CERAMIC RESONATOR SURFACE MOUNT

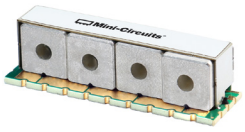
Band Pass Filter

CBP12-2003CL+

50Ω 1980 to 2025 MHz

THE BIG DEAL

- Narrow Band Design with Fast Roll-off
- High Rejection, 70 dB Typ.
- Low Insertion Loss, 1.1 dB Typ.

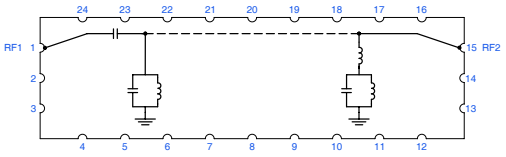


Generic photo used for illustration purposes only

APPLICATIONS

- Satcom
- Wireless Communication

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	—	—	—	2002.5	—	MHz
	Insertion Loss	F1-F2	1980 - 2025	—	1.1	1.8	dB
	Return Loss	F1-F2	1980 - 2025	10	15	—	dB
Stopband, Lower	Rejection	DC-F3	DC - 1550	60	70	—	dB
		F3-F4	1550 - 1850	20	29	—	
Stopband, Upper	Rejection	F5-F6	2125 - 2350	20	26	—	dB
		F6-F7	2350 - 2800	40	50	—	

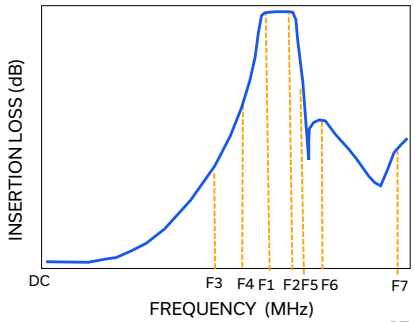
1. Tested in Evaluation Board P/N TB-CBP122003CL+.
2. This component should not be used as a DC-block. In applications where DC voltage and/or current is present at either the input or output ports, external DC blocking capacitors are required.

ABSOLUTE MAXIMUM RATINGS[3]

Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
Input Power[4]	15 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



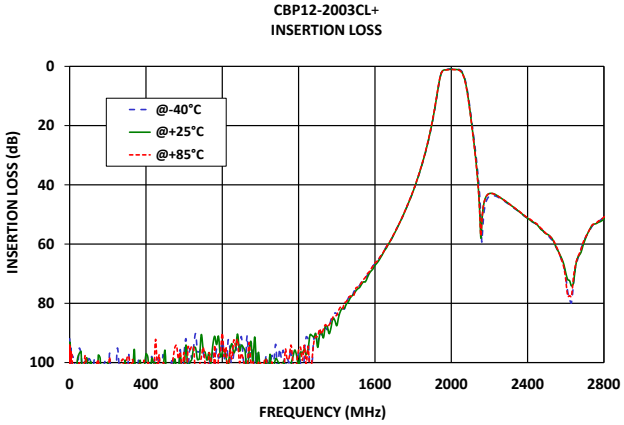
REV. OR
ECO-027850
EDU5207
CBP12-2003CL+
URJ
251120

