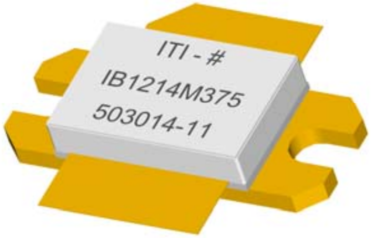
Part Number: IB1214M375

Integra
TECHNOLOGIES, INC.

L-Band Radar Transistor

The high power pulsed radar transistor device part number IB1214M375 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 375 watts of peak pulse power under the conditions of 300µs pulse width and 10% duty cycle. All devices are 100% screened for large signal RF parameters.



TYPICAL DATA TYPICAL DATA TYPICAL DATA TYPICAL DATA

Device Lot / SN	Freq (MHz)	P_{OUT} (W)	I_C (A)	RL (dB)	P_{IN} (W)	G (dB)	N_C (%)	VSWR 1.5:1	VSWR 3:1
D3636-3	1215	375	14.90	15.5	36.65	10.10	59.9	s	p
	1300	375	15.53	17.5	40.93	9.62	57.5	s	p
	1400	375	15.85	15.5	49.66	8.78	56.3	s	p

Conditions: PW=300us, DF=10%, Vcc=42V

s = stable, p = passed

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
- Micro-strip structure on soft pc board with dielectric constant 10.2

US Patent Number
- US7795716

MAXIMUM RATINGS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Collector-Emitter Voltage	V_{CES}	--	85	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	$R_{TH(JC)}$	--	0.17	°C/W	V_{CC}=42V, Pulse Format=300us, 10%, T_F=25±5°C, Pin=59W, Pout= 375W, Nc=55%
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.					

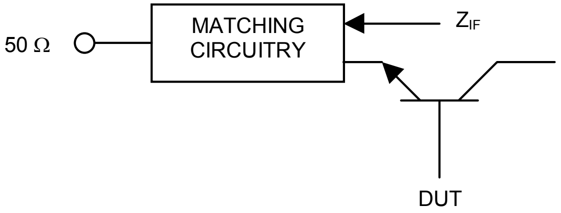
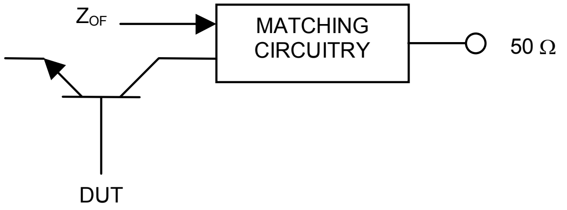
DC ELECTRICAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Collector-Emitter Breakdown Voltage	BV_{CES}	85	--	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}=42V, V_{BE}=0V, T_F=25±5°C.
100%	DC Current Gain	H_{FE}	20	150	--	V_{CE}=5V, I_C=0.5A, T_F=25±5°C.

