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

All our coaxial-ceramic resonator filters are built with rugged construction, qualified to withstand multiple demanding reflow cycles. Custom integrated assembly with LNA in greatly simplifying system integration. They can be realized in small form factors with high-quality, precise machining for applications where size is critical. Excellent repeatability across units is achieved through precise tuning and process control.

Key Features

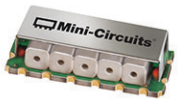
Feature	Advantages
Low insertion loss	Low signal loss results in better SNR in signal chain
Fast roll-off	Higher selectivity results in better adjacent channel rejection and dynamic range
Wide stop band	Wide spur-free stopband results in better receiver sensitivity
Excellent power handling	Well suited 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 1165 to 1201 MHz

CBP-1183A+



Generic photo used for illustration purposes only
CASE STYLE: KV1514

Features

- Fast roll-off
- Low passband IL
- Miniature shielded package

Applications

- Aviation / Aeronautical
- Test and measurement

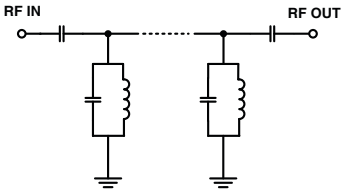
Electrical Specifications at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	-	-	-	1183	-	MHz
	Insertion Loss	F1-F2	1165-1201	-	3.0	4.0	dB
	VSWR	F1-F2	1165-1201	-	1.7	2.3	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC-1130	20.0	30.0	-	dB
	VSWR	DC-F3	DC-1130	-	20.0	-	:1
Stop Band, Upper	Insertion Loss	F4-F5	1235-2800	20.0	30.0	-	dB
	VSWR	F4-F5	1235-2800	-	20.0	-	:1

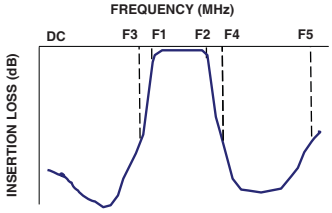
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	10 W max.

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

Functional Schematic



Typical Frequency Response

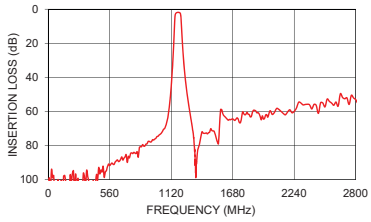


+RoHS Compliant
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

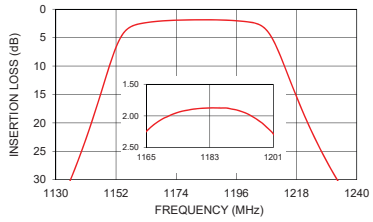
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	107.14	348.50	1165	25.03
500	92.11	308.94	1167	23.89
1000	74.51	90.30	1169	23.01
1130	35.95	25.46	1171	22.31
1135	30.43	20.74	1173	21.73
1143	20.00	12.31	1175	21.29
1148	12.41	6.61	1177	20.92
1156	3.54	1.32	1179	20.66
1165	2.25	1.11	1181	20.46
1183	1.87	1.15	1183	20.39
1201	2.28	1.17	1185	20.39
1206	3.22	1.51	1187	20.50
1214	10.57	7.50	1189	20.69
1222	19.95	20.16	1191	20.97
1235	31.74	40.92	1193	21.37
1500	71.39	82.37	1195	21.88
1750	66.55	77.22	1197	22.57
2000	63.26	75.80	1199	23.63
2500	54.97	93.48	1200	24.31
2800	53.05	95.37	1201	25.15

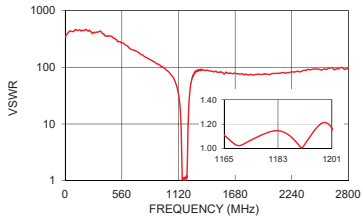
CBP-1183A+
INSERTION LOSS (Full band)



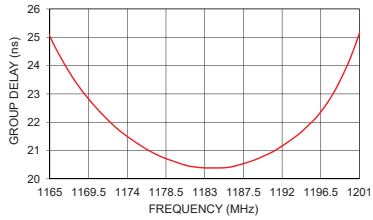
CBP-1183A+
INSERTION LOSS (Pass band)



