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

50Ω 504 to 509 MHz

CBP6-507BG+

Generic photo used for illustration purposes only

CASE STYLE: KV1710-3

Features

- High rejection, 70 dB typ.
- High selectivity <2% Bandwidth
- Miniature shielded package

Applications

- Industrial / Business Radio pool
- Private and public land mobile
- Test and measurement

Electrical Specifications at 25°C

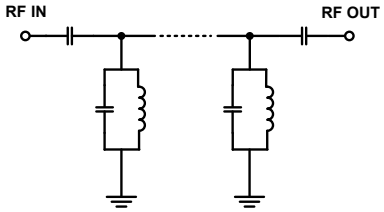
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	-	-	-	507	-	MHz
	Insertion Loss	F1-F2	504 - 509	-	3.8	4.8	dB
	VSWR	F1-F2	504- 509	-	1.43	1.92	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 430	70	85	-	dB
		F3-F4	430 - 486	40	52	-	dB
Stop Band, Upper	Insertion Loss	F5-F6	528 - 600	40	52	-	dB
		F6-F7	600 - 1300	60	70	-	dB
		F7-F8	1300 - 1900	-	40	-	dB

Measured on Mini-Circuits Characterization Test Board TB-1123+

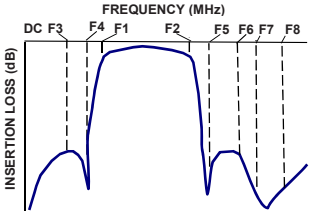
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input*	6W Max. @ 25°C

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

Functional Schematic



Typical Frequency Response

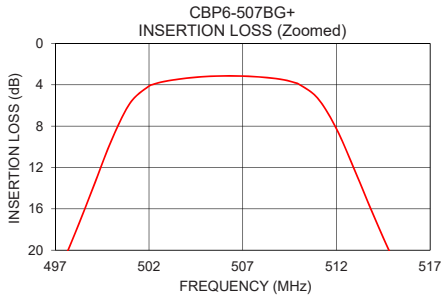


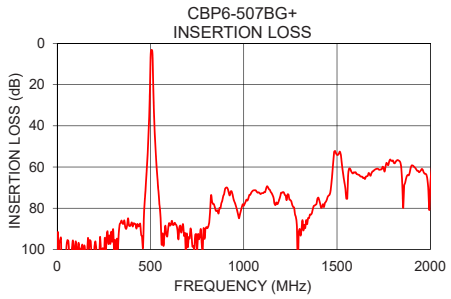
+RoHS Compliant

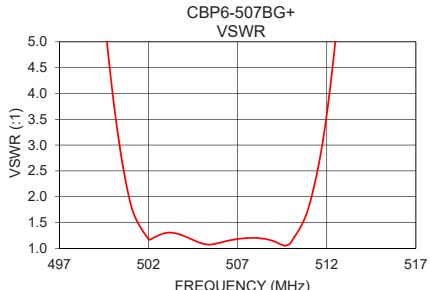
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

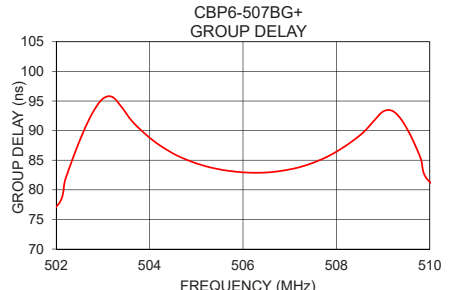
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (ns)
1	108.12	353.45	504.0	88.81
10	97.61	418.70	505.0	84.47
100	96.14	863.84	505.6	83.31
430	87.65	421.65	505.8	83.11
486	51.65	91.40	506.0	82.95
495	30.00	28.81	506.2	82.89
498	18.61	12.21	506.4	82.90
504	3.36	1.24	506.6	82.98
505	3.20	1.09	506.8	83.18
506	3.15	1.11	507.0	83.45
507	3.16	1.18	507.2	83.81
509	3.46	1.14	507.4	84.29
516	24.52	23.90	507.6	84.88
519	33.86	46.90	507.8	85.57
528	52.52	135.45	508.0	86.43
600	87.24	419.00	508.2	87.44
1000	78.78	211.67	508.4	88.56
1300	90.06	130.36	508.6	89.88
1500	54.08	10.71	508.8	91.61
1900	59.29	111.79	509.0	93.23









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.

