Ceramic

Bandpass Filter

BFCW-252+

50Ω 2400 to 2500 MHz

The Big Deal

- Very good rejection, 30 dB typical
- Rugged, ceramic construction
- Tiny size, 0.063" x 0.032" x 0.024" (0603)

CASE STYLE: JC0603C-1

Product Overview

Mini-Circuits' BFCW-252+ is a LTCC band pass filter with a passband from 2400 to 2500 MHz, supporting a variety of applications. This model provides 3.0 dB typical passband insertion loss and provides a very good stopband rejection due to strategically constructed layout with minimal interaction between components. It provides a wide operating temperature range from -55 to +125°C. Housed in a tiny 0603 ceramic form factor with wrap-around terminations, the filter is ideal for dense PCB layouts and with minimal performance variation due to parasitics.

Key Features

Feature	Advantages
Ultra-wide stopband	The LTCC band pass filter provides a very good stopband rejection suitable for high end applications.
LTCC Construction	Provides repeatable performance in a rugged, ceramic package well suited for tough environments such as high humidity and temperature extremes.
Tiny size (0.063 x 0.032 x 0.024")	Saves space in dense circuit board layouts and minimizes the effects of parasitics.
Wrap-around terminations	Provides excellent solderability and easy visual inspection

Ceramic

Bandpass Filter

50Ω 2400 to 2500 MHz

BFCW-252+

Generic photo used for illustration purposes only

CASE STYLE: JC0603C-1

+RoHS Compliant

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

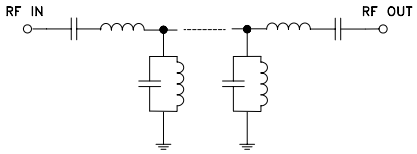
Features

- High Rejection
- Miniature size 0603
- Low cost
- Aqueous washable

Applications

- ISM Band
- WLAN
- Bluetooth
- Zigbee

Functional Schematic



Electrical Specifications[1,2] at 25°C

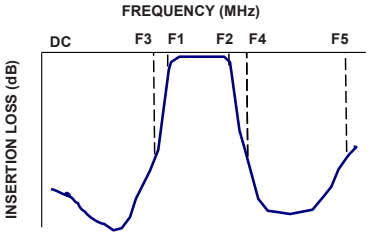
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	—	—	2450	—	dB
	Insertion Loss	F1-F2	2400 - 2500	—	3.0	4.0	dB
	Return Loss	F1-F2	2400 - 2500	—	11	—	dB
Stop Band, Lower	Insertion Loss	DC-F3	10 - 1860	20	25	—	dB
Stop Band, Upper	Insertion Loss	F4-F5	3200 - 8000	20	30	—	dB

1. Tested on Evaluation Board TB-BFCW-252+
2. This filter is not intended for use as a DC Blocking circuit element. In Application where DC Voltage is present at either input or output ports, blocking capacitors are required at the corresponding RF ports.

Maximum Ratings	
Operating Temperature	-55°C to 125°C
Storage Temperature[3]	-55°C to 125°C
RF Power Input[4]	0.5W at 25°C

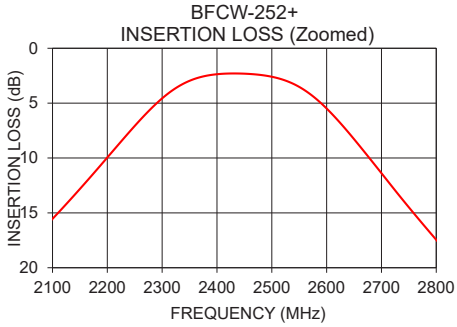
3. Refer to product storage temperature after installation
   Suggestion for T&R unused product storage condition:
   +5 ~ +35 °C, Humidity 45~75%RH, 12 month Max.
4. Derate linearly to 0.1W at 125°C.
   Permanent damage may occur if any of these limits exceeded.

