CERAMIC RESONATOR SURFACE MOUNT

Bandpass Filter

CBP3-1870CB+

50Ω 1820 to 1920 MHz

KEY FEATURES

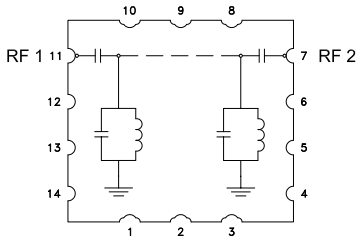
- Good Insertion Loss, 1.7 dB Typ.
- High Rejection, 70 dB Typ.
- Smaller Package

Generic photo used for illustration purposes only

APPLICATIONS

- 5G Base Station

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

All our coaxial-ceramic resonator filters are built with rugged contruction, 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	—	—	—	1870	—	MHz
	Insertion Loss	F1-F2	1820 - 1920	—	1.7	2.2	dB
	Return Loss	F1-F2	1820 - 1920	10	14	—	dB
Stop Band, Lower	Rejection	DC-F3	DC - 1400	60	70	—	dB
		F3-F4	1400 - 1724	20	29	—	
Stop Band, Upper	Rejection	F5-F6	2036 - 2280	20	30	—	dB
		F6-F7	2280 - 2900	43	55	—	

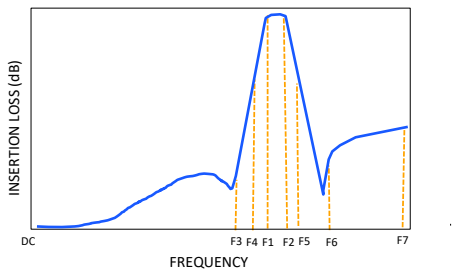
1. Tested in Evaluation Board P/N TB-CBP3-1870CB+.
2. This filter is bi-directional RF1 and RF2 ports may be interchanged, see S-Parameters for actual performance.
3. This component should not be used as a DC-block. In applications where DC voltage and/or current is present at either the input or output 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]	10 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 2 W at +85°C.

