CERAMIC RESONATOR SURFACE MOUNT

Band Pass Filter

CBP4-4777AG+

50Ω 4707 to 4847 MHz

THE BIG DEAL

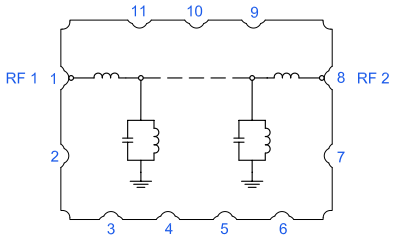
- Good Insertion Loss, 2.3 dB Typ.
- Excellent Rejection, 57 dB Typ.
- Good Return Loss, 18 dB Typ.
- Miniature Shielded Package

Generic photo used for illustration purposes only

APPLICATIONS

- 5G Deployment
- Telemetry Applications
- Wireless Local Area Networks

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

All our coaxial-ceramic resonator filters are built with rugged construction, qualified to withstand multiple demanding reflow cycles. Excellent repeatability across units is achieved through precise tunning and process control.

ELECTRICAL SPECIFICATIONS[1,2,3] AT +25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Passband	Center Frequency	—	—	—	4777	—	MHz
	Insertion Loss	F1-F2	4707 - 4847	—	2.3	2.9	dB
	Return Loss	F1-F2	4707 - 4847	10	18	—	dB
Stopband, Lower	Rejection	DC-F3	DC - 4000	50	57	—	dB
		F3-F4	4000 - 4565	20	28	—	
Stopband, Upper	Rejection	F5-F6	5000 - 5500	20	28	—	dB
		F6-F7	5500 - 7000	33	45	—	

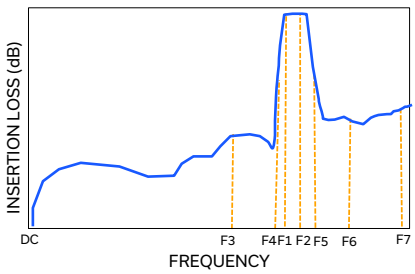
1. Tested in Evaluation Board P/N TB-CBP4-4777AG+.
2. This filter is bi-directional RF1 and RF2 ports may be interchanged, see S-Parameters for actual performance.
3. This component should not be used as a DC-block. In applications where DC voltage and/or current is present at either the input or output ports, external DC blocking capacitors are required.

ABSOLUTE MAXIMUM RATINGS[4]

Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
Input Power[5]	5 W at +25°C

4. Permanent damage may occur if any of these limits are exceeded.
5. Power rating applies only to signals within the passband. Power rating above +25°C operating temperature decreases linearly to 1 W at +85°C.