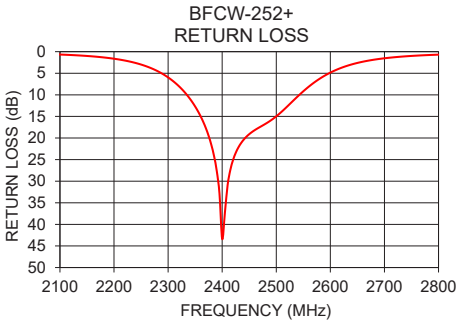
Typical Frequency Response



Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)
10	79.20	0.05
100	61.12	0.05
500	47.82	0.07
1000	45.17	0.09
1500	46.81	0.13
1860	26.82	0.22
2000	20.51	0.37
2400	2.37	43.37
2450	2.32	19.11
2500	2.60	14.98
3000	29.06	0.27
3200	44.65	0.15
4000	32.25	0.04
4500	31.25	0.07
5000	31.87	0.14
5500	33.81	0.21
6000	36.37	0.30
6500	45.69	0.34
7000	43.88	0.34
8000	50.56	0.35





Notes

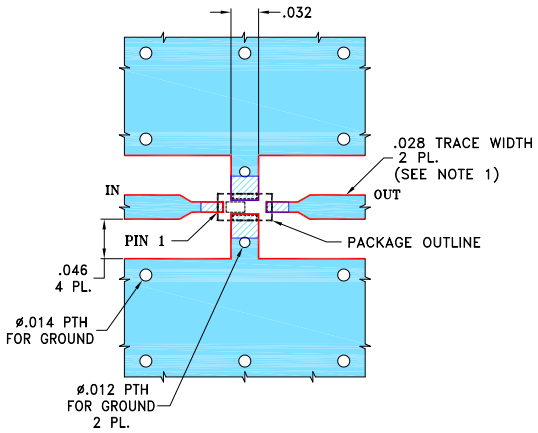
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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	3
GROUND	2,4

Product Marking: N/A

Evaluation Board MCL P/N: TB-BFCW-252+
Suggested PCB Layout (PL-563)

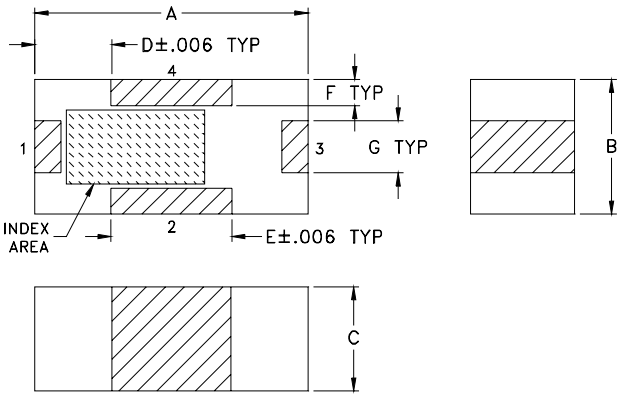


NOTES:
1. TRACE WIDTH IS SHOWN FOR FR4, GRADE IT-180TC (ITEQ CORP.) WITH DIELECTRIC THICKNESS .016±.0015. COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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	wt
.063	.031	.024	.018	.028	.006	.012	grams
1.60	0.79	0.61	0.46	0.71	0.15	0.30	0.005

