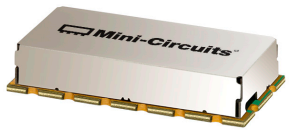
Surface Mount

Bandpass Filter

BPF-V1000+

50Ω 940 to 1060 MHz



Generic photo used for illustration purposes only

CASE STYLE: KV1974

The Big Deal

- Flat group delay
- Steep rejection up to 3000 MHz
- Thin package

Product Overview

The BPF-V1000+ is a 50Ω bandpass filter fabricated using SMT technology. This bandpass filter covers from 940-1060 MHz. It has very low group delay flatness for the committed rejection performance. Equalization had made with in the circuit to achieve this. So that this filter provides sharp rejection with flat group delay in the flat gain requirement application.

Key Features

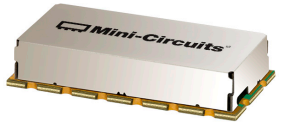
Feature	Advantages
Low group delay flatness	Can be used in flat gain requirement application
Steep rejection	This enables the filter to attenuate spurious signals near the passband edges and goes up to 3000 MHz
Thin package	Helps to use in the small housing.

Surface Mount

Bandpass Filter

BPF-V1000+

50Ω 940 to 1060 MHz



Generic photo used for illustration purposes only

CASE STYLE: KV1974

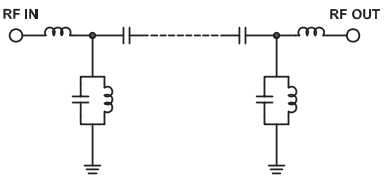
Features

- Flat group delay
- Steep rejection up to 3000 MHz
- Thin package

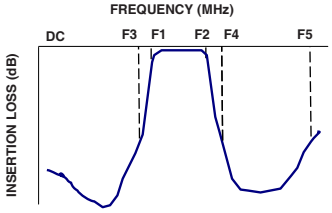
Applications

- Aviation / Aeronautical
- Radar and Navigation system

Functional Schematic



Typical Frequency Response



+RoHS Compliant

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

Electrical Specifications at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	—	—	1000	—	MHz
	Insertion Loss	F1-F2	940-1060	—	5	6	dB
	Group delay flatness	F1-F2	940-1060	—	3	—	ns
	VSWR	F1-F2	940-1060	—	1.5	2	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC-860	30	40	—	dB
	VSWR	DC-F3	DC-860	—	10	—	:1
Stop Band, Upper	Insertion Loss	F4-F5	1140-3000	30	40	—	dB
	VSWR	F4-F5	1140-3000	—	10	—	:1

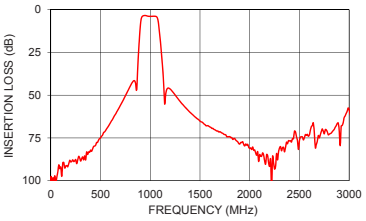
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	0.5 W

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

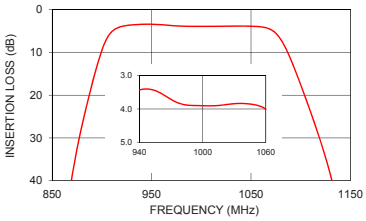
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	99.47	192.05	940	11.15
250	87.68	72.29	945	11.05
860	47.17	23.99	950	11.04
880	27.10	12.58	960	11.15
885	22.16	9.85	970	11.31
895	13.22	4.90	975	11.43
905	6.75	1.88	980	11.57
920	3.92	1.25	990	11.80
940	3.43	1.34	995	11.82
1000	3.90	1.05	1000	11.74
1060	4.01	1.36	1005	11.58
1085	9.06	3.30	1010	11.38
1100	17.59	7.90	1015	11.15
1105	20.75	9.66	1020	10.94
1120	30.84	14.93	1025	10.75
1125	34.60	16.70	1030	10.60
1140	49.83	22.00	1035	10.49
2000	81.15	126.29	1040	10.44
2500	76.64	102.68	1050	10.66
3000	58.51	91.68	1060	11.64

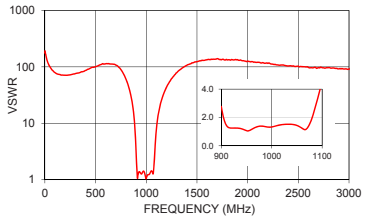
BPF-V1000+
INSERTION LOSS (Full band)



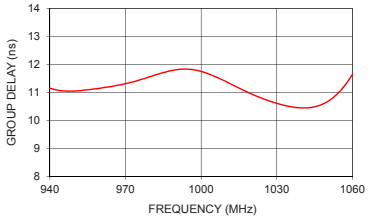
BPF-V1000+
INSERTION LOSS (Pass band)



