

Ceramic Bandpass Filter

BFCG-1902+

50Ω 17.0 to 20.4 GHz

The Big Deal

- Low Insertion Loss – Mid band 1.5dB typical
- Pick and place standard case style
- Small size 2.0mm x 1.25mm
- High quality distributed filter topology



CASE STYLE: GE0805C-13

Product Overview

The BFCG-1902+ LTCC Band Pass Filter achieves a miniature size and high repeatability of performance at mmWave frequencies, by utilizing a proprietary LTCC material system and distributed filter topology. The passband loss at 17-20.4GHz is as low as 1.5dB, with typical stopband rejections at 38dB up to 39GHz. This model handles up to 1W RF input power, and provides a wide operating temperature range from -55 to +125°C.

Key Features

Feature	Advantages
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 (2.0mm x 1.25mm)	Allows for high layout density of circuit boards, while minimizing effects of parasitics.

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



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50Ω 17.0 to 20.4 GHz

BFCG-1902+



Generic photo used for illustration purposes only

CASE STYLE: GE0805C-13

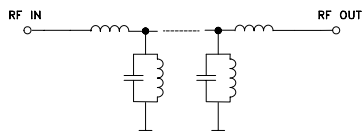
Features

- Small size
- Temperature stable
- Hermetically sealed
- LTCC construction

Applications

- Satcom

Functional Schematic



Electrical Specifications¹ at 25°C

Parameter	F#	Frequency (GHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—		18.6		GHz
	Insertion Loss	F1-F2	17 - 20.4	1.5	2.5	dB
	Return Loss	F1-F2	17 - 20.4	15	—	dB
Stop Band, Lower	Insertion Loss	DC-F3	DC - 10.8	30	38	dB
		F3-F4	10.8 - 13	20	24	dB
Stop Band, Upper	Insertion Loss	F4-F5	24.5 - 26	17	28	dB
		F5-F6	26 - 39	30	38	dB

1. Measured on Mini-Circuits Test Board TB-BFCG-1902C+ with feedline losses removed by normalization of S12 and S21 traces to measurement of TB thru-line.

Maximum Ratings

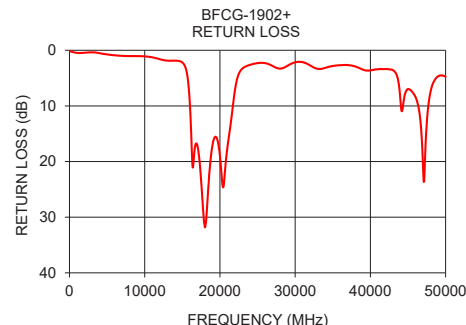
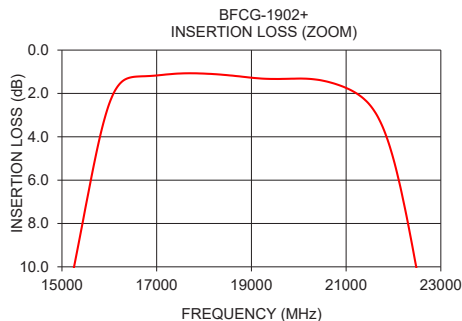
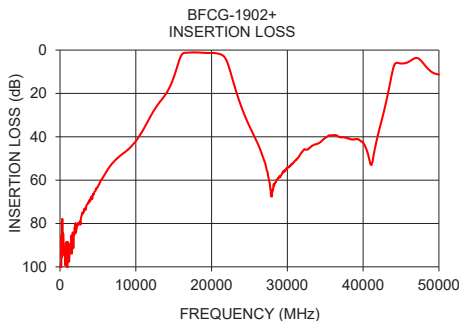
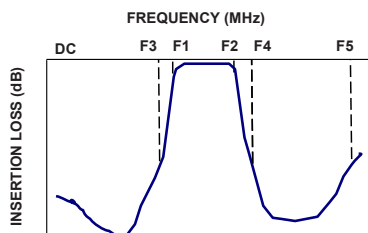
Operating Temperature	-55°C to 125°C
Storage Temperature	-55°C to 125°C
RF Power Input	1W at 25°C

Permanent damage may occur if any of these limits exceeded.

Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)
1000	90.70	0.46
5000	63.02	0.74
10800	37.82	1.22
12000	30.23	1.60
14000	20.04	1.87
15000	12.64	2.20
16000	2.46	9.59
17000	1.17	17.12
18000	1.08	31.84
19000	1.27	17.18
20400	1.37	24.61
21000	1.74	17.39
22000	5.03	7.14
23000	16.26	3.26
25000	35.11	2.30
30000	54.37	2.16
35000	40.47	2.83
40000	42.71	3.64
50000	11.24	4.77

Typical Frequency Response



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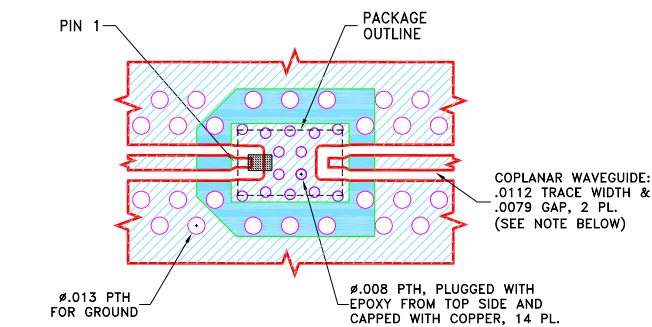
REV. OR
ECO-004775
BFCG-1902+
WY/CP/AM
201104
Page 2 of 3

Pad Connections

INPUT	1
OUTPUT	3
GROUND	2

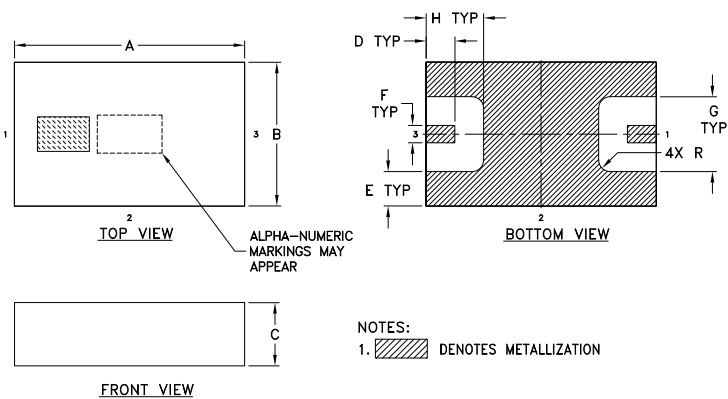
Product Marking: MF

Demo Board MCL P/N: TB-BFCG-1902C+
Suggested PCB Layout (PL-689)



- NOTES:
- TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR ROGERS RO4350B, DIELECTRIC THICKNESS: .0066±.0007; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
 - UNIT FOOT PRINT IS OPTIMIZED FOR PERFORMANCE AND IS DIFFERENT FROM CASE STYLE GE0805C-13 RECOMMENDATIONS.
 - BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- Legend:
- Blue box: DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).
 - Hatched box: DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

Outline Drawing



- NOTES:
1. Hatched box: DENOTES METALLIZATION

Outline Dimensions (inch mm)

A	B	C	D	E	F	G	H	wt
.079	.049	.022	.010	.012	.006	.026	.020	grams
2.01	1.24	0.56	0.25	0.30	0.15	0.66	0.51	0.011

