



Mini-Circuits

CERAMIC

Bandpass Filter

50Ω

37 to 40 GHz

BFCQ-3852A+

THE BIG DEAL

- Optimized for 5G N260 band (37 to 40 GHz)
- Low Insertion Loss – Mid band 2.5dB typical
- Surface mountable pick and place standard case style
- Standard small 1008 (2.5mm x 2.0mm) case style
- High quality distributed filter topology
- Wide rejection band



Generic photo used for illustration purposes only

CASE STYLE: NL1008C-6

+RoHS Compliant

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

APPLICATIONS

- Test and Measurement
- Ka-Band for SatCOM and Radar
- 5G N260 Telecom Band

PRODUCT OVERVIEW

The BFCQ-3852A+ LTCC (Low Temperature Co-Fired Ceramic) Bandpass Filter that covers the 5G N260 band from 37 to 40 GHz. It has a low insertion loss, 2.5dB (typ) and has up to 40dB stopband rejection. This model can handle up to 1W of RF input power and has an operating temperature from -55 to +125 °C. Utilizing a proprietary LTCC material system and a distributed filter topology, this filter is able to achieve repeatable performance on a lot-to-lot basis, up to mmWave frequencies.

KEY FEATURES

Feature	Advantages
5G n260 band compatible	Designed for 5G Telecommunications, n260 band, 37 – 40 GHz
Proprietary mmWave compatible LTCC material system	Low loss and repeatable performance on a lot-to-lot basis up to mmWave frequencies.
Cost effective	LTCC is scalable technology that is cost effective due to ease of production in high quantities.
Small size (2.5mm x 2.0mm)	Allows for high layout density of circuit boards, while minimizing effects of parasitics.
Surface Mountable	Suitable for very high volume automated assembly process.





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ELECTRICAL SPECIFICATIONS¹ AT 25°C

Parameter	F#	Frequency (GHz)	Min.	Typ.	Max.	Units
Center Frequency	—	—	—	38.5	—	GHz
Passband	F1-F2	37 - 38.6	—	2.9	—	dB
		38.6 - 40	—	2.5	3.4	dB
	F1-F2	37 - 40	—	10	—	dB
		37 - 40	—	10	—	dB
Stopband, Lower	DC-F3	0.1 - 28	45	55	—	dB
		28 - 33.2	30	45	—	dB
Stopband, Upper	F4-F5	44.8 - 47	20	25	—	dB
		47 - 54	30	36	—	dB
		54 - 58	20	30	—	dB

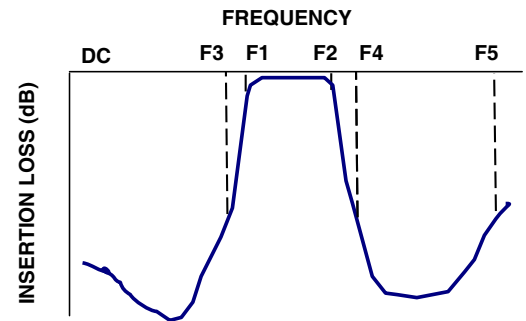
1. Measured on Mini-Circuits Test Board TB-BFCQ-3852AC+ with feedline losses removed by normalization of S12 and S21 traces to measurement of TB thru-line.

ABSOLUTE MAXIMUM RATINGS

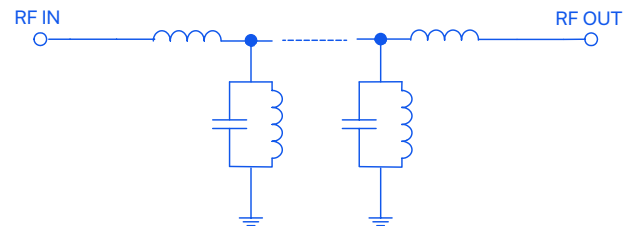
Parameter	Ratings
Operating Temperature	-55°C to +125°C
Storage Temperature	-55°C to +125°C
RF Power Input	1 W at 25°C

