



Mini-Circuits

CERAMIC RESONATOR SURFACE MOUNT

Band Pass Filter

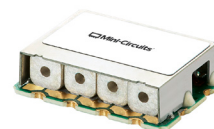
CBP4-4475AG+

50Ω

4405 to 4545 MHz

THE BIG DEAL

- Good Insertion Loss, 2.1 dB Typ.
- Excellent Rejection, 59 dB Typ.
- Good Return Loss, 18 dB Typ.
- Miniature Shielded Package

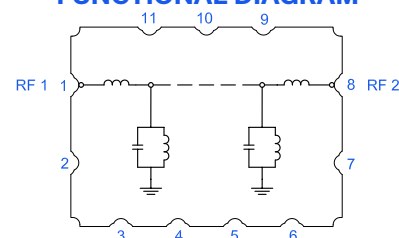


Generic photo used for illustration purposes only

APPLICATIONS

- Radio Astronomy
- Wireless Local Area Networks (WLAN)
- Scientific Research and Experimentation
- Amateur Radio (Ham radio)
- Satellite Communications

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 tuning and process control.

ELECTRICAL SPECIFICATIONS^{1,2,3} AT +25°C

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Passband	Center Frequency	—	—	4475	—	MHz
	Insertion Loss	F1-F2	—	2.1	2.7	dB
	Return Loss	F1-F2	10	18	—	dB
Stopband, Lower	Rejection	DC-F3	50	59	—	dB
		F3-F4	20	29	—	dB
Stopband, Upper	Rejection	F5-F6	20	31	—	dB
		F6-F7	33	45	—	dB

1. Tested in Evaluation Board P/N TB-CBP4-4475AG+.

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.

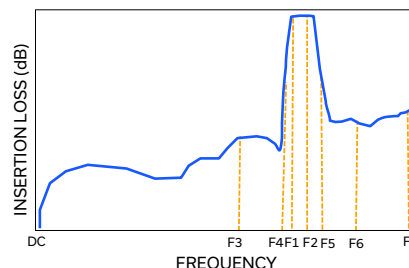
ABSOLUTE MAXIMUM RATINGS⁴

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



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REV. A
ECO-028461
EDU4841
CBP4-4475AG+
URJ
260206

PAGE 1 OF 4



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CERAMIC RESONATOR SURFACE MOUNT

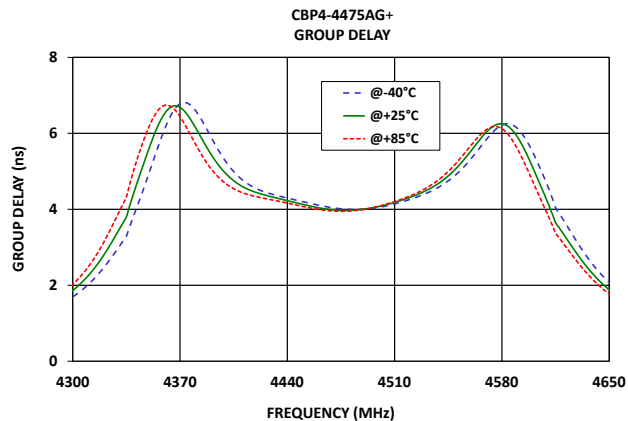
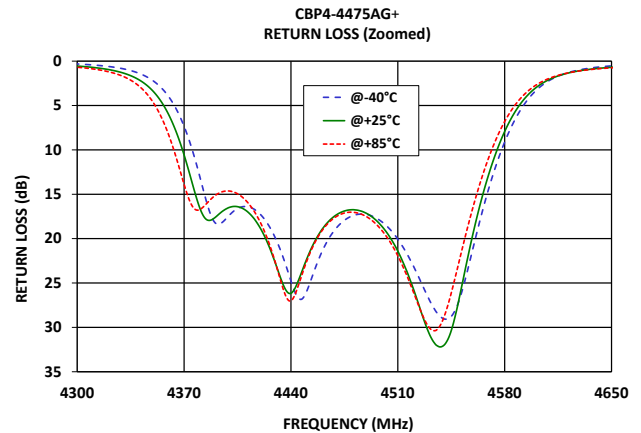
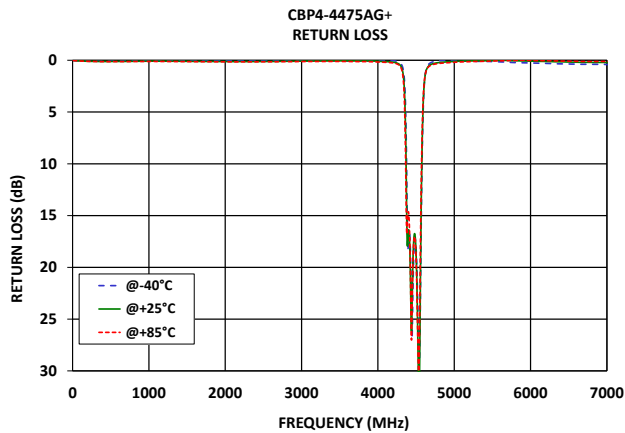
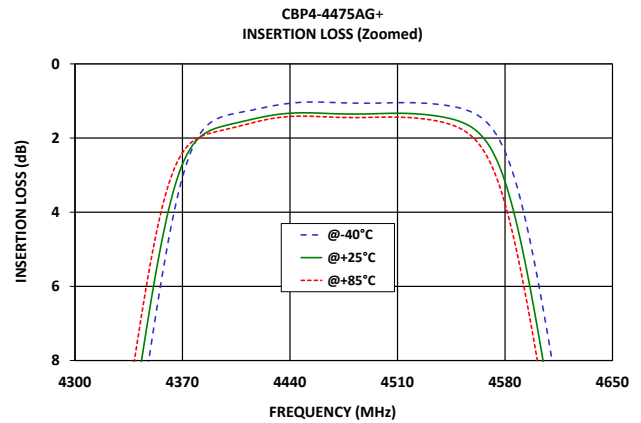
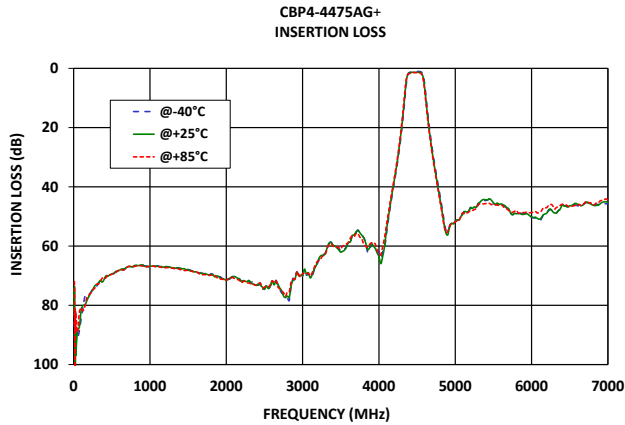
Band Pass Filter

