CERAMIC RESONATOR SURFACE MOUNT

Bandpass Filter

CBP2-1300BV+

50Ω 1200 to 1400 MHz

KEY FEATURES

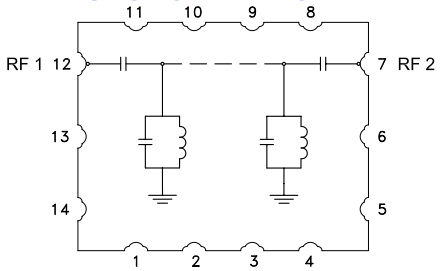
- Good Insertion Loss, 2.1 dB Typ.
- High Rejection, 65 dB Typ.
- Low-Profile Shielded Package

Generic photo used for illustration purposes only

APPLICATIONS

- 5G Applications
- Test and Measurements
- Wireless Communication

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

All our Surface Mount 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.

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

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Passband	Center Frequency	—	—	—	1300	—	MHz
	Insertion Loss	F1-F2	1200 - 1400	—	2.1	3	dB
	Return Loss	F1-F2	1200 - 1400	10	15.7	—	dB
Stopband, Lower	Rejection	DC-F3	DC - 1000	55	65	—	dB
		F3-F4	1000 - 1090	20	27	—	
Stopband, Upper	Rejection	F5-F6	1515 - 1680	20	28	—	dB
		F6-F7	1680 - 3900	—	35	—	
		F7-F8	3900 - 20000	—	20	—	

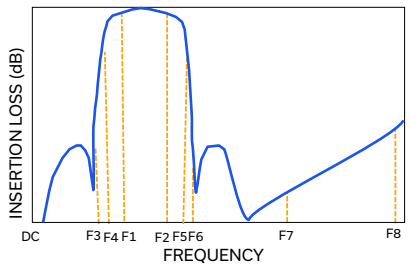
1. Tested in Evaluation Board P/N TB-CBP2-1300BV+.
2. This filter is bi-directional RF1 and RF2 ports may be interchanged, see S-Parameters for actual performance.
3. This component should not be used as a DC-block. In applications where DC voltage and/or current is present at either the input or output ports, external DC blocking capacitors are required.

ABSOLUTE MAXIMUM RATINGS[4]

Parameter	Ratings
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
Input Power[5]	6 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.

TYPICAL FREQUENCY RESPONSE AT +25°C



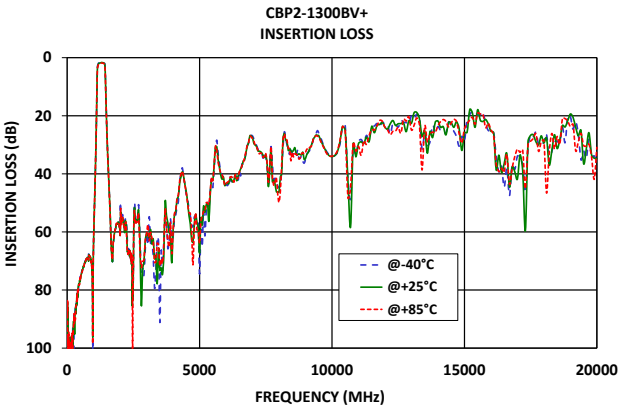
REV. A
ECO-025443
CBP2-1300BV+
EDU4238
URJ
250519

