CERAMIC RESONATOR SURFACE MOUNT

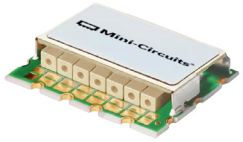
Band Pass Filter

CBP2-1962BV+

50Ω 1837 to 2087 MHz

THE BIG DEAL

- Good Insertion Loss, 1.8 dB Typ.
- Excellent Rejection, 70 dB Typ.
- Good Return Loss, 15 dB Typ.
- Miniature Shielded Package

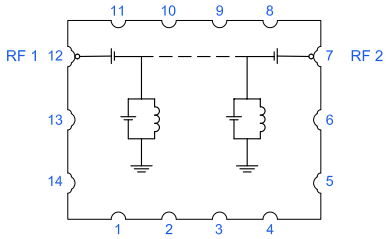


Generic photo used for illustration purposes only

APPLICATIONS

- Aerospace
- General
- Satellite
- Telecommunications and Mobile 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] AT +25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Passband	Center Frequency	—	—	—	1962	—	MHz
	Insertion Loss	F1-F2	1837 - 2087	—	1.8	2.5	dB
	Return Loss	F1-F2	1837 - 2087	10	15	—	dB
Stopband, Lower	Rejection	DC-F3	DC - 1300	60	70	—	dB
		F3-F4	1300 - 1720	20	30	—	
Stopband, Upper	Rejection	F5-F6	2210 - 2350	20	30	—	dB
		F6-F7	2350 - 3400	40	50	—	

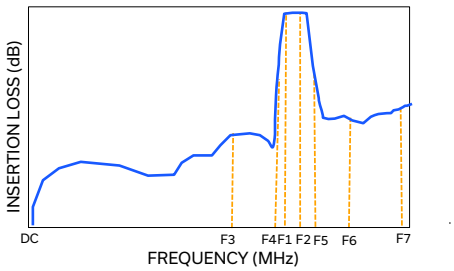
1. Tested in Evaluation Board P/N TB-CBP2-1962BV+.
2. This component should not be used as a DC-block. In applications where DC voltage and/or current is present at either the input or output ports, external DC blocking capacitors are required.

ABSOLUTE MAXIMUM RATINGS[3]

Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
Input Power[4]	10 W at +25°C

3. Permanent damage may occur if any of these limits are exceeded.
4. 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. OR
ECO-027744
EDU5205
CBP2-1962BV+
URJ
251122