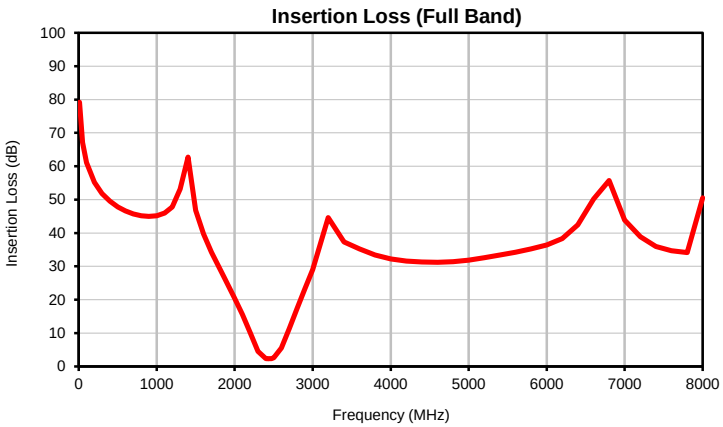
Ceramic Bandpass Filter BFCW-252+

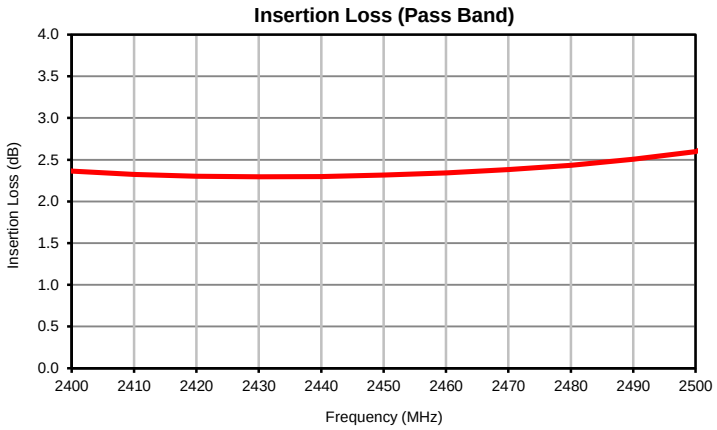
Typical Performance Data

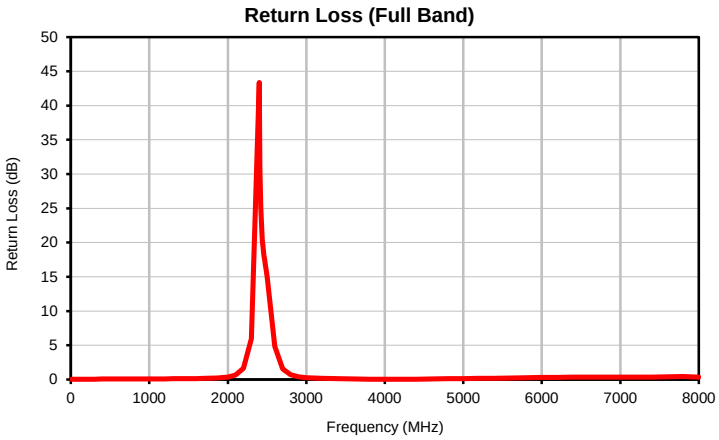
FREQUENCY (MHz)	INSERTION LOSS (dB)	RETURN LOSS (dB)
10	79.20	0.05
50	67.11	0.05
100	61.12	0.05
200	55.17	0.06
300	51.80	0.06
400	49.55	0.07
500	47.82	0.07
600	46.60	0.07
700	45.72	0.08
800	45.16	0.08
900	44.96	0.08
1000	45.17	0.09
1100	45.99	0.09
1200	47.82	0.11
1300	53.17	0.11
1400	62.74	0.12
1500	46.81	0.13
1600	39.67	0.14
1700	34.26	0.16
1860	26.82	0.22
1900	25.06	0.25
2000	20.51	0.37
2100	15.55	0.67
2200	9.95	1.64
2300	4.56	5.96
2400	2.37	43.37
2410	2.33	30.91
2420	2.30	25.12
2430	2.30	22.16
2440	2.30	20.35
2450	2.32	19.11
2460	2.34	18.19
2470	2.38	17.44
2480	2.43	16.71
2490	2.50	15.91
2500	2.60	14.98
2600	5.49	4.85
2700	11.38	1.53
2800	17.46	0.69
2900	23.17	0.40
3000	29.06	0.27
3200	44.65	0.15
3400	37.31	0.11
3600	35.19	0.08
3800	33.40	0.05
4000	32.25	0.04
4200	31.60	0.04
4400	31.32	0.06
4600	31.23	0.08
4800	31.40	0.11
5000	31.87	0.14
5200	32.57	0.16
5400	33.41	0.19
5600	34.23	0.23
5800	35.23	0.27
6000	36.37	0.30
6200	38.30	0.32
6400	42.47	0.34
6600	50.18	0.34
6800	55.77	0.34
7000	43.88	0.34
7200	38.84	0.34
7400	35.98	0.35
7600	34.72	0.38
7800	34.15	0.43
8000	50.56	0.35