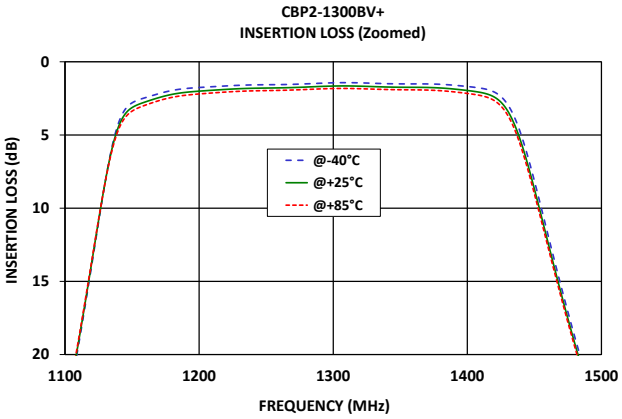
Bandpass Filter

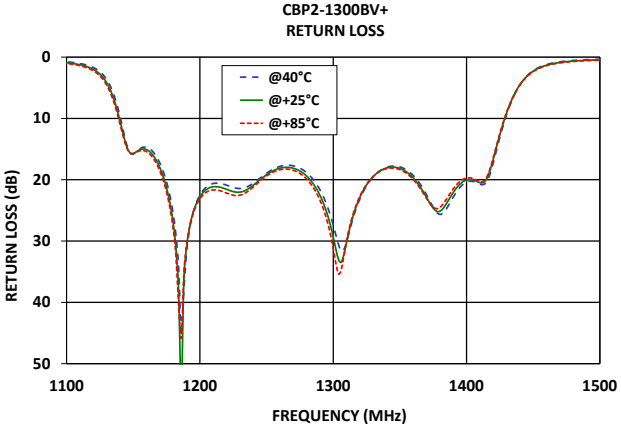
CBP2-1300BV+

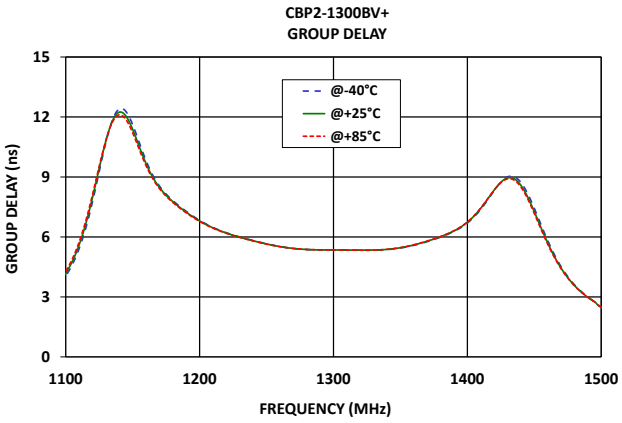
50Ω 1200 to 1400 MHz

TYPICAL PERFORMANCE GRAPHS









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Bandpass Filter

CBP2-1300BV+

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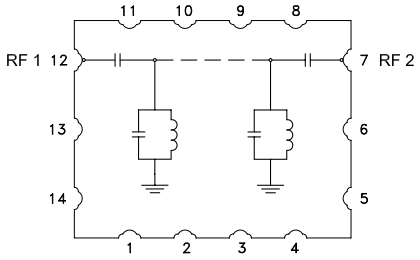


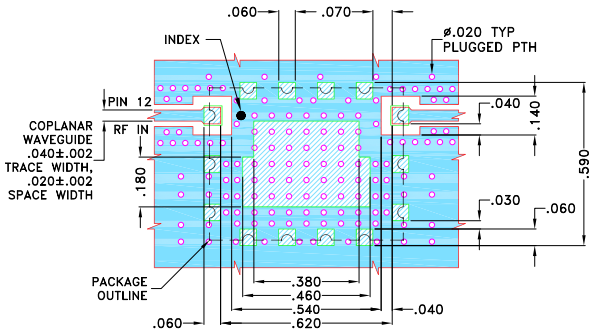
Figure 1. CBP2-1300BV+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description
RF1[2]	12	Connects to RF Input Port
RF2[2]	7	Connects to RF Output Port
GROUND	1-6,8-11,13,14	Connects to Ground on PCB, (See drawing PL-722)
NC	—	No connection, not used internally. See drawing PL-722 for connection to PCB

SUGGESTED PCB LAYOUT (PL-722)

SUGGESTED MOUNTING CONFIGURATION FOR WA3176-1 CASE STYLE



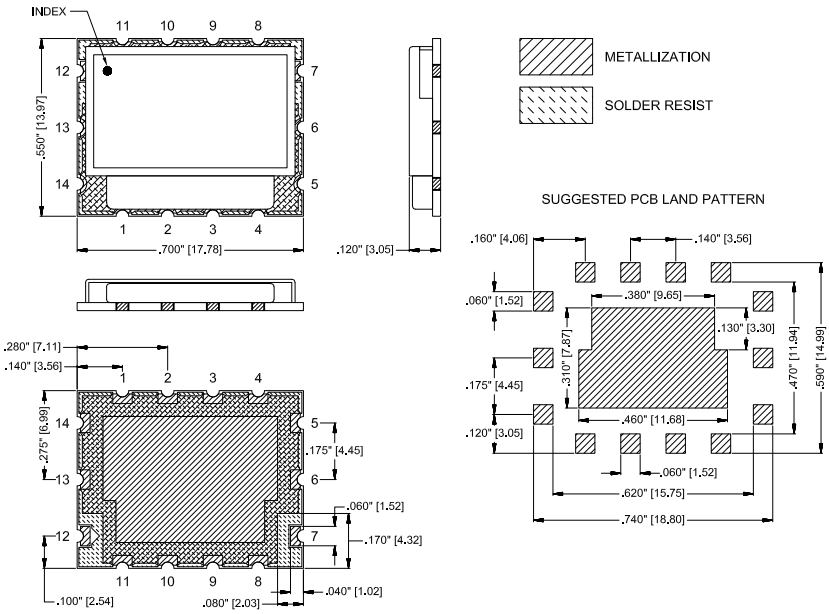
NOTES:
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .020±.0015. COPPER: 1/2 Oz. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

Figure 2. Suggested PCB Layout PL-722

CASE STYLE DRAWING



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

PRODUCT MARKING*: CBP2-1300BV

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

CERAMIC RESONATOR SURFACE MOUNT

Bandpass Filter

CBP2-1300BV+

50Ω 1200 to 1400 MHz

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD. CLICK HERE

Performance Data and 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 Status	Compliant
Tape and Reel	TR-F122
Suggested Layout for PCB Design	PL-722
Evaluation Board	TB-CBP2-1300BV+
	Gerber File
Environmental Rating	ENV117

