Surface Mount

I&Q Demodulator

SYIQ-895D+

50Ω 868 to 895 MHz

CASE STYLE: TTT1289

+RoHS Compliant
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
LO/RF Power	50mW
I&Q Current	40mA

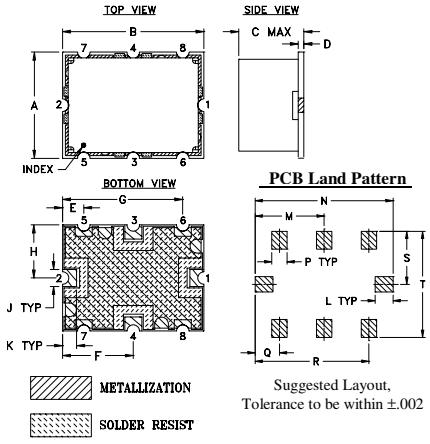
Permanent damage may occur if any of these limits are exceeded.

Pin Connections

LO (carrier)	2
RF (signal)	1
I (0°)(ref.)	3
Q (90°)*	4
GROUND	5,6,7,8

*Q=+90° for LO<RF
Q=-90° for LO>RF

Outline Drawing

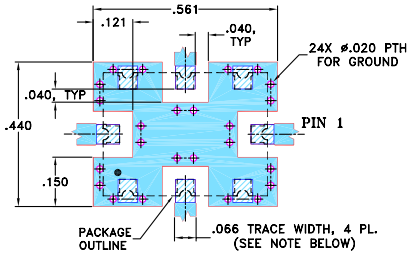


Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K
.38	.50	.23	.020	.075	.250	.425	.187	.060	.050
9.65	12.70	5.84	0.51	1.91	6.35	10.80	4.75	1.52	1.27

L	M	N	P	Q	R	S	T	wt.
.070	.270	.540	.060	.095	.445	.208	.415	grams
1.78	6.86	13.72	1.52	2.41	11.30	5.28	10.54	0.8

Demo Board MCL P/N: TB-459+
Suggested PCB Layout (PL-280)



NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Features

- low conversion loss, 6.4dB typ.
- excellent 3rd and 5th order harmonic suppression
- good amplitude & phase unbalance
- good VSWR all ports, RF 1.35:1 typ., LO 1.3:1 typ., I&Q 1.35:1 typ.
- shielded case

Applications

- cellular
- radar and communication systems

Demodulator Electrical Specifications

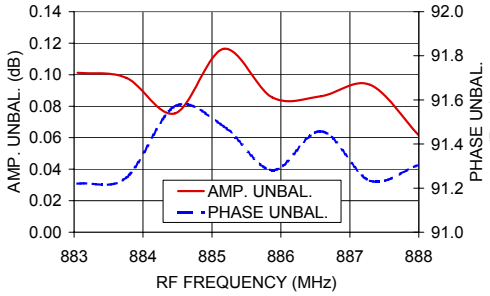
FREQUENCY (MHz) RF (SIGNAL) LO (CARRIER)		I&Q		CONVERSION LOSS (dB)			AMPLITUDE UNBALANCE (dB)		PHASE UNBALANCE (Deg.) with reference to 90°		HARMONIC SUPPRESSION (-dBc) 3XI/Q		5XI/Q	
f_L	f_U	Min.	Max.	$\overline{X}$	σ	Max.	Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.
868	895	DC	5	6.4	0.10	7.5	0.15	0.4	1.5	4.0	45	35	64	50

1. Operating LO power: 10±1dBm
2. 1dB Compression: +5 dBm typical.
3. DC offset, 1.5 mV typ.
4. Conversion Loss= RF power, dBm - (I + Q) power, dBm

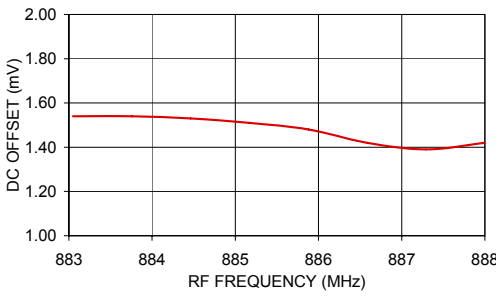
Typical Performance Data

Frequency (MHz) LO=883MHz RF	I&Q	Conversion Loss (dB)	Amplitude Unbalance (dB)	Phase (I&Q) (deg.)	DC Offset (mV)
883.05	0.05	6.37	0.10	91.22	1.54
883.76	0.76	6.38	0.10	91.25	1.54
884.46	1.46	6.37	0.08	91.57	1.53
885.17	2.17	6.37	0.12	91.48	1.51
885.88	2.88	6.39	0.09	91.28	1.48
886.59	3.59	6.41	0.09	91.46	1.42
887.29	4.29	6.43	0.09	91.23	1.39
888.00	5.00	6.41	0.06	91.31	1.42