TYPICAL FREQUENCY RESPONSE AT +25°C



REV. OR
ECO-026012
EDU5074
CBP3-1870CB+
URJ
25062

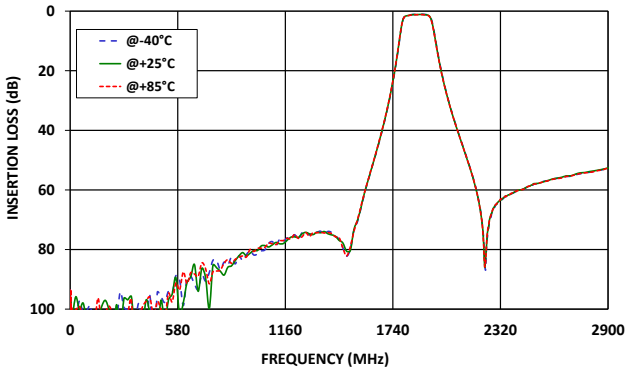
Bandpass Filter

CBP3-1870CB+

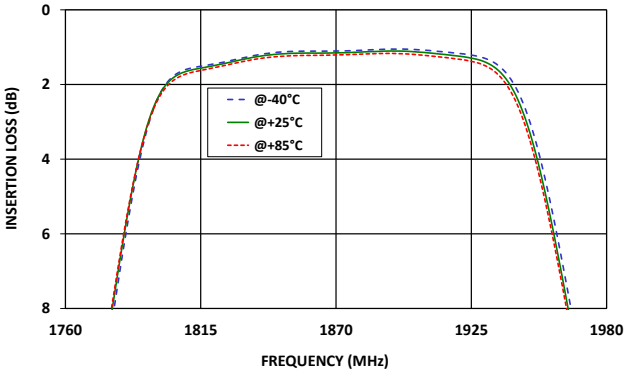
50Ω 1820 to 1920 MHz

TYPICAL PERFORMANCE GRAPHS

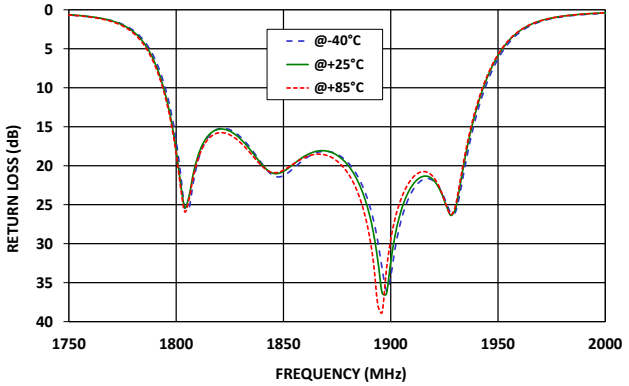
CBP3-1870CB+
INSERTION LOSS



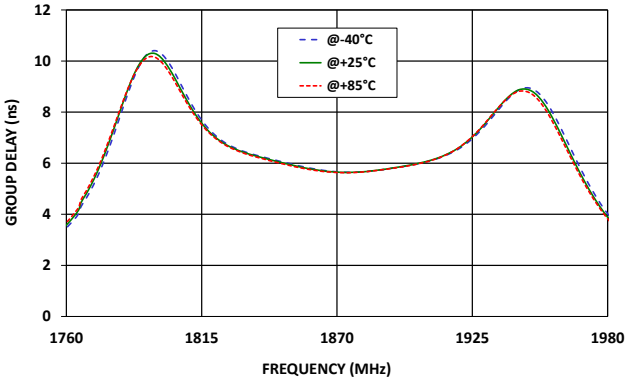
CBP3-1870CB+
INSERTION LOSS (Zoomed)



CBP3-1870CB+
RETURN LOSS (Zoomed)



CBP3-1870CB+
GROUP DELAY



Bandpass Filter

CBP3-1870CB+

50Ω 1820 to 1920 MHz

FUNCTIONAL DIAGRAM

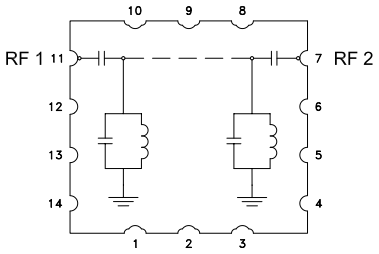


Figure 1. CBP3-1870CB+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description
RF1[2]	11	Connects to RF Input Port
RF2[2]	7	Connects to RF Output Port
GROUND	1-6, 8-10,12-14	Connects to Ground on PCB, (See drawing PL-818)
NC	-	No connection, not used internally. See drawing PL-818 for connection to PCB

SUGGESTED PCB LAYOUT (PL-818)

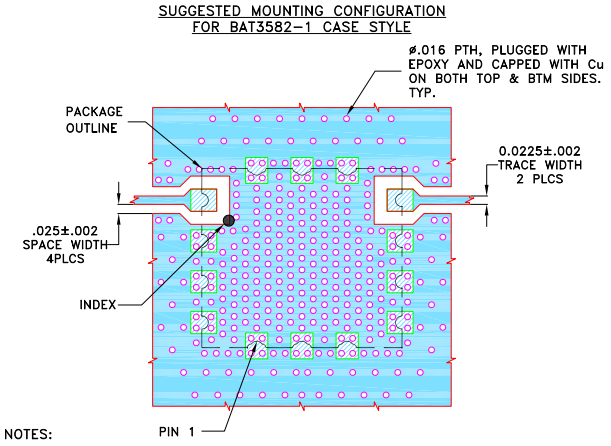
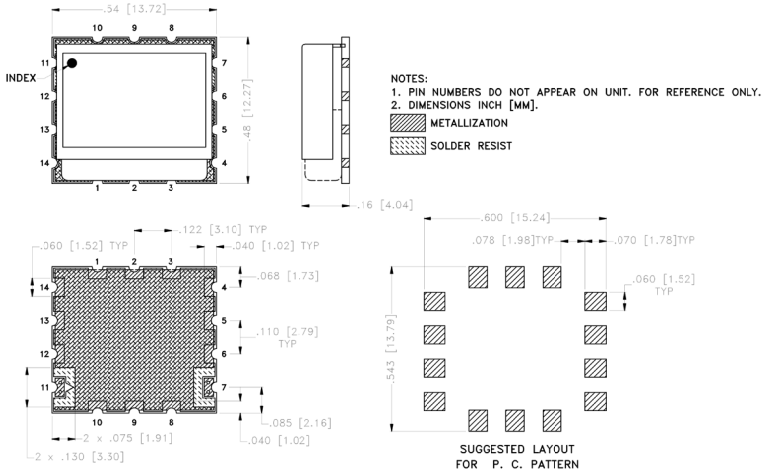


Figure 2. Suggested PCB Layout PL-818

CASE STYLE DRAWING



Weight: 1.5 grams
Dimensions are in inches (mm). Tolerances: 2Pl. ± .015; 3Pl. ± .003

PRODUCT MARKING*: CBP3-1870CB

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

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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	BAT3582-1 Lead Finish: Gold over Nickel Plate
RoHS Status	Compliant
Tape and Reel	TR-F014
Suggested Layout for PCB Design	PL-654
Evaluation Board	TB-CBP3-1870CB+
	Gerber File
Environmental Rating	ENV54

