



CERAMIC

Bandpass Filter

BFCQ-2602+

50Ω 25 to 27.5 GHz

THE BIG DEAL

- Innovative and industry leading
- 5G n258 bandpass filter
- Low Insertion Loss – Mid band 2.0dB typical
- Surface mountable pick and place standard case style
- Small size 2.5mm x 2.0mm
- 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

- 5G Telecommunications

PRODUCT OVERVIEW

The BFCQ-2602+ LTCC Bandpass Filter covers the 5G n258 band. This corresponds to a passband of 25 to 27.5 GHz, with as low as 2dB passband loss, and up to 40dB stopband rejection. This model handles up to 1W RF input power and provides a wide operating temperature range 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 n258 band compatible	Designed for 5G Telecommunications, n258 band, 25 – 27.5 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 allows for cost reduction at volume.
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.





Mini-Circuits

CERAMIC

Bandpass Filter

BFCQ-2602+

50Ω 25 to 27.5 GHz

ELECTRICAL SPECIFICATIONS¹ AT 25°C

Parameter	F#	Frequency (GHz)	Min.	Typ.	Max.	Units
Center Frequency	—	—	—	26.2	—	GHz
Passband	F1-F2	25 - 25.5	—	2.4	—	dB
		25.5 - 27.1	—	2.0	2.8	
	F1-F2	27.1 - 27.5	—	2.4	—	dB
		25 - 27.5	—	13	—	
	F1-F2	25 - 27.5	—	13	—	dB
Stop Band, Lower	DC-F3	0.1 - 18	33	50	—	dB
		18 - 21.7	25	37	—	
Stop Band, Upper	F4-F5	31 - 37	25	36	—	dB
		37 - 45	33	40	—	
		45 - 50	26	40	—	

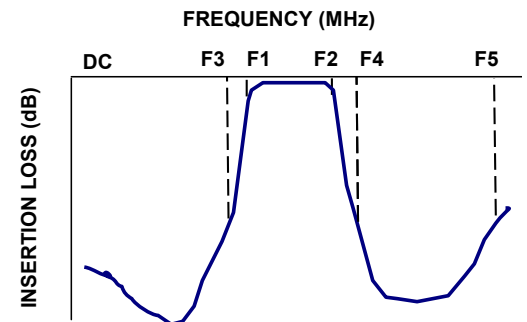
1. Measured on Mini-Circuits Test Board TB-BFCQ-2602C+ with feedline losses removed by normalization of S12 and S21 traces to measurement of TB thru-line.

MAXIMUM RATINGS

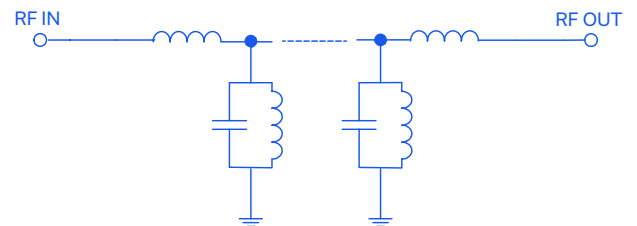
Parameter	Ratings
Operating Temperature	-55°C to +125°C
Storage Temperature	-55°C to +125°C
RF Power Input	1W