CBP-1183A+
VSWR



CBP-1183A+
GROUP DELAY

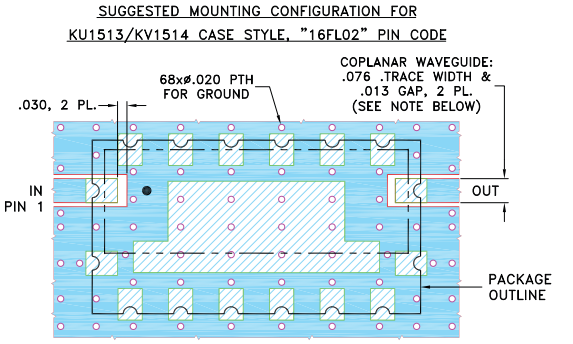


Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

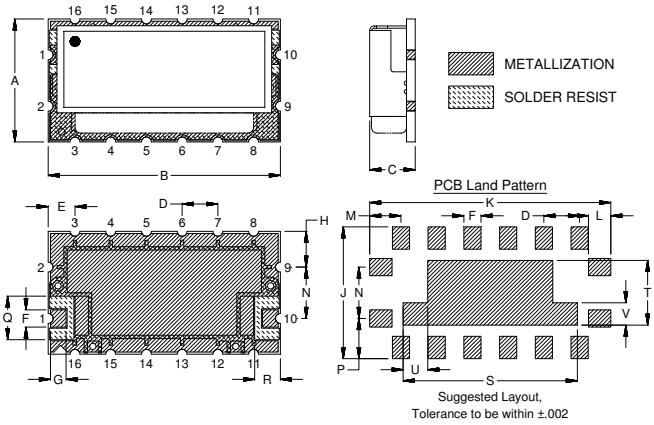
INPUT	1
OUTPUT	10
GROUND	2,3,4,5,6,7,8,9,11,12,13,14,15,16

Demo Board MCL P/N: TB-578+
Suggested PCB Layout (PL-331)



NOTE: 1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .060"±.004";
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 SOLDER MASK

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L
.550	**1.040**	**.225**	**.160**	**.120**	**.077**	**.070**	**.160**	**.590**	**1.080**	**.100**
13.97	26.24	5.72	4.06	3.05	1.96	1.78	4.06	14.99	27.43	2.54

M	N	P	Q	R	S	T	U	V		Wt.
.140	**.230**	**.180**	**.195**	**.115**	**.780**	**.290**	**.110**	**.100**		grams
3.56	5.84	4.57	4.95	2.92	19.81	7.37	2.79	2.54		4.8

