Surface Mount

Coaxial-Ceramic Resonator Filters and Multiplexers

50Ω DC to 6 GHz

The Big Deal

- Low insertion loss with excellent power handling
- Passbands up to 6 GHz
- Fractional bandwidth from <1 to 25%
- Low profile designs with min. height of 0.120”
- Excellent temperature stability
- Rugged construction to handle demanding environmental conditions

Product Overview

Mini-Circuits’ *Coaxial-Ceramic Resonator filters* offer low insertion loss in very small form factors, using ceramic material with high dielectric constant and superior Q factor. Bandpass and bandstop filters,diplexer and multiplexer designs can be constructed using this technology. Low insertion loss combined with excellent power handling makes these filters well suited for transmitter and receiver signal chains. Advanced filter design and construction can achieve stopband width greater than 3x the center frequency as high as 20 GHz.

All our coaxial-ceramic resonator filters are built with rugged construction, qualified to withstand multiple demanding reflow cycles. Custom integrated assembly with LNA in greatly simplifying system integration. They can be realized in small form factors with high-quality, precise machining for applications where size is critical. Excellent repeatability across units is achieved through precise tuning and process control.

Key Features

Feature	Advantages
Low insertion loss	Low signal loss results in better SNR in signal chain
Fast roll-off	Higher selectivity results in better adjacent channel rejection and dynamic range
Wide stop band	Wide spur-free stopband results in better receiver sensitivity
Excellent power handling	Well suited for transmitter applications
Rugged Construction	These filter assemblies have been qualified over a wide range of thermal, mechanical and environmental conditions including withstanding the stress of extensive solder reflow cycles
Small Size	Very well suited for high performance applications where size is a constraint.
Temperature stability	Very minimal change in electrical performance across temperature makes these filters suitable for a wide range of operating conditions.

Surface Mount

Bandpass Filter

50Ω 5725 to 5875 MHz

CBP-5800AG+

Generic photo used for illustration purposes only
CASE STYLE: RZ2511

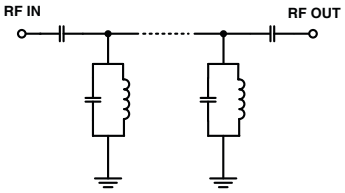
Features

- Fast roll-off
- Low passband IL
- Miniature shielded package

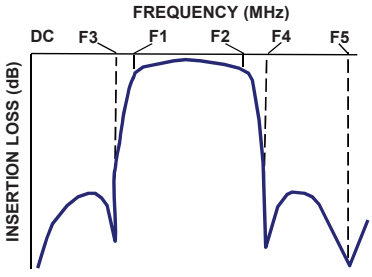
Applications

- Industrial scientific and Medical applications
- Test and Measurement
- WIFI
- WLAN
- Harmonic rejection

Functional Schematic



Typical Frequency Response



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

Electrical Specifications at 25°C

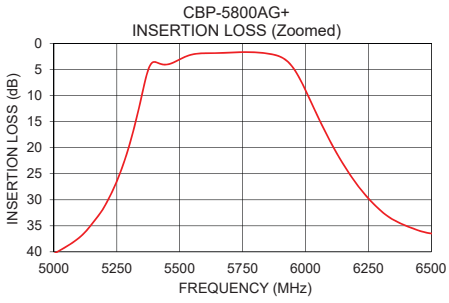
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	-	-	-	5800	-	MHz
	Insertion Loss	F1-F2	5725-5875	-	3	4.0	dB
	VSWR	F1-F2	5725-5875	-	1.92	2.32	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC-5100	20	30	-	dB
	VSWR	DC-F3	DC-5100	-	20	-	:1
Stop Band, Upper	Insertion Loss	F4-F5	6250-7300	20	30	-	dB
		F5-F6	7300-18000	-	10	-	dB
	VSWR	F4-F6	6250-18000	-	20.0	-	:1

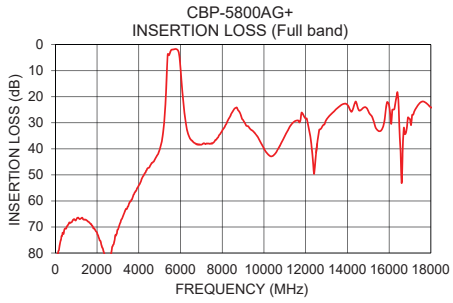
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	1W Max.

