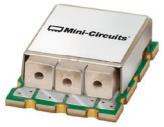
Surface Mount

Bandpass Filter

CBP-1645J+

50Ω 1622 to 1668 MHz



Generic photo used for illustration purposes only
CASE STYLE: MQ1770

The Big Deal

- Good Insertion Loss
- Low VSWR
- Miniature shielded package

Product Overview

CBP-1645J+ is a ceramic coaxial resonator based bandpass filter in a shielded package fabricated using SMT technology. This filter has narrow passband and offers low insertion loss , low VSWR and high power handling for use in satellite communication.

Key Features

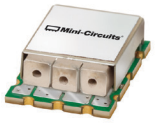
Feature	Advantages
High Q	The CBP-1645J+ filter incorporates High-Q ceramic resonators that enables low insertion loss.
Low VSWR	This filter maintains typical VSWR over passband frequency range making this filter easier to integrate between other components.
Rugged construction	The CBP-1645J+ has been qualified over wide range of thermal, mechanical and environmental conditions including withstanding the stress of extensive solder reflow cycles.

Surface Mount

Bandpass Filter

50Ω 1622 to 1668 MHz

CBP-1645J+



Generic photo used for illustration purposes only

CASE STYLE: MQ1770

Features

- Good Insertion loss
- Low VSWR
- Miniature shielded package

Applications

- Satellite communication
- Radio astronomy

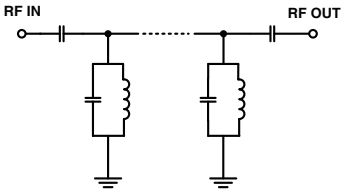
Electrical Specifications at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	—	—	1645	—	MHz
	Insertion Loss	F1-F2	1622-1668	—	1.3	2.0	dB
	VSWR	F1-F2	1622-1668	—	1.5	2.32	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC-1520	20	27.7	—	dB
	VSWR	DC-F3	DC-1520	—	20	—	:1
Stop Band, Upper	Insertion Loss	F4-F5	1820-4000	20	27.1	—	dB
	VSWR	F4-F5	1820-4000	—	20	—	:1

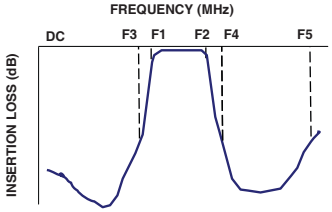
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	8 W

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

Functional Schematic



Typical Frequency Response

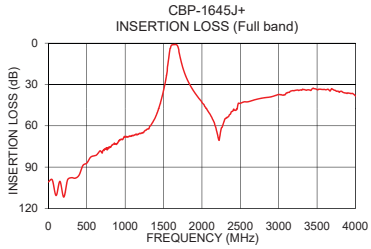


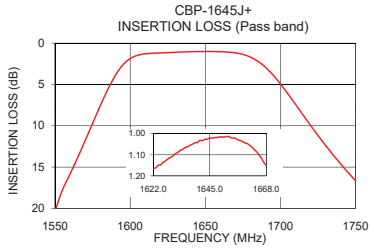
+RoHS Compliant

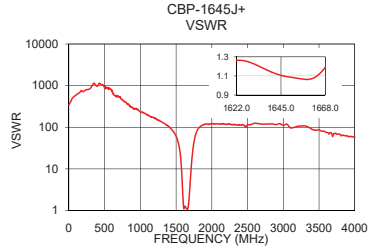
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

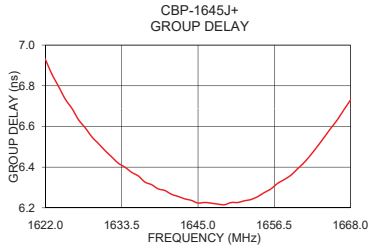
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	100.66	350.26	1622	6.93
100	110.58	593.87	1624	6.80
400	95.75	968.56	1626	6.69
800	75.52	395.09	1628	6.59
1000	67.99	232.74	1630	6.52
1515	30.50	52.78	1632	6.45
1520	29.15	49.53	1636	6.36
1548	20.30	30.47	1638	6.31
1548	20.30	30.47	1640	6.29
1590	3.64	3.32	1642	6.26
1622	1.17	1.26	1644	6.24
1645	1.02	1.11	1646	6.23
1668	1.15	1.19	1650	6.23
1692	3.45	3.45	1654	6.26
1765	20.25	58.70	1658	6.34
1820	27.76	97.31	1660	6.39
1850	30.93	107.47	1662	6.46
2200	65.71	118.55	1664	6.55
3000	37.22	111.45	1666	6.63
4000	38.32	58.17	1668	6.73