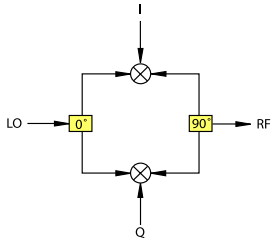
SYIQ-895D+
AMPLITUDE & PHASE UNBALANCE



SYIQ-895D+
DC OFFSET



I&Q demodulation block diagram



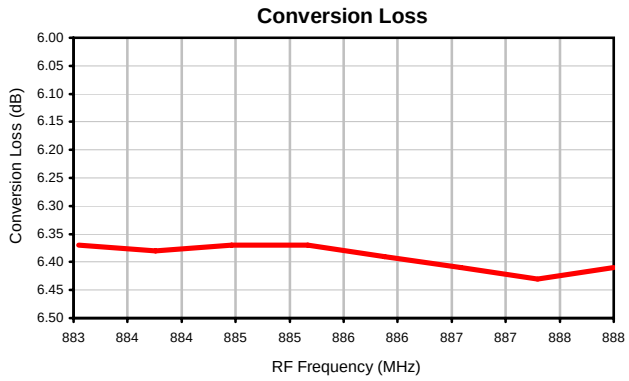
Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

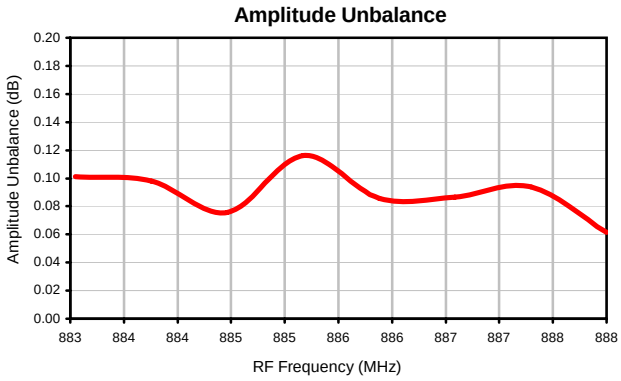
I&Q Demodulator SYIQ-895D+

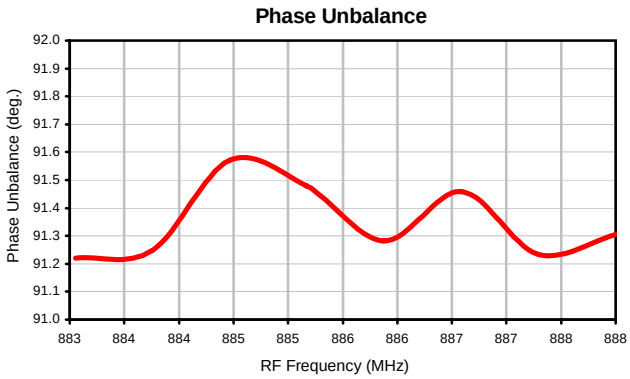
Typical Performance Data

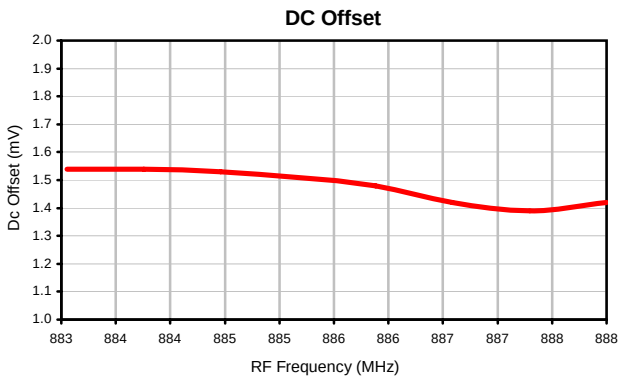
FREQUENCY (MHz) LO = 883 MHz RF	I&Q	CONVERSION LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)	DC OFFSET (mV)
883.05	0.05	6.37	0.10	91.22	1.54
883.76	0.76	6.38	0.10	91.25	1.54
884.46	1.46	6.37	0.08	91.57	1.53
885.17	2.17	6.37	0.12	91.48	1.51
885.88	2.88	6.39	0.09	91.28	1.48
886.59	3.59	6.41	0.09	91.46	1.42
887.29	4.29	6.43	0.09	91.23	1.39
888.00	5.00	6.41	0.06	91.31	1.42