CBP4-4475AG+

50 Ω

4405 to 4545 MHz

TYPICAL PERFORMANCE GRAPHS





FUNCTIONAL DIAGRAM

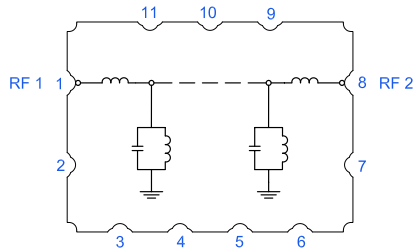
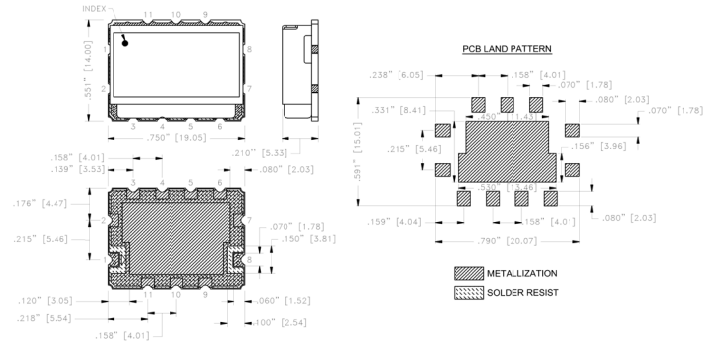


Figure 1. CBP4-4475AG+ Functional Diagram

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)

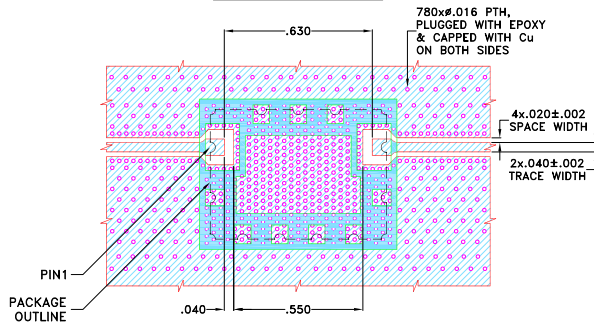
CASE STYLE DRAWING



Weight: 2.4 gram

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

SUGGESTED PCB LAYOUT

SUGGESTED MOUNTING CONFIGURATION FOR
RZ2511-1 CASE STYLE

NOTES:

- 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.
- 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

Figure 2. Suggested PCB Layout

PRODUCT MARKING*: CBP4-4475AG

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



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CBP4-4475AG+

50Ω

4405 to 4545 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-CBP4-4475AG+ Gerber File
Environmental Rating	ENV54
MSL Level	MSL1

NOTES

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' applicable established test performance criteria and measurement instructions.
- 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



