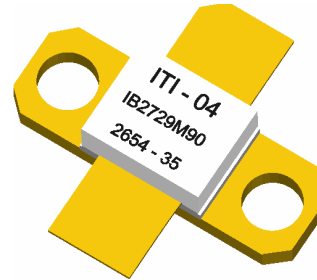


# Part Number: IB2729M90



## S-Band Radar Transistor

The high power pulsed radar transistor part number IB2729M90 is designed for S-Band ATC radar systems operating over the instantaneous bandwidth of 2.7-2.9 GHz. While operating in class C mode this common base device supplies a minimum of 90 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
- BeO 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
  - US6181200B1
  - US6331931B1

*TYPICAL DATA      TYPICAL DATA      TYPICAL DATA      TYPICAL DATA*

Test Sequence Name	Freq (GHz)	PW (us)	Duty (%)	Vcc (V)	P <sub>IN</sub> (W)	IRL (dB)	P <sub>OUT</sub> (W)	G <sub>p</sub> (dB)	OPC (dB)	OPF (dB)	I <sub>c</sub> (A)	n <sub>c</sub> (%)	Droop (dB)	VSWR-ξ LMT 1.5:1	VSWR 2:1
OPC	2.700	100	10	36.0	10.7	--	112	--	0.25	--	--	--	--	--	--
Nominal	2.700	100	10	36.0	9.5	-11	106	10.5	--	0.49	5.70	52	-0.10	--	P
1.5:1 Stability/OD	2.700	100	10	36.0	11.2	--	--	--	--	--	--	--	--	S	--
OPC	2.800	100	10	36.0	10.7	--	106	--	0.18	--	--	--	--	--	--
Nominal	2.800	100	10	36.0	9.5	-18	101	10.3	--	--	5.50	51	-0.14	--	P
1.5:1 Stability/OD	2.800	100	10	36.0	11.2	--	--	--	--	--	--	--	--	S	--
OPC	2.900	100	10	36.0	10.7	--	100	--	0.27	--	--	--	--	--	--
Nominal	2.900	100	10	36.0	9.5	-23	94	10.0	--	--	5.00	52	-0.20	--	P
1.5:1 Stability/OD	2.900	100	10	36.0	11.2	--	--	--	--	--	--	--	--	S	--

**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	$V_{EBO}$	--	2.5	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	$R_{TH(JC)}$	--	0.54	°C/W	$V_{CC}=36V$ , $PW=100\mu s$ , $DF=10\%$ , $T_F=25\pm 5^\circ C$ , $P_{OUT}=90W$ , $N_C=40\%$ , $F=F3$ .
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.					

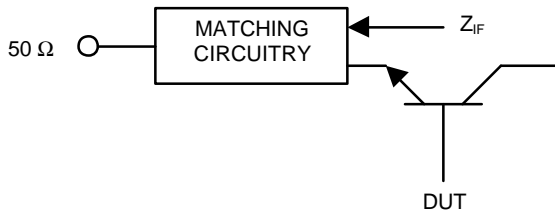
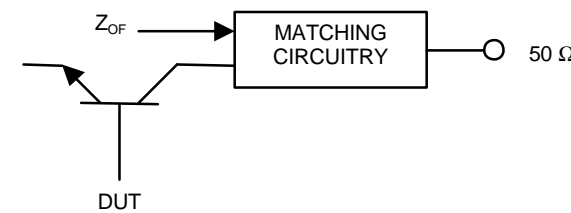
**DC ELECTRICAL CHARACTERISTICS**

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Collector-Emitter Breakdown Voltage	$BV_{CES}$	70	--	V	$I_C=20mA$ , $V_{BE}=0V$ , $T_F=25\pm 5^\circ C$ .
100%	Zero Base Voltage Collector Leakage Current	$I_{CES}$	--	3.5	mA	$V_{CE}=40V$ , $V_{BE}=0V$ , $T_F=25\pm 5^\circ C$ .
100%	DC Current Gain	$H_{FE}$	10	100	--	$V_{CE}=5V$ , $I_C=0.1A$ , $T_F=25\pm 5^\circ C$ .