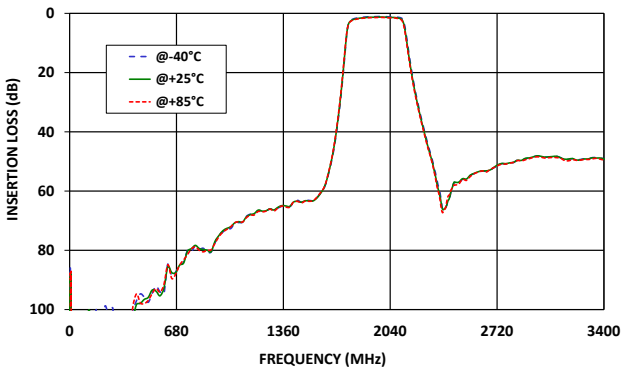
Band Pass Filter

CBP2-1962BV+

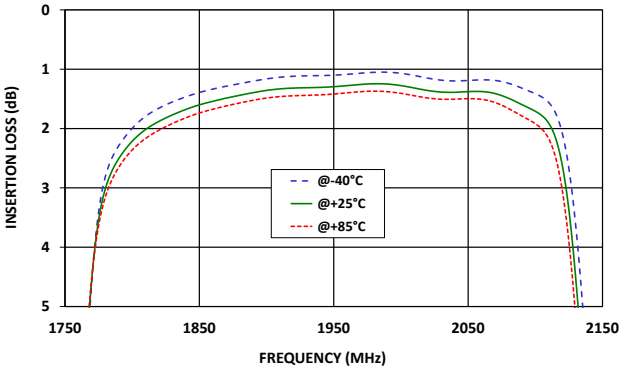
50Ω 1837 to 2087 MHz

TYPICAL PERFORMANCE GRAPHS

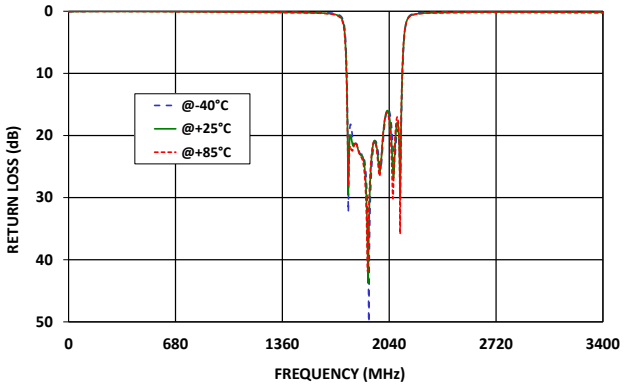
CBP2-1962BV+
INSERTION LOSS



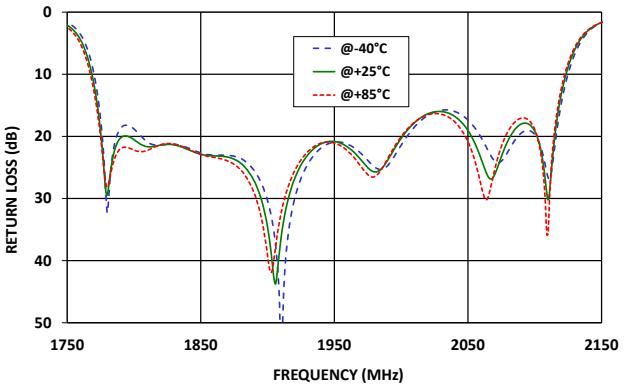
CBP2-1962BV+
INSERTION LOSS (Zoomed)



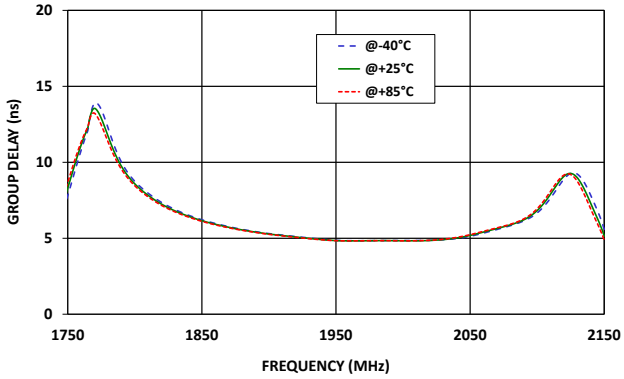
CBP2-1962BV+
RETURN LOSS



CBP2-1962BV+
RETURN LOSS (Zoomed)



CBP2-1962BV+
GROUP DELAY



CERAMIC RESONATOR SURFACE MOUNT

Band Pass Filter

CBP2-1962BV+

50Ω 1837 to 2087 MHz

FUNCTIONAL DIAGRAM

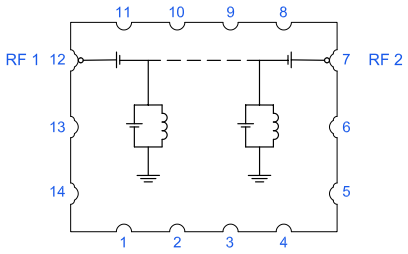


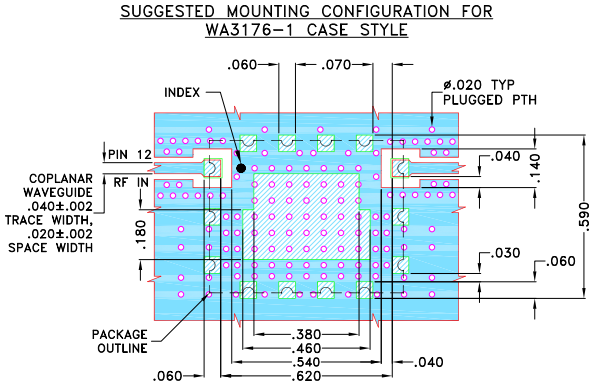
Figure 1. CBP2-1926BV+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description
RF1[5]	12	Connects to RF Input Port
RF2[5]	7	Connects to RF Output Port
GROUND	1-6,8-11,13,14	Connects to Ground on PCB, (See drawing PL-722)

5. This filter is bi-directional; RF1 and RF2 ports may be interchanged, see S-parameters for actual performance.

SUGGESTED PCB LAYOUT



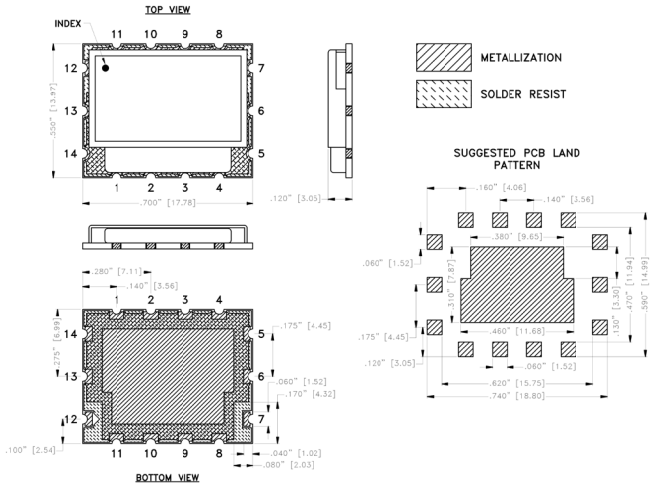
NOTES:
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .020±.0015. COPPER: 1/2 Oz. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

