Part Number: IB0912M600

Integra
TECHNOLOGIES, INC.

L-Band Avionics Transistor

The high power pulsed transistor device part number IB0912M600 is designed for systems operating over the instantaneous bandwidth of 960-1215 MHz. While operating in class C mode under pulsing conditions of 10us/10% and Vcc=50V, this common base device supplies a minimum of 600 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.

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

TYPICAL DATA TYPICAL DATA TYPICAL DATA TYPICAL DATA

General Information IB0912M600		Test Sequence Name	Freq (MHz)	PIN (W)	RL (dB)	POUT (W)	GP (dB)	dG (dB)	IC (A)	nc (%)	Droop (dB)	VSWR-S 1.5:1 (P-F)	VSWR-LMT 3:1 (P-F)
Date:	3/23/2009												
Assbly Lot - SN :	D4419-1	Nominal	960	90	-9.0	845	9.73		30.100	56.1	0.05	P	P
Wafer :	B5DE-13-2												
Test Fixture :	TBD	Nominal	1090	90	-10.0	781	9.38	1.23	26.880	58.1	0.04	P	P
Pass / Fail :	Device Passes												
OPERATOR:	FB	Nominal	1215	90	-15.0	637	8.50		23.850	53.4	0.03	P	P

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MAXIMUM RATINGS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Collector-Emitter Voltage	V_{CES}	--	75	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=10us/10%, T_F=25±5°C, P_{IN}=90W, 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}	75	--	V	I_C = 40mA, V_{BE} = 0V, T_F = 25±5°C.
100%	Zero Base Voltage Collector Leakage Current	I_{CES}	--	500	uA	V_{CE} = 50V, V_{BE} = 0V, T_F = 25±5°C.
100%	DC Current Gain	H_{FE}	20	100	--	V_{CE} = 5V, I_C = 500mA, T_F = 25±5°C.

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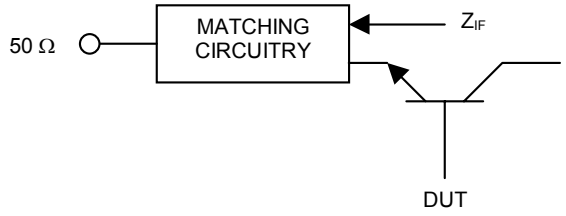
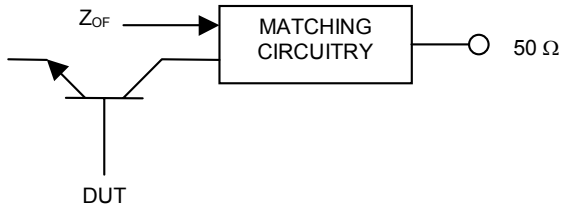
RF ELECTRICAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Input Return Loss	RL	-18	-8	dB	V_{CC}=50V, P_{IN}=90W, Pulse = Note 2, T_F=25±5°C, F=F1.
BD	Maximum Overdrive	$P_{IN(MAX)}$	--	120	W	V_{CC}=50V, Pulse = Note 2, T_F=25±5°C, F=F1.
100%	Power Gain	G_P	8.24	10.24	dB	V_{CC}=50V, P_{IN}=90W, Pulse = Note 2, TF=25±5° C, F=F1
100%	Output Power	Pout	600	951	W	V_{CC}=50V, P_{IN}=90W, Pulse = Note 2, TF=25±5° C, F=F1
100%	Collector Efficiency ($P_O/I_C/V_{CC}$)	N_{C1}	48	80	%	V_{CC}=50V, P_{IN}=90W, Pulse = Note 2, T_F=25±5°C, F=960/1090MHz
100%	Collector Efficiency ($P_O/I_C/V_{CC}$)	N_{C2}	46	80	%	V_{CC}=50V, P_{IN}=90W, Pulse = Note 2, T_F=25±5°C, F=1215MHz
100%	Pulse Amplitude Droop	Droop	-0.5	0.5	dB	V_{CC}=50V, P_{IN}=90W, Pulse = Note 2, T_F=25±5°C, F=F1.
100%	Gain Flatness	ΔG		1.5	dB	Delta between highest gain and lowest gain from 960-1215MHz
100%	Stability into 1.5:1 VSWR	VSWR-S	--	--	--	V_{CC}=50V, P_{IN}=90W, Pulse = Note 2, T_F=25±5°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}=90W, Pulse = Note 2, T_F=25±5°C, F=F1. Rotate 3:1 output VSWR through 360° phase. Survival.

