Surface Mount

Coaxial-Ceramic Resonator Filters and Multiplexers

50Ω DC to 6 GHz

The Big Deal

- Low insertion loss with excellent power handling
- Passbands up to 6 GHz
- Fractional bandwidth from <1 to 25%
- Low profile designs with min. height of 0.120”
- Excellent temperature stability
- Rugged construction to handle demanding environmental conditions

Product Overview

Mini-Circuits’ *Coaxial-Ceramic Resonator filters* offer low insertion loss in very small form factors, using ceramic material with high dielectric constant and superior Q factor. Bandpass and bandstop filters,diplexer and multiplexer designs can be constructed using this technology. Low insertion loss combined with excellent power handling makes these filters well suited for transmitter and receiver signal chains. Advanced filter design and construction can achieve stopband width greater than 3x the center frequency as high as 20 GHz.

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.

Key Features

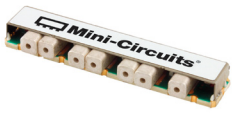
Feature	Advantages
Low insertion loss	Low signal loss results in better SNR in signal chain
Fast roll-off	Higher selectivity results in better adjacent channel rejection and dynamic range
Wide stop band	Wide spur-free stopband results in better receiver sensitivity
Excellent power handling	Well suited for transmitter applications
Rugged Construction	These filter assemblies have been qualified over a wide range of thermal, mechanical and environmental conditions including withstanding the stress of extensive solder reflow cycles
Small Size	Very well suited for high performance applications where size is a constraint.
Temperature stability	Very minimal change in electrical performance across temperature makes these filters suitable for a wide range of operating conditions.

Surface Mount

Bandpass Filter

CBP-1953AF+

50Ω 1858 to 2048 MHz



Generic photo used for illustration purposes only

CASE STYLE:SV2484

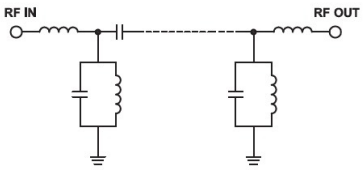
Features

- High rejection of 60 dB.
- High selectivity
- Miniature shielded package

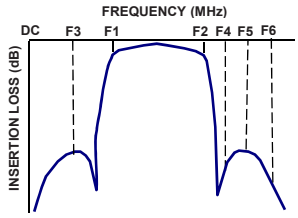
Applications

- Mobile satellite
- Fixed microwave
- Defense/Military

Functional Schematic



Typical Frequency Response



+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Electrical Specifications[(1)] at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	-	-	-	1953	-	MHz
	Insertion Loss	F1-F2	1858-2048	-	3.0	3.5	dB
	VSWR	F1-F2	1858-2048	-	1.78	2.0	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC-1500	60	65	-	dB
	VSWR	DC-F3	DC-1500	-	20	-	:1
Stop Band, Upper	Insertion Loss	F4-F5	2400-2600	60	63	-	dB
		F5-F6	2600-3500	40	50	-	dB
	VSWR	F4-F6	2400-3500	-	20	-	:1

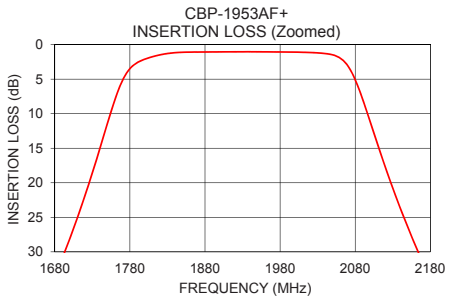
(1) Measured on Mini-Circuits Characterization Test Board TB-1069+.

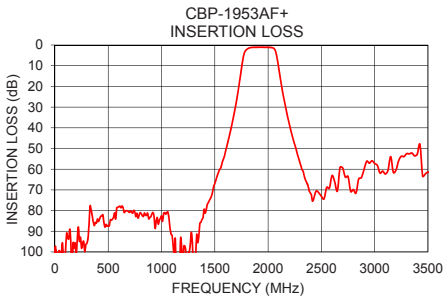
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	5 W Max.