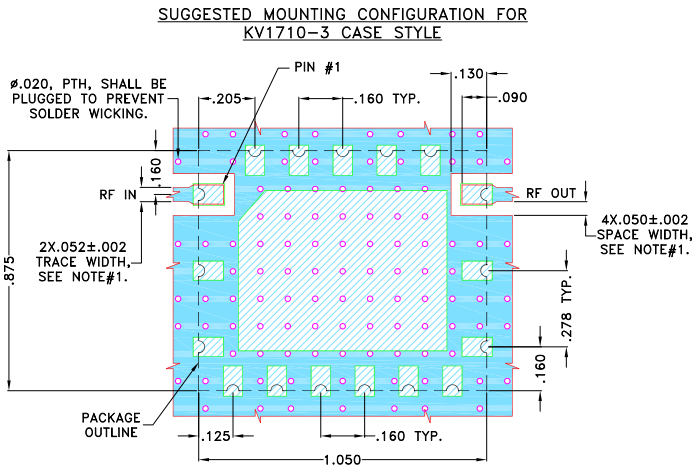
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

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	12
GROUND	2-11, 13-17

Demo Board MCL P/N: TB-1123+
Suggested PCB Layout (PL-654)



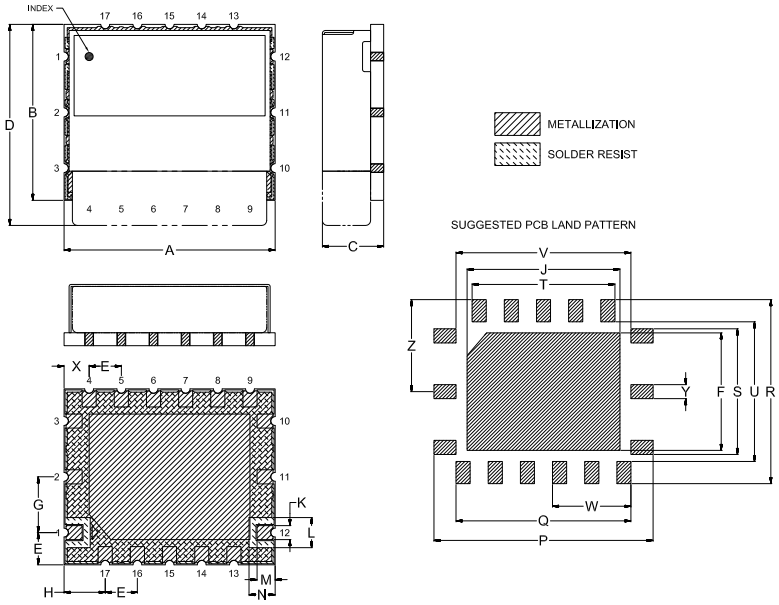
NOTES:

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

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L	M	N
1.050	**.875**	**.330**	**1.000**	**.160**	**.585**	**.278**	**.205**	**.760**	**.070**	**.150**	**.090**	**.130**
26.67	22.23	8.38	25.40	4.06	14.86	7.05	5.21	19.30	1.78	3.81	2.29	3.30

P	Q	R	S	T	U	V	W	X	Y	Z		Wt.
1.090	**.870**	**.915**	**.625**	**.710**	**.695**	**.870**	**.390**	**.125**	**.070**	**.458**		grams
27.69	22.10	23.24	15.88	18.03	17.65	22.10	9.91	3.18	1.78	11.62		15

