

L-Band Radar Transistor

The high power pulsed radar transistor device part number IB1214M6 is designed for L-Band radar systems operating over the instantaneous bandwidth of 1.200 - 1.400 GHz. While operating in class C mode this common base device supplies a minimum of 6 watts of peak pulse power under the conditions of 100 μ s pulse width and 10% duty cycle, and Pin=0.8W. 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 50 Ω
- Long-term Correlation
- 100% Device RF Screening
- No External Tuning Allowed

TYPICAL DATA TYPICAL DATA TYPICAL DATA TYPICAL DATA

General Information	Test Sequence	Freq	Pin	RL	POUT	GP	dG	IC	nc	Droop	VSWR-S	VSWR-LMT
IB1214M6	Name	(MHz)	(W)	(dB)	(W)	(dB)	(dB)	(A)	(%)	(dB)	1.5:1 (P-F)	2:1 (P-F)
Date:	4/2/2009											
Asbly Lot - SN :	D2560-1	Nominal	1200	0.8	-13.0	6.8	9.29	0.460	52.8	0.13	P	P
Wafer :	NA											
Test Fixture :	NA	Nominal	1300	0.8	-15.0	6.6	9.14	0.30	49.8	0.13	P	P
Pass / Fail :	Device Passes											
OPERATOR:	FB	Nominal	1400	0.8	-18.0	6.3	8.99	0.480	47.2	0.14	P	P
Vcc=28V	Pulse: 100us-10%											

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	-40	+150	°C	--
Note	Screen 'BD' = parameter qualified By Design.					

THERMAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Thermal Resistance	$R_{TH(JC)}$	--	2.69	°C/W	$V_{CC}=28V$, Pulse Format=100us, 10%, $T_F=25\pm 5^\circ C$, $P_{in}=0.8W$, $P_{OUT}=6.0W$, $N_C=40\%$
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	$I_C=10mA$, $V_{BE}=0V$, $T_F=25\pm 5^\circ C$.
100%	Zero Base Voltage Collector Leakage Current	I_{CES}	--	100	μA	$V_{CE}=28V$, $V_{BE}=0V$, $T_F=25\pm 5^\circ C$.
100%	DC Current Gain	H_{FE}	20	120	--	$V_{CE}=5V$, $I_C=0.1A$, $T_F=25\pm 5^\circ C$.
100%	Emitter Base Leakage Current	I_{ebo}	--	1	mA	$V_{Eb}=2V$, $I_C=0mA$, $T_F=25\pm 5^\circ C$.
100%	Reverse Base-Emitter Break Down Voltage	BV_{Ebo}	2	--	V	$I_b=10mA$, $T_F=25\pm 5^\circ C$.