Figure 2. Suggested PCB Layout

CASE STYLE DRAWING



Weight: 1.3 grams
Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3Pl. ± .015

PRODUCT MARKING*: CBP2-1962BV

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

Band Pass Filter

CBP2-1962BV+

50Ω 1837 to 2087 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	WA3176-1 Lead Finish: Gold over Nickel Plate
RoHS/REACH Status	Compliant
Tape and Reel	F122
Suggested Layout for PCB Design	PL-722
Evaluation Board	TB-CBP2-1962BV+ 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 CBP2-1962BV+

Typical Performance Data

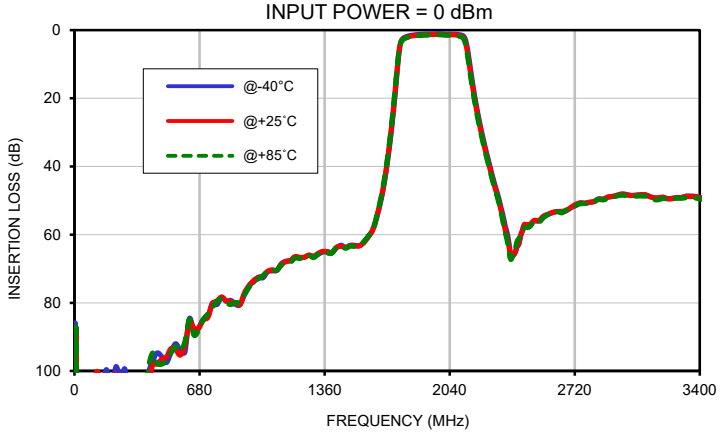
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
10	112.53	108.91	106.76	0.05	0.05	0.05	0.05	0.05	0.05
20	111.92	121.01	105.83	0.05	0.05	0.05	0.05	0.05	0.05
50	108.01	106.88	111.75	0.04	0.04	0.04	0.04	0.04	0.04
100	118.93	107.03	119.06	0.03	0.03	0.04	0.03	0.04	0.04
150	104.56	112.13	107.34	0.01	0.03	0.03	0.02	0.03	0.03
200	107.73	105.15	109.16	0.01	0.02	0.03	0.01	0.03	0.03
300	127.78	107.35	107.52	0.00	0.02	0.03	0.01	0.03	0.03
400	100.96	103.92	99.83	0.01	0.03	0.04	0.01	0.03	0.04
500	97.55	95.91	96.93	0.00	0.04	0.05	0.01	0.04	0.05
600	94.58	92.79	91.54	0.00	0.04	0.05	0.01	0.04	0.06
700	84.94	84.99	84.95	0.02	0.06	0.08	0.03	0.06	0.08
1000	72.49	72.59	72.95	0.05	0.11	0.13	0.07	0.11	0.13
1300	66.41	66.37	66.74	0.10	0.17	0.19	0.12	0.16	0.18
1500	63.11	63.25	63.37	0.14	0.22	0.26	0.16	0.21	0.24
1600	60.31	60.52	60.32	0.19	0.28	0.31	0.21	0.28	0.32
1700	39.45	38.80	38.27	0.41	0.54	0.62	0.46	0.60	0.69
1720	31.03	30.25	29.63	0.58	0.74	0.85	0.65	0.83	0.96
1740	20.80	19.94	19.26	1.03	1.29	1.49	1.12	1.42	1.67
1778	3.01	3.19	3.32	25.42	26.67	26.14	16.10	18.20	20.35
1837	1.49	1.70	1.85	21.60	21.82	21.73	23.86	24.43	24.42
1850	1.39	1.60	1.74	22.67	22.88	22.89	25.61	26.46	26.71
1900	1.16	1.36	1.49	30.35	34.65	39.21	33.02	33.09	32.21
1920	1.12	1.32	1.45	30.25	26.95	25.66	27.77	24.94	23.92
1940	1.11	1.31	1.43	21.88	21.20	21.09	21.12	20.24	20.07
1962	1.08	1.27	1.39	21.47	22.06	22.77	20.41	20.40	20.68
1980	1.05	1.25	1.37	24.89	25.70	26.47	22.31	22.04	22.04
1990	1.05	1.25	1.38	24.68	23.80	23.55	21.88	20.90	20.58
2000	1.07	1.28	1.41	21.42	20.32	20.03	19.68	18.64	18.35
2050	1.19	1.38	1.50	17.36	19.05	20.86	15.87	16.81	17.84
2087	1.29	1.56	1.75	20.10	18.46	17.36	17.91	16.52	15.51
2127	3.01	3.78	4.37	8.49	7.57	7.03	8.15	6.90	6.10
2180	20.51	21.51	22.21	0.54	0.65	0.70	0.50	0.58	0.61
2210	28.86	29.69	30.28	0.32	0.44	0.48	0.30	0.39	0.42
2215	30.09	30.90	31.48	0.30	0.42	0.46	0.29	0.37	0.41
2230	33.66	34.42	34.99	0.26	0.37	0.42	0.25	0.33	0.37
2300	47.98	48.73	49.13	0.15	0.26	0.30	0.14	0.22	0.26
2350	58.97	60.23	61.01	0.12	0.22	0.26	0.11	0.19	0.23
2400	64.67	64.76	63.48	0.09	0.19	0.24	0.08	0.16	0.20
2410	63.36	63.08	61.62	0.09	0.19	0.23	0.07	0.15	0.20
2430	59.78	59.46	59.36	0.08	0.18	0.22	0.07	0.15	0.19
2450	57.02	57.00	57.96	0.07	0.18	0.22	0.06	0.14	0.19
2475	57.34	57.01	57.68	0.06	0.17	0.22	0.05	0.14	0.18
2500	56.04	55.82	56.03	0.06	0.17	0.21	0.05	0.14	0.18
2525	55.96	55.93	56.39	0.05	0.16	0.21	0.05	0.13	0.18
2550	54.68	54.61	55.05	0.04	0.15	0.20	0.04	0.12	0.17
2600	53.57	53.48	53.62	0.03	0.14	0.19	0.02	0.11	0.16
2625	53.27	53.20	53.18	0.03	0.14	0.19	0.02	0.11	0.16
2650	53.31	53.18	53.61	0.03	0.14	0.19	0.02	0.11	0.16
2675	53.00	52.89	52.75	0.03	0.14	0.19	0.01	0.10	0.16
2700	52.08	51.99	52.07	0.02	0.13	0.19	0.00	0.10	0.16
2725	51.52	51.12	51.39	0.02	0.13	0.19	0.00	0.10	0.16
2750	50.74	50.68	50.94	0.02	0.13	0.19	0.01	0.09	0.15
2775	50.86	50.75	50.89	0.02	0.14	0.20	0.00	0.10	0.16
2800	50.56	50.47	50.56	0.02	0.14	0.20	0.00	0.10	0.17
2900	49.06	48.94	49.44	0.01	0.13	0.20	0.01	0.09	0.16
3000	48.21	48.27	48.57	0.02	0.14	0.21	0.00	0.10	0.18
3100	48.25	48.26	48.71	0.03	0.15	0.22	0.02	0.12	0.20
3200	49.05	49.02	49.37	0.02	0.15	0.23	0.02	0.13	0.20
3300	49.11	49.16	49.34	0.03	0.16	0.23	0.02	0.13	0.20
3400	49.11	49.17	49.53	0.04	0.17	0.25	0.03	0.14	0.21