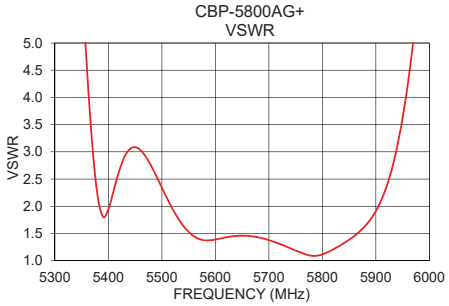
Permanent damage may occur if any of these limits are exceeded.

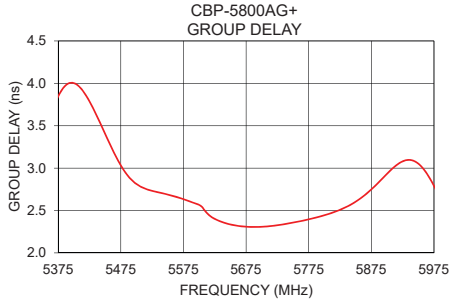
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (ns)
10	88.88	974.33	5725	2.33
2500	84.50	54.46	5730	2.33
5100	37.30	20.86	5740	2.34
5210	30.49	17.62	5750	2.36
5300	19.48	12.88	5760	2.37
5350	9.80	6.16	5770	2.39
5400	3.53	1.95	5780	2.40
5725	1.68	1.29	5790	2.42
5800	1.69	1.12	5800	2.44
5875	2.15	1.59	5810	2.47
5925	3.29	2.51	5815	2.48
6000	8.96	7.96	5820	2.49
6120	20.71	18.83	5825	2.51
6250	29.73	22.40	5830	2.52
6260	30.26	22.51	5835	2.54
7300	37.98	12.39	5840	2.56
7500	37.97	10.15	5845	2.58
10000	39.86	17.80	5850	2.60
16400	18.29	3.58	5855	2.63
18000	24.10	3.51	5875	2.75







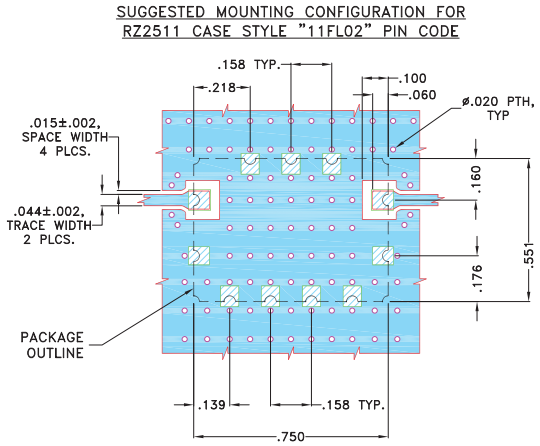


Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

Pad Connections

INPUT	1
OUTPUT	8
GROUND	2,3,4,5,6,7,9,10,11

Demo Board MCL P/N: TB-984+
Suggested PCB Layout (PL-581)



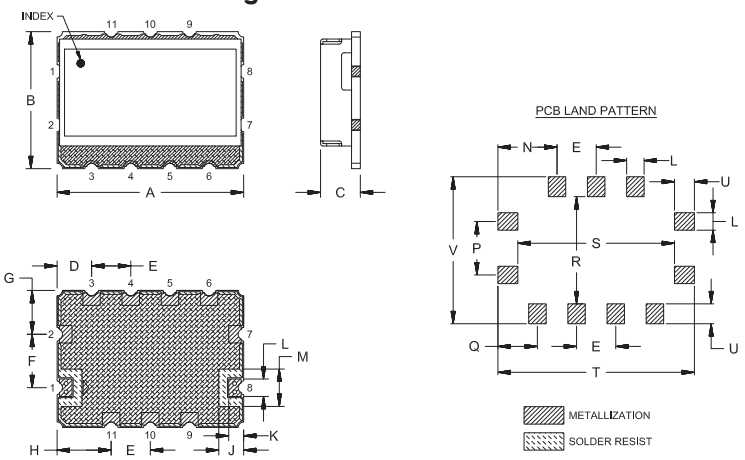
NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .023"±.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 SOLDERMASK

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L
.750	**.551**	**.175**	**.139**	**.158**	**.215**	**.176**	**.218**	**.100**	**.060**	**.070**
19.05	14.00	4.45	3.52	4.00	5.46	4.48	5.52	2.54	1.52	1.78

M	N	P	Q	R	S	T	U	V	Wt.
.150	**.238**	**.215**	**.159**	**.431**	**.630**	**.790**	**.080**	**.591**	grams
3.81	6.03	5.46	4.03	10.95	16.00	20.07	2.03	15.02	2.0

Note: Please refer to case style drawing for details.