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

TYPICAL FREQUENCY RESPONSE



FUNCTIONAL SCHEMATIC





Mini-Circuits®

CERAMIC

Bandpass Filter

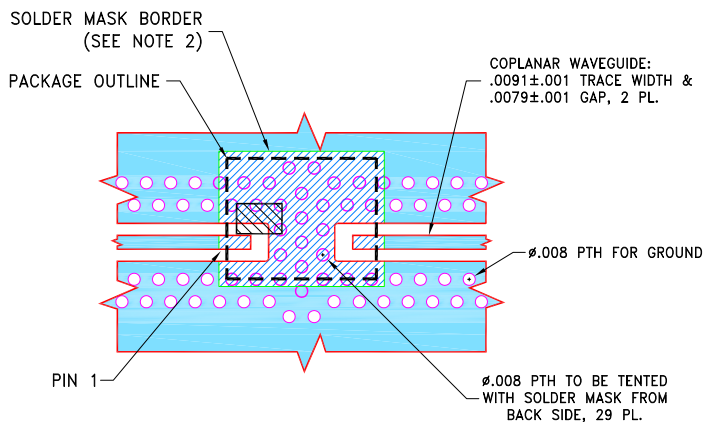
BFCQ-2602+

50Ω 25 to 27.5 GHz

PAD CONNECTIONS

INPUT	1
OUTPUT	2
GROUND	3

PRODUCT MARKING: NU

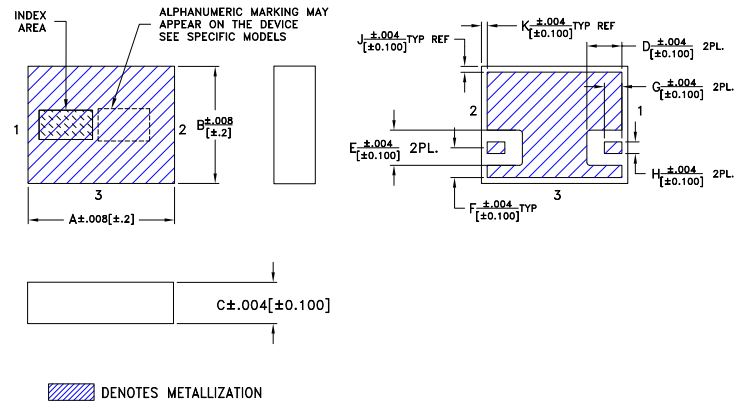
EVALUATION BOARD MCL P/N: TB-BFCQ-2602C+
SUGGESTED PCB LAYOUT (PL-707)

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

Mini-Circuits®

www.minicircuits.com P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com

PAGE 3 OF 4



CERAMIC

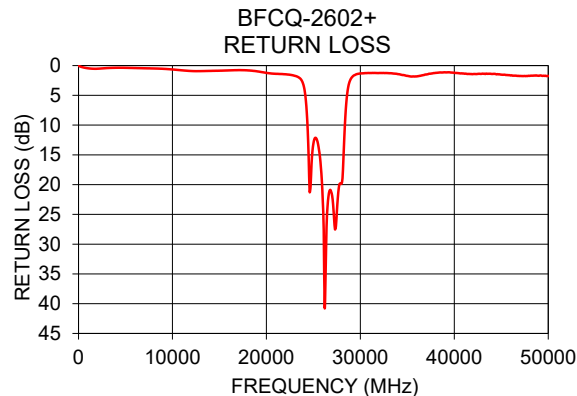
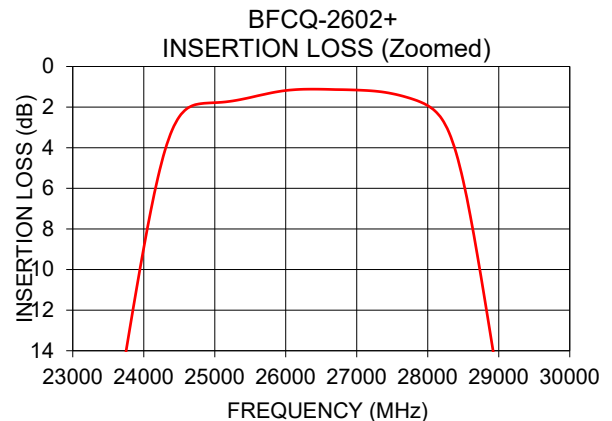
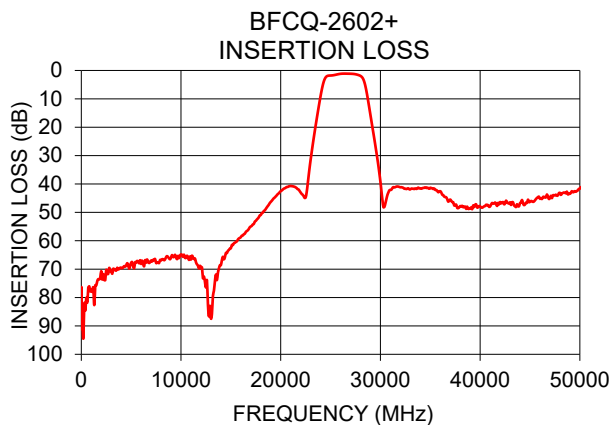
Bandpass Filter