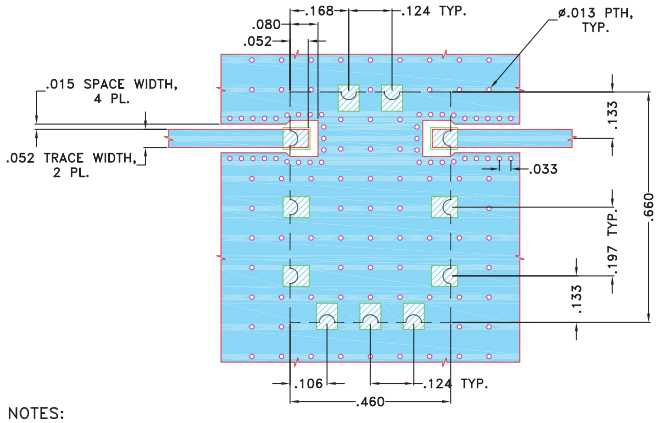
Notes

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	9
GROUND	2,3,4,5,6,7,8,10,11

Demo Board MCL P/N: TB-692+
Suggested PCB Layout (PL-375)



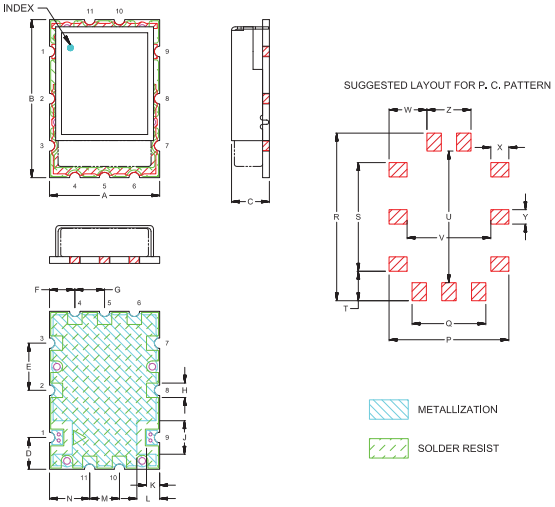
NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .030"±.002". 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
.460	**.660**	**.175**	**.133**	**.197**	**.106**	**.124**	**.060**	**.140**	**.055**	**.095**	**.124**	**.168**
11.68	16.76	4.45	3.38	5.00	2.69	3.15	1.52	3.56	1.40	2.41	3.15	4.27

P	Q	R	S	T	U	V	W	X	Y	Z	WT.GRAMS
.500	**.308**	**.700**	**.454**	**.123**	**.550**	**.350**	**.158**	**.075**	**.060**	**.184**	1.8
12.70	7.82	17.78	11.53	3.12	13.97	8.89	4.01	1.91	1.52	4.67	

Note: Please refer to case style drawing for details.