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 Band Pass Filter CBP2-1300BV+

Typical Performance Data

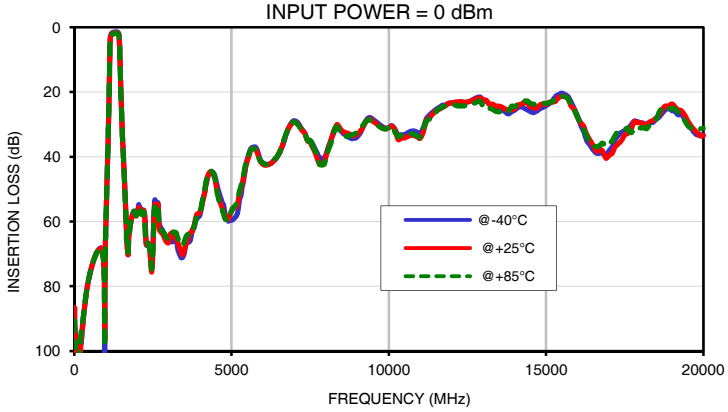
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
10	86.99	86.71	90.68	0.03	0.03	0.03	0.04	0.04	0.04
54	99.54	98.37	100.41	0.02	0.02	0.02	0.04	0.04	0.05
104	104.09	106.16	105.36	0.01	0.02	0.02	0.05	0.06	0.07
154	99.72	105.73	101.86	0.01	0.02	0.02	0.07	0.09	0.11
204	98.02	99.52	95.16	0.01	0.02	0.03	0.10	0.14	0.17
254	92.62	93.35	91.59	0.01	0.02	0.04	0.15	0.20	0.24
304	87.85	88.65	88.47	0.01	0.03	0.04	0.21	0.27	0.32
410	79.88	80.62	80.21	0.01	0.03	0.05	0.37	0.46	0.53
500	76.14	76.00	75.91	0.02	0.05	0.07	0.53	0.64	0.73
600	72.49	72.48	72.53	0.03	0.06	0.09	0.70	0.84	0.95
700	69.75	69.94	69.94	0.04	0.09	0.12	0.82	0.98	1.11
750	69.00	69.10	69.13	0.06	0.10	0.13	0.85	1.01	1.14
800	68.42	68.76	68.82	0.07	0.12	0.15	0.84	1.01	1.14
850	68.07	68.22	68.36	0.09	0.14	0.18	0.82	0.98	1.10
880	68.58	68.73	68.80	0.11	0.16	0.20	0.80	0.95	1.07
900	69.29	69.47	69.64	0.12	0.17	0.21	0.77	0.92	1.04
920	70.82	70.54	71.01	0.13	0.19	0.23	0.75	0.89	1.01
940	73.18	73.61	73.67	0.15	0.21	0.25	0.74	0.88	0.99
960	81.10	82.94	83.57	0.17	0.23	0.27	0.73	0.86	0.98
980	75.34	74.68	74.30	0.19	0.26	0.30	0.72	0.85	0.96
1000	63.09	62.74	62.44	0.22	0.29	0.33	0.71	0.84	0.95
1090	29.12	28.91	28.75	0.61	0.74	0.83	1.01	1.19	1.34
1108	20.46	20.24	20.08	0.97	1.16	1.30	1.42	1.66	1.86
1126	10.40	10.30	10.25	2.58	2.99	3.31	3.29	3.82	4.25
1152	2.71	3.03	3.27	15.49	15.47	15.55	17.92	17.47	17.30
1200	1.76	2.01	2.20	22.51	22.78	23.11	19.46	19.44	19.52
1220	1.65	1.89	2.07	20.88	21.56	22.17	18.22	18.39	18.56
1240	1.58	1.81	1.99	20.57	20.91	21.18	17.88	17.91	17.99
1260	1.56	1.78	1.95	17.83	18.12	18.38	16.46	16.60	16.78
1280	1.51	1.73	1.89	18.84	19.40	19.89	17.43	17.75	18.09
1300	1.44	1.66	1.83	27.40	29.31	31.22	22.05	22.41	22.74
1320	1.44	1.67	1.84	23.12	22.87	22.69	21.40	21.22	21.11
1340	1.50	1.72	1.90	17.97	18.08	18.19	18.14	18.28	18.45
1360	1.51	1.75	1.92	19.30	19.69	19.96	20.19	20.74	21.26
1380	1.54	1.79	1.98	25.65	25.14	24.52	46.74	42.94	38.14
1400	1.69	1.96	2.16	20.39	20.02	19.71	22.48	22.22	21.93
1428	2.66	3.08	3.36	10.78	10.44	10.31	13.60	13.40	13.41
1454	9.58	10.12	10.44	1.71	1.80	1.88	2.85	3.07	3.25
1484	20.06	20.49	20.72	0.49	0.59	0.65	1.46	1.67	1.85
1515	29.05	29.39	29.57	0.28	0.36	0.41	1.25	1.46	1.63
1680	66.05	67.40	67.19	0.15	0.21	0.26	1.75	2.07	2.36
2000	56.92	57.76	57.57	0.16	0.24	0.29	2.67	2.94	3.19
3000	66.15	66.53	64.81	1.66	1.96	2.23	0.55	0.66	0.75
3900	59.10	57.75	58.62	2.05	2.35	2.55	0.32	0.43	0.53
5000	59.59	56.80	56.62	2.02	2.30	2.44	0.23	0.31	0.37
5500	40.72	41.28	40.66	0.70	0.81	0.95	0.20	0.29	0.35
6000	42.10	42.33	41.93	0.35	0.52	0.68	0.16	0.27	0.35
7000	28.86	29.28	29.22	2.49	2.92	3.16	0.19	0.34	0.49
8000	39.43	39.93	40.67	3.18	3.07	3.12	0.32	0.47	0.62
8500	32.26	31.79	32.58	0.70	0.81	0.89	0.67	0.74	0.76
9000	33.78	33.02	32.27	0.84	1.15	1.37	0.62	0.79	0.80
9500	28.48	29.10	29.31	3.78	4.02	4.29	0.15	0.28	0.37
10000	30.93	31.02	31.00	1.35	1.67	1.96	0.12	0.29	0.43
11000	32.90	34.29	33.84	1.70	2.01	2.26	0.60	0.82	1.06
12000	23.37	23.43	24.08	4.84	6.18	7.35	1.15	1.36	1.56
13000	22.41	22.31	24.34	3.79	4.21	4.22	1.35	1.31	1.52
14000	25.64	25.17	24.49	2.63	2.76	3.18	1.44	2.53	2.53
15000	24.24	23.84	23.51	4.56	4.97	5.35	4.64	4.41	5.25
18000	29.46	29.47	31.11	8.73	7.87	7.47	3.99	4.88	5.33
20000	33.34	33.42	31.19	6.56	7.24	8.01	5.69	6.73	6.96