TYPICAL FREQUENCY RESPONSE



REV. A
ECO-028461
EDU4839
CBP4-4777AG+
URJ
260206

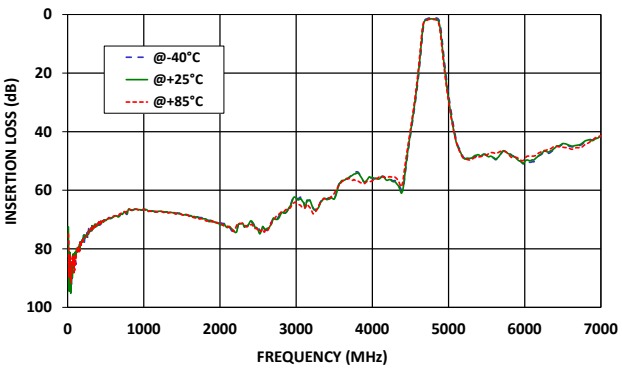
Band Pass Filter

CBP4-4777AG+

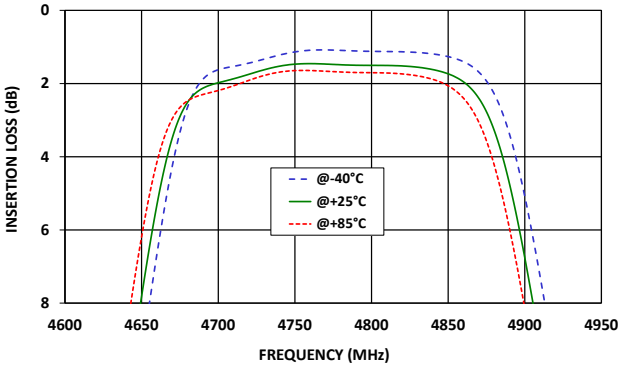
50Ω 4707 to 4847 MHz

TYPICAL PERFORMANCE GRAPHS

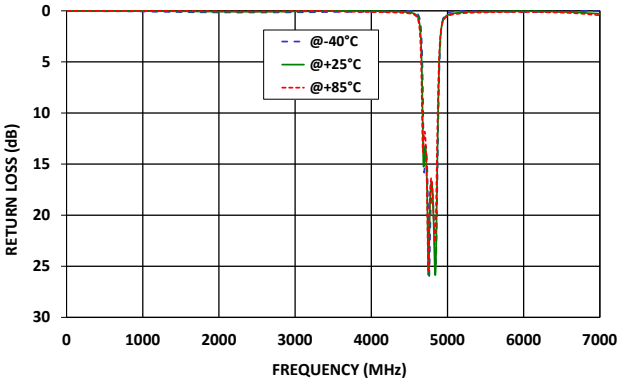
CBP4-4777AG+
INSERTION LOSS



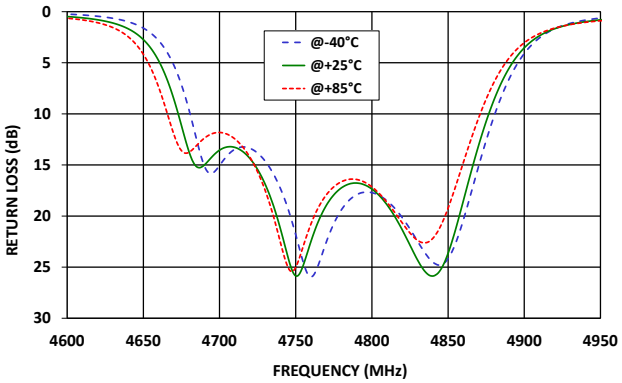
CBP4-4777AG+
INSERTION LOSS (Zoomed)



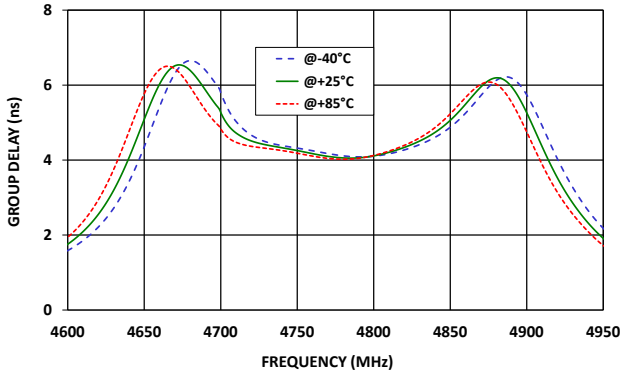
CBP4-4777AG+
RETURN LOSS



CBP4-4777AG+
RETURN LOSS (Zoomed)



CBP4-4777AG+
GROUP DELAY



CERAMIC RESONATOR SURFACE MOUNT

Band Pass Filter

CBP4-4777AG+

50Ω 4707 to 4847 MHz

FUNCTIONAL DIAGRAM

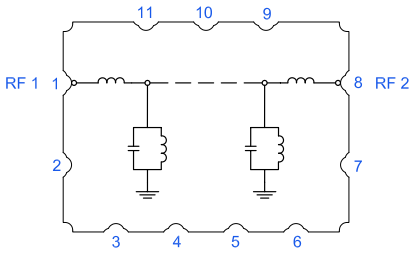


Figure 1. CBP4-4777AG+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description
RF1[2]	1	Connects to RF Input Port
RF2[2]	8	Connects to RF Output Port
GROUND	2-7,9,10,11	Connects to Ground on PCB, (See drawing PL-761)

SUGGESTED PCB LAYOUT

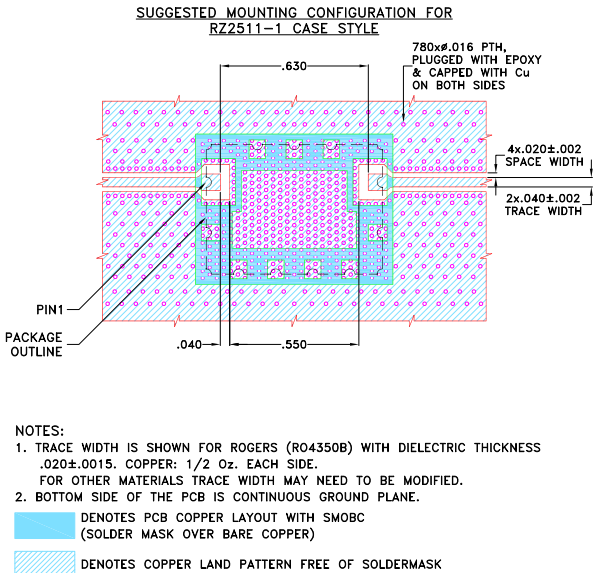
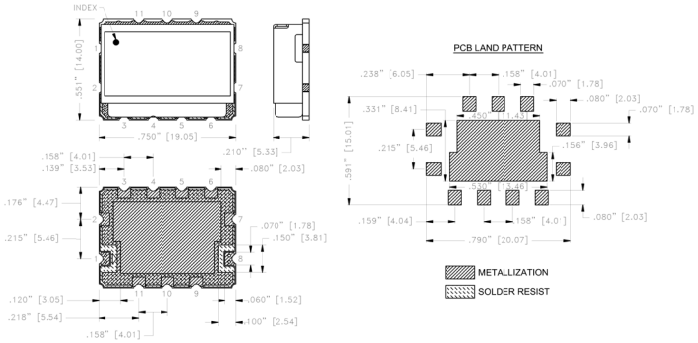


Figure 2. Suggested PCB Layout

CASE STYLE DRAWING



Weight: 2.4 gram
Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3Pl. ± .015

PRODUCT MARKING*: CBP4-4777AG

*Marking may contain other features or characters for internal lot control.