Surface mount Band Pass Filter CBP-5800AG+

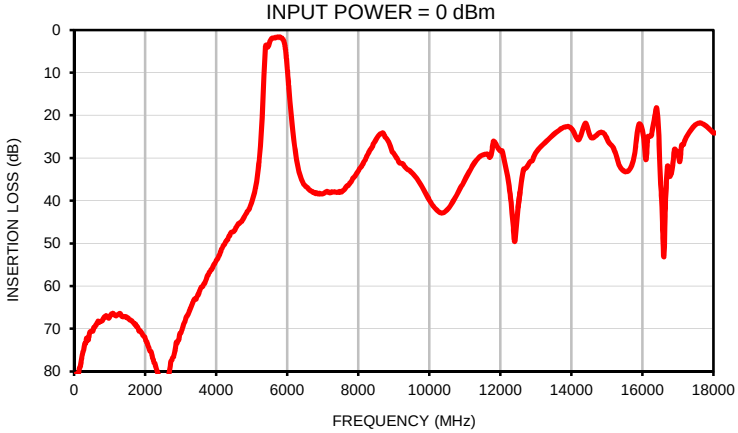
Typical Performance Data

FREQ. (MHz)	INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	OUTPUT RETURN LOSS (dB)
10	88.88	0.02	0.01
20	107.33	0.03	0.02
50	81.03	0.04	0.04
100	80.79	0.07	0.08
250	75.41	0.16	0.16
500	70.55	0.20	0.19
1000	67.23	0.18	0.16
1500	67.49	0.18	0.16
2000	72.16	0.26	0.23
2500	84.50	0.32	0.29
3000	71.01	0.33	0.31
3500	61.97	0.34	0.31
4000	54.03	0.39	0.35
4500	47.18	0.51	0.44
5000	40.35	0.74	0.67
5100	37.30	0.83	0.76
5200	31.38	0.97	0.89
5300	19.48	1.35	1.34
5350	9.80	2.84	3.17
5400	3.53	9.87	13.23
5450	4.02	5.84	6.09
5500	3.04	7.93	8.46
5550	2.10	13.60	15.96
5600	1.86	15.78	17.35
5650	1.83	14.56	15.00
5700	1.74	15.96	16.79
5725	1.68	17.95	19.42
5800	1.69	25.19	27.01
5850	1.92	15.85	17.57
5875	2.15	12.89	15.08
5925	3.29	7.32	8.80
6000	8.96	2.19	2.54
6050	14.13	1.29	1.44
6100	18.95	0.99	1.06
6120	20.71	0.92	0.99
6150	23.16	0.86	0.92
6200	26.76	0.80	0.85
6250	29.73	0.78	0.81
6260	30.26	0.77	0.80
6500	36.46	0.77	0.78
7000	38.38	1.04	0.85
7300	37.98	1.41	0.99
7500	37.97	1.72	1.16
8000	33.04	2.27	2.01
8500	25.66	3.40	4.17
9000	28.93	3.09	5.04
9500	33.40	1.40	1.79
10000	39.86	0.98	1.12
10500	42.16	0.96	1.07
11000	35.07	1.09	1.22
11500	29.29	1.51	1.92
12000	28.38	1.83	1.58
12500	41.45	1.23	1.25
13000	28.69	1.35	1.57
13500	24.45	1.61	2.15
14000	23.08	2.19	3.19
14500	24.27	4.79	5.69
15000	25.46	4.42	2.32
16400	18.29	4.98	2.85
18000	24.10	5.10	2.14

