

L-Band Avionics Transistor

The high power pulsed avionics transistor part number IB1012S150 is designed for L-Band avionics systems operating at 1025 to 1150 MHz. While operating in class C mode under DME pulse conditions at $V_{CC}=50V$, this common base device supplies a minimum of 150 watts of peak pulse power. It utilizes a low loss internal input impedance matching structure to yield maximum device gain and to ease the implementation of external matching circuitry. The new generation bipolar transistor geometry utilizes a gold metallization system to achieve maximum reliability. Emitter ballast resistance is incorporated on the active cell for optimum thermal distribution and maximum reliability. All devices are 100% screened for large signal RF parameters.



TYPICAL DATA

TYPICAL DATA

TYPICAL DATA

TYPICAL DATA

General Information IB1012S150	Freq (MHz)	PIN (W)	RL (dB)	POUT (W)	GP (dB)	dG (dB)	IC (A)	nc (%)	Droop (dB)	VSWR-S 1.5:1	VSWR-LMT 3:1	
Correlation Device	Correlation Device	Correlation Device	Correlation Device	Correlation Device	Correlation Device	Correlation Device	Correlation Device	Correlation Device	Correlation Device	Correlation Device	Correlation Device	
Date:	2/19/2009											
Assbly Lot - SN :	D4019	1025	12	-11.0	173	11.59	6.500	53.2	0.15	S	P	
Wafer :	B3DE-4-8											
Test Fixture :	2361	1090	12	-11.0	173	11.59	0.42	6.400	54.1	0.10	S	P
Pass / Fail :	Device Passes											
OPERATOR:	FB	1150	12	-12.0	157	11.17	6.000	52.3	0.06	S	P	
Vcc=50V	Pulse=10us-1%											

Integra

TECHNOLOGIES, INC.

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

BeO 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

MAXIMUM RATINGS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Collector-Emitter Voltage	V_{CES}	--	85	V	--
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	$R_{TH(JC)}$	--	TBD	°C/W	$V_{CC}=50V$, Pulse format 10 μ s, 1%, $T_F=25\pm5^\circ C$, $P_{IN}=12W$, $N_C=50\%$
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, 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.						

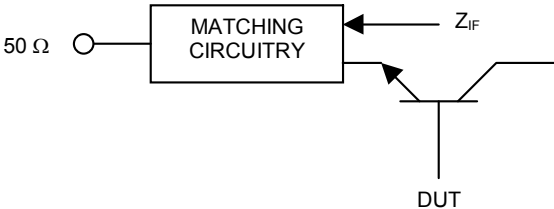
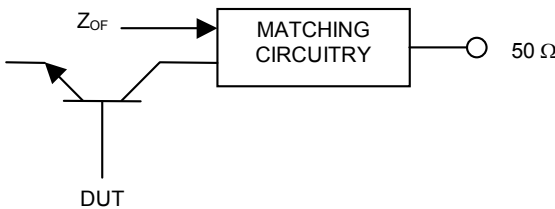
DC ELECTRICAL CHARACTERISTICS