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

TYPICAL FREQUENCY RESPONSE



FUNCTIONAL SCHEMATIC





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Bandpass Filter

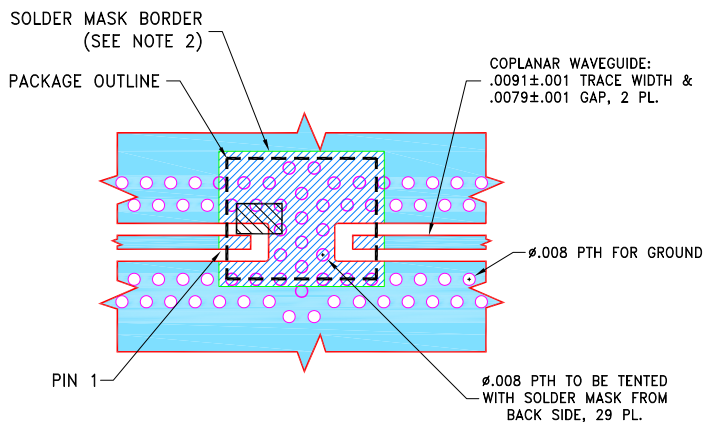
BFCQ-3852A+

50Ω 37 to 40 GHz

PAD CONNECTIONS

INPUT	1
OUTPUT	2
GROUND	3

PRODUCT MARKING: NS

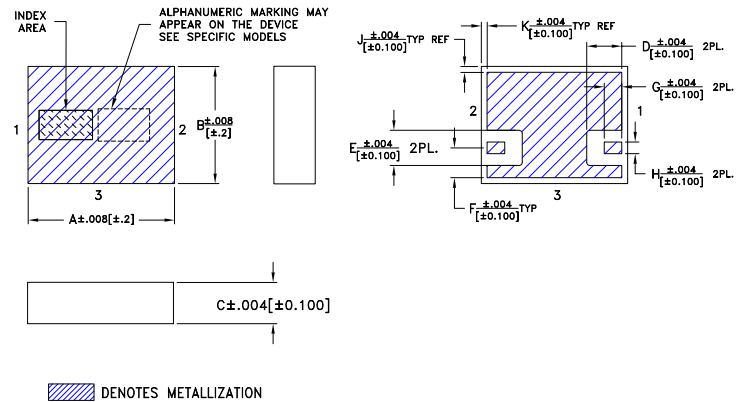
EVALUATION BOARD MCL P/N: TB-BFCQ-3852AC+
SUGGESTED PCB LAYOUT (PL-707)

NOTES:

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR MEGTRON-7 R5785(N); DIELECTRIC THICKNESS: .0049±.001; CLOTH STYLE: 2116; COPPER: HVLP/HVLP. FOR OTHER MATERIALS LINE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. SOLDER MASK OPENING FOR COMPONENT SOLDERING HAS BEEN INCREASED AGAINST PCB LAND PATTERN RECOMMENDATIONS PER NL1008C-6 AND CAN BE DEVIATED FROM THIS DRAWING TO COMPLY WITH CUSTOMERS' DESIGN RULES.
3. 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 (Inches)
mm

A	B	C	D	E	F	G	H	J	K	wt
.098	.079	.028	.024	.024	.020	.012	.008	.004	.004	grams
2.49	2.01	0.71	0.6	0.6	0.51	0.3	0.2	0.1	0.1	.019

TAPE & REEL INFORMATION: F75

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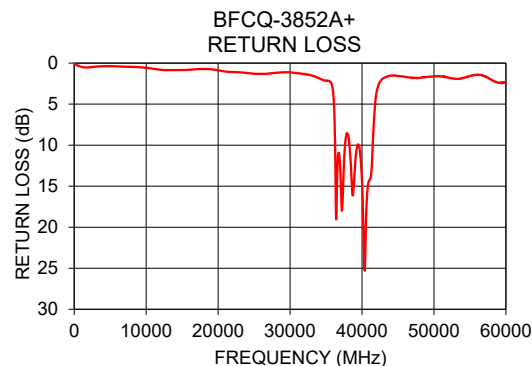
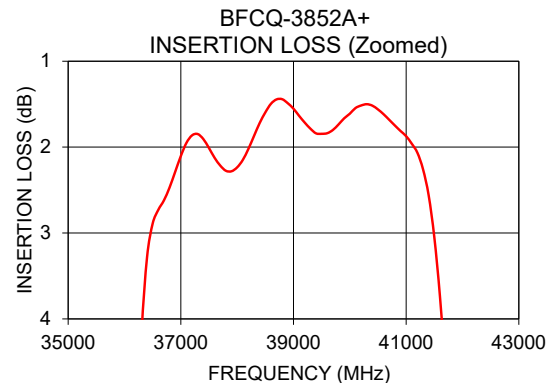
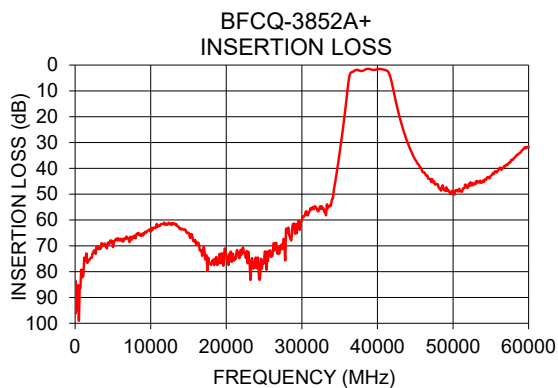
Bandpass Filter