Notes

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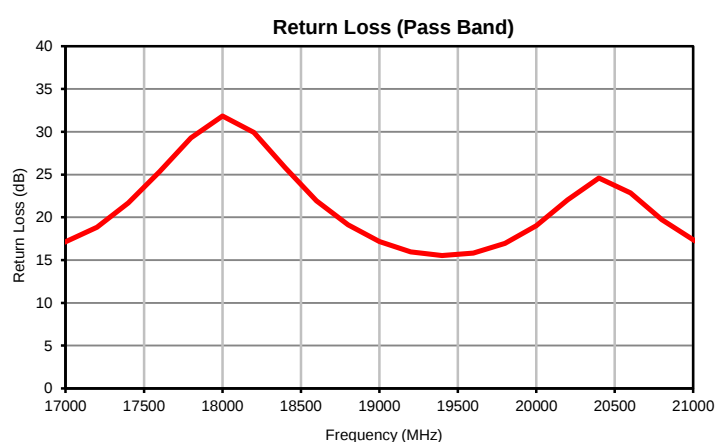
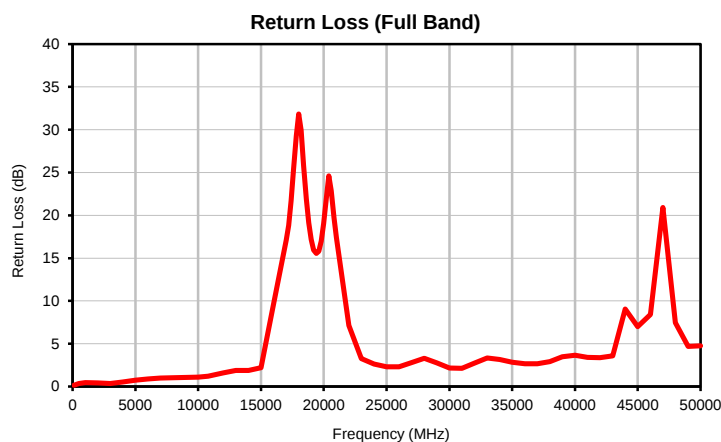
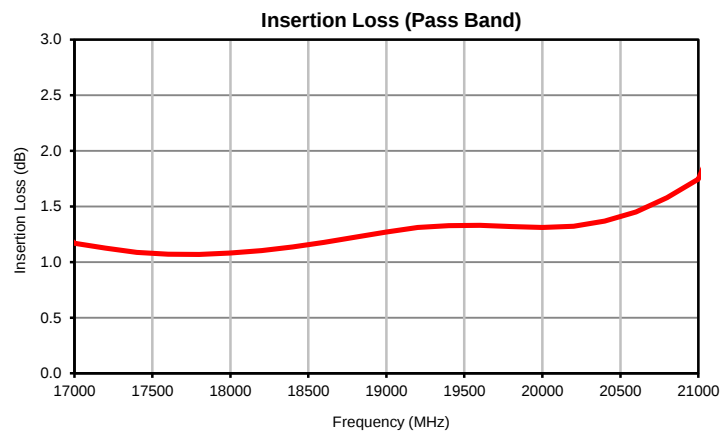
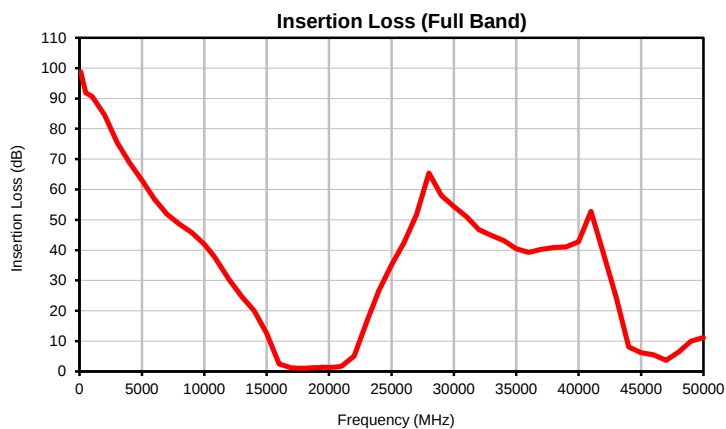
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Typical Performance Data