Note: Please refer to case style drawing for details

Surface Mount Band Pass Filter CBP-1183A+

Typical Performance Data

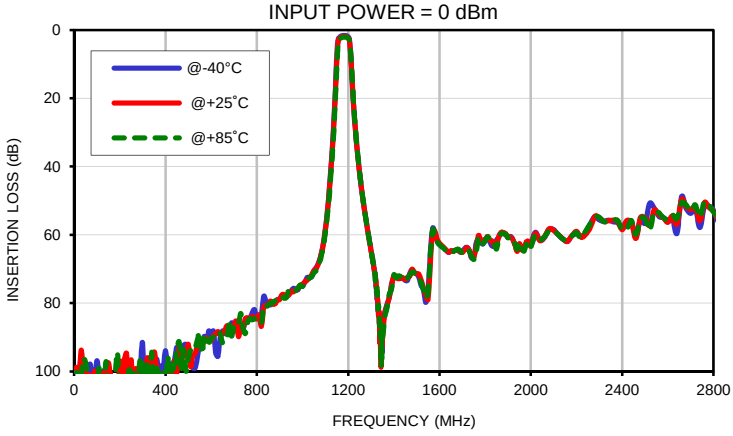
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	102.35	107.14	101.46	0.05	0.05	0.05	0.05	0.05	0.05
10	105.34	98.91	102.86	0.05	0.05	0.05	0.05	0.05	0.05
50	102.25	97.59	97.30	0.04	0.04	0.04	0.04	0.04	0.04
100	96.86	105.71	110.90	0.03	0.04	0.04	0.04	0.04	0.04
500	92.92	92.11	96.07	0.03	0.06	0.06	0.02	0.05	0.06
750	84.63	84.60	88.90	0.06	0.10	0.11	0.04	0.09	0.11
800	84.35	84.61	84.48	0.07	0.12	0.13	0.05	0.10	0.12
850	79.87	80.62	80.46	0.08	0.13	0.14	0.06	0.11	0.13
900	78.85	78.92	78.28	0.10	0.15	0.16	0.07	0.12	0.15
950	76.43	76.55	76.87	0.12	0.17	0.18	0.08	0.14	0.16
1000	75.03	74.51	75.13	0.14	0.19	0.20	0.11	0.16	0.19
1050	70.67	70.46	71.12	0.18	0.24	0.25	0.15	0.21	0.23
1100	58.45	58.71	59.44	0.29	0.36	0.37	0.27	0.34	0.37
1110	52.38	52.79	53.85	0.34	0.42	0.43	0.33	0.40	0.43
1120	44.69	45.28	46.53	0.42	0.51	0.52	0.42	0.50	0.53
1130	35.21	35.95	37.46	0.58	0.68	0.70	0.58	0.68	0.71
1135	29.58	30.43	32.09	0.73	0.84	0.84	0.73	0.83	0.87
1140	23.16	24.17	26.03	1.00	1.11	1.11	0.99	1.10	1.12
1143	18.86	20.00	22.00	1.30	1.41	1.37	1.29	1.39	1.37
1150	8.02	9.38	11.54	4.15	3.86	3.22	3.94	3.65	3.09
1155	3.25	4.04	5.26	16.00	13.13	9.70	13.45	11.36	8.70
1156	2.88	3.54	4.52	21.75	17.16	12.46	16.37	13.98	10.84
1160	2.25	2.64	3.08	23.41	26.78	42.61	20.52	20.87	20.05
1165	1.92	2.25	2.54	26.68	25.60	24.85	26.04	25.02	24.18
1170	1.75	2.04	2.27	36.07	38.53	34.77	48.07	39.75	34.81
1175	1.66	1.93	2.14	27.24	28.17	29.14	33.82	36.81	40.29
1180	1.62	1.88	2.08	24.89	23.96	23.48	27.11	26.31	26.53
1183	1.62	1.87	2.06	24.95	23.34	22.01	24.96	23.87	23.30
1190	1.65	1.90	2.07	47.78	37.36	27.44	25.64	24.79	23.62
1195	1.76	2.01	2.16	22.25	23.54	27.33	21.15	21.44	22.87
1200	1.96	2.22	2.37	22.33	20.90	20.18	21.21	20.02	19.36
1201	2.03	2.28	2.42	24.72	22.21	20.45	22.31	20.81	19.55
1205	2.76	2.88	2.86	14.52	17.62	23.02	13.55	15.93	19.56
1206	3.17	3.22	3.09	11.34	13.82	18.60	10.76	12.85	16.60
1210	6.32	5.98	5.23	4.27	5.32	7.18	4.14	5.11	6.85
1215	12.32	11.80	10.70	1.57	1.97	2.52	1.54	1.91	2.44
1220	18.23	17.76	16.78	0.82	1.04	1.26	0.80	1.01	1.23
1223	21.44	21.01	20.14	0.62	0.80	0.95	0.61	0.78	0.93
1230	27.99	27.65	26.99	0.40	0.52	0.60	0.39	0.51	0.61
1232	29.65	29.35	28.73	0.36	0.48	0.55	0.35	0.47	0.55
1233	30.47	30.16	29.58	0.35	0.46	0.53	0.33	0.45	0.53
1235	32.02	31.74	31.20	0.32	0.42	0.49	0.30	0.41	0.49
1250	41.97	41.80	41.46	0.21	0.29	0.33	0.18	0.28	0.33
1300	64.57	64.59	64.40	0.14	0.20	0.22	0.10	0.18	0.21
1400	72.15	71.92	71.76	0.14	0.19	0.21	0.10	0.16	0.19
1500	71.40	71.39	71.50	0.15	0.21	0.22	0.11	0.17	0.20
1600	62.91	62.47	62.88	0.16	0.22	0.23	0.12	0.18	0.21
1700	64.92	65.20	65.31	0.17	0.22	0.23	0.13	0.19	0.22
1800	61.22	61.63	61.69	0.19	0.24	0.24	0.14	0.20	0.23
1900	60.78	60.76	60.86	0.18	0.23	0.24	0.14	0.20	0.23
1950	63.08	62.58	62.31	0.18	0.23	0.24	0.15	0.21	0.23
2000	62.44	63.26	63.48	0.19	0.23	0.24	0.15	0.20	0.23
2100	58.48	58.77	58.83	0.18	0.22	0.24	0.15	0.21	0.23
2200	59.72	59.00	59.37	0.17	0.22	0.23	0.14	0.20	0.23
2300	55.66	54.98	54.90	0.15	0.20	0.22	0.14	0.20	0.22
2400	57.74	58.49	58.44	0.13	0.19	0.21	0.12	0.19	0.22
2500	56.59	54.97	55.23	0.12	0.19	0.20	0.12	0.19	0.22
2600	55.68	56.34	55.64	0.11	0.18	0.21	0.11	0.18	0.22
2700	53.70	52.53	53.04	0.10	0.19	0.22	0.10	0.18	0.23
2800	52.88	53.05	53.41	0.10	0.18	0.22	0.11	0.19	0.24