BFCQ-3852A+

50Ω 37 to 40 GHz

TYPICAL PERFORMANCE DATA AT 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)
10	85.26	0.05
5000	70.51	0.38
10000	64.52	0.57
20000	73.53	0.88
25000	75.86	1.30
30000	60.17	1.15
34000	51.82	1.82
37000	2.10	13.39
38500	1.60	13.18
40000	1.61	14.39
45000	36.70	1.57
45000	36.70	1.57
50000	48.91	1.59
58000	36.29	2.03
60000	31.74	2.27



NOTES

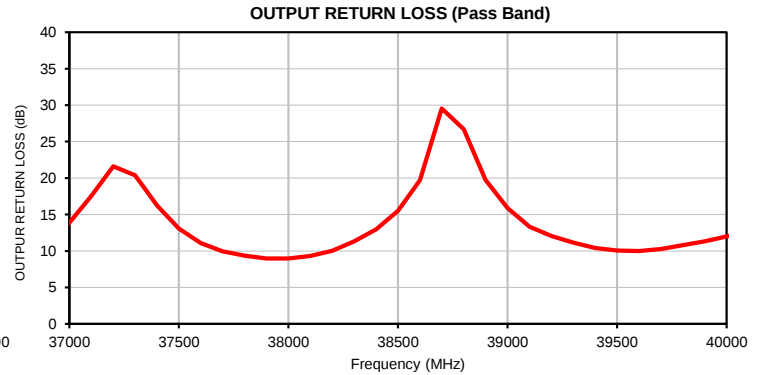
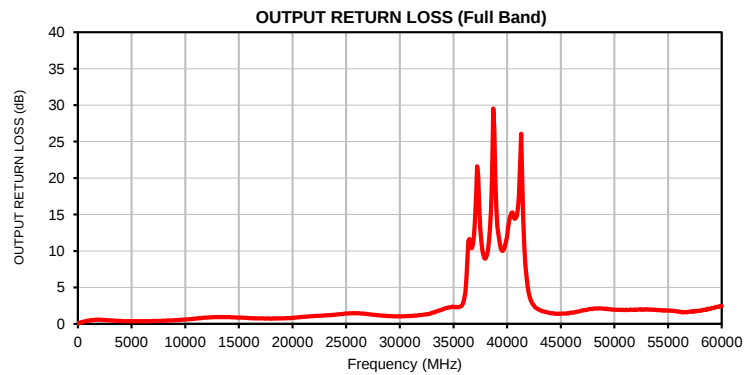
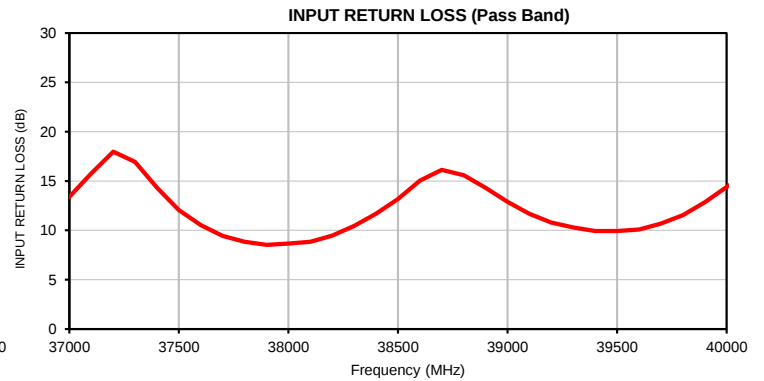
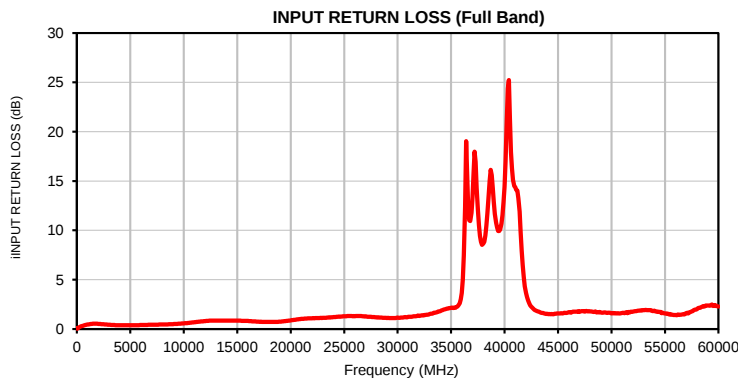
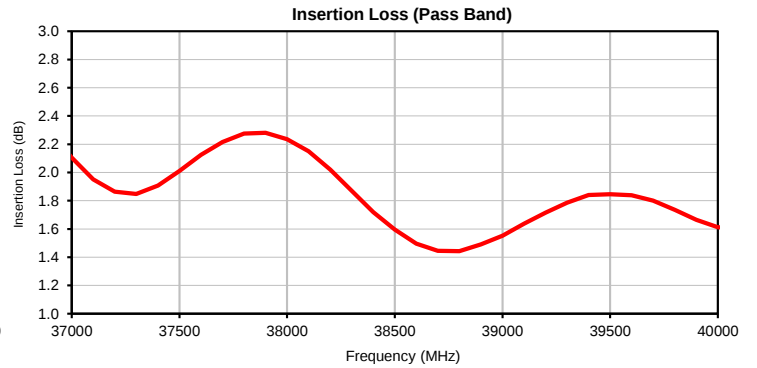
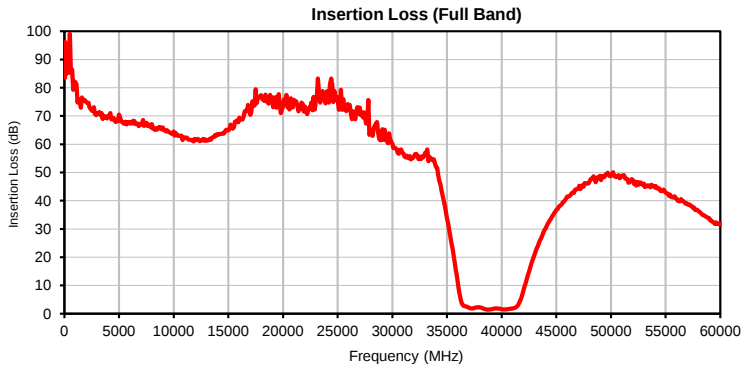
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Typical Performance Data