BFCQ-2602+

50Ω 25 to 27.5 GHz

TYPICAL PERFORMANCE DATA AT 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)
10	82.48	0.05
3000	70.39	0.42
6000	68.18	0.41
9000	65.89	0.54
15000	62.64	0.86
22200	43.79	1.49
23300	24.02	1.87
25000	1.78	13.12
26200	1.13	40.62
27500	1.34	24.51
29300	22.23	1.67
30500	46.78	1.26
40000	47.89	1.20
45000	46.28	1.52
50000	41.69	1.75

**NOTES**

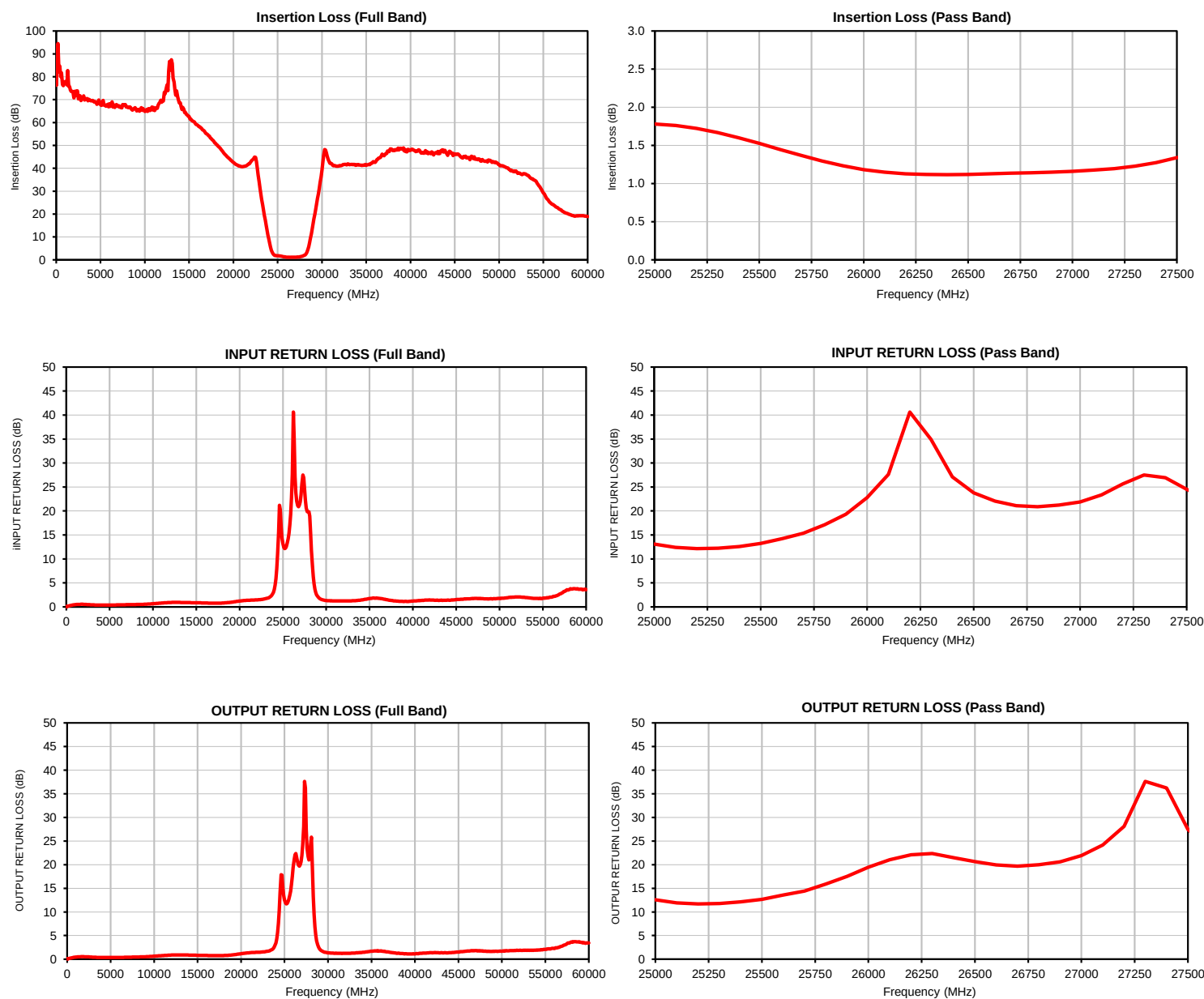
- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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/terms/viewterm.html