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 CBP3-1870CB+

Typical Performance Data

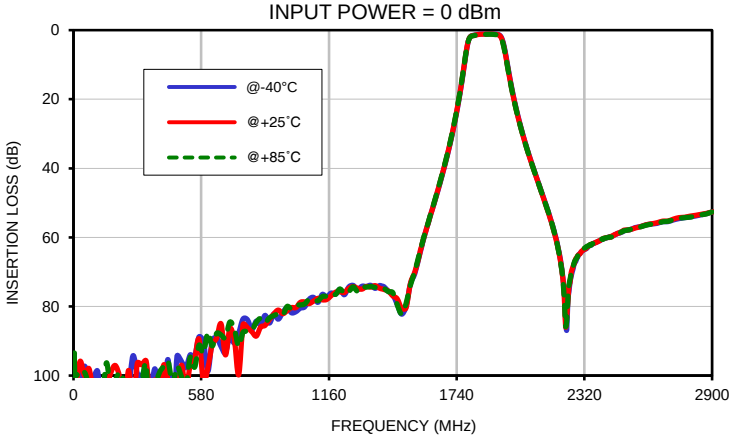
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	107.02	97.46	97.65	0.06	0.06	0.06	0.05	0.05	0.05
5	110.55	100.75	97.71	0.06	0.06	0.06	0.06	0.06	0.06
10	103.25	103.62	99.93	0.05	0.05	0.05	0.05	0.05	0.05
30	102.82	95.87	100.34	0.05	0.05	0.05	0.04	0.04	0.04
50	97.27	100.07	99.07	0.04	0.04	0.04	0.04	0.04	0.04
110	98.79	102.44	102.53	0.04	0.03	0.03	0.02	0.03	0.04
150	120.57	103.88	96.28	0.05	0.03	0.02	0.01	0.02	0.03
210	105.83	100.64	98.99	0.06	0.02	0.02	0.01	0.02	0.03
250	103.32	98.50	105.60	0.07	0.01	0.01	0.00	0.02	0.02
310	100.10	96.91	101.68	0.08	0.01	0.00	0.00	0.02	0.02
410	106.53	96.89	97.32	0.08	0.01	0.00	0.01	0.01	0.02
510	97.73	104.57	103.33	0.06	0.01	0.01	0.01	0.02	0.03
710	88.44	86.29	84.50	0.05	0.02	0.02	0.01	0.03	0.03
810	86.67	87.31	86.91	0.06	0.02	0.02	0.01	0.03	0.05
910	82.12	82.13	82.62	0.09	0.03	0.03	0.00	0.03	0.05
1010	81.51	80.33	79.60	0.12	0.03	0.03	0.01	0.05	0.06
1210	75.04	75.76	74.93	0.12	0.05	0.04	0.02	0.07	0.08
1310	74.13	74.99	74.30	0.12	0.06	0.05	0.04	0.08	0.10
1400	74.10	74.90	74.50	0.15	0.08	0.07	0.05	0.09	0.11
1510	80.07	80.44	79.18	0.19	0.10	0.10	0.07	0.11	0.14
1610	56.09	56.04	55.90	0.22	0.14	0.14	0.11	0.16	0.19
1710	32.98	32.74	32.54	0.37	0.30	0.32	0.25	0.32	0.36
1724	28.94	28.68	28.48	0.43	0.36	0.38	0.32	0.39	0.44
1755	18.46	18.13	17.91	0.77	0.74	0.78	0.65	0.77	0.84
1820	1.45	1.50	1.56	15.25	15.31	15.77	15.55	15.93	16.52
1830	1.32	1.36	1.41	16.31	16.57	17.04	17.32	18.12	18.93
1850	1.12	1.17	1.24	21.29	20.73	20.58	25.63	24.80	24.47
1870	1.10	1.15	1.21	18.15	18.11	18.66	17.80	17.82	18.27
1890	1.06	1.11	1.17	24.97	26.19	28.90	21.47	21.89	22.64
1900	1.06	1.11	1.19	34.20	32.37	29.48	24.03	23.67	23.12
1910	1.10	1.17	1.25	23.28	22.55	21.61	21.63	21.09	20.41
1920	1.17	1.24	1.32	21.98	21.87	21.50	21.85	21.62	21.24
1930	1.29	1.38	1.48	26.05	25.68	25.34	28.98	26.83	25.68
1940	1.76	1.93	2.08	13.51	12.72	12.36	13.50	12.73	12.33
1950	3.25	3.56	3.77	6.30	5.88	5.74	6.18	5.86	5.74
1960	6.08	6.49	6.72	2.92	2.72	2.69	2.79	2.71	2.71
1970	9.63	10.04	10.25	1.50	1.40	1.40	1.37	1.39	1.42
1980	13.23	13.61	13.78	0.90	0.82	0.83	0.76	0.82	0.87
1990	16.61	16.96	17.10	0.61	0.54	0.55	0.48	0.54	0.59
2002	20.31	20.62	20.72	0.44	0.37	0.37	0.31	0.37	0.42
2010	22.57	22.86	22.94	0.37	0.30	0.30	0.24	0.31	0.35
2030	27.69	27.92	27.97	0.30	0.22	0.21	0.14	0.21	0.25
2036	29.10	29.31	29.36	0.28	0.20	0.20	0.13	0.20	0.23
2040	30.02	30.22	30.27	0.28	0.20	0.19	0.12	0.19	0.22
2060	34.36	34.53	34.55	0.25	0.17	0.16	0.09	0.15	0.18
2070	36.39	36.54	36.56	0.23	0.15	0.14	0.08	0.14	0.17
2080	38.33	38.50	38.48	0.21	0.13	0.12	0.07	0.13	0.16
2090	40.23	40.40	40.40	0.20	0.12	0.10	0.06	0.12	0.15
2100	42.10	42.23	42.24	0.19	0.11	0.10	0.05	0.12	0.14
2150	51.33	51.62	51.53	0.17	0.10	0.08	0.05	0.11	0.14
2200	62.77	62.92	63.09	0.16	0.09	0.08	0.03	0.08	0.11
2250	75.69	74.19	73.87	0.15	0.08	0.07	0.03	0.09	0.12
2280	67.11	66.27	66.47	0.15	0.08	0.07	0.02	0.08	0.11
2400	60.62	60.56	60.43	0.17	0.07	0.08	0.02	0.08	0.11
2500	58.01	57.89	58.09	0.20	0.09	0.10	0.03	0.10	0.13
2600	56.38	56.33	56.47	0.20	0.10	0.11	0.04	0.12	0.16
2700	55.43	55.26	55.33	0.20	0.14	0.15	0.04	0.12	0.17
2800	54.07	53.84	54.13	0.23	0.17	0.19	0.07	0.17	0.23
2850	53.46	53.31	53.46	0.22	0.16	0.19	0.07	0.16	0.23
2900	52.65	52.65	52.63	0.26	0.20	0.23	0.09	0.20	0.27