BPF-V1000+
VSWR



BPF-V1000+
GROUP DELAY



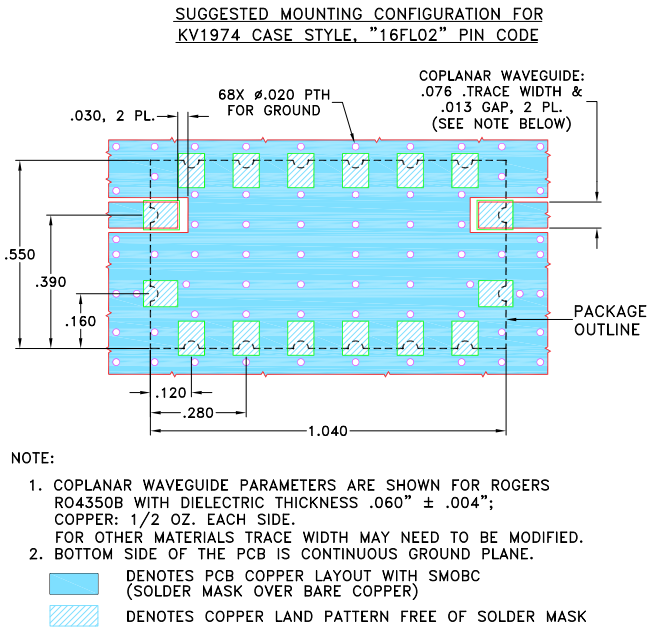
Notes

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-953+
Suggested PCB Layout (PL-507)



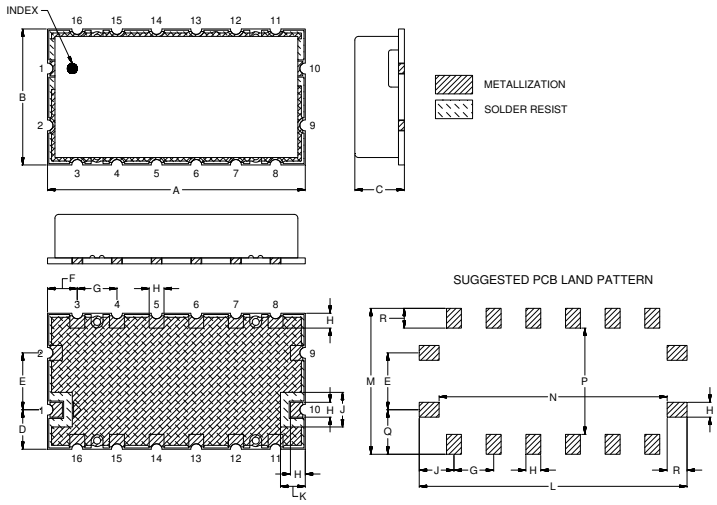
NOTE:

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
1.040	**.550**	**.200**	**.160**	**.230**	**.120**	**.160**	**.060**	**.140**
26.42	13.97	5.08	4.06	5.84	3.05	4.06	1.52	3.56

K	L	M	N	P	Q	R	Wt.
.100	**1.080**	**.590**	**.920**	**.430**	**.180**	**.080**	grams
2.54	27.43	14.99	23.37	10.92	4.57	2.03	2