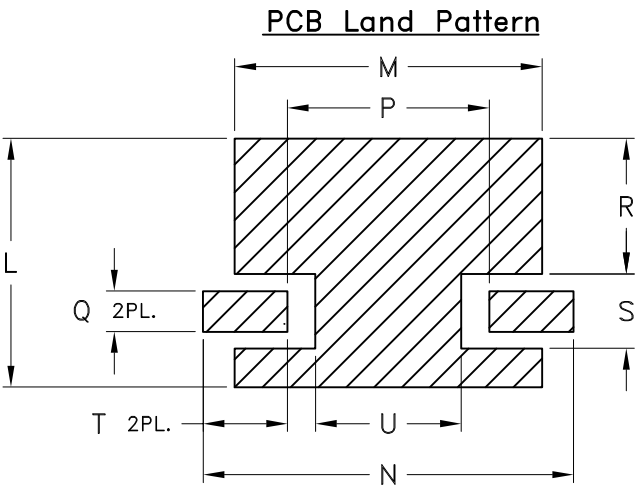
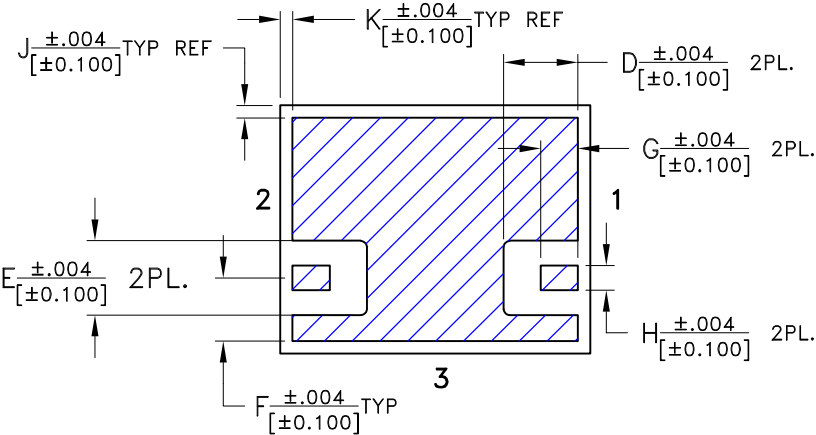
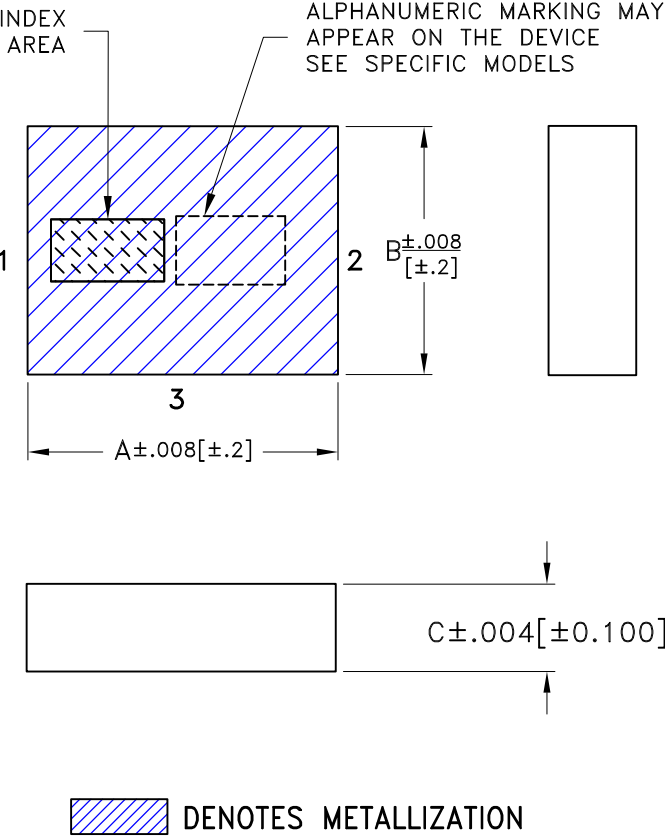
FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	OUTPUT RETURN LOSS (dB)
10	85.26	0.05	0.05
1700	75.50	0.54	0.56
3400	71.00	0.41	0.44
5100	69.27	0.38	0.36
6800	66.39	0.43	0.38
8500	65.21	0.47	0.46
10300	63.12	0.60	0.63
12000	61.73	0.81	0.86
15400	65.47	0.83	0.84
17100	71.45	0.73	0.75
20600	72.32	0.97	0.91
24000	78.75	1.21	1.26
27400	71.31	1.24	1.27
30900	57.18	1.20	1.10
32600	54.67	1.43	1.35
34300	47.08	1.97	2.17
36000	10.66	3.66	3.36
36200	5.86	7.46	6.11
36400	3.28	19.05	11.44
36500	2.89	15.69	11.63
36600	2.73	12.32	10.77
36800	2.47	10.95	10.78
37000	2.10	13.39	13.85
37100	1.95	15.76	17.54
37200	1.86	17.99	21.62
37300	1.85	16.93	20.39
37400	1.91	14.32	16.23
37500	2.01	12.06	13.07
37600	2.13	10.52	11.08
37700	2.21	9.44	9.96
37800	2.28	8.85	9.37
37900	2.28	8.53	8.98
38000	2.24	8.66	8.98
38100	2.15	8.84	9.30