Typical Performance Data

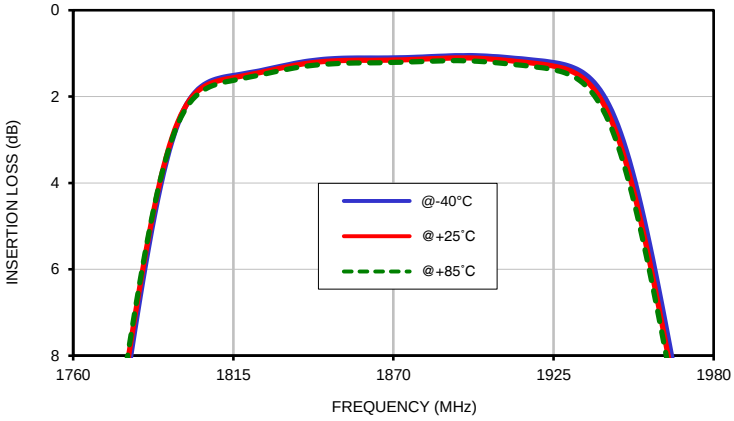
FREQ.	GROUP DELAY		
	(nsec)		
(MHz)	@-40°C	@+25˚C	@+85˚C
1820	7.14	7.06	7.02
1824	6.83	6.78	6.74
1826	6.71	6.67	6.63
1830	6.53	6.50	6.47
1832	6.46	6.43	6.40
1834	6.40	6.37	6.33
1840	6.24	6.21	6.17
1842	6.19	6.16	6.12
1844	6.14	6.11	6.07
1846	6.09	6.06	6.02
1848	6.05	6.01	5.97
1850	6.00	5.97	5.93
1852	5.96	5.92	5.88
1854	5.91	5.88	5.84
1856	5.87	5.83	5.80
1858	5.83	5.80	5.77
1860	5.79	5.76	5.73
1864	5.73	5.70	5.68
1870	5.66	5.65	5.63
1874	5.65	5.64	5.63
1878	5.65	5.65	5.64
1880	5.66	5.66	5.65
1882	5.67	5.67	5.67
1884	5.70	5.70	5.69
1890	5.77	5.77	5.76
1894	5.82	5.83	5.82
1898	5.89	5.90	5.88
1900	5.92	5.93	5.92
1920	6.59	6.64	6.64