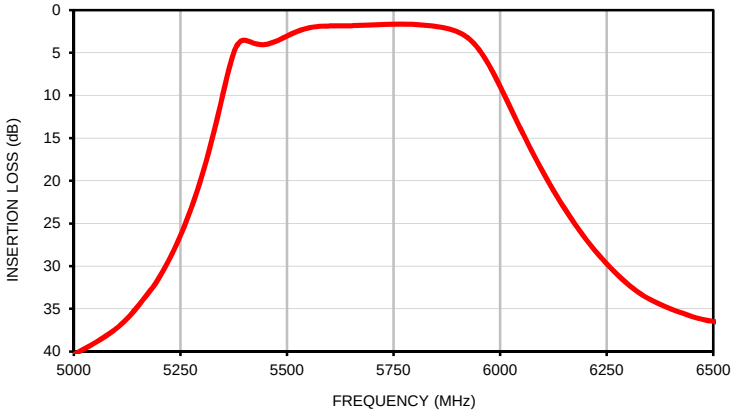
FREQ. (MHz)	GROUP DELAY (ns)
5650	2.34
5655	2.33
5660	2.32
5665	2.32
5670	2.31
5675	2.31
5680	2.31
5685	2.31
5690	2.31
5695	2.31
5700	2.31
5705	2.31
5710	2.31
5715	2.32
5720	2.32
5725	2.33
5730	2.33
5735	2.34
5740	2.34
5745	2.35
5750	2.36
5755	2.36
5760	2.37
5765	2.38
5770	2.39
5775	2.40
5780	2.40
5785	2.41
5790	2.42
5795	2.43
5800	2.44
5805	2.46
5810	2.47
5815	2.48
5820	2.49
5825	2.51
5830	2.52
5835	2.54
5840	2.56
5845	2.58
5850	2.60
5855	2.63
5860	2.66
5865	2.69
5870	2.72
5875	2.75
5880	2.78
5885	2.82
5890	2.86
5895	2.90
5900	2.93
5905	2.97
5910	3.00
5915	3.03
5920	3.06
5925	3.08
5930	3.09
5935	3.10
5940	3.09
5945	3.08

Typical Performance Curves

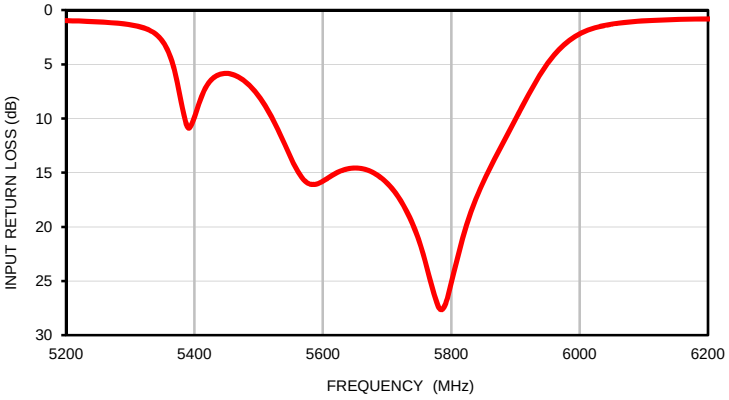
INSERTION LOSS
INPUT POWER = 0 dBm



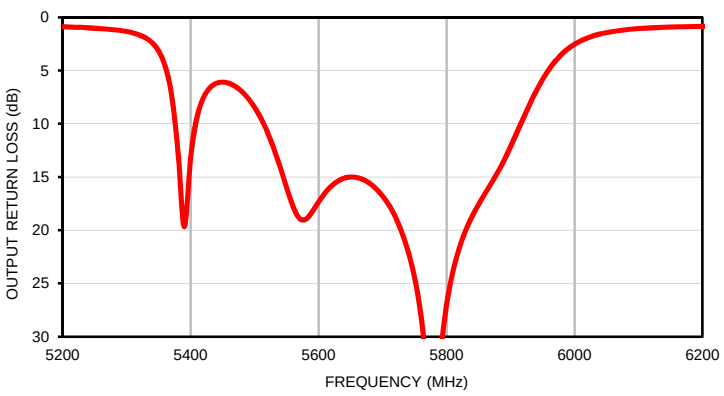
INSERTION LOSS (Zoomed)
INPUT POWER = 0 dBm



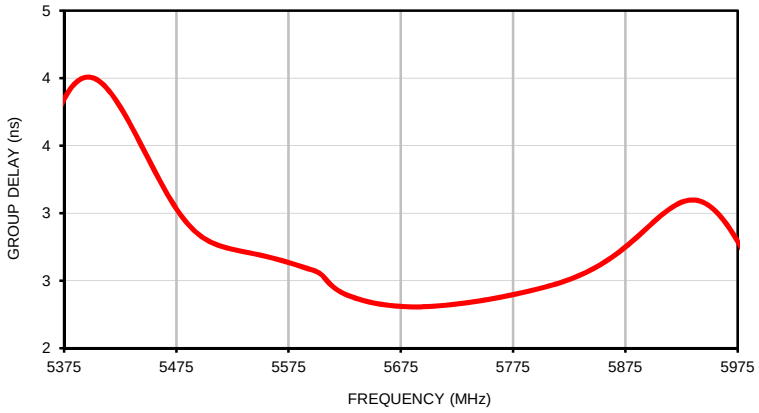
INPUT RETURN LOSS
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS
INPUT POWER = 0 dBm