Typical Performance Data

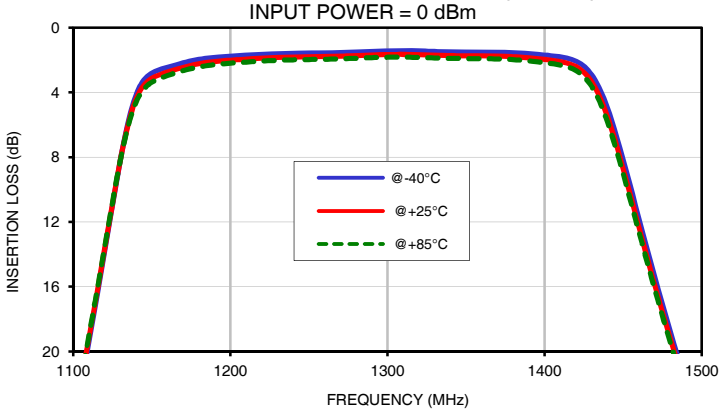
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
1200	6.83	6.80	6.78
1204	6.68	6.65	6.63
1208	6.54	6.52	6.50
1212	6.42	6.40	6.38
1216	6.31	6.29	6.28
1220	6.21	6.19	6.18
1224	6.12	6.11	6.10
1228	6.04	6.03	6.01
1232	5.96	5.95	5.94
1236	5.89	5.88	5.87
1240	5.82	5.81	5.80
1244	5.75	5.74	5.73
1248	5.69	5.68	5.67
1252	5.63	5.62	5.61
1256	5.57	5.57	5.56
1260	5.52	5.52	5.51
1264	5.48	5.47	5.47
1268	5.44	5.44	5.44
1272	5.41	5.41	5.41
1276	5.39	5.39	5.39
1280	5.37	5.37	5.37
1284	5.36	5.36	5.36
1288	5.35	5.35	5.36
1292	5.35	5.35	5.35
1296	5.35	5.35	5.35
1300	5.35	5.35	5.35
1304	5.34	5.35	5.35
1308	5.34	5.35	5.34
1312	5.34	5.34	5.34
1316	5.34	5.34	5.34
1320	5.34	5.34	5.34
1324	5.34	5.34	5.34
1328	5.34	5.34	5.34
1332	5.34	5.35	5.35
1336	5.35	5.36	5.36
1340	5.37	5.38	5.38
1344	5.39	5.40	5.41
1348	5.43	5.44	5.45
1352	5.47	5.48	5.49
1356	5.52	5.54	5.55
1360	5.58	5.60	5.61
1364	5.65	5.67	5.68
1368	5.72	5.74	5.75
1372	5.81	5.83	5.84
1376	5.90	5.92	5.92
1380	5.99	6.01	6.02
1384	6.10	6.12	6.13
1388	6.21	6.24	6.24
1392	6.35	6.37	6.38
1396	6.50	6.54	6.55
1400	6.70	6.73	6.75