38200	2.02	9.46	10.03
38300	1.87	10.46	11.31
38400	1.72	11.71	12.99
38500	1.60	13.18	15.49
38600	1.50	15.04	19.69
38700	1.44	16.13	29.53
38800	1.44	15.59	26.71
38900	1.49	14.32	19.76
39000	1.55	12.90	15.89
39100	1.64	11.67	13.32
39200	1.72	10.80	12.04
39300	1.79	10.29	11.14
39400	1.84	9.94	10.41
39500	1.85	9.92	10.05
39600	1.84	10.09	9.98
39700	1.80	10.69	10.27
39800	1.74	11.54	10.80
39900	1.66	12.84	11.32
40000	1.61	14.39	11.99
40500	1.56	21.36	15.30
41000	1.87	14.37	15.78
41500	3.05	9.77	14.38
42000	8.28	3.67	4.34
42500	14.97	2.28	2.49
42700	17.43	2.06	2.19
43000	20.88	1.83	1.92
43100	21.94	1.78	1.85
43200	22.98	1.75	1.80
43300	23.93	1.70	1.73
43400	25.01	1.66	1.70
43500	25.90	1.63	1.67
43600	26.75	1.63	1.62
43700	27.65	1.58	1.59
43800	28.56	1.54	1.55
43900	29.40	1.54	1.54
44000	30.14	1.55	1.50
46300	42.03	1.72	1.60
49800	49.12	1.65	1.96
51500	47.66	1.61	1.95
54900	43.43	1.61	1.84
56600	39.90	1.47	1.63
60000	31.74	2.27	2.43