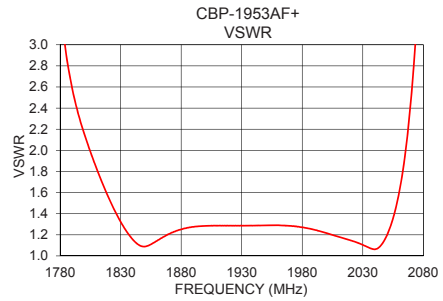
Permanent damage may occur if any of these limits are exceeded.

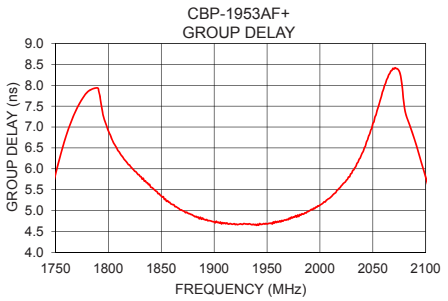
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (ns)
1	106.04	347.95	1858	5.20
10	104.24	311.83	1860	5.15
500	87.24	221.81	1870	5.00
1000	82.63	657.90	1880	4.88
1500	66.97	147.78	1890	4.79
1600	51.60	102.69	1900	4.73
1690	30.90	57.16	1910	4.70
1725	20.27	35.32	1920	4.66
1780	3.48	3.40	1930	4.68
1858	1.09	1.13	1940	4.65
1953	1.04	1.29	1953	4.69
2048	1.44	1.15	1960	4.74
2073	3.55	2.94	1970	4.78
2116	16.43	24.49	1980	4.86
2131	21.05	36.07	1990	4.99
2166	30.55	59.57	2000	5.13
2400	71.83	135.70	2010	5.32
2600	63.10	149.13	2020	5.59
2700	59.40	167.52	2030	5.89
3500	61.38	126.22	2048	6.92









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.

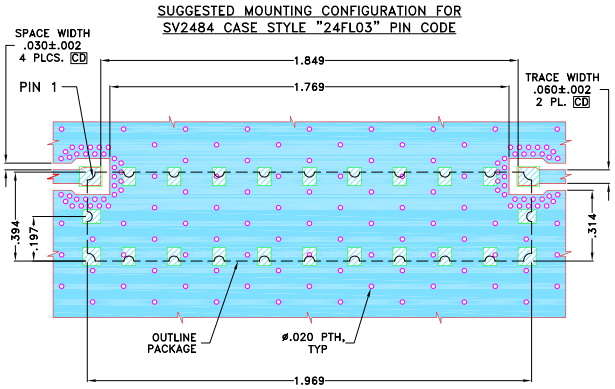
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

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/MCLStore/terms.jsp

Pad Connections

INPUT	1
OUTPUT	11
GROUND	2 - 10, 12 - 24

Demo Board MCL P/N: TB-1069+
Suggested PCB Layout (PL-604)

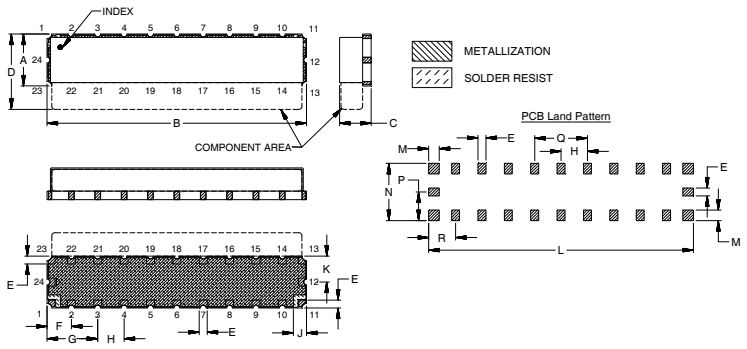


NOTES:
1. TRACE WIDTH IS SHOWN FOR REOGERS (RO4350B), WITH DIELECTRIC THICKNESS .030"±.002", COPPER: 1/2 Oz. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K
.394	**1.969**	**.240**	**.492**	**.060**	**.184**	**.384**	**.200**	**.100**	**.197**
10.00	50.00	6.10	12.50	1.52	4.68	9.76	5.08	2.54	5.00

L	M	N	P	Q	R				Wt.
2.009	**.080**	**.434**	**.217**	**.400**	**.204**				grams
51.02	2.03	11.02	5.51	10.16	5.19				7.0

