Surface Mount

Bandpass Filter

CBP-A1060C+

50Ω 1015 to 1105 MHz

Generic photo used for illustration purposes only
CASE STYLE: MP1766

The Big Deal

- Excellent Rejection
- Low passband Insertion Loss
- Miniature shielded package

Product Overview

CBP-A1060C+ is a ceramic-coaxial-resonator based bandpass filter in a shielded package fabricated using SMT technology. This filter offers outstanding close in rejection, low insertion loss and high power handling for use in aviation, mobile radio, broadband and fixed wireless.

Key Features

Feature	Advantages
High Selectivity	The CBP-A1060C+ filter incorporates High-Q ceramic resonators that enables sharp rejection near passband.
Low Passband VSWR	This filter maintains typical VSWR over a narrow passband frequency range making this filter easier to integrate into receiver and transmitter RF chains with less concerns for in band frequency ripple.
Rugged construction	The CBP-A1060C+ has been qualified over wide range of thermal, mechanical and environmental conditions including withstanding the stress of extensive solder reflow cycles.

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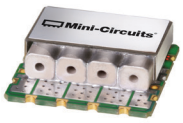
CBP-A1060C+



Generic photo used for illustration purposes only

CASE STYLE: MP1766

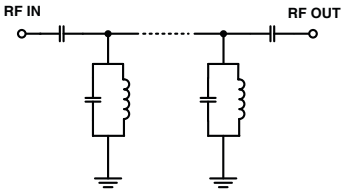
Features

- Low Insertion loss
- High selectivity
- Miniature shielded package

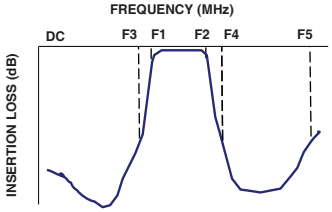
Applications

- Traffic collision avoidance system (TCAS)
- Aeronautical radio navigation
- Fixed satellite
- Radio astronomy
- 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

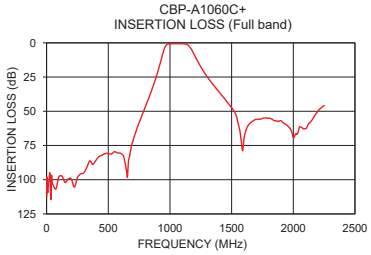
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	—	—	1060	—	MHz
	Insertion Loss	F1-F2	1015-1105	—	0.7	2	dB
	VSWR	F1-F2	1015-1105	—	1.3	—	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC-865	20	30	—	dB
	VSWR	DC-F3	DC-865	—	20	—	:1
Stop Band, Upper	Insertion Loss	F4-F5	1350-2250	20	29	—	dB
	VSWR	F4-F5	1350-2250	—	20	—	:1

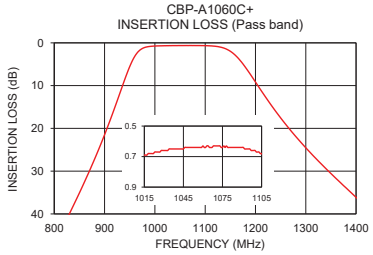
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	5W

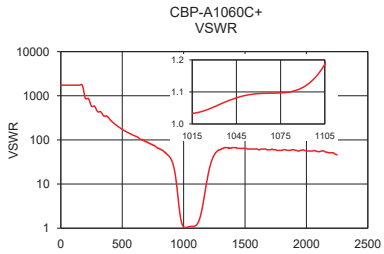
Permanent damage may occur if any of these limits are exceeded.

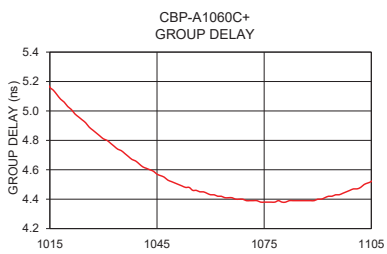
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	112.60	1737.18	1015	5.16
760	56.05	75.53	1019	5.06
865	31.24	46.96	1023	4.96
920	15.22	24.14	1028	4.85
940	8.61	11.24	1034	4.74
956	4.01	4.48	1039	4.66
967	2.05	2.43	1042	4.61
983	0.98	1.35	1047	4.55
1015	0.69	1.03	1050	4.51
1060	0.63	1.09	1055	4.46
1088	0.64	1.11	1060	4.43
1105	0.68	1.19	1065	4.41
1144	1.57	2.28	1070	4.39
1162	3.15	4.15	1075	4.38
1185	6.55	9.96	1080	4.38
1220	12.67	28.49	1085	4.39
1310	25.80	62.05	1090	4.40
1350	30.56	66.82	1095	4.43
1560	61.63	62.05	1100	4.47
2250	45.82	45.72	1105	4.52









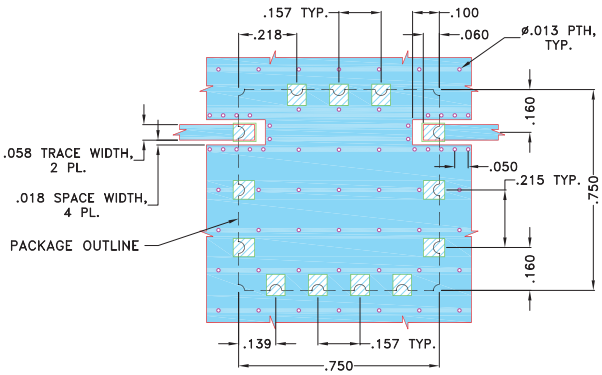
Notes

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

Demo Board MCL P/N: TB-684+
Suggested PCB Layout (PL-373)