Typical Performance Curves



Outline Dimensions

NL1008C-6



Suggested Layout,
Tolerance to be within $\pm .002$

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
NL1008C-6	.098 (2.50)	.079 (2.00)	.028 (.705)	.024 (.60)	.024 (.60)	.020 (.51)	.012 (.30)	.008 (.20)	.004 (.10)	.004 (.10)	.079 (2.0)	.098 (2.5)	.118 (3.0)
CASE #	P	Q	R	S	T	U	WT, GRAM						
NL1008C-6	.064 (1.63)	.013 (.3)	.043 (1.09)	.024 (.60)	.027 (.7)	.046 (1.2)	.019						

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .01$; 3 Pl. $\pm .005$

- Notes:
1. Open style, ceramic base.
 2. Termination finish:
For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.
 3. Pad tolerance is non-cumulative. Minimum spacing between each pad is .004.
 4. Line width should be designed to match 50 Ω characteristic depending on PCB material and thickness.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

DEVICE ORIENTATION IN T&R

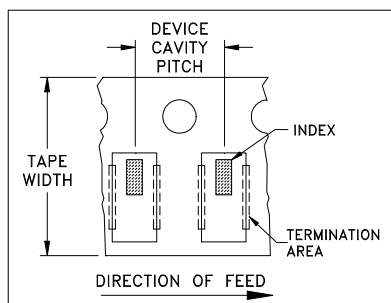


ILLUSTRATION 1

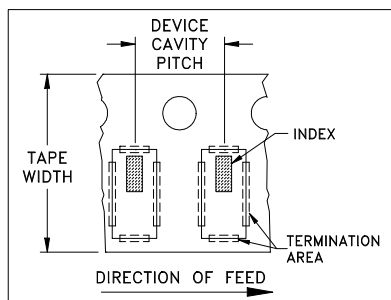


ILLUSTRATION 2

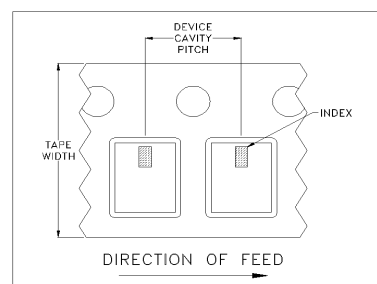


ILLUSTRATION 3

Applicable Case Styles

FV1206-1
FV1206-3

Applicable Case Styles

FV1206-4
FV1206-5
FV1206-6
FV1206-7
FV1206-9

Applicable Case Styles

FV1206-11
FV1206-12
GE0805C-18
NL1008C-6
NL1008C-7
NL1008C-9
NL1008C-10
NL1008C-12

Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
8	4	7	Small quantity standards (see note)	20
				50
				100
				200
				500
				1000
			Standard	3000

Note: Please consult individual model data sheet to determine device per reel availability.

