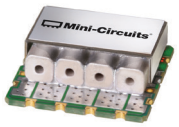
Surface Mount

Bandpass Filter

CBP-1950C+

50Ω 1920 to 1980 MHz



Generic photo used for illustration purposes only
CASE STYLE: MP1766

The Big Deal

- Narrow bandwidth
- Excellent Rejection
- High power handling
- Miniature shielded package

Product Overview

CBP-1950C+ 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 public cellular networks and CDMA handsets applications

Key Features

Feature	Advantages
High Selectivity	The CBP-1950C+ filter incorporates High-Q ceramic resonators that enables sharp rejection near passband.
Low Passband VSWR	This filter maintains typical VSWR over 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-1950C+ has been qualified over wide range of thermal, mechanical and environmental conditions including withstanding the stress of extensive solder reflow cycles.

Notes
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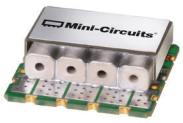
Surface Mount

Bandpass Filter

50Ω 1920 to 1980 MHz

CBP-1950C+



Generic photo used for illustration purposes only
CASE STYLE: MP1766

Features

- Narrow bandwidth
- Excellent rejection
- High selectivity
- High power handling
- Miniature shielded package

Applications

- Public cellular network
- Wireless local loop (WLL)
- WCDMA handsets

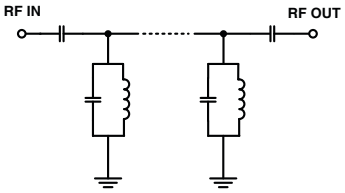
Electrical Specifications at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	—	—	1950	—	MHz
	Insertion Loss	F1-F2	1920-1980	—	1.00	2.50	dB
	VSWR	F1-F2	1920-1980	—	1.33	2.32	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC-1740	20	32	—	dB
	VSWR	DC-F3	DC-1740	—	20	—	:1
Stop Band, Upper	Insertion Loss	F4-F5	2190-4300	20	27	—	dB
	VSWR	F4-F5	2190-4300	—	20	—	:1

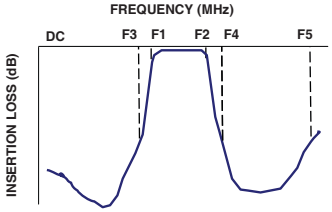
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	10W

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

Functional Schematic



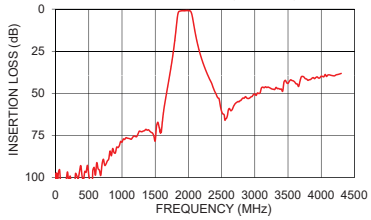
Typical Frequency Response



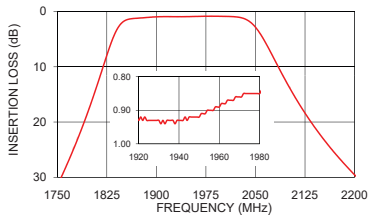
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	103.07	347.44	1920	4.52
700	92.01	347.44	1923	4.47
1200	75.56	133.63	1926	4.42
1740	34.02	45.72	1929	4.38
1754	30.51	42.38	1932	4.34
1790	20.22	28.03	1935	4.30
1818	10.49	11.93	1938	4.28
1840	3.31	3.00	1941	4.26
1880	1.13	1.29	1944	4.24
1920	0.93	1.22	1947	4.23
1950	0.92	1.30	1950	4.21
1980	0.85	1.08	1953	4.21
2030	1.17	1.38	1956	4.22
2055	3.64	3.92	1959	4.23
2100	13.46	23.81	1962	4.23
2134	20.00	44.55	1965	4.25
2190	28.31	66.82	1968	4.26
2204	30.05	69.49	1970	4.27
2550	65.91	91.43	1975	4.30
4300	38.17	40.41	1980	4.33

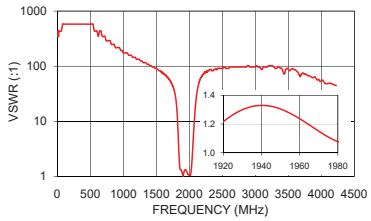
CBP-1950C+
INSERTION LOSS (Full band)



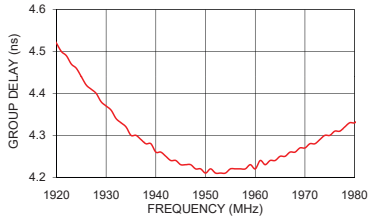
CBP-1950C+
INSERTION LOSS (Pass band)