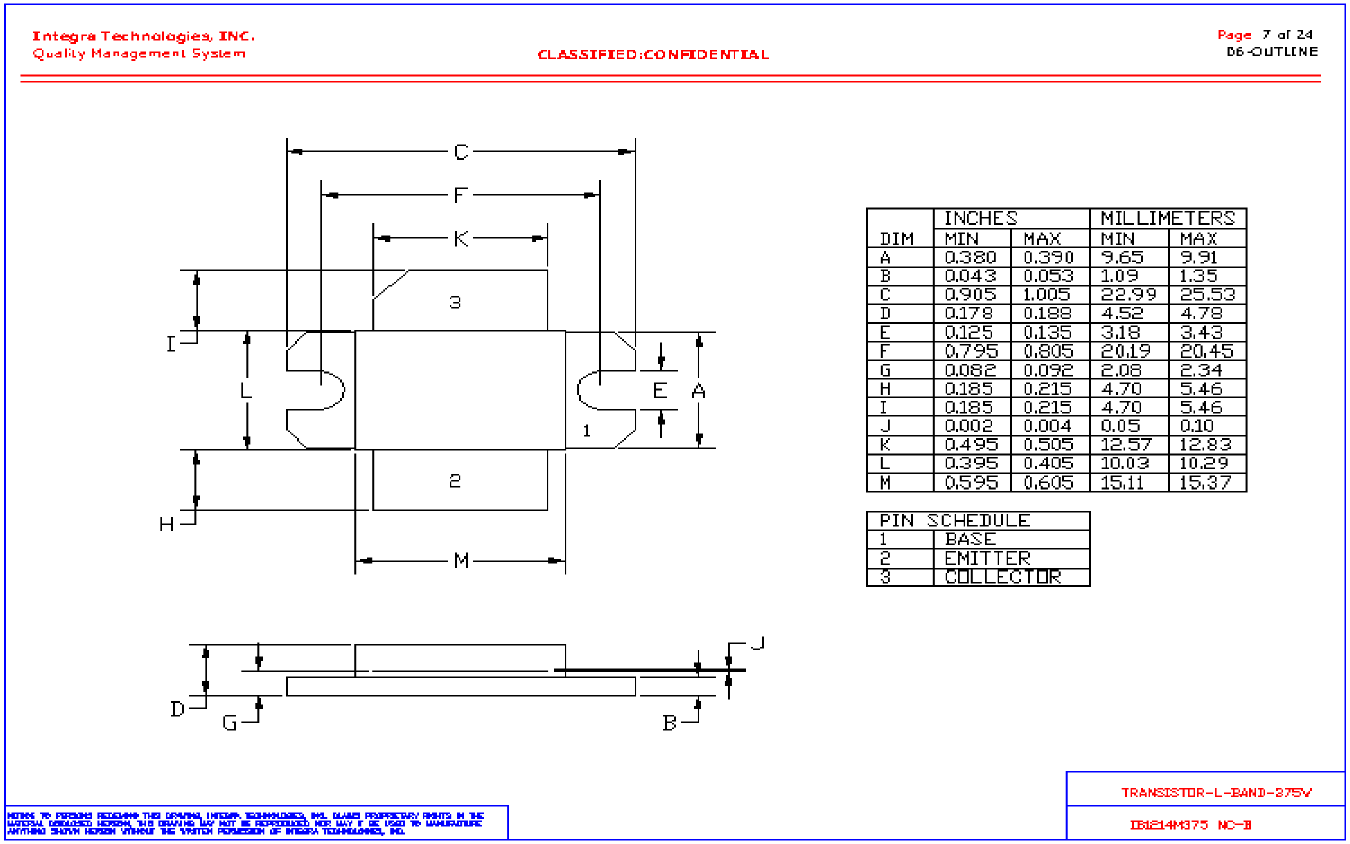
RF ELECTRICAL CHARACTERISTICS

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, Pout=$Pout_1$, $Pout_2$, $Pout_3$, F=F1, F2, F3.
100%	Input Power	P_{IN}	--	59.4	W	V_{CC}=V1, PW=PW1, DF=DF1, T_F=25±5°C, Pout=$Pout_1$, $Pout_2$, $Pout_3$, F=F1, F2, F3.
100%	Power Gain	G	8	--	dB	V_{CC}=V1, PW=PW1, DF=DF1, T_F=25±5°C, Pout=$Pout_1$, $Pout_2$, $Pout_3$, F=F1, F2, F3.
100%	Collector Efficiency ($P_O/I_C/V_{CC}$)	N_C	55	--	%	V_{CC}=V1, PW=PW1, DF=DF1, T_F=25±5°C, Pout=$Pout_1$, $Pout_2$, $Pout_3$, F=F1, F2, F3.
100%	Pulse Amplitude Droop	D	--	0.5	dB	V_{CC}=V1, PW=PW1, DF=DF1, T_F=25±5°C, Pout=$Pout_1$, $Pout_2$, $Pout_3$, 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	VSWR-S	--	--	--	1.5:1 output VSWR through 360° phase. No oscillatory or pulse break-up characteristics allowed on detected output pulse.
100%	3:1 Load Mismatch Tolerance	LMT		--	--	V_{CC}=V1, PW=PW1, DF=DF1, T_F=25±5°C, Pout=375w, F=F1, F2, F3. Rotate 3:1 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, Pout=375W, F=F3 Measured at middle of Pulse with respect to phase reference, marked in groups of 5 degree margin.
BD	Pulse Risetime	RT	--	80	ns	V_{CC}=V1, PW=PW1, DF=DF1, T_F=25±5°C, Pout=$Pout_1$, $Pout_2$, $Pout_3$ F=F1, F2, F3
Note	V1 = 42V; PW1 = 300µs; DF1 = 10%; $Pout_1$ = $Pout_2$ = $Pout_3$ = 375W; 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.					

RF TEST FIXTURE IMPEDANCE CHARACTERISTICS

Frequency (MHz)	Z_{IF} (Ω)	Z_{OF} (Ω)
1.215	1.69-j2.14	1.88-j1.16
1.300	1.75-j1.66	1.62-j1.12
1.400	2.03-j0.84	1.14-j0.68
Impedance Definition		