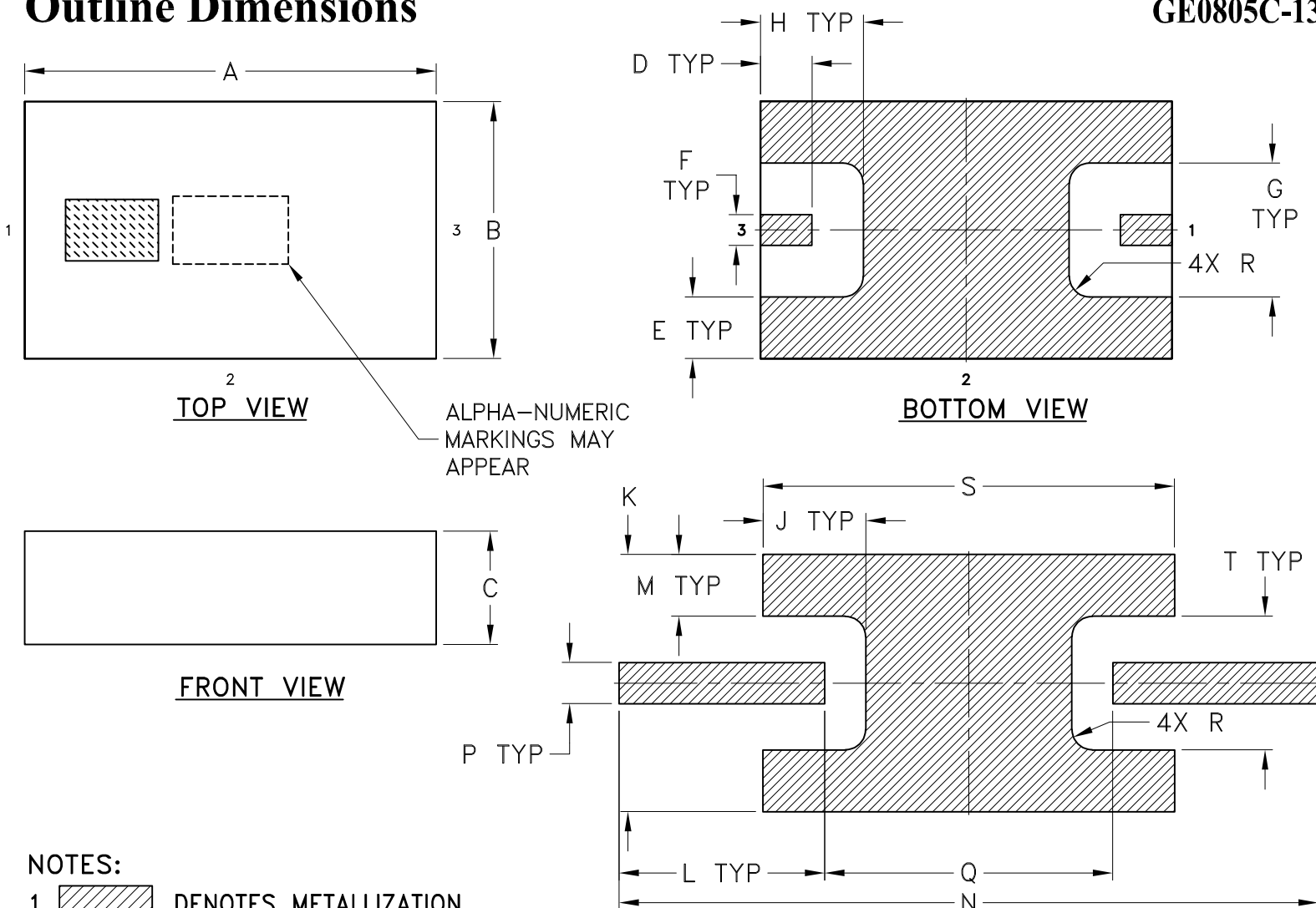
FREQUENCY (MHz)	INSERTION LOSS (dB)	RETURN LOSS (dB)
100	98.77	0.15
500	91.91	0.35
1000	90.70	0.46
2000	84.55	0.44
3000	75.58	0.37
4000	68.86	0.53
5000	63.02	0.74
6000	56.79	0.90
7000	51.88	1.00
8000	48.61	1.04
9000	45.78	1.05
10000	41.98	1.10
10800	37.82	1.22
12000	30.23	1.60
13000	24.72	1.86
14000	20.04	1.87
15000	12.64	2.20
16000	2.46	9.59
17000	1.17	17.12
17200	1.12	18.83
17400	1.09	21.69
17600	1.07	25.34
17800	1.07	29.27
18000	1.08	31.84
18200	1.10	29.93
18400	1.14	25.80
18600	1.18	21.93
18800	1.22	19.13
19000	1.27	17.18
19200	1.31	15.96
19400	1.33	15.54
19600	1.33	15.80
19800	1.32	16.97
20000	1.31	19.02
20200	1.32	22.03
20400	1.37	24.61
20600	1.45	22.86
20800	1.58	19.73
21000	1.74	17.39
22000	5.03	7.14
23000	16.26	3.26
24000	26.81	2.62
25000	35.11	2.30
26000	42.47	2.31
27000	51.68	2.82
28000	65.37	3.29
29000	58.02	2.77
30000	54.37	2.16
31000	51.13	2.14
32000	46.81	2.74
33000	44.91	3.33
34000	43.14	3.17
35000	40.47	2.83
36000	39.24	2.68
37000	40.23	2.68
38000	40.82	2.92
39000	41.10	3.47
40000	42.71	3.64
41000	52.78	3.39
42000	38.55	3.37
43000	24.46	3.57
44000	8.04	9.05
45000	6.18	6.98
46000	5.44	8.40
47000	3.62	20.92
48000	6.34	7.45
49000	9.96	4.69
50000	11.24	4.77

Typical Performance Curves



Outline Dimensions

GE0805C-13



NOTES:

1. DENOTES METALLIZATION

Suggested Layout,
Tolerance to be within $\pm 0.002[.05]$

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
GE0805C-13	.079 (2.00)	.049 (1.25)	.022 (.55)	.010 (.25)	.012 (.30)	.006 (.15)	.026 (.65)	.020 (.50)	.020 (.50)	.049 (1.25)	.039 (1.00)	.012 (.30)	.134 (3.40)	.008 (.20)	.055 (1.40)	.004 (.10)
CASE#	S	T	WT, GRAM													
GE0805C-13	.079 (2.00)	.026 (.65)	0.011													

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm 0.01(.25)$; 3 Pl. $\pm 0.005(.100)$

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 over Nickel plate. All models, no (+) suffix.