Band Pass Filter CBP-1645J+

Typical Performance Data

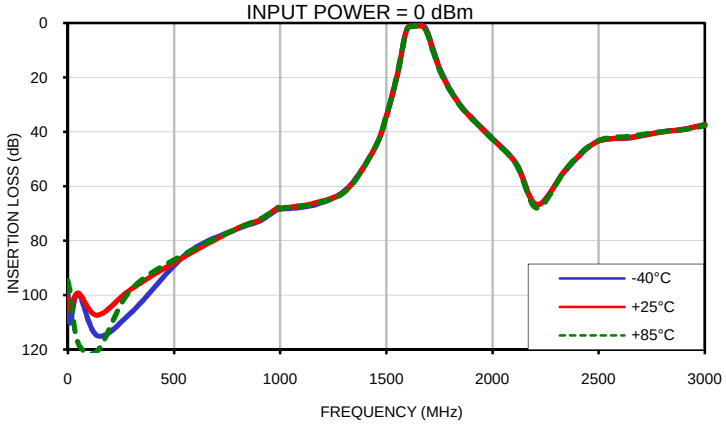
FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	99.08	100.66	94.67	0.05	0.05	0.05	0.05	0.05	0.05
11	110.20	105.27	98.48	0.05	0.05	0.05	0.05	0.05	0.05
50	99.30	99.21	117.73	0.03	0.03	0.04	0.04	0.04	0.04
140	114.85	107.30	120.37	0.02	0.03	0.03	0.02	0.03	0.03
300	106.28	97.66	97.72	0.00	0.02	0.02	0.01	0.02	0.03
565	84.46	85.11	84.29	0.01	0.02	0.03	0.01	0.02	0.03
805	75.45	75.18	75.24	0.00	0.04	0.06	0.00	0.04	0.06
905	72.68	72.31	72.04	0.01	0.06	0.08	0.01	0.06	0.07
990	68.30	67.71	68.05	0.02	0.07	0.10	0.02	0.07	0.08
1000	68.37	67.99	68.05	0.03	0.07	0.10	0.02	0.06	0.08
1165	66.75	66.06	66.33	0.05	0.10	0.13	0.04	0.08	0.11
1315	60.78	61.11	61.33	0.09	0.14	0.17	0.07	0.11	0.14
1445	46.18	46.01	45.87	0.15	0.20	0.25	0.13	0.18	0.21
1500	34.56	34.31	34.08	0.22	0.28	0.34	0.21	0.27	0.31
1550	19.91	19.54	19.21	0.46	0.59	0.71	0.49	0.60	0.68
1565	14.28	13.88	13.52	0.77	0.97	1.15	0.83	1.00	1.14
1580	7.96	7.62	7.37	1.91	2.35	2.71	2.02	2.43	2.73
1585	5.89	5.64	5.47	2.87	3.50	3.97	3.03	3.61	4.03
1590	4.05	3.93	3.87	4.52	5.39	5.99	4.74	5.56	6.10
1598	2.04	2.14	2.22	9.62	11.03	11.75	10.08	11.44	12.09
1599	1.88	2.00	2.09	10.57	12.07	12.78	11.10	12.55	13.19
1604	1.34	1.53	1.66	16.98	18.98	19.49	18.35	20.49	20.83
1605	1.27	1.47	1.60	18.72	20.83	21.25	20.55	22.97	23.13
1606	1.22	1.43	1.56	20.65	22.82	23.17	23.32	26.15	26.03
1608	1.14	1.35	1.48	24.75	26.26	26.91	32.29	35.46	35.80
1609	1.11	1.32	1.45	26.19	26.75	28.00	38.41	34.69	43.01
1611	1.07	1.28	1.41	25.43	25.00	27.22	28.55	27.29	31.16
1616	1.01	1.22	1.33	19.97	20.41	22.72	20.18	20.77	23.24
1617	1.01	1.21	1.32	19.35	19.92	22.23	19.50	20.23	22.67
1622	0.98	1.17	1.27	17.66	18.71	21.15	17.78	19.00	21.56
1623	0.98	1.17	1.27	17.53	18.66	21.14	17.67	18.98	21.60
1632	0.91	1.09	1.19	18.35	20.18	23.19	18.81	21.10	25.07
1633	0.91	1.09	1.19	18.62	20.54	23.60	19.14	21.58	25.84
1637	0.88	1.06	1.17	19.92	22.16	25.18	20.76	24.01	30.16
1644	0.83	1.03	1.14	22.95	25.47	26.93	24.69	30.60	45.12
1645	0.83	1.03	1.14	23.44	25.92	27.01	25.29	31.64	41.48
1649	0.82	1.02	1.14	25.17	27.40	27.39	27.18	33.64	33.60
1650	0.82	1.02	1.14	25.44	27.57	27.41	27.37	33.21	32.55
1658	0.82	1.03	1.16	26.92	30.23	32.31	25.60	27.75	27.81
1666	0.88	1.10	1.24	21.89	23.52	24.44	20.41	21.07	20.94
1669	0.92	1.15	1.31	19.22	20.05	20.20	18.14	18.43	18.10
1675	1.10	1.37	1.56	14.30	14.40	14.08	13.76	13.65	13.18
1676	1.15	1.42	1.62	13.56	13.61	13.27	13.09	12.95	12.47
1682	1.54	1.87	2.13	9.71	9.60	9.24	9.47	9.26	8.83
1684	1.73	2.08	2.36	8.63	8.51	8.18	8.44	8.23	7.84
1686	1.95	2.33	2.63	7.65	7.52	7.22	7.50	7.30	6.95
1698	3.98	4.49	4.90	3.58	3.56	3.44	3.53	3.48	3.34
1699	4.19	4.71	5.13	3.36	3.35	3.24	3.31	3.27	3.14
1720	9.39	9.94	10.37	0.99	1.08	1.10	0.97	1.05	1.07
1765	18.99	19.40	19.69	0.22	0.30	0.34	0.19	0.28	0.32
1850	30.19	30.43	30.57	0.11	0.16	0.20	0.07	0.14	0.17
1980	40.87	41.06	41.15	0.10	0.15	0.18	0.07	0.12	0.15
2110	51.37	51.54	51.67	0.11	0.15	0.18	0.08	0.12	0.15
2210	66.67	66.74	67.95	0.11	0.15	0.18	0.08	0.12	0.15
2350	53.64	53.34	53.14	0.11	0.15	0.19	0.08	0.13	0.16
2490	43.71	43.69	43.41	0.11	0.16	0.20	0.10	0.15	0.18
2650	42.15	41.98	41.50	0.08	0.14	0.19	0.08	0.14	0.17
2800	39.91	39.97	39.89	0.07	0.15	0.21	0.08	0.16	0.19
2900	39.03	39.04	39.16	0.07	0.15	0.22	0.08	0.15	0.20
3000	37.28	37.27	37.74	0.06	0.16	0.24	0.08	0.16	0.22