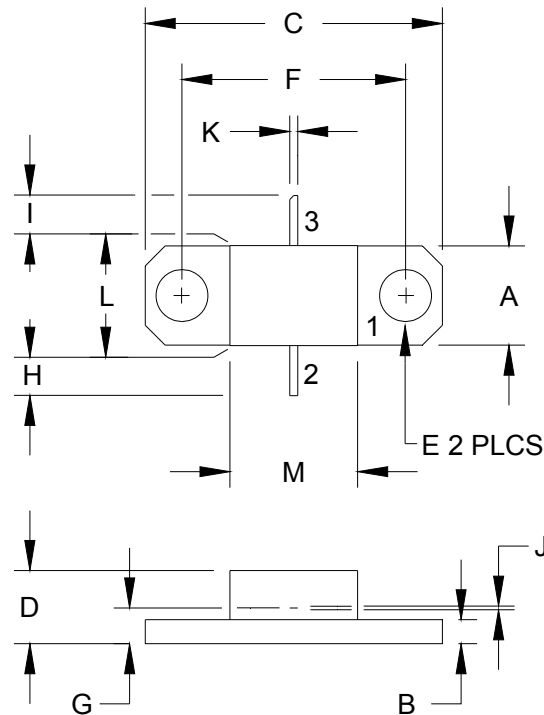
RF ELECTRICAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Input Return Loss	RL	-18	-10	dB	$V_{CC}=V1, PW=PW1, DF=DF1, T_F=25\pm5^\circ C, P_{IN}=P_{IN1}, P_{IN2}, P_{IN3}, F=F1, F2, F3.$
100%	Output Power	P_{OUT}	6.0	9.5	W	$V_{CC}=V1, PW=PW1, DF=DF1, T_F=25\pm5^\circ C, P_{IN}=P_{IN1}, P_{IN2}, P_{IN3}, F=F1, F2, F3.$
100%	Power Gain	Gp	8.75	10.75	dB	$V_{CC}=V1, PW=PW1, DF=DF1, T_F=25\pm5^\circ C, P_{IN}=P_{IN1}, P_{IN2}, P_{IN3}, F=F1, F2, F3.$
100%	Collector Efficiency ($P_O/I_C/V_{CC}$)	N_C	40	75	%	$V_{CC}=V1, PW=PW1, DF=DF1, T_F=25\pm5^\circ C, P_{IN}=P_{IN1}, P_{IN2}, P_{IN3}, F=F1, F2, F3.$
100%	Pulse Amplitude Droop	Droop	-0.5	0.5	dB	$V_{CC}=V1, PW=PW1, DF=DF1, T_F=25\pm5^\circ C, P_{IN}=P_{IN1}, P_{IN2}, P_{IN3}, F=F1, F2, F3.$
100%	Gain Flatness	dG	0	1.5	dB	$V_{CC}=V1, PW=PW1, DF=DF1, T_F=25\pm5^\circ C, P_{IN}=P_{IN1}, P_{IN2}, P_{IN3}, F=F1, F2, F3.$
100%	Stability into 1.5:1 VSWR	VSWR-S	--	--	--	Rotate 1.5:1 output VSWR through 360° phase. No oscillatory or pulse break-up characteristics allowed on detected output pulse. All non-harmonically related signals must be at least -65 dBc.
100%	2:1 Load Mismatch Tolerance	VSWR-LMT	--	--	--	$V_{CC}=V1, PW=PW1, DF=DF1, T_F=25\pm5^\circ C, P_{IN}=P_{IN1}, P_{IN2}, P_{IN3}, F=F1, F2, F3.$ Rotate 2:1 output VSWR through 360° phase. Post test $P_O =$ Pre test $P_O \pm 10W.$
Note	$V1 = 28V; PW1 = 100\mu s; DF1 = 10\%; P_{IN1} = P_{IN2} = P_{IN3} = 0.8W; F1 = 1.200 GHz, F2 = 1.300 GHz, F3 = 1.400 GHz.$					
Note	$T_F =$ Device flange temperature.					
Note	Screen 'BD' = parameter qualified By Design.					

BROADBAND RF TEST FIXTURE IMPEDANCE CHARACTERISTICS

Frequency (GHz)	Z_{IF} (Ω)	Z_{OF} (Ω)
1.200	9.05 - j5.96	5.35 + j16.22
1.300	8.28 - j4.45	5.27 + j15.88
1.400	7.88 - j2.95	4.44 + j16.61
Impedance Definition		