Typical Performance Data

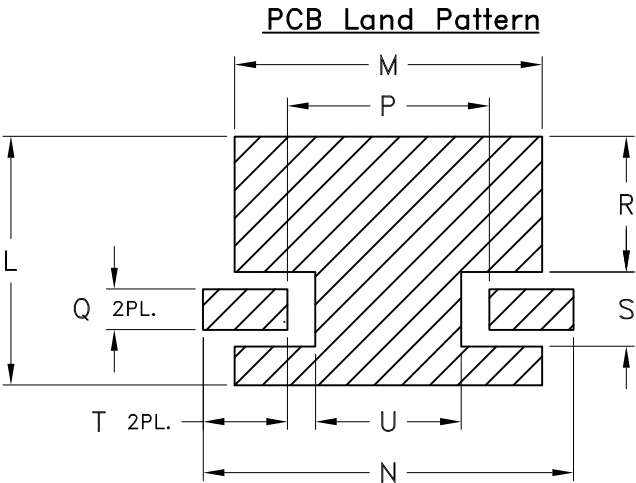
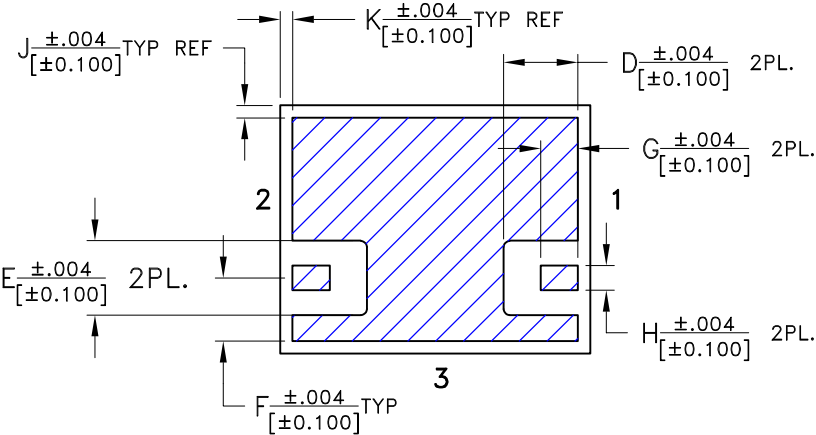
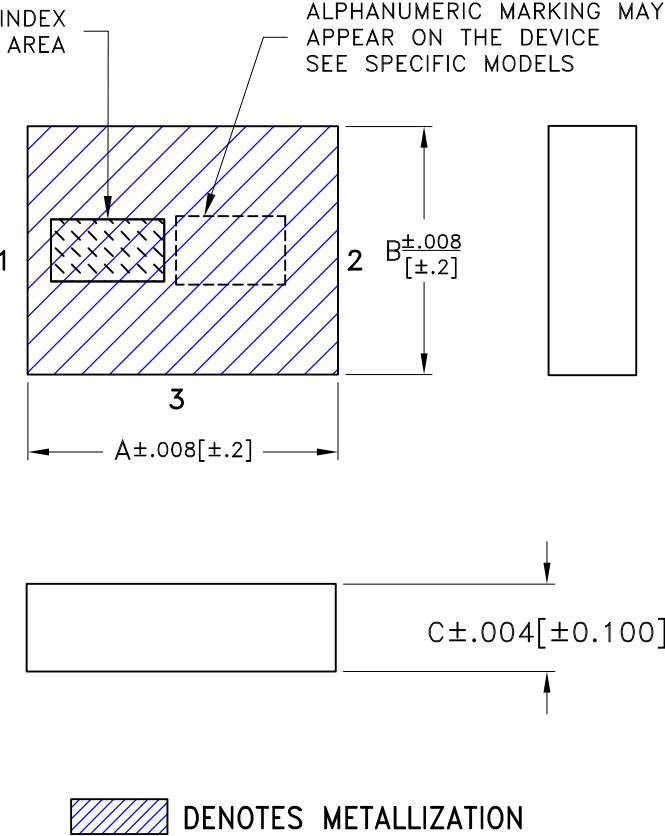
FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	OUTPUT RETURN LOSS (dB)
10	82.48	0.05	0.05
1700	73.52	0.54	0.53
3400	70.39	0.39	0.39
5100	67.53	0.38	0.35
6800	67.85	0.44	0.40
8500	65.79	0.51	0.48
10300	64.91	0.69	0.66
12000	69.33	0.91	0.88
13700	71.26	0.91	0.88
15400	60.71	0.84	0.81
17100	54.72	0.76	0.76
18900	46.73	0.94	0.89
20600	41.07	1.34	1.29
22300	44.28	1.51	1.49
24000	8.94	3.61	3.45
24000	8.94	3.61	3.45
24100	7.09	4.52	4.33
24200	5.46	5.89	5.65
24300	4.12	7.99	7.62
24500	2.48	15.58	14.13
24600	2.10	21.18	17.89
24700	1.91	20.29	17.80
24800	1.83	16.62	15.24
24900	1.80	14.37	13.56
25000	1.78	13.12	12.57
25100	1.76	12.39	11.92
25200	1.72	12.13	11.71
25300	1.67	12.22	11.79
25400	1.60	12.58	12.12
25500	1.53	13.22	12.68
25600	1.45	14.20	13.56
25700	1.37	15.33	14.41
25800	1.30	17.13	15.91
25900	1.23	19.32	17.52
26000	1.18	22.78	19.45
26100	1.15	27.64	21.03