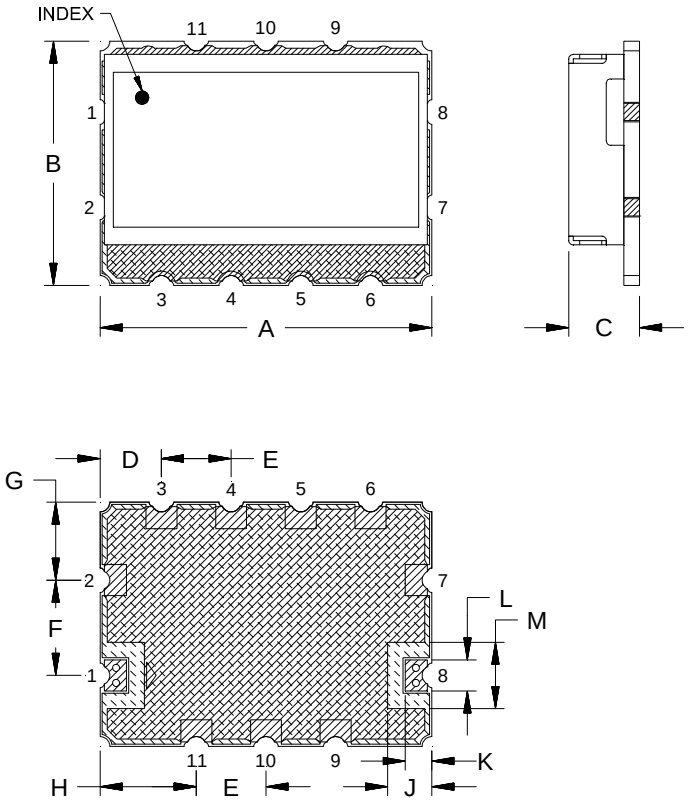
GROUP DELAY
INPUT POWER = 0 dBm

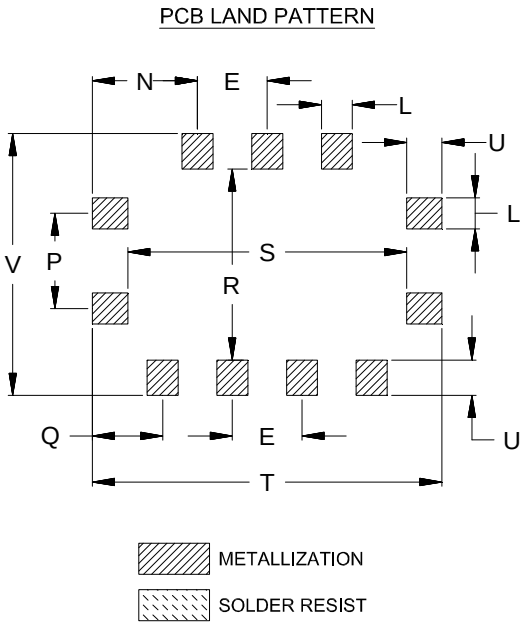


Case Style RZ

Outline Dimensions

RZ2511





CASE#	A	B	C	D	E	F	G	H	J	K	L	M
RZ2511	.750 (19.05)	.551 (14.00)	.175 (4.45)	.139 (3.52)	.158 (4.00)	.215 (5.46)	.176 (4.48)	.218 (5.52)	.100 (2.54)	.060 (1.52)	.070 (1.78)	.150 (3.81)