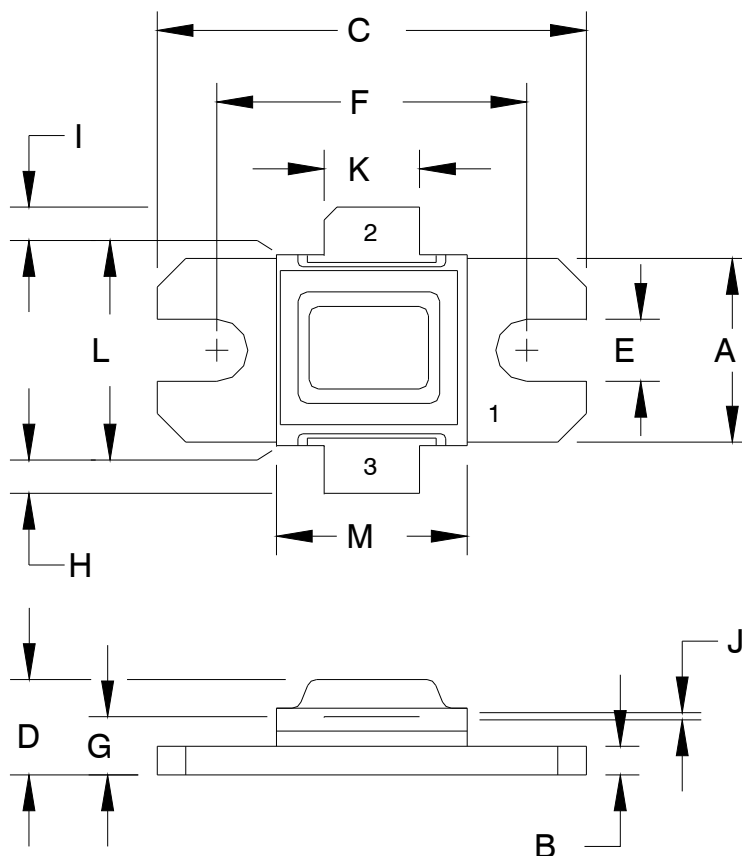
Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Collector-Emitter Breakdown Voltage	BV_{CES}	85	--	V	$I_C = 10mA$, $V_{BE} = 0V$, $T_F = 25\pm5^\circ C$.
100%	Zero Base Voltage Collector Leakage Current	I_{CES}	--	100	μA	$V_{CE} = 50V$, $V_{BE} = 0V$, $T_F = 25\pm5^\circ C$.
100%	DC Current Gain	H_{FE}	5	100	--	$V_{CE} = 5V$, $I_C = 200mA$, $T_F = 25\pm5^\circ C$.

RF ELECTRICAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Input Return Loss	RL	-18	-9	dB	$V_{CC}=50V$, $P_{IN}=12W$, Pulse = Note 2, $T_F=25\pm5^\circ C$, $F=F1$.
BD	Maximum Overdrive	$P_{IN(MAX)}$	--	16	W	$V_{CC}=50V$, Pulse = Note 2, $T_F=25\pm5^\circ C$, $F=F1$.
100%	Power Gain	G_P	11	12.5	dB	$V_{CC}=50V$, $P_{IN}=12W$, Pulse = Note 2, $T_F=25\pm5^\circ C$, $F=F1$.
100%	Gain Flatness	dG	--	1.5	dB	$V_{CC}=50V$, $P_{IN}=12W$, Pulse = Note 2, $T_F=25\pm5^\circ C$, $F=F1$.
100%	Output Power	P_{out}	150	214	W	$V_{CC}=50V$, $P_{IN}=12W$, Pulse = Note 2, $T_F=25\pm5^\circ C$, $F=F1$.
100%	Collector Efficiency ($P_O/I_C/V_{CC}$)	N_C	50	75	%	$V_{CC}=50V$, $P_{IN}=12W$, Pulse = Note 2, $T_F=25\pm5^\circ C$, $F=F1$.
100%	Pulse Amplitude Droop	Droop	-0.5	0.5	dB	$V_{CC}=50V$, $P_{IN}=12W$, Pulse = Note 2, $T_F=25\pm5^\circ C$, $F=F1$.
100%	Stability into 1.5:1 VSWR	VSWR-S	--	--	--	$V_{CC}=50V$, $P_{IN}=12W$, Pulse = Note 2, $T_F=25\pm5^\circ C$, $F=F1$. Rotate 1.5:1 output VSWR through 360° phase. No oscillatory or pulse break-up characteristics allowed on detected output pulse.
100%	Load Mismatch Tolerance	VSWR-LMT	3:1	--	--	$V_{CC}=50V$, $P_{IN}=12W$, Pulse = Note 2, $T_F=25\pm5^\circ C$, $F=F1$. Rotate 3:1 output VSWR through 360° phase. Survival.
BD	Pulse Risettime	RT	--	80	ns	$V_{CC}=50V$, $P_{IN}=12W$, Pulse = Note 2, $T_F=25\pm5^\circ C$, $F=F1$. Measure between 10% and 90% detected power points.
Note 1	F1 = 1025/1090/1150 MHz.					
Note 2	Pulse format = 10 μ s, 1%					
Note 3	T_F = Device flange temperature.					
Note 4	Screen 'BD' = parameter qualified By Design.					