Band Pass Filter

CBP4-4777AG+

50Ω 4707 to 4847 MHz

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD CLICK HERE

Performance Data & Graphs	Data Graphs S-Parameter (S2P Files) Data Set (.zip file) De-embedded to device pads
Case Style	RZ2511-1 Lead Finish: Gold over Nickel Plate
RoHS/REACH Status	Compliant
Tape and Reel	F122
Suggested Layout for PCB Design	PL-761
Evaluation Board	TB-CBP4-4777AG+ Gerber File
Environmental Rating	ENV54
MSL Level	MSL1

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-Circuits' 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/terms/viewterm.html

Surface Mount Bandpass Filter CBP4-4777AG+

Typical Performance Data

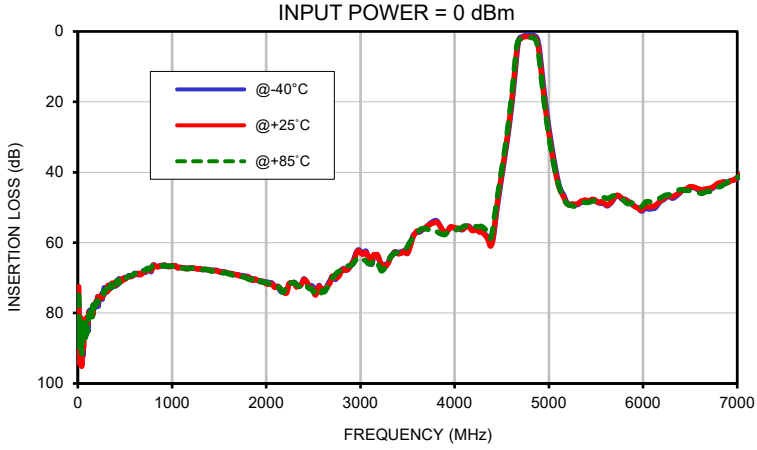
FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
10	77.19	72.50	74.92	0.01	0.00	0.01	0.00	0.01	0.01
21	82.67	94.50	83.13	0.01	0.00	0.01	0.00	0.01	0.01
51	91.63	89.48	85.76	0.01	0.01	0.00	0.00	0.01	0.02
101	81.44	81.07	85.32	0.01	0.00	0.00	0.01	0.01	0.02
151	80.81	80.67	79.24	0.01	0.01	0.00	0.01	0.02	0.02
201	76.39	77.69	77.46	0.02	0.01	0.01	0.01	0.02	0.02
301	74.08	73.18	73.29	0.03	0.01	0.01	0.01	0.02	0.02
406	71.40	71.99	71.77	0.03	0.01	0.00	0.01	0.02	0.03
500	69.85	70.41	70.33	0.04	0.01	0.00	0.02	0.02	0.03
600	68.72	69.19	68.84	0.05	0.01	0.00	0.02	0.02	0.04
700	67.89	68.12	67.99	0.04	0.00	0.01	0.01	0.03	0.05
1000	66.51	66.48	66.69	0.06	0.01	0.01	0.04	0.02	0.05
2000	71.19	71.72	71.31	0.16	0.08	0.05	0.14	0.06	0.02
3000	62.44	62.72	64.27	0.14	0.06	0.03	0.12	0.04	0.00
3500	63.00	63.00	61.08	0.12	0.02	0.04	0.10	0.00	0.07
3600	56.96	56.67	57.10	0.10	0.01	0.07	0.09	0.02	0.10
3800	53.70	54.11	56.80	0.10	0.02	0.10	0.08	0.04	0.13
3920	56.92	56.82	57.14	0.10	0.03	0.11	0.08	0.05	0.15
3940	56.03	56.16	57.04	0.10	0.03	0.12	0.08	0.05	0.15
4000	55.77	55.65	56.76	0.11	0.03	0.12	0.08	0.06	0.16
4220	56.19	56.36	55.39	0.09	0.05	0.15	0.08	0.06	0.17
4240	56.24	56.46	55.45	0.09	0.06	0.15	0.08	0.06	0.17
4300	56.71	57.17	55.59	0.08	0.06	0.16	0.08	0.06	0.17
4320	57.47	57.82	56.06	0.08	0.07	0.16	0.08	0.07	0.18
4340	58.02	58.42	56.66	0.08	0.07	0.17	0.08	0.07	0.18
4380	59.80	61.01	58.81	0.06	0.08	0.18	0.07	0.08	0.19
4565	29.75	28.64	27.30	0.09	0.28	0.39	0.10	0.29	0.41
4601	22.22	20.86	19.32	0.25	0.49	0.66	0.28	0.53	0.72
4629	15.32	13.70	11.92	0.62	1.07	1.50	0.70	1.18	1.67
4651	9.16	7.55	5.95	1.69	2.88	4.41	1.90	3.22	5.11
4673	3.68	3.11	2.76	6.32	10.07	13.12	7.25	12.44	21.26
4707	1.55	1.90	2.10	13.80	13.21	12.14	15.01	13.76	12.34
4710	1.53	1.87	2.06	13.47	13.28	12.45	14.34	13.69	12.57
4750	1.14	1.47	1.65	21.83	25.86	25.01	23.05	27.53	25.52
4770	1.08	1.47	1.66	22.58	18.98	17.94	24.57	19.34	18.16
4777	1.09	1.48	1.68	20.15	17.61	16.91	21.00	17.76	17.00
4800	1.12	1.50	1.70	17.71	17.36	17.15	17.60	17.00	16.88
4810	1.13	1.51	1.71	18.52	18.92	18.68	18.12	18.20	18.17
4820	1.13	1.52	1.74	20.17	21.38	20.69	19.52	20.24	20.16
4840	1.19	1.62	1.89	24.52	25.87	22.18	24.52	26.63	24.78
4847	1.24	1.69	2.00	24.65	24.73	20.36	26.45	28.51	23.46
4881	2.36	3.39	4.37	9.88	8.31	6.66	10.04	8.42	6.76
4896	4.33	5.89	7.23	4.96	4.22	3.55	4.94	4.19	3.54
4937	13.93	15.81	17.10	0.91	1.05	1.10	0.86	1.00	1.06
4956	18.38	20.14	21.31	0.53	0.72	0.82	0.50	0.68	0.78
5000	27.23	28.77	29.68	0.22	0.42	0.53	0.19	0.38	0.50
5020	30.75	32.23	33.01	0.16	0.35	0.46	0.13	0.32	0.44
5155	46.30	46.91	47.21	0.01	0.19	0.28	0.02	0.16	0.26
5500	48.19	48.09	47.90	0.09	0.07	0.15	0.10	0.07	0.15
5950	50.21	50.25	49.75	0.12	0.05	0.11	0.11	0.05	0.13
6100	50.25	49.61	48.35	0.12	0.04	0.12	0.13	0.04	0.13
6175	48.59	48.37	47.45	0.12	0.04	0.11	0.13	0.04	0.13
6220	47.75	47.48	46.77	0.11	0.06	0.13	0.13	0.05	0.14
6325	47.31	46.81	45.92	0.11	0.07	0.14	0.12	0.06	0.16
6500	44.19	44.06	45.30	0.08	0.10	0.17	0.09	0.09	0.19
6620	45.20	44.95	46.01	0.07	0.13	0.21	0.07	0.12	0.23
6640	45.19	44.88	45.89	0.07	0.13	0.23	0.07	0.13	0.23
6720	44.73	44.47	45.48	0.05	0.16	0.26	0.06	0.15	0.27
6840	42.87	42.79	43.78	0.01	0.22	0.33	0.02	0.19	0.32
7000	41.70	41.47	41.45	0.05	0.29	0.43	0.01	0.24	0.41