Typical Performance Data

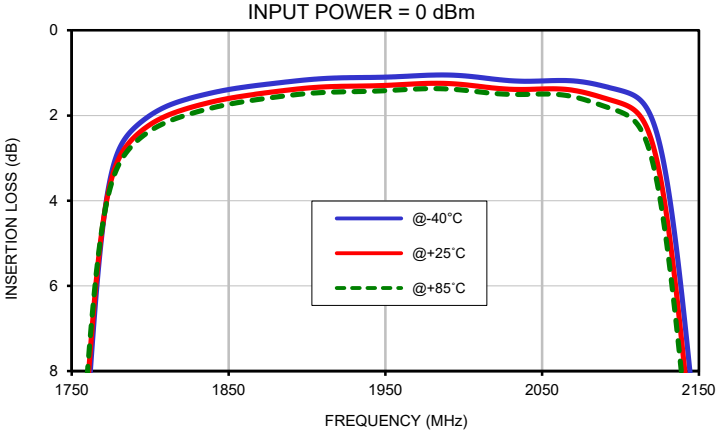
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
1837	6.62	6.55	6.49
1840	6.52	6.45	6.40
1842	6.45	6.39	6.34
1843	6.42	6.36	6.31
1845	6.36	6.30	6.25
1850	6.22	6.16	6.11
1855	6.09	6.03	5.99
1860	5.97	5.92	5.88
1865	5.87	5.82	5.78
1870	5.76	5.72	5.69
1875	5.67	5.63	5.60
1880	5.58	5.55	5.52
1885	5.51	5.47	5.45
1890	5.43	5.40	5.38
1900	5.31	5.28	5.26
1905	5.25	5.23	5.21
1910	5.21	5.18	5.16
1920	5.11	5.08	5.06
1940	4.93	4.91	4.89
1950	4.86	4.85	4.84
1960	4.84	4.83	4.83
1962	4.84	4.83	4.83
1980	4.84	4.84	4.84
1990	4.85	4.84	4.84
2000	4.85	4.84	4.83
2010	4.85	4.83	4.84
2020	4.86	4.85	4.87
2050	5.13	5.19	5.24
2087	6.03	6.10	6.15