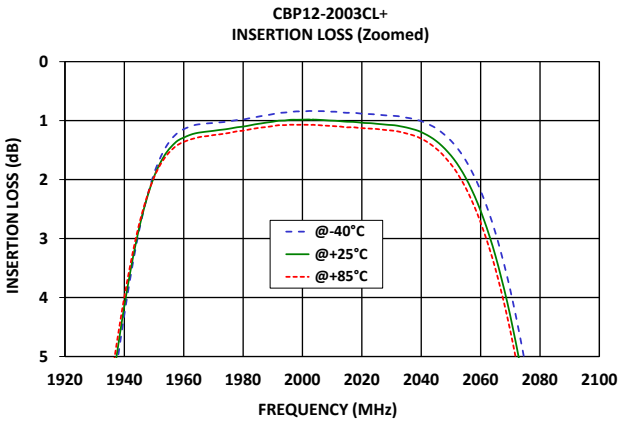
Band Pass Filter

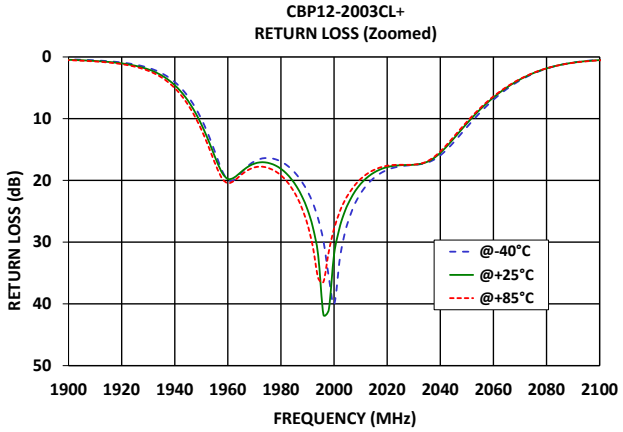
CBP12-2003CL+

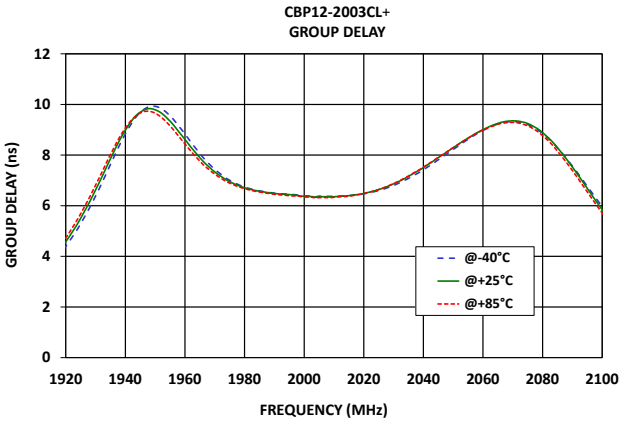
50Ω 1980 to 2025 MHz

TYPICAL PERFORMANCE GRAPHS









CERAMIC RESONATOR SURFACE MOUNT

Band Pass Filter

CBP12-2003CL+

50Ω 1980 to 2025 MHz

FUNCTIONAL DIAGRAM

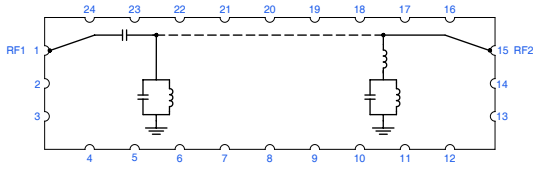
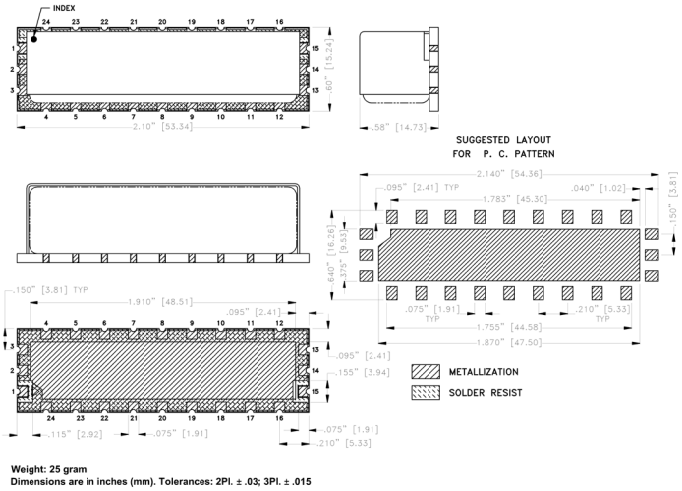


Figure 1. CBP12-2003CL+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description
RF1	1	Connects to RF Input Port
RF2	15	Connects to RF Output Port
GROUND	2-14, 16-24	Connects to Ground on PCB, (See drawing PL-840)

CASE STYLE DRAWING



Weight: 25 gram
Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3Pl. ± .015

SUGGESTED PCB LAYOUT

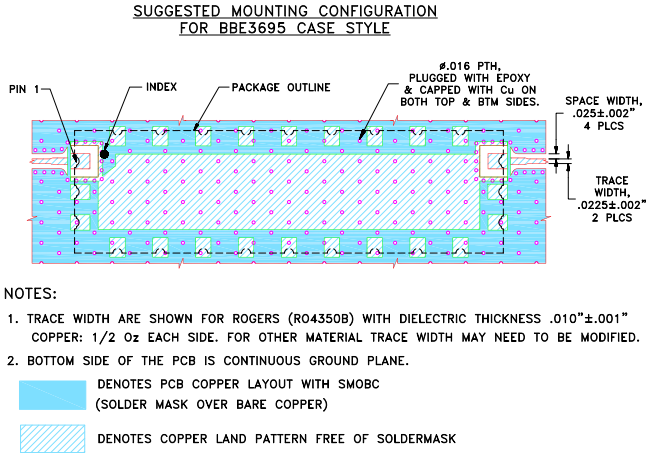


Figure 2. Suggested PCB Layout

PRODUCT MARKING*: CBP12-2003CL

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

Band Pass Filter

CBP12-2003CL+

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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	BBE3695 Lead Finish: Gold over Nickel Plate
RoHS/REACH Status	Compliant
Tape and Reel	-
Suggested Layout for PCB Design	PL-840
Evaluation Board	TB-CBP122003CL+ Gerber File
Environmental Rating	ENV115
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 CBP12-2003CL+