CBP-1950C+
VSWR



CBP-1950C+
GROUP DELAY



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

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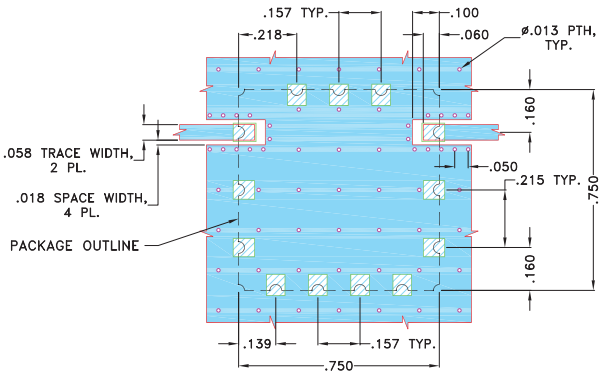
Pad Connections

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)



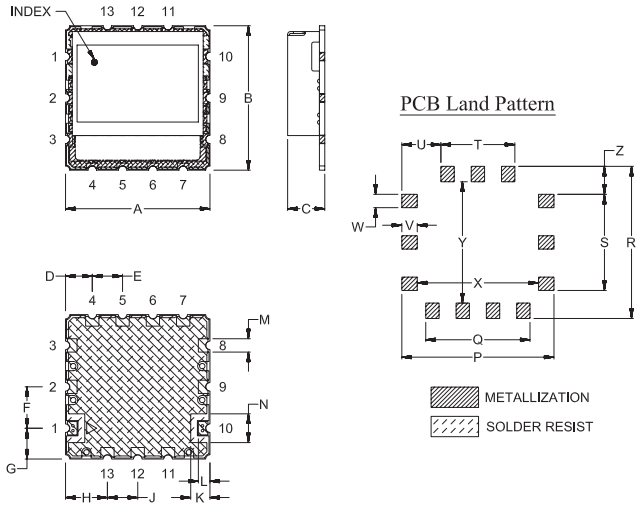
NOTES:

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.

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Band Pass Filter CBP-1950C+

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	99.55	103.07	106.57	0.05	0.05	0.05	0.05	0.05	0.05
200	109.13	103.56	96.87	0.01	0.03	0.03	0.01	0.03	0.03
500	92.56	98.61	97.78	0.00	0.03	0.04	0.00	0.04	0.05
860	83.43	82.74	85.99	0.02	0.07	0.09	0.03	0.09	0.11
1040	79.12	77.35	76.53	0.04	0.10	0.12	0.06	0.12	0.14
1160	76.20	76.13	76.00	0.06	0.12	0.14	0.08	0.14	0.17
1360	72.18	71.35	71.31	0.09	0.16	0.18	0.12	0.19	0.22
1420	73.16	72.46	71.93	0.10	0.17	0.20	0.13	0.20	0.24
1500	78.27	78.20	77.56	0.12	0.19	0.22	0.16	0.23	0.26
1540	65.85	67.16	65.50	0.14	0.21	0.24	0.17	0.25	0.28
1590	72.61	73.08	73.22	0.15	0.23	0.25	0.19	0.27	0.31
1646	55.99	55.79	55.62	0.17	0.26	0.29	0.21	0.30	0.34
1714	40.62	40.14	40.11	0.23	0.32	0.37	0.28	0.38	0.44
1740	34.55	34.02	33.95	0.27	0.38	0.43	0.32	0.44	0.50
1756	30.51	29.98	29.88	0.30	0.42	0.48	0.36	0.49	0.57
1760	29.46	28.93	28.83	0.31	0.43	0.50	0.37	0.51	0.59
1768	27.31	26.76	26.66	0.33	0.47	0.54	0.40	0.55	0.64
1790	20.81	20.22	20.14	0.45	0.62	0.72	0.53	0.74	0.86
1796	18.87	18.28	18.20	0.50	0.70	0.81	0.61	0.84	0.97
1798	18.20	17.61	17.54	0.53	0.73	0.84	0.63	0.87	1.01
1829	6.88	6.49	6.69	2.14	2.76	2.92	2.44	3.19	3.40
1839	3.62	3.54	3.83	4.62	5.59	5.61	5.20	6.42	6.46
1846	2.12	2.25	2.55	7.98	9.11	8.81	9.09	10.64	10.23
1859	1.09	1.36	1.56	15.87	16.46	16.28	19.82	19.73	18.97
1870	0.98	1.22	1.35	15.47	16.85	18.50	16.38	17.18	18.36
1874	0.95	1.18	1.31	15.28	16.98	18.90	15.81	16.91	18.14