Typical Performance Curves

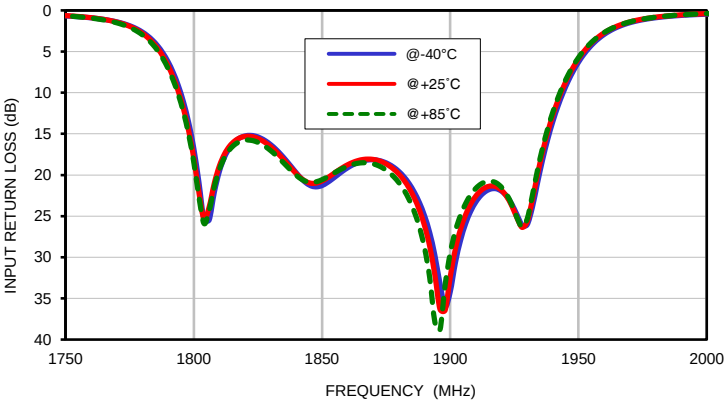
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



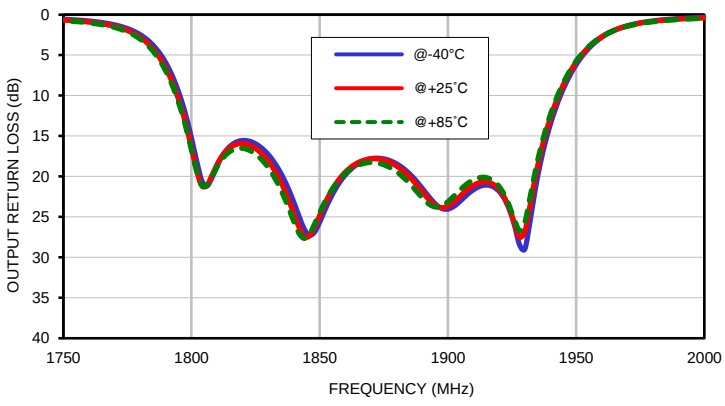
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



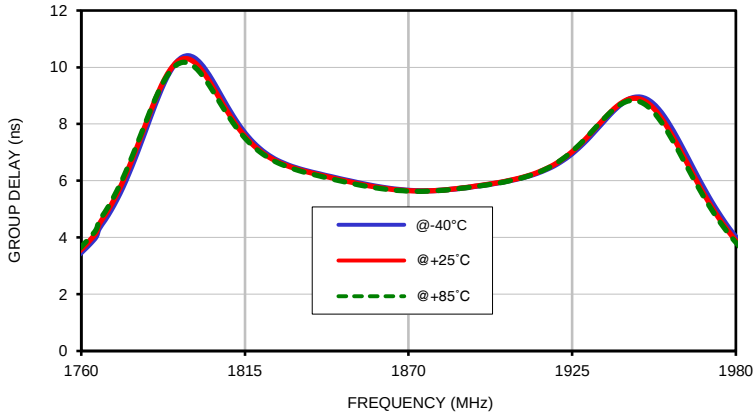
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