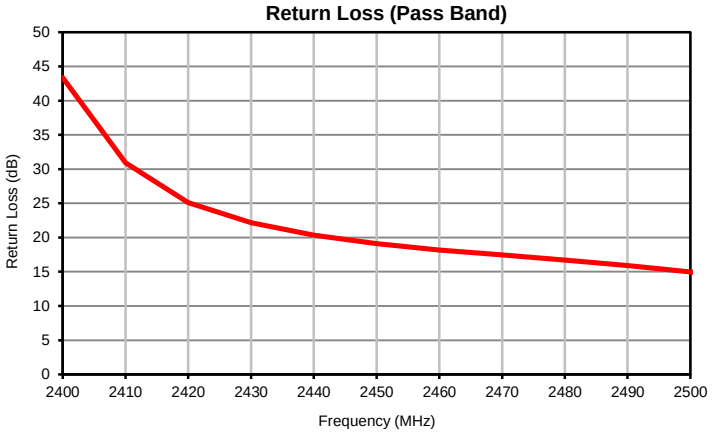
Ceramic Bandpass Filter BFCW-252+

Typical Performance Curves





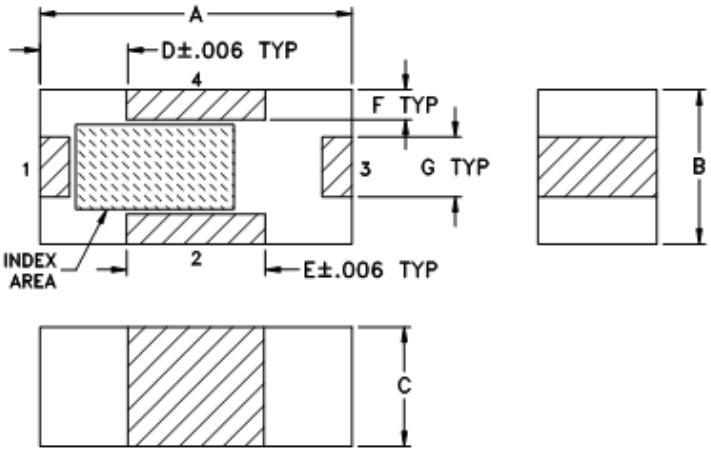




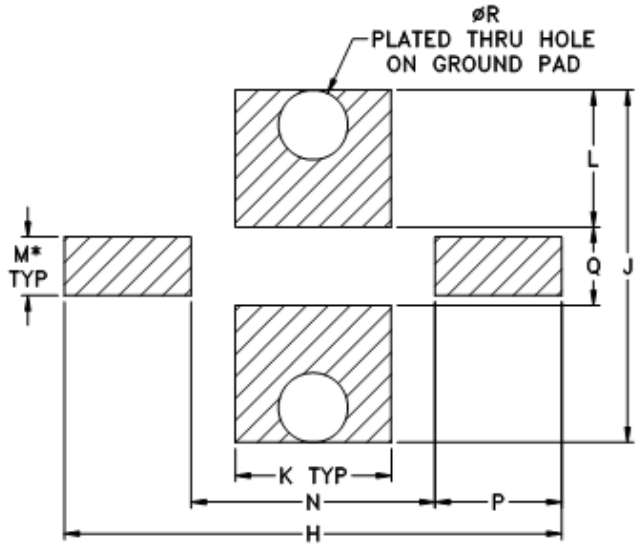
Case Style JC

Outline Dimensions

JC0603C-1



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	L
JC0603C-1	.063 (1.60)	.031 (0.80)	.024 (0.60)	.018 (0.45)	.028 (0.70)	.006 (0.15)	.012 (0.30)	.100 (2.54)	.071 (1.80)	.032 (0.80)	.028 (0.70)