Note: Please refer to case style drawing for details

Band Pass Filter BPF-V1000+

Typical Performance Data

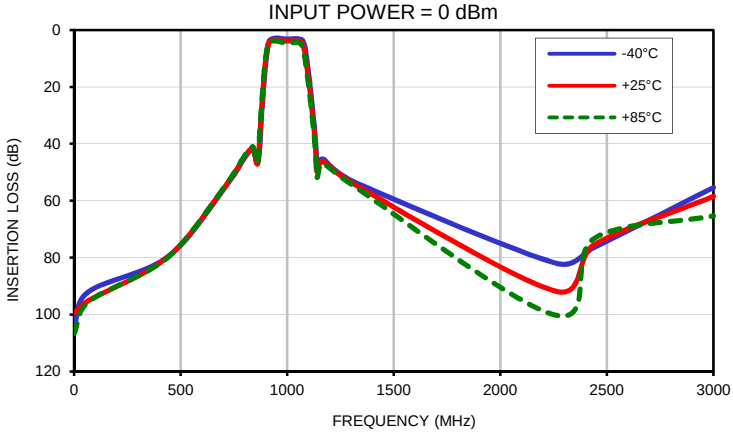
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1.0	103.65	99.47	106.71	0.08	0.09	0.09	0.09	0.10	0.11
70.0	91.88	94.98	95.46	0.17	0.20	0.21	0.21	0.24	0.25
440.0	79.73	79.76	79.94	0.15	0.19	0.21	0.14	0.20	0.23
710.0	55.11	54.84	54.60	0.11	0.16	0.20	0.22	0.33	0.39
790.0	46.01	45.65	45.30	0.18	0.26	0.31	0.37	0.52	0.60
805.0	44.31	43.97	43.59	0.21	0.30	0.36	0.43	0.59	0.68
830.0	42.04	41.73	41.34	0.29	0.41	0.49	0.58	0.77	0.89
840.0	41.74	41.52	41.17	0.35	0.48	0.57	0.66	0.88	1.02
860.0	46.66	47.17	46.78	0.53	0.72	0.86	0.94	1.23	1.44
870.0	42.38	38.99	36.88	0.70	0.95	1.14	1.18	1.56	1.83
880.0	29.39	27.10	25.46	1.00	1.38	1.68	1.58	2.11	2.54
885.0	24.27	22.16	20.60	1.26	1.77	2.19	1.90	2.56	3.14
890.0	19.50	17.53	16.08	1.68	2.42	3.05	2.37	3.27	4.11
900.0	10.82	9.49	8.67	3.91	5.89	7.66	4.50	6.57	8.65
910.0	5.15	5.13	5.19	12.87	19.14	22.69	10.88	14.75	18.21
912.0	4.58	4.74	4.89	16.90	25.81	26.22	12.68	16.47	19.71
916.0	3.84	4.22	4.47	39.73	24.83	22.40	15.76	18.59	21.16
919.0	3.53	3.98	4.27	22.87	19.90	19.85	16.89	19.07	21.47
927.0	3.14	3.64	3.97	15.09	16.09	17.47	16.68	19.05	21.90
930.0	3.06	3.57	3.90	14.35	15.79	17.31	16.38	19.07	22.24
935.0	2.97	3.48	3.84	13.99	15.93	17.43	16.12	19.51	23.52
940.0	2.90	3.43	3.81	14.42	16.65	17.77	16.41	20.84	26.57
945.0	2.84	3.40	3.82	15.59	17.73	17.88	17.51	23.76	33.08
947.0	2.83	3.40	3.83	16.27	18.15	17.77	18.27	25.69	34.27
949.0	2.81	3.41	3.85	17.08	18.48	17.55	19.27	28.28	31.25
952.0	2.79	3.42	3.89	18.48	18.67	17.04	21.34	32.63	26.22
956.0	2.79	3.46	3.96	20.29	18.23	16.21	25.70	28.29	21.79
960.0	2.82	3.52	4.04	20.78	17.26	15.43	30.28	22.92	18.98
972.0	2.99	3.75	4.28	16.28	15.18	14.92	18.46	16.47	15.51
990.0	3.19	3.89	4.41	17.53	21.55	26.51	16.04	16.90	17.02
994.0	3.19	3.90	4.42	19.71	26.72	38.93	16.54	17.31	16.89
996.0	3.18	3.90	4.43	21.09	30.78	34.45	16.79	17.34	16.58
1000.0	3.18	3.90	4.44	23.88	32.15	25.45	17.15	17.05	15.69
1003.0	3.17	3.90	4.45	24.60	26.78	22.37	17.20	16.56	14.93
1011.0	3.16	3.90	4.47	20.80	20.84	18.71	16.58	15.10	13.23
1028.0	3.08	3.84	4.44	19.90	19.48	16.33	16.13	13.76	11.88
1035.0	3.05	3.83	4.42	21.66	18.10	14.98	16.40	13.70	11.99
1040.0	3.04	3.84	4.41	21.38	16.68	14.14	16.48	13.82	12.36
1043.0	3.05	3.84	4.41	20.43	15.94	13.81	16.50	13.99	12.75
1051.0	3.09	3.88	4.43	17.73	14.91	13.90	16.81	15.20	14.80
1054.0	3.12	3.91	4.46	17.17	15.01	14.43	17.21	16.11	16.15
1063.0	3.25	4.12	4.80	17.87	17.49	17.29	20.85	21.96	21.56
1066.0	3.34	4.28	5.08	19.16	18.53	16.72	23.88	23.82	19.68
1069.0	3.47	4.55	5.50	20.68	17.86	14.47	27.58	21.23	16.37
1070.0	3.53	4.66	5.67	20.91	17.12	13.56	27.52	19.82	15.32
1074.0	3.90	5.31	6.60	18.13	13.11	10.15	20.31	14.76	11.84
1082.0	5.58	7.75	9.55	9.13	6.87	5.59	10.51	8.60	7.60
1084.0	6.27	8.61	10.50	7.63	5.87	4.87	9.04	7.64	6.93
1100.0	14.96	17.59	19.53	2.30	2.21	2.13	3.65	3.89	4.06
1105.0	18.22	20.75	22.63	1.79	1.81	1.79	3.04	3.36	3.59
1110.0	21.56	23.99	25.82	1.46	1.52	1.54	2.61	2.96	3.20
1125.0	32.29	34.60	36.38	0.93	1.04	1.09	1.80	2.15	2.38
1130.0	36.41	38.77	40.62	0.83	0.94	1.00	1.62	1.96	2.18
1135.0	41.19	43.69	45.69	0.75	0.86	0.92	1.47	1.80	2.02
1140.0	47.22	49.83	51.85	0.68	0.79	0.85	1.34	1.66	1.87
1170.0	45.40	46.23	46.94	0.43	0.53	0.59	0.87	1.15	1.32
1300.0	52.92	53.62	54.25	0.14	0.22	0.27	0.41	0.63	0.76
2260.0	81.96	91.84	100.29	0.07	0.16	0.21	0.34	0.51	0.62
2440.0	76.40	75.49	73.28	0.08	0.17	0.22	0.30	0.48	0.58
3000.0	55.36	58.51	65.33	0.10	0.19	0.24	0.65	0.68	0.70