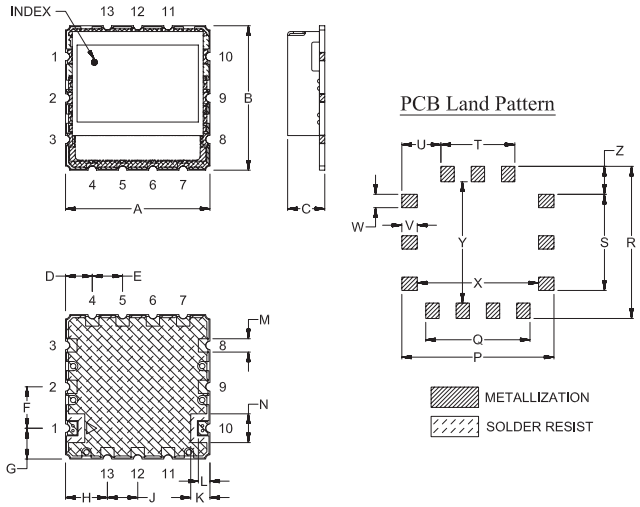
NOTES:

1. TRACE WIDTH IS SHOWN FOR OAK (OAK-602) WITH DIELECTRIC THICKNESS .022"±.0015". 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
.750	**.750**	**.210**	**.139**	**.157**	**.215**	**.160**	**.218**	**.157**	**.100**	**.060**	**.069**	**.149**
19.05	19.05	5.33	3.53	3.99	5.46	4.06	5.54	3.99	2.54	1.52	1.75	3.78

P	Q	R	S	T	U	V	W	X	Y	Z		wt,
.790	**.541**	**.790**	**.499**	**.384**	**.203**	**.080**	**.069**	**.630**	**.630**	**.145**		grams
20.07	13.74	20.07	12.67	9.75	5.16	2.03	1.75	16.00	16.00	3.68		4.6

Note: Please refer to case style drawing for details.