26200	1.13	40.62	22.09
26300	1.12	34.92	22.34
26400	1.12	27.12	21.48
26500	1.12	23.79	20.64
26600	1.13	22.05	19.92
26700	1.14	21.12	19.69
26800	1.14	20.88	19.98
26900	1.15	21.25	20.60
27000	1.16	21.89	21.92
27100	1.18	23.37	24.14
27200	1.20	25.63	28.10
27300	1.23	27.51	37.62
27400	1.27	26.96	36.22
27500	1.34	24.51	27.45
27600	1.42	22.22	23.44
27700	1.51	20.60	21.76
27800	1.62	19.83	21.00
27900	1.75	19.86	21.93
28000	1.93	19.84	24.26
28200	2.59	15.53	18.95
28300	3.25	11.76	13.22
28400	4.26	8.61	9.43
28500	5.64	6.32	6.83
28600	7.37	4.75	5.06
28700	9.32	3.68	3.86
28800	11.41	2.97	3.11
28900	13.57	2.52	2.62
29000	15.74	2.19	2.28
29200	20.11	1.80	1.84
30900	42.22	1.24	1.28
32600	41.78	1.26	1.25
34300	41.38	1.52	1.51
36000	42.54	1.82	1.74
37700	48.43	1.30	1.33
39500	47.32	1.13	1.12
41200	46.69	1.35	1.31
42900	46.88	1.39	1.34
44600	46.53	1.44	1.48
46300	44.60	1.69	1.74
49800	42.25	1.76	1.71
51500	38.86	2.04	1.87
54900	29.91	1.73	2.09
60000	18.90	3.59	3.42

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.