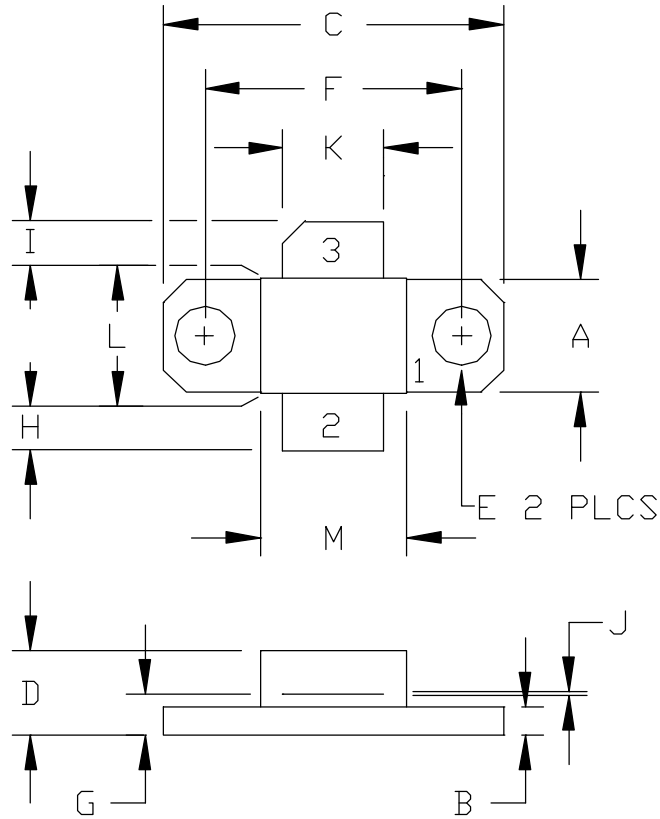
**RF ELECTRICAL CHARACTERISTICS**

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Input Return Loss	IRL	7	--	dB	$V_{CC}=36V$ , $PW=100\mu s$ , $DF=10\%$ , $T_F=25\pm 5^\circ C$ , $P_{IN}=P_{IN1}$ , $P_{IN2}$ , $P_{IN3}$ , $F=F1$ , $F2$ , $F3$ .
100%	Output Power	$P_O$	90	--	W	$V_{CC}=36V$ , $PW=100\mu s$ , $DF=10\%$ , $T_F=25\pm 5^\circ C$ , $P_{IN}=P_{IN1}$ , $P_{IN2}$ , $P_{IN3}$ , $F=F1$ , $F2$ , $F3$ .
100%	Collector Efficiency ( $P_O/I_C/V_{CC}$ )	$N_C$	40	--	%	$V_{CC}=36V$ , $PW=100\mu s$ , $DF=10\%$ , $T_F=25\pm 5^\circ C$ , $P_{IN}=P_{IN1}$ , $P_{IN2}$ , $P_{IN3}$ , $F=F1$ , $F2$ , $F3$ .
100%	Pulse Amplitude Droop	D	--	0.6	dB	$V_{CC}=36V$ , $PW=100\mu s$ , $DF=10\%$ , $T_F=25\pm 5^\circ C$ , $P_{IN}=P_{IN1}$ , $P_{IN2}$ , $P_{IN3}$ , $F=F1$ , $F2$ , $F3$ .
100%	Output Power Flatness $=10*\text{LOG}(P_{O\text{MAX}}/P_{O\text{MIN}})$	OPF	--	0.75	dB	Calculate from $P_O$ at each frequency F.
100%	Output Power Compression $=10*\text{LOG}(P_{OC}/P_O)$	OPC	+0.02	+0.48	dB	$P_{OC}$ measured with $P_{IN}$ increased by 0.5dB at $F=F1$ , $F2$ , $F3$ .
100%	Insertion Phase	IP	-30	+30	Deg	$V_{CC}=36V$ , $PW=100\mu s$ , $DF=10\%$ , $T_F=25\pm 5^\circ C$ , $P_{IN}=P_{IN2}$ , $F=F2$ , Mark in $5^\circ$ 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 $360^\circ$ 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	--	--	--	$V_{CC}=36V$ , $PW=100\mu s$ , $DF=10\%$ , $T_F=25\pm 5^\circ C$ , $P_{IN}=P_{IN1}$ , $P_{IN2}$ , $P_{IN3}$ , $F=F1$ , $F2$ , $F3$ . Rotate 2:1 output VSWR through $360^\circ$ phase. Post test $P_O = \text{Pre test } P_O \pm 3W$ .
BD	Pulse Risetime	RT	--	150	ns	$V_{CC}=36V$ , $PW=100\mu s$ , $DF=10\%$ , $T_F=25\pm 5^\circ C$ , $P_{IN}=P_{IN1}$ , $P_{IN2}$ , $P_{IN3}$ , $F=F1$ , $F2$ , $F3$ . Measure between 10% and 90% detected power points.
Note	F1 = 2.70 GHz, F2 = 2.80 GHz, F3 = 2.90 GHz.					
Note	$P_{IN1} = 10.5W$ , $P_{IN2} = 10.5W$ , $P_{IN3} = 10.5W$ .					
Note	$T_F$ = Device flange temperature.					
Note	Parts are binned and marked in 5 degree increments for Insertion Phase IP : ITI-1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12.					
Note	Screen 'BD' = parameter qualified By Design.					

