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
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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

+RoHS Compliant

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

Features

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

Applications

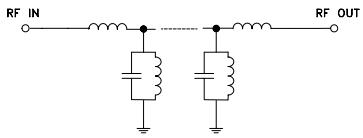
- Satcom

Electrical Specifications[1] 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	—	
Stop Band, Upper	Insertion Loss	F4-F5	24.5 - 26	17	28	—	dB
		F5-F6	26 - 39	30	38	—	

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.

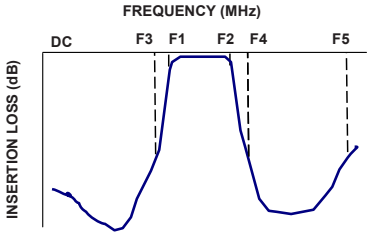
Functional Schematic



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

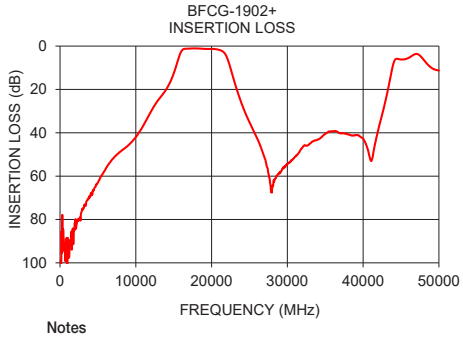
Permanent damage may occur if any of these limits exceeded.

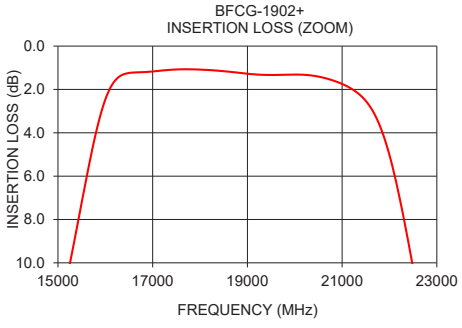
Typical Frequency Response

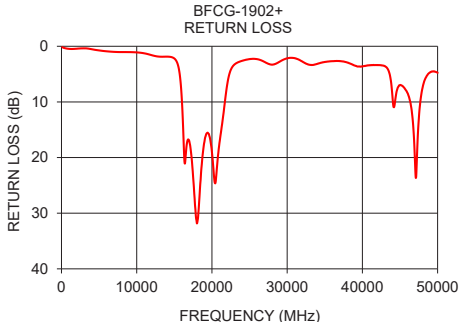


Typical Performance Data at 25°C

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







Notes

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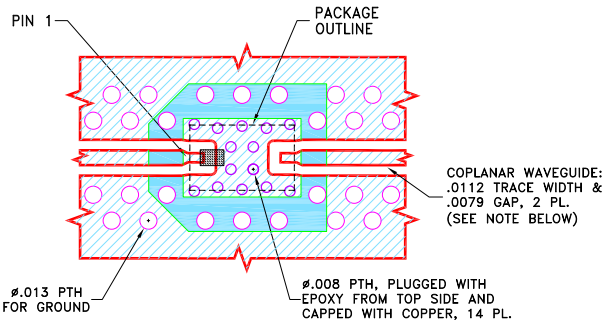
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Pad Connections