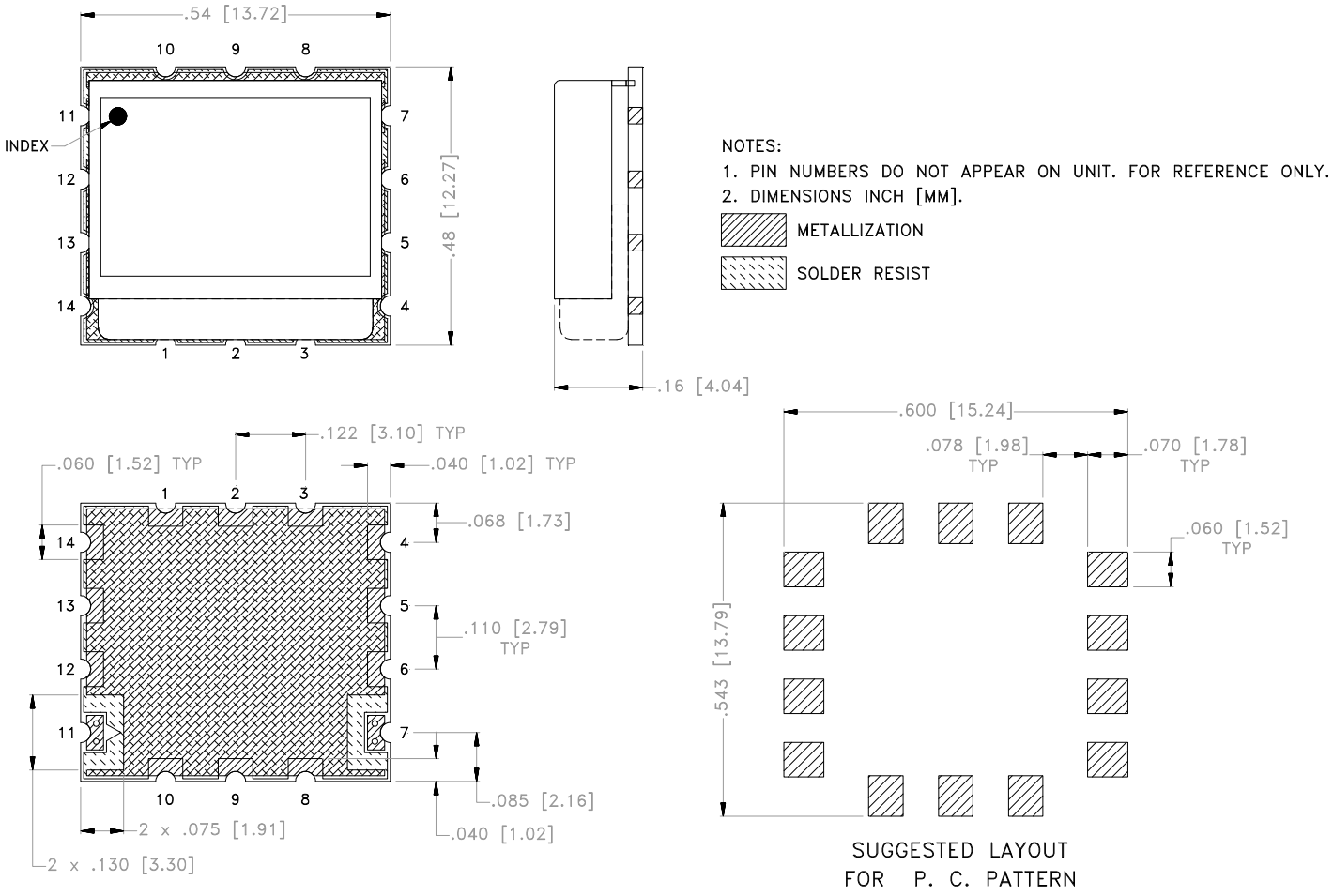
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style BAT

Outline Dimension

BAT3582-1

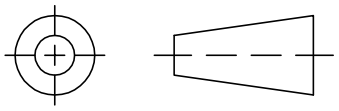


Dimensions are in inches [mm]. Tolerances: 2 Pl ± .015; 3 Pl ± .003

Notes:

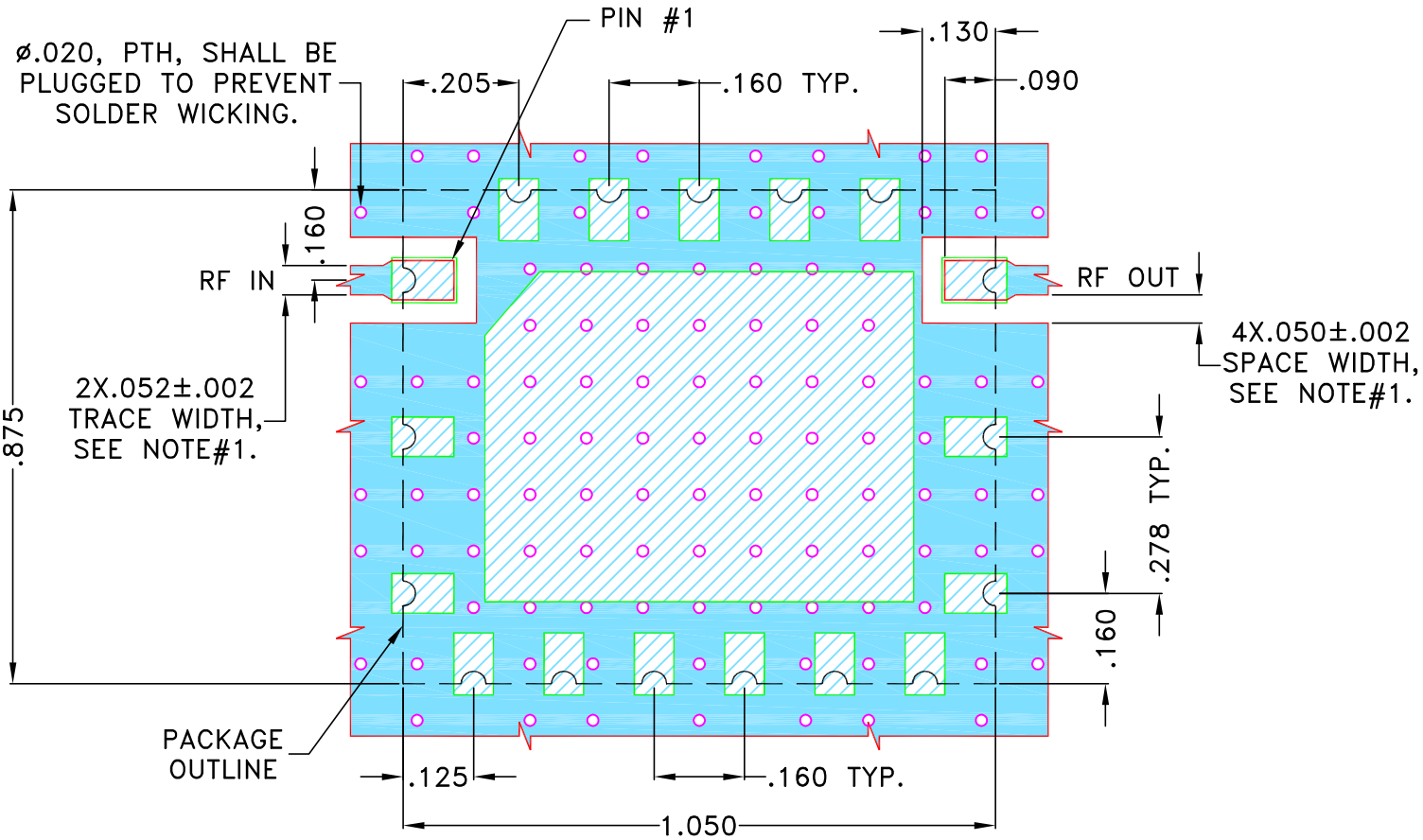
1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Unit Weight: 1.5grams
4. Termination finish:
   For RoHS Case Styles: 2-5 µ inch (.05-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate.
   All models, (+) suffix.