Typical Performance Data

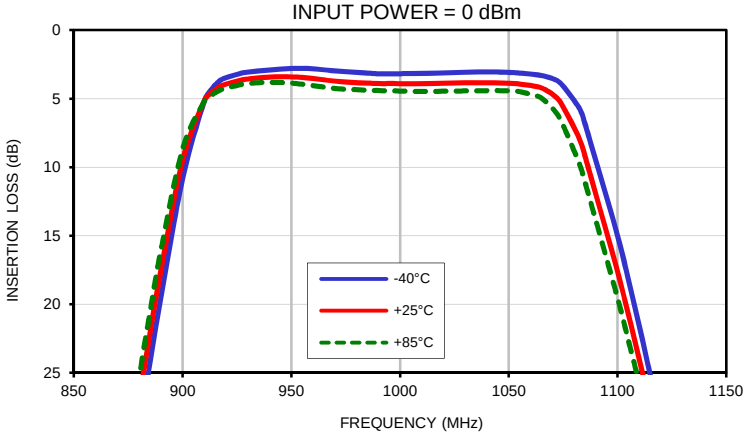
FREQ.	GROUP DELAY		
(MHz)	(nsec)		
	@-40°C	@+25°C	@+85°C
940	11.16	11.15	11.16
945	11.00	11.05	11.09
950	10.98	11.04	11.09
955	11.03	11.09	11.13
960	11.12	11.15	11.20
965	11.18	11.21	11.29
970	11.25	11.31	11.42
975	11.31	11.43	11.58
980	11.39	11.57	11.75
985	11.50	11.70	11.89
990	11.61	11.80	11.95
995	11.69	11.82	11.90
1000	11.68	11.74	11.75
1005	11.60	11.58	11.52
1010	11.44	11.38	11.27
1015	11.25	11.15	11.02
1020	11.05	10.94	10.79
1021	11.01	10.90	10.74
1022	10.98	10.86	10.71
1023	10.94	10.83	10.67
1024	10.91	10.79	10.63
1025	10.87	10.75	10.60
1026	10.85	10.72	10.56
1027	10.82	10.69	10.53
1028	10.79	10.66	10.51
1029	10.76	10.63	10.48
1030	10.74	10.60	10.45
1035	10.63	10.49	10.37
1040	10.55	10.44	10.38
1042	10.54	10.44	10.42
1043	10.53	10.45	10.44
1044	10.53	10.47	10.48
1045	10.53	10.48	10.52
1046	10.54	10.51	10.57
1047	10.55	10.53	10.63
1048	10.56	10.57	10.69
1049	10.57	10.61	10.76
1050	10.60	10.66	10.84
1051	10.63	10.72	10.93
1052	10.66	10.78	11.03
1053	10.70	10.86	11.13
1054	10.75	10.94	11.25
1055	10.80	11.04	11.37
1056	10.87	11.13	11.51
1057	10.94	11.25	11.64
1058	11.02	11.37	11.79
1059	11.11	11.50	11.94
1060	11.22	11.64	12.10

Typical Performance Curves

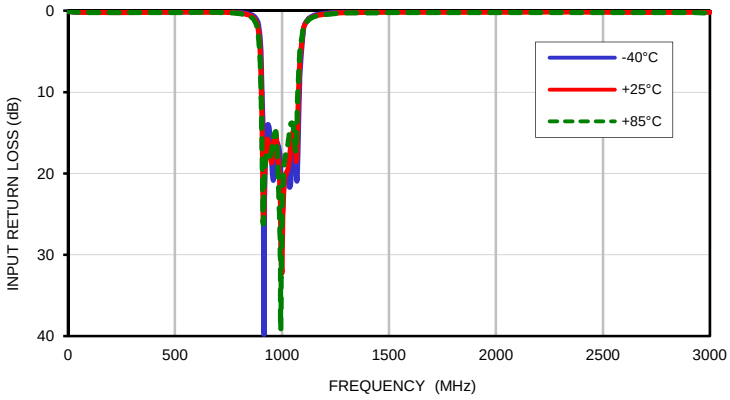
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



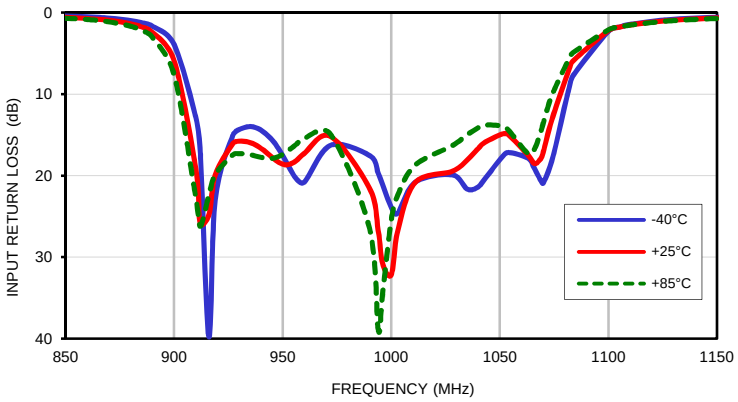
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



