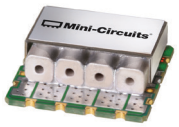
*Surface Mount*

# 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

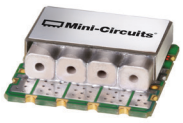
| Feature | Advantages |
|---|---|
| High Selectivity | The CBP-1950C+ filter incorporates High-Q ceramic resonators that enables sharp rejection near passband. |
| Low Passband VSWR | This filter maintains typical VSWR over passband frequency range making this filter easier to integrate into receiver 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. |

*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

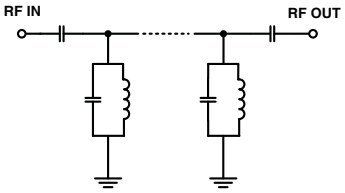
## Electrical Specifications at 25°C

| 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 |

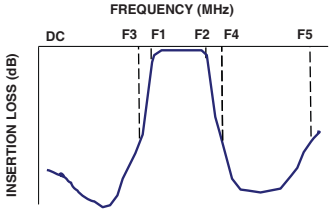
| Maximum Ratings | |
|---|---|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| RF Power Input | 10W |

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

## Functional Schematic



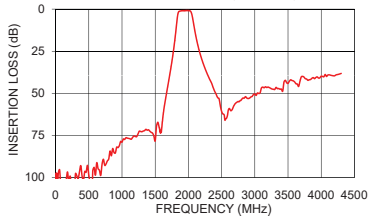

## Typical Frequency Response



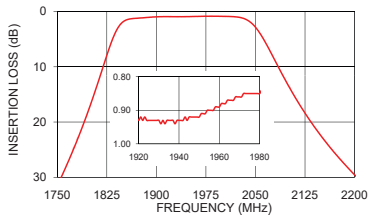

## Typical Performance Data at 25°C

| 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 |

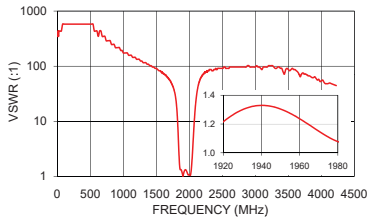
CBP-1950C+
INSERTION LOSS (Full band)



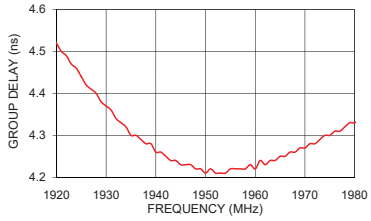

CBP-1950C+
INSERTION LOSS (Pass band)




CBP-1950C+
VSWR




CBP-1950C+
GROUP DELAY



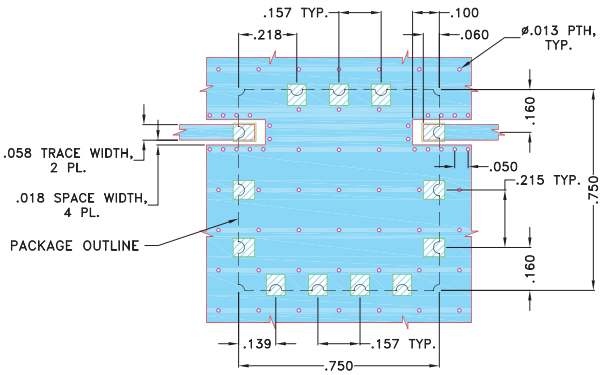

***+RoHS Compliant***
*The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications*

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)***



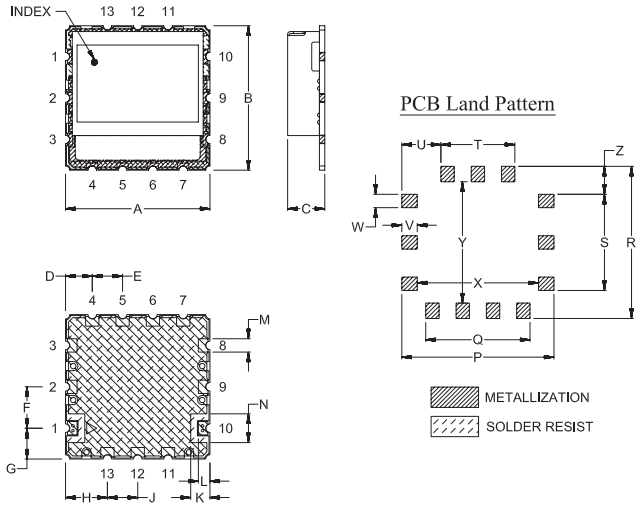

NOTES:

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-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 |

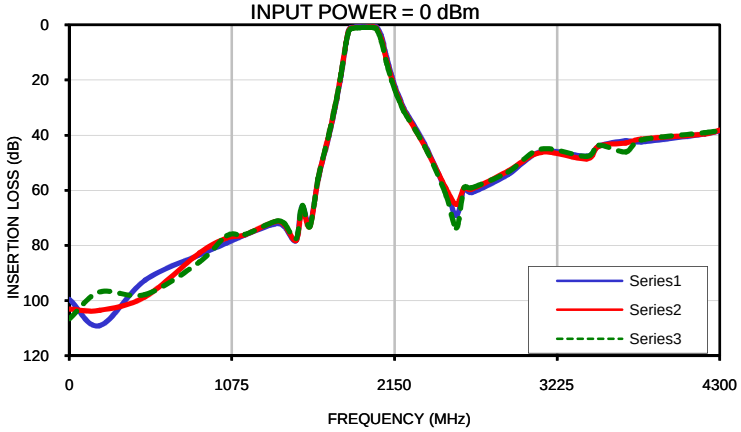
*Typical Performance Data*

| 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 |

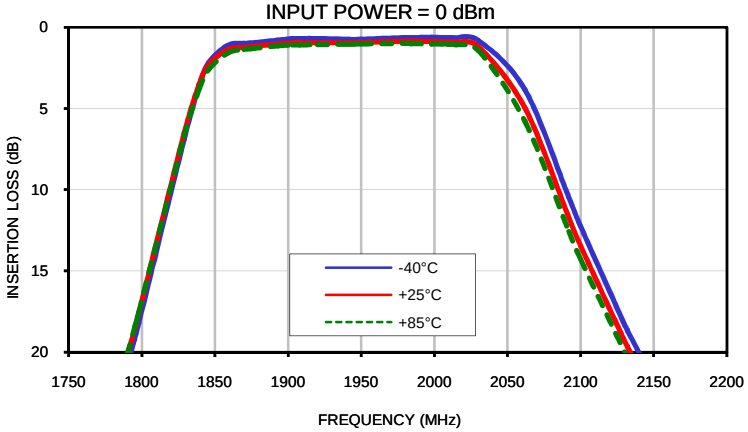
# Band Pass Filter CBP-1950C+

*Typical Performance Curves*

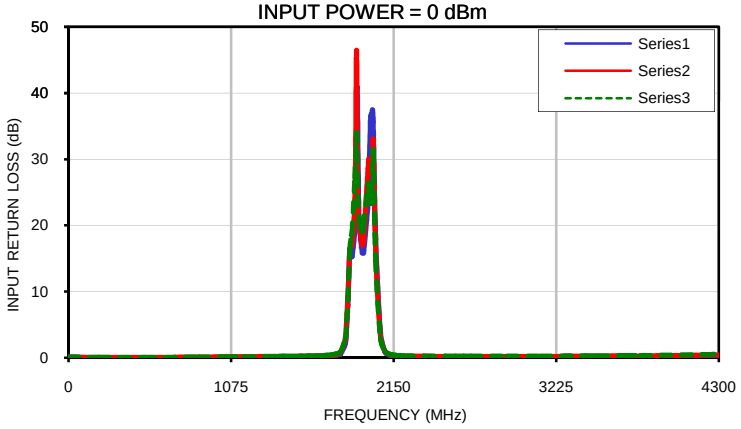
**INSERTION LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



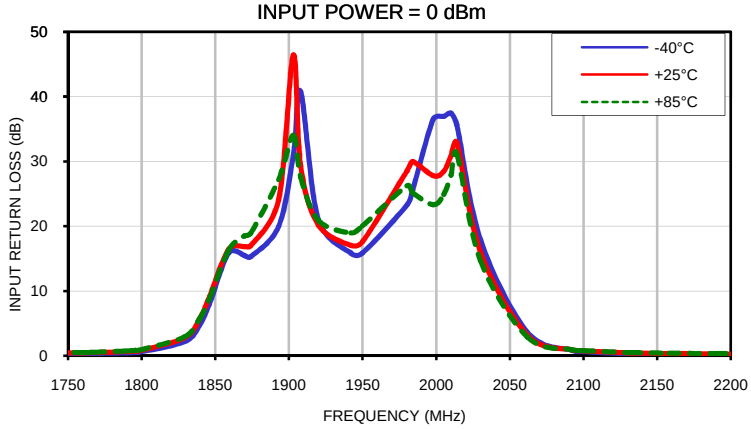

**INSERTION LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



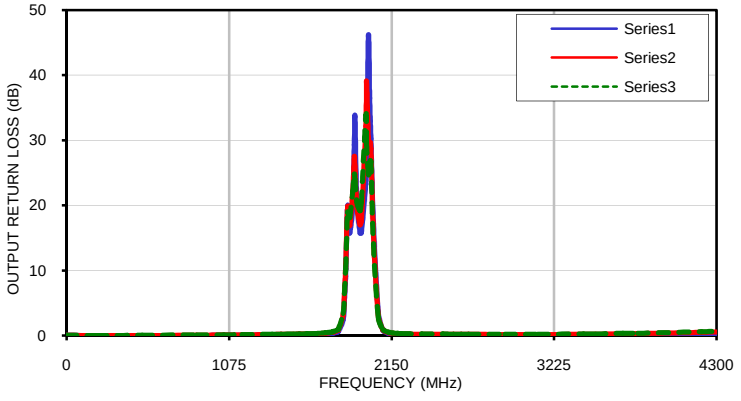

**INPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



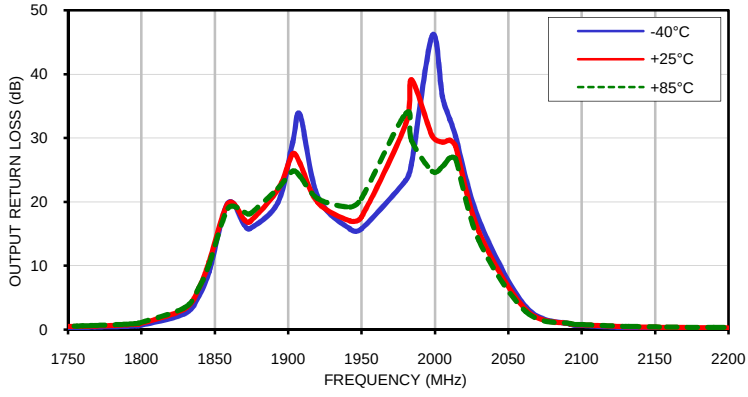

**INPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



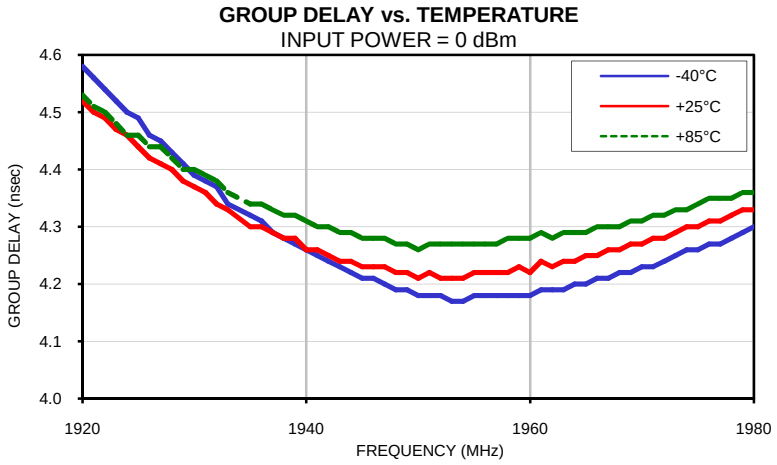

**OUTPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm




**OUTPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



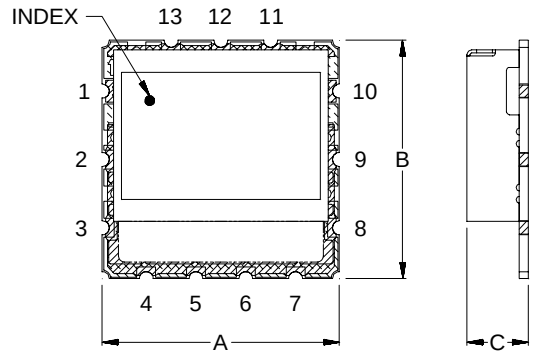
*Typical Performance Curves*

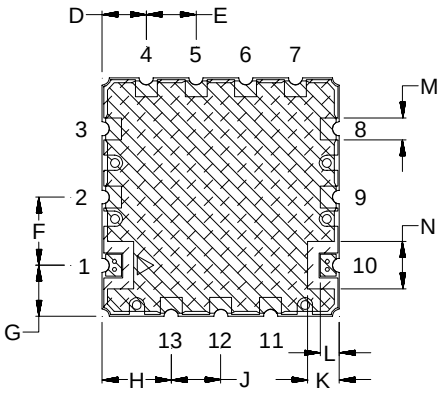


# Case Style MP

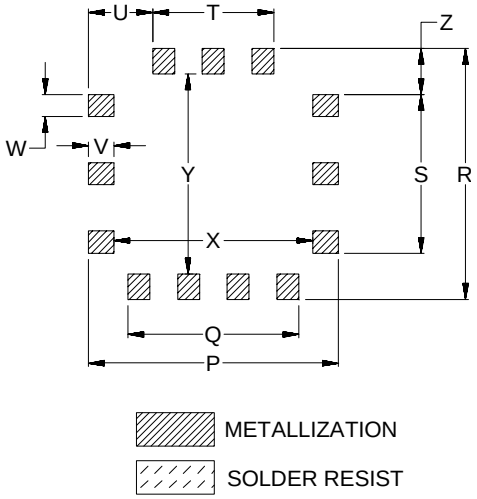
## Outline Dimensions

**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) |

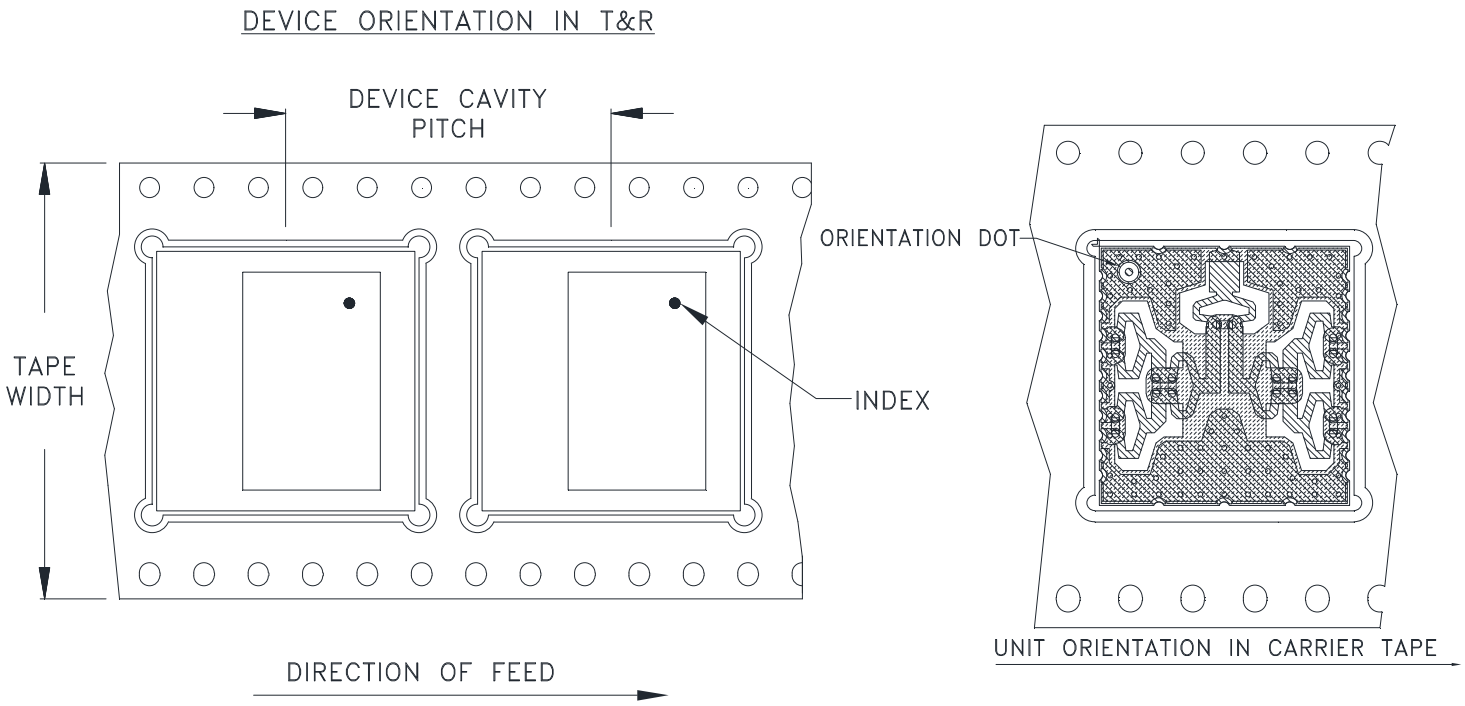
| CASE# | P | Q | R | S | T | U | V | W | X | Y | Z | WT.GRAMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MP1766 | .790 (20.07) | .541 (13.74) | .790 (20.07) | .499 (12.67) | .384 (9.75) | .203 (5.16) | .080 (2.03) | .069 (1.75) | .630 (16.00) | .630 (16.00) | .145 (3.68) | 4.6 |

**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.

# 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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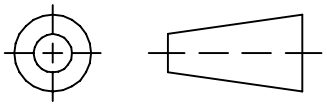
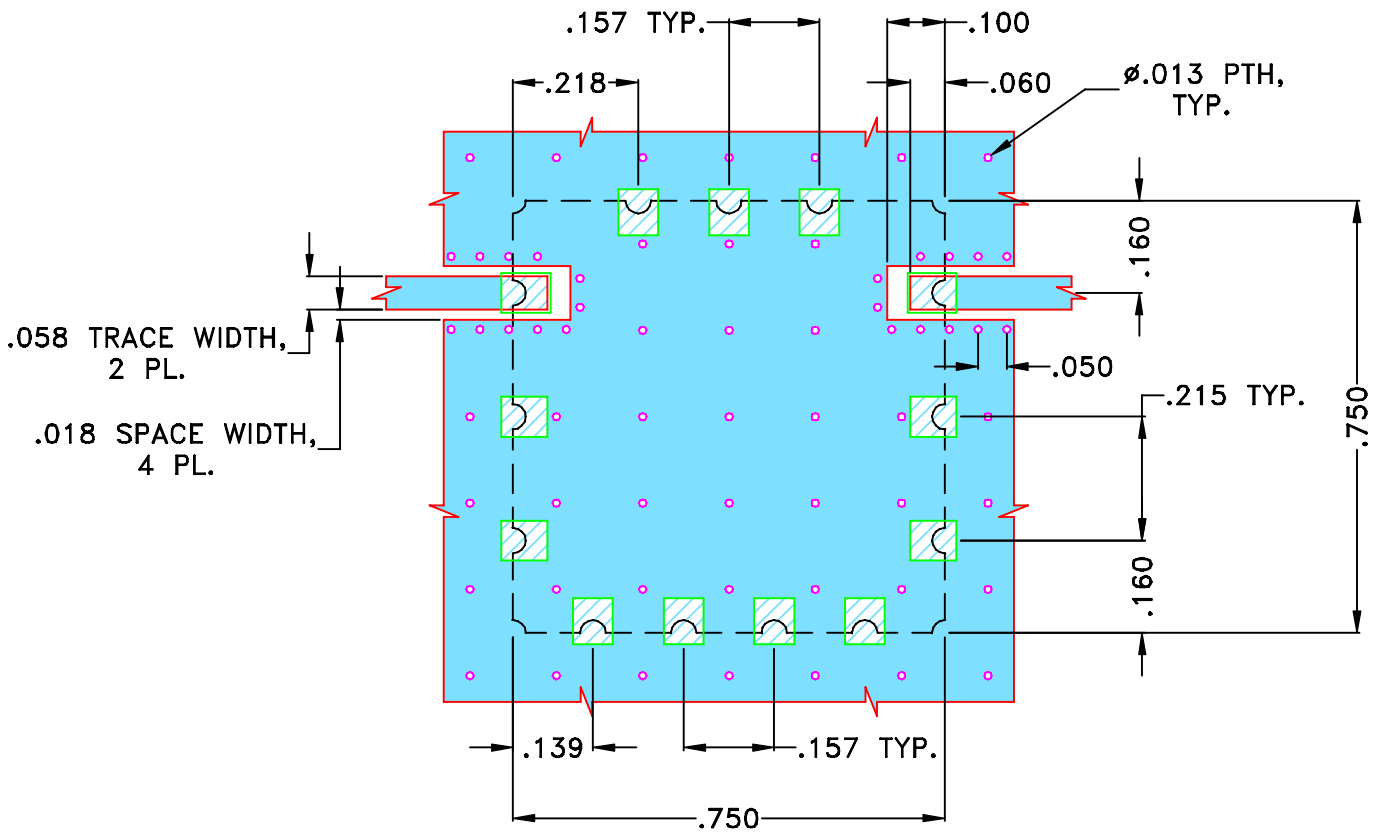
THIRD ANGLE PROJECTION



| 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 ± | | | |



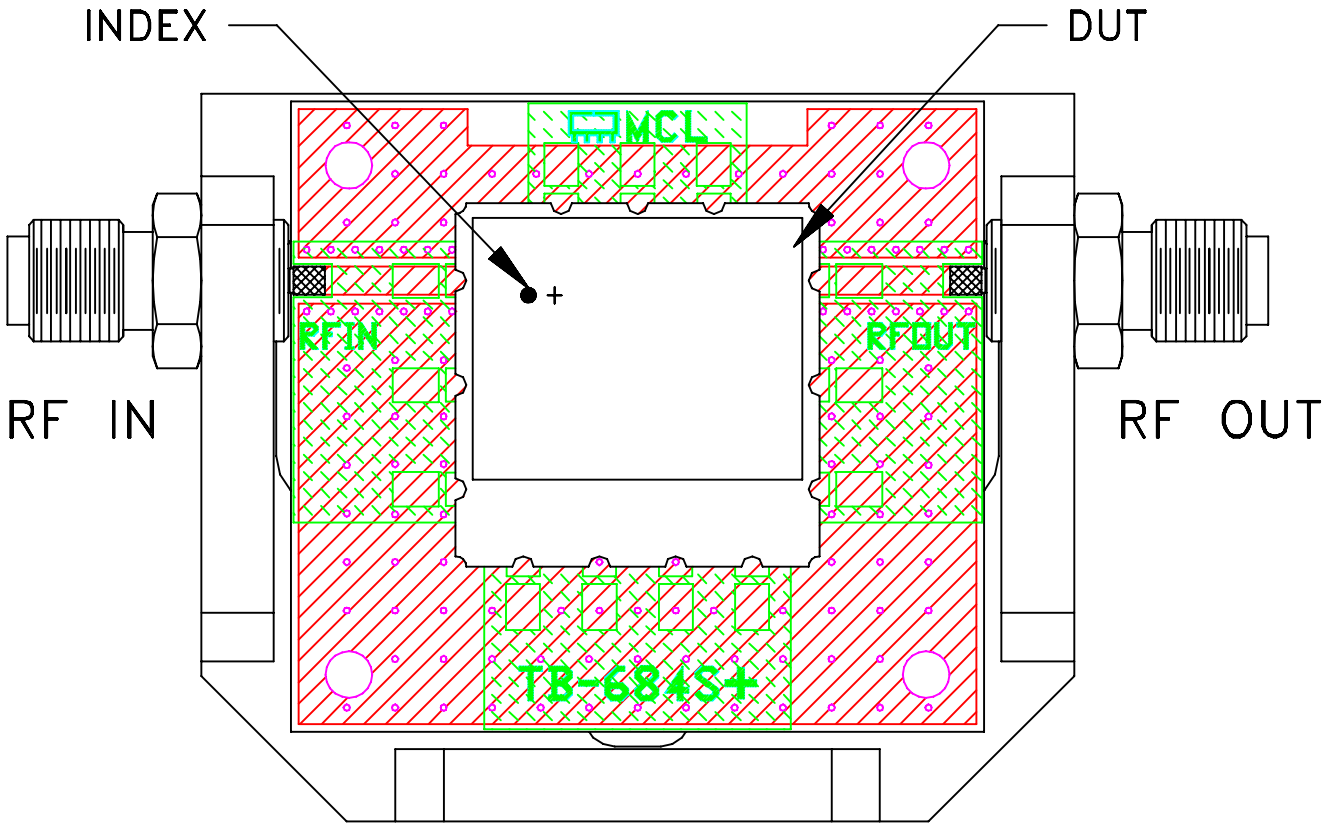
ASHEETA1.DWG REV:A DATE:01/12/95

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

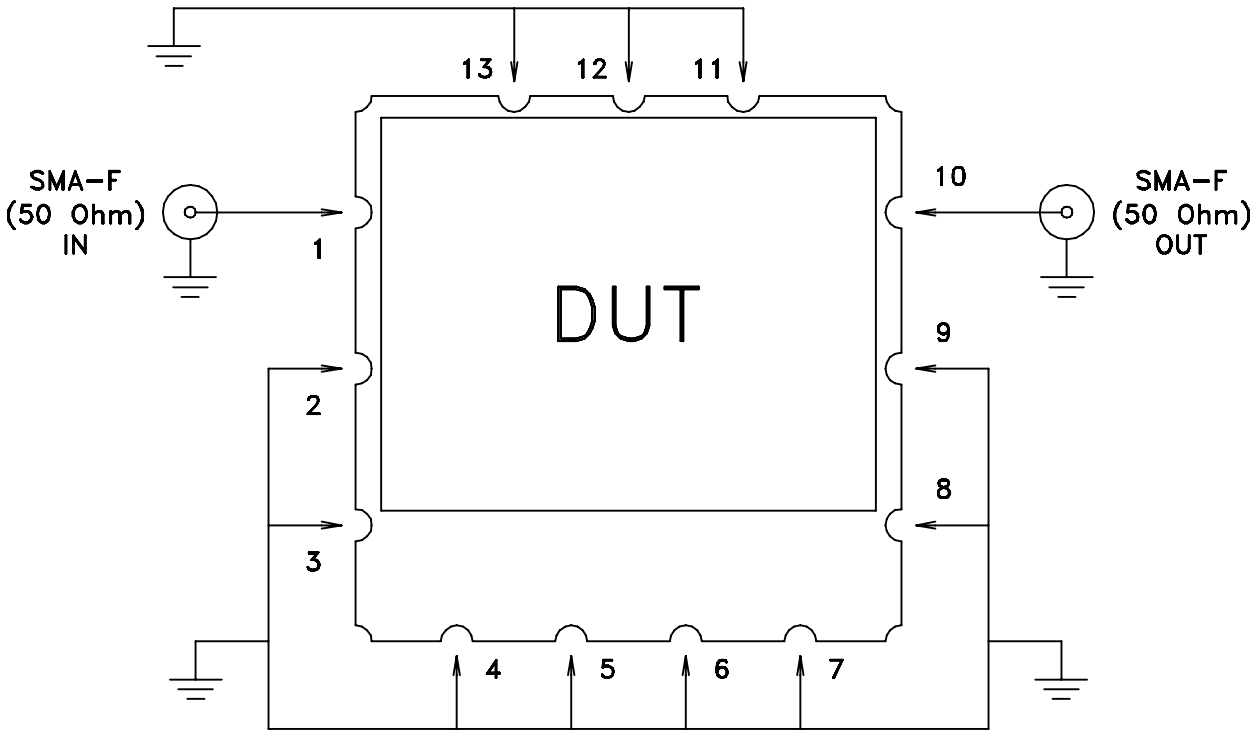
# PL, 13FL01, MP1766, BPF, TB-684+, 50 Ohm

| SIZE | CODE IDENT | DRAWING NO: | REV: |
|---|---|---|---|
| A | 15542 | 98-PL-373 | OR |
| FILE: 98PL373 | SCALE: 4:1 | SHEET: 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<br>Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C<br>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<br>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 |