Typical Performance Curves

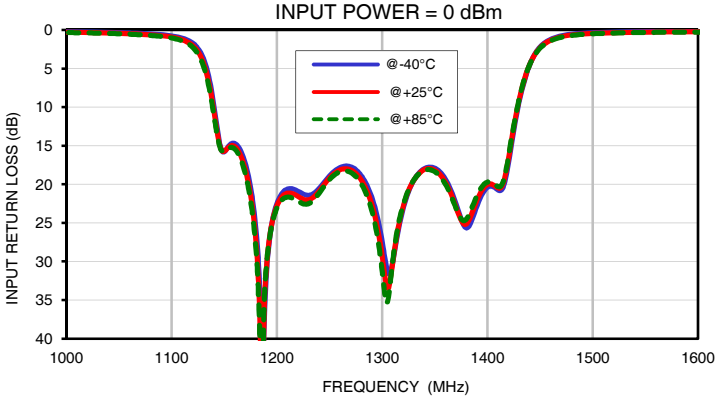
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



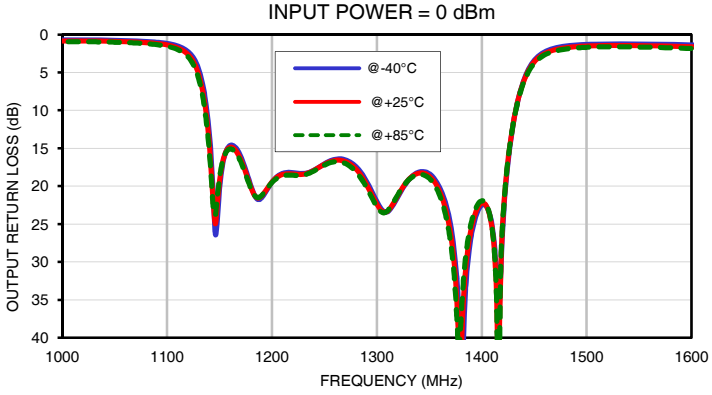
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



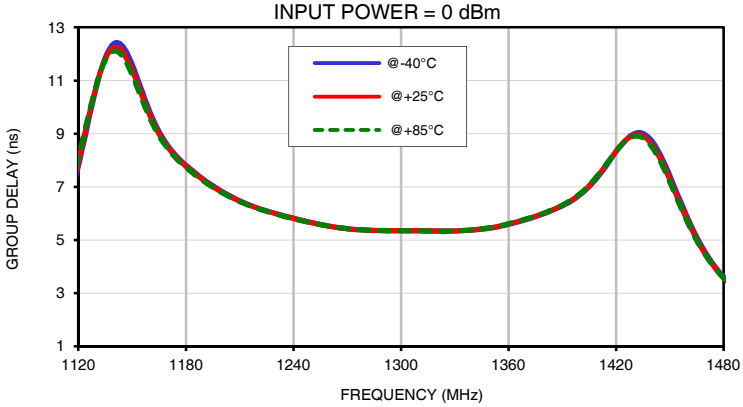
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



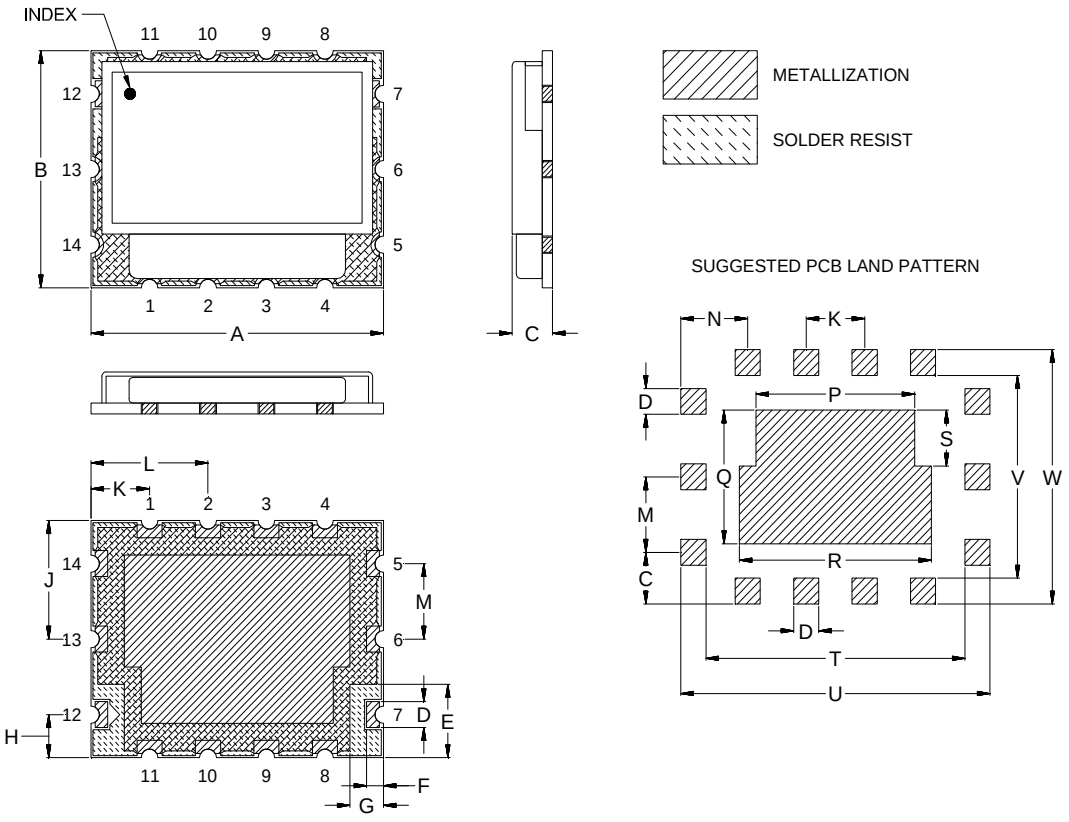
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