INPUT	1
OUTPUT	3
GROUND	2

Product Marking: MF

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

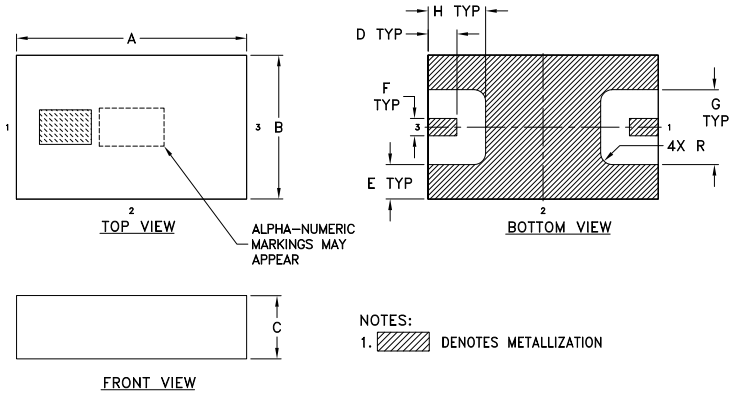


NOTES:
1. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR ROGERS RO4350B, DIELECTRIC THICKNESS: .0066±.0007; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. UNIT FOOT PRINT IS OPTIMIZED FOR PERFORMANCE AND IS DIFFERENT FROM CASE STYLE GE0805C-13 RECOMMENDATIONS.
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.

Outline Drawing



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

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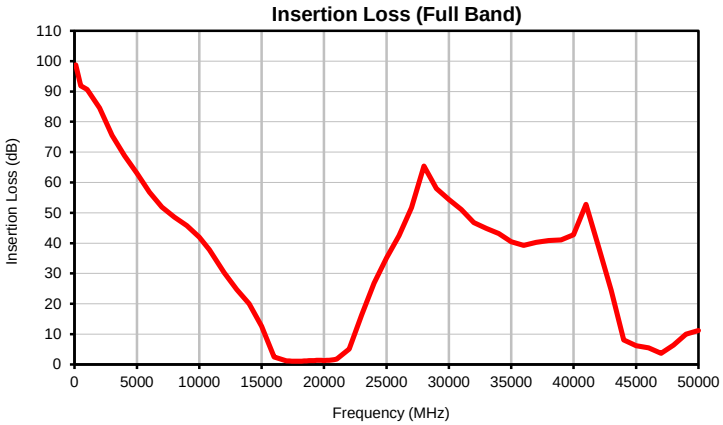
Ceramic Bandpass Filter BFCG-1902+

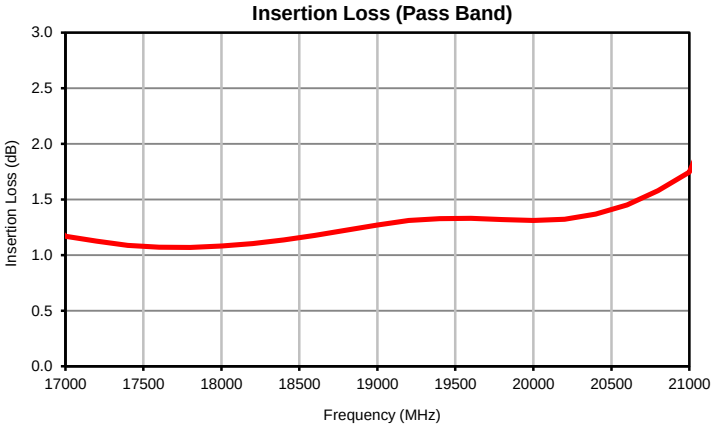
Typical Performance Data

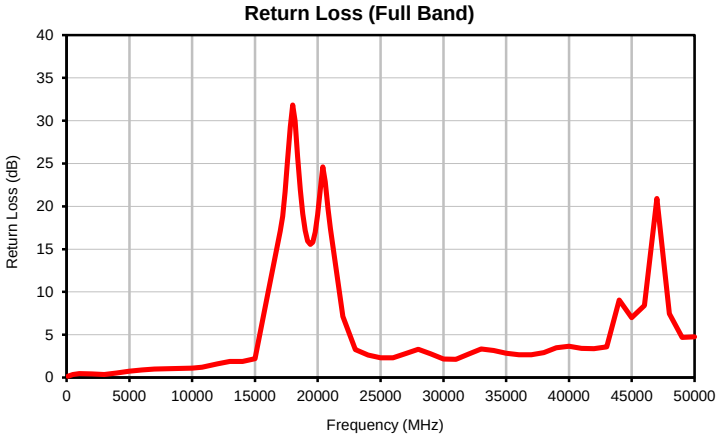
FREQUENCY (MHz)	INSERTION LOSS (dB)	RETURN LOSS (dB)
100	98.77	0.15
500	91.91	0.35
1000	90.70	0.46
2000	84.55	0.44
3000	75.58	0.37
4000	68.86	0.53
5000	63.02	0.74
6000	56.79	0.90
7000	51.88	1.00
8000	48.61	1.04
9000	45.78	1.05
10000	41.98	1.10
10800	37.82	1.22
12000	30.23	1.60
13000	24.72	1.86
14000	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