1893	0.78	1.01	1.14	19.95	24.05	27.16	19.90	21.95	22.16
1903	0.69	0.94	1.08	30.90	46.41	34.02	29.30	27.49	24.80
1908	0.68	0.93	1.07	40.76	29.31	27.54	33.61	25.98	24.01
1920	0.68	0.93	1.05	21.05	20.20	20.89	20.86	19.94	20.51
1942	0.73	0.93	1.03	15.83	17.01	18.94	15.76	17.01	19.19
1950	0.72	0.92	1.01	15.86	17.60	20.03	15.79	17.62	20.52
1980	0.63	0.85	0.98	23.28	28.52	26.23	23.34	32.16	33.79
1984	0.62	0.85	0.99	25.59	30.00	25.13	25.84	39.09	29.62
1998	0.61	0.86	1.01	36.48	27.79	23.31	46.01	30.28	24.78
2005	0.62	0.87	1.02	36.93	28.43	24.87	36.48	29.33	25.53
2010	0.63	0.89	1.04	37.42	30.87	27.92	32.94	29.66	26.88
2014	0.64	0.91	1.06	35.62	32.89	31.14	30.27	28.71	26.73
2030	0.80	1.17	1.42	17.87	15.99	14.65	17.19	15.33	13.94
2062	3.84	4.97	5.78	3.59	3.16	2.87	3.57	3.12	2.83
2092	10.48	11.72	12.57	0.83	0.91	0.93	0.85	0.93	0.96
2100	12.26	13.46	14.28	0.61	0.73	0.77	0.64	0.75	0.79
2130	18.30	19.31	19.99	0.28	0.41	0.47	0.31	0.44	0.51
2132	18.66	19.66	20.34	0.27	0.40	0.46	0.31	0.44	0.50
2158	23.01	23.87	24.46	0.19	0.31	0.37	0.23	0.35	0.41
2190	27.57	28.31	28.83	0.15	0.26	0.31	0.19	0.30	0.36
2212	30.33	31.00	31.48	0.14	0.24	0.29	0.17	0.28	0.33
2350	43.33	43.99	44.17	0.12	0.21	0.24	0.14	0.23	0.27
2490	59.98	59.18	61.58	0.11	0.19	0.22	0.13	0.21	0.25
2560	69.13	65.07	73.68	0.10	0.19	0.22	0.12	0.21	0.24
2610	59.47	59.14	59.11	0.09	0.18	0.22	0.12	0.20	0.24
2660	60.86	59.61	59.08	0.09	0.18	0.21	0.11	0.20	0.23
2900	54.35	53.07	53.36	0.07	0.17	0.21	0.09	0.19	0.22
3120	46.01	46.29	45.07	0.07	0.18	0.23	0.08	0.18	0.23
3420	47.67	48.68	47.69	0.08	0.22	0.25	0.11	0.23	0.27
3500	44.05	44.05	43.73	0.07	0.20	0.27	0.11	0.24	0.29
3680	42.07	42.88	46.11	0.12	0.27	0.31	0.19	0.32	0.37
3780	42.55	41.48	41.81	0.10	0.25	0.32	0.17	0.32	0.39
4200	39.60	39.59	39.16	0.22	0.38	0.46	0.34	0.53	0.63
4300	38.47	38.17	38.47	0.25	0.43	0.51	0.34	0.56	0.68