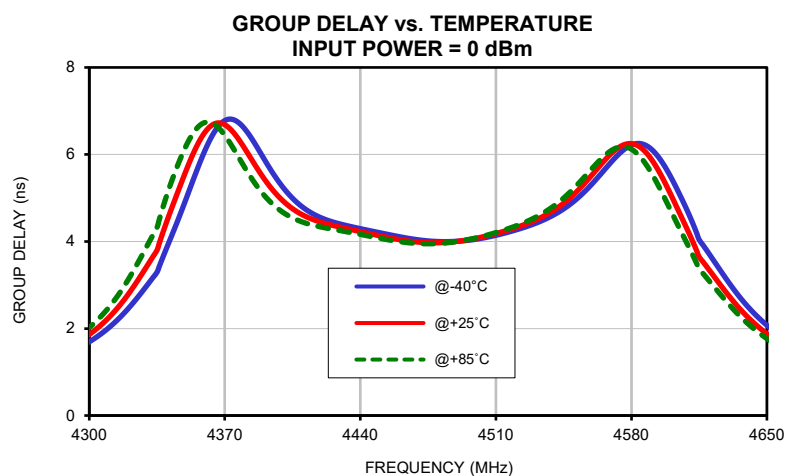
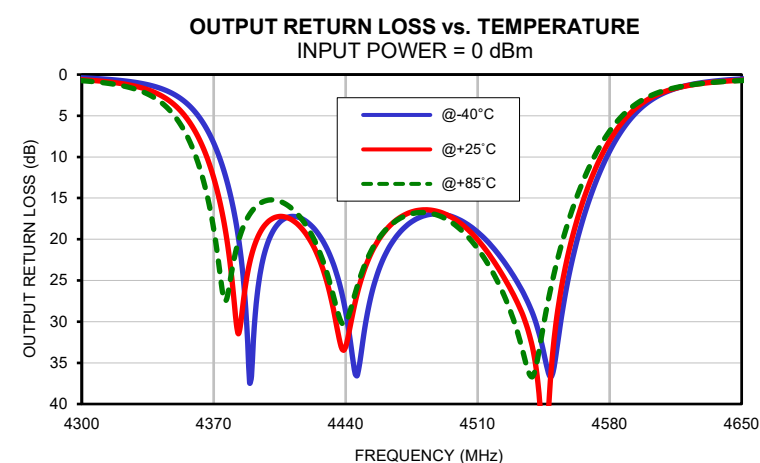
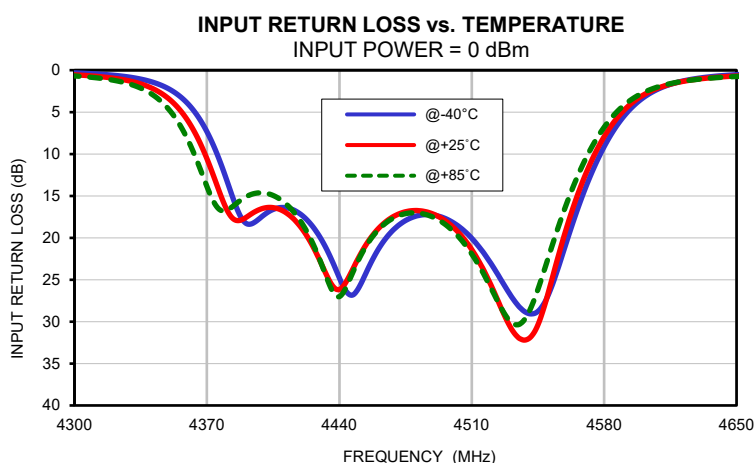
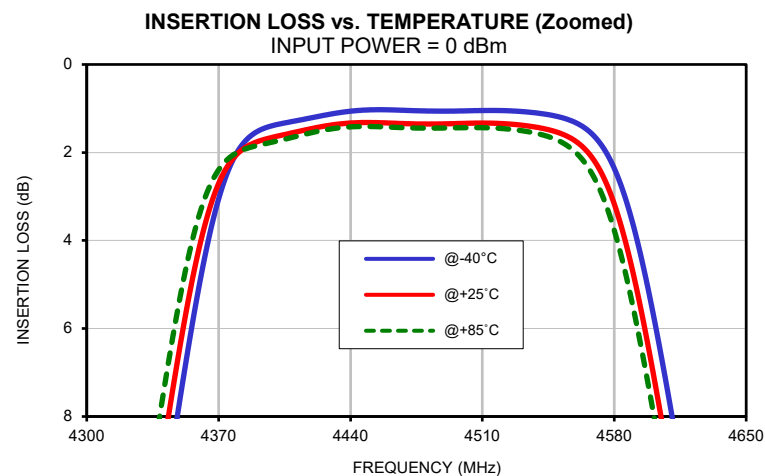
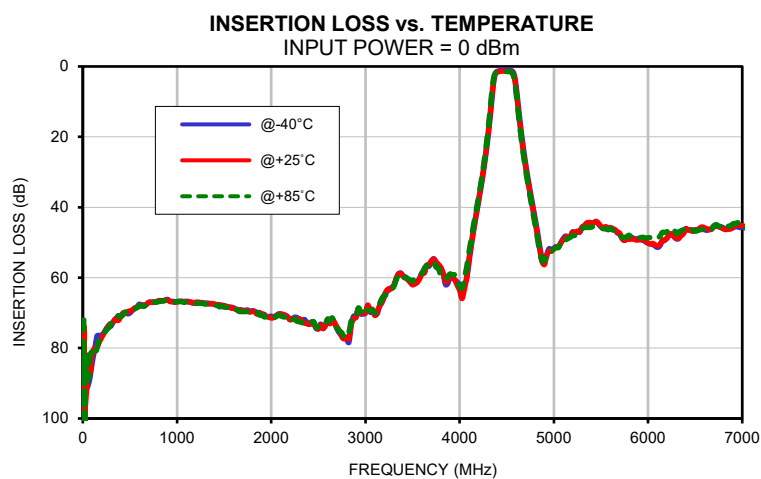
Typical Performance Data