CASE #	M*	N	P	Q	R	WT. GRAMS
JC0603C-1	.012 (0.30)	.049 (1.24)	.026 (0.65)	.016 (0.40)	.014 (0.35)	.005

Dimensions are in inches (mm). Tolerances: 3 Pl. ± .004

Notes:

1. Open style, ceramic base.
2. Termination finish:
   For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
3. * - Line width should be designed to match 50 OHMS characteristic impedance, depending on PCB material & thickness.

Tape & Reel Packaging TR-F74

DEVICE ORIENTATION IN T&R

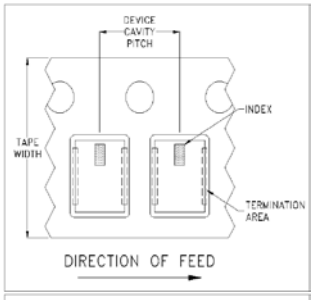


ILLUSTRATION 1

Applicable Case Styles
GE0805C-1
GE0805C-1AP
JV1210C-1
GU2939

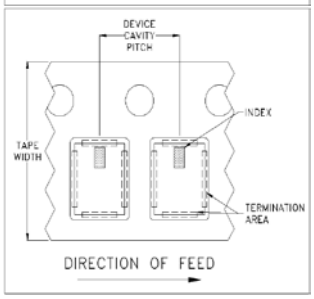


ILLUSTRATION 2

Applicable Case Styles
JV1210C
JV1210C-2
JV1210C-3
JV1210C-4
JV1210C-5
JV1210C-6
JV1210C-11

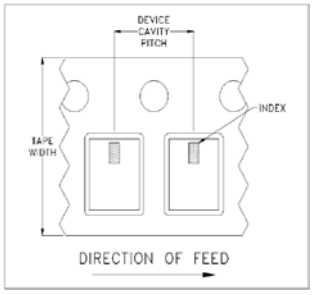


ILLUSTRATION 3

Applicable Case Styles
JC0603C-8
JV1210C-7
JV1210C-8
JV1210C-9
JV1210C-10
JV1210C-13
GE0805C-13

Tape Width, mm	Device Cavity Pitch, mm	Real Size, inches	Devices per Reel	
8	4	7	Small quantity standards **(see note)**	20
				50
				100
				200
				500
				1000
			Standard	2000
				4000

Note: Small reel availability varies by model. Refer to pricing and availability on individual model dashboard.