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)

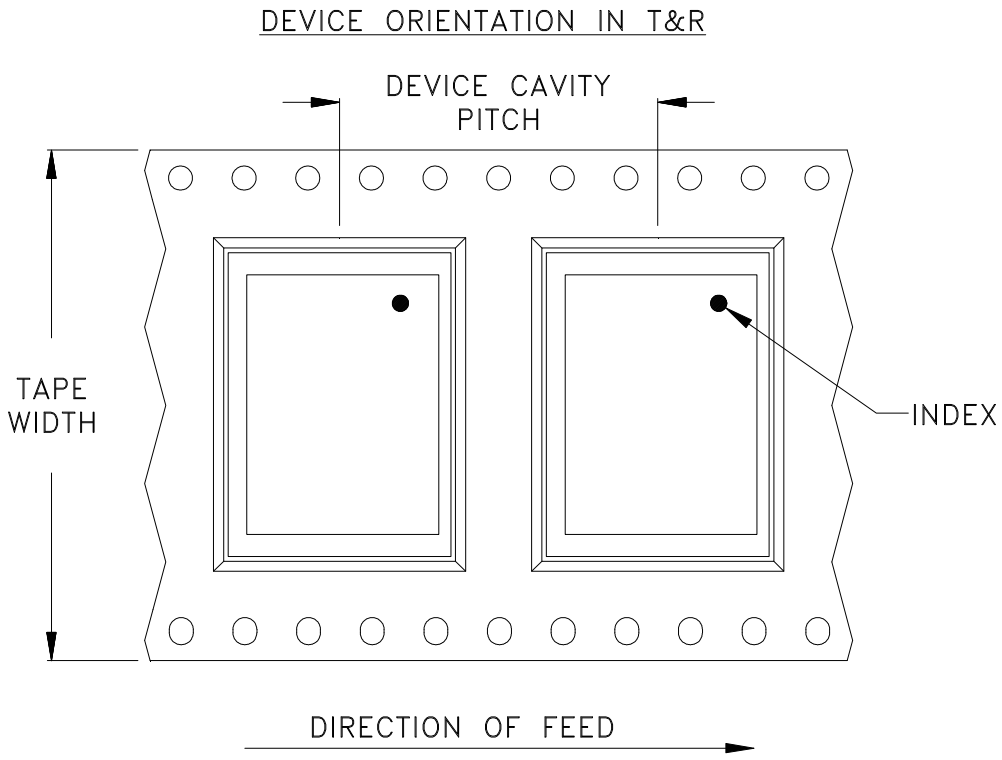
CASE#	N	P	Q	R	S	T	U	V	W	WT.GRAMS
WA176-1	.160 (4.06)	.380 (9.65)	.310 (7.87)	.460 (11.68)	.130 (3.30)	.620 (15.75)	.740 (18.80)	.470 (11.94)	.590 (14.99)	1.3

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.