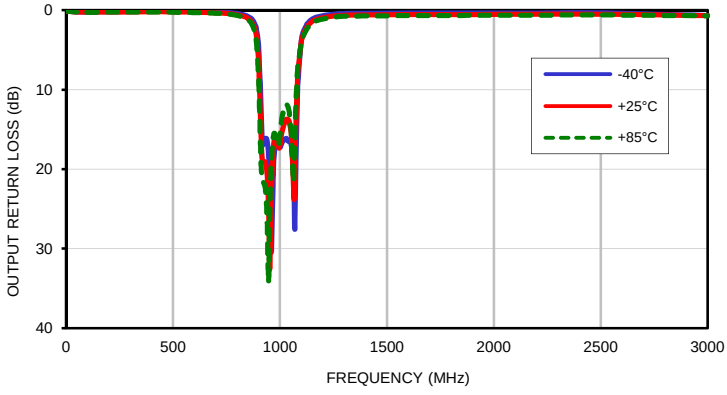
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



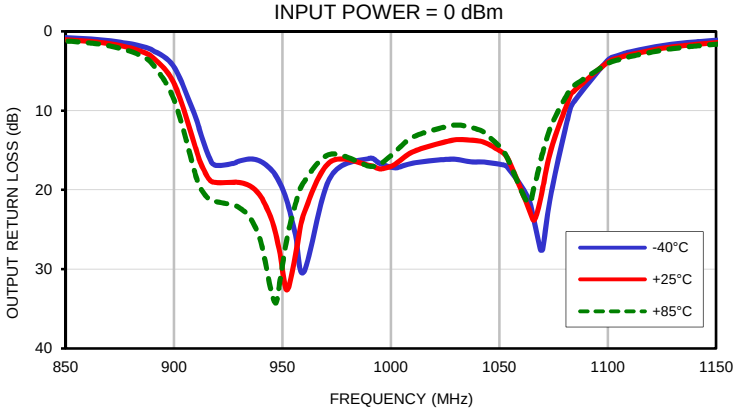
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



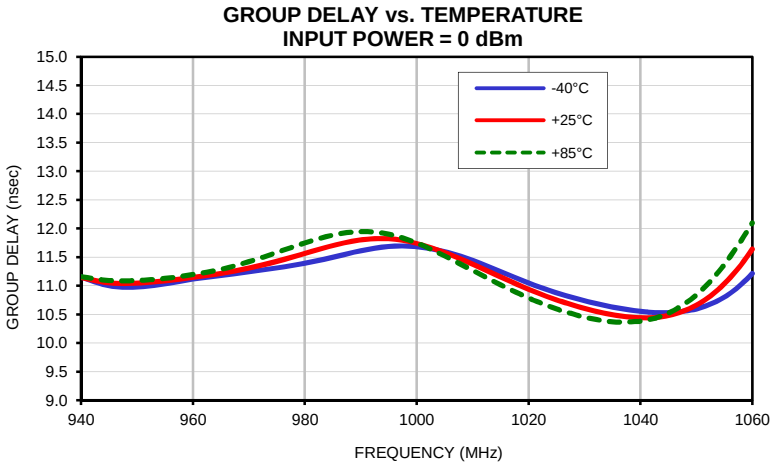
OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