Typical Performance Curves

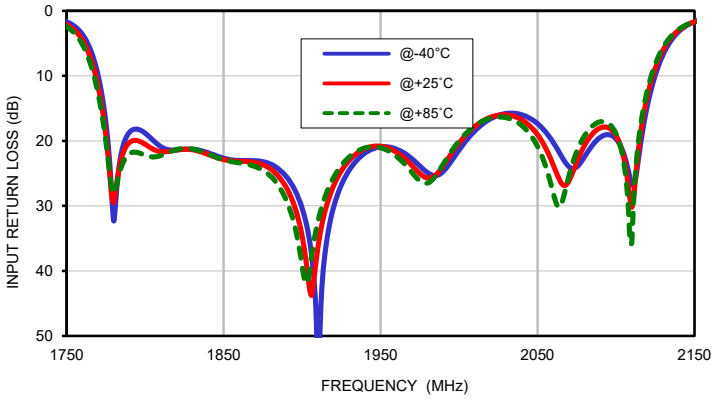
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



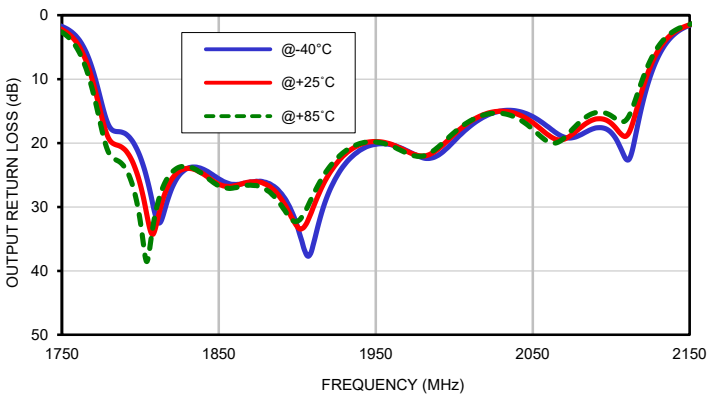
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



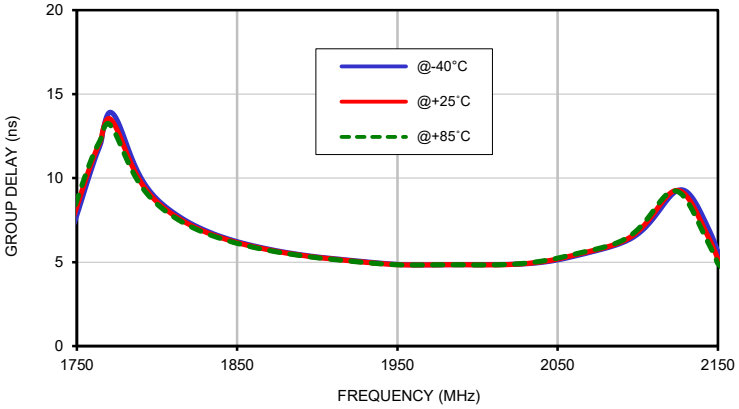
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



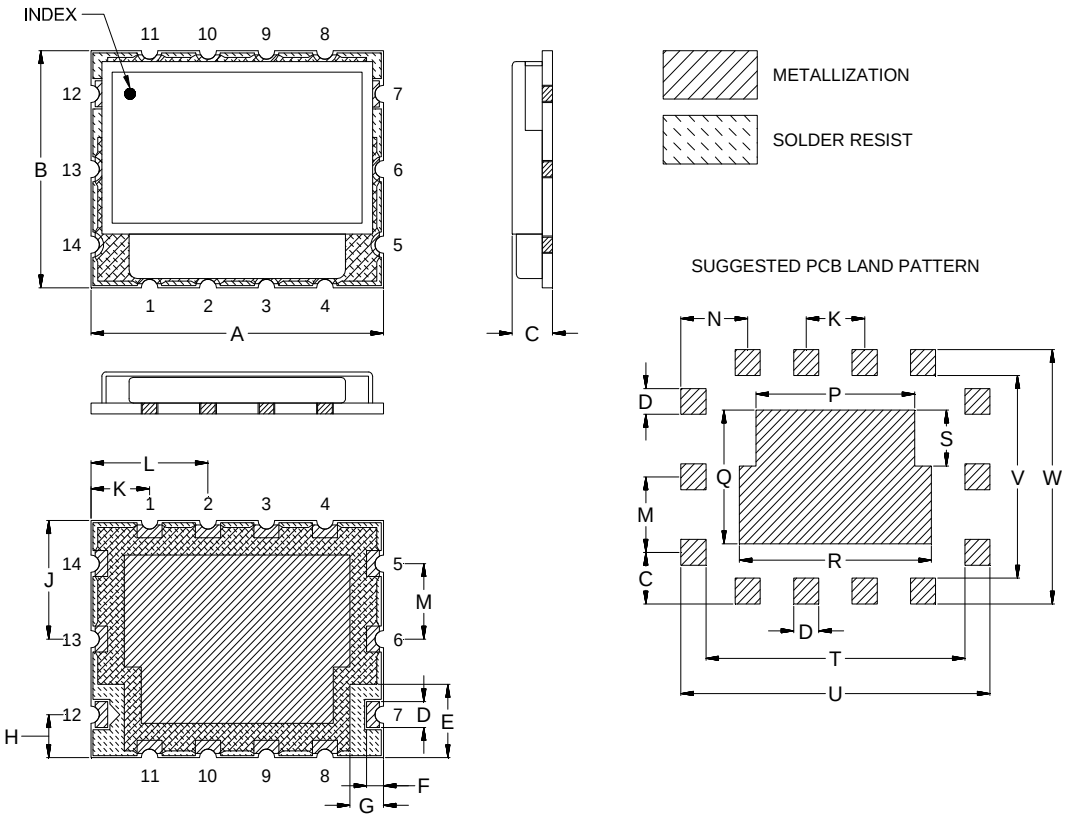
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style WA