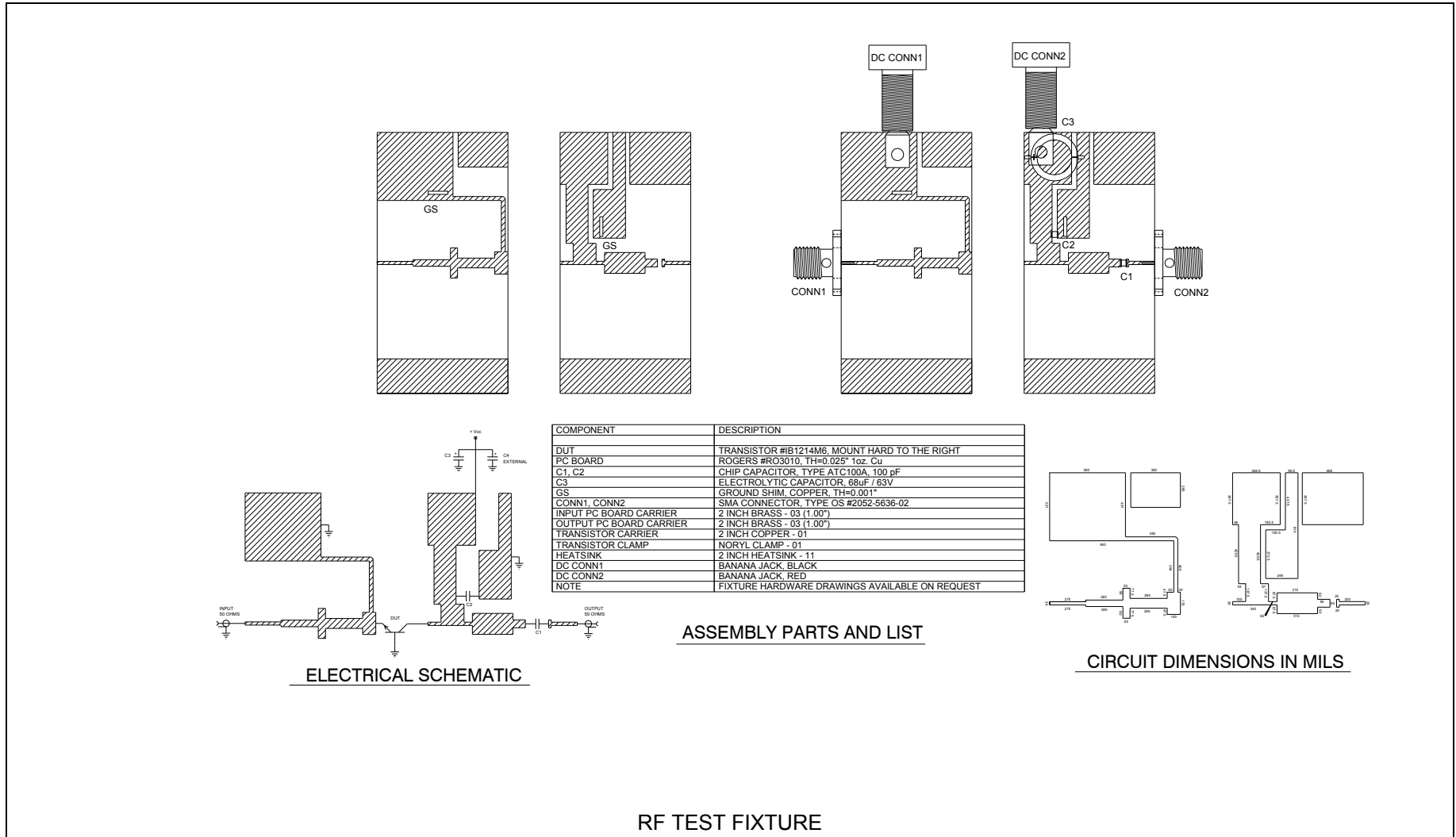
PACKAGE DIMENSIONAL OUTLINE DRAWING



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.243	0.253	6.17	6.43
B	0.055	0.065	1.40	1.65
C	0.739	0.749	18.77	19.02
D	0.178	0.188	4.52	4.78
E	0.125	0.135	3.18	3.43
F	0.555	0.565	14.10	14.35
G	0.082	0.092	2.08	2.34
H	0.040	0.200	1.02	5.08
I	0.040	0.200	1.02	5.08
J	0.004	0.006	0.10	0.15
K	0.055	0.065	1.40	1.65
L	0.245	0.255	6.22	6.48
M	0.315	0.325	8.00	8.26

PIN SCHEDULE	
1	BASE
2	EMITTER
3	COLLECTOR

RF TEST FIXTURE



RF TEST FIXTURE

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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