Typical Performance Data

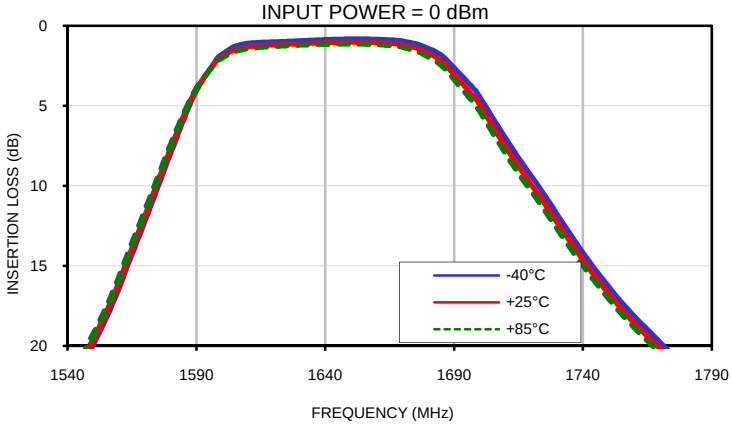
FREQ.	GROUP DELAY		
(MHz)	(nsec)		
	@-40°C	@+25°C	@+85°C
1616	7.66	7.49	7.41
1617	7.52	7.37	7.31
1618	7.40	7.27	7.21
1619	7.30	7.18	7.13
1620	7.19	7.09	7.04
1621	7.10	7.00	6.96
1622	7.01	6.93	6.90
1623	6.93	6.86	6.83
1624	6.86	6.80	6.77
1625	6.79	6.73	6.71
1626	6.74	6.69	6.67
1627	6.68	6.63	6.62
1628	6.64	6.59	6.58
1629	6.58	6.55	6.54
1630	6.55	6.52	6.50
1631	6.51	6.48	6.47
1632	6.48	6.45	6.44
1633	6.45	6.42	6.41
1634	6.42	6.40	6.39
1635	6.40	6.37	6.36
1636	6.38	6.36	6.34
1637	6.35	6.33	6.31
1638	6.34	6.31	6.30
1639	6.32	6.29	6.28
1640	6.31	6.29	6.27
1641	6.29	6.27	6.25
1642	6.28	6.26	6.24
1643	6.27	6.24	6.23
1644	6.26	6.24	6.22
1645	6.25	6.22	6.21
1646	6.25	6.23	6.21
1647	6.25	6.22	6.21
1648	6.24	6.22	6.21
1649	6.24	6.22	6.21
1650	6.24	6.23	6.22
1651	6.24	6.23	6.22
1652	6.25	6.23	6.23
1653	6.25	6.24	6.24
1654	6.26	6.26	6.26
1655	6.28	6.27	6.28
1656	6.29	6.29	6.31
1657	6.31	6.32	6.34
1658	6.33	6.34	6.36
1659	6.35	6.36	6.39
1660	6.38	6.39	6.42
1661	6.41	6.42	6.46
1662	6.44	6.46	6.49
1663	6.47	6.50	6.54
1664	6.52	6.55	6.59
1665	6.56	6.59	6.64
1666	6.59	6.63	6.68
1667	6.64	6.68	6.74
1668	6.69	6.73	6.79
1669	6.74	6.78	6.84
1670	6.78	6.83	6.89
1671	6.84	6.89	6.95
1672	6.89	6.94	7.00
1673	6.94	6.99	7.05
1674	6.99	7.05	7.09
1675	7.04	7.10	7.14