Outline Dimensions

WA3176-1



CASE#	A	B	C	D	E	F	G	H	J	K	L	M
WA3176-1	.700 (17.78)	.550 (13.97	.120 (3.05)	.060 (1.52)	.170 (4.32)	.040 (1.02)	.080 (2.03)	.100 (2.54)	.275 (6.99)	.140 (3.56)	.280 (7.11)	.175 (4.45)

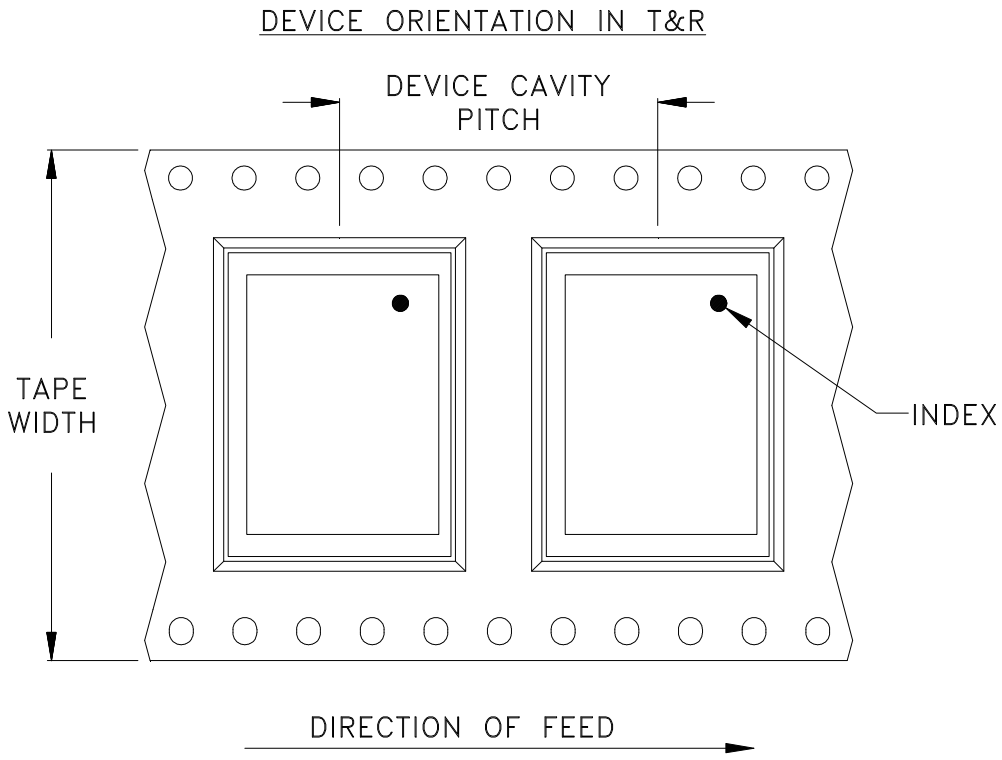
CASE#	N	P	Q	R	S	T	U	V	W	WT.GRAMS
WA176-1	.160 (4.06)	.380 (9.65)	.310 (7.87)	.460 (11.68)	.130 (3.30)	.620 (15.75)	.740 (18.80)	.470 (11.94)	.590 (14.99)	1.3

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

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:
   For RoHS Case Styles: 3-5 µ inch Gold over 120-240 µ inch Nickel plate.
   For RoHS-5 Case Styles: Tin-Lead plate.