Note: Please refer to case style drawing for details

Surface mount Bandpass Filter CBP6-507BG+

Typical Performance Data

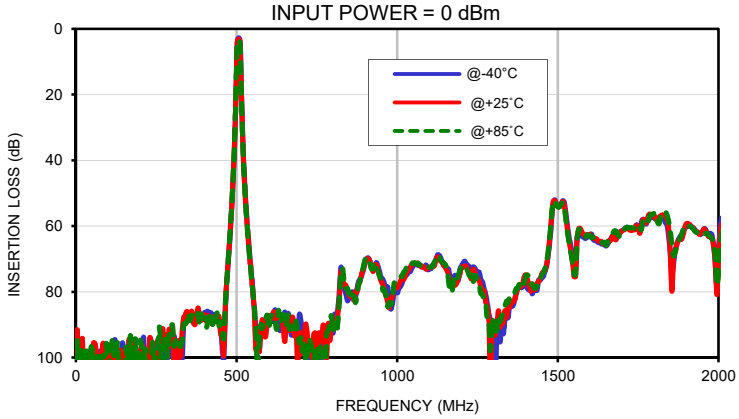
FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	96.59	108.12	104.61	0.05	0.05	0.05	0.05	0.05	0.05
5	104.36	120.07	94.94	0.05	0.05	0.05	0.04	0.04	0.04
50	97.07	98.29	95.67	0.03	0.03	0.03	0.04	0.04	0.05
100	102.11	96.14	109.11	0.02	0.02	0.02	0.06	0.08	0.09
200	109.13	98.68	94.78	0.00	0.02	0.02	0.23	0.28	0.30
300	99.90	90.19	90.17	0.00	0.02	0.03	0.53	0.62	0.67
310	96.88	95.39	94.87	0.01	0.02	0.03	0.57	0.66	0.71
320	95.02	94.87	94.72	0.01	0.02	0.03	0.60	0.70	0.76
350	87.22	87.37	86.63	0.01	0.03	0.03	0.71	0.83	0.90
400	86.28	86.90	88.01	0.01	0.03	0.04	0.89	1.05	1.16
410	85.94	87.35	88.97	0.01	0.03	0.04	0.93	1.10	1.21
420	86.38	87.82	87.20	0.01	0.03	0.04	0.97	1.14	1.26
430	86.90	87.65	87.28	0.02	0.04	0.05	1.01	1.19	1.31
440	88.77	88.46	86.29	0.02	0.05	0.05	1.05	1.24	1.37
450	89.66	92.80	89.22	0.03	0.05	0.06	1.10	1.29	1.43
460	100.30	99.24	94.09	0.04	0.06	0.07	1.14	1.34	1.49
470	75.93	75.49	76.22	0.05	0.08	0.09	1.20	1.40	1.56
486	52.04	51.65	51.62	0.15	0.19	0.21	1.34	1.57	1.74
492	39.24	38.68	38.65	0.29	0.36	0.40	1.48	1.73	1.92
498	19.63	18.61	18.62	1.13	1.43	1.55	2.12	2.54	2.80
500	10.29	9.37	9.51	3.33	4.48	4.80	3.89	4.98	5.37
502	3.94	4.13	4.44	19.92	21.83	21.16	15.06	16.75	16.71
503	3.30	3.62	3.91	18.35	17.72	17.78	17.38	17.32	17.50
504	3.04	3.36	3.64	17.94	19.48	19.86	17.30	18.18	18.54
505	2.86	3.20	3.47	23.21	26.94	28.43	19.71	20.93	21.31
506	2.78	3.15	3.41	27.25	25.82	26.52	22.50	23.16	23.45
507	2.77	3.16	3.44	22.48	21.65	21.79	23.15	23.07	23.01
508	2.83	3.26	3.54	20.86	20.81	20.77	21.87	21.34	20.97
509	2.98	3.46	3.77	22.15	23.67	23.56	20.26	19.69	19.15
510	3.31	3.95	4.30	35.80	25.11	24.78	18.30	16.52	15.97
511	4.27	5.30	5.70	13.43	10.80	10.87	11.72	9.92	9.83
512	6.73	8.25	8.66	5.92	4.97	5.11	6.06	5.34	5.47
513	10.70	12.38	12.74	2.80	2.52	2.66	3.39	3.28	3.46
514	15.12	16.72	17.02	1.54	1.49	1.59	2.32	2.42	2.60
515	19.34	20.79	21.05	0.98	1.00	1.08	1.86	2.02	2.20
518	29.89	31.01	31.18	0.41	0.45	0.50	1.42	1.63	1.79
528	51.84	52.52	52.63	0.09	0.13	0.15	1.27	1.47	1.64
530	54.98	55.68	55.74	0.07	0.11	0.13	1.26	1.47	1.64
600	89.93	87.24	91.35	0.01	0.04	0.05	1.33	1.55	1.72
620	85.47	88.01	89.40	0.01	0.04	0.06	1.33	1.54	1.72
640	87.73	88.39	88.26	0.01	0.04	0.06	1.32	1.53	1.70
660	86.58	88.44	87.04	0.01	0.04	0.06	1.30	1.51	1.67
680	91.48	93.41	91.92	0.01	0.04	0.06	1.29	1.49	1.65
700	88.70	98.96	94.02	0.01	0.05	0.06	1.28	1.48	1.64
1000	80.33	78.78	76.72	0.04	0.08	0.10	4.69	5.38	5.92
1050	72.10	71.43	71.15	0.05	0.09	0.11	4.45	4.91	5.27
1100	72.96	72.64	72.47	0.06	0.10	0.12	4.19	4.58	4.97
1150	72.49	72.69	71.79	0.07	0.11	0.13	3.88	4.18	4.50
1200	72.17	72.54	72.33	0.08	0.12	0.14	3.19	3.42	3.64
1250	73.99	76.01	76.98	0.08	0.12	0.14	2.45	2.64	2.78
1300	92.28	90.06	90.35	0.09	0.13	0.15	1.88	2.03	2.14
1350	83.72	84.80	81.67	0.11	0.16	0.19	1.46	1.59	1.68
1400	77.03	74.86	75.23	0.16	0.21	0.25	1.16	1.28	1.36
1450	75.79	74.52	74.84	0.32	0.40	0.46	0.96	1.06	1.13
1500	54.00	54.08	54.14	1.45	1.63	1.77	0.81	0.90	0.97
1550	73.15	75.30	74.62	0.51	0.60	0.66	0.70	0.78	0.84
1600	62.81	62.56	62.96	0.15	0.21	0.24	0.61	0.68	0.73
1700	61.43	61.46	61.90	0.08	0.13	0.15	0.48	0.54	0.59
1800	57.39	56.85	56.01	0.08	0.13	0.16	0.40	0.45	0.49
1900	60.25	59.29	60.30	0.09	0.16	0.19	0.34	0.39	0.42