Typical Performance Data

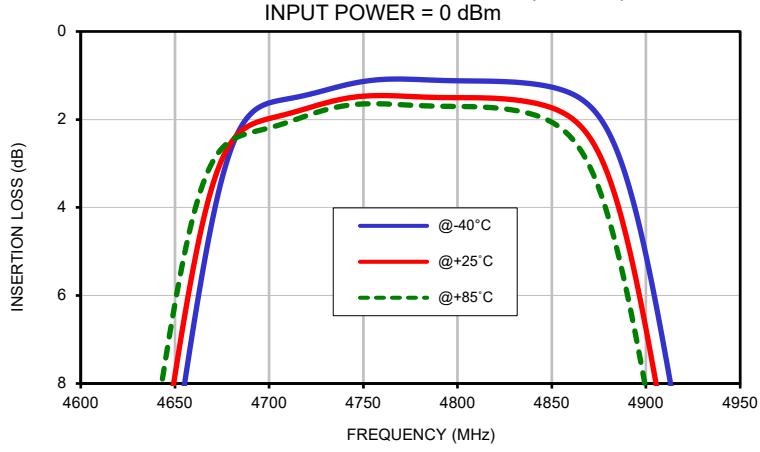
FREQ.	GROUP DELAY		
	(nsec)		
(MHz)	@-40°C	@+25°C	@+85°C
4707	5.20	4.83	4.54
4710	5.03	4.72	4.47
4713	4.90	4.64	4.43
4716	4.78	4.58	4.40
4719	4.69	4.53	4.37
4722	4.62	4.48	4.35
4725	4.56	4.45	4.34
4728	4.51	4.42	4.32
4731	4.47	4.40	4.31
4734	4.44	4.37	4.29
4737	4.41	4.35	4.27
4740	4.39	4.33	4.25
4743	4.37	4.31	4.23
4746	4.35	4.28	4.21
4749	4.33	4.26	4.19
4752	4.31	4.24	4.17
4755	4.29	4.21	4.14
4758	4.26	4.19	4.12
4761	4.24	4.16	4.10
4764	4.22	4.14	4.08
4770	4.17	4.10	4.05
4777	4.13	4.07	4.03
4800	4.10	4.11	4.12
4810	4.17	4.21	4.24
4820	4.27	4.34	4.39
4830	4.41	4.51	4.59
4840	4.61	4.74	4.87
4845	4.73	4.89	5.04
4847	4.78	4.95	5.11