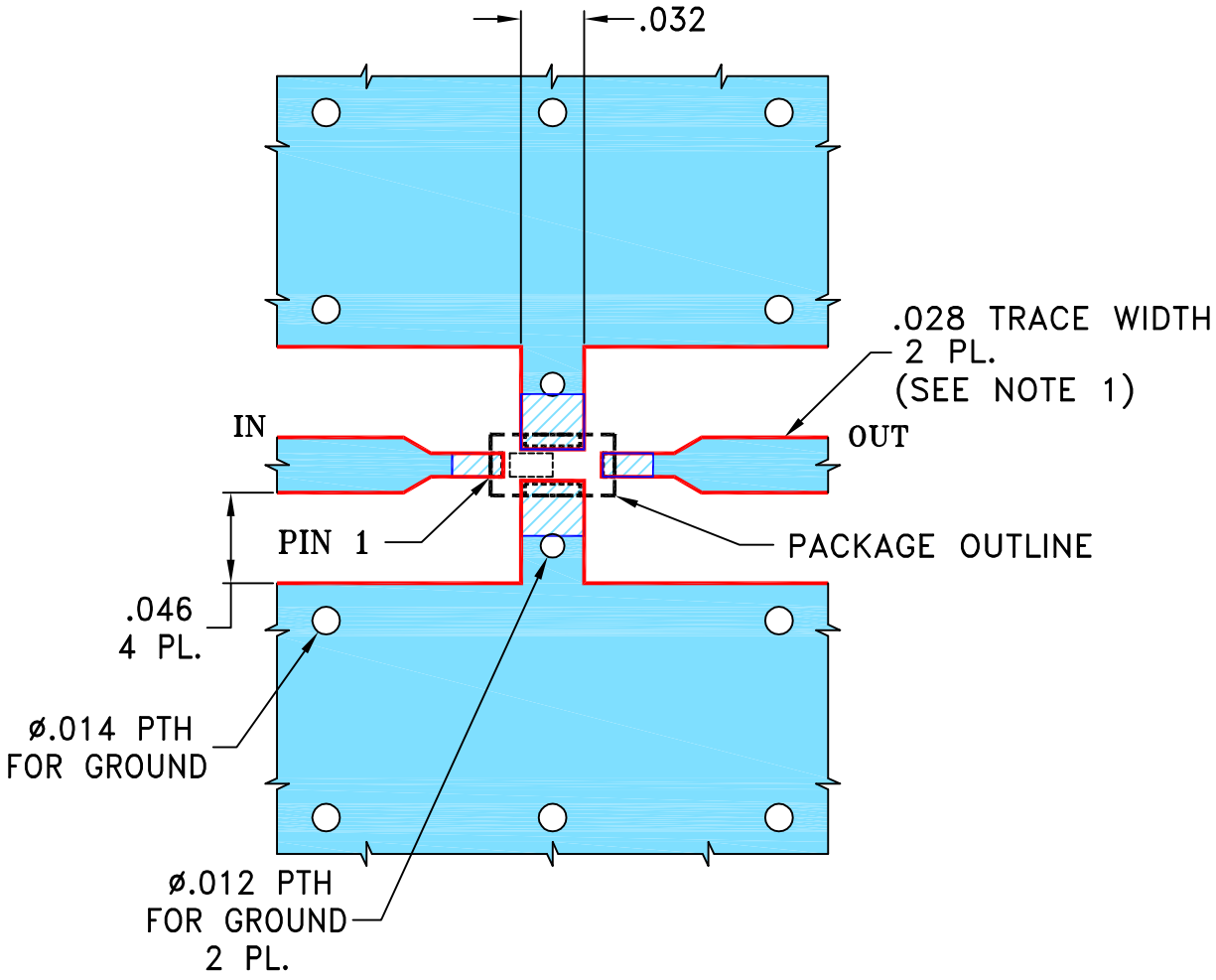
Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.
Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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	M168200	NEW RELEASE	05/31/18	NP	SL

SUGGESTED MOUNTING CONFIGURATION
FOR JC0603C-1 CASE STYLE, "04FL01" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR FR4, GRADE IT-180TC (ITEQ CORP.) WITH DIELECTRIC THICKNESS .016±.0015. COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP 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	NP	05/30/18
TOLERANCES ON:	CHECKED	GF	05/30/18
2 PL DECIMALS ±	APPROVED	SL	05/31/18
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