Typical Performance Data

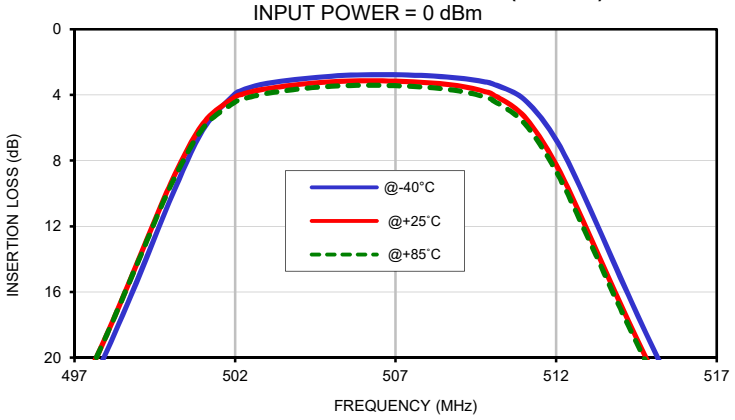
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
493.0	19.90	21.81	22.12
494.0	26.49	28.77	29.01
495.0	34.02	36.07	36.21
496.0	41.20	42.75	42.83
497.0	48.04	49.18	49.16
498.0	54.61	55.31	55.19
499.0	60.82	61.15	60.96
500.0	66.75	66.75	66.52
501.0	72.35	72.06	71.79
502.0	77.66	77.11	76.77
502.2	82.65	81.86	81.47
502.4	87.25	86.22	85.77
502.6	91.42	90.12	89.61
502.8	94.93	93.29	92.71
503.0	97.48	95.39	94.71
503.2	98.44	95.70	94.97
503.4	97.21	93.99	93.31
503.6	94.83	91.83	91.26
503.8	92.82	90.20	89.73
504.0	91.04	88.81	88.39
504.2	89.47	87.60	87.24
504.4	88.17	86.61	86.30
504.6	87.04	85.75	85.48
504.8	86.12	85.06	84.80
505.0	85.34	84.47	84.25
505.2	84.70	83.98	83.78
505.4	84.19	83.62	83.42
505.6	83.76	83.31	83.14
505.8	83.42	83.11	82.95
506.0	83.18	82.95	82.82
506.2	83.01	82.89	82.76
506.4	82.89	82.90	82.77
506.6	82.87	82.98	82.87
506.8	82.93	83.18	83.06
507.0	83.07	83.45	83.35
507.2	83.29	83.81	83.72
507.4	83.62	84.29	84.20
507.6	84.03	84.88	84.78
507.8	84.56	85.57	85.49
508.0	85.23	86.43	86.35
508.2	86.03	87.44	87.34
508.4	86.96	88.56	88.47
508.6	88.06	89.88	89.75
508.8	89.70	91.61	91.43
509.0	91.66	93.23	92.92
509.2	92.40	93.33	92.95
509.4	91.33	91.76	91.35
509.6	88.91	89.00	88.58
509.8	85.59	85.43	85.04
510.0	81.69	81.33	80.94
511.0	77.37	76.83	76.45

