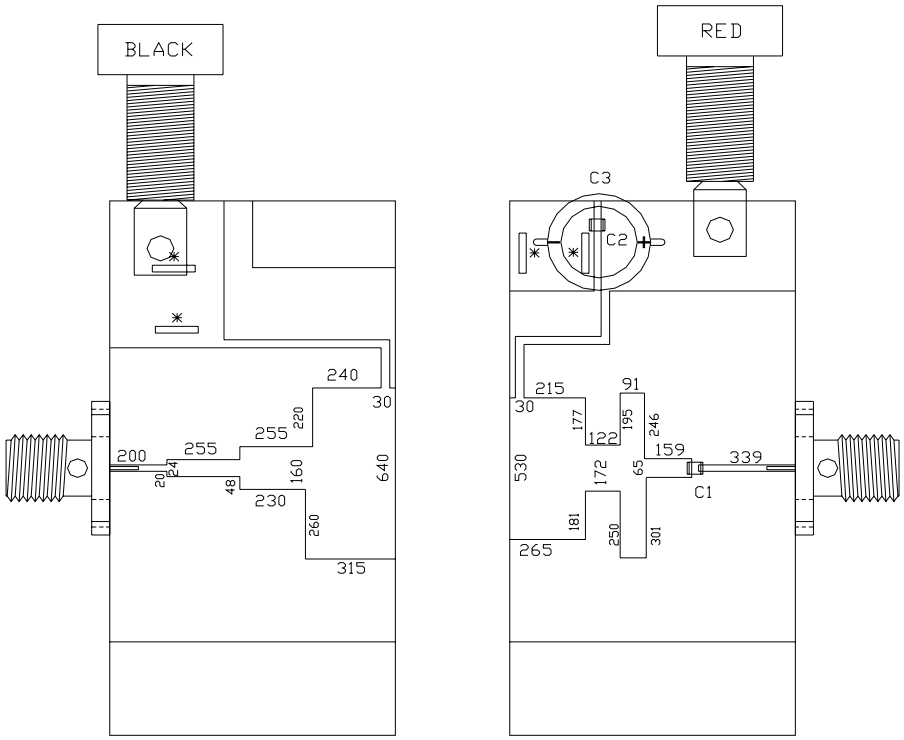
RF TEST FIXTURE



PARTS LIST

PC Board Type: ROGERS RO3010 .025"
Input PC Board Carrier: -03 (1.0")
Output PC board Carrier: -03 (1.0")
Transistor Carrier: -03 (P64)
Transistor Clamp: -04 (P64)
Heatsink: -10
RF Connector: OS #2052-5636-02
Chip Capacitor: ATC100A - 100pF, 2 plcs, C1, C2
Electrolytic Capacitor, 68uf/63v, C3
Dia wire
Grounds: 4 places - *
Banana Jack Red - 1 place
Banana Jack Black - 1 place

ASSEMBLY AND PARTS LIST

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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 and 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.

WARNING

Product and environmental safety - toxic materials

This product contains beryllium oxide. The product is entirely safe provided that the BeO base is not damaged. All persons who handle, use or dispose of this product should be aware of its nature and of the necessary safety precautions. After use, dispose of as chemical or special waste according to the regulations applying at the location of the user. It must never be thrown out with general or domestic waste.

DISCLAIMER

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