Typical Performance Curves





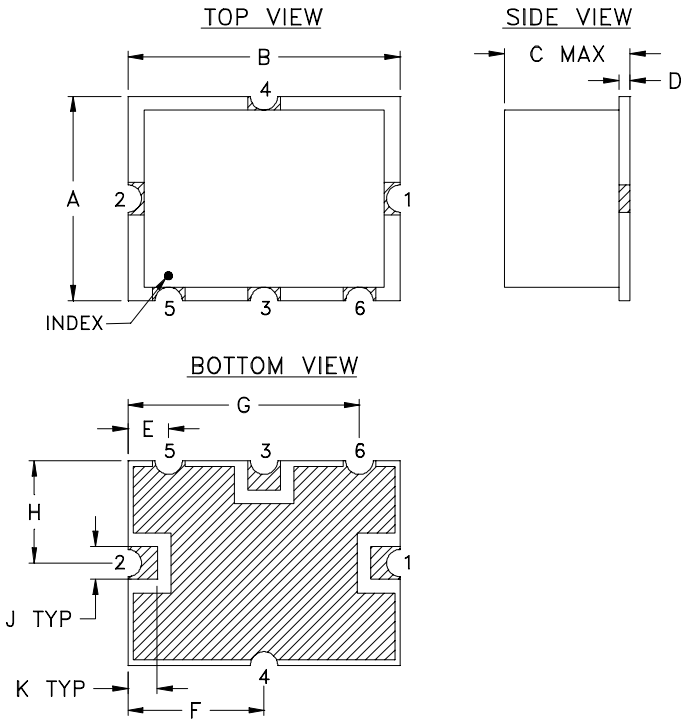




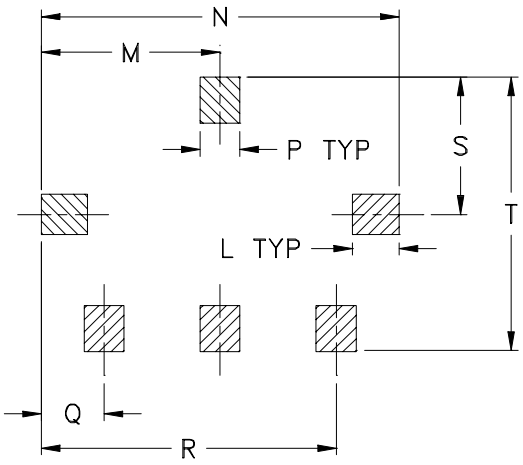
Case Style TTT

Outline Dimensions

TTT166
TTT167



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N
TTT166	.38 (9.65)	.50 (12.70)	.15 (3.81)	.020 (0.51)	.075 (1.91)	.250 (6.35)	.425 (10.80)	.187 (4.75)	.050 (1.27)	.050 (1.27)	.070 (1.78)	.270 (6.86)	.540 (13.72)
TTT167			.23 (5.84)										

CASE #	P	Q	R	S	T	WT. GRAM
TTT166	.060 (1.52)	.095 (2.41)	.445 (11.30)	.208 (5.28)	.415 (10.54)	.8
TTT167						.8

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .01; 3 Pl. ± .005

Note:

1. Case material: Plastic.
2. Base material: Printed wiring laminate.
3. Termination finish:
   For RoHS Case Styles: 3-5 µ inch (.08-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate. All models, (+) suffix.
   For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