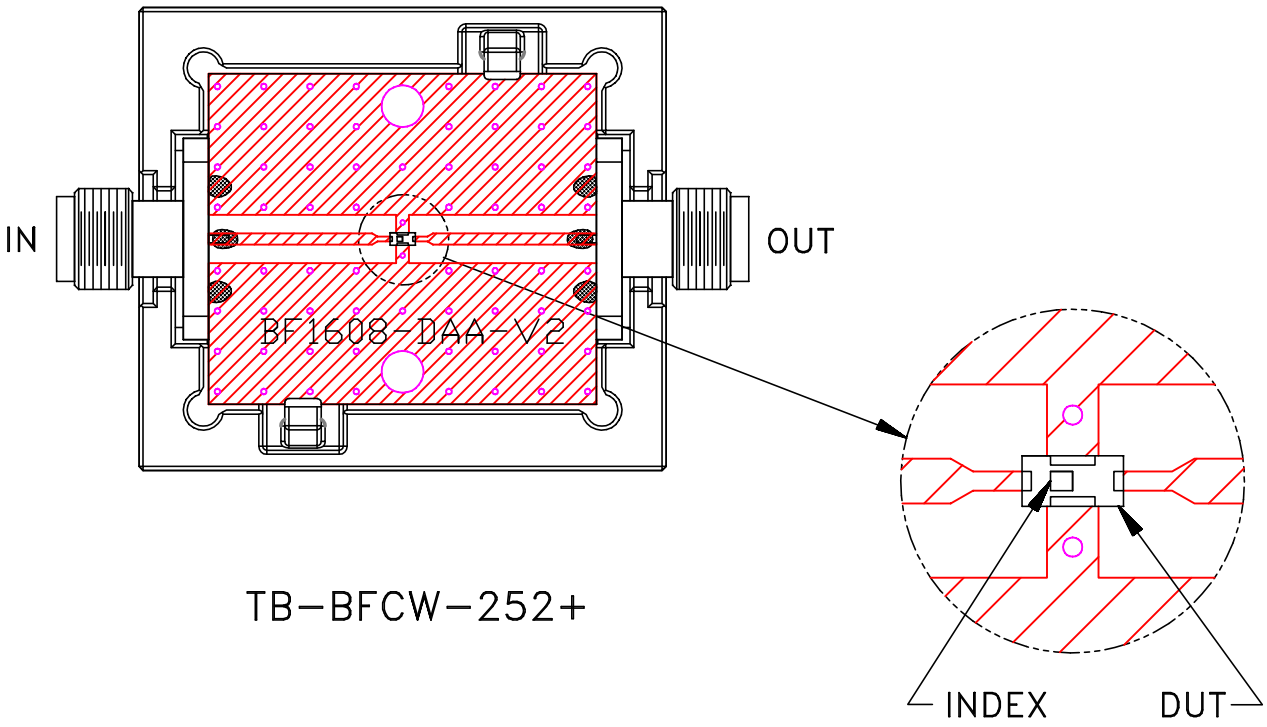
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 04FL01, JC0603C-1, TB-1023+

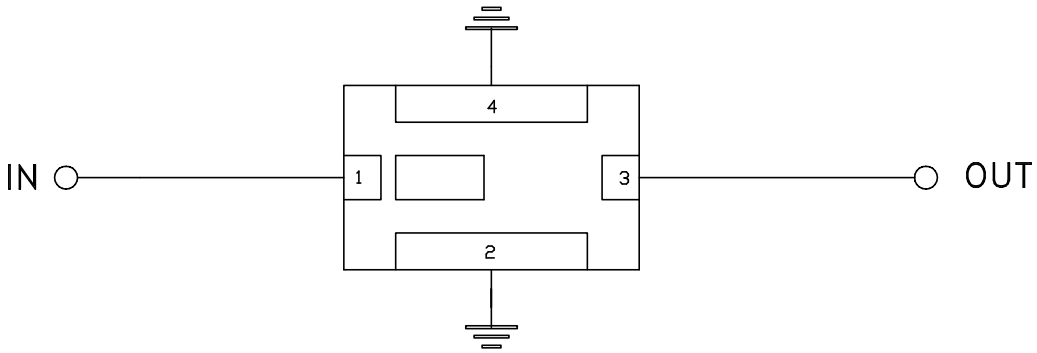
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-563	OR

FILE:	SCALE:	SHEET:
98PL563	10:1	1 OF 1

Evaluation Board and Circuit



TB-BFCW-252+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: FR4 or equivalent,
   Dielectric Constant=4.5, Thickness=.016 inch.

Mini-Circuits®

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	-55° to 125° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 125° 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
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process: 250°C peak	J-STD-020C, 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, 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