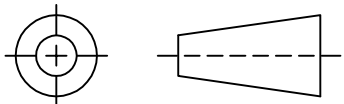
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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

RF/IF MICROWAVE COMPONENTS

THIRD ANGLE PROJECTION



REVISIONS

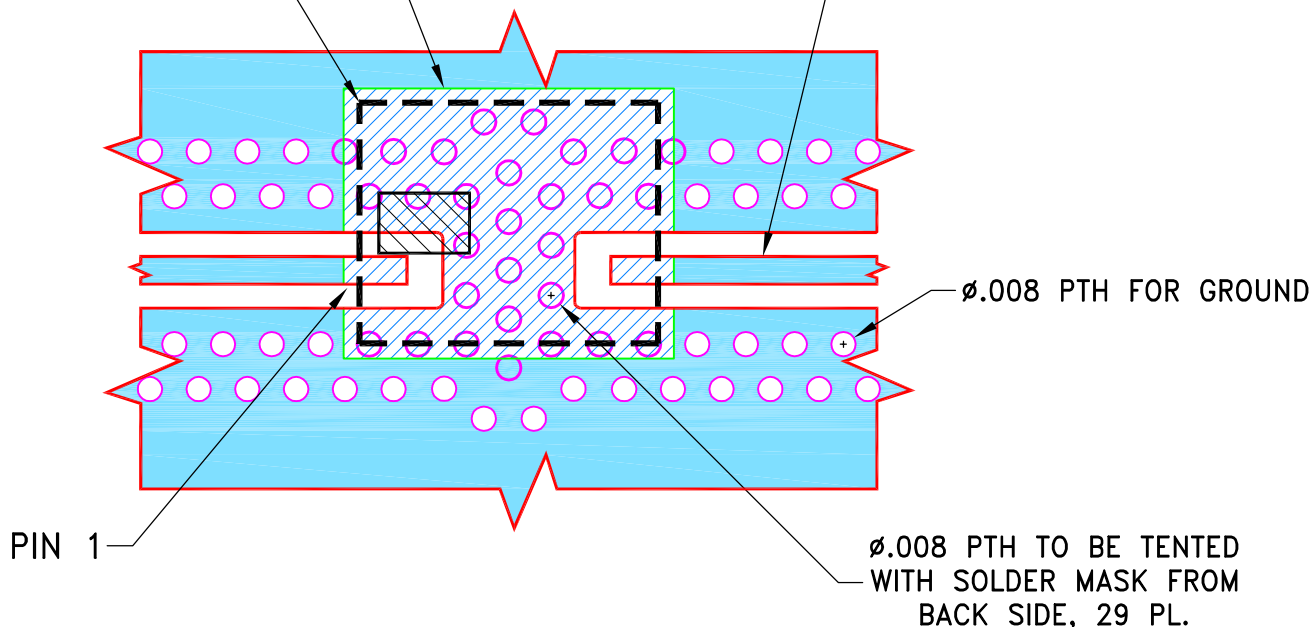
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-007756	NEW RELEASE	05/12/21	ITG	IL

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.

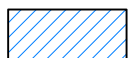


NOTES:

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	DRAWN	ITG
TOLERANCES ON:	CHECKED	GF
2 PL DECIMALS ±	APPROVED	IL
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		

Mini-Circuits®

THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS. EXCEPT FOR USE EXPRESSLY GRANTED, IN WRITING, TO ITS VENDORS, VENDEE AND THE UNITED STATES GOVERNMENT, MINI-CIRCUITS RESERVES ALL PROPRIETARY DESIGN, USE, MANUFACTURING AND REPRODUCTION RIGHTS THERETO. THESE CONTENTS SHALL NOT BE USED, DUPLICATED OR DISCLOSED TO ANY OUTSIDE PARTY, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF MINI-CIRCUITS.