Typical Performance Curves

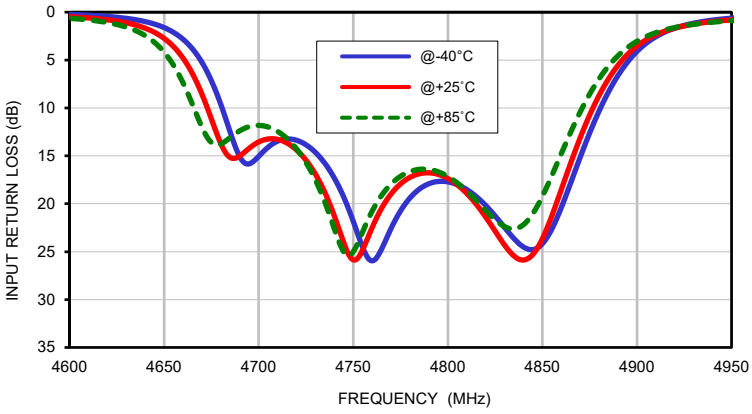
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



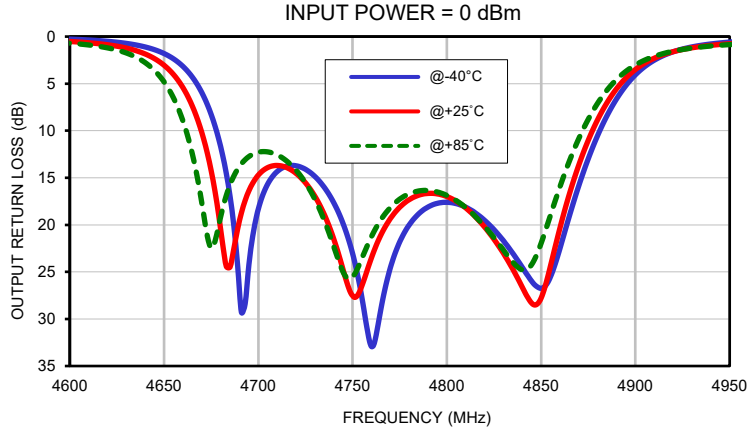
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



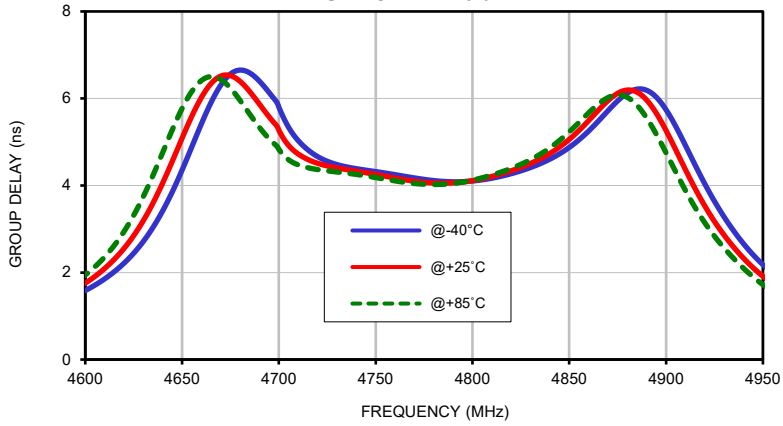
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



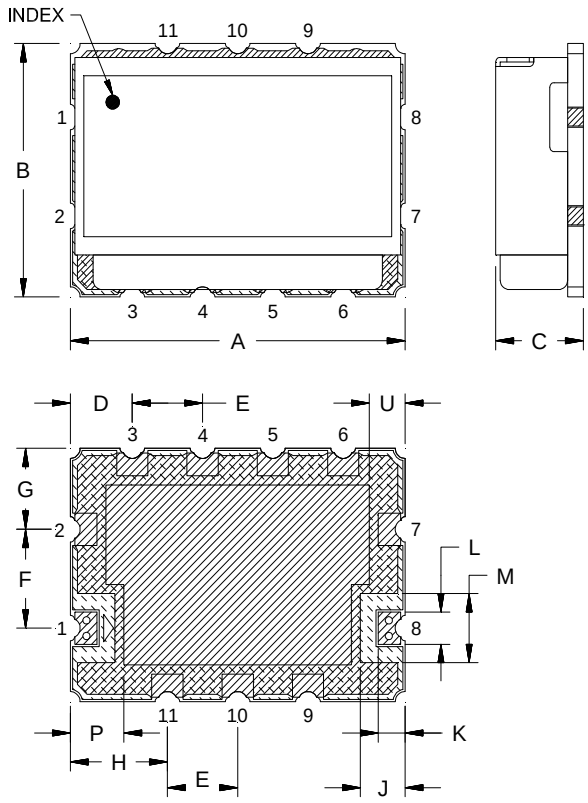
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm

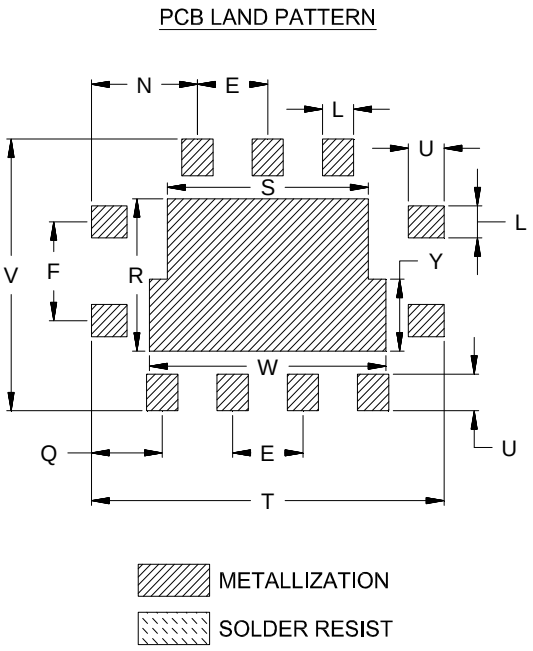


Case Style RZ

Outline Dimensions

RZ2511-1





CASE#	A	B	C	D	E	F	G	H	J	K	L	M
RZ2511-1	.750 (19.05)	.551 (14.00)	.210 (5.33)	.139 (3.53)	.158 (4.01)	.215 (5.46)	.176 (4.47)	.218 (5.54)	.100 (2.54)	.060 (1.52)	.070 (1.78)	.150 (3.81)

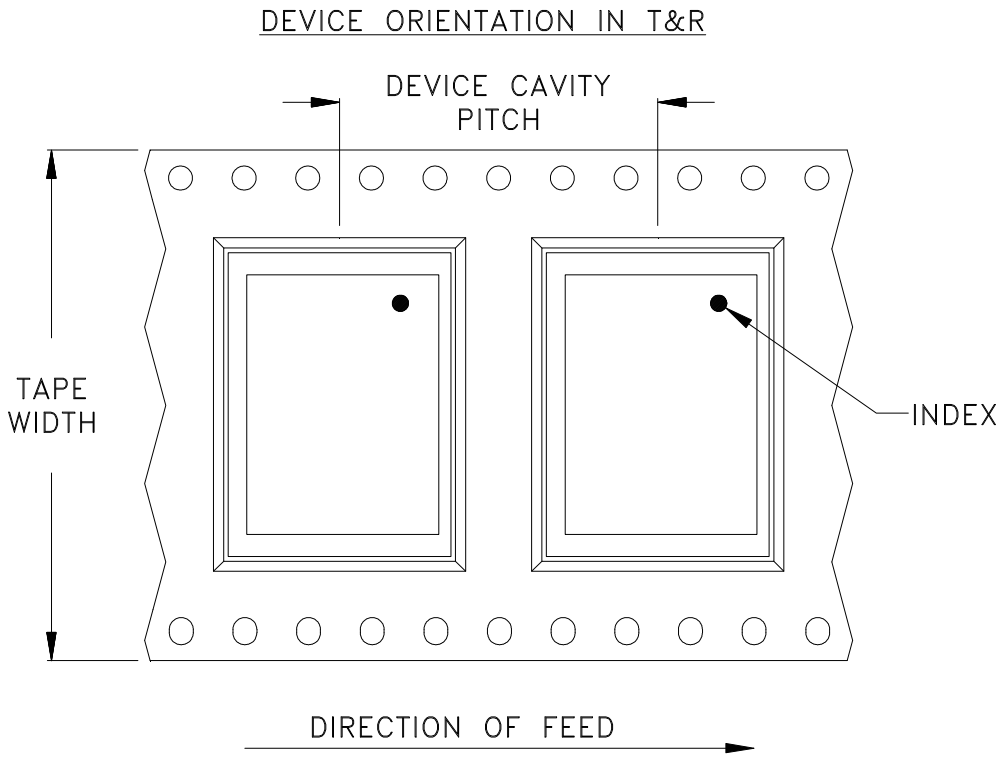
CASE#	N	P	Q	R	S	T	U	V	W	Y	WT.GRAMS
RZ2511-1	.238 (6.05)	.120 (3.05)	.159 (4.04)	.331 (8.41)	.450 (11.43)	.790 (20.07)	.080 (2.03)	.591 (15.01)	.530 (13.46)	.156 (3.96)	2.4

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.