**BROADBAND RF TEST FIXTURE IMPEDANCE CHARACTERISTICS**

Frequency (GHz)	$Z_{IF}$ (W)	$Z_{OF}$ (W)
2.70	6.0 - j6.5	3.9 - j7.2
2.80	5.1 - j4.0	3.5 - j7.0
2.90	5.0 - j2.1	3.2 - j6.6
Impedance Definition		

**PACKAGE DIMENSIONAL OUTLINE DRAWING**



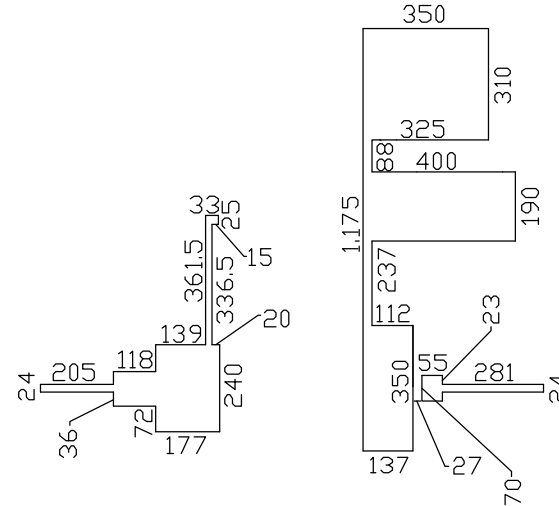
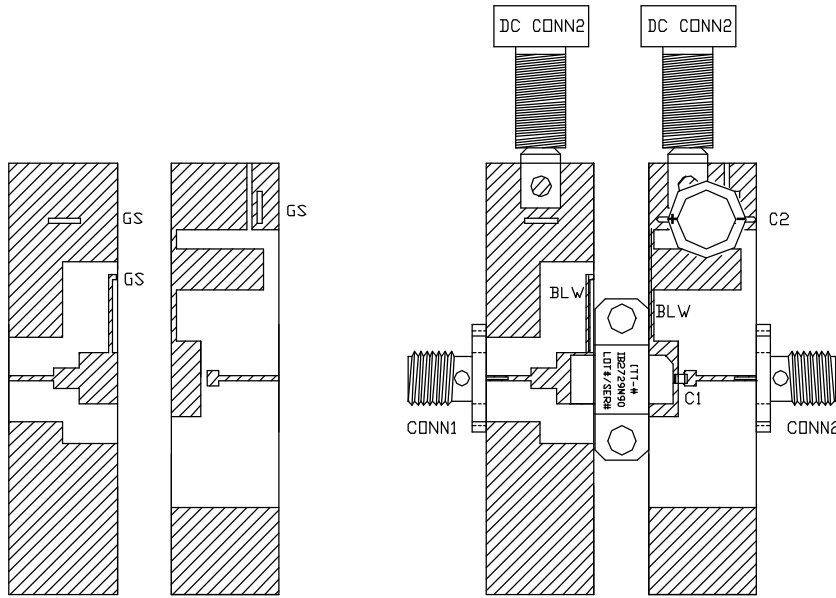
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.243	0.253	6.17	6.43
B	0.055	0.065	1.40	1.65
C	0.739	0.749	18.77	19.02
D	0.165	0.185	4.19	4.70
E	0.125	0.135	3.18	3.43
F	0.555	0.565	14.10	14.35
G	0.082	0.092	2.08	2.34
H	0.070	0.125	1.78	3.18
I	0.070	0.125	1.78	3.18
J	0.004	0.006	0.10	0.15
K	0.215	0.225	5.46	5.72
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: IB2729M90	REV: NC
SHEET NAME: 06-OUTLINE	REV: NC