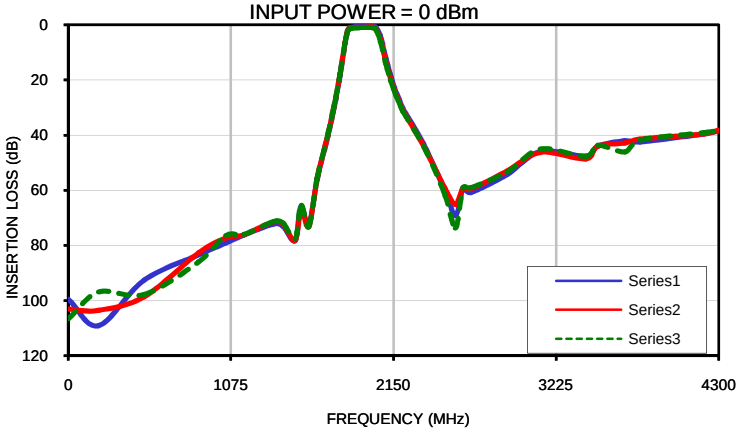
Typical Performance Data

FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
1920	4.58	4.52	4.53
1921	4.56	4.50	4.51
1922	4.54	4.49	4.50
1923	4.52	4.47	4.48
1924	4.50	4.46	4.46
1925	4.49	4.44	4.46
1926	4.46	4.42	4.44
1927	4.45	4.41	4.44
1928	4.43	4.40	4.42
1929	4.41	4.38	4.40
1930	4.39	4.37	4.40
1931	4.38	4.36	4.39
1932	4.37	4.34	4.38
1933	4.34	4.33	4.36
1935	4.32	4.30	4.34
1936	4.31	4.30	4.34
1937	4.29	4.29	4.33
1938	4.28	4.28	4.32
1939	4.27	4.28	4.32
1940	4.26	4.26	4.31
1941	4.25	4.26	4.30
1942	4.24	4.25	4.30
1943	4.23	4.24	4.29
1944	4.22	4.24	4.29
1945	4.21	4.23	4.28
1946	4.21	4.23	4.28
1947	4.20	4.23	4.28
1948	4.19	4.22	4.27
1949	4.19	4.22	4.27
1950	4.18	4.21	4.26
1951	4.18	4.22	4.27
1952	4.18	4.21	4.27
1953	4.17	4.21	4.27
1954	4.17	4.21	4.27
1955	4.18	4.22	4.27
1956	4.18	4.22	4.27
1957	4.18	4.22	4.27
1958	4.18	4.22	4.28
1959	4.18	4.23	4.28
1960	4.18	4.22	4.28
1961	4.19	4.24	4.29
1962	4.19	4.23	4.28
1963	4.19	4.24	4.29
1964	4.20	4.24	4.29
1965	4.20	4.25	4.29
1966	4.21	4.25	4.30
1967	4.21	4.26	4.30
1968	4.22	4.26	4.30
1969	4.22	4.27	4.31
1970	4.23	4.27	4.31
1971	4.23	4.28	4.32
1972	4.24	4.28	4.32
1973	4.25	4.29	4.33
1974	4.26	4.30	4.33
1975	4.26	4.30	4.34
1976	4.27	4.31	4.35
1977	4.27	4.31	4.35
1978	4.28	4.32	4.35
1979	4.29	4.33	4.36
1980	4.30	4.33	4.36

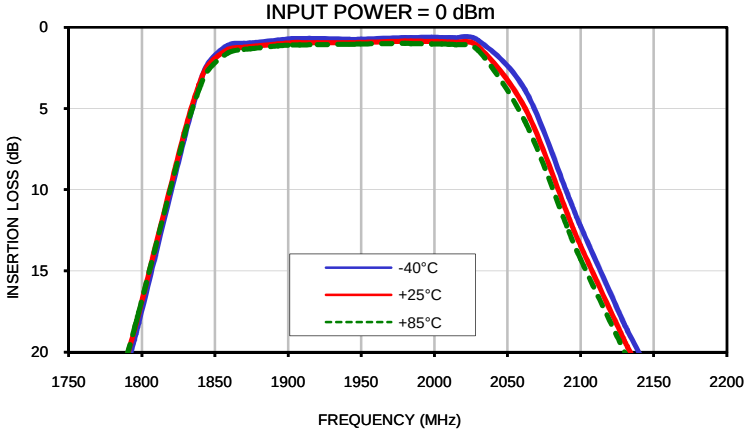
Band Pass Filter CBP-1950C+

Typical Performance Curves

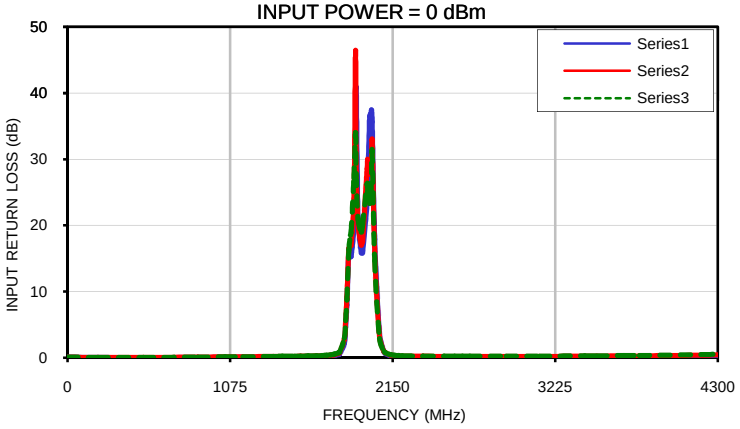
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



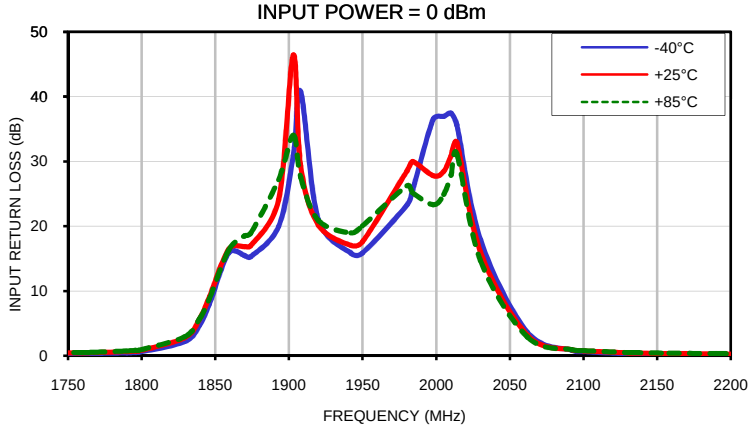
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