Typical Performance Data

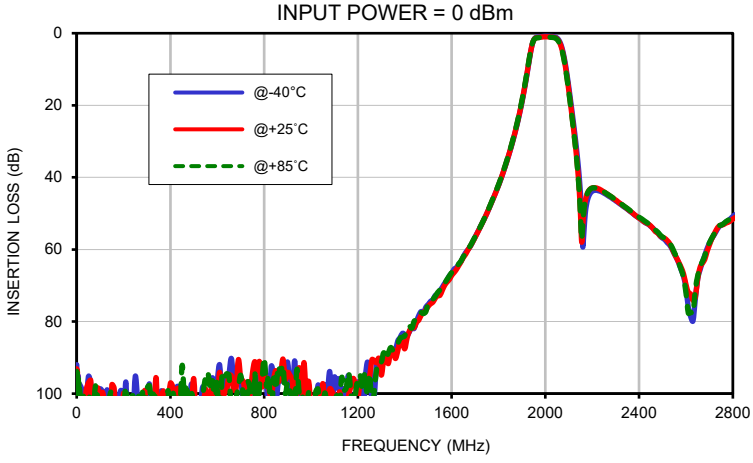
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
10.0	97.48	100.99	96.55	0.06	0.06	0.05	0.15	0.15	0.15
20.0	98.43	113.39	104.02	0.06	0.05	0.06	0.14	0.15	0.16
50.0	95.25	96.99	100.05	0.05	0.05	0.05	0.15	0.15	0.16
100.0	98.65	102.84	105.57	0.04	0.04	0.05	0.16	0.16	0.17
150.0	102.47	97.60	99.08	0.03	0.04	0.04	0.17	0.17	0.18
200.0	109.15	99.86	104.94	0.02	0.03	0.04	0.18	0.18	0.18
300.0	108.67	110.30	98.60	0.01	0.02	0.04	0.18	0.19	0.20
400.0	108.02	97.07	114.83	0.01	0.03	0.04	0.17	0.20	0.21
500.0	111.80	95.95	104.88	0.00	0.03	0.04	0.17	0.20	0.22
600.0	96.76	102.08	96.91	0.00	0.02	0.04	0.16	0.19	0.21
700.0	96.39	95.63	94.92	0.00	0.03	0.05	0.13	0.18	0.21
1000.0	127.86	104.84	100.16	0.01	0.05	0.07	0.08	0.15	0.18
1300.0	93.40	94.88	91.23	0.03	0.07	0.09	0.08	0.14	0.18
1500.0	75.27	75.80	74.86	0.04	0.08	0.10	0.08	0.14	0.18
1550.0	71.44	72.73	71.22	0.05	0.08	0.11	0.09	0.15	0.18
1800.0	42.26	42.21	42.01	0.11	0.15	0.18	0.14	0.20	0.24
1850.0	32.49	32.37	32.16	0.15	0.21	0.23	0.19	0.26	0.30
1894.0	21.09	20.86	20.58	0.33	0.39	0.45	0.37	0.46	0.52
1896.0	20.46	20.22	19.94	0.34	0.41	0.47	0.39	0.48	0.55
1898.0	19.83	19.60	19.30	0.36	0.44	0.49	0.41	0.51	0.58
1900.0	19.19	18.94	18.65	0.38	0.46	0.52	0.44	0.54	0.61
1942.0	3.67	3.57	3.45	4.87	5.46	5.99	5.27	6.01	6.60
1946.0	2.63	2.61	2.56	7.01	7.76	8.44	7.65	8.63	9.40
1950.0	1.90	1.95	1.96	10.02	10.90	11.76	11.18	12.50	13.53
1962.0	1.10	1.24	1.32	20.01	19.63	20.15	25.31	23.80	23.67
1980.0	0.98	1.10	1.17	16.95	18.13	19.20	16.08	17.04	18.04
1990.0	0.89	1.02	1.09	21.77	24.73	27.14	19.03	20.59	22.09
1994.0	0.86	1.00	1.08	26.21	32.10	35.79	20.83	22.33	23.63
2000.0	0.84	0.98	1.07	40.09	31.96	27.80	22.60	22.80	22.88
2002.5	0.84	0.98	1.07	31.77	26.97	24.65	22.39	22.03	21.81
2003.0	0.84	0.99	1.07	30.59	26.28	24.15	22.30	21.86	21.61
2013.0	0.86	1.01	1.10	20.42	19.33	18.77	19.16	18.65	18.44
2017.0	0.87	1.02	1.11	18.97	18.29	17.95	18.35	18.08	17.99
2025.0	0.90	1.05	1.14	17.71	17.54	17.47	17.99	18.24	18.46
2067.0	3.26	3.67	3.91	4.61	4.40	4.30	5.90	5.83	5.78
2101.0	15.46	16.44	16.78	0.44	0.49	0.52	1.08	1.23	1.33
2109.0	19.35	20.53	20.86	0.29	0.34	0.38	0.83	0.97	1.07
2125.0	27.62	29.33	29.64	0.17	0.23	0.27	0.57	0.68	0.78
2127.0	28.71	30.52	30.83	0.16	0.22	0.26	0.54	0.66	0.75
2200.0	43.85	42.94	42.94	0.06	0.12	0.15	0.24	0.32	0.39
2300.0	46.52	46.28	46.23	0.02	0.08	0.11	0.14	0.22	0.28
2350.0	48.84	48.75	48.62	0.02	0.08	0.11	0.13	0.21	0.26
2400.0	51.30	51.30	51.07	0.01	0.06	0.09	0.11	0.19	0.24
2420.0	52.31	52.25	51.93	0.01	0.07	0.10	0.11	0.19	0.25
2440.0	53.03	52.99	52.83	0.00	0.07	0.10	0.10	0.19	0.25
2460.0	54.15	54.26	53.97	0.01	0.06	0.10	0.10	0.19	0.25
2480.0	55.41	55.47	55.21	0.01	0.07	0.10	0.10	0.19	0.25
2500.0	56.86	56.61	56.55	0.01	0.07	0.11	0.10	0.20	0.25
2520.0	58.11	57.53	57.59	0.00	0.07	0.10	0.10	0.20	0.26
2540.0	59.84	59.62	59.31	0.00	0.06	0.09	0.11	0.20	0.26
2560.0	62.44	62.34	62.17	0.00	0.06	0.10	0.11	0.21	0.27
2580.0	65.75	65.07	65.64	0.00	0.07	0.10	0.11	0.21	0.28
2600.0	70.81	69.73	72.03	0.01	0.06	0.10	0.12	0.23	0.29
2620.0	78.63	72.36	77.38	0.00	0.06	0.10	0.13	0.24	0.31
2640.0	73.66	73.23	71.17	0.00	0.07	0.10	0.15	0.25	0.33
2660.0	65.68	64.99	64.85	0.00	0.07	0.11	0.17	0.28	0.36
2680.0	61.65	62.79	61.82	0.01	0.06	0.10	0.19	0.31	0.40
2700.0	58.26	58.75	58.16	0.01	0.06	0.10	0.21	0.34	0.44
2750.0	53.26	53.25	53.25	0.00	0.08	0.11	0.34	0.50	0.62
2800.0	50.83	51.56	50.88	0.01	0.09	0.13	0.63	0.82	0.97