PACKAGE DIMENSIONAL OUTLINE DRAWING



Integra Technologies, INC.
Quality Management System

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D6-OUTLINE

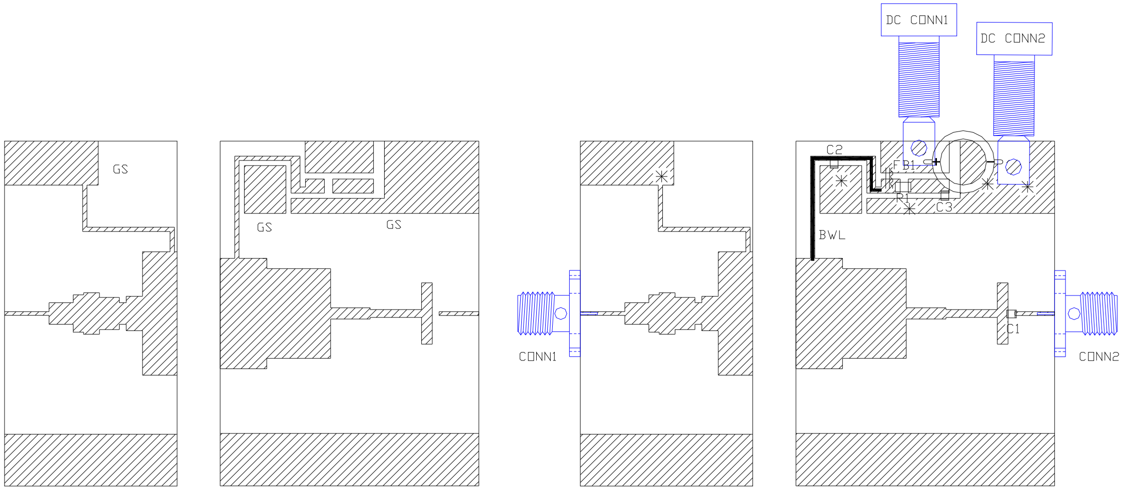
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.380	0.390	9.65	9.91
B	0.043	0.053	1.09	1.35
C	0.905	1.005	22.99	25.53
D	0.178	0.188	4.52	4.78
E	0.125	0.135	3.18	3.43
F	0.795	0.805	20.19	20.45
G	0.082	0.092	2.08	2.34
H	0.185	0.215	4.70	5.46
I	0.185	0.215	4.70	5.46
J	0.002	0.004	0.05	0.10
K	0.495	0.505	12.57	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