Typical Performance Data

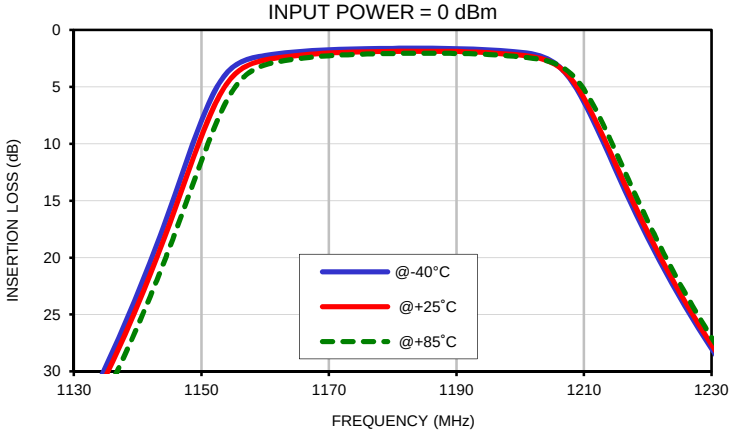
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
1165	24.64	25.03	26.05
1166	24.07	24.43	25.30
1167	23.59	23.89	24.67
1168	23.15	23.42	24.11
1169	22.77	23.01	23.63
1170	22.42	22.64	23.20
1171	22.10	22.31	22.82
1172	21.81	22.00	22.48
1173	21.56	21.73	22.16
1174	21.34	21.50	21.89
1175	21.16	21.29	21.65
1176	20.97	21.09	21.42
1177	20.82	20.92	21.22
1178	20.70	20.78	21.05
1179	20.60	20.66	20.90
1180	20.51	20.56	20.78
1181	20.44	20.46	20.66
1182	20.41	20.42	20.57
1183	20.39	20.39	20.51
1184	20.40	20.39	20.48
1185	20.42	20.39	20.47
1186	20.47	20.42	20.46
1187	20.56	20.50	20.50
1188	20.66	20.59	20.57
1189	20.77	20.69	20.65
1190	20.92	20.83	20.77
1191	21.09	20.97	20.91
1192	21.29	21.16	21.05
1193	21.51	21.37	21.25
1194	21.76	21.60	21.45
1195	22.07	21.88	21.68
1196	22.43	22.18	21.94
1197	22.88	22.57	22.26
1198	23.43	23.04	22.63
1199	24.10	23.63	23.08
1200	24.90	24.31	23.64
1201	25.84	25.15	24.30

Typical Performance Curves

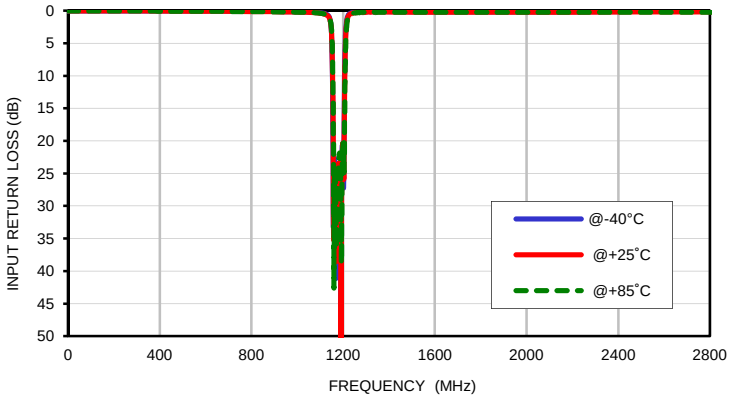
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



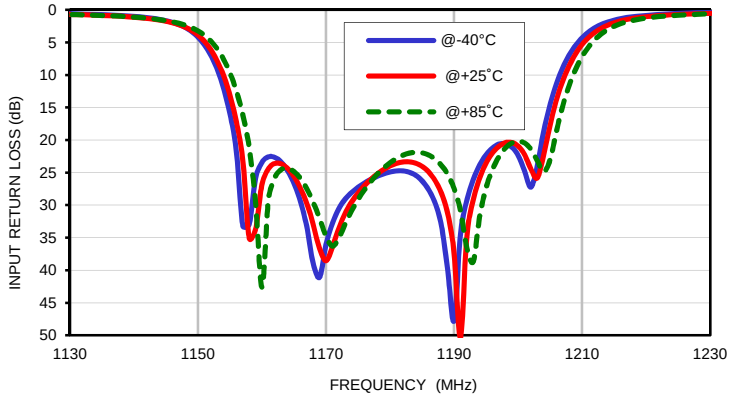
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