Note: Please refer to case style drawing for details

Surface Mount Band Pass Filter CBP-1953AF+

Typical Performance Data

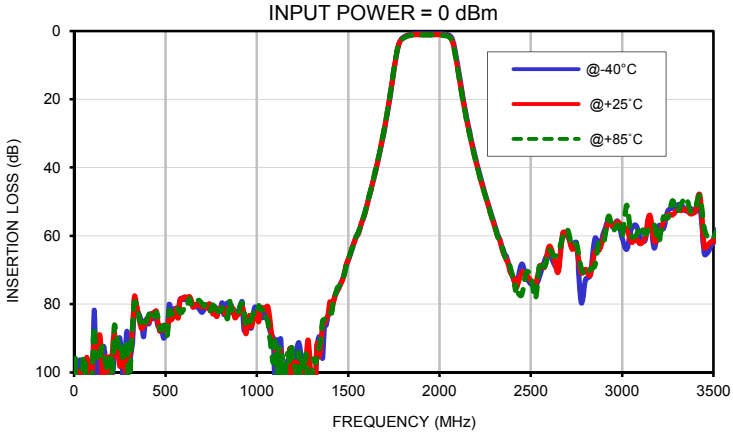
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	99.64	106.04	105.94	0.05	0.05	0.05	0.05	0.05	0.06
5	102.42	97.38	110.23	0.05	0.05	0.05	0.06	0.07	0.07
10	102.63	104.24	101.71	0.05	0.06	0.06	0.06	0.07	0.07
50	96.73	100.25	95.38	0.06	0.07	0.07	0.09	0.10	0.09
100	105.53	99.31	97.83	0.07	0.08	0.08	0.11	0.12	0.11
200	95.36	101.61	95.79	0.09	0.09	0.09	0.12	0.14	0.13
250	89.94	98.20	94.12	0.09	0.10	0.09	0.12	0.14	0.14
500	89.07	87.24	86.92	0.05	0.08	0.08	0.07	0.11	0.12
1000	82.58	82.63	83.01	0.03	0.03	0.04	0.02	0.08	0.09
1250	120.07	100.61	96.60	0.03	0.04	0.05	0.06	0.13	0.14
1500	67.24	66.97	66.97	0.05	0.12	0.13	0.16	0.24	0.25
1600	51.71	51.60	51.38	0.10	0.17	0.18	0.23	0.33	0.34
1650	41.12	40.86	40.73	0.15	0.23	0.24	0.32	0.43	0.46
1670	36.42	36.10	35.96	0.18	0.26	0.27	0.38	0.50	0.54
1680	33.89	33.56	33.42	0.20	0.28	0.29	0.41	0.54	0.59
1690	31.25	30.90	30.73	0.21	0.30	0.32	0.45	0.59	0.65
1700	28.47	28.08	27.89	0.25	0.34	0.36	0.52	0.67	0.73
1720	22.39	21.91	21.75	0.33	0.44	0.47	0.71	0.92	1.01
1725	20.78	20.27	20.11	0.38	0.49	0.53	0.79	1.02	1.12
1750	11.97	11.44	11.34	0.88	1.11	1.18	1.74	2.22	2.41
1780	3.46	3.48	3.54	4.76	5.26	5.40	7.31	8.28	8.60
1800	1.93	2.10	2.17	8.31	8.72	8.93	10.09	10.60	10.94
1858	0.89	1.09	1.17	26.80	24.36	24.93	31.78	27.62	29.00
1953	0.85	1.04	1.12	17.79	17.94	17.88	18.40	18.48	18.35
2048	1.13	1.44	1.55	25.46	23.06	23.44	21.85	20.39	20.52
2050	1.17	1.48	1.60	23.20	20.96	21.22	20.55	19.06	19.17
2074	3.03	3.74	3.93	6.36	5.78	5.81	6.51	5.99	6.03
2106	12.22	13.18	13.38	0.91	1.01	1.07	1.11	1.23	1.29
2131	20.24	21.05	21.22	0.35	0.48	0.53	0.53	0.67	0.72
2166	29.88	30.55	30.67	0.17	0.29	0.32	0.32	0.44	0.47
2186	34.69	35.29	35.39	0.13	0.24	0.27	0.28	0.39	0.42
2191	35.81	36.42	36.50	0.12	0.24	0.26	0.26	0.37	0.40
2201	38.06	38.62	38.68	0.11	0.22	0.25	0.25	0.36	0.38
2251	47.90	48.37	48.44	0.07	0.17	0.19	0.20	0.29	0.31
2301	56.61	57.19	57.14	0.05	0.15	0.16	0.17	0.26	0.28
2351	64.43	65.22	64.93	0.05	0.14	0.15	0.15	0.24	0.26
2400	72.01	71.83	72.08	0.05	0.13	0.13	0.13	0.23	0.25
2500	74.08	73.08	71.63	0.03	0.12	0.12	0.12	0.23	0.25
2550	71.56	68.76	67.65	0.03	0.11	0.11	0.12	0.24	0.26
2600	65.16	63.10	64.15	0.03	0.12	0.11	0.12	0.25	0.27
2700	60.14	59.40	58.15	0.02	0.10	0.10	0.14	0.28	0.33
2750	62.05	63.48	62.50	0.02	0.10	0.10	0.15	0.30	0.33
2800	72.71	69.84	71.62	0.01	0.09	0.09	0.13	0.28	0.32
2850	60.82	64.68	68.81	0.02	0.10	0.10	0.16	0.32	0.34
2900	58.81	60.17	61.68	0.01	0.10	0.10	0.18	0.32	0.37
2950	57.49	57.10	58.35	0.00	0.09	0.10	0.19	0.35	0.41
3000	60.68	57.26	59.99	0.01	0.08	0.09	0.23	0.37	0.40
3050	58.05	61.86	60.12	0.01	0.08	0.09	0.23	0.39	0.44
3100	60.55	62.34	57.15	0.02	0.08	0.09	0.25	0.39	0.45
3150	54.09	53.92	57.64	0.02	0.08	0.09	0.26	0.42	0.48
3200	57.07	60.45	61.85	0.02	0.08	0.10	0.25	0.43	0.48
3250	52.69	53.76	54.76	0.02	0.08	0.11	0.31	0.48	0.54
3300	50.99	52.48	53.10	0.02	0.09	0.12	0.30	0.46	0.50
3350	52.71	52.21	48.77	0.01	0.10	0.14	0.34	0.50	0.54
3375	52.02	53.60	52.95	0.01	0.14	0.15	0.34	0.50	0.53
3400	53.05	52.67	51.77	0.01	0.11	0.15	0.35	0.50	0.53
3425	50.90	48.10	48.41	0.02	0.12	0.14	0.39	0.54	0.56
3450	65.35	63.36	58.10	0.02	0.12	0.14	0.38	0.51	0.55
3475	64.28	62.32	60.85	0.02	0.11	0.16	0.41	0.54	0.59
3500	60.87	61.38	60.47	0.01	0.14	0.17	0.41	0.55	0.59