RF TEST FIXTURE IMPEDANCE CHARACTERISTICS

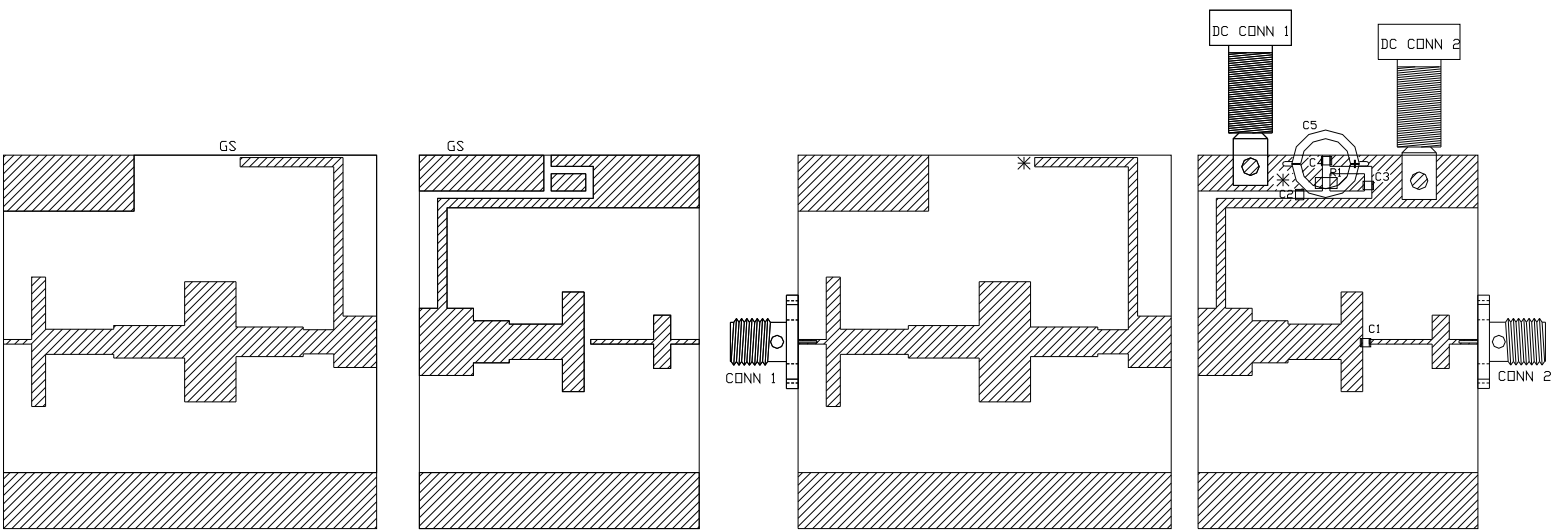
Frequency (MHz)	Z_{IF} (Ω)	Z_{OF} (Ω)
1025	12.52 -j 7.84	4.94 -j0.13
1090	8.63 -j 3.11	5.31 -j0.17
1150	8.27 +j 1.48	5.51 -j0.4
Impedance Definition		

PACKAGE DIMENSIONAL OUTLINE DRAWING


DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.380	0.390	9.65	9.91
B	0.058	0.062	1.47	1.57
C	0.895	0.905	22.73	22.99
D	0.195	0.205	4.95	5.21
E	0.125	0.135	3.18	3.43
F	0.645	0.655	16.38	16.64
G	0.112	0.132	2.84	3.35
H	0.080	0.120	2.03	3.05
I	0.080	0.120	2.03	3.05
J	0.003	0.005	0.08	0.13
K	0.195	0.205	4.95	5.21
L	0.395	0.405	10.03	10.29
M	0.395	0.405	10.03	10.29