NOTICE TO PERSONS RECEIVING THIS DRAWING, INTEGRATECH, INC. CLAIMS PROPRIETARY RIGHTS IN THE MATERIAL DISCLOSED HEREON. THIS DRAWING MAY NOT BE REPRODUCED NOR MAY IT BE USED TO MANUFACTURE ANYTHING SHOWN HEREON WITHOUT THE WRITTEN PERMISSION OF INTEGRATECH, INC.

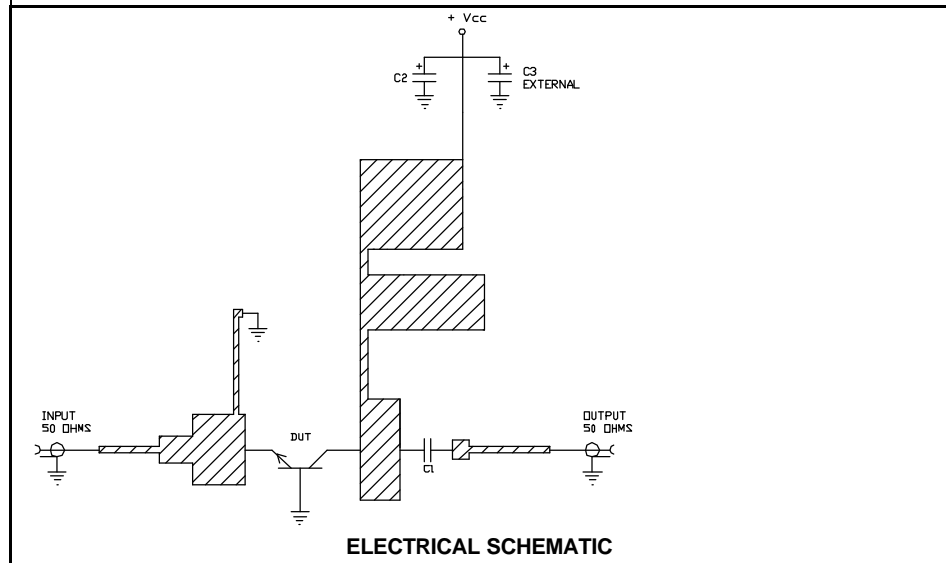
**BROADBAND RF TEST FIXTURE**



**CIRCUIT DIMENSIONS IN MILS (1 MIL = 0.001")**

COMPONENT	DESCRIPTION
DUT	TRANSISTOR #IB2729M90, MOUNT HARD TO THE RIGHT
PC BOARD	ROGERS #6010.2LM, TH=0.025" 1oz. Cu.
C1	CHIP CAPACITOR, TYPE ATC100A, 39 pF
C2	ELECTROLYTIC CAPACITOR, 68uF / 63V
C3 - NOT SHOWN	ELECTROLYTIC CAPACITOR, 2200uF / 63V
GS	GROUND SHIM, COPPER, TH=0.001"
CONN1, CONN2	SMA CONNECTOR, TYPE DS #2052-5636-02
INPUT PC BOARD CARRIER	0.5 INCH BRASS - 01
OUTPUT PC BOARD CARRIER	0.5 INCH BRASS - 01
TRANSISTOR CARRIER	2 INCH COPPER - 01
TRANSISTOR CLAMP	NORYL CLAMP -01
HEAT SINK	2 INCH HEAT SINK - 09
DC CONN1	BANANA JACK, BLACK
DC CONN2	BANANA JACK, RED
BLW	BIAS LINE WIRE - COPPER - 0.022" DIA TYPICAL
NOTE	FIXTURE HARDWARE DRAWINGS AVAILABLE ON REQUEST

**ASSEMBLY AND PARTS LIST**



**ELECTRICAL SCHEMATIC**

Part Number: **IB2729M90****Integra**  
TECHNOLOGIES, INC.**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**

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.