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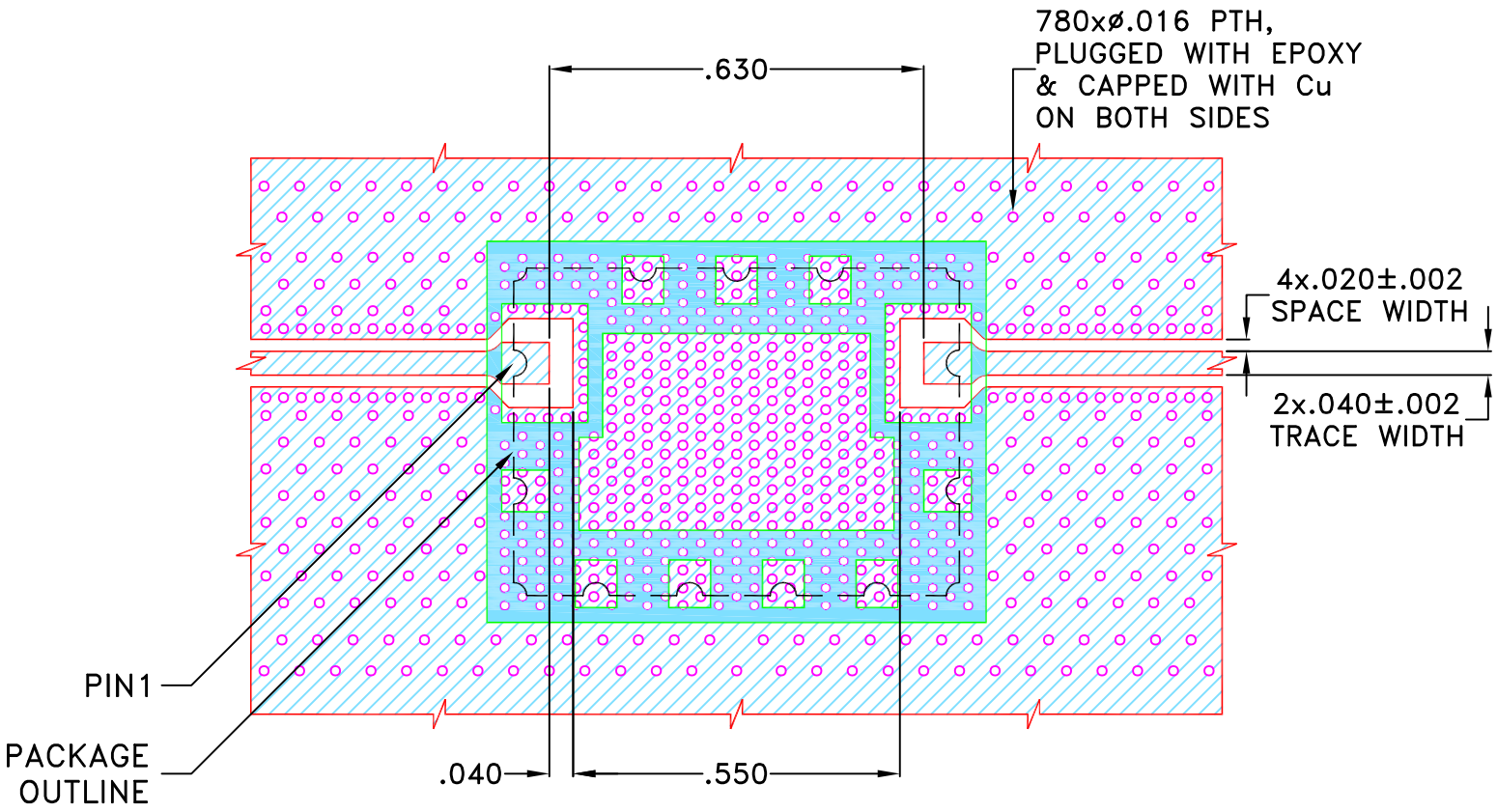
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-026307	NEW RELEASE	JUL 25	DDR	VC

SUGGESTED MOUNTING CONFIGURATION FOR RZ2511-1 CASE STYLE



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .020±.0015. 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	DDR	23 JUL 25
TOLERANCES ON:	CHECKED	GKK	23 JUL 25
2 PL DECIMALS ±	APPROVED	KN	23 JUL 25
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