THIRD ANGLE PROJECTION



REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M176568	NEW RELEASE	OCT 19	AP	VC

SUGGESTED MOUNTING CONFIGURATION FOR KV1710-3 CASE STYLE



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .023"±.002". 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	AP	23 OCT 19
TOLERANCES ON:	CHECKED	MD	23 OCT 19
2 PL DECIMALS ±	APPROVED	KKK	23 OCT 19
3 PL DECIMALS ± .005"			
ANGLES ±			
FRACTIONS ±			

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

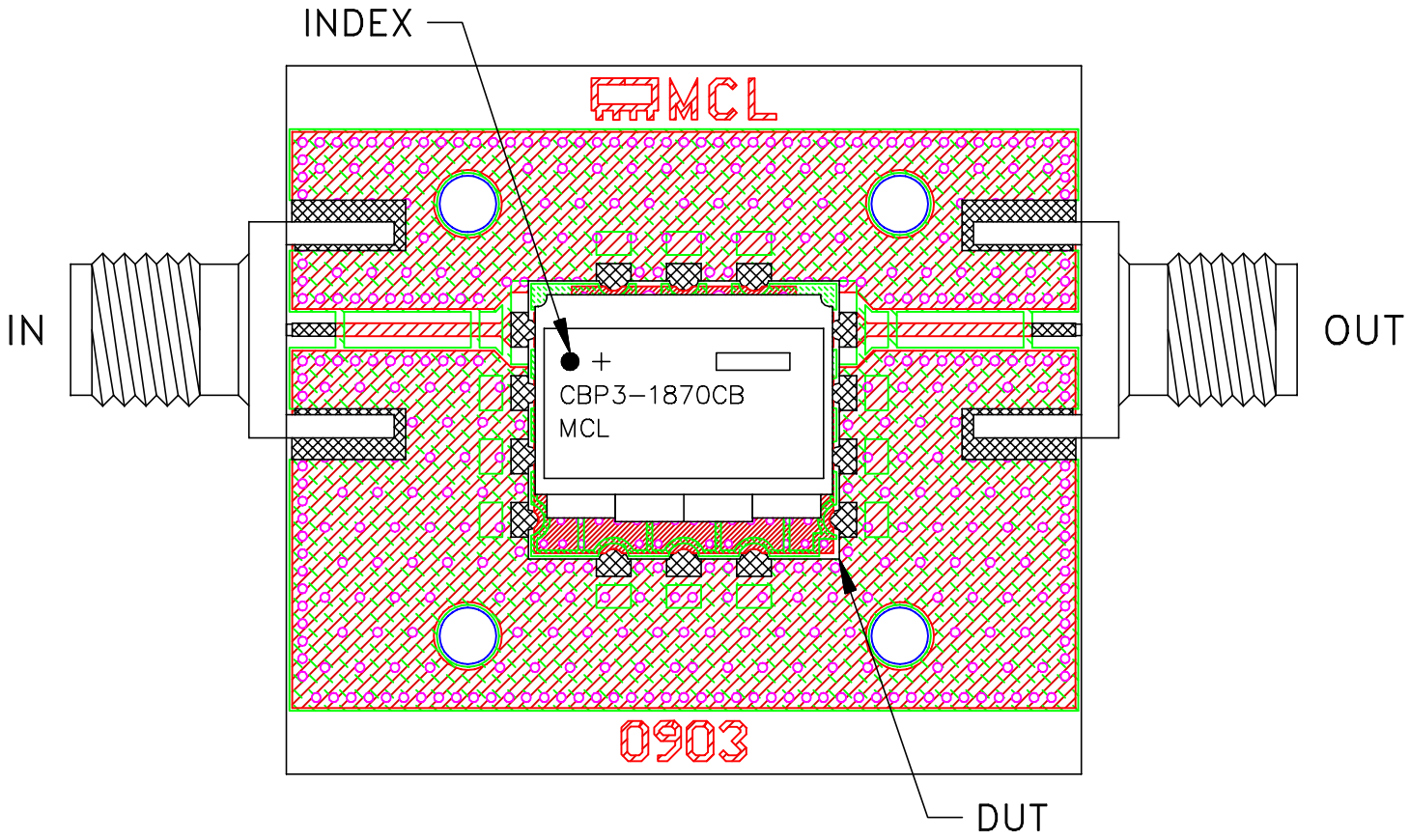
Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