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Go to: www.minicircuits.com/pages/pdfs/tape.pdf

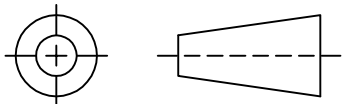


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THIRD ANGLE PROJECTION



REVISIONS

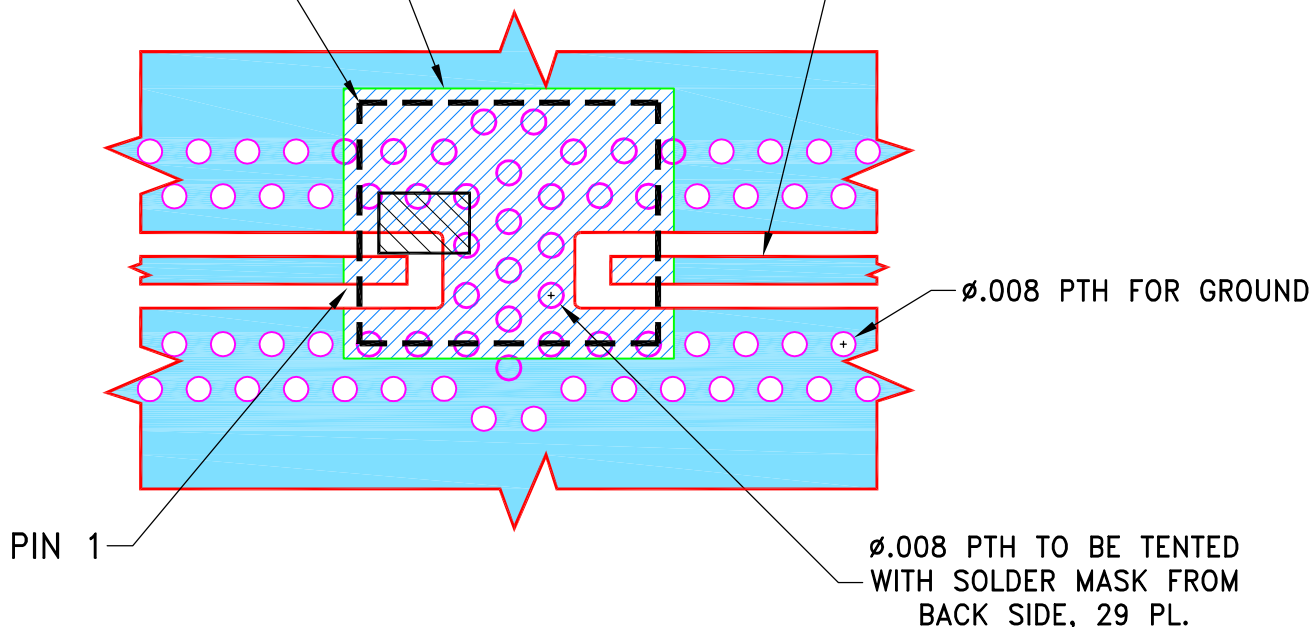
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-007756	NEW RELEASE	05/12/21	ITG	IL

SUGGESTED MOUNTING CONFIGURATION
FOR NL1008C-6 CASE STYLE

SOLDER MASK BORDER
(SEE NOTE 2)

PACKAGE OUTLINE

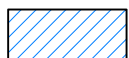
COPLANAR WAVEGUIDE:
.0091±.001 TRACE WIDTH &
.0079±.001 GAP, 2 PL.

**NOTES:**

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR MEGTRON-7 R5785(N); DIELECTRIC THICKNESS: .0049±.001; CLOTH STYLE: 2116; COPPER: HVLP/HVLP. FOR OTHER MATERIALS LINE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. SOLDER MASK OPENING FOR COMPONENT SOLDERING HAS BEEN INCREASED AGAINST PCB LAND PATTERN RECOMMENDATIONS PER NL1008C-6 AND CAN BE DEVIATED FROM THIS DRAWING TO COMPLY WITH CUSTOMERS' DESIGN RULES.
3. 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 TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ±	DRAWN	ITG	05/12/21
	CHECKED	GF	05/12/21
	APPROVED	IL	05/12/21