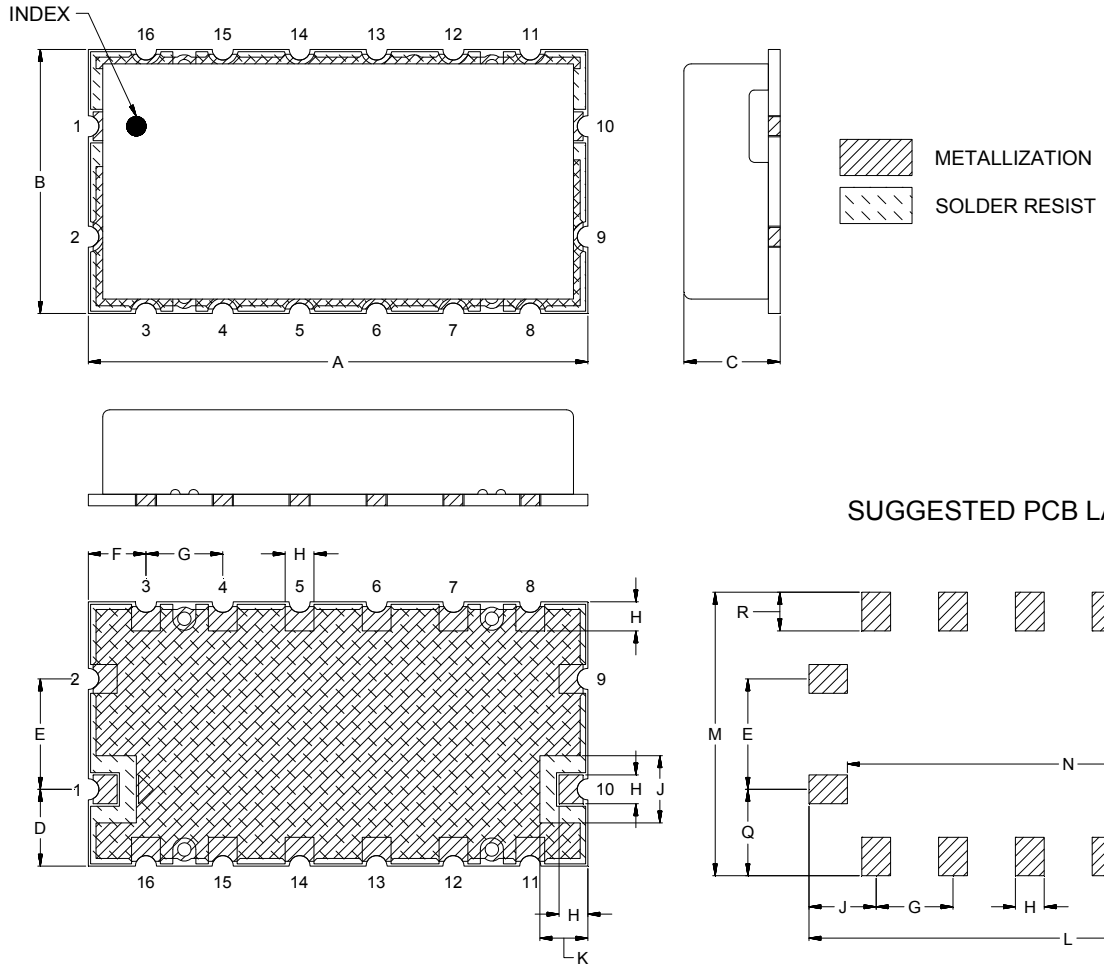
Typical Performance Curves



Case Style KV

Outline Dimensions

KV1974



CASE#	A	B	C	D	E	F	G	H	J	K	L	M
KV1974	1.040 (26.42)	.550 (13.97)	.200 (5.08)	.160 (4.06)	.230 (5.84)	.120 (3.05)	.160 (4.06)	.060 (1.52)	.140 (3.56)	.100 (2.54)	1.080 (27.43)	.590 (14.99)

CASE#	N	P	Q	R	WT. GRAM
KV1974	.920 (23.37)	.430 (10.92)	.180 (4.57)	.080 (2.03)	2

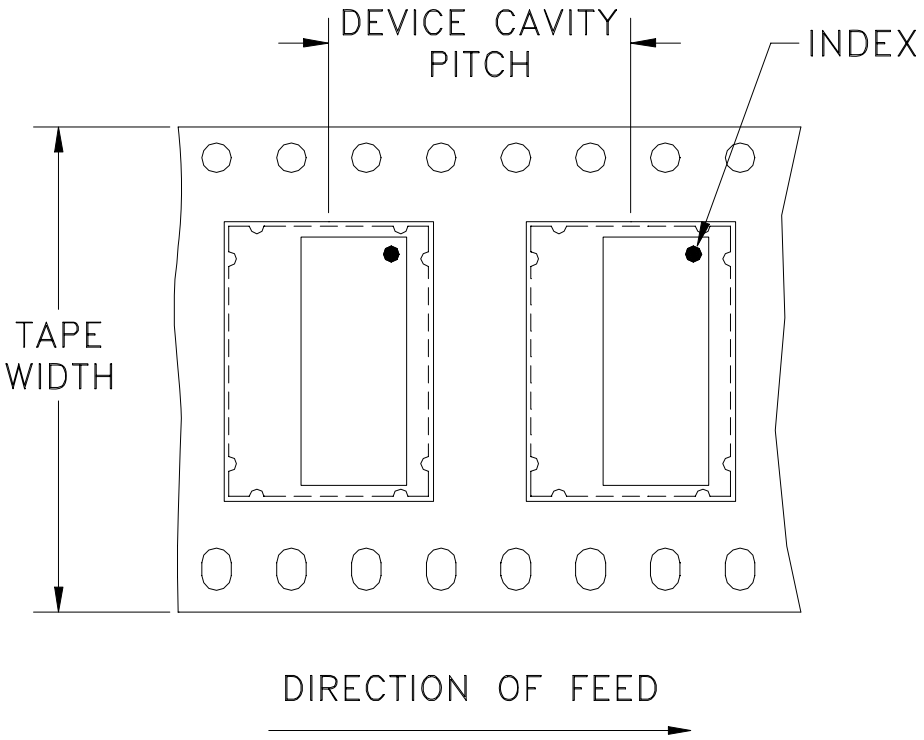
Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3PL. ± .015

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:
   For RoHS Case Styles: 3-5 µ inch (.08-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate.
   For RoHS-5 Case Styles: Tin-Lead plate.