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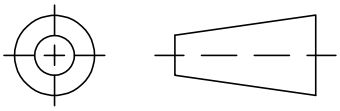
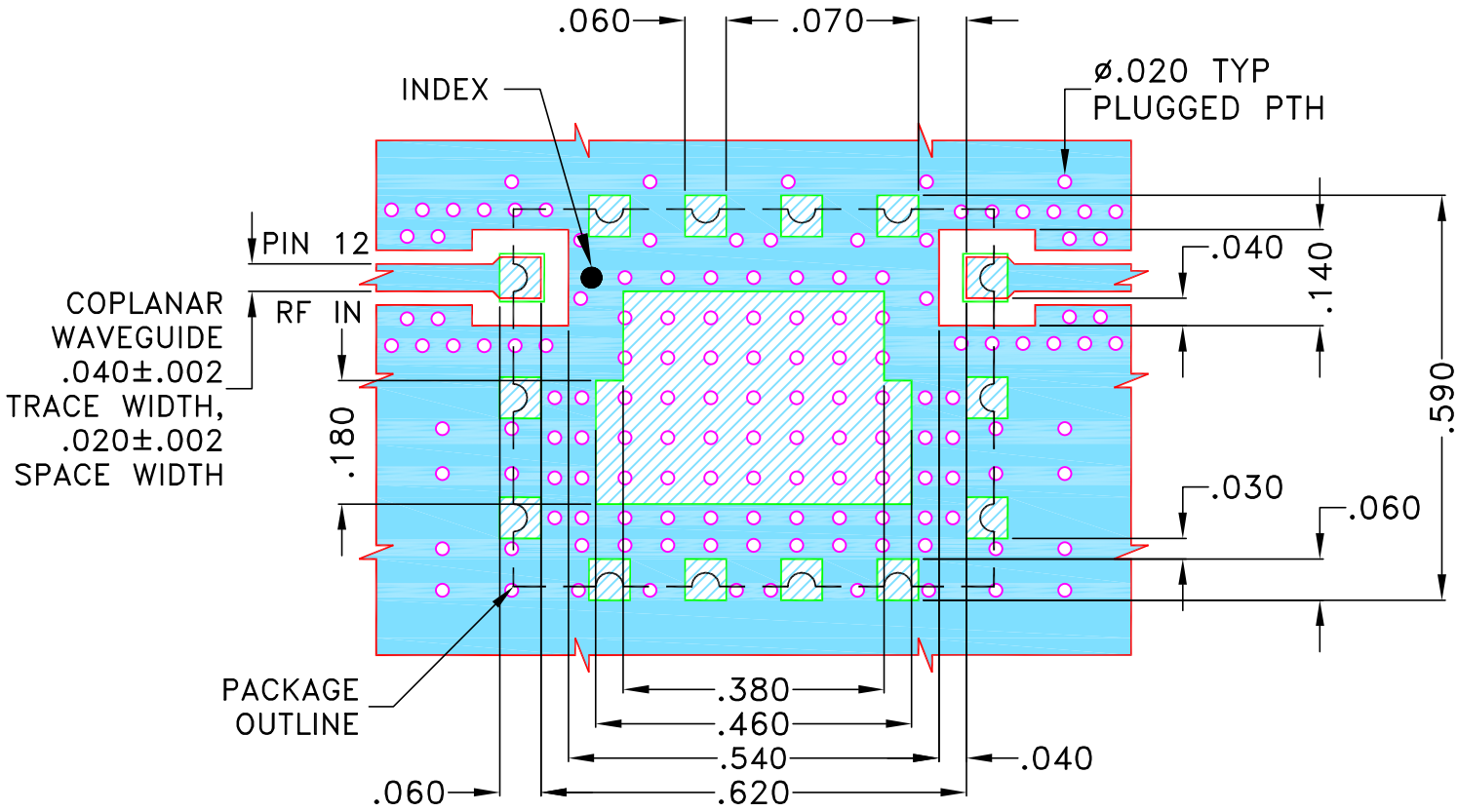
THIRD ANGLE PROJECTION