Typical Performance Data

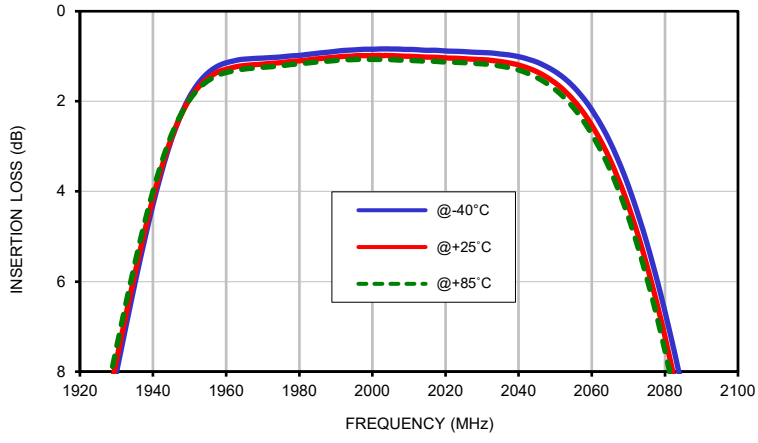
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
1980.0	6.74	6.71	6.68
1982.0	6.67	6.65	6.61
1984.0	6.61	6.59	6.56
1986.0	6.57	6.55	6.52
1988.0	6.53	6.51	6.49
1990.0	6.50	6.49	6.45
1992.0	6.47	6.46	6.43
1994.0	6.46	6.45	6.41
1996.0	6.45	6.43	6.39
1998.0	6.42	6.40	6.38
2000.0	6.39	6.37	6.34
2002.0	6.39	6.37	6.34
2002.5	6.38	6.36	6.34
2003.0	6.38	6.36	6.32
2003.5	6.36	6.34	6.32
2004.0	6.36	6.33	6.32
2004.5	6.36	6.35	6.31
2005.0	6.38	6.36	6.32
2007.0	6.37	6.36	6.32
2009.0	6.37	6.35	6.32
2011.0	6.38	6.36	6.35
2013.0	6.39	6.38	6.35
2015.0	6.40	6.40	6.38
2017.0	6.43	6.43	6.41
2019.0	6.45	6.46	6.45
2021.0	6.49	6.51	6.51
2023.0	6.54	6.57	6.57
2025.0	6.60	6.64	6.64