Typical Performance Curves

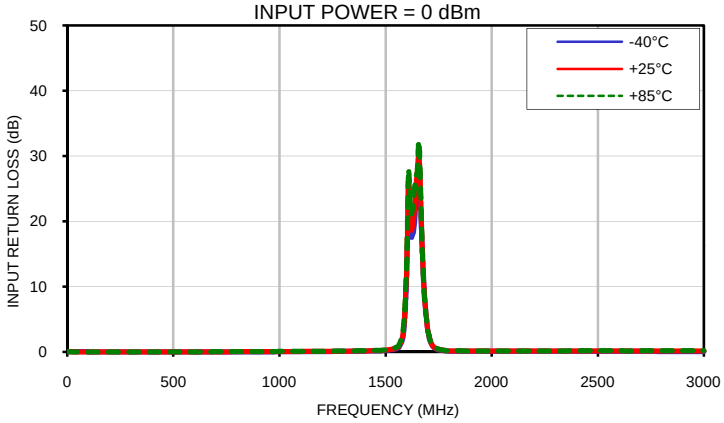
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



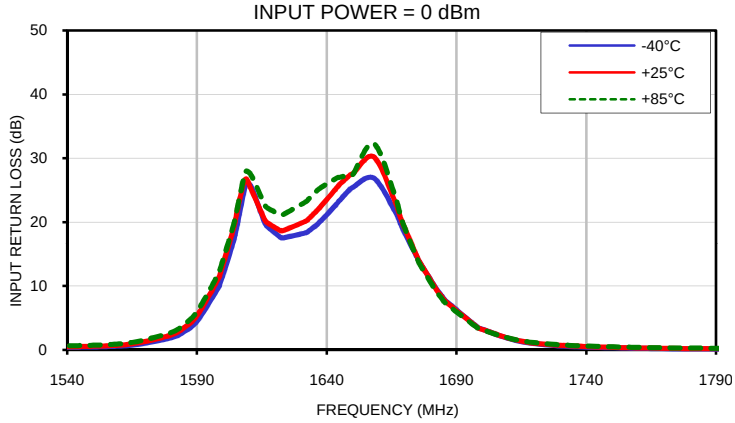
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



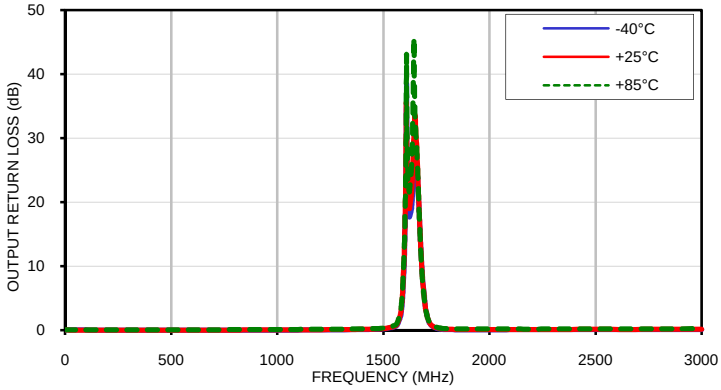
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



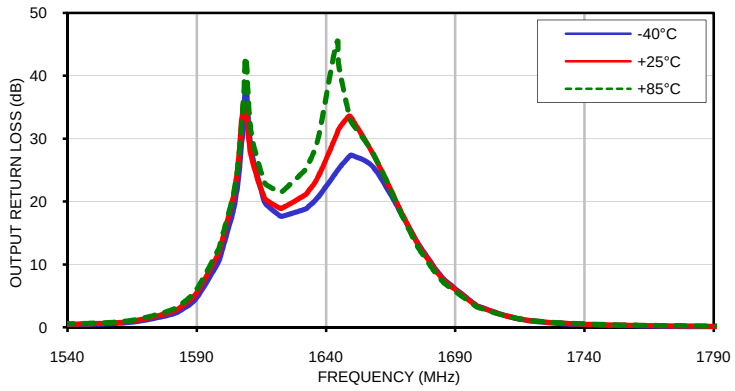
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



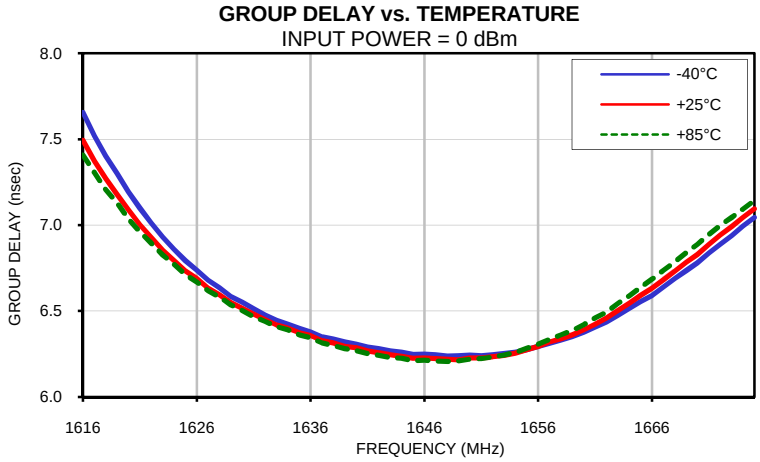
OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