Note 1	F1 = 960/1090/1215 MHz.
Note 2	Pulse width = 10us, Duty Factor = 10%
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)
960	1.39 – j1.65	1.02 – j1.59
1090	1.15 – j1.27	0.99 – j1.18
1215	0.84 - j0.71	0.94 – j0.92
Impedance Definition		

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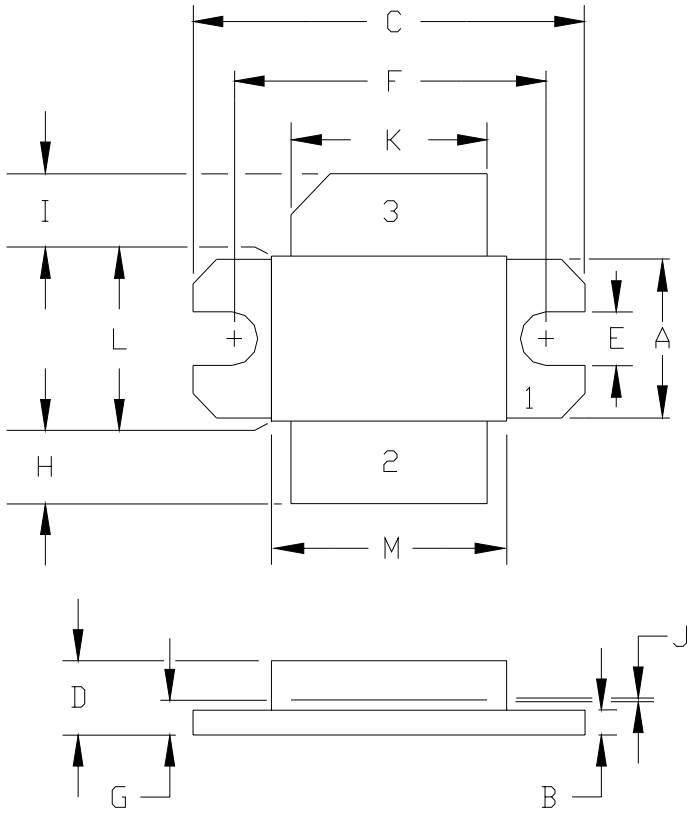
PACKAGE DIMENSIONAL OUTLINE DRAWING



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

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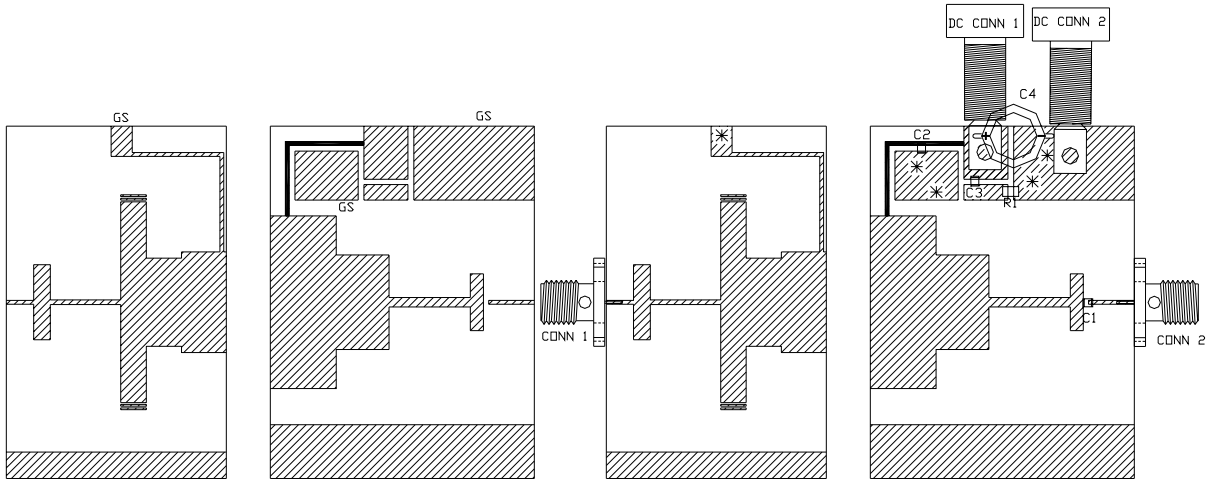
RF TEST FIXTURE