Band Pass Filter CBP-A1060C+

Typical Performance Data

FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40℃	@+25˚C	@+85˚C	@-40℃	@+25˚C	@+85˚C	@-40℃	@+25˚C	@+85˚C
1	101.78	112.60	95.54	0.00	0.00	0.00	0.00	0.00	0.00
25	105.23	94.87	102.23	0.00	0.00	0.00	0.00	0.00	0.00
35	113.60	114.44	100.44	0.00	0.00	0.00	0.00	0.00	0.00
100	112.04	97.80	95.64	0.00	0.01	0.01	0.00	0.00	0.01
150	105.77	102.03	98.12	0.00	0.02	0.02	0.00	0.01	0.01
300	89.72	95.12	93.08	0.02	0.05	0.05	0.01	0.04	0.04
450	83.76	82.10	83.32	0.07	0.10	0.11	0.05	0.08	0.09
550	80.17	79.56	79.47	0.11	0.15	0.16	0.08	0.12	0.13
655	102.23	98.39	92.67	0.17	0.22	0.23	0.13	0.17	0.18
700	72.13	71.71	71.60	0.19	0.24	0.25	0.15	0.19	0.21
725	64.79	64.72	64.52	0.21	0.26	0.27	0.17	0.21	0.22
755	57.38	57.21	57.08	0.23	0.29	0.30	0.18	0.23	0.24
785	50.52	50.28	50.17	0.25	0.31	0.32	0.21	0.26	0.28
800	47.04	46.83	46.66	0.26	0.32	0.34	0.22	0.27	0.29
830	40.22	40.00	39.82	0.29	0.36	0.38	0.25	0.30	0.32
865	31.49	31.24	31.03	0.33	0.41	0.43	0.30	0.37	0.39
875	28.84	28.59	28.36	0.35	0.43	0.45	0.32	0.39	0.42
900	21.75	21.49	21.22	0.43	0.52	0.55	0.41	0.49	0.53
920	15.49	15.22	14.94	0.60	0.73	0.79	0.60	0.72	0.78
945	7.24	7.03	6.79	1.70	2.00	2.19	1.73	2.03	2.23
960	3.21	3.16	3.06	4.37	4.95	5.34	4.43	5.04	5.45
967	2.02	2.05	2.02	6.70	7.46	7.95	6.80	7.60	8.12
972	1.46	1.55	1.55	8.85	9.75	10.29	8.99	9.94	10.53
994	0.64	0.79	0.85	22.12	23.61	24.18	22.85	24.79	25.50
1004	0.57	0.73	0.79	28.35	29.72	30.10	30.18	32.56	32.88
1015	0.54	0.69	0.75	31.98	33.00	33.16	34.46	35.80	35.32
1021	0.53	0.68	0.73	32.31	33.22	33.19	33.85	34.50	33.95
1026	0.52	0.67	0.72	31.86	32.62	32.46	32.66	32.98	32.52
1036	0.51	0.65	0.71	29.99	30.37	30.28	29.88	29.93	29.76
1053	0.50	0.64	0.69	27.77	27.88	28.14	27.30	27.24	27.48
1060	0.49	0.63	0.69	27.52	27.54	27.92	26.99	26.89	27.23
1085	0.49	0.64	0.69	27.03	26.52	26.82	26.61	26.08	26.31
1105	0.52	0.68	0.74	22.30	21.55	21.39	22.12	21.39	21.21
1118	0.60	0.78	0.85	17.44	16.78	16.50	17.38	16.72	16.44
1137	0.99	1.22	1.34	10.62	10.21	9.94	10.62	10.20	9.93
1151	1.74	2.05	2.21	6.66	6.44	6.24	6.67	6.44	6.24
1161	2.67	3.03	3.23	4.56	4.45	4.32	4.56	4.44	4.31
1185	6.13	6.55	6.80	1.73	1.79	1.78	1.70	1.75	1.74
1220	12.30	12.67	12.90	0.56	0.67	0.69	0.52	0.61	0.64
1245	16.43	16.77	16.97	0.36	0.46	0.49	0.31	0.40	0.43
1270	20.19	20.50	20.65	0.29	0.39	0.41	0.23	0.32	0.34
1300	24.26	24.54	24.66	0.26	0.35	0.37	0.21	0.29	0.31
1320	26.78	27.03	27.14	0.25	0.34	0.36	0.20	0.27	0.29
1350	30.33	30.56	30.65	0.25	0.34	0.35	0.19	0.26	0.28
1400	35.95	36.13	36.19	0.26	0.34	0.35	0.20	0.26	0.28
1440	40.34	40.48	40.56	0.26	0.33	0.35	0.21	0.27	0.28
1475	44.36	44.49	44.55	0.26	0.34	0.35	0.21	0.27	0.29
1510	48.49	48.67	48.77	0.27	0.34	0.35	0.22	0.27	0.28
1590	80.59	78.76	78.14	0.27	0.34	0.35	0.23	0.28	0.29
1650	58.76	58.60	58.60	0.26	0.34	0.34	0.23	0.28	0.29
1700	55.97	56.02	55.81	0.26	0.33	0.34	0.24	0.29	0.30
1760	55.01	54.98	54.97	0.26	0.33	0.34	0.25	0.30	0.31
1810	55.20	55.05	55.16	0.25	0.33	0.33	0.24	0.29	0.30
1880	57.33	57.37	57.40	0.25	0.32	0.34	0.24	0.29	0.31
1950	60.53	60.18	59.79	0.24	0.32	0.33	0.24	0.30	0.32
2000	69.76	69.30	68.75	0.23	0.32	0.33	0.24	0.31	0.32
2050	61.01	61.50	62.74	0.24	0.33	0.34	0.24	0.31	0.33
2100	63.14	62.72	62.06	0.23	0.33	0.35	0.24	0.32	0.34
2190	51.15	51.07	50.96	0.25	0.36	0.38	0.24	0.34	0.36
2250	45.88	45.82	45.72	0.27	0.40	0.43	0.28	0.38	0.42