Typical Performance Curves

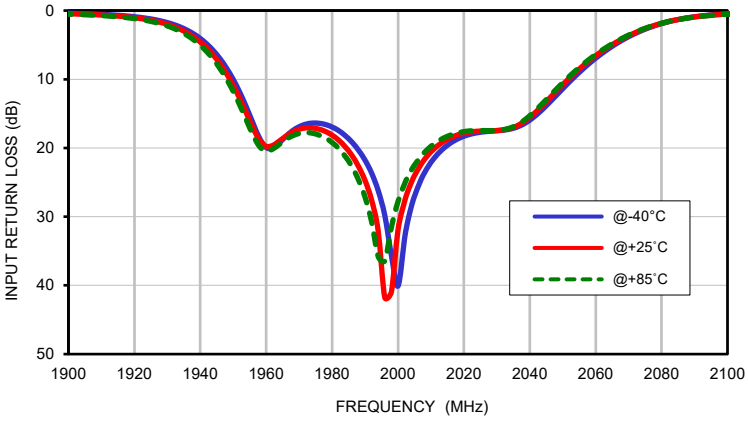
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



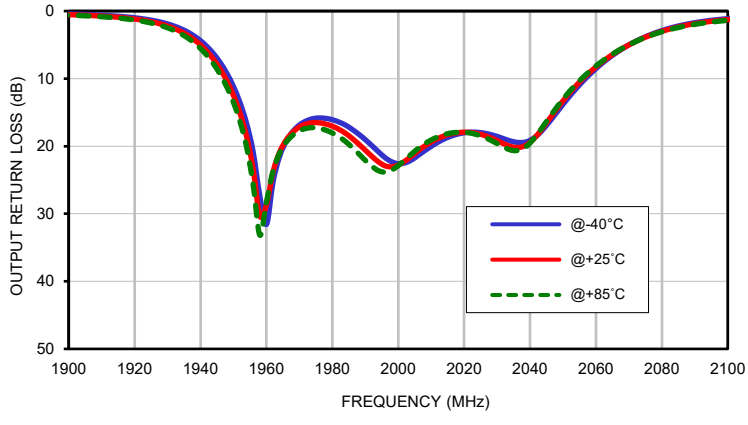
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



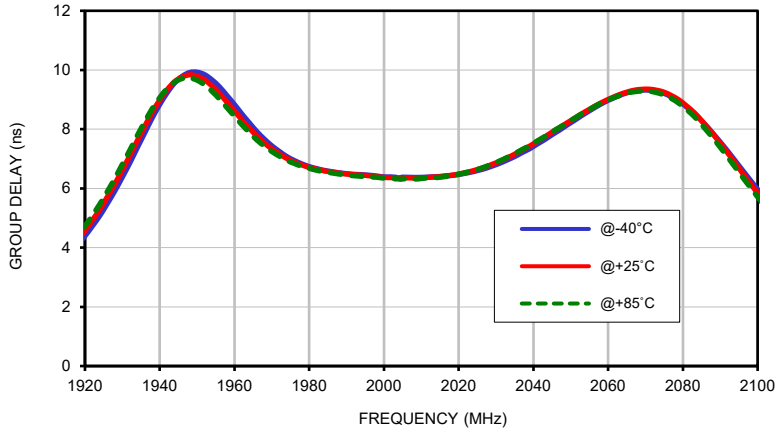
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm

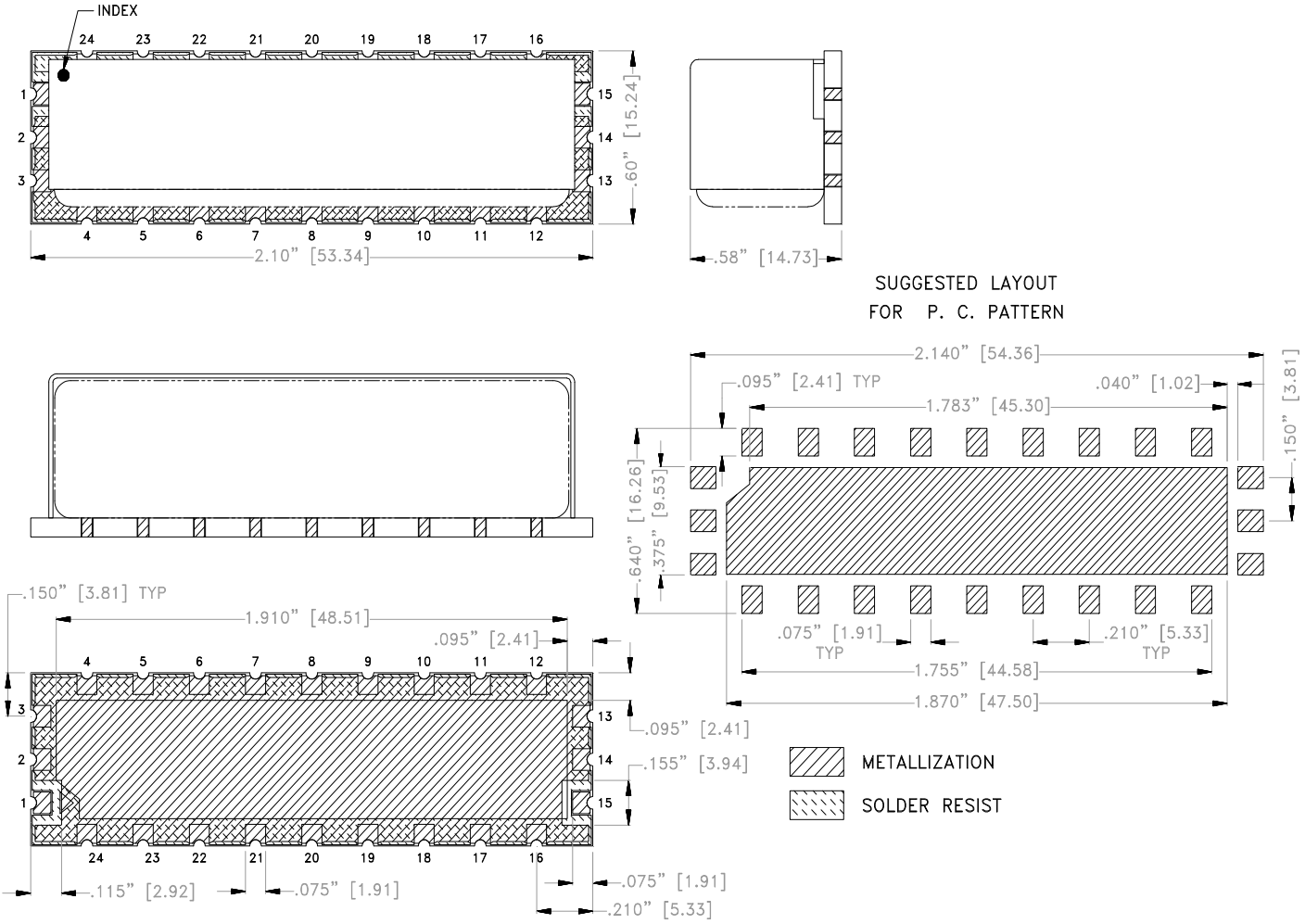


GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style BBE

Outline Dimensions BBE3695



Dimensions are in inches [mm]. Tolerances: 2 Pl. ± .03; 3 Pl. ± .015

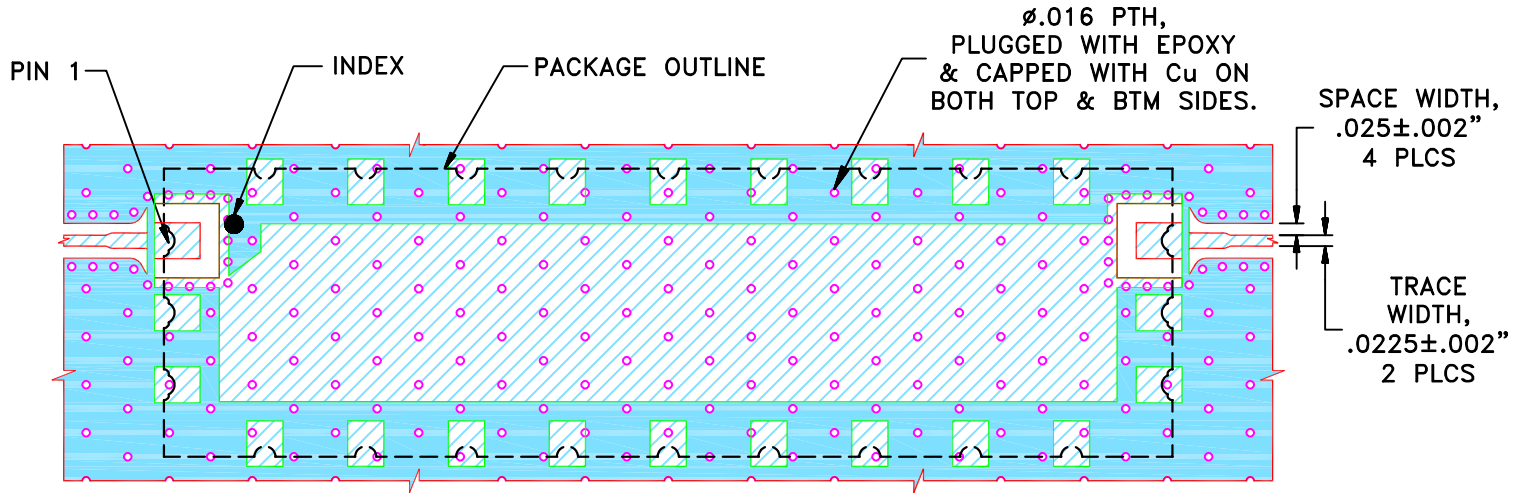
Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Unit Weight: 25 grams
4. 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.

THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	NPO-005684	NEW RELEASE	OCT 25	SS	VR

SUGGESTED MOUNTING CONFIGURATION FOR BBE3695 CASE STYLE