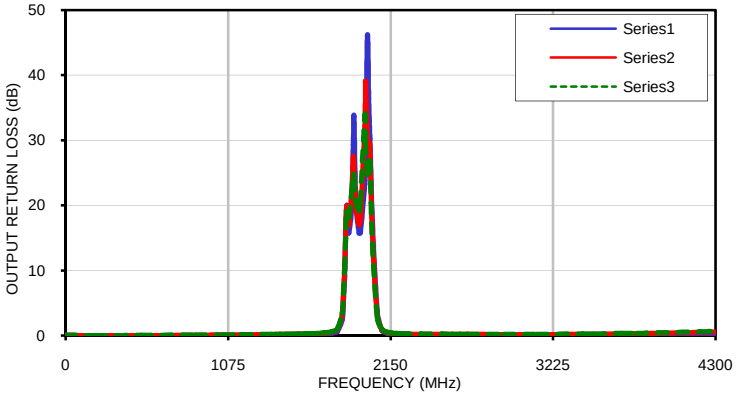
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



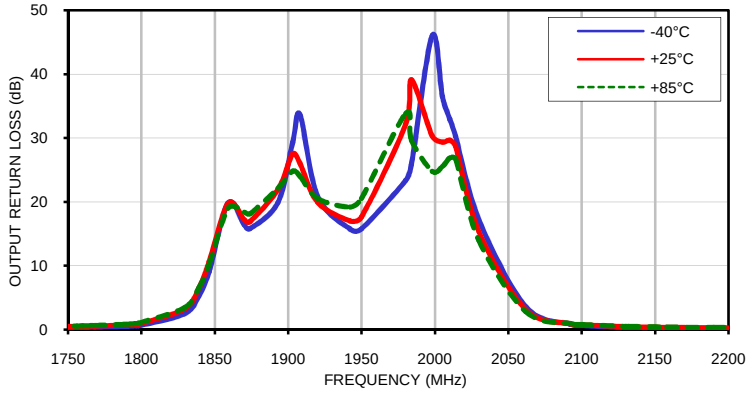
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



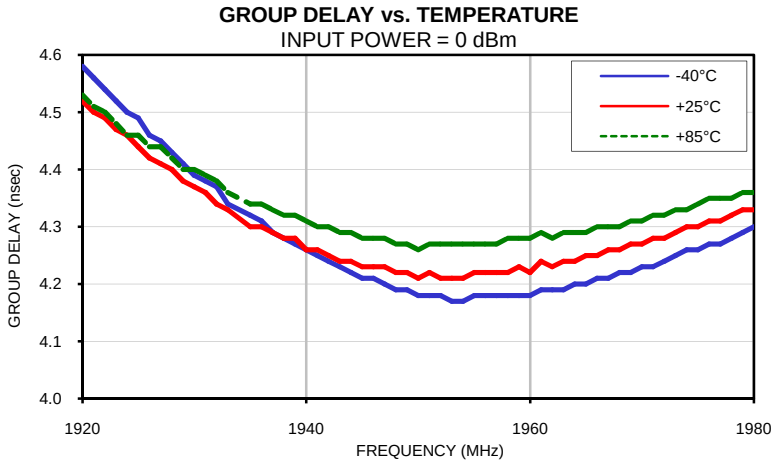
OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



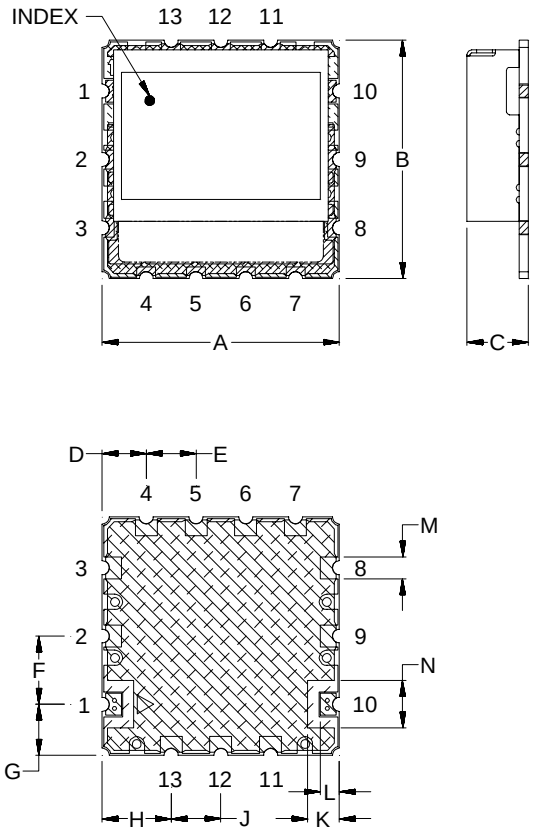
Typical Performance Curves



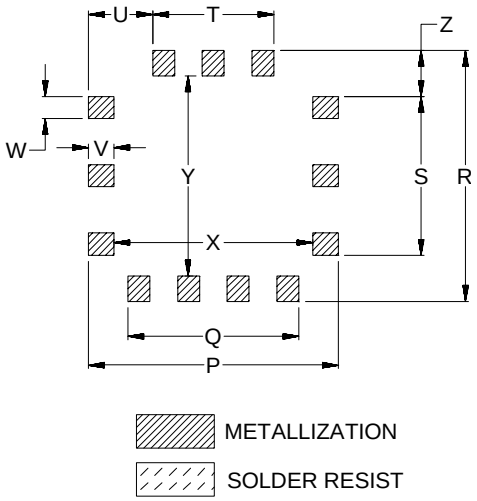
Case Style MP

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.