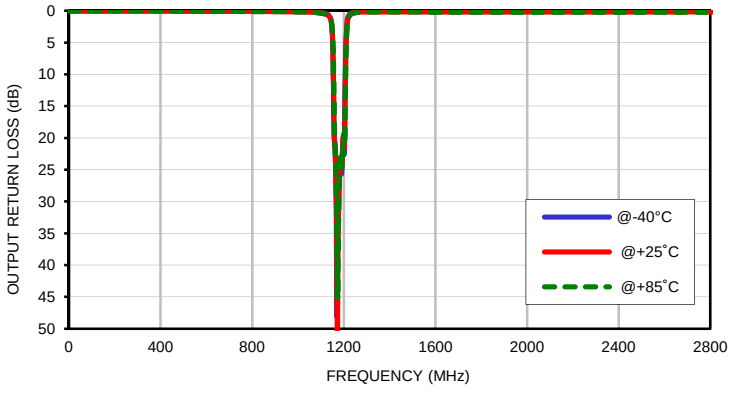
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



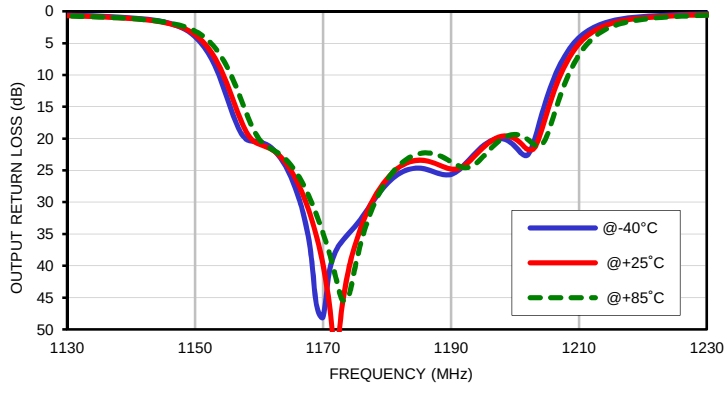
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



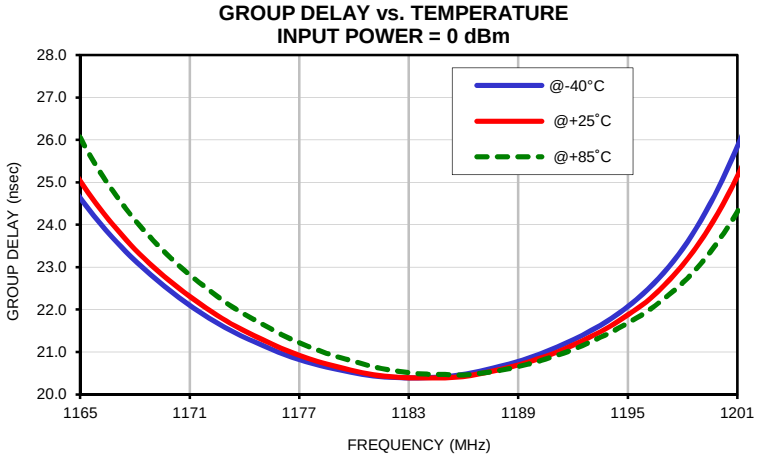
OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