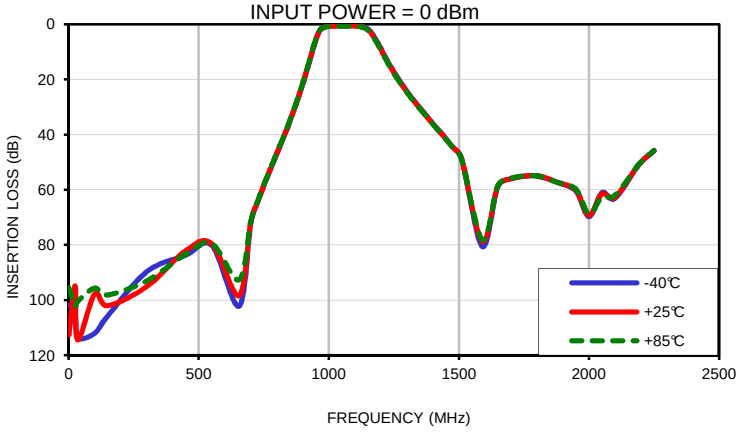
Typical Performance Data

FREQ.	GROUP DELAY		
(MHz)	(nsec)		
	@-40°C	@+25°C	@+85°C
1015	5.20	5.16	5.12
1016	5.16	5.14	5.09
1017	5.14	5.11	5.07
1018	5.11	5.08	5.03
1019	5.08	5.06	5.01
1020	5.06	5.03	4.99
1021	5.03	5.01	4.96
1022	5.00	4.98	4.94
1023	4.98	4.96	4.92
1024	4.96	4.94	4.90
1025	4.94	4.92	4.88
1026	4.91	4.89	4.86
1027	4.89	4.87	4.84
1028	4.87	4.85	4.82
1029	4.85	4.83	4.80
1030	4.83	4.81	4.78
1031	4.81	4.80	4.76
1032	4.79	4.78	4.74
1033	4.78	4.76	4.73
1034	4.76	4.74	4.71
1035	4.74	4.73	4.70
1036	4.73	4.71	4.68
1037	4.70	4.69	4.66
1038	4.69	4.67	4.65
1039	4.68	4.66	4.63
1040	4.66	4.64	4.62
1041	4.64	4.62	4.60
1042	4.63	4.61	4.59
1043	4.61	4.60	4.58
1044	4.60	4.59	4.56
1045	4.58	4.57	4.55
1046	4.58	4.56	4.54
1047	4.56	4.55	4.52
1048	4.55	4.53	4.52
1049	4.53	4.52	4.50
1050	4.53	4.51	4.49
1052	4.50	4.49	4.47
1053	4.50	4.48	4.47
1056	4.47	4.46	4.45
1057	4.46	4.45	4.44
1059	4.45	4.44	4.43
1060	4.45	4.43	4.43
1062	4.43	4.42	4.41
1066	4.42	4.41	4.39
1069	4.40	4.40	4.39
1070	4.40	4.39	4.38
1080	4.38	4.38	4.38
1082	4.39	4.39	4.38
1090	4.40	4.40	4.41
1092	4.41	4.41	4.41
1093	4.41	4.42	4.42
1096	4.43	4.43	4.44
1097	4.43	4.44	4.44
1098	4.44	4.45	4.46
1099	4.45	4.46	4.46
1100	4.46	4.47	4.48
1102	4.48	4.48	4.50
1103	4.49	4.50	4.51
1104	4.50	4.51	4.52
1105	4.51	4.52	4.54

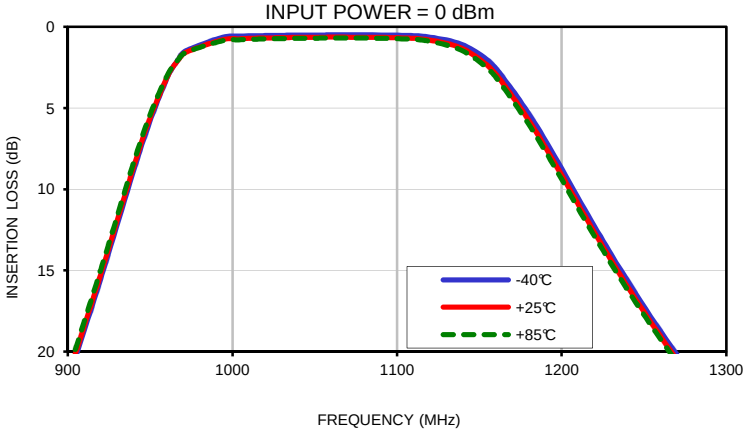
Band Pass Filter CBP-A1060C+

Typical Performance Curves

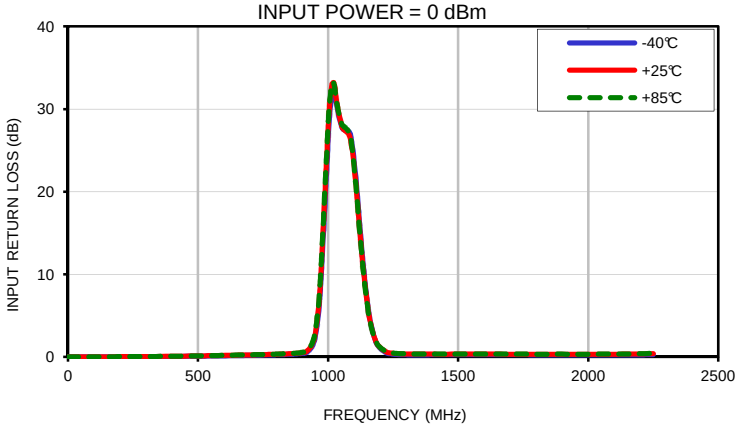
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



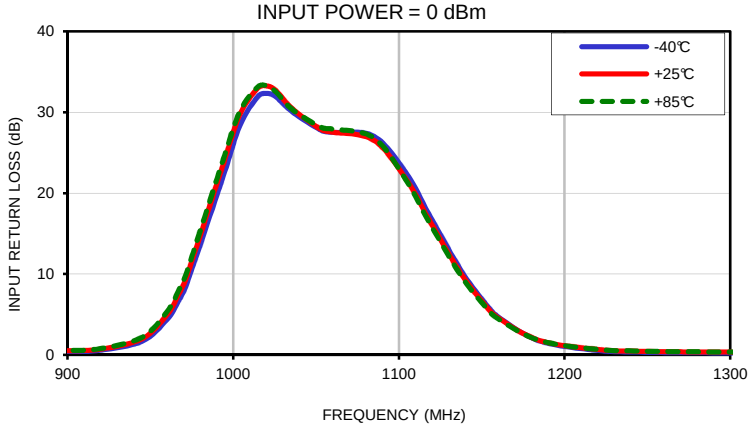
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



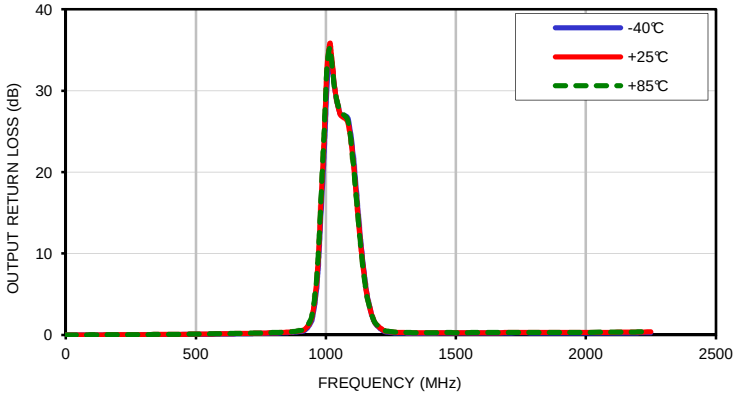
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