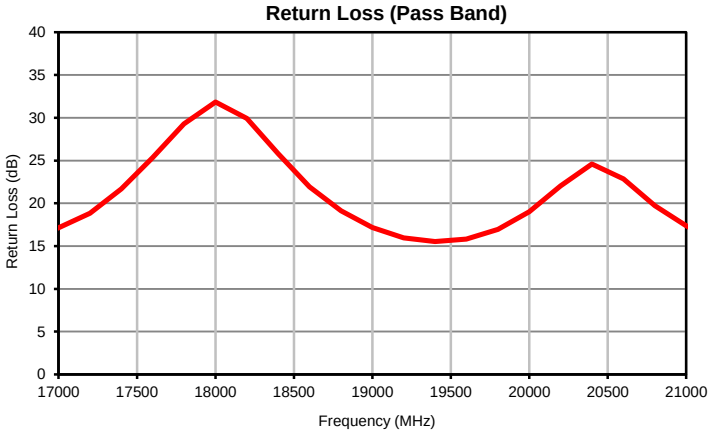
Ceramic Bandpass Filter BFCG-1902+

Typical Performance Curves





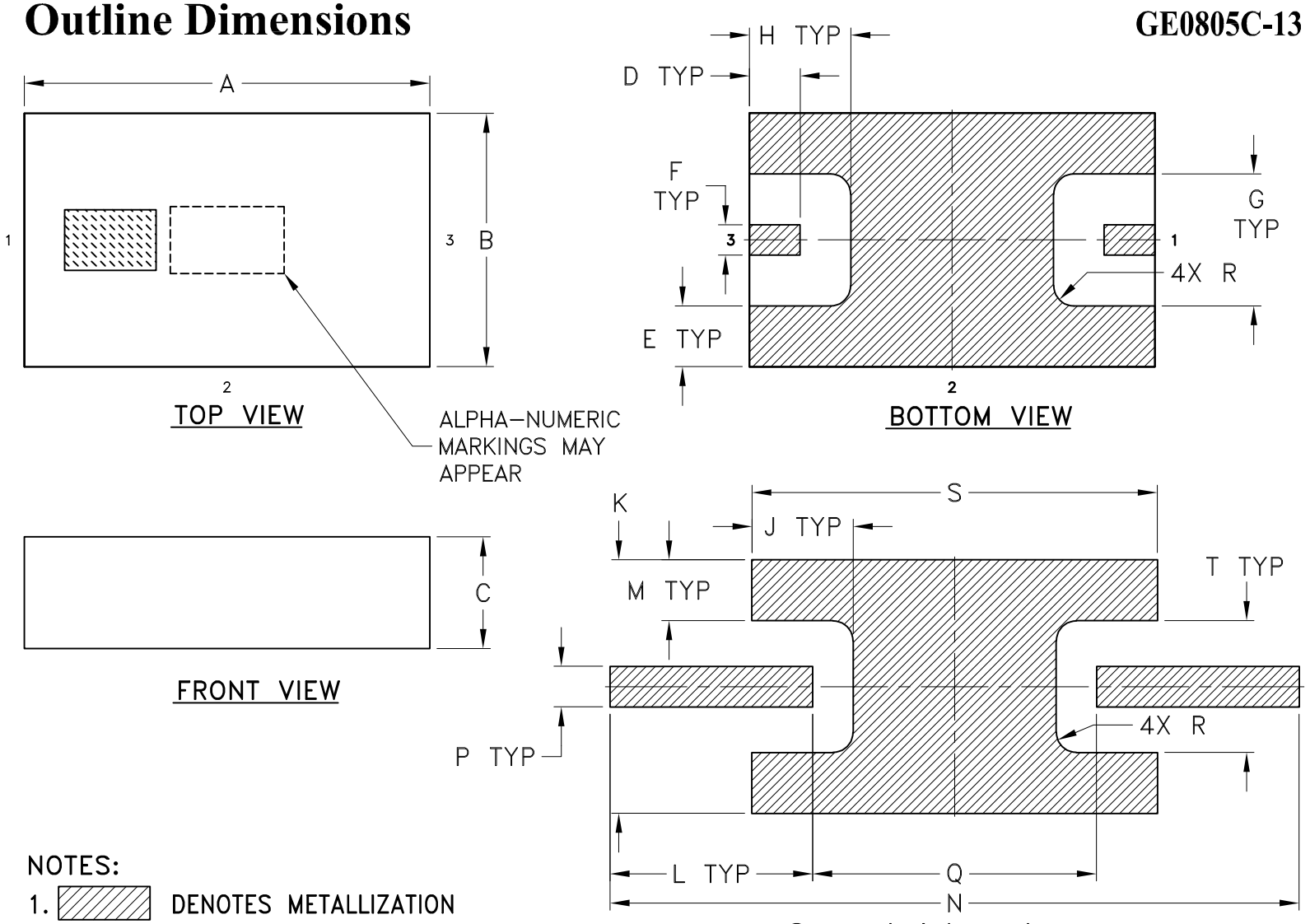




Case Style GE

Outline Dimensions

GE0805C-13



NOTES:
1. DENOTES METALLIZATION

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.±.01(.25); 3 Pl. ±.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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RF/IF MICROWAVE COMPONENTS