Typical Performance Data

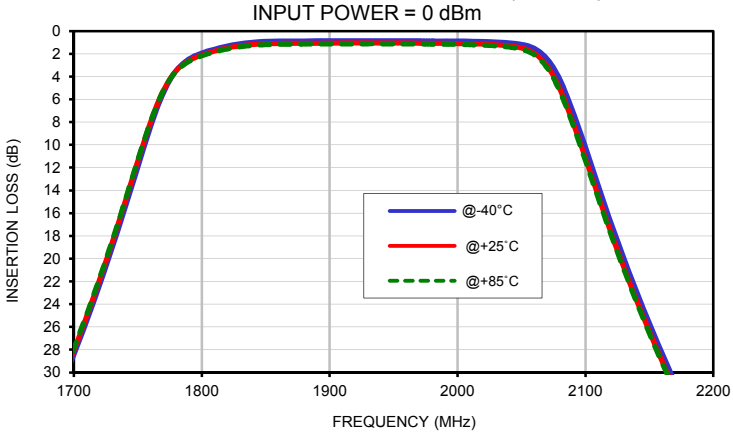
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
1858	5.25	5.20	5.18
1860	5.21	5.15	5.14
1864	5.14	5.09	5.08
1868	5.07	5.01	5.01
1872	5.01	4.98	4.97
1876	4.96	4.93	4.92
1880	4.91	4.88	4.86
1884	4.86	4.83	4.82
1888	4.82	4.79	4.78
1892	4.80	4.77	4.75
1896	4.77	4.76	4.75
1900	4.75	4.73	4.72
1904	4.74	4.72	4.72
1908	4.74	4.71	4.70
1912	4.72	4.70	4.69
1916	4.70	4.68	4.68
1920	4.69	4.66	4.66
1924	4.68	4.67	4.67
1928	4.70	4.69	4.68
1932	4.67	4.67	4.67
1936	4.68	4.66	4.66
1940	4.66	4.65	4.66
1944	4.68	4.67	4.69
1948	4.70	4.68	4.70
1953	4.70	4.69	4.71
1956	4.74	4.73	4.75
1960	4.74	4.74	4.77
1964	4.76	4.76	4.76
1968	4.77	4.77	4.77
1972	4.79	4.80	4.78
1976	4.83	4.84	4.81
1980	4.84	4.86	4.83
1984	4.88	4.91	4.88
1988	4.95	4.97	4.96
1992	4.99	5.03	5.01
1996	5.07	5.08	5.07
2000	5.10	5.13	5.12
2004	5.17	5.21	5.20
2008	5.26	5.28	5.28
2012	5.32	5.37	5.36
2016	5.44	5.48	5.48
2020	5.52	5.59	5.57
2024	5.64	5.69	5.69
2028	5.75	5.81	5.81
2032	5.89	5.98	5.98
2036	6.07	6.16	6.15
2040	6.26	6.38	6.39
2042	6.39	6.50	6.51
2044	6.52	6.64	6.66
2046	6.65	6.78	6.81
2048	6.78	6.92	6.95