PL, KV1710-3, TB-1123+, 50 Ohm

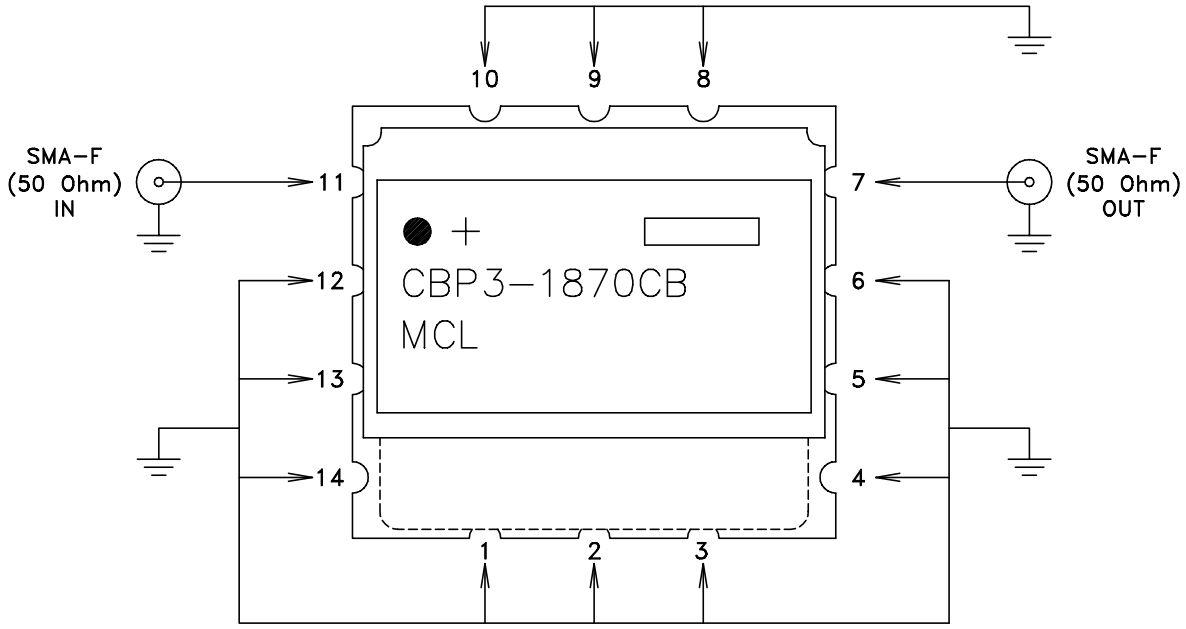
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-654	OR
FILE: 98PL654		SCALE: 3:1	SHEET: 1 OF 1

Evaluation Board and Circuit

TB-CBP3-1870CB+



Schematic diagram



Notes:

1. PCB Material: ROGERS (RO4350B) OR Equivalent, Dielectric Constant=3.48
   Thickness=.010 inch
2. 50 Ohm SMA Female Connector.

Mini-Circuits®

Mini-Circuits

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