FREQ. (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
10	91.19	81.35	71.98	0.02	0.02	0.03	0.02	0.02	0.02
20	86.07	83.40	82.58	0.03	0.03	0.04	0.02	0.02	0.03
50	91.06	88.69	89.25	0.04	0.04	0.05	0.03	0.04	0.04
100	84.08	81.28	80.74	0.06	0.07	0.07	0.06	0.06	0.07
150	76.59	79.81	80.07	0.08	0.09	0.09	0.07	0.08	0.08
200	76.31	76.97	76.50	0.09	0.10	0.10	0.08	0.09	0.09
300	73.73	73.04	72.93	0.09	0.11	0.12	0.08	0.10	0.10
400	71.14	71.23	71.08	0.09	0.12	0.13	0.08	0.11	0.11
500	70.05	69.41	69.54	0.09	0.12	0.13	0.07	0.11	0.11
600	67.52	68.19	67.97	0.08	0.12	0.13	0.06	0.10	0.11
700	66.95	67.05	67.22	0.07	0.11	0.13	0.06	0.09	0.11
1000	66.91	66.80	66.73	0.04	0.09	0.12	0.02	0.07	0.08
2000	70.93	71.46	71.50	0.05	0.12	0.15	0.03	0.10	0.11
3000	70.10	69.95	69.24	0.02	0.09	0.13	0.01	0.07	0.10
3500	61.76	62.06	60.96	0.06	0.06	0.12	0.04	0.06	0.10
3600	58.69	58.80	58.70	0.07	0.06	0.12	0.05	0.06	0.11
3800	57.10	57.20	59.44	0.06	0.07	0.13	0.04	0.08	0.13
3500	61.76	62.06	60.96	0.06	0.06	0.12	0.04	0.06	0.10
3600	58.69	58.80	58.70	0.07	0.06	0.12	0.05	0.06	0.11
4000	62.01	63.56	62.66	0.04	0.10	0.17	0.01	0.11	0.17
4241	32.06	31.27	30.46	0.09	0.25	0.33	0.13	0.28	0.34
4255	29.57	28.73	27.87	0.12	0.29	0.37	0.16	0.32	0.39
4291	22.45	21.41	20.40	0.26	0.47	0.58	0.32	0.53	0.62
4321	15.37	14.10	12.87	0.61	0.97	1.22	0.73	1.09	1.33
4351	7.20	6.03	4.97	2.38	3.64	4.99	2.69	4.07	5.59
4367	3.54	3.04	2.61	6.13	8.98	12.11	6.92	10.44	15.21
4405	1.33	1.59	1.70	16.62	16.40	14.95	17.91	17.22	15.38
4420	1.20	1.45	1.54	17.27	18.83	18.18	18.00	19.72	18.70
4435	1.09	1.35	1.43	22.16	25.22	25.71	24.09	30.33	28.27
4450	1.03	1.32	1.41	26.07	22.45	22.71	30.91	23.61	23.14
4475	1.05	1.35	1.44	17.94	16.89	17.12	17.86	16.67	16.89
4500	1.06	1.34	1.44	18.16	18.70	19.17	17.60	17.91	18.64
4510	1.05	1.33	1.44	20.06	21.40	21.93	19.13	20.07	21.15
4540	1.11	1.44	1.58	29.03	32.05	28.96	29.55	34.26	36.22
4545	1.14	1.48	1.64	28.77	30.38	26.14	33.76	51.82	30.29
4563	1.40	1.86	2.16	18.51	16.78	14.25	19.85	17.41	14.58
4581	2.46	3.30	3.92	8.70	7.56	6.50	8.85	7.62	6.53
4600	5.53	6.86	7.74	3.40	3.06	2.76	3.42	3.06	2.75
4608	7.35	8.79	9.70	2.31	2.17	2.02	2.32	2.17	2.01
4629	12.55	14.03	14.89	0.99	1.09	1.10	0.98	1.07	1.07
4657	19.05	20.42	21.16	0.45	0.62	0.69	0.45	0.61	0.66
4715	29.97	31.14	31.79	0.17	0.35	0.43	0.17	0.34	0.39
4800	42.92	44.11	44.87	0.05	0.22	0.31	0.08	0.23	0.28
4900	55.43	56.30	55.14	0.02	0.16	0.24	0.04	0.18	0.23
5000	51.63	51.78	51.85	0.05	0.12	0.20	0.03	0.17	0.21
5100	48.85	49.17	48.76	0.08	0.08	0.16	0.01	0.15	0.19
5200	47.02	46.99	48.01	0.09	0.07	0.14	0.01	0.15	0.19
5300	45.61	45.72	46.14	0.10	0.05	0.12	0.02	0.16	0.19
5400	44.61	44.40	45.65	0.11	0.05	0.10	0.02	0.16	0.18
5500	45.60	45.39	46.02	0.13	0.03	0.08	0.00	0.15	0.17
5600	46.03	45.75	46.03	0.16	0.00	0.06	0.01	0.14	0.16
5700	47.59	47.39	47.98	0.19	0.02	0.03	0.04	0.11	0.13
5800	49.00	49.09	47.93	0.22	0.05	0.02	0.06	0.09	0.12
5900	48.95	49.26	48.72	0.24	0.07	0.00	0.06	0.08	0.11
6000	50.21	50.14	48.62	0.26	0.09	0.02	0.08	0.07	0.10
6100	51.41	50.92	48.63	0.28	0.10	0.04	0.09	0.07	0.10
6200	48.77	48.86	47.00	0.30	0.12	0.05	0.08	0.08	0.11
6500	46.56	46.37	46.79	0.36	0.17	0.09	0.12	0.04	0.09
6600	46.35	45.85	46.39	0.38	0.19	0.10	0.14	0.03	0.08
7000	45.65	45.27	44.56	0.41	0.22	0.13	0.13	0.04	0.10