Typical Performance Curves

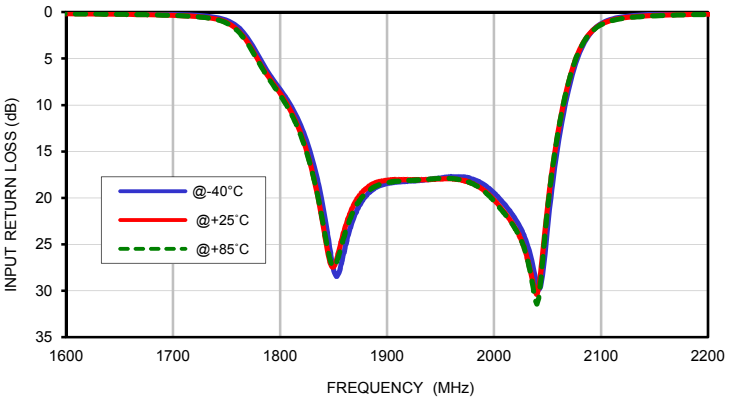
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



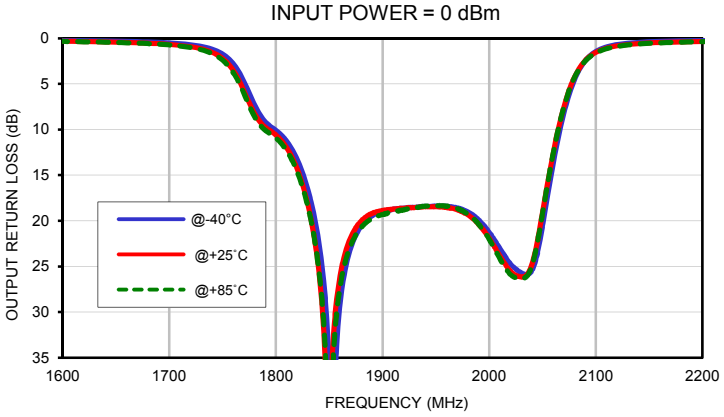
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



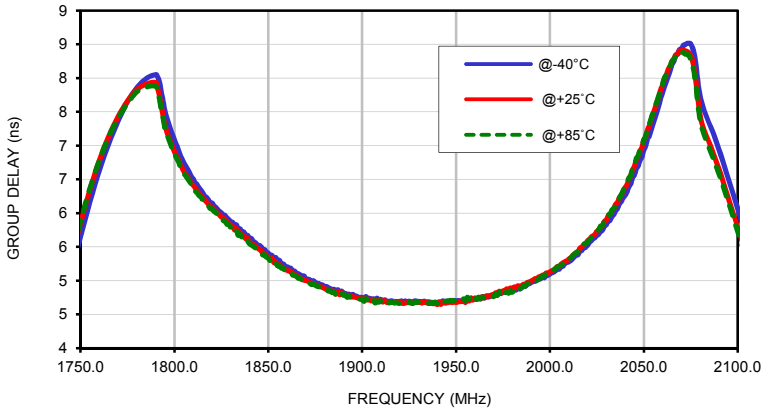
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