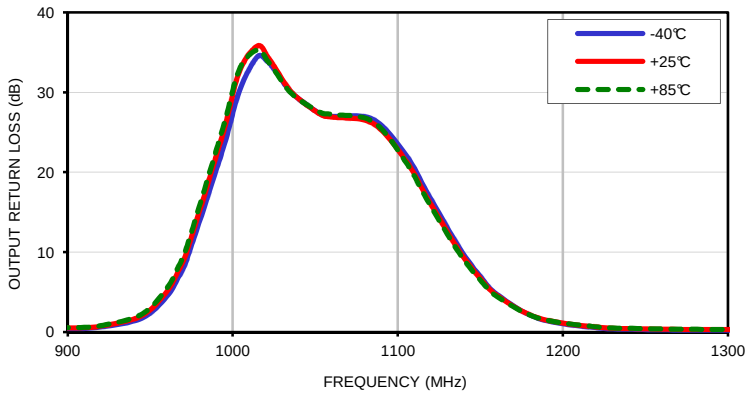
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



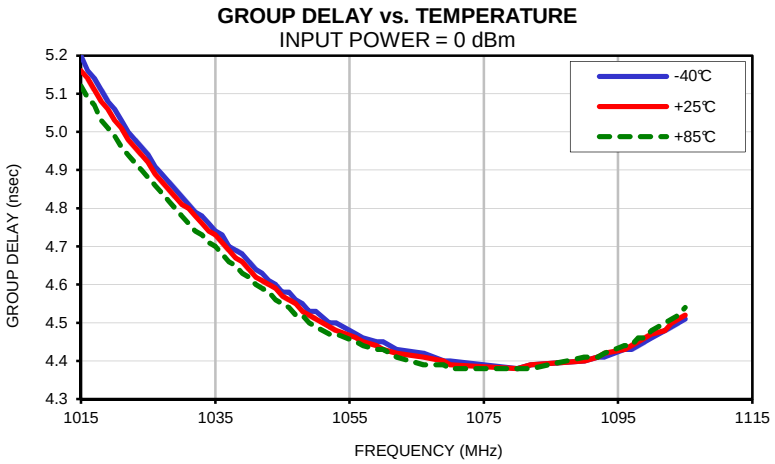
OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



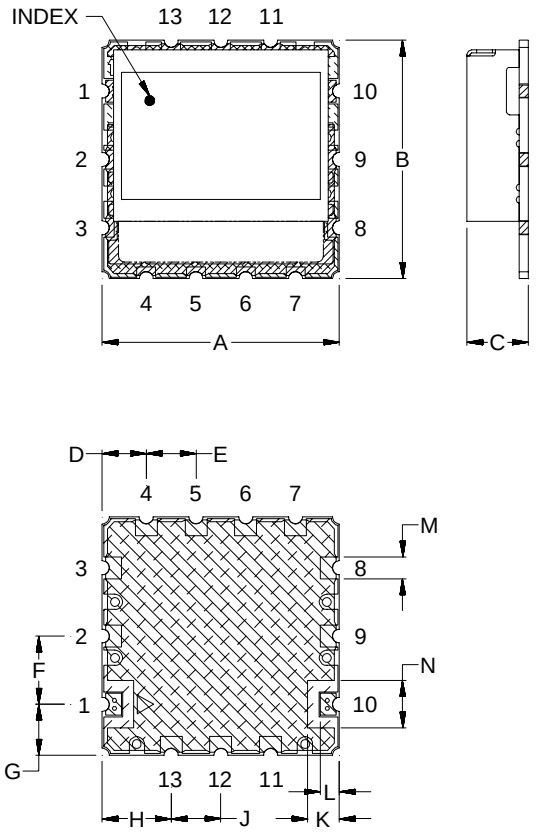
Typical Performance Curves



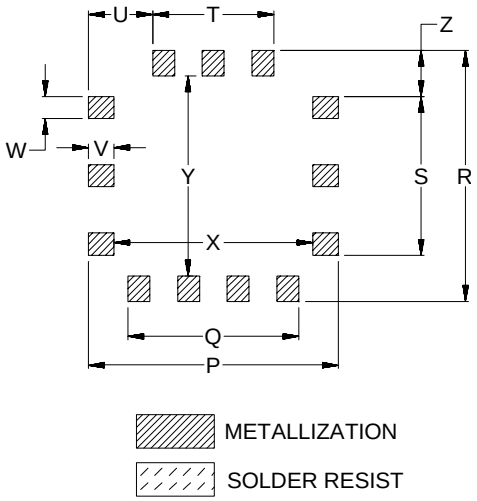
Case Style MP

Outline Dimensions

MP1766



PCB Land Pattern



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
MP1766	.750 (19.05)	.750 (19.05)	.210 (5.33)	.139 (3.53)	.157 (3.99)	.215 (5.46)	.160 (4.06)	.218 (5.54)	.157 (3.99)	.100 (2.54)	.060 (1.52)	.069 (1.75)	.149 (3.78)