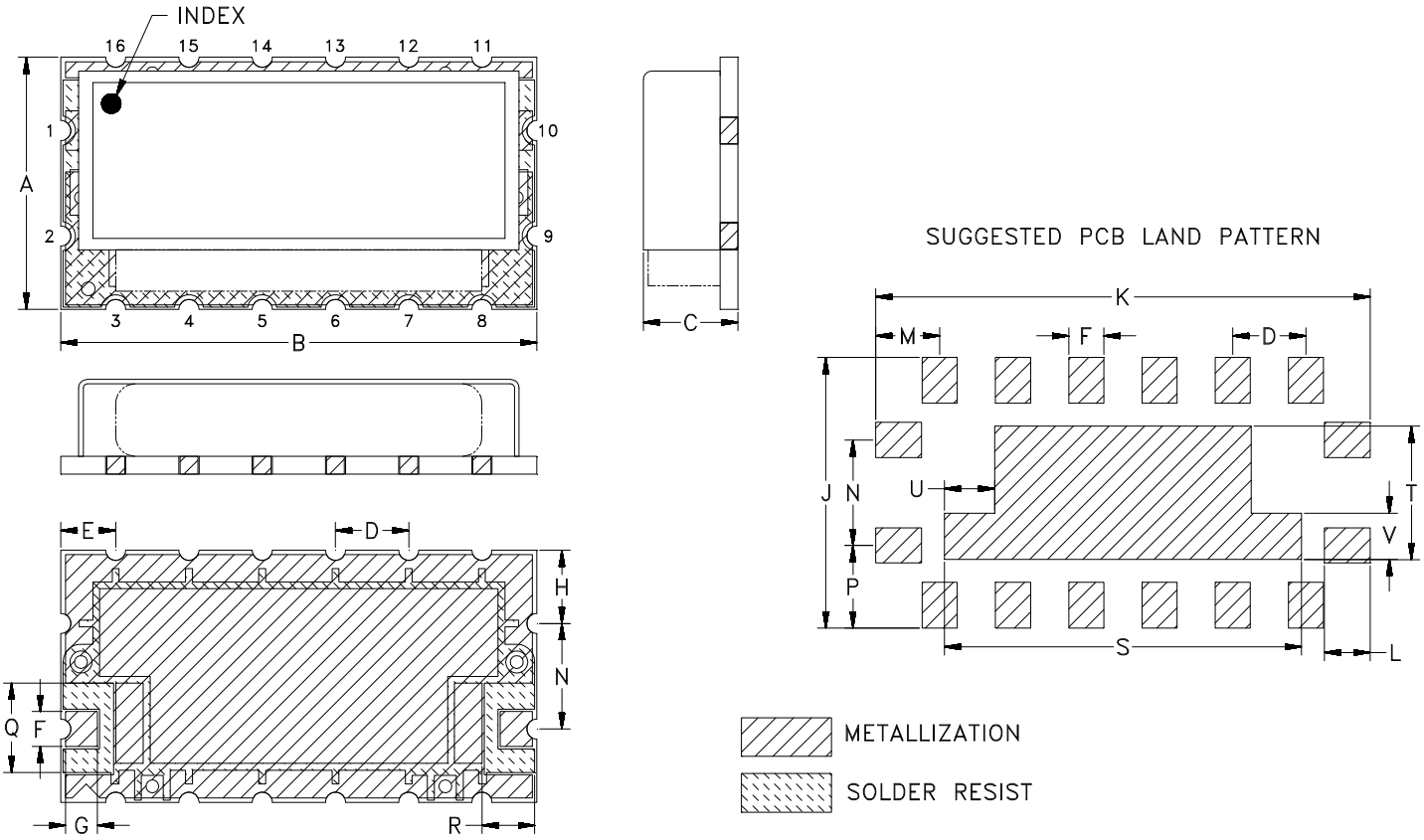
Typical Performance Curves



Case Style KV

KV1514

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	L	M
KV1514	.550 (13.97)	1.040 (26.24)	.225 (5.72)	.160 (4.06)	.120 (3.05)	.077 (1.96)	.070 (1.78)	.160 (4.06)	.590 (14.99)	1.080 (27.43)	.100 (2.54)	.140 (3.56)

CASE#	N	P	Q	R	S	T	U	V	WT, GRAMS
KV1514	.230 (5.84)	.180 (4.57)	.195 (4.95)	.115 (2.92)	.780 (19.81)	.290 (7.37)	.110 (2.79)	.100 (2.54)	4.8

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

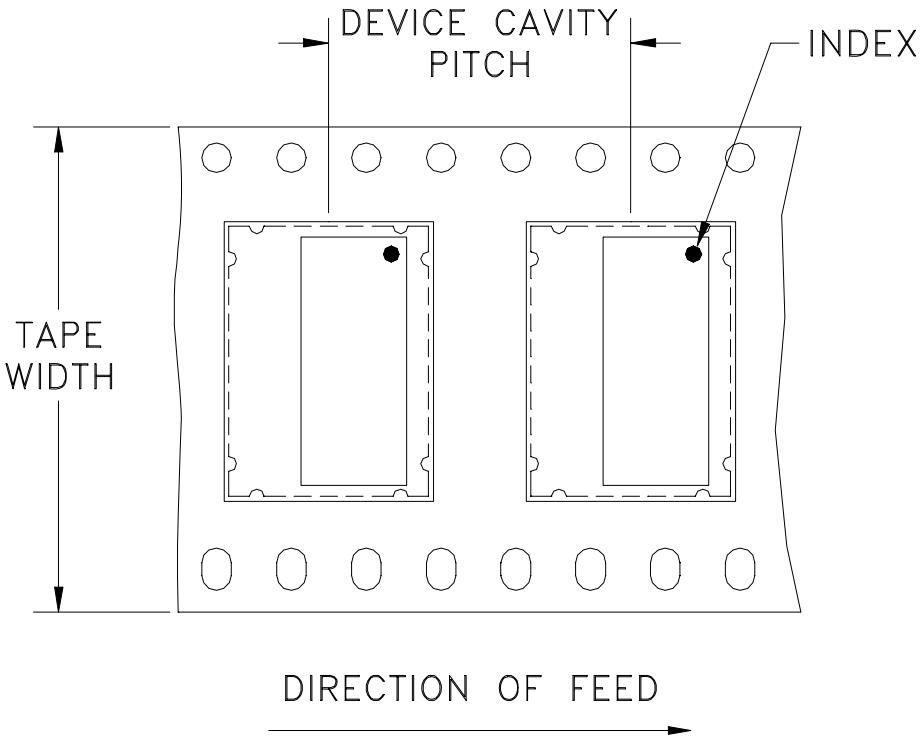
Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:

   For RoHS Case Styles: 2-5 µ inch (.05-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate.
   All models, (+) suffix.