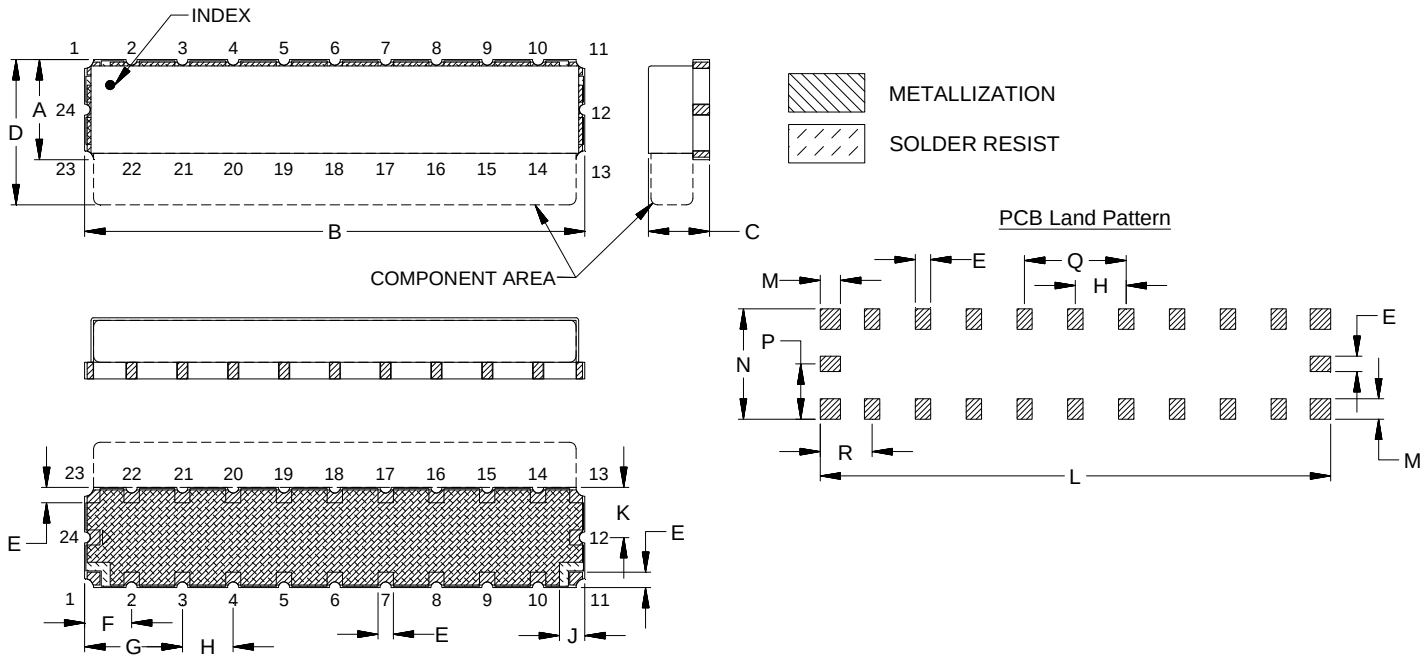
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style SV

SV2484

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	L	M
SV2484	.394 (10.00)	1.969 (50.00)	.240 (6.10)	.492 (12.50)	.060 (1.52)	.184 (4.68)	.384 (9.76)	.200 (5.08)	.100 (2.54)	.197 (5.00)	2.009 (51.02)	.080 (2.03)

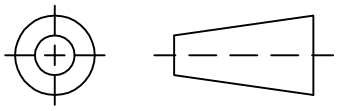
CASE#	N	P	Q	R	WT. GRAMS
SV2484	.434 (11.02)	.217 (5.51)	.400 (10.16)	.204 (5.19)	7.0

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.