Typical Performance Data

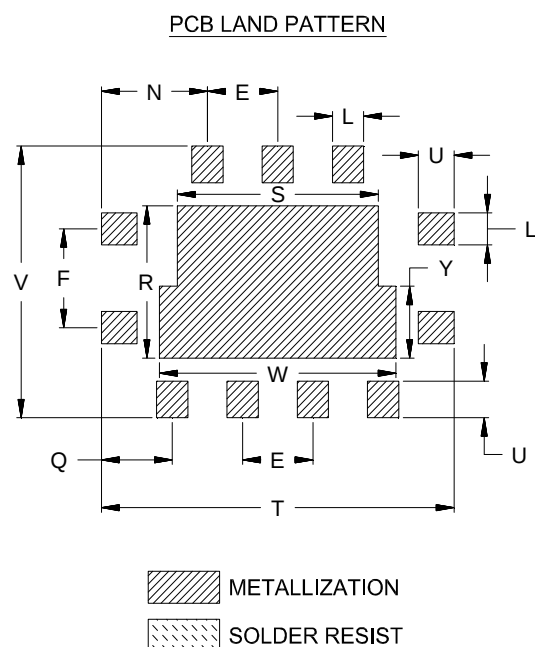
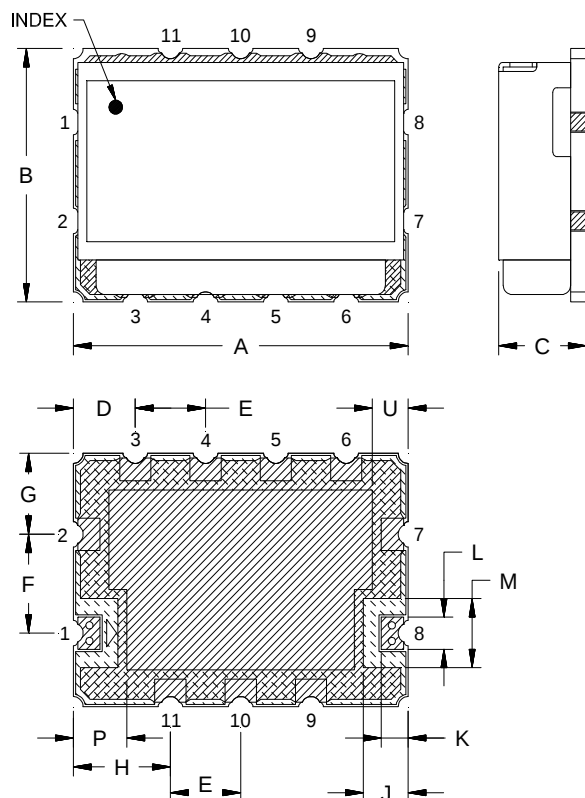
FREQ.	GROUP DELAY		
(MHz)	(nsec)		
	@-40°C	@+25°C	@+85°C
4405	4.99	4.75	4.54
4409	4.83	4.64	4.47
4413	4.70	4.55	4.41
4417	4.60	4.48	4.36
4421	4.52	4.43	4.32
4425	4.46	4.38	4.29
4429	4.41	4.34	4.26
4433	4.36	4.30	4.22
4437	4.32	4.26	4.19
4441	4.29	4.22	4.15
4445	4.25	4.18	4.12
4449	4.21	4.14	4.08
4453	4.17	4.10	4.05
4457	4.14	4.07	4.02
4461	4.10	4.04	3.99
4465	4.07	4.01	3.97
4469	4.04	3.99	3.96
4473	4.02	3.98	3.95
4475	4.01	3.97	3.95
4481	4.00	3.97	3.96
4485	4.00	3.98	3.97
4489	4.00	4.00	3.99
4493	4.02	4.02	4.02
4497	4.03	4.05	4.06
4501	4.06	4.09	4.10
4505	4.09	4.13	4.14
4520	4.26	4.31	4.35
4530	4.41	4.48	4.54
4545	4.75	4.88	5.00

Typical Performance Curves



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. $\pm .03$; 3PL. $\pm .015$

Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- 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.