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

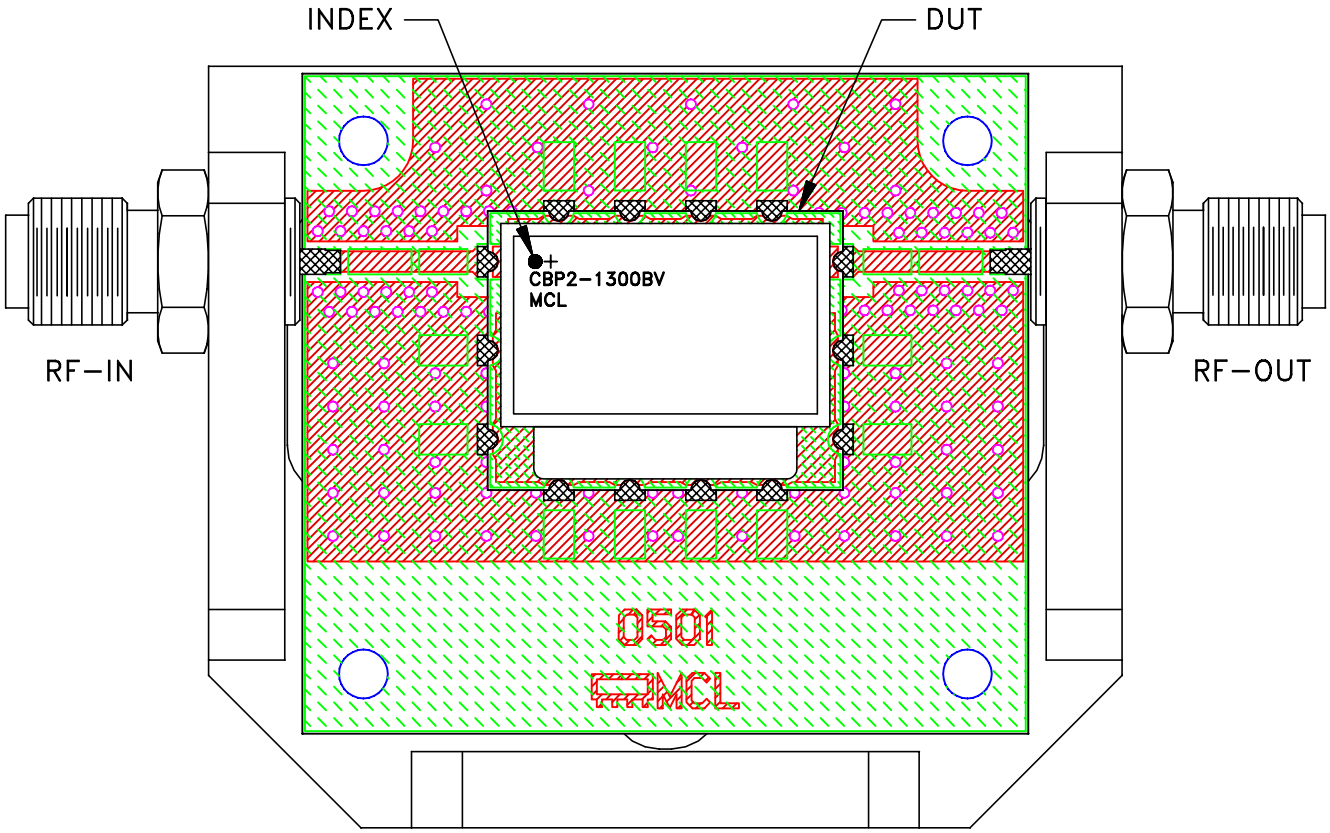
PL DWG WA3176-1 C.S 50 OHM CBP2

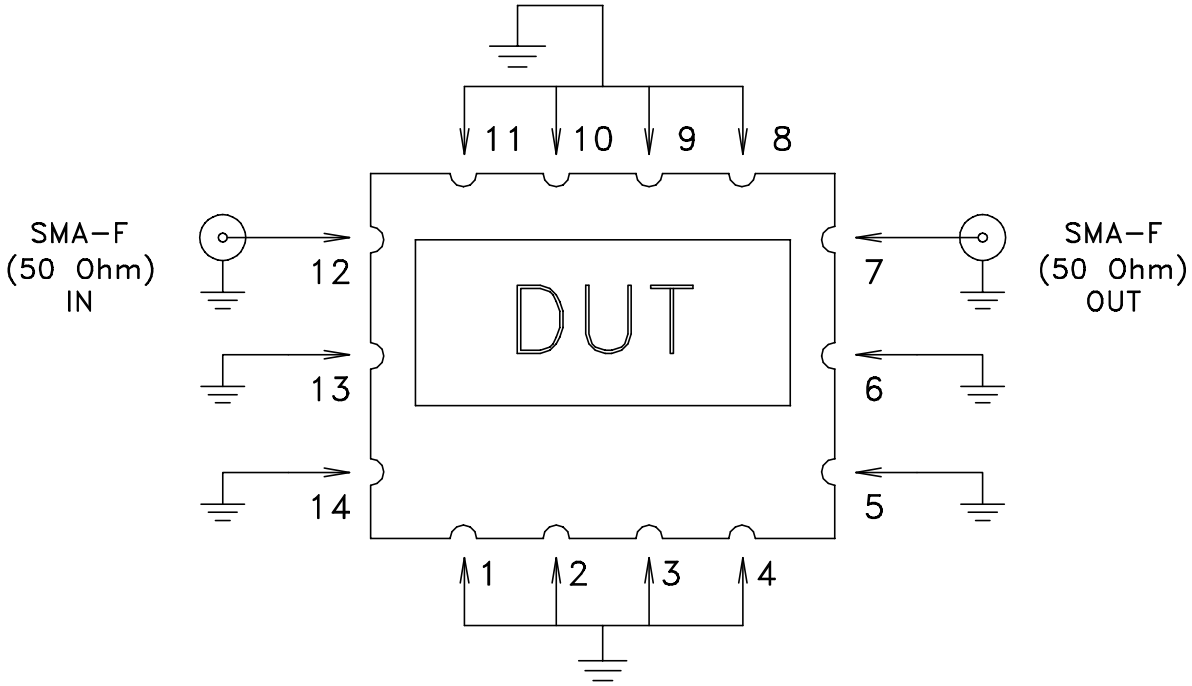
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-722	A

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

Evaluation Board and Circuit

TB-CBP2-1300BV+





Schematic diagram

Notes:

1. 50 Ohm SMA female connectors.
2. PCB Material: RO4350B OR Equivalent
   Dielectric Constant=3.48±.05, Thickness=.020 inch.

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Environmental Specifications ENV117

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
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process: 245°C peak	J-STD-020C, 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