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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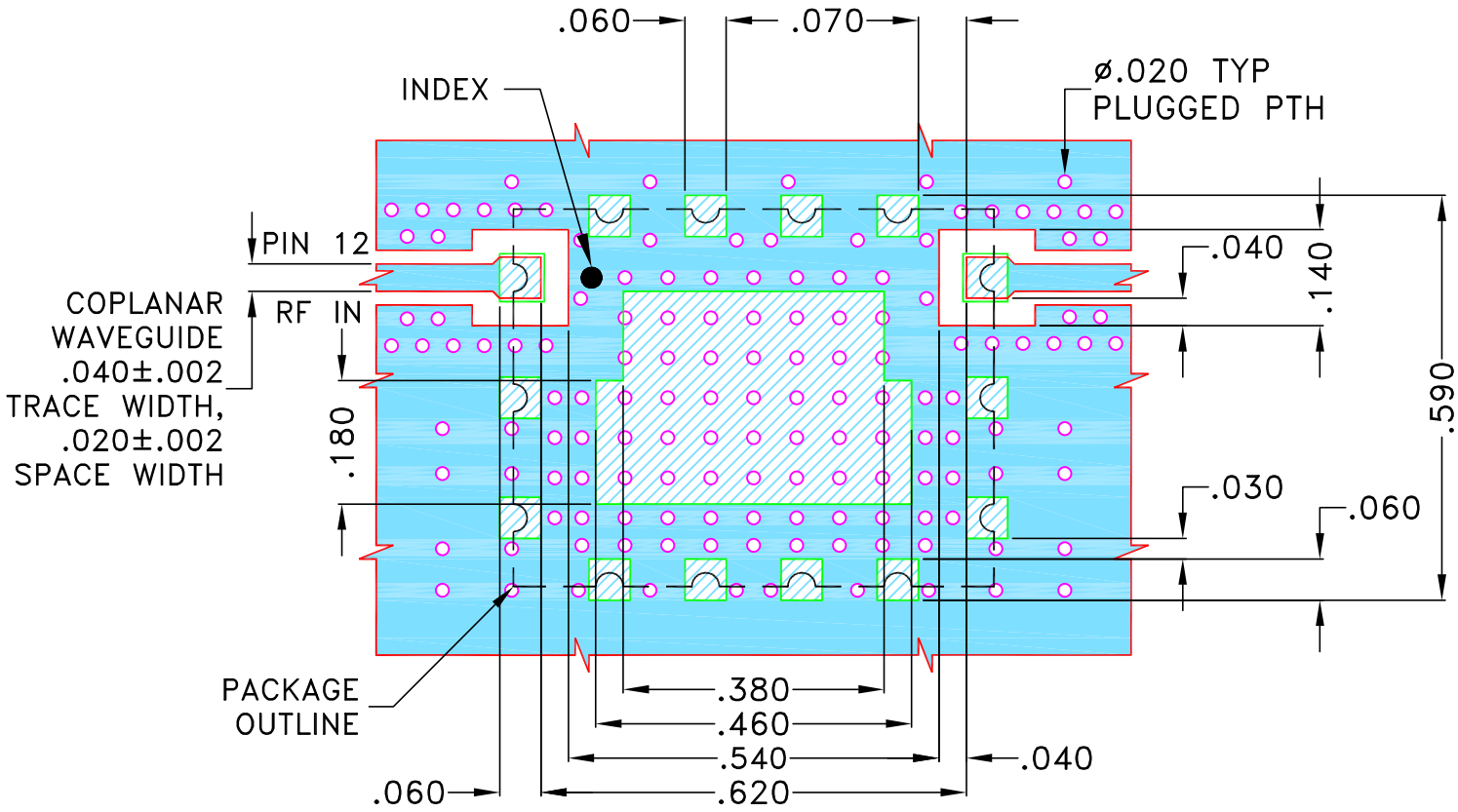
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-010788	NEW RELEASE	NOV 21	DDR	VC
A	ECO-025443	INPUT PIN NUMBER CORRECTED	MAY 25	SPM	VR

SUGGESTED MOUNTING CONFIGURATION FOR WA3176-1 CASE STYLE



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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 NOV 21
TOLERANCES ON:	CHECKED	DDR	23 NOV 21
2 PL DECIMALS ±	APPROVED	KN	23 NOV 21
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