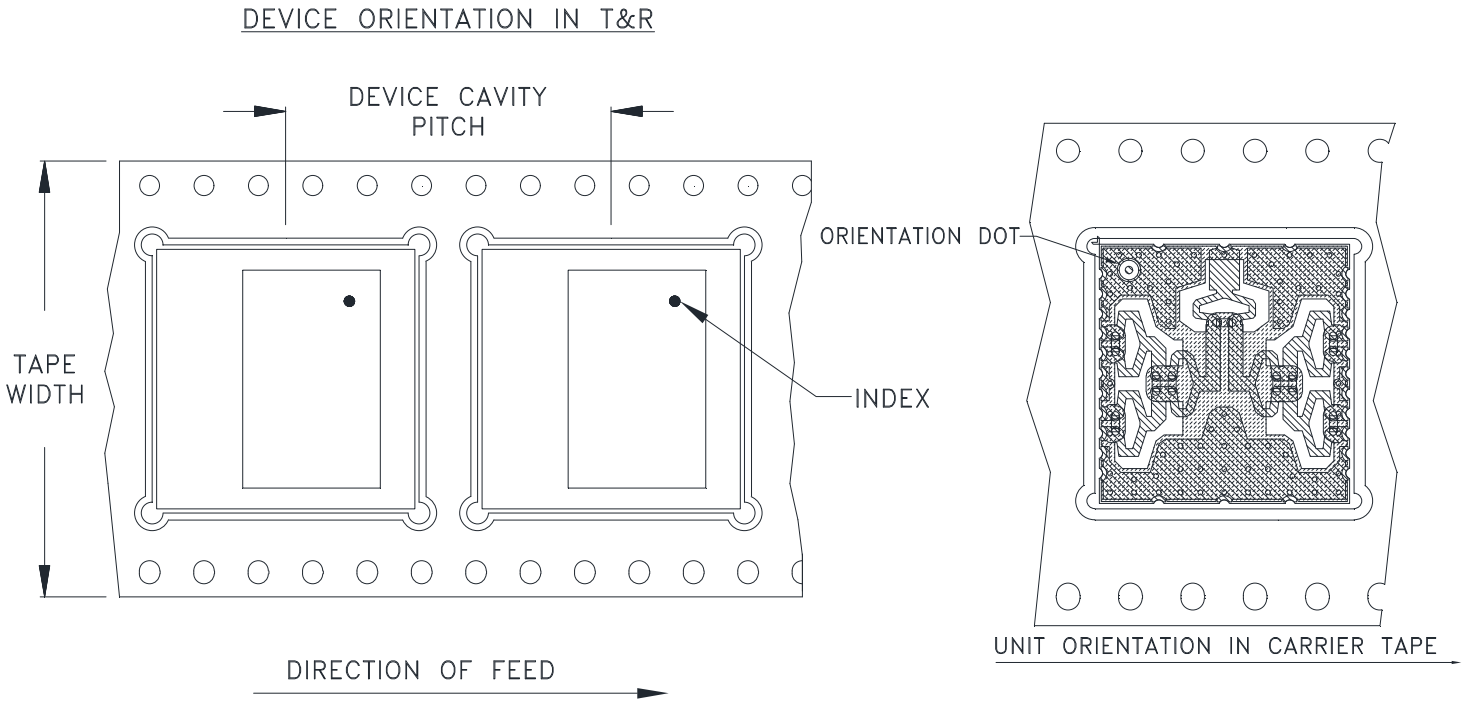
CASE#	P	Q	R	S	T	U	V	W	X	Y	Z	WT.GRAMS
MP1766	.790 (20.07)	.541 (13.74)	.790 (20.07)	.499 (12.67)	.384 (9.75)	.203 (5.16)	.080 (2.03)	.069 (1.75)	.630 (16.00)	.630 (16.00)	.145 (3.68)	4.6