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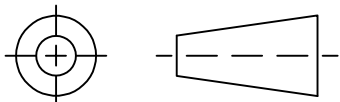
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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

RF/IF MICROWAVE COMPONENTS

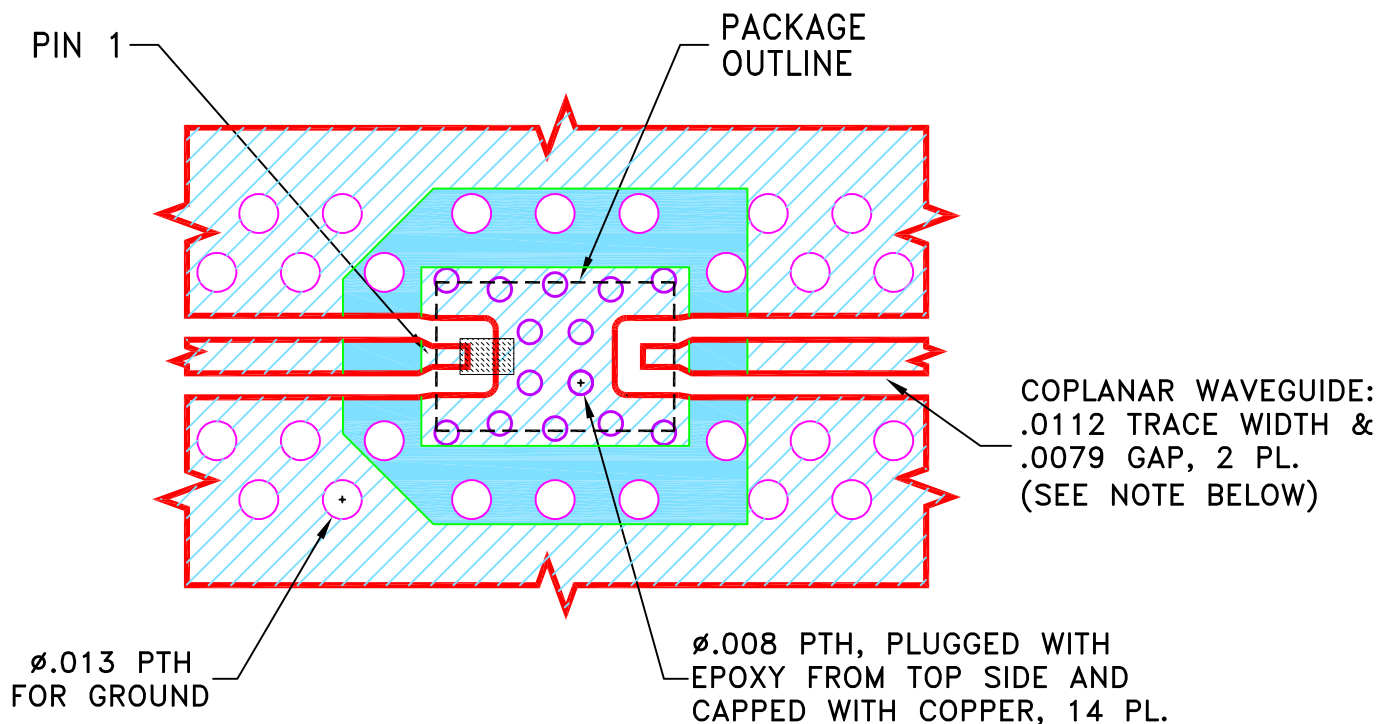
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-003933	NEW RELEASE	03/04/20	ITG	IL

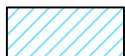
SUGGESTED MOUNTING CONFIGURATION
FOR GE0805C-13 CASE STYLE

NOTES:

1. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR ROGERS R04350B, DIELECTRIC THICKNESS: $.0066 \pm .0007$; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. UNIT FOOT PRINT IS OPTIMIZED FOR PERFORMANCE AND IS DIFFERENT FROM CASE STYLE GE0805C-13 RECOMMENDATIONS.
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