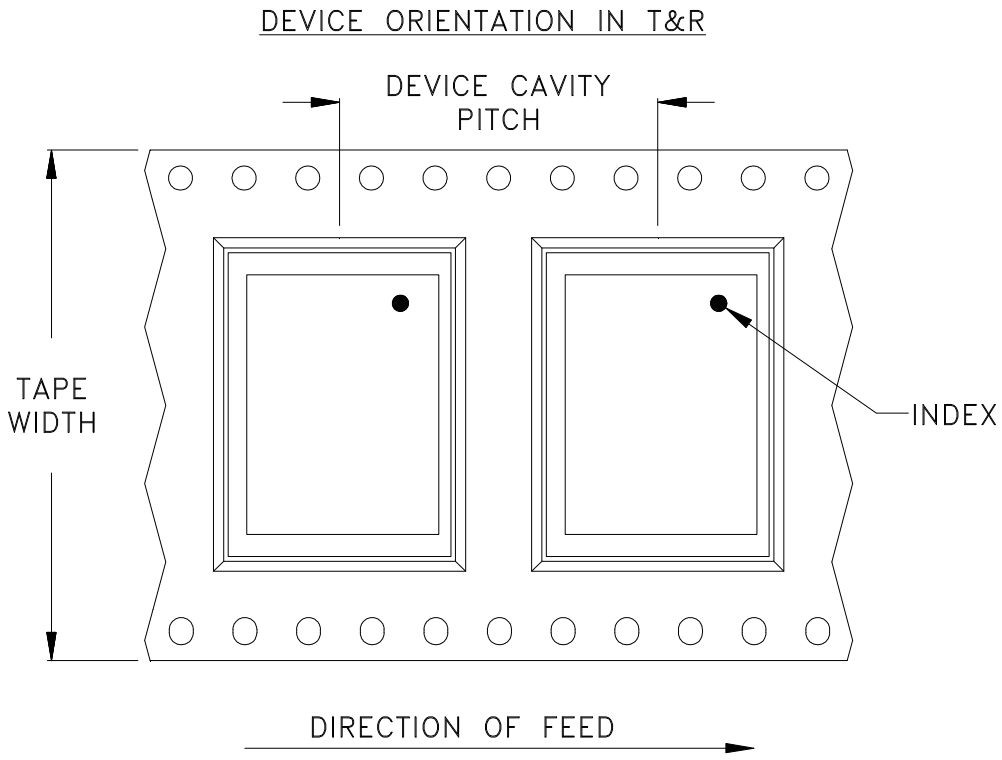
CASE#	N	P	Q	R	S	T	U	V	WT.GRAMS
RZ2511	.238 (6.03)	.215 (5.46)	.159 (4.03)	.431 (10.95)	.630 (16.00)	.790 (20.07)	.080 (2.03)	.591 (15.02)	2.0

Dimensions are in inches (mm). Tolerances: 2PL. ± .03; 3PL. ± .015

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:
   For RoHS Case Styles: 2-5 µ inch (.05-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate.
   All models, (+) suffix.

Tape & Reel Packaging TR-F122



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	20	13	500

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.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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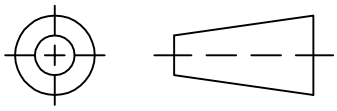
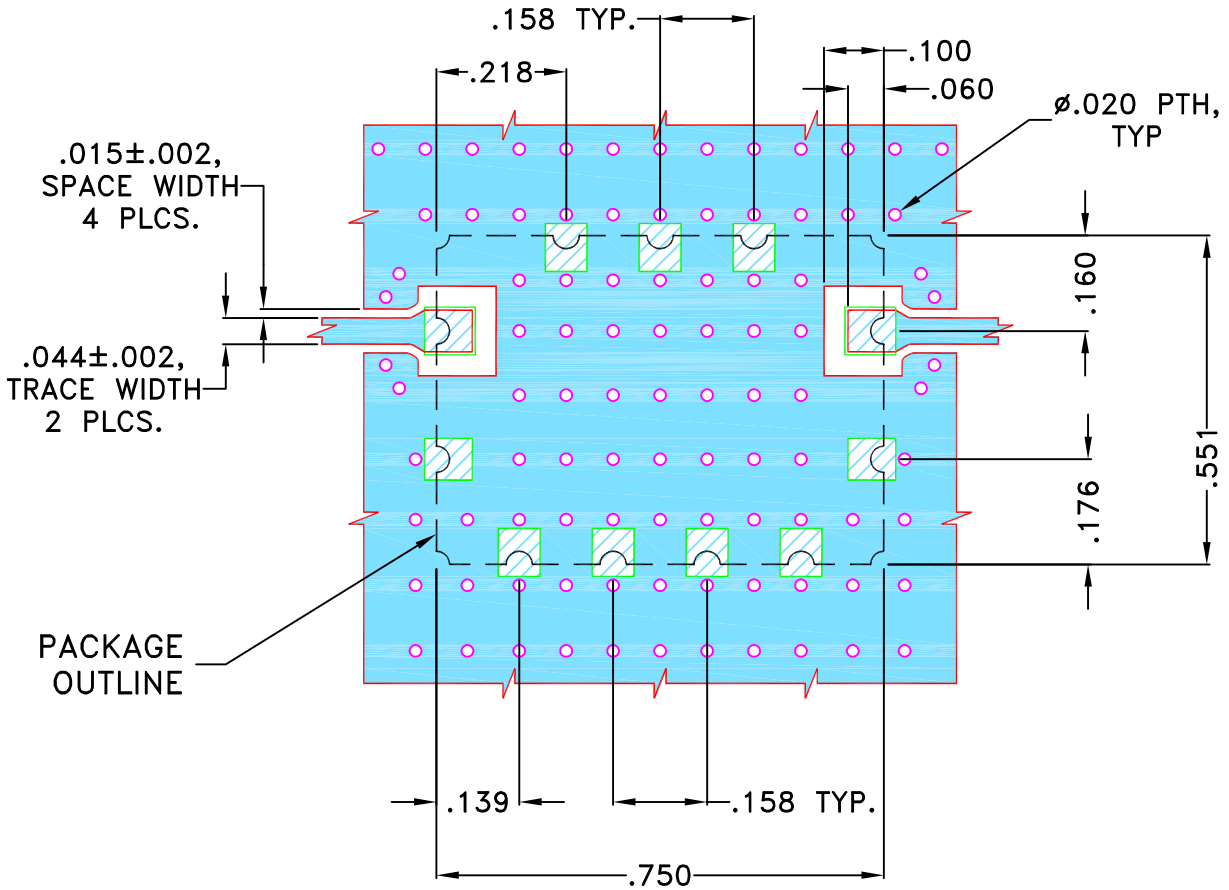
THIRD ANGLE PROJECTION



REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M167003	NEW RELEASE	APR 18	TM	VC

SUGGESTED MOUNTING CONFIGURATION FOR RZ2511 CASE STYLE "11FL02" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .023"±.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 SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	TM	07 APR 18
TOLERANCES ON:	CHECKED	MD	07 APR 18
2 PL DECIMALS ±	APPROVED	KK	07 APR 18
3 PL DECIMALS ± .005"			
ANGLES ±			
FRACTIONS ±			

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

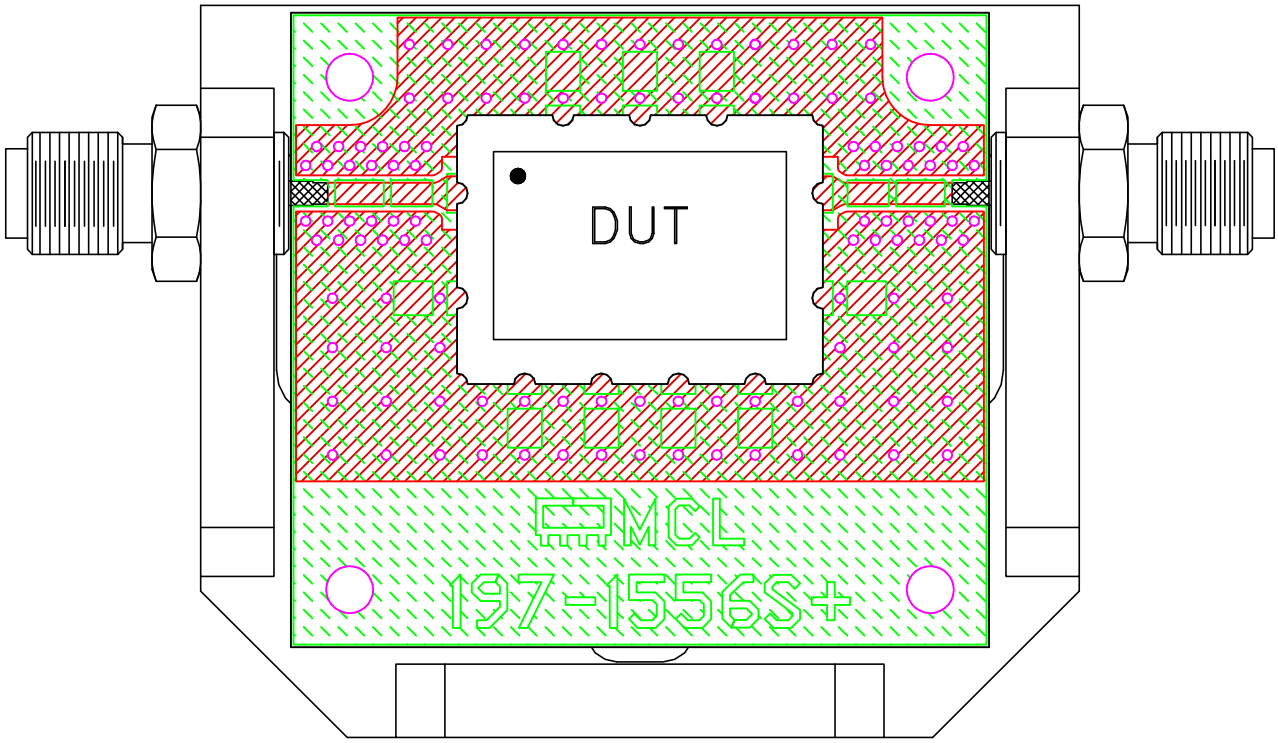
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