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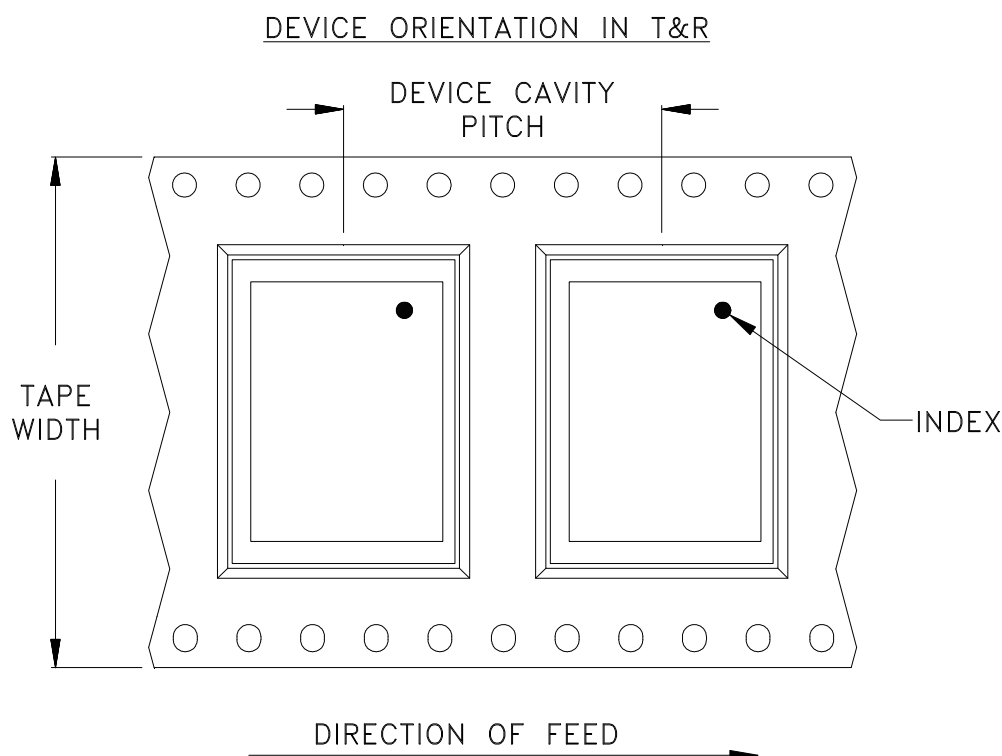


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RF/MICROWAVE COMPONENTS



Tape & Reel Packaging TR-F122



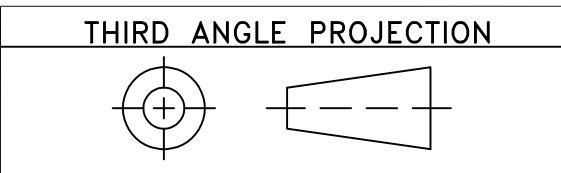
Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	20	13	500

