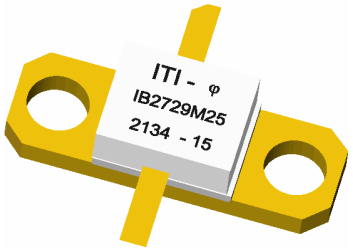
Part Number: IB2729M25

Integra
TECHNOLOGIES, INC.

S-Band Radar Transistor

The high power pulsed radar transistor part number IB2729M25 is designed for S-Band ATC radar systems operating over the instantaneous bandwidth of 2.7-2.9 GHz. It is designed to serve as a driver transistor for part number IB2729M150. While operating in class C mode this common base device supplies a minimum of 25 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, including power gain compression. Excellent spectral stability into output mismatch over a broad input power range make it ideal for use in reliable high power solid state transmitters.



- 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
- Insertion Phase Marking
  - – 5° Increment Marking
- US Patent Number
  - – 6181200B1
  - – 6331931B1

TYPICAL DATA TYPICAL DATA TYPICAL DATA TYPICAL DATA

General Information		Freq (GHz)	PW (us)	Duty (%)	Vcc (V)	P_{IN} (W)	IRL (dB)	IRL (P-F)	P_{OUT} (W)	P_{OUT} (P-F)	G_P (dB)	OPC (dB)	OPC (P-F)	OPF (dB)	OPF (P-F)	I_C (A)	n_C (%)	n_C (P-F)	d - IP (deg)	IP (var) (P-F)	Droop (dB)	Droop (P-F)	VSWR 1.5:1	VSWR 1.5:1 (P-F)	VSWR 2:1	VSWR 2:1 (P-F)
Date:	April 12, 2001	2.700	100	10	36.0	3.9	--	--	33	--	--	0.16	P	--	--	--	--	--	--	--	--	--	--	--	--	--
Assbly Lot - SN :	D1206-2	2.700	100	10	36.0	3.5	-11	P	32	P	9.6	--	--	0.43	P	1.98	45	P	--	--	-0.20	P	--	--	P	P
Wafer :	222620-11	2.700	100	10	36.0	4.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	S	P	--	--
Test Fixture :	399/399																									
Pass / Fail :	Device Passes	2.800	100	10	36.0	3.9	--	--	32	--	--	0.44	P	--	--	--	--	--	--	--	--	--	--	--	--	--
		2.800	100	10	36.0	3.5	-16	P	29	P	9.2	--	--	--	--	1.78	46	P	-2	P	0.00	P	--	--	P	P
		2.800	100	10	36.0	4.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	S	P	--	--
		2.900	100	10	36.0	3.9	--	--	34	--	--	0.23	P	--	--	--	--	--	--	--	--	--	--	--	--	--
		2.900	100	10	36.0	3.5	-25	P	32	P	9.6	--	--	--	--	1.98	45	P	--	--	-0.30	P	--	--	P	P
		2.900	100	10	36.0	4.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	S	P	--	--

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MAXIMUM RATINGS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Collector-Emitter Voltage	V_{CES}	--	70	V	V_{BE}=0V.
BD	Emitter-Base Voltage	V_{EBO}	--	3.5	V	--
BD	Collector Current, Peak	I_C	--	2.9	A	PW=100µs, DF=10%.
BD	Continuous Power Dissipation, Peak	P_D	--	90	W	PW=100µs, DF=10%, T_F=25°C.
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	$R_{TH(JC)}$	--	1.20	°C/W	V_{CC}=36V, PW=100µs, DF=10%, T_F=25±5°C, P_{OUT}=25W, P_{IN}=3.5W.
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}	70	--	V	I_C=10mA, V_{BE}=0V, T_F=25±5°C.
100%	Zero Base Voltage Collector Leakage Current	I_{CES}	--	1.5	mA	V_{CE}=30V, V_{BE}=0V, T_F=25±5°C.
100%	DC Current Gain	H_{FE}	10	150	--	V_{CE}=5V, I_C=0.1A, T_F=25±5°C.