Tape & Reel Packaging TR-F106

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
44	24	13	250

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.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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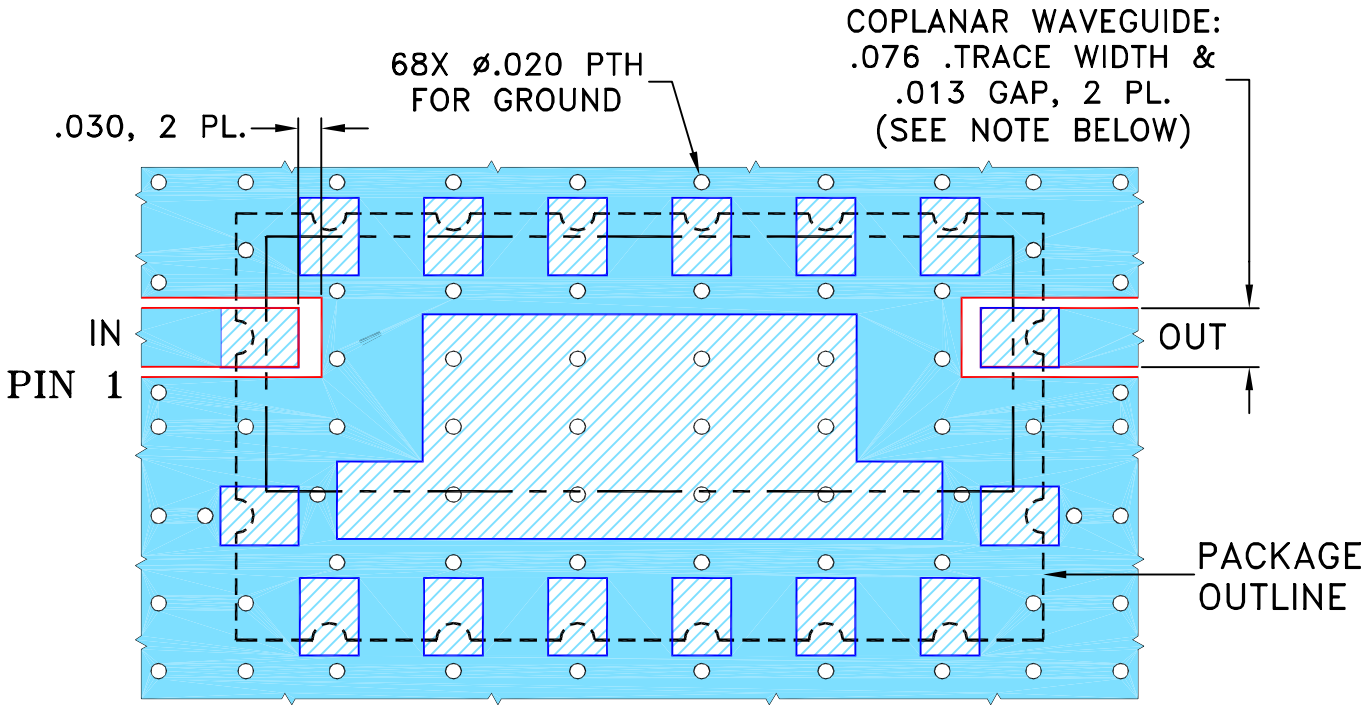
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M126876	NEW RELEASE	04/21/10	MMG	RD

SUGGESTED MOUNTING CONFIGURATION FOR KU1513/KV1514 CASE STYLE, "16FL02" PIN CODE



NOTE: 1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .060" ± .004";
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 SOLDER MASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	MMG	04/08/10
TOLERANCES ON:	CHECKED	IL	04/21/10
2 PL DECIMALS ±	APPROVED	RD	04/21/10
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