PIN	
1	BASE
2	COLLECTOR
3	EMITTER

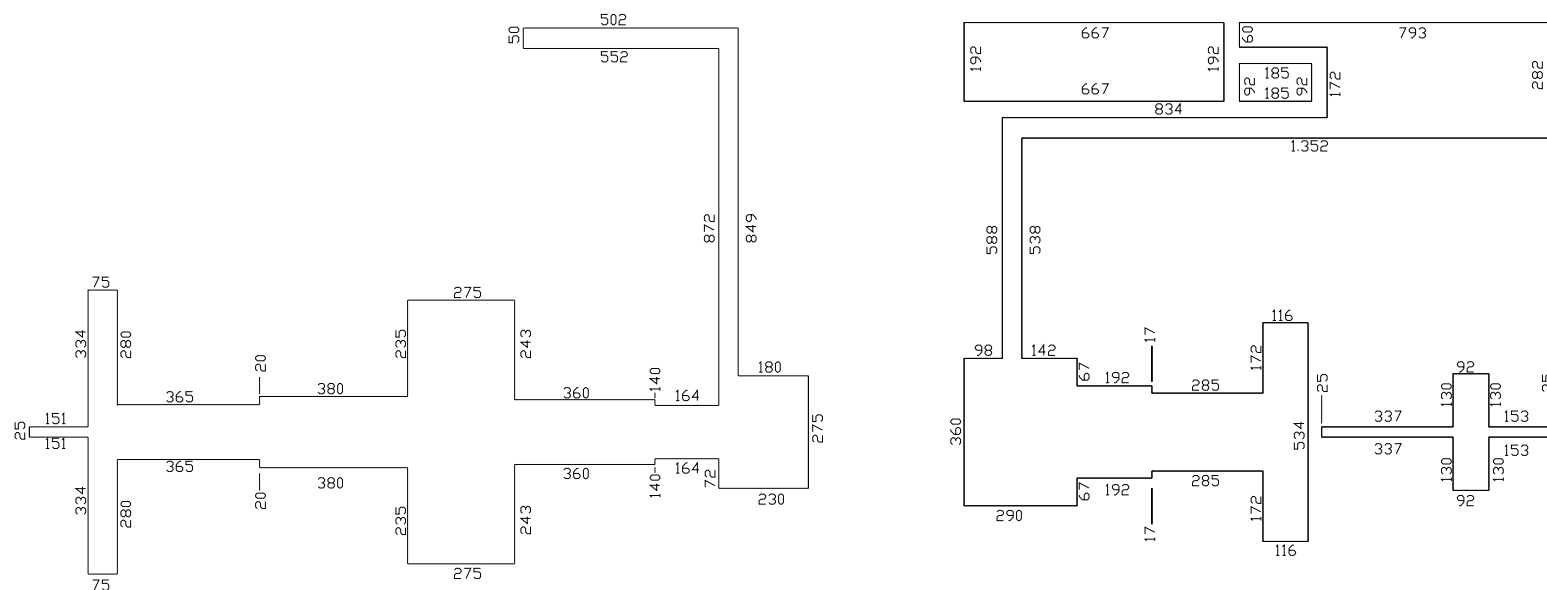
RF TEST FIXTURE



COMPONENT	DESCRIPTION
DUT	TRANSISTOR #IB1012S150 MOUNT HARD TO THE RIGHT
PC BOARD	ROGERS #RD3010 .025" 1oz Cu
C1, C2	CHIP CAPACITOR ATC 100A 100pF
C3	CHIP CAPACITOR 2.2uF
C4	TANTALUM CAPACITOR AVX 4.7uF, 50V ESR=0.3ohms
C5	ELECTROLYTIC CAPACITOR, 68uF / 63V
C6(NOT SHOWN)	ELECTROLYTIC CAPACITOR, 4700uF / 80V
R1	CHIP RESISTOR 100ohms
GS (2 PLACES)	GROUND SHIM, COPPER, TH=0.001"
CONN 1, CONN 2	SMA CONNECTOR, DS #2052-5636-02
INPUT PC BOARD CARRIER	2 INCH BRASS-07 (2")
OUTPUT PC BOARD CARRIER	2 INCH BRASS-05 (1.5")
TRANSISTOR CARRIER	2 INCH COPPER-02 (P44)
TRANSISTOR CLAMP	NORYL CLAMP-02 (P44)
ALUMINUM HEAT SINK	2 INCH HEATSINK-11
DC CONN 1	BANANA JACK, BLACK
DC CONN 2	BANANA JACK, RED
NOTE	FIXTURE HARDWARE DRAWINGS AVAILABLE ON REQUEST