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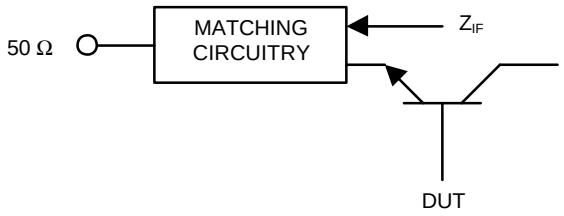
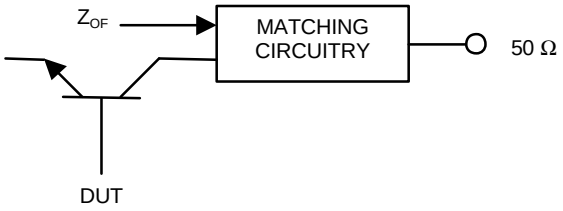
RF ELECTRICAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Input Return Loss	IRL	7	--	dB	V_{CC}=36V, PW=100µs, DF=10%, T_F=25±5°C, P_{IN}=P_{IN1}, P_{IN2}, P_{IN3}, F=F1, F2, F3.
100%	Output Power	P_O	25	--	W	V_{CC}=36V, PW=100µs, DF=10%, T_F=25±5°C, P_{IN}=P_{IN1}, P_{IN2}, P_{IN3}, F=F1, F2, F3.
100%	Collector Efficiency ($P_O/I_C/V_{CC}$)	N_C	30	--	%	V_{CC}=36V, PW=100µs, DF=10%, T_F=25±5°C, P_{IN}=P_{IN1}, P_{IN2}, P_{IN3}, F=F1, F2, F3.
100%	Pulse Amplitude Droop	D	--	0.6	dB	V_{CC}=36V, PW=100µs, DF=10%, T_F=25±5°C, P_{IN}=P_{IN1}, P_{IN2}, P_{IN3}, F=F1, F2, F3.
100%	Output Power Flatness =10*LOG(P_{OMAX}/P_{OMIN})	OPF	--	0.75	dB	Calculate from P_O at each frequency F.
100%	Output Power Compression =10*LOG(P_{OC}/P_O)	OPC	+0.05	+0.45	dB	P_{OC} measured with P_{IN} increased by 0.5dB at F=F1, F2, F3.
100%	Insertion Phase	IP	-20	+20	Deg	V_{CC}=36V, PW=100µs, DF=10%, T_F=25±5°C, P_{IN}=P_{IN2}, F=F2, mark in 5° increments.
100%	Stability into 1.5:1 VSWR with +0.7dB overdrive	VSWR-S	--	--	--	Repeat P_O with P_{IN} increased by 0.7dB. 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	LMT	--	--	--	V_{CC}=36V, PW=100µs, DF=10%, T_F=25±5°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±2W.
BD	Pulse Risetime	RT	--	150	ns	V_{CC}=36V, PW=100µs, DF=10%, T_F=25±5°C, P_{IN}=P_{IN1}, P_{IN2}, P_{IN3}, F=F1, F2, F3. Measure between 10% and 90% detected power points.

Note	F1 = 2.70 GHz, F2 = 2.80 GHz, F3 = 2.90 GHz.
Note	P_{IN1} = 3.5W, P_{IN2} = 3.5W, P_{IN3} = 3.5W.
Note	Parts are binned and marked in 5 degree increments for Insertion Phase IP : ITI-1, -2, -3, -4, -5, -6, -7, -8.
Note	T_F = Device flange temperature.
Note	Screen 'BD' = parameter qualified By Design.

BROADBAND RF TEST FIXTURE IMPEDANCE CHARACTERISTICS

Frequency (GHz)	Z_{IF} (W)	Z_{OF} (W)
2.70	7.3 – j4.4	15.1 – j12.4
2.80	6.8 – j3.8	13.9 – j9.0
2.90	6.4 – j3.2	14.3 – j6.1
Impedance Definition		

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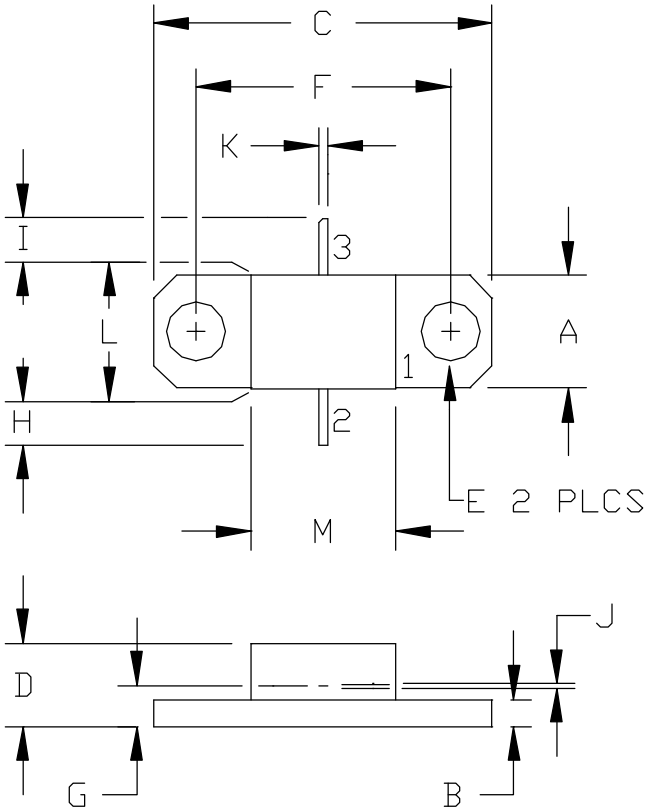
PACKAGE DIMENSIONAL OUTLINE DRAWING



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	0.210	0.240	5.33	6.10
I	0.100	0.175	2.54	4.44
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