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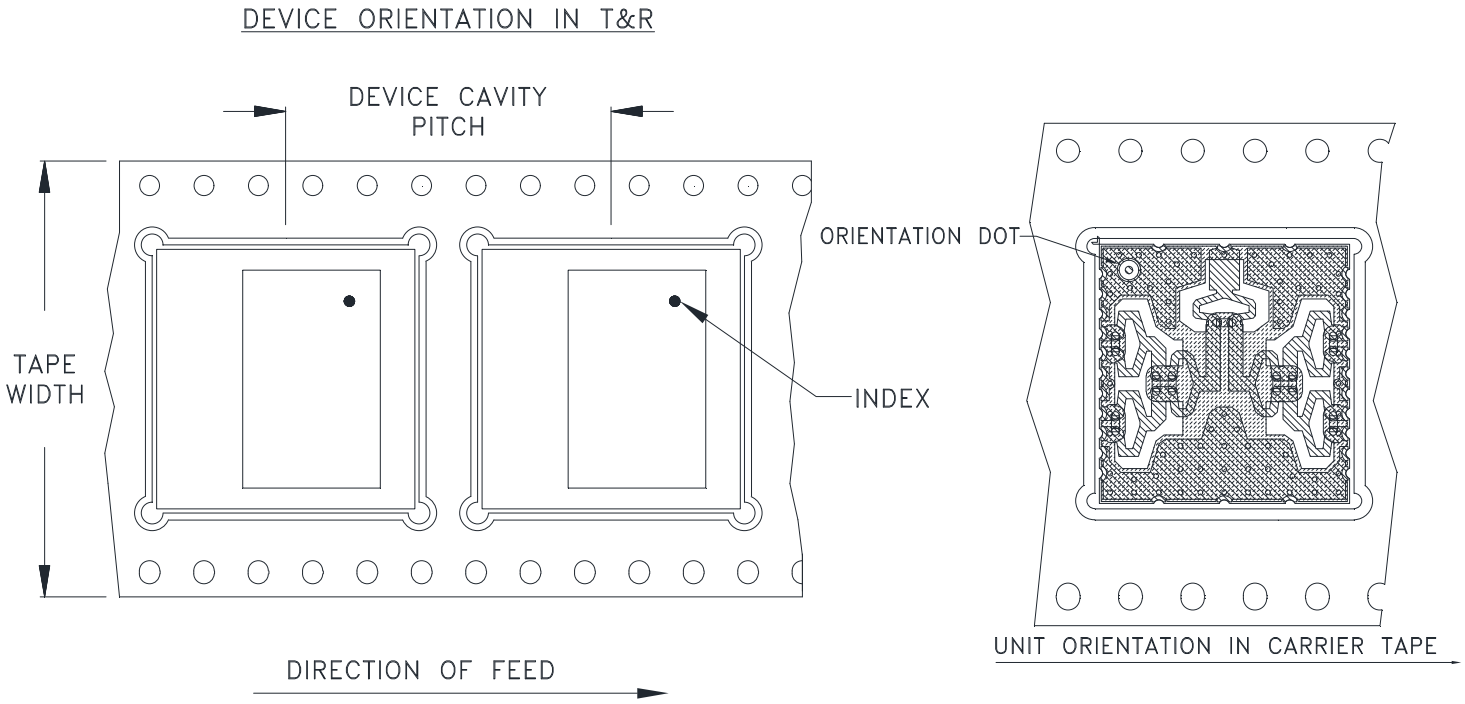
Tape & Reel Packaging TR-F111



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.