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

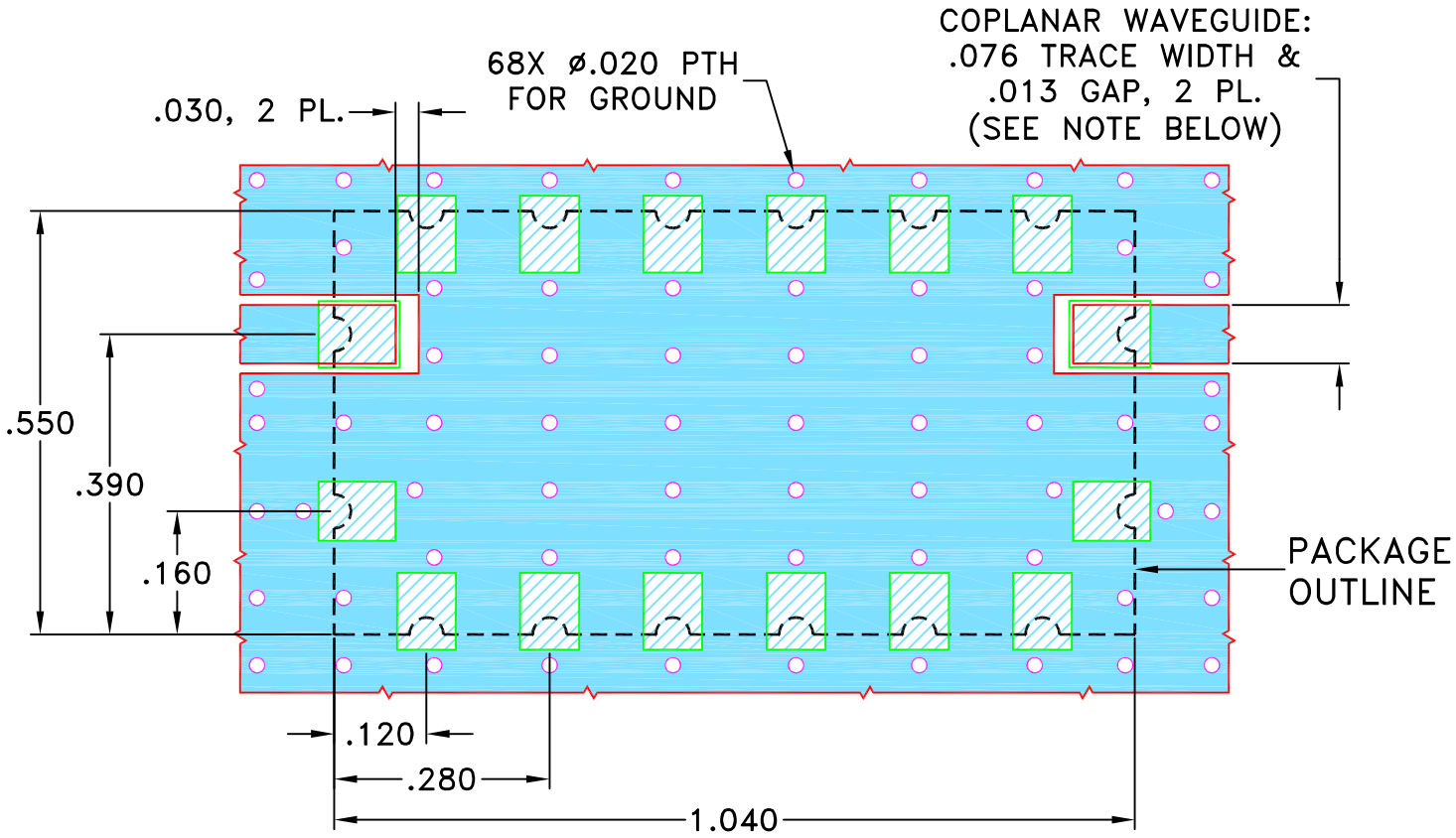
Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

THIRD ANGLE PROJECTION

REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M160945	NEW RELEASE	MAR 17	TM	MD

SUGGESTED MOUNTING CONFIGURATION FOR KV1974 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	TM	24 MAR 17
TOLERANCES ON:	CHECKED	MD	24 MAR 17
2 PL DECIMALS ±	APPROVED	MD	24 MAR 17
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