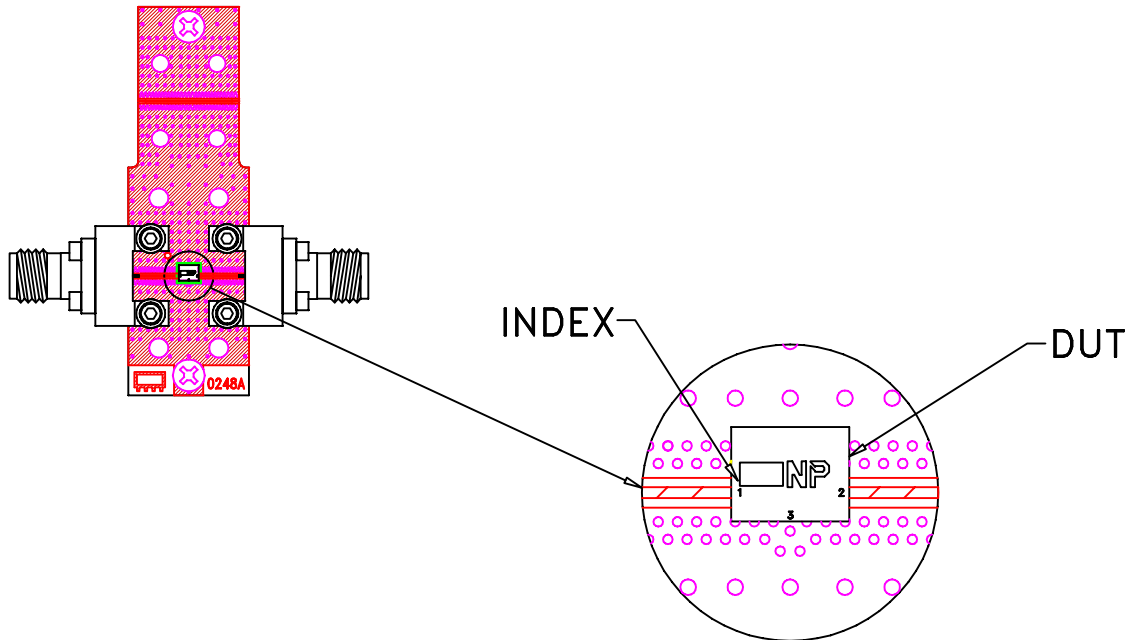


Mini-Circuits® 13 Neptune Avenue
Brooklyn NY 11235

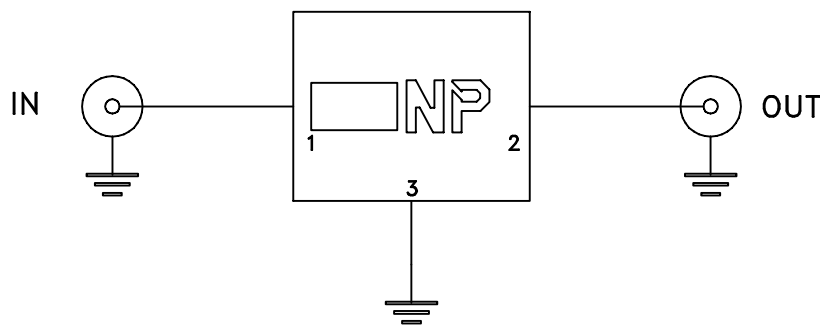
PL, NL1008C-6, TB-BFCQ-XXXX+

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-2602C+



Schematic Diagram

Notes:

1. 50 Ohm 1.85 Female connectors.
2. PCB Material: Megtron 7(N) or equivalent,
Dielectric Constant=3.4, 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	