SUNSTAR 商斯达实业集团是集研发、生产、工程、销售、代理经销、技术咨询、信息服务等为一体的高科技企业，是专业高科技电子产品生产厂家，是具有 10 多年历史的专业电子元器件供应商，是中国最早和最大的仓储式连锁规模经营大型综合电子零部件代理分销商之一，是一家专业代理和分销世界各大品牌 IC 芯片和电子元器件的连锁经营综合性国际公司，专业经营进口、国产名厂名牌电子元件，型号、种类齐全。在香港、北京、深圳、上海、西安、成都等全国主要电子市场设有直属分公司和产品展示展销窗口门市部专卖店及代理分销商，已在全国范围内建成强大统一的供货和代理分销网络。我们专业代理经销、开发生产电子元器件、集成电路、传感器、微波光电元器件、工控机/DOC/DOM 电子盘、专用电路、单片机开发、MCU/DSP/ARM/FPGA 软件硬件、二极管、三极管、模块等，是您可靠的一站式现货配套供应商、方案提供商、部件功能模块开发配套商。商斯达实业公司拥有庞大的资料库，有数位毕业于著名高校——有中国电子工业摇篮之称的西安电子科技大学（西军电）并长期从事国防尖端科技研究的高级工程师为您精挑细选、量身订做各种高科技电子元器件，并解决各种技术问题。

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。

更多产品请看本公司产品专用销售网站：

商斯达中国传感器科技信息网：<http://www.sensor-ic.com/>

商斯达工控安防网：<http://www.pc-ps.net/>

商斯达电子元器件网：<http://www.sunstare.com/>

商斯达微波光电产品网：[HTTP://www.rfoe.net/](http://www.rfoe.net/)

商斯达消费电子产品网：<http://www.icasic.com/>

商斯达实业科技产品网：<http://www.sunstars.cn/> 微波元器件销售热线：

地址：深圳市福田区福华路福庆街鸿图大厦 1602 室

电话：0755-82884100 83397033 83396822 83398585

传真：0755-83376182 (0) 13823648918 MSN: SUNS8888@hotmail.com

邮编：518033 E-mail:szss20@163.com QQ: 195847376

深圳赛格展销部：深圳华强北路赛格电子市场 2583 号 电话：0755-83665529 25059422

技术支持：0755-83394033 13501568376

欢迎索取免费详细资料、设计指南和光盘；产品凡多，未能尽录，欢迎来电查询。

北京分公司：北京海淀区知春路 132 号中发电子大厦 3097 号

TEL: 010-81159046 82615020 13501189838 FAX: 010-62543996

上海分公司：上海市北京东路 668 号上海赛格电子市场 D125 号

TEL: 021-28311762 56703037 13701955389 FAX: 021-56703037

西安分公司：西安高新开发区 20 所(中国电子科技集团导航技术研究所)

西安劳动南路 88 号电子商城二楼 D23 号

TEL: 029-81022619 13072977981 FAX:029-88789382