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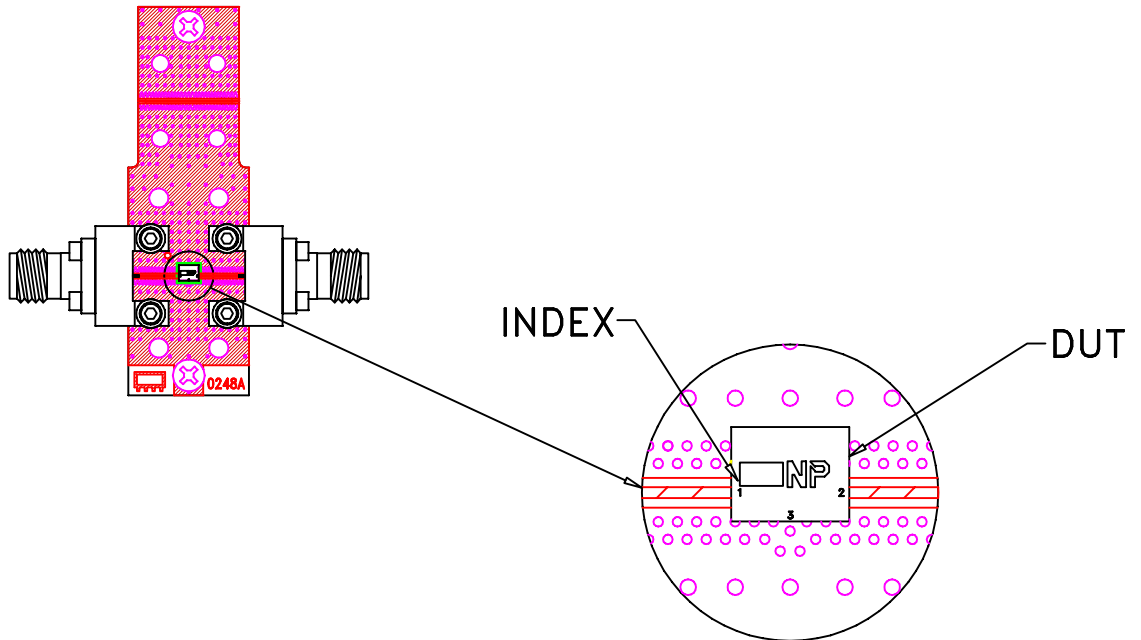


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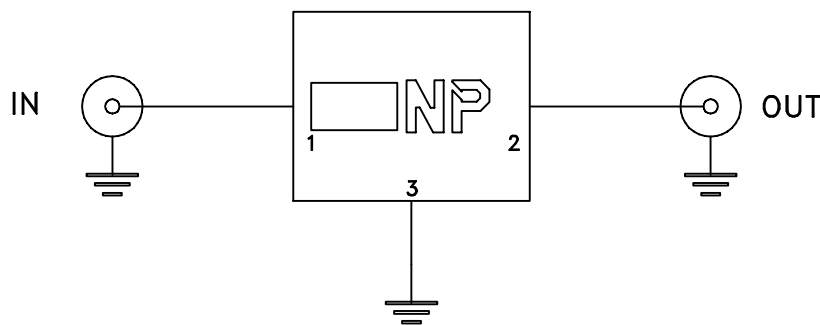
PL, NL1008C-6, TB-BFCQ-XXXX+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-707	OR
FILE:	98PL707	SCALE: 15:1	SHEET: 1 OF 1

Evaluation Board and Circuit



TB-BFCQ-3852AC+



Schematic Diagram

Notes:

1. 50 Ohm 1.85 Female connectors.
2. PCB Material: Megtron 7(N) or equivalent,
Dielectric Constant=3.6, Thickness=.005 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
Thermal Cycling	-55 to 125°C, 100 cycles, Dwell Time 15 minutes.	MIL-STD-202, Method 107, Condition A-3
Mechanical Shock	50g, 11ms half-sine, 18 shocks applied each to 3 axes	MIL-STD-202 Method 213, Condition A
Vibration	10-2000Hz sine, 20g, 12 cycles applied each to 3 axes	MIL-STD-202, Method 204, Condition D
Constant Acceleration	30Kg, Y1 Direction	MIL-STD-883, Method 2001, Condition E
Humidity	85°C, 90-95% Relative Humidity, 250hours	
Solderability	10X / 30X Magnification	J-STD-002C Test S, J-STD-002C Test S1
High Temp Storage	125°C, 250 hours	