TRANSISTOR-L-BAND-375V

IB1214M375 NC-B

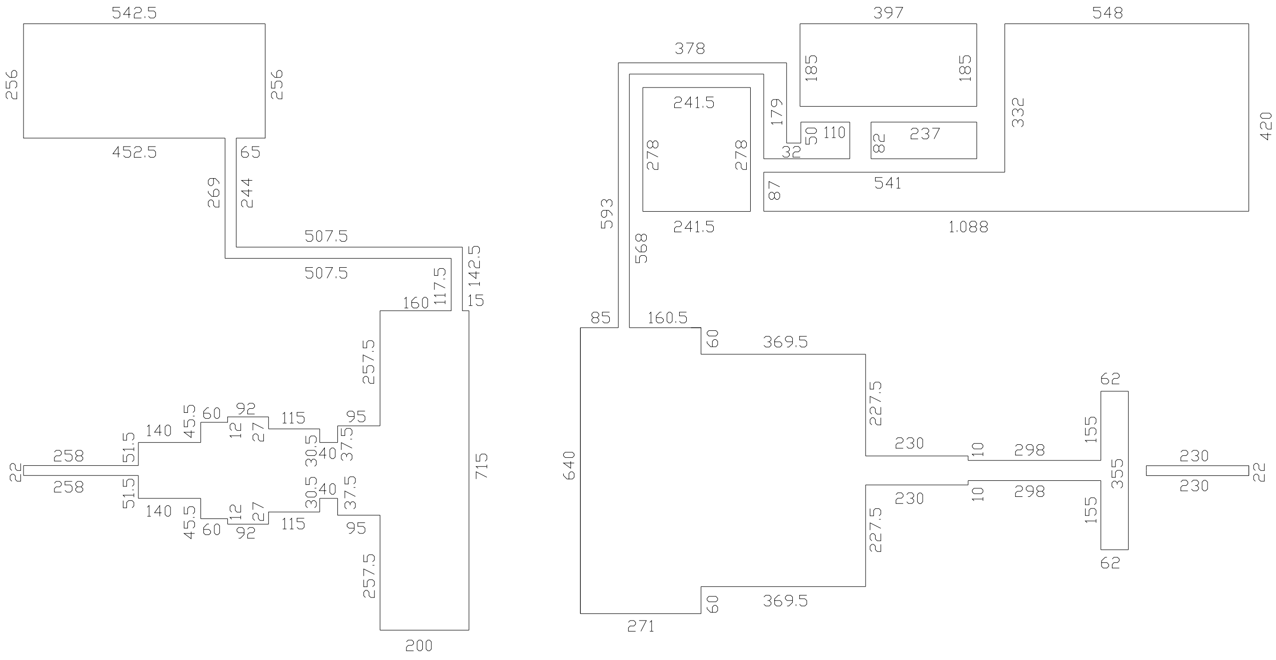
RF TEST FIXTURE



COMPONENT	DESCRIPTION
DUT	TRANSISTOR #IB1214M375, MOUNT HARD TO THE RIGHT
PC BOARD	ROGERS #RO6010, TH=0.025" 1oz. Cu
C1, C2	CHIP CAPACITOR, TYPE ATC100A, 100 pF
C3	ELECTROLYTIC CAPACITOR, 68uF / 63V
C4 - NOT SHOWN	ELECTROLYTIC CAPACITOR, 4700uF / 63V
C5	CHIP CAPACITOR 4.7uF C5750X7R2A475M
FB1	FERRITE BEAD (CYLINDRICAL)
R1	CHIP RESISTOR 10 OHMS
GS	GROUND SHIM, COPPER, TH=0.001"
BLW	BIAS LINE WIRE 22 AWG, WIRE
CONN1, CONN2	SMA CONNECTOR, TYPE OS #2052-5636-02
INPUT PC BOARD CARRIER	2 INCH BRASS - 03 (1.00")
OUTPUT PC BOARD CARRIER	2 INCH BRASS - 05 (1.50")
TRANSISTOR CARRIER	2 INCH COPPER - 03
TRANSISTOR CLAMP	NORYL CLAMP - 04
HEATSINK	2 INCH HEATSINK - 11
DC CONN1	BANANA JACK, RED
DC CONN2	BANANA JACK, BLACK
NOTE	FIXTURE HARDWARE DRAWINGS AVAILABLE ON REQUEST

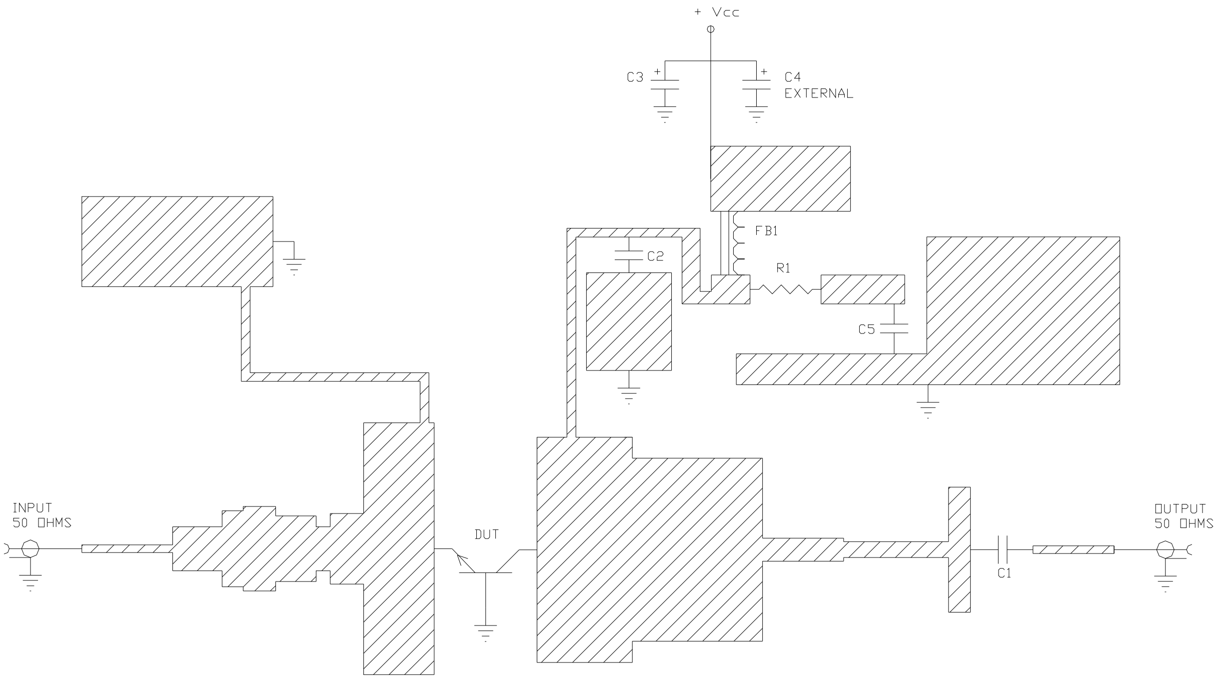
ASSEMBLY AND PARTS LIST

RF TEST FIXTURE



CIRCUIT DIMENSIONS

RF TEST FIXTURE



ELECTRICAL SCHEMATIC

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.

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.

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