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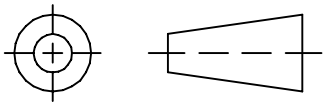
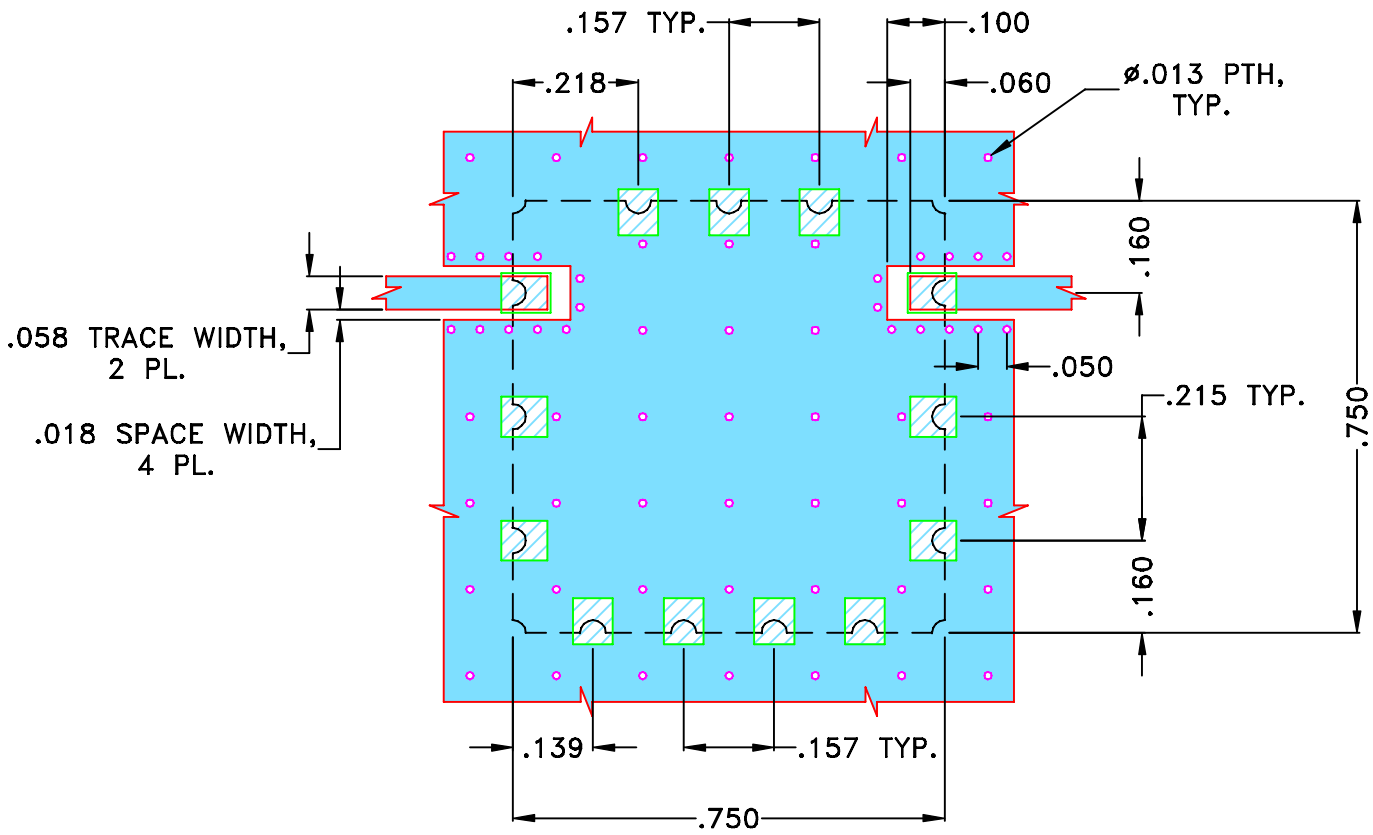
THIRD ANGLE PROJECTION



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 ±			

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

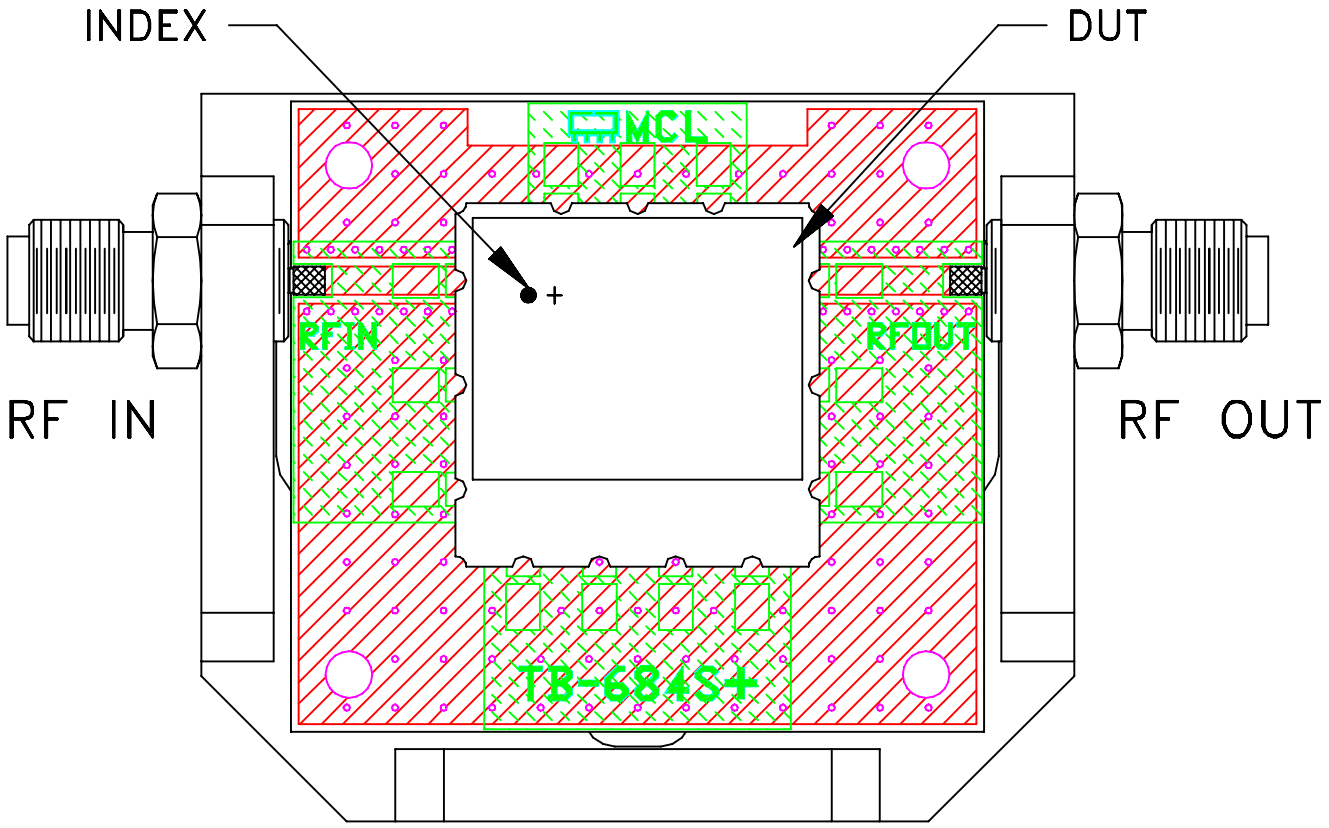
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