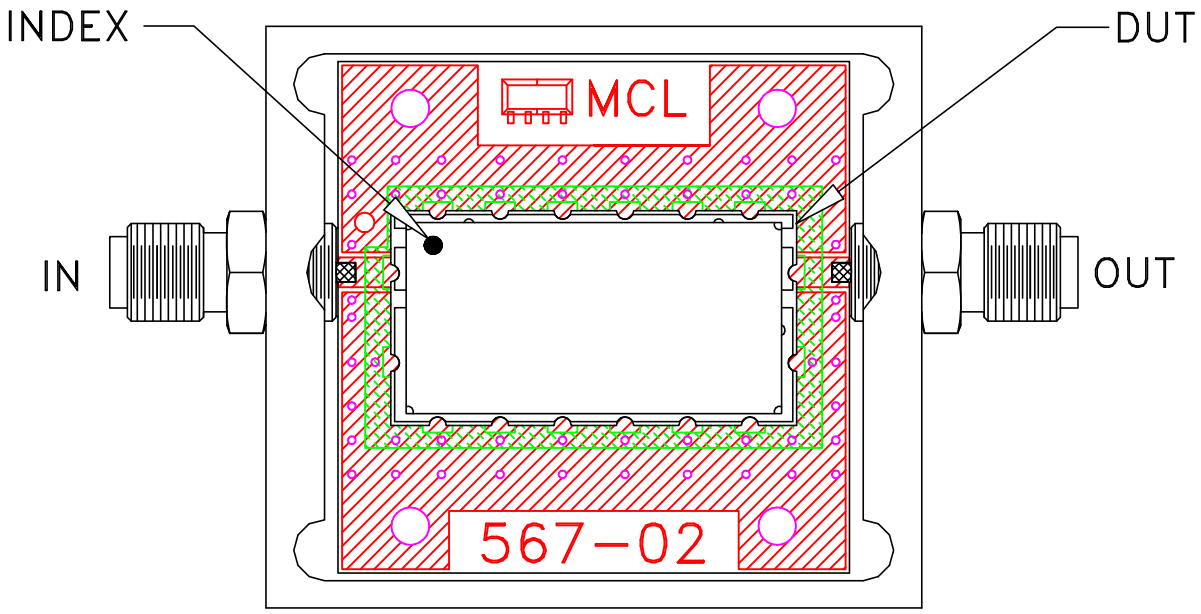
Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

PL, 16FL02, KV1974, TB-953+

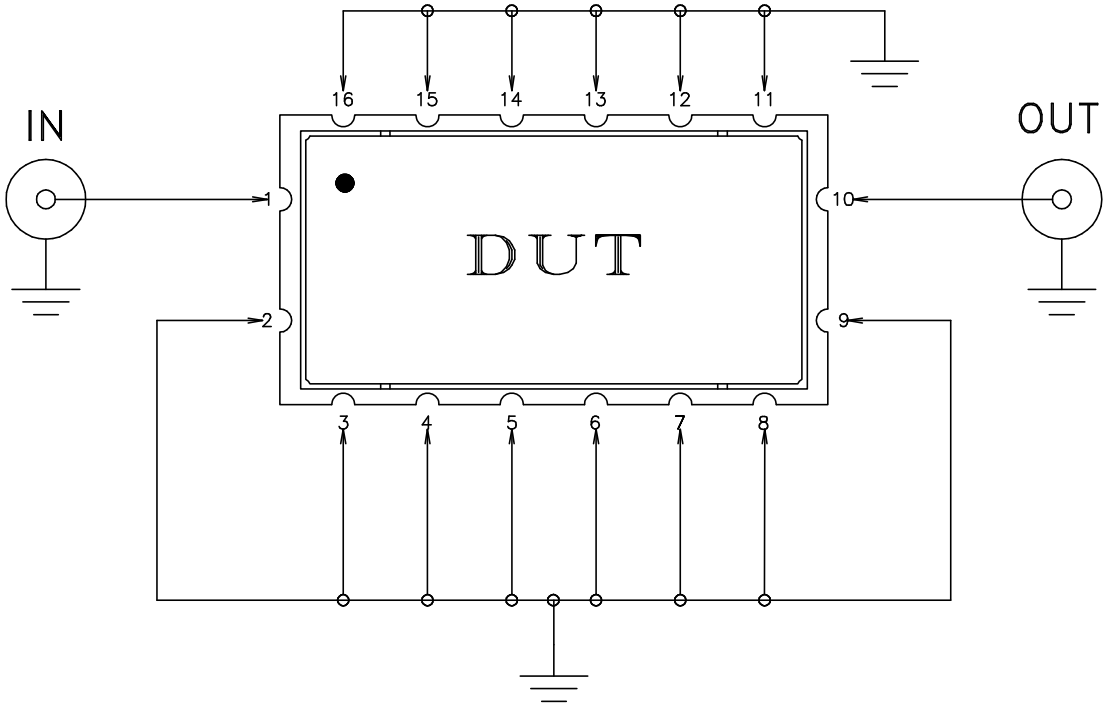
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-507	OR

FILE:	SCALE:	SHEET:
98PL507	4:1	1 OF 1

Evaluation Board and Circuit



TB-953+



Schematic Diagram

Notes:

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

Mini-Circuits®

Mini-Circuits

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