DOCUMENT NUMBER: IB2729M25	REV: NC
SHEET NAME: 06-OUTLINE	REV: NC

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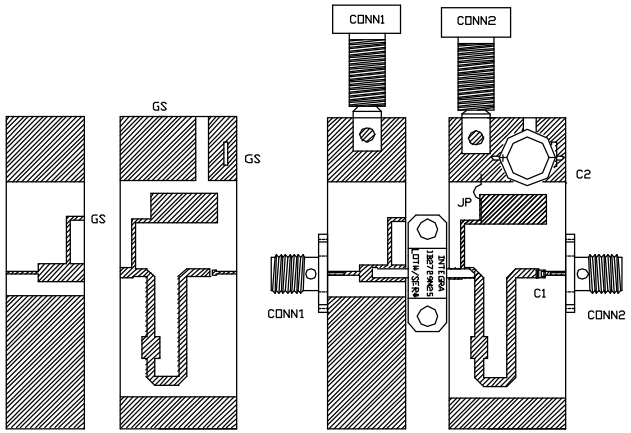
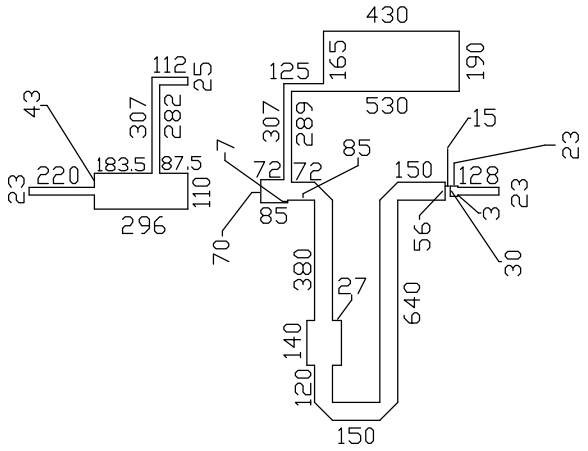
BROADBAND RF TEST FIXTURE

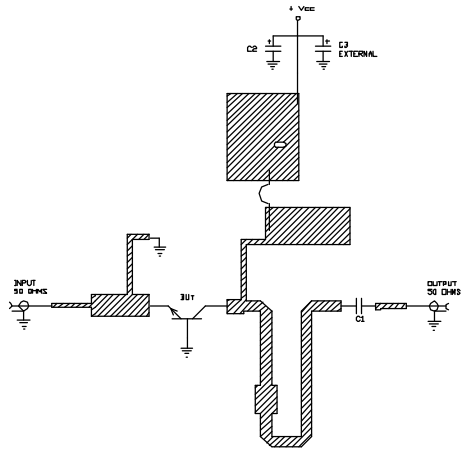




CIRCUIT DIMENSIONS IN MILS (1 MIL = 0.001")

COMPONENT	DESCRIPTION
DUT	TRANSISTOR IB2729M25, MOUNT HARD TO THE RIGHT
PC BOARD	ROGERS #RO3010, TH=0.025"
INPUT PC BOARD CARRIER	2 INCH BRASS -1 (0.50")
OUTPUT PC BOARD CARRIER	2 INCH BRASS -02 (0.75")
TRANSISTOR CARRIER	2 INCH COPPER -01
TRANSISTOR CLAMP	NORYL CLAMP -01
HEATSINK	2 INCH HEATSINK -09
CONN1, CONN2	SMA CONNECTOR, TYPE OS #2052-5636-02
C1	CHIP CAPACITOR, TYPE ATC100A, 39pF
C2	ELECTROLYTIC CAPACITOR, 68uF / 63V
C3	ELECTROLYTIC CAPACITOR, 4700uF / 50V
DC CONN1	BANANA JACK, BLACK
DC CONN2	BANANA JACK, RED
GS	GROUND SHIM, COPPER, TH=0.001"
JW	JUMPER WIRE, COPPER, 0.22" DIA TYPICAL
NOTE	FIXTURE HARDWARE DRAWINGS AVAILABLE ON REQUEST

ASSEMBLY AND PARTS LIST



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.

DISCLAIMER

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微波光电部专业代理经销高频、微波、光纤、光电元器件、组件、部件、模块、整机；电磁兼容元器件、材料、设备；微波 CAD、EDA 软件、开发测试仿真工具；微波、光纤仪器仪表。欢迎国外高科技微波、光纤厂商将优秀产品介绍到中国、共同开拓市场。长期大量现货专业批发高频、微波、卫星、光纤、电视、CATV 器件： 晶振、VCO、连接器、PIN 开关、变容二极管、开关二极管、低噪晶体管、功率电阻及电容、放大器、功率管、MMIC、混频器、耦合器、功分器、振荡器、合成器、衰减器、滤波器、隔离器、环行器、移相器、调制解调器；光电子元器件和组件：红外发射管、红外接收管、光电开关、光敏管、发光二极管和发光二极管组件、半导体激光二极管和激光器组件、光电探测器和光接收组件、光发射接收模块、光纤激光器和光放大器、光调制器、光开关、DWDM 用光发射和接收器件、用户接入系统光光收发器件与模块、光纤连接器、光纤跳线/尾纤、光衰减器、光纤适 配器、光隔离器、光耦合器、光环行器、光复用器/转换器；无线收发芯片和模组、蓝牙芯片和模组。

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