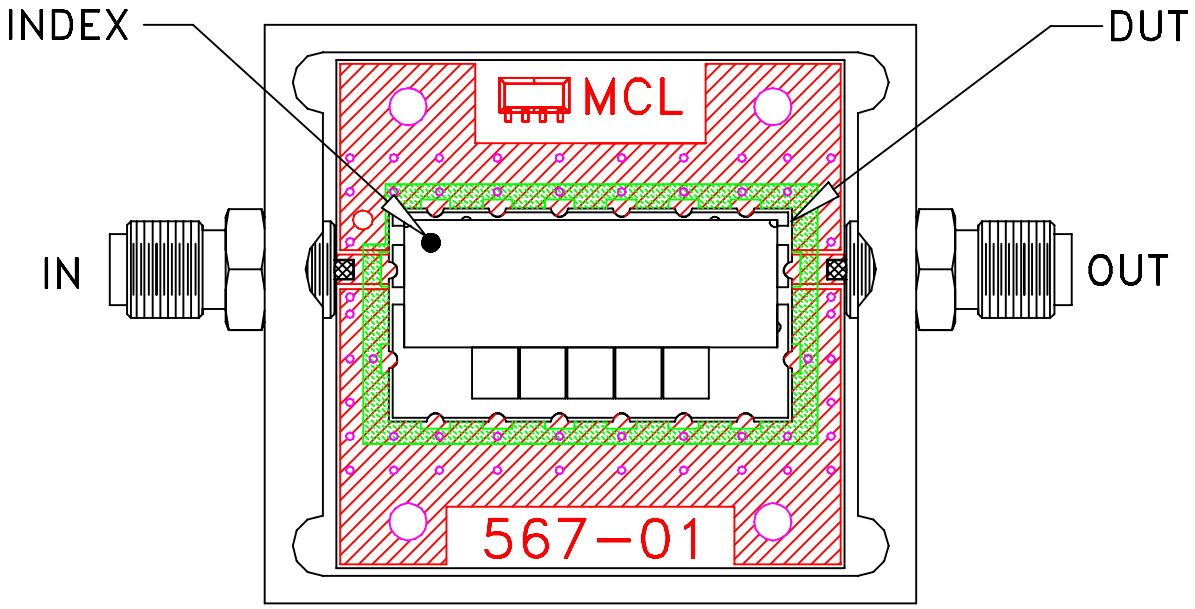
ASHEETA1.DWG REV:A DATE:01/12/95

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

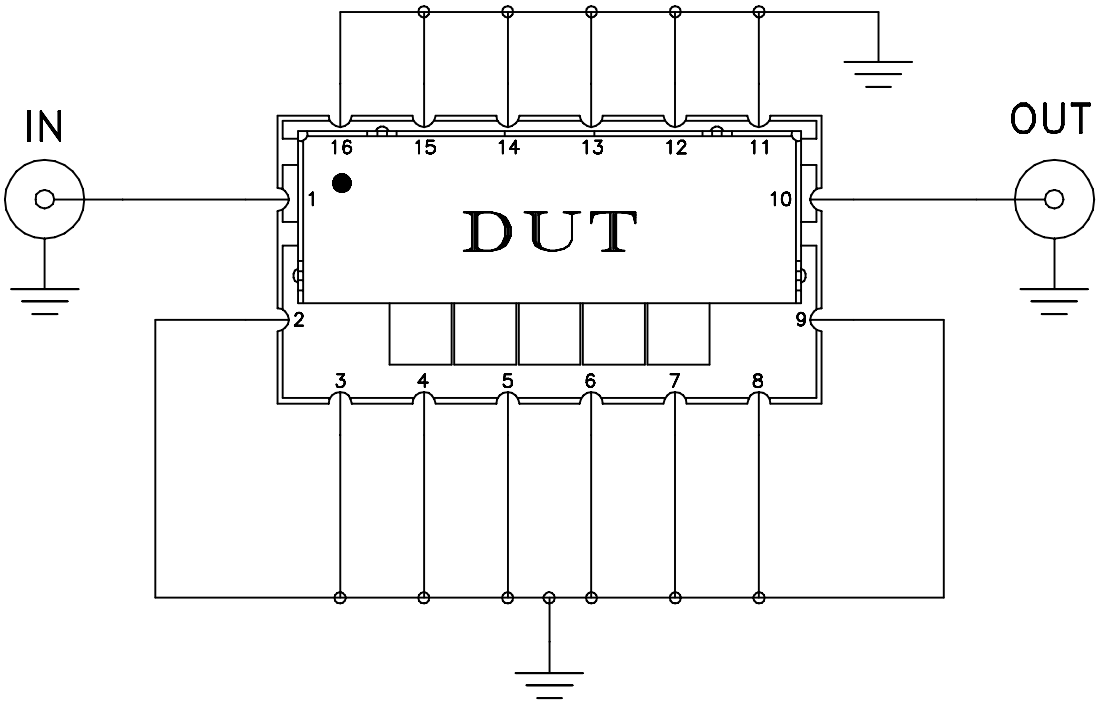
PL, 16FL02, KU1513/KV1514, TB-578+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-331	OR
FILE: 98PL331	SCALE: 4:1	SHEET: 1 OF 1	

Evaluation Board and Circuit



TB-578+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.060 inch.

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Environmental Specifications ENV02T1

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, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	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
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215