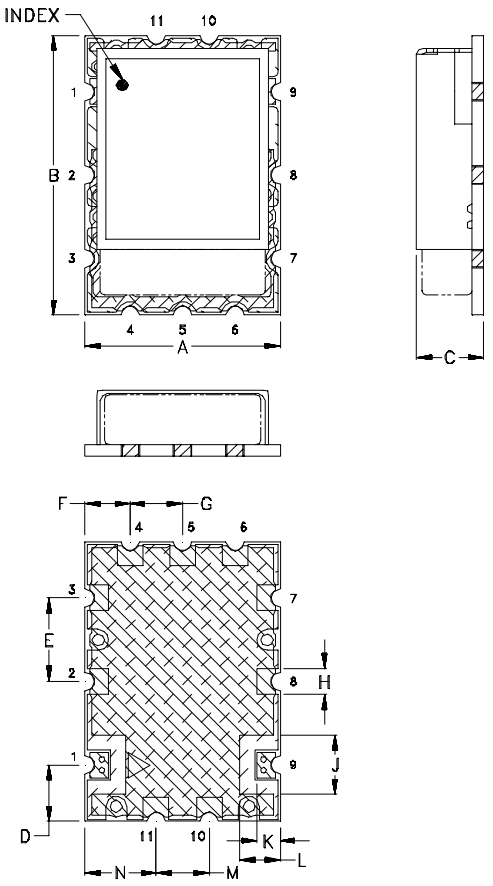
Typical Performance Curves



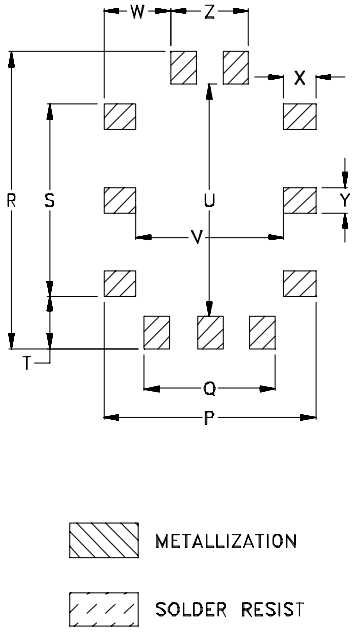
Case Style MQ

MQ1770

Outline Dimensions



PCB Land Pattern



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
MQ1770	.460 (11.68)	.660 (16.76)	.175 (4.45)	.133 (3.38)	.197 (5.00)	.106 (2.69)	.124 (3.15)	.060 (1.52)	.140 (3.56)	.055 (1.40)	.095 (2.41)	.124 (3.15)	.168 (4.27)

CASE#	P	Q	R	S	T	U	V	W	X	Y	Z	WT,GRAMS
MQ1770	.500 (12.70)	.308 (7.82)	.700 (17.78)	.454 (11.53)	.123 (3.12)	.550 (13.97)	.350 (8.89)	.158 (4.01)	.075 (1.91)	.060 (1.52)	.184 (4.67)	1.8

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.

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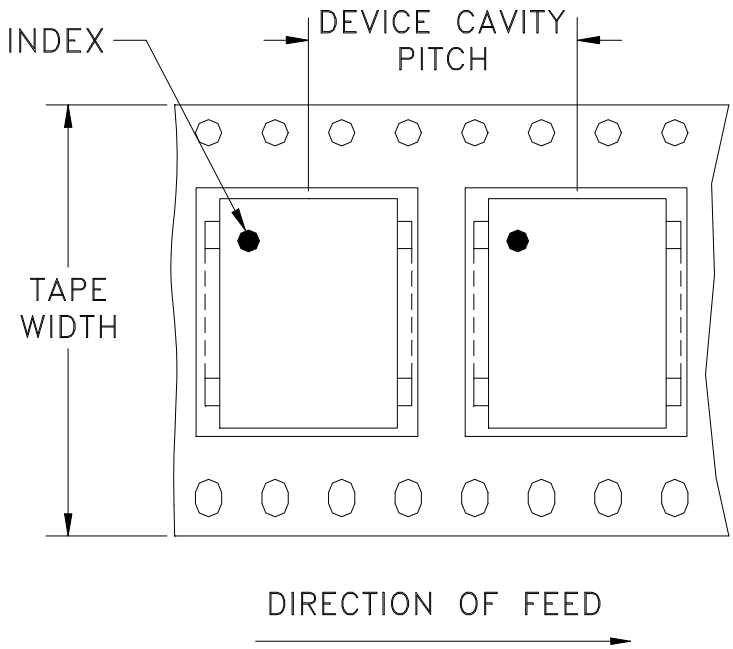
Tape & Reel Packaging TR-F5