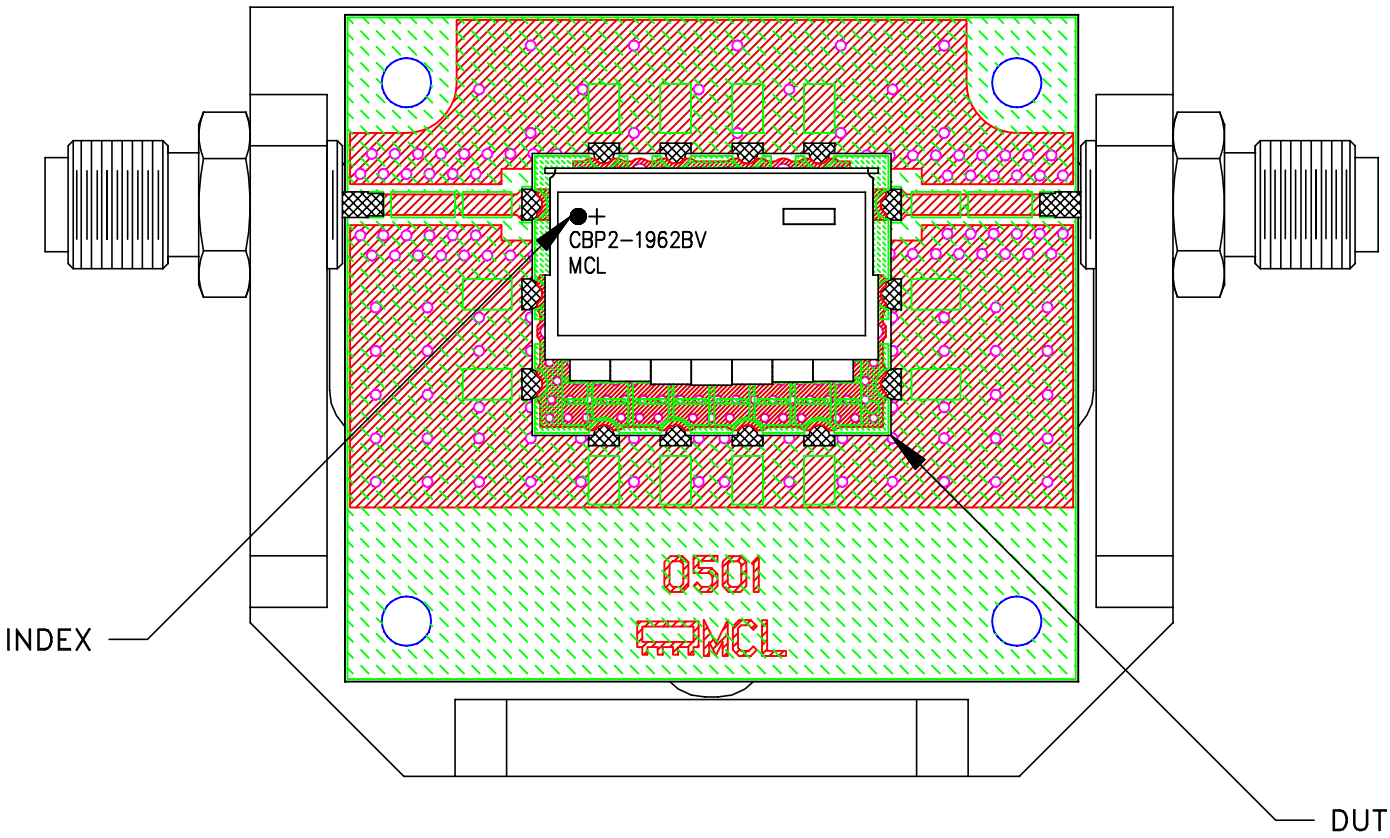
PL DWG WA3176-1 C.S 50 OHM CBP2

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-722	A

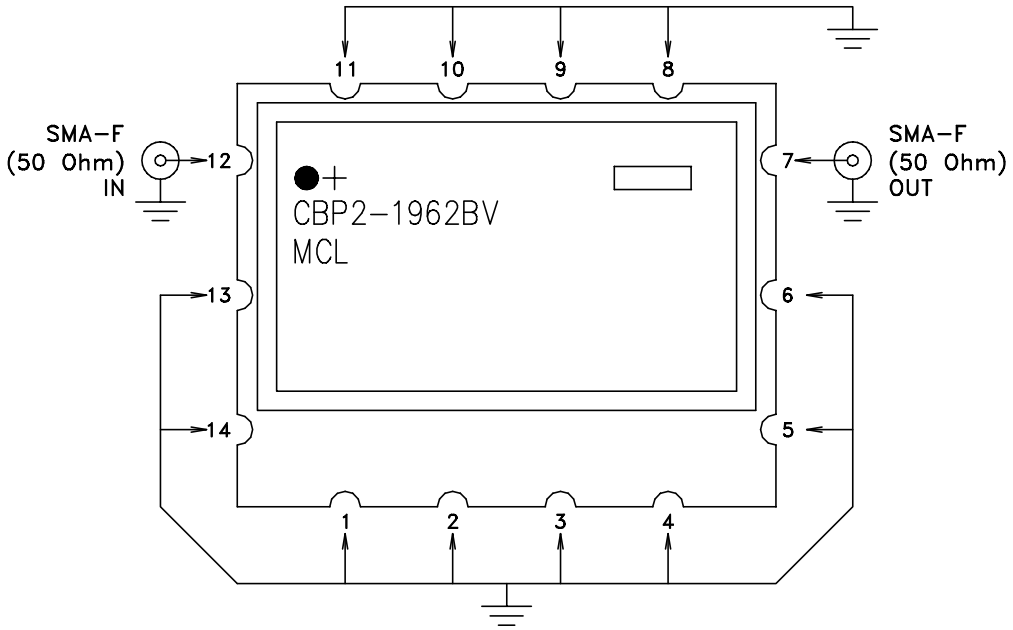
FILE:	SCALE:	SHEET:
98-PL-722	3.5:1	1 OF 1

Evaluation Board and Circuit

TB-CBP2-1962BV+



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.

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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