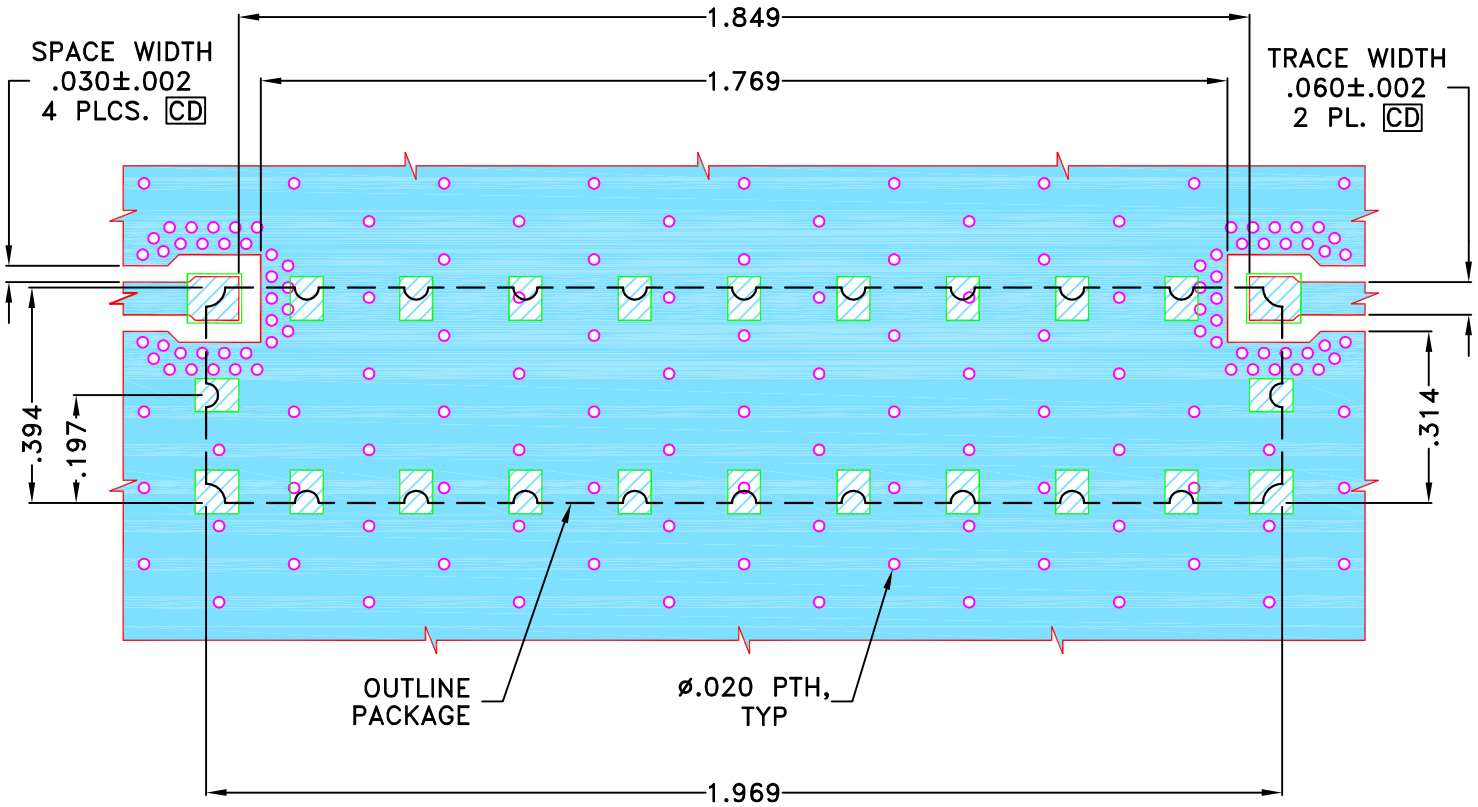
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M169276	NEW RELEASE	AUG 18	TM	MD

SUGGESTED MOUNTING CONFIGURATION FOR SV2484 CASE STYLE "24FL03" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR REOGERS (RO4350B), WITH DIELECTRIC THICKNESS .030"±.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	TM	16 AUG 18
TOLERANCES ON:	CHECKED	MD	16 AUG 18
2 PL DECIMALS ± .005"	APPROVED	KK	16 AUG 18
3 PL DECIMALS ±			
ANGLES ±			
FRACTIONS ±			

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

Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

PL, 24FL03, SV2484, CBP
TB-1069+, 50 Ohm

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-604	OR
FILE: 98PL604		SCALE: 3:1	SHEET: 1 OF 1

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