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	16	13	500

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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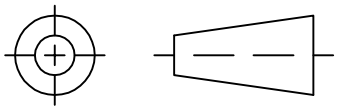
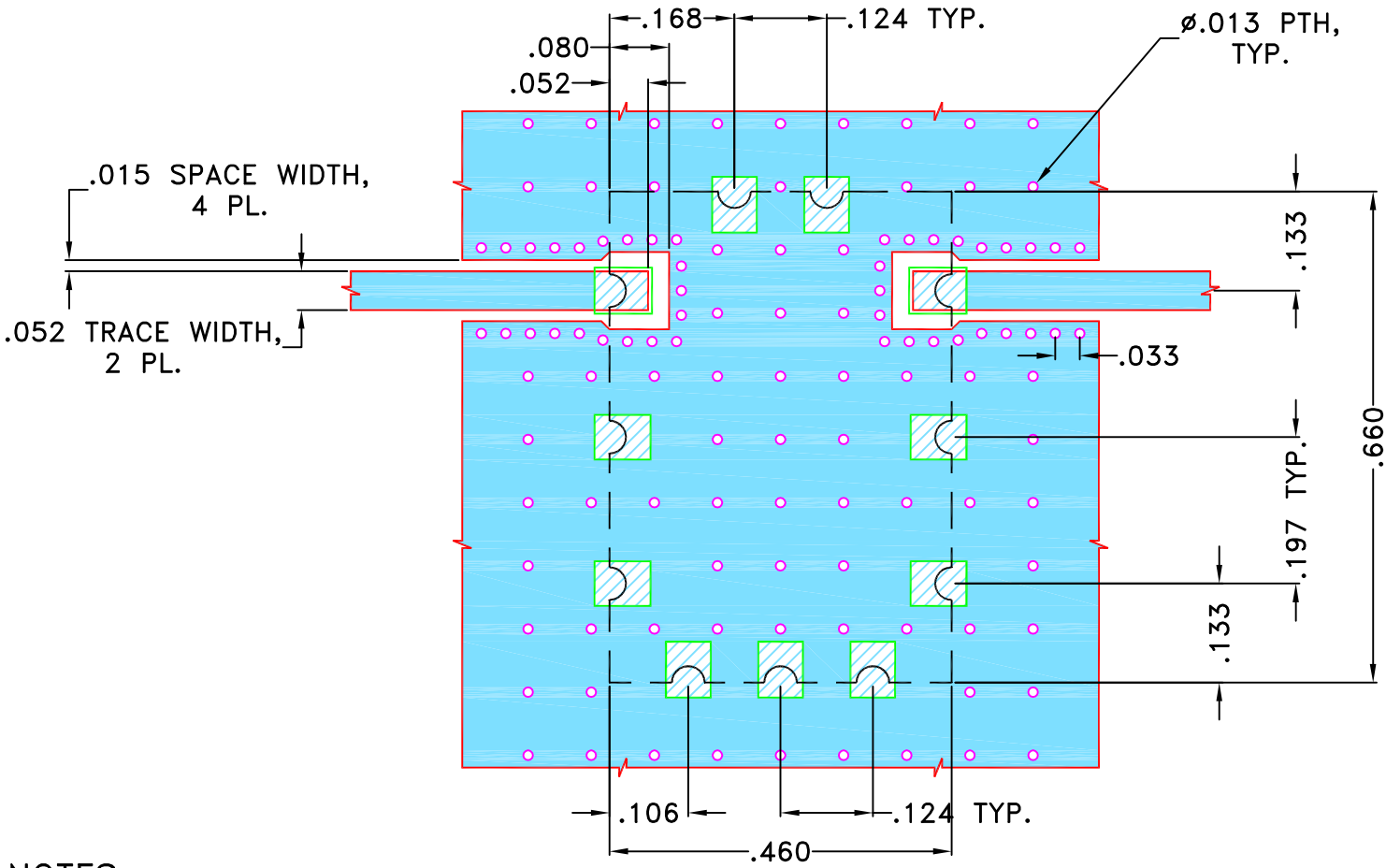
THIRD ANGLE PROJECTION



REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M137891	NEW RELEASE	JUL 12	DDR	KG

SUGGESTED MOUNTING CONFIGURATION FOR MQ1770 CASE STYLE "11FL01" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .030"±.002". 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	06 JUL 12
TOLERANCES ON:	CHECKED	MD	06 JUL 12
2 PL DECIMALS ±	APPROVED	KR	06 JUL 12
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