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Tape & Reel Packaging TR-F114

DEVICE ORIENTATION IN T&R

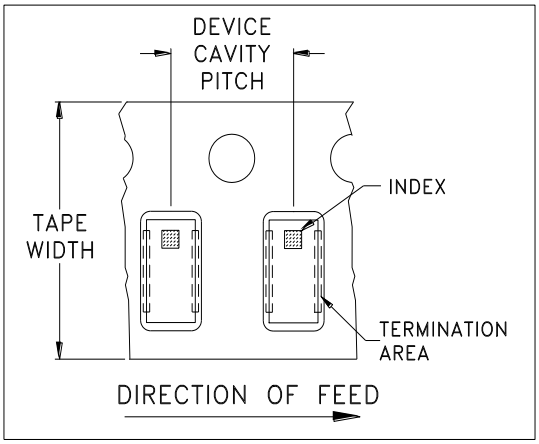


ILLUSTRATION 1

Applicable Case Styles	
GE0805C	JC0603C
GE0805C-1	JC0603C-4
GE0805C-1AP	JC0603C-6
GE0805C-7	
GE0805C-9	
GE0805C-10	
GE0805C-11	
GE0805C-12	

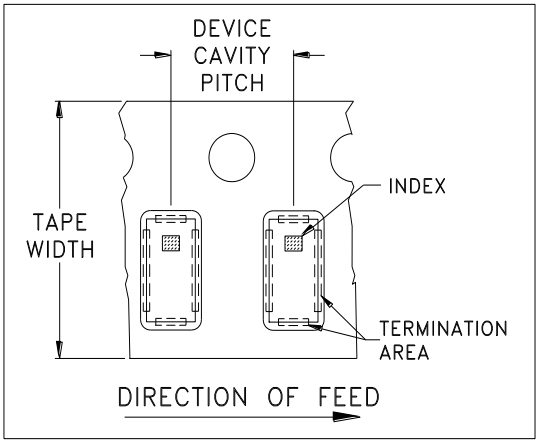


ILLUSTRATION 2

Applicable Case Styles	
GE0805C-2	JC0603C-1
GE0805C-3	JC0603C-2
GE0805C-4	JC0603C-3
GE0805C-5	JC0603C-5
GE0805C-6	JC0603C-7
GE0805C-8	
GE0805C-15	