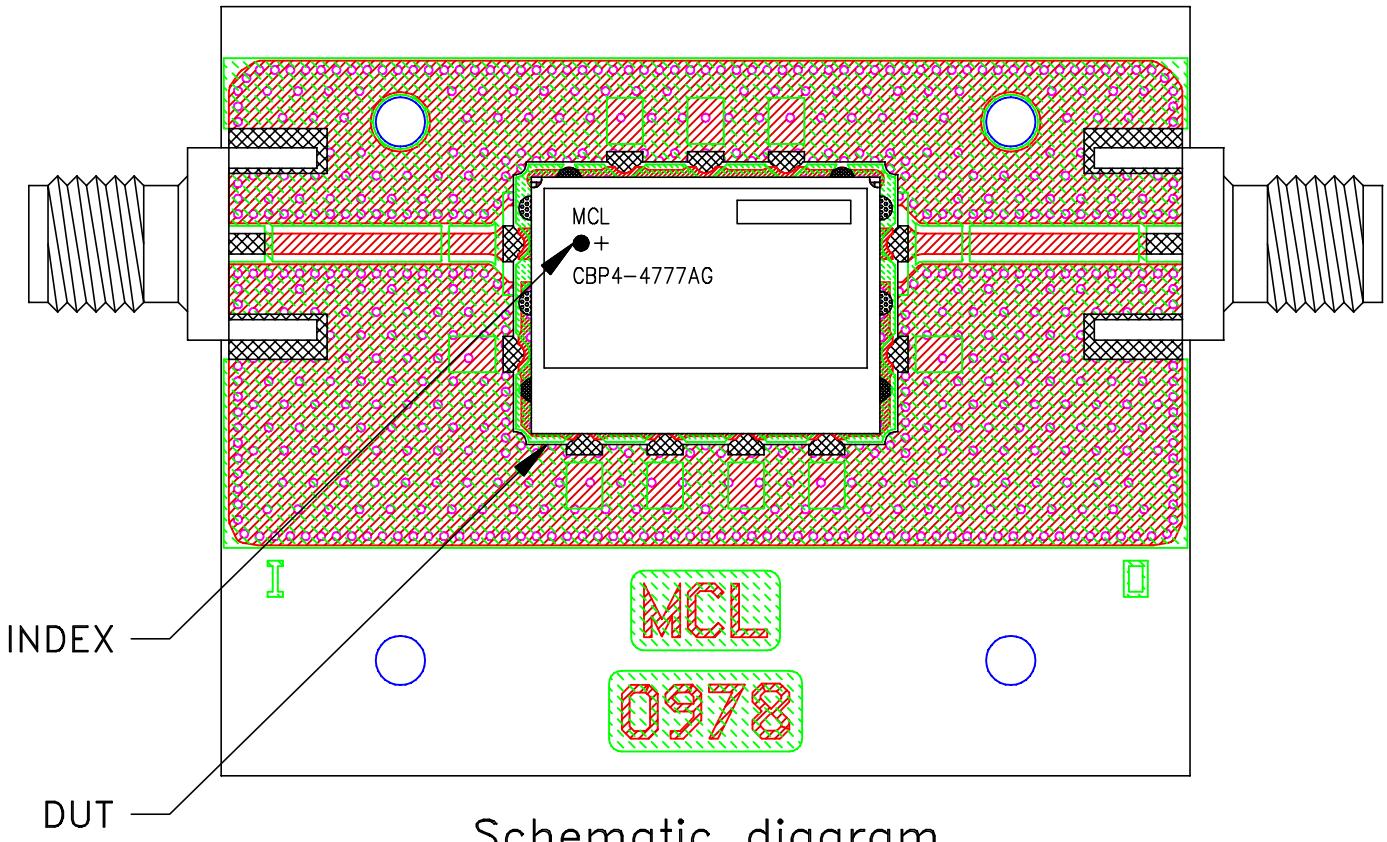
PL DWG, RZ2511-1, TB-1274

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-761	OR

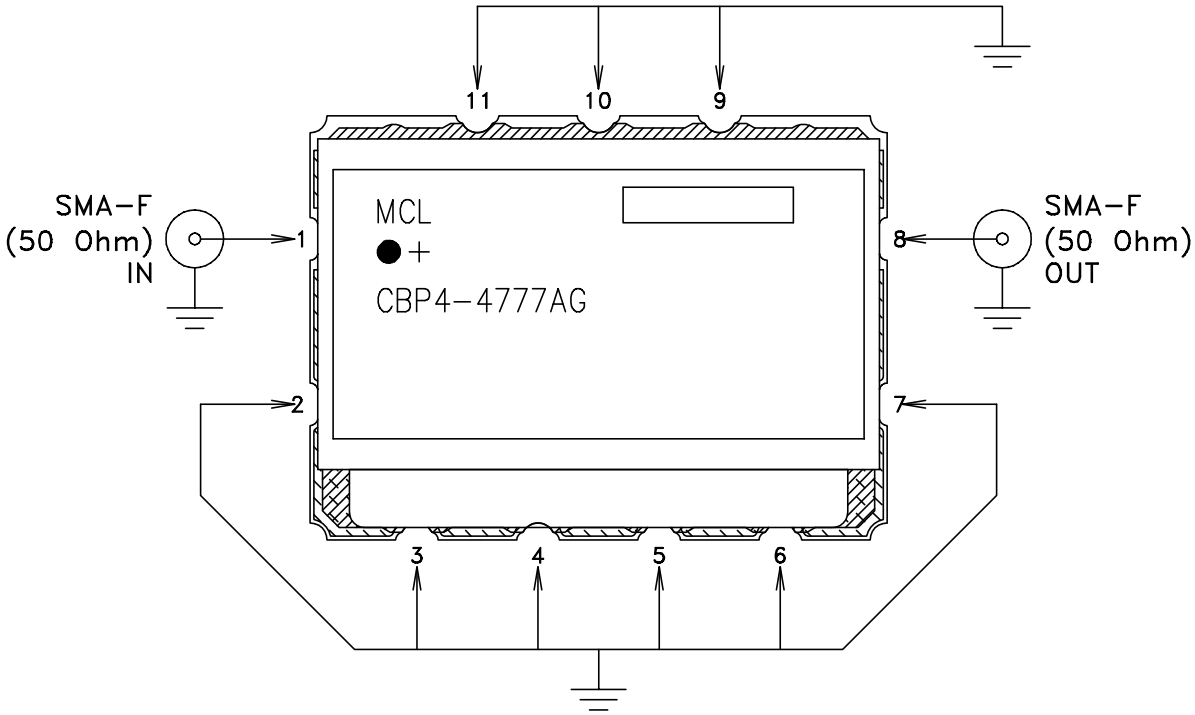
FILE:	SCALE:	SHEET:
98-PL-761	3:1	1 OF 1

Evaluation Board and Circuit

TB-CBP4-4777AG+



Schematic diagram



Notes:

1. PCB Material: ROGERS (RO4350B) OR Equivalent, Dielectric Constant=3.48±.05
Dielectric Thickness: .020±.0015 inch
2. 50 Ohm SMA Female Connectors.

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