Typical Performance Curves

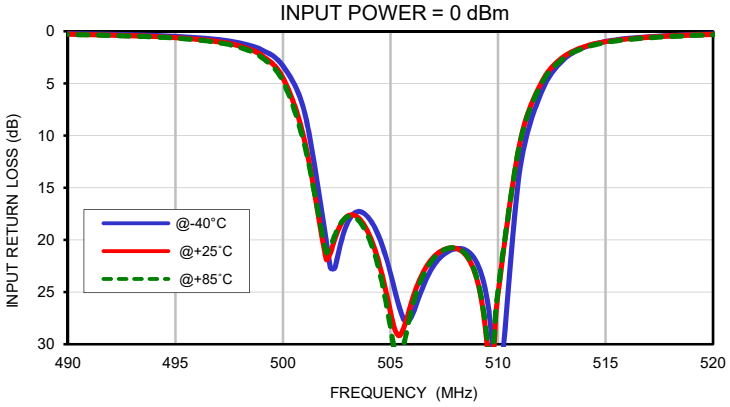
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



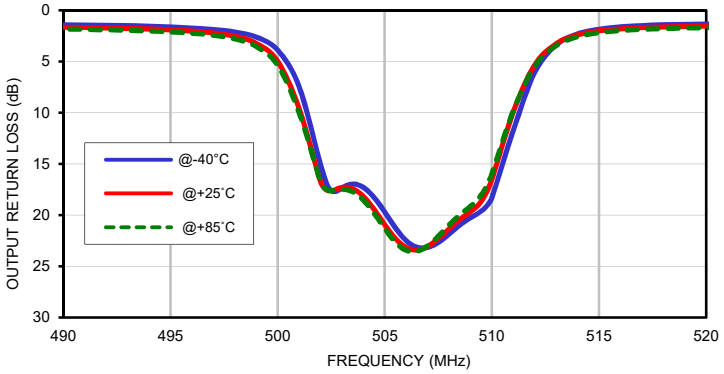
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



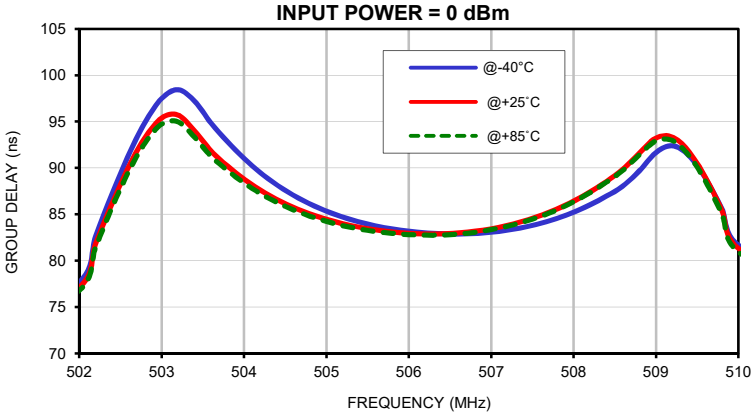
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



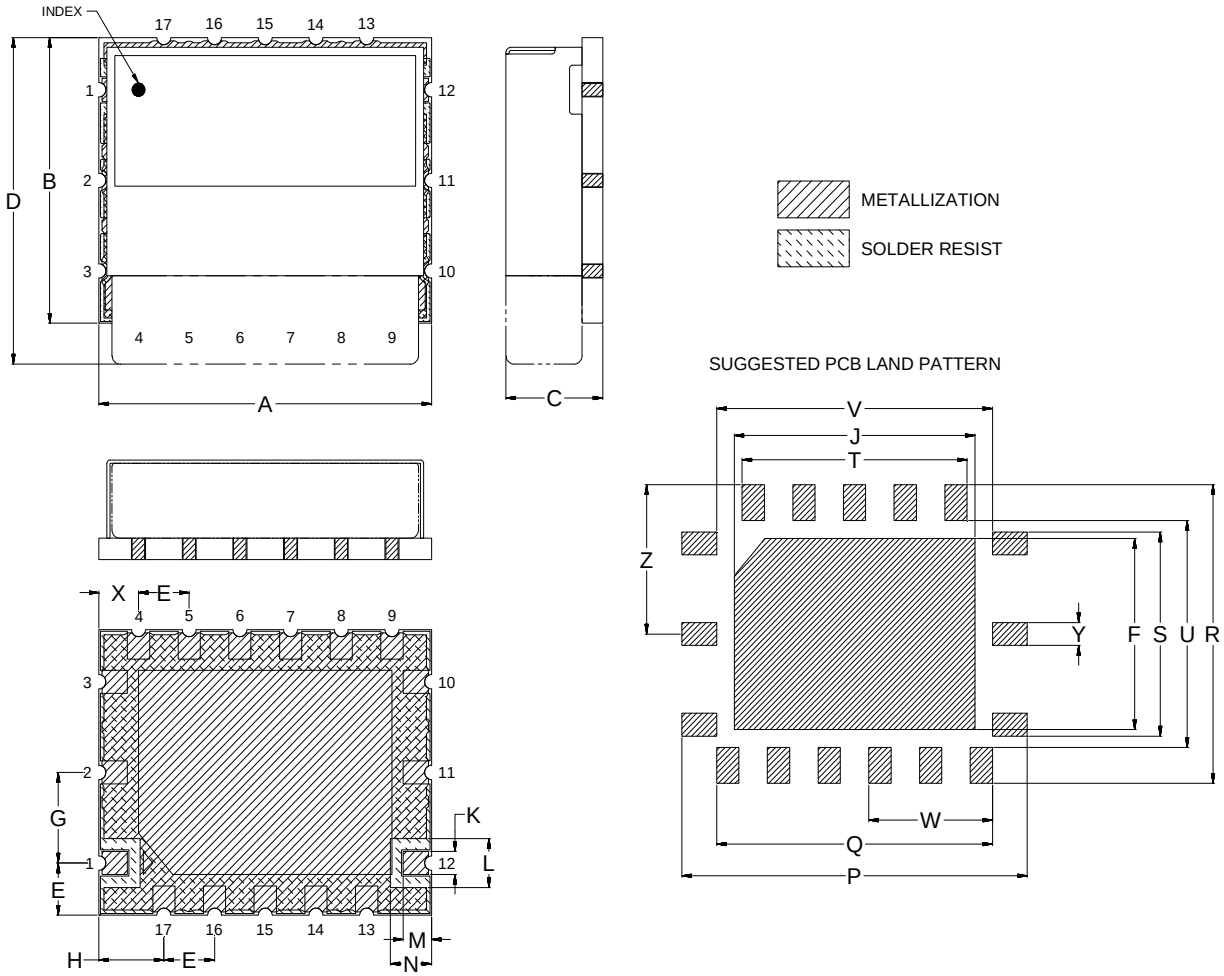
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style KV