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

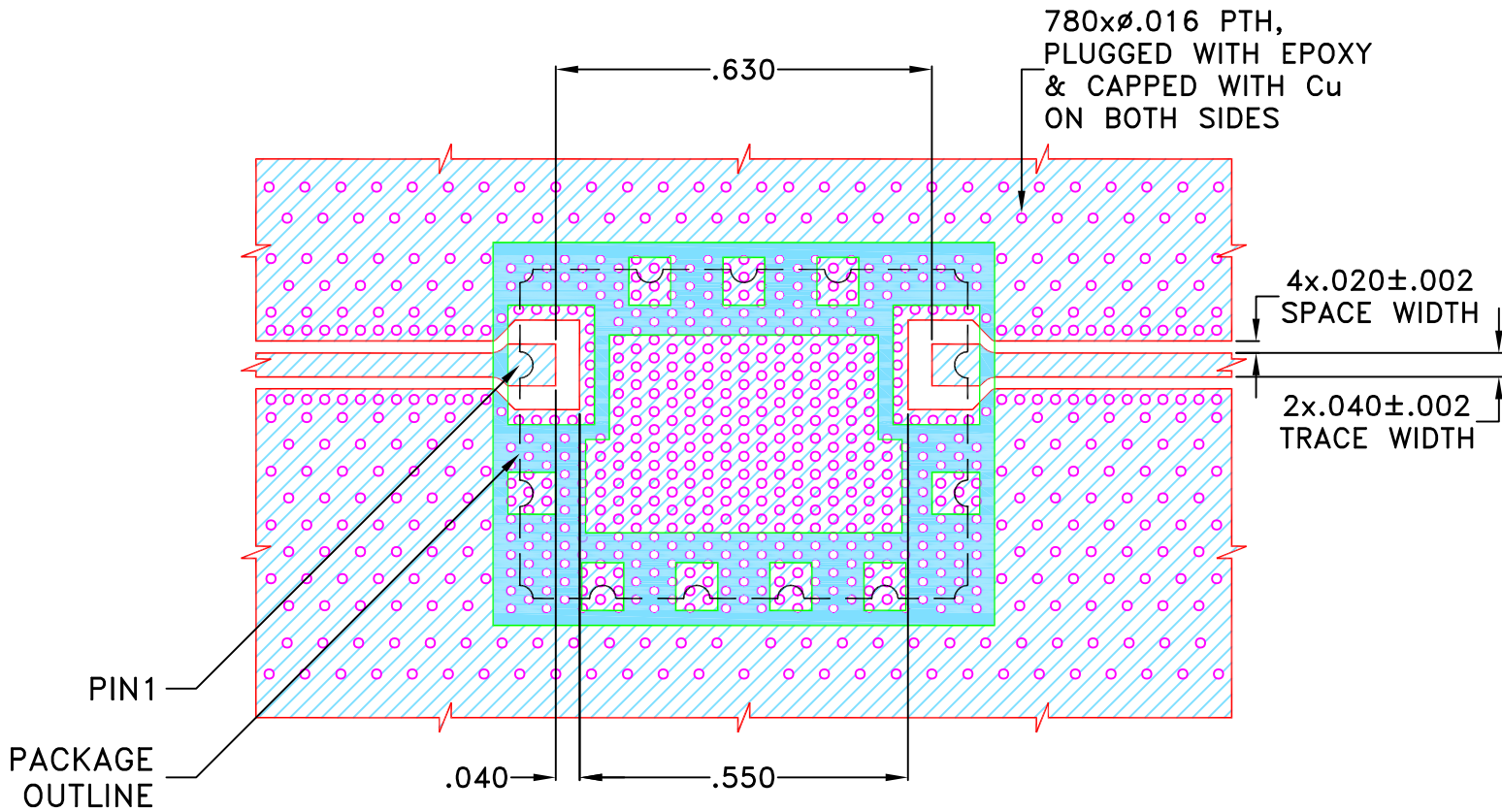


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REVISIONS					
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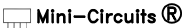
SUGGESTED MOUNTING CONFIGURATION FOR
RZ2511-1 CASE STYLE



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 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 TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ±	DRAWN	DDR	23 JUL 25
	CHECKED	GKK	23 JUL 25
	APPROVED	KN	23 JUL 25
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ASHEETA1.DWG REV:A DATE:01/12/95			

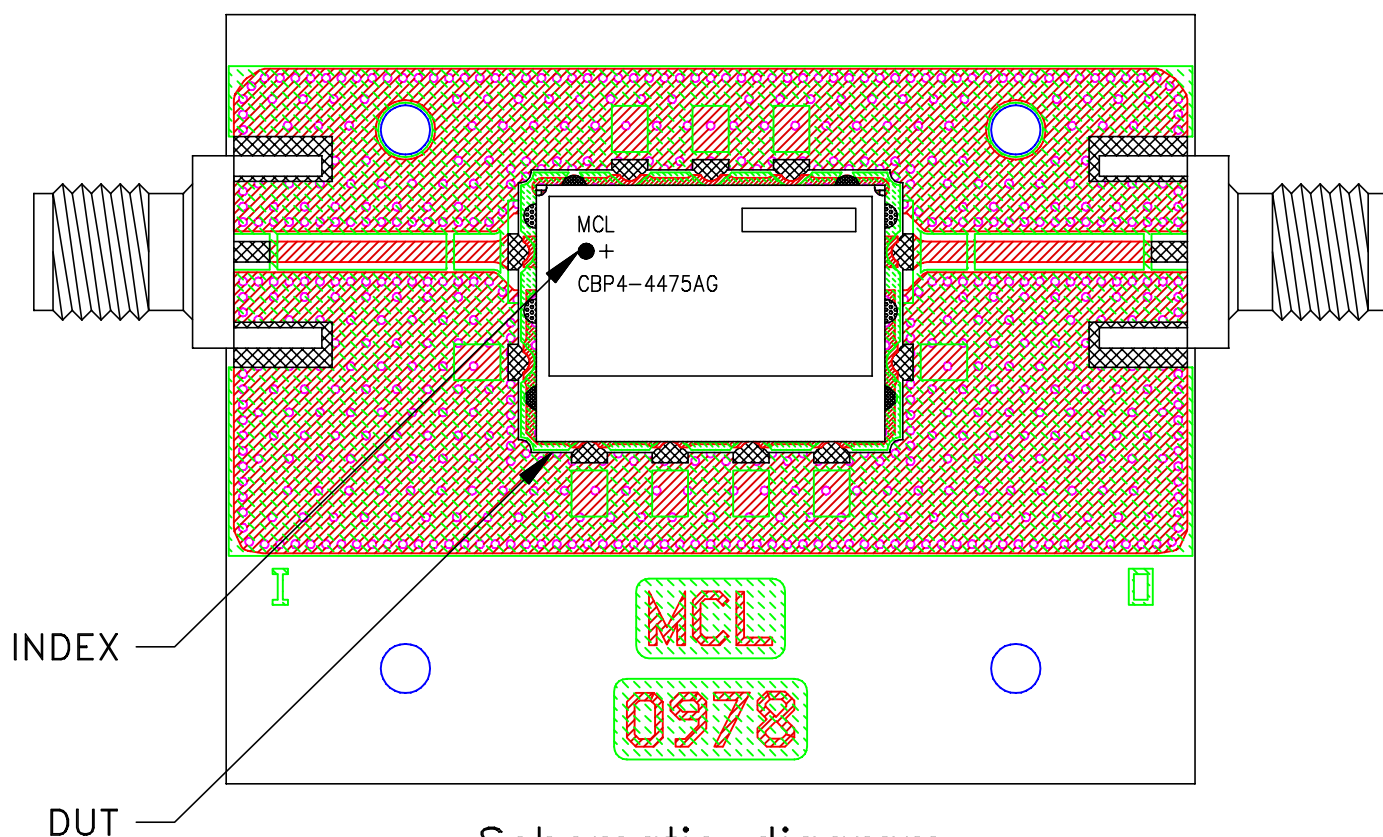
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PL DWG, RZ2511-1, TB-1274