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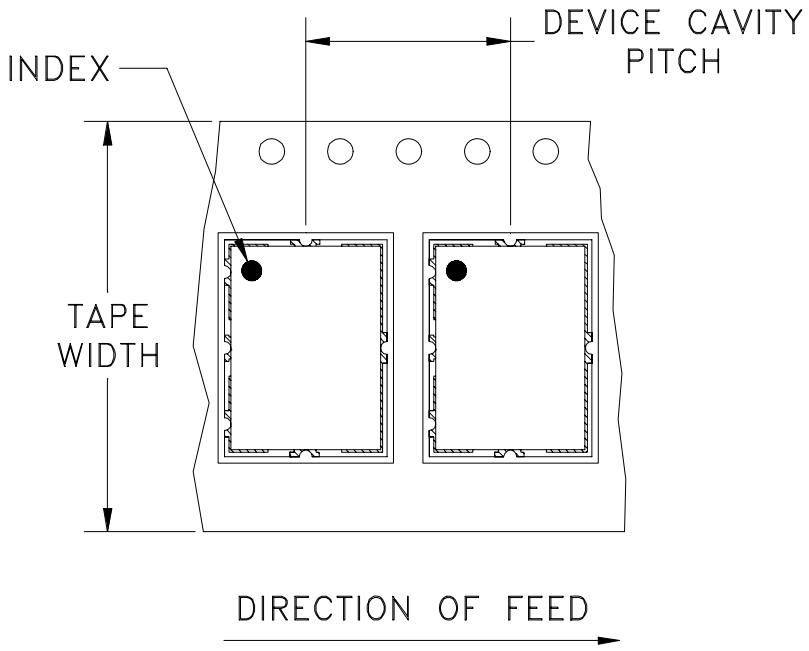
Tape & Reel Packaging TR-F12

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
24	12	7	Small quantity standards (see note)	10
				20
				50
				100
				200
		13	Standard	500

Note: Please Consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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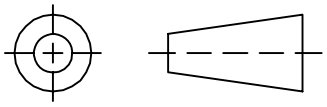
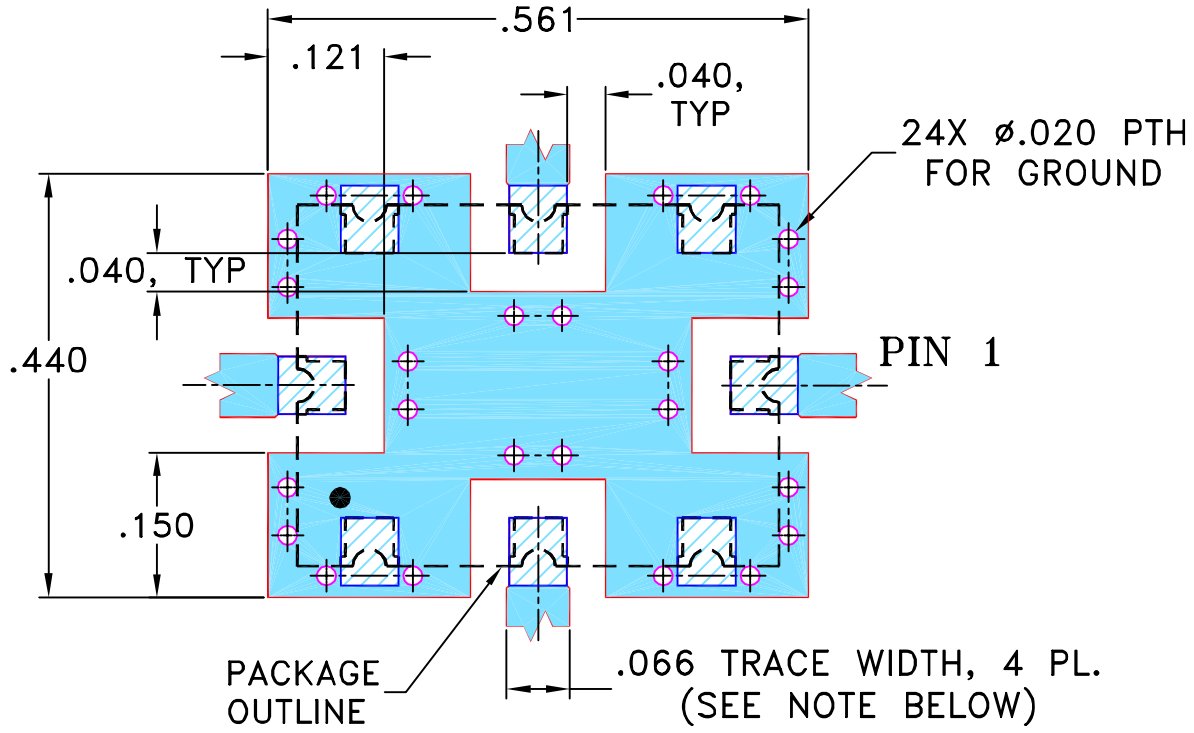
THIRD ANGLE PROJECTION



REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M113234	NEW RELEASE	09/04/07	AV	DJ

SUGGESTED MOUNTING CONFIGURATION FOR TTT1289 CASE STYLE, "su" PIN CONNECTION



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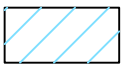


DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	AV	08/28/07
TOLERANCES ON:	CHECKED	MMG	09/04/07
2 PL DECIMALS ±	APPROVED	DJ	09/04/07
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

Mini-Circuits®

ASHEETA1.DWG REV:A DATE:01/12/95

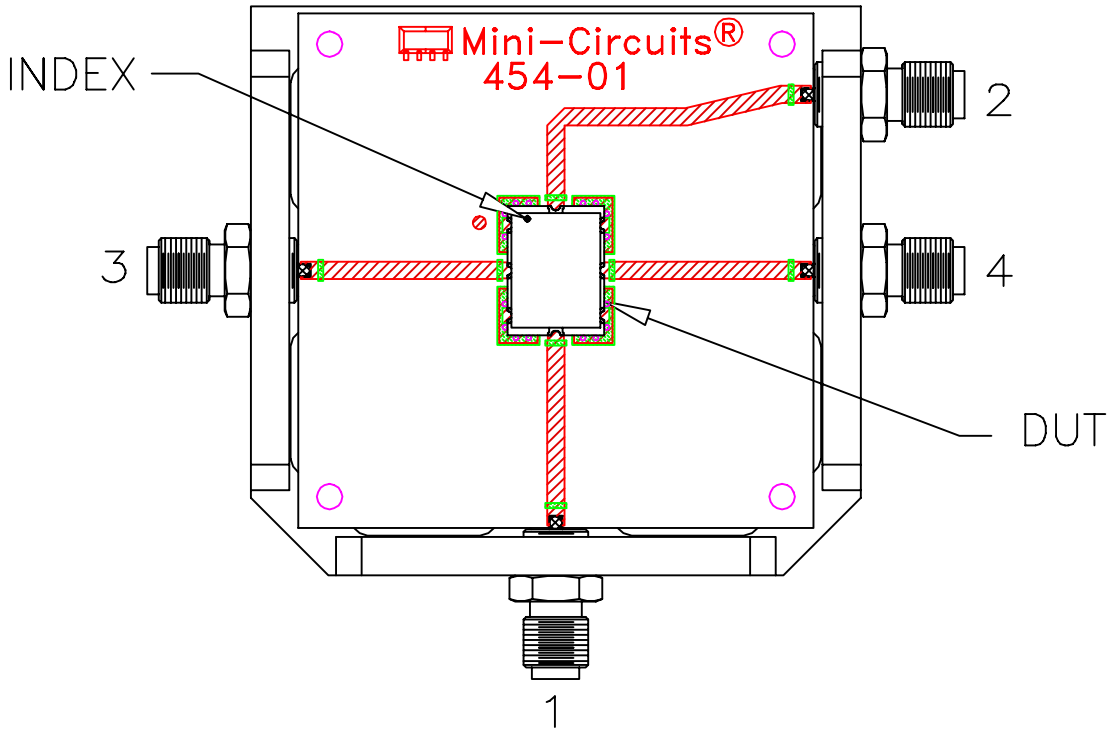
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, su, TTT1289, SYIQ-895M+, TB-459+

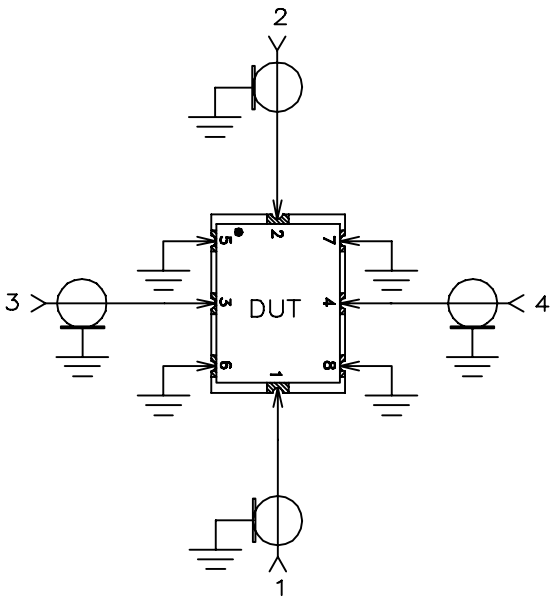
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-280	OR
FILE: 98PL280	SCALE: 5:1	SHEET: 1 OF 1	

Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



TB-459+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: Rogers RO4350B or its equivalent, Dielectric Constant=3.5, Thickness=.010"

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Environmental Specifications ENV02T1

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215