KV1710-3

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
KV1710-3	1.050 (26.67)	.875 (22.23)	.330 (8.38)	1.000 (25.40)	.160 (4.06)	.585 (14.86)	.278 (7.05)	.205 (5.21)	.760 (19.30)	.070 (1.78)	.150 (3.81)	.090 (2.29)	.130 (3.30)

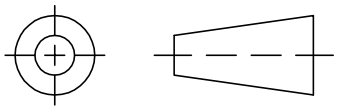
CASE#	P	Q	R	S	T	U	V	W	X	Y	Z	WT.GRAM
KV1710-3	1.090 (27.69)	.870 (22.10)	.915 (23.24)	.625 (15.88)	.710 (18.03)	.695 (17.65)	.870 (22.10)	.390 (9.91)	.125 (3.18)	.070 (1.78)	.458 (11.62)	15

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

Notes:

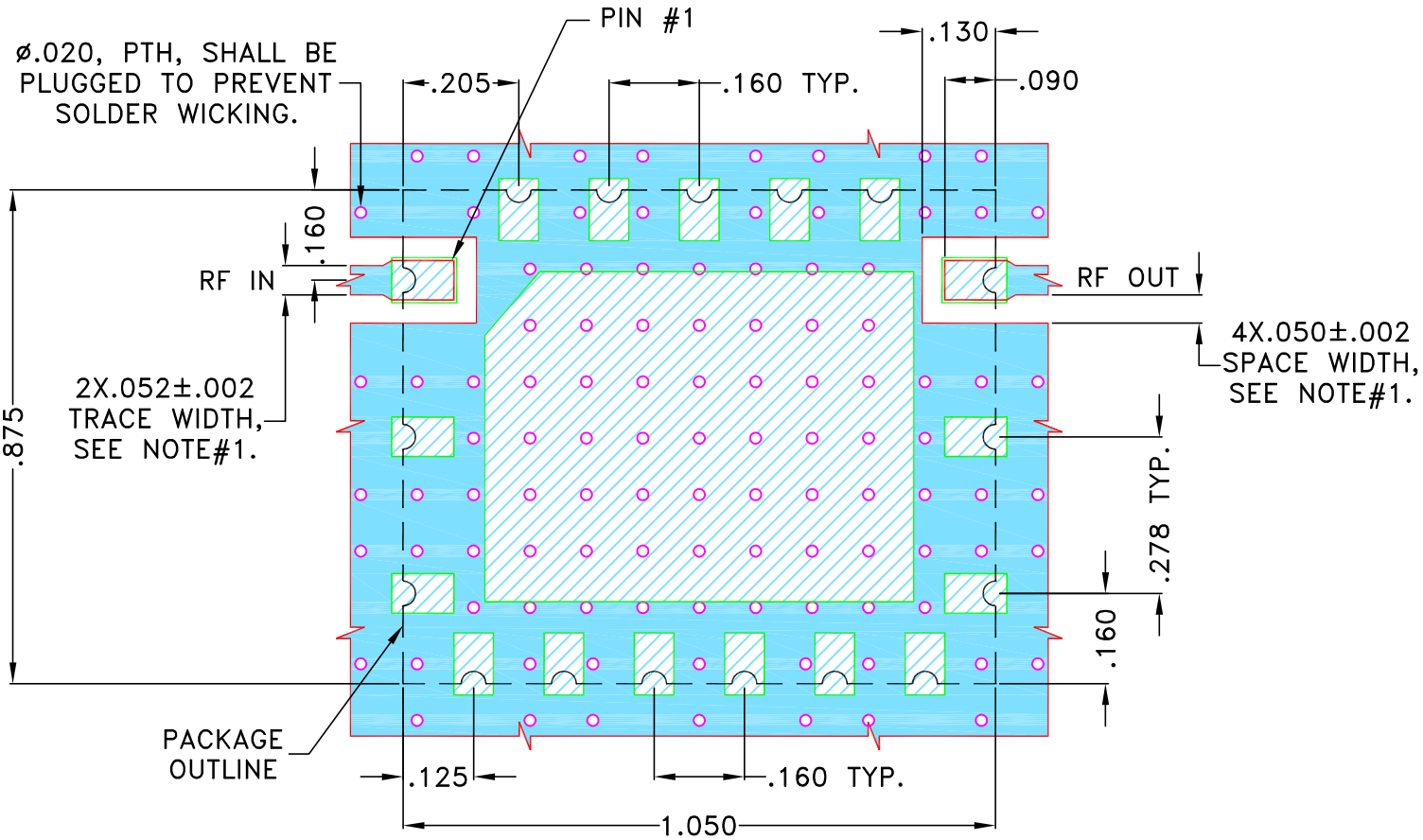
1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:
   For RoHS Case Styles: 2-5µinch (.05-.13microns) Gold over 120-240µinch (3.05-6.10microns) Nickel plate.
   For RoHS-5 Case Styles: Tin-Lead plate.

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:

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   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

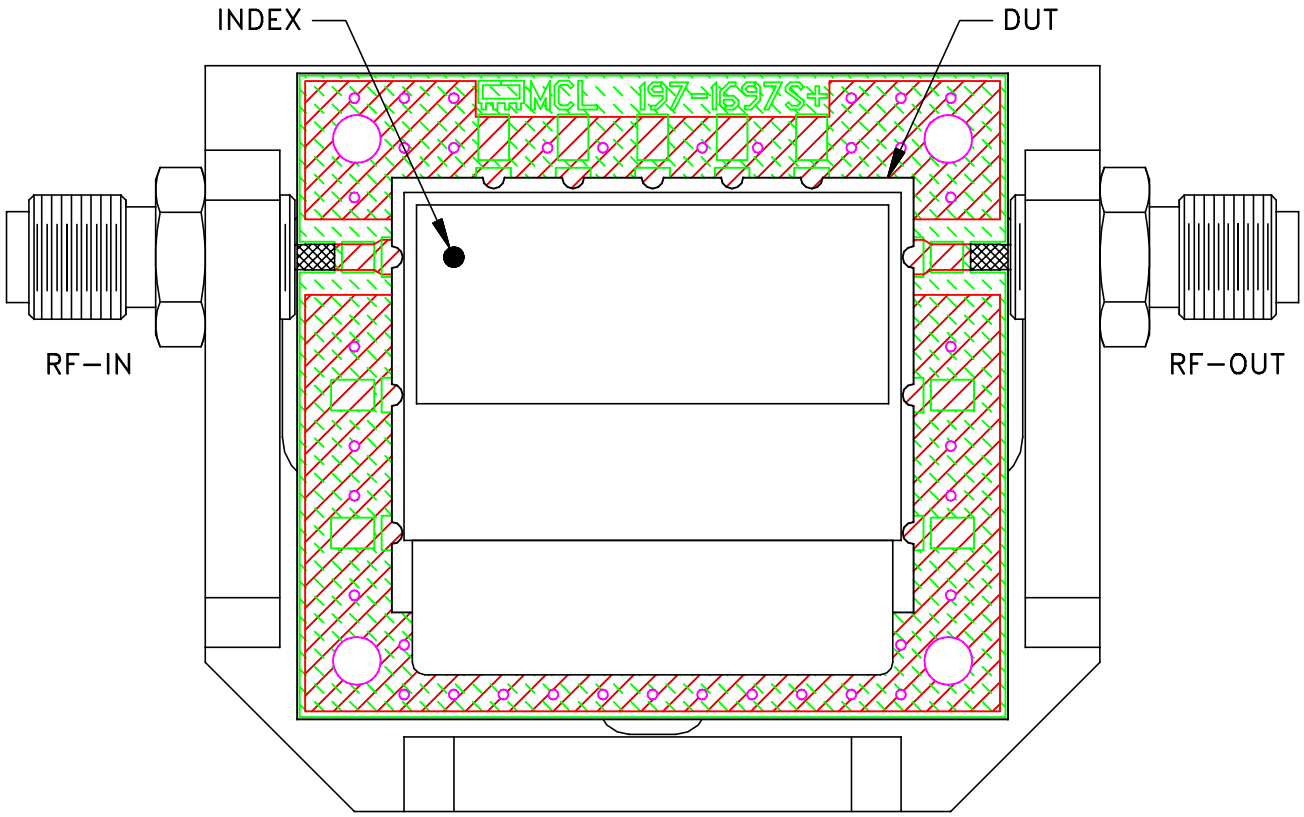
Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