COMPONENT	DESCRIPTION
DUT	TRANSISTOR #IB0912M600 MOUNT HARD TO THE RIGHT
PC BOARD	ROGERS #RT 6010 25MILS 1oz
C1, C2	CHIP CAPACITOR ATC100A 100pF
C3	CHIP CAPACITOR 0.1uF
C4	ELECTROLYTIC CAPACITOR 68uF / 63V
C5 (NOT SHOWN)	ELECTROLYTIC CAPACITOR, 4700uF / 50V
R1	CHIP RESISTOR 10 OHMS
BIAS LINE WIRE	BIAS LINE WIRE #22
GS (5 PLACES)	GROUND SHIM, COPPER, TH=0.001"
CONN 1, CONN 2	SMA CONNECTOR, OS #2052-5636-02
INPUT PC BOARD CARRIER	2 INCH BRASS-04 (1.25")
OUTPUT PC BOARD CARRIER	2 INCH BRASS-05 (1.5")
TRANSISTOR CARRIER	2 INCH COPPER-03 (P64)
TRANSISTOR CLAMP	NORYL CLAMP-04 (P64)
ALUMINUM HEAT SINK	2 INCH HEATSINK-11
DC CONN 1	BANANA JACK, RED
DC CONN 2	BANANA JACK, BLACK
NOTE	FIXTURE HARDWARE DRAWINGS AVAILABLE ON REQUEST

ASSEMBLY AND PART LIST

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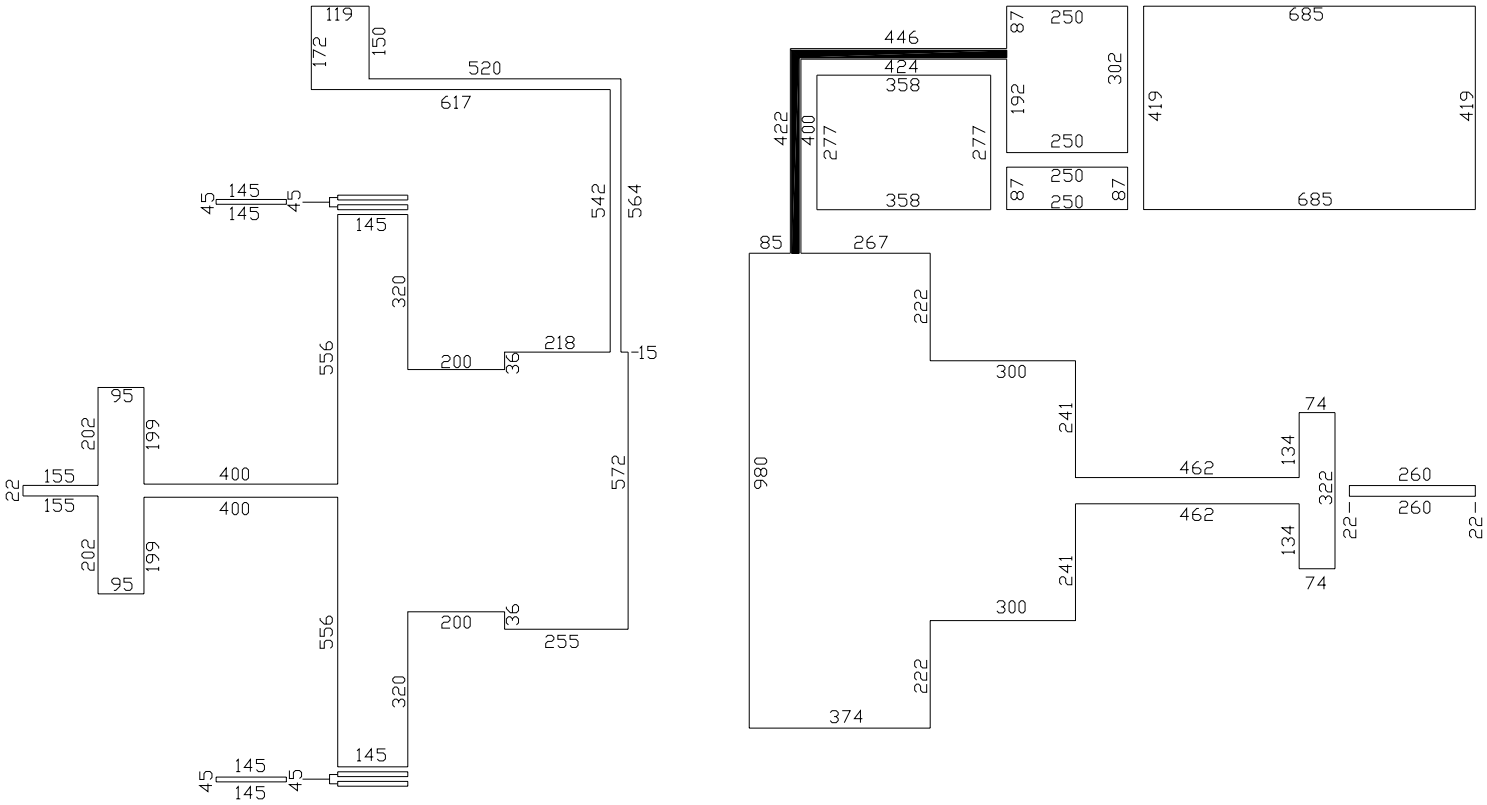