NOTES:

1. TRACE WIDTH ARE SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .010"±.001" COPPER: 1/2 Oz EACH SIDE. FOR OTHER MATERIAL 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	SS	07 OCT 25
TOLERANCES ON:	CHECKED	MD	16 OCT 25
2 PL DECIMALS ± .005"	APPROVED	NK	16 OCT 25
3 PL DECIMALS ±			
ANGLES ±			
FRACTIONS ±			

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

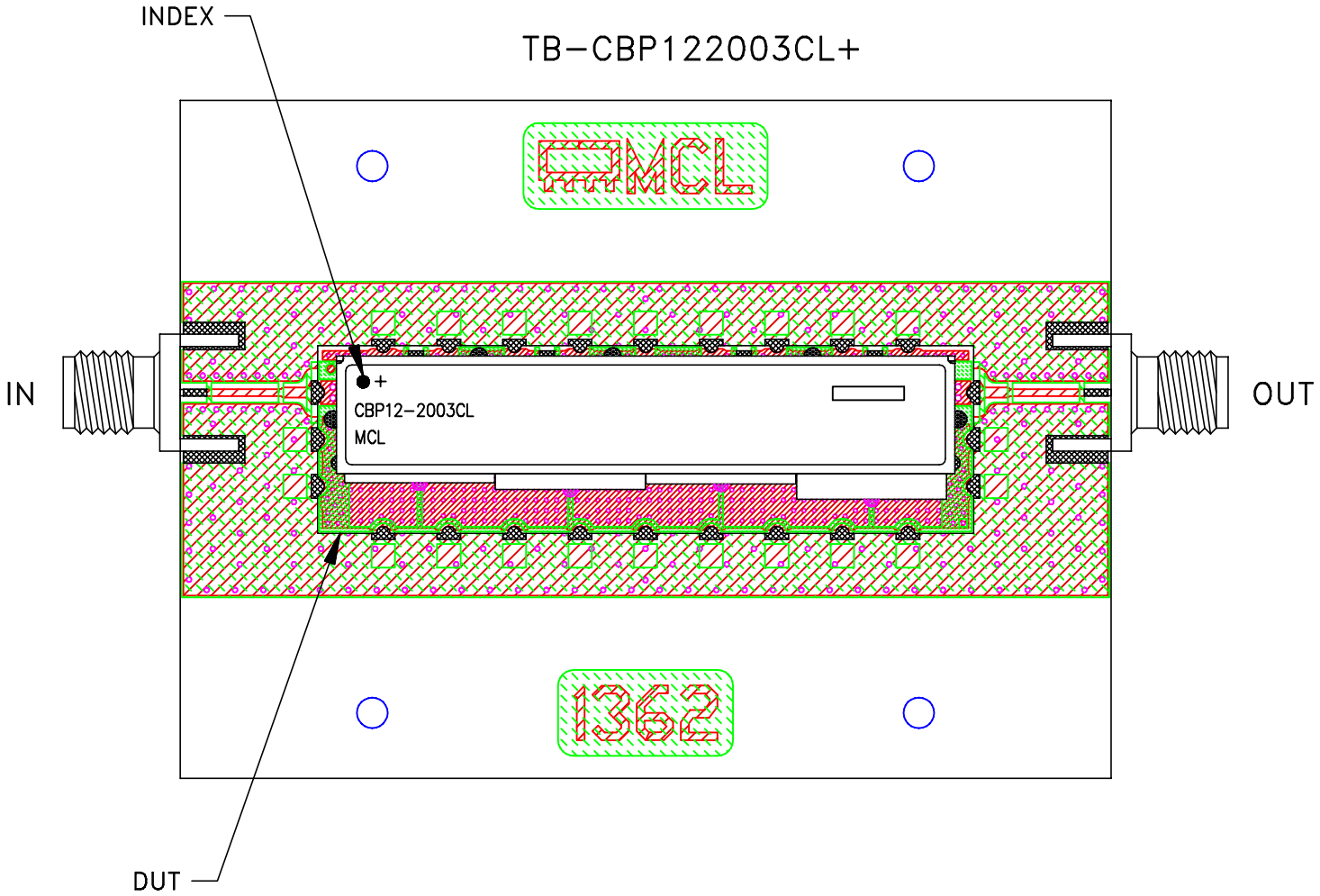
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, BBE3695, TB-1318, 50 Ohm