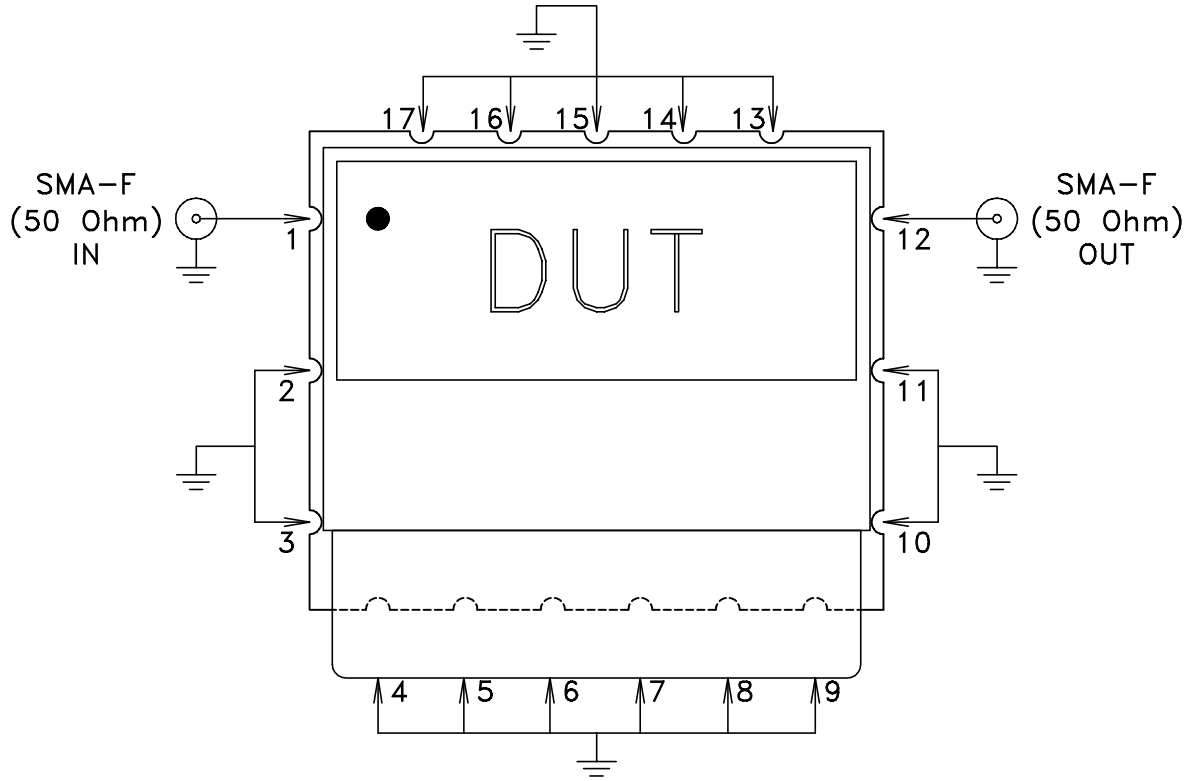
PL, KV1710-3, TB-1123+, 50 Ohm

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-1123+





Schematic diagram

Notes:

1. 50 Ohm SMA female connectors.
2. PCB Material: ROGERS (RO4350B) OR Equivalent
Dielectric Constant=3.48, Thickness=.023 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