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	4000

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

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

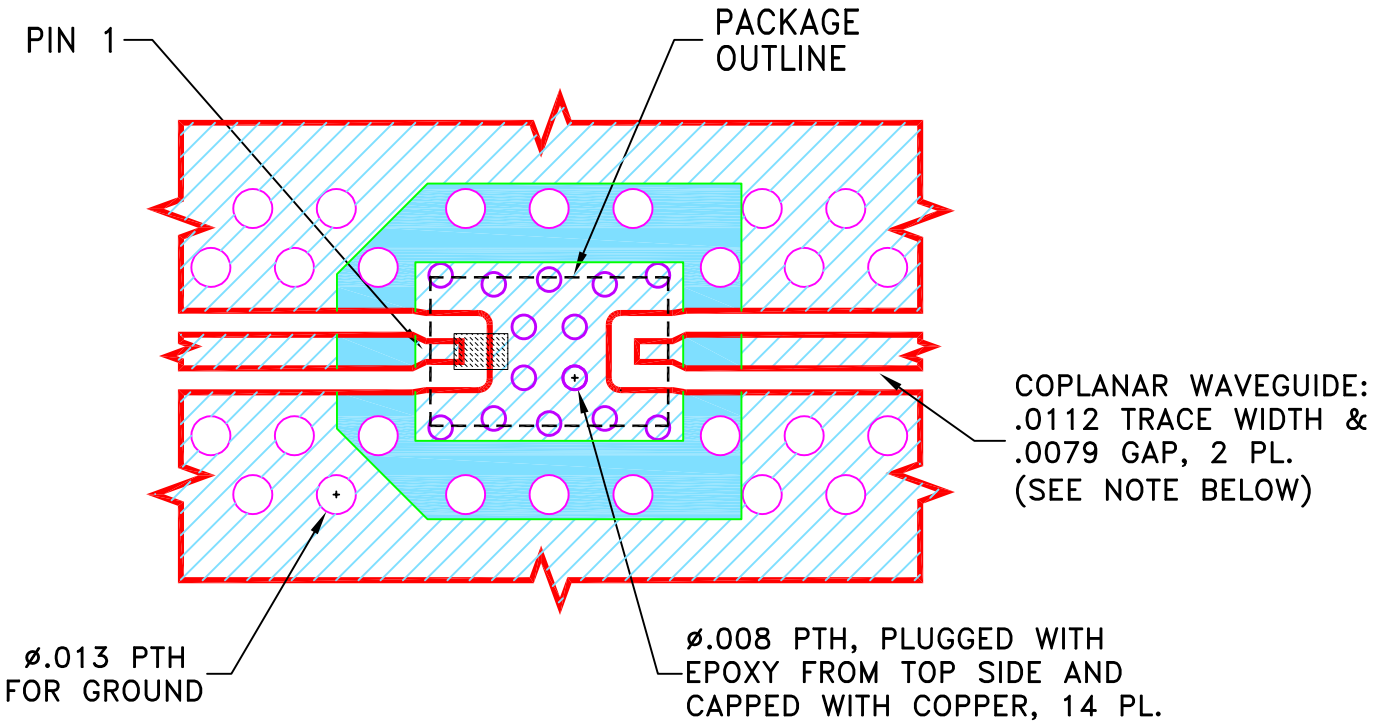
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THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	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 RO4350B, DIELECTRIC THICKNESS: .0066±.0007; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
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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	09/03/20
TOLERANCES ON:	CHECKED	GF	09/03/20
2 PL DECIMALS ±	APPROVED	IL	09/03/20
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