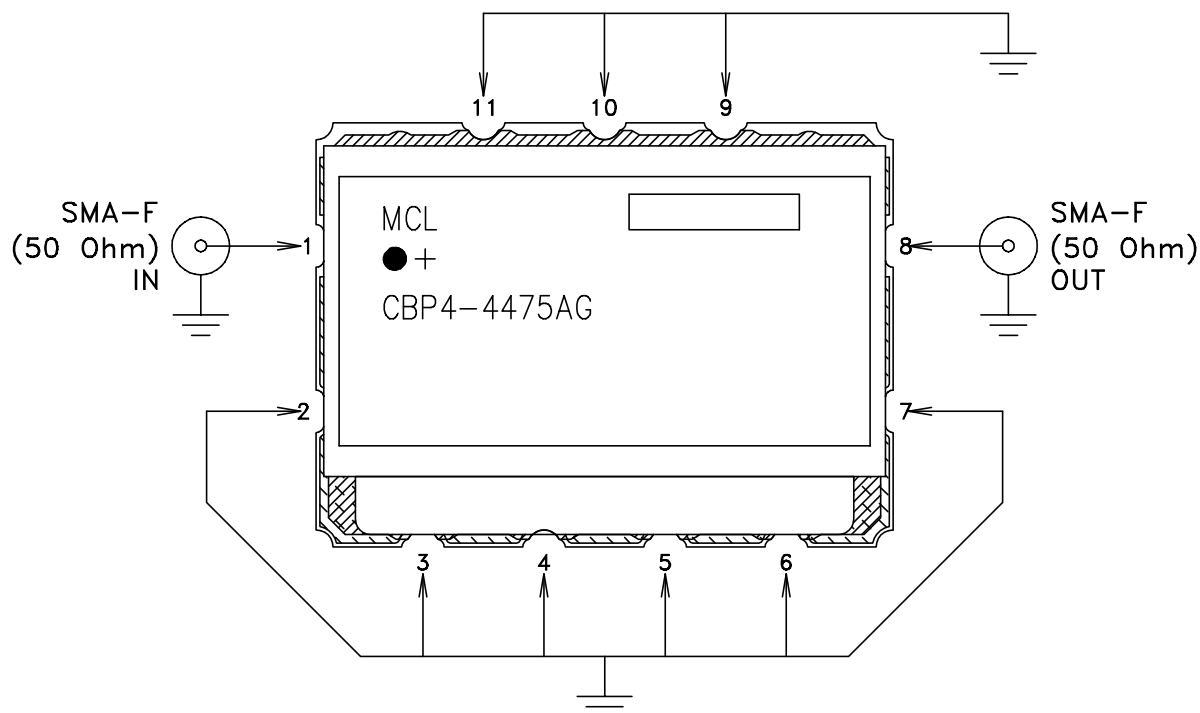
SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-761	REV: OR
FILE: 98-PL-761	SCALE: 3:1	SHEET: 1 OF 1	

Evaluation Board and Circuit

TB-CBP4-4475AG+



Schematic diagram



Notes:

1. PCB Material: ROGERS (R04350B) OR Equivalent, Dielectric Constant= 3.48 ± 0.05
Dielectric Thickness: $.020 \pm .0015$ inch
2. 50 Ohm SMA Female Connectors.

 **Mini-Circuits®**



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