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-F111



Applicable Case styles: **Applicable Case styles:RS1539**

Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	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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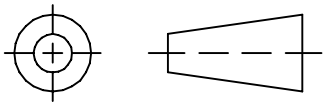
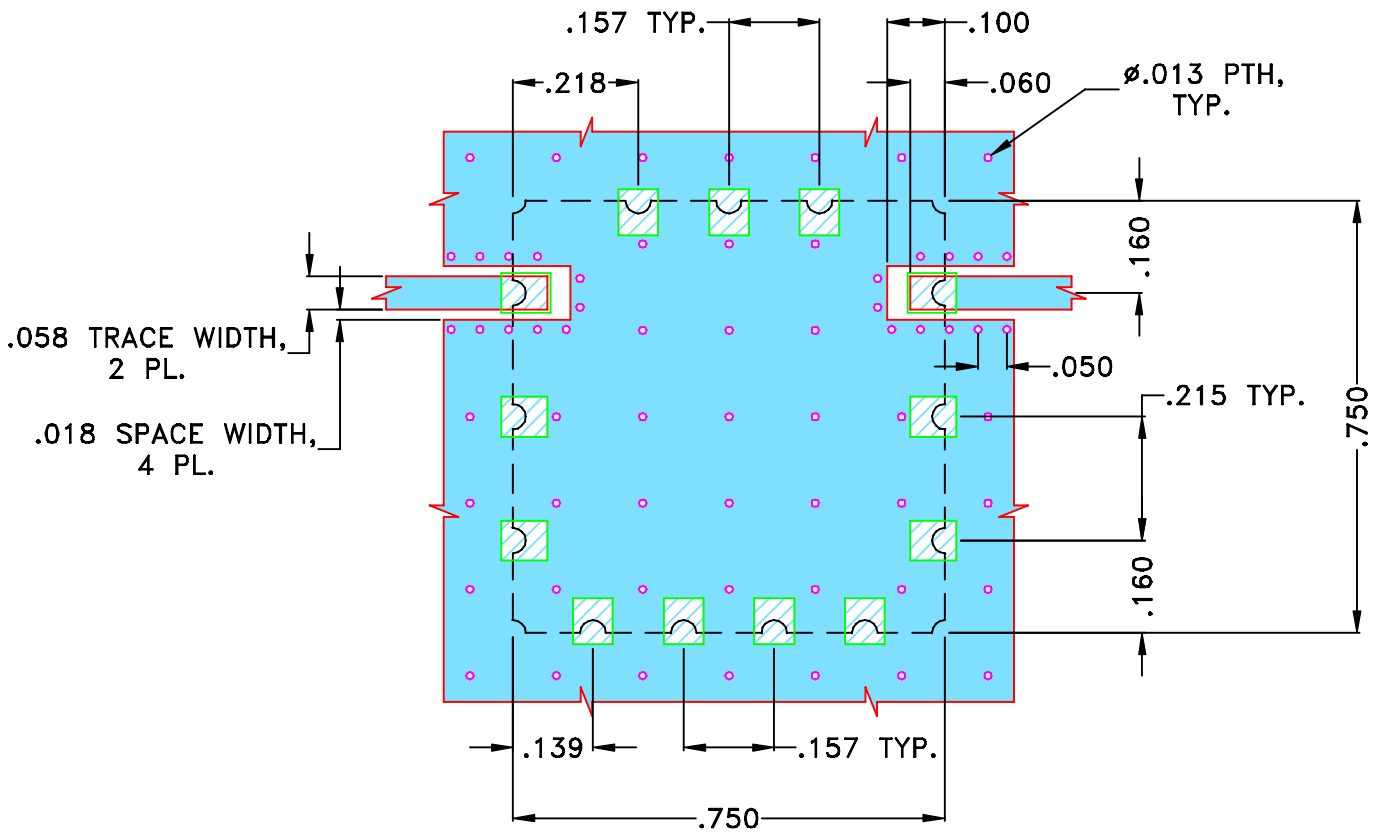
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M137721	NEW RELEASE	JUN 12	DDR	KG

SUGGESTED MOUNTING CONFIGURATION FOR MP1766 CASE STYLE "13FL01" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR OAK (OAK-602) WITH DIELECTRIC THICKNESS .022"±.0015". 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	DDR	22 JUN 12
TOLERANCES ON:	CHECKED	MD	22 JUN 12
2 PL DECIMALS ±	APPROVED	GM	22 JUN 12
3 PL DECIMALS ± .005"			
ANGLES ±			
FRACTIONS ±			

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

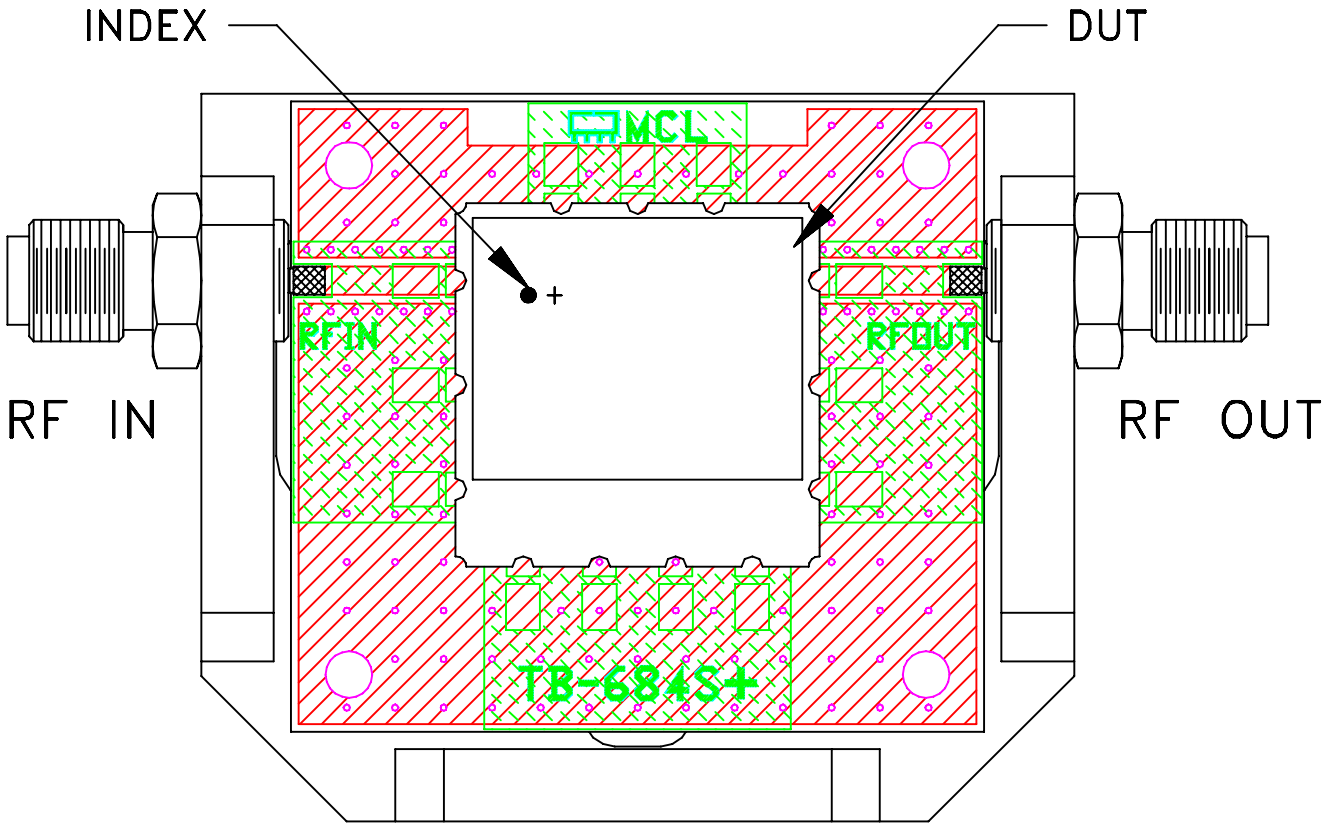
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 13FL01, MP1766, BPF, TB-684+, 50 Ohm