CIRCUIT DIMENSIONS

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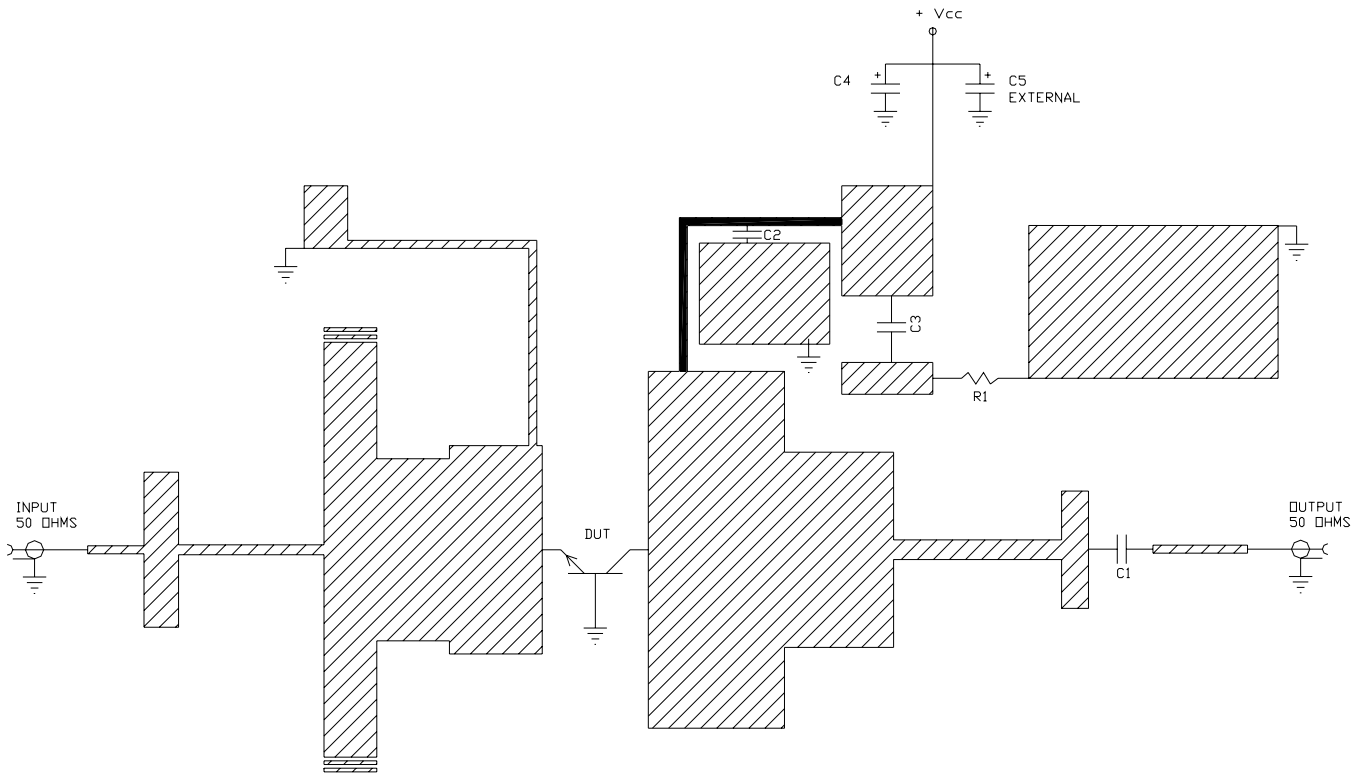

ELECTRICAL SCHEMATIC

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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.

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