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

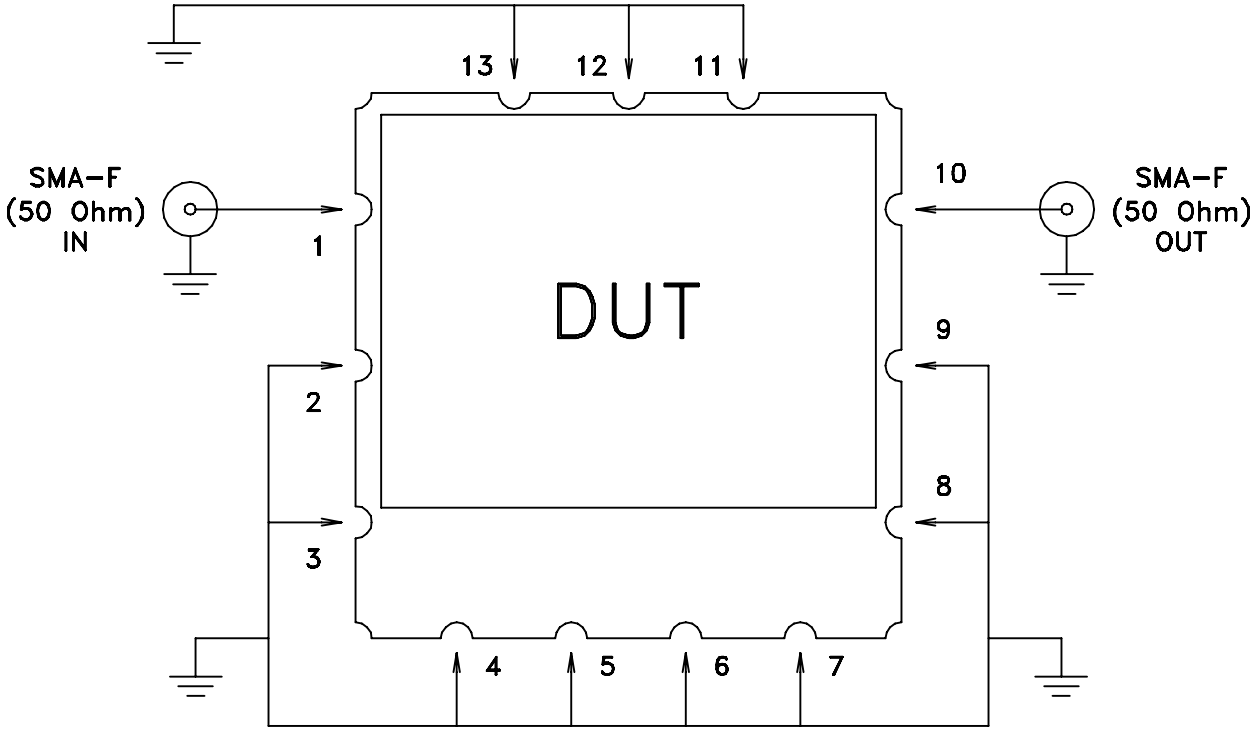
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-373	OR

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.

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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

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