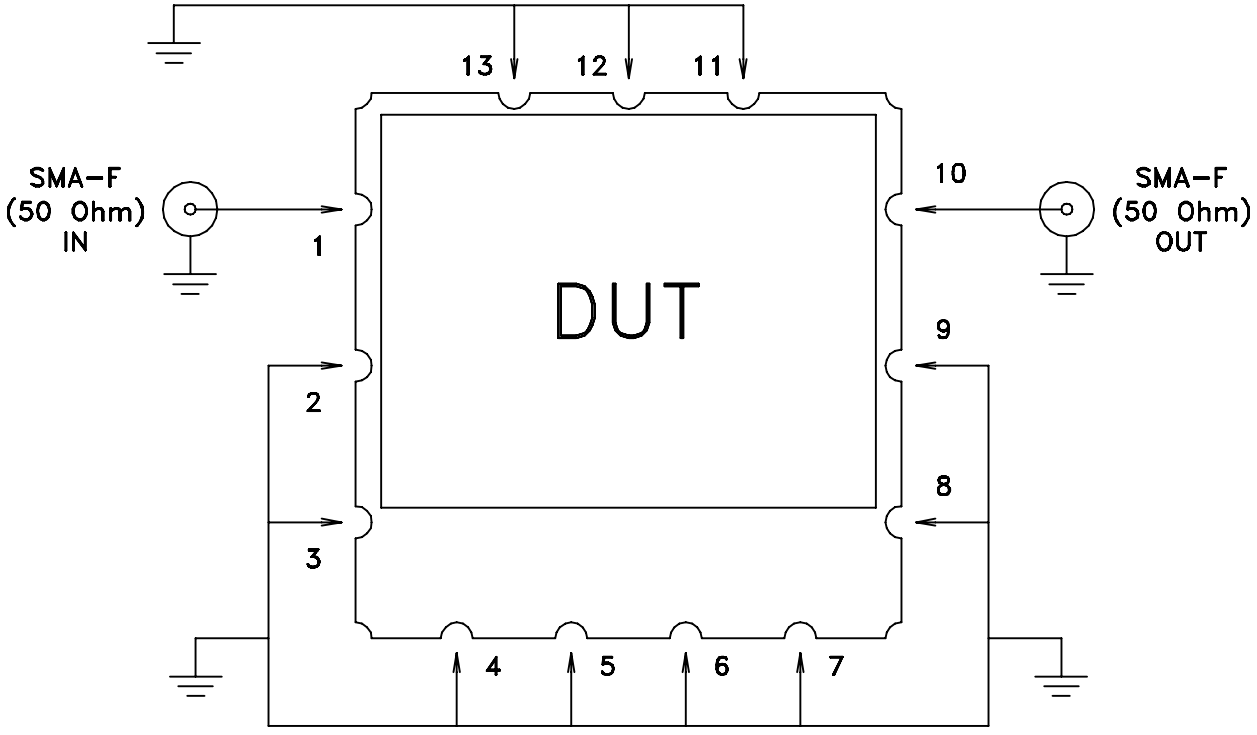
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-373	OR

FILE:	SCALE:	SHEET:
98PL373	4:1	1 OF 1

Evaluation Board and Circuit



TB-684+



Schematic Diagram

Notes:
1. 50 Ohm SMA Female connectors.
2. PCB Material: OAK-602 OR Equivalent
   Dielectric Constant=2.50±.04, Thickness=.022 inch.

Mini-Circuits®

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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