DIMENSIONS ARE IN INCHES

TOLERANCES ON:
2 PL DECIMALS $\pm$
3 PL DECIMALS $\pm$.005
ANGLES $\pm$
FRACTIONS $\pm$



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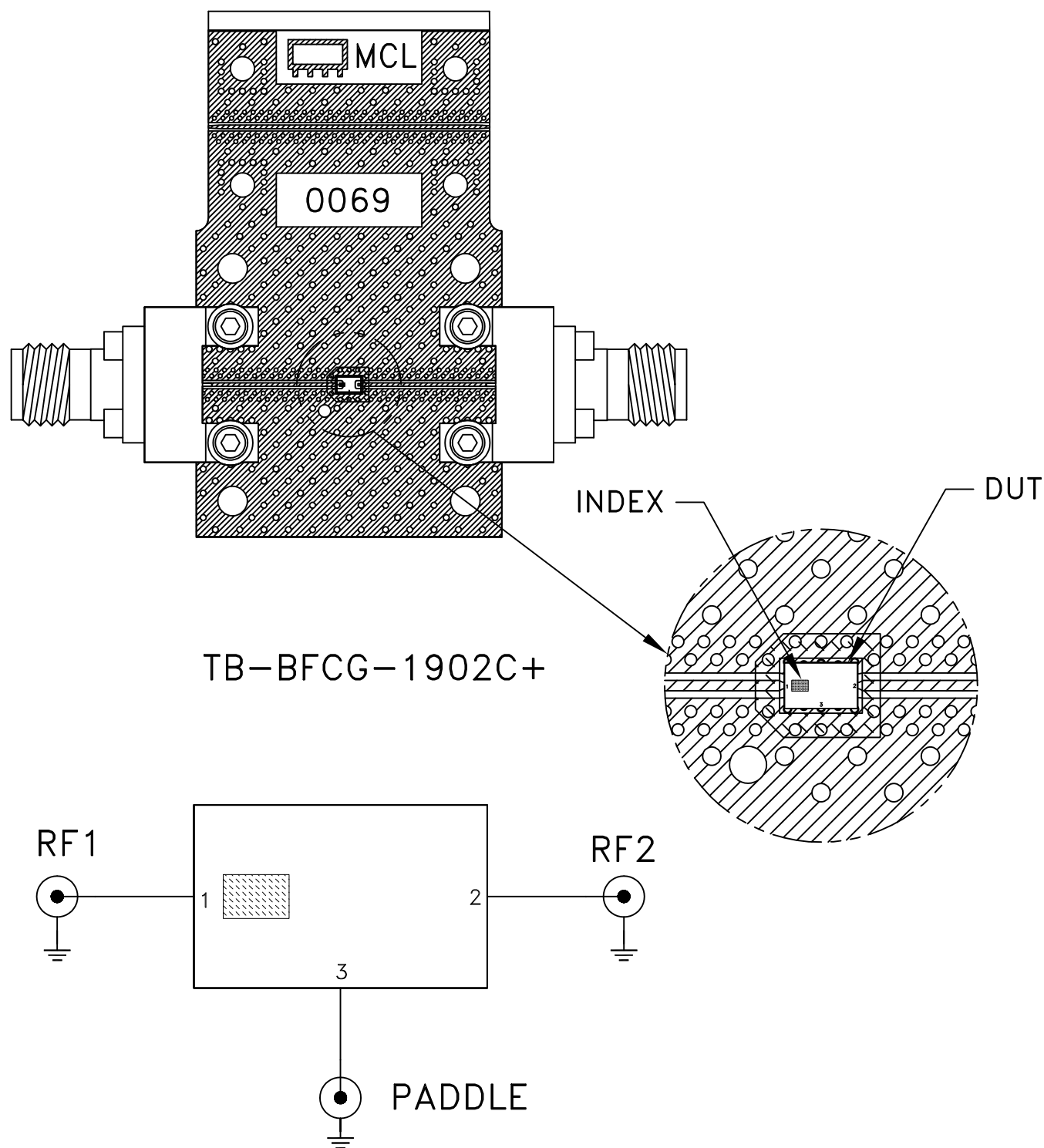
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1 OF 1

Evaluation Board and Circuit



TB-BFCG-1902C+

Schematic Diagram

Notes:

1. 50 Ohm 2.40mm Female end launch connectors.
2. PCB Material: R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.0066 inch.



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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	