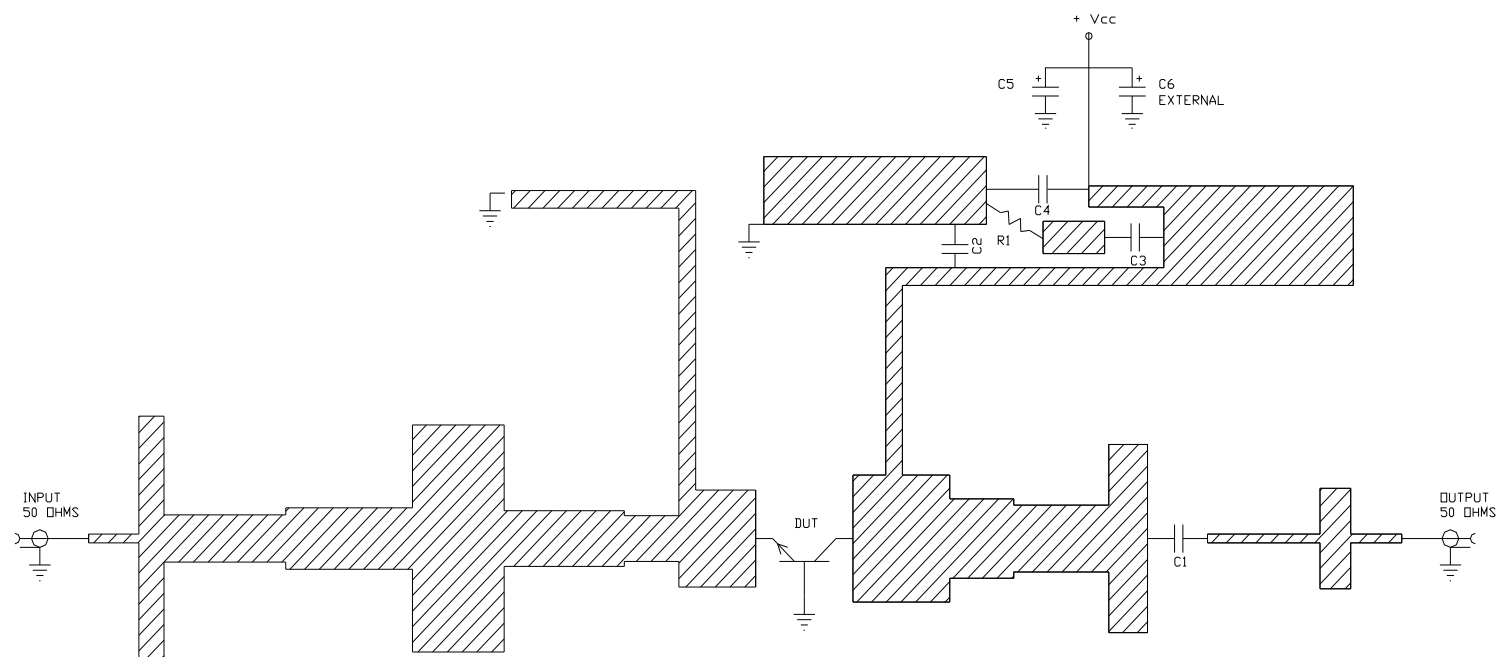
ASSEMBLY AND PARTS LIST

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.

DISCLAIMER

Integra Technologies Inc. reserves the right to make changes without further notice to any products herein. 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.
--