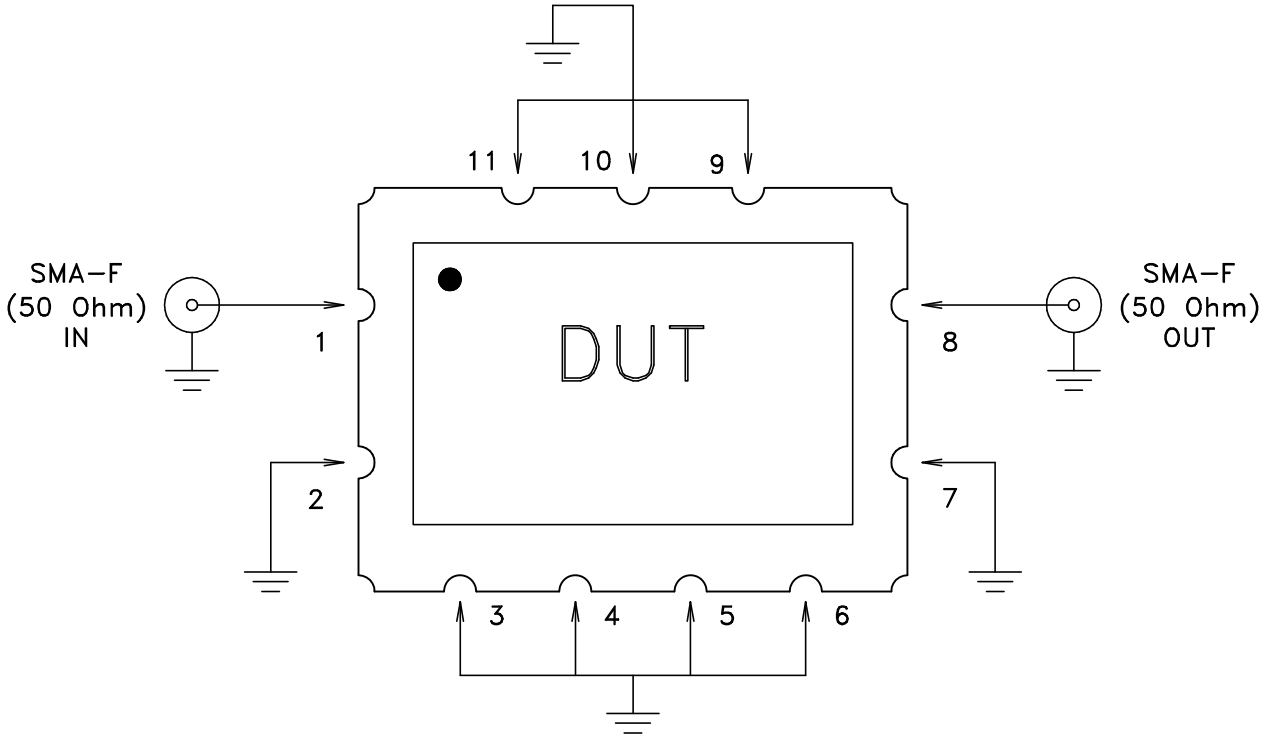
PL, 11FL02, RZ2511, CBP, TB-984+, 50 Ohm

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-581	OR
FILE: 98PL581		SCALE: 3:1	SHEET: 1 OF 1

Evaluation Board and Circuit

TB-984+





Notes:
1. 50 Ohm SMA Female connectors.
2. PCB Material: ROGERS OR Equivalent
   Dielectric Constant=3.48±.05, Thickness=.023 inch.

Mini-Circuits®

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Environmental Specifications ENV54

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, 96 hours, 40°C	MIL-STD-202, Method 103B, Condition B, Except 50°C
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process, 245°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 4 times in each of three axes (total 12)	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