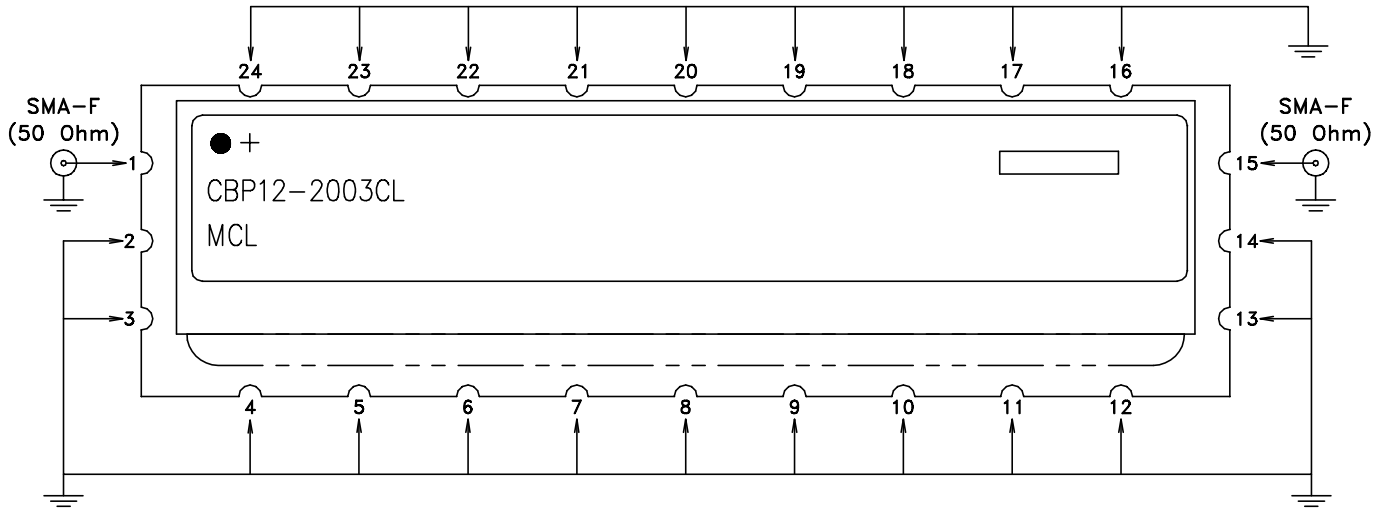
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-840	OR

FILE:	SCALE:	SHEET:
98-PL-840	2.4:1	1 OF 1

Evaluation Board and Circuit



Schematic diagram



Notes:

1. PCB Material: ROGERS (RO4350B). OR Equivalent, Dielectric Constant=3.48±.05
   Dielectric Thickness: .010"±.002
2. 50 Ohm SMA Female Connectors.

Mini-Circuits®

Mini-Circuits

Environmental Specifications ENV115

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
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-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