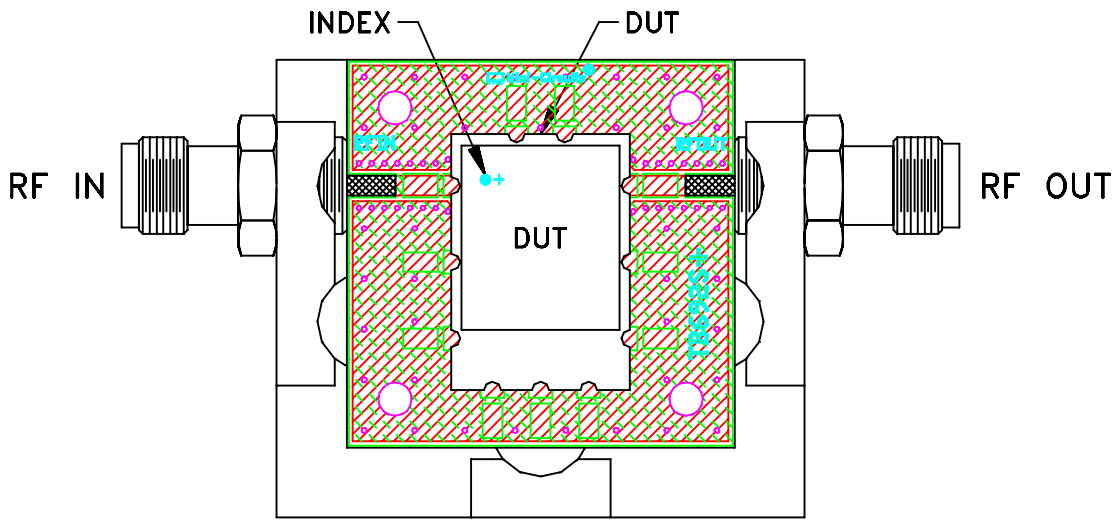
ASHEETA1.DWG REV:A DATE:01/12/95

Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

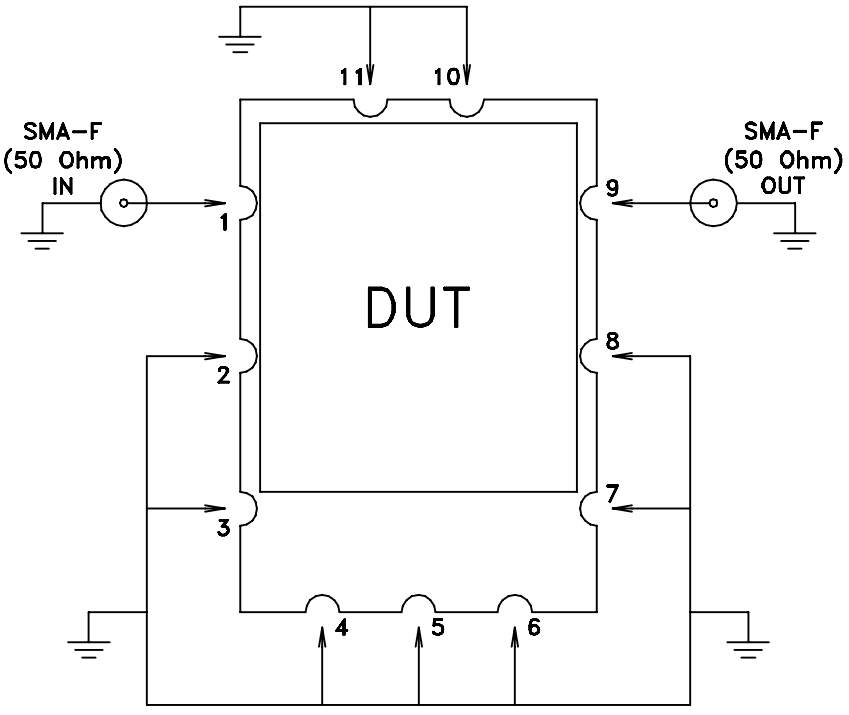
PL,11FL01, MQ1770, BPF, TB-692+, 50 Ohm

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-375	OR
FILE: 98PL375		SCALE: 4:1	SHEET: 1 OF 1

Evaluation Board and Circuit



TB-692+



Schematic Diagram

Notes:
1. 50 Ohm SMA Female connectors.
2. PCB Material: ROGERS (RO4350B) OR Equivalent
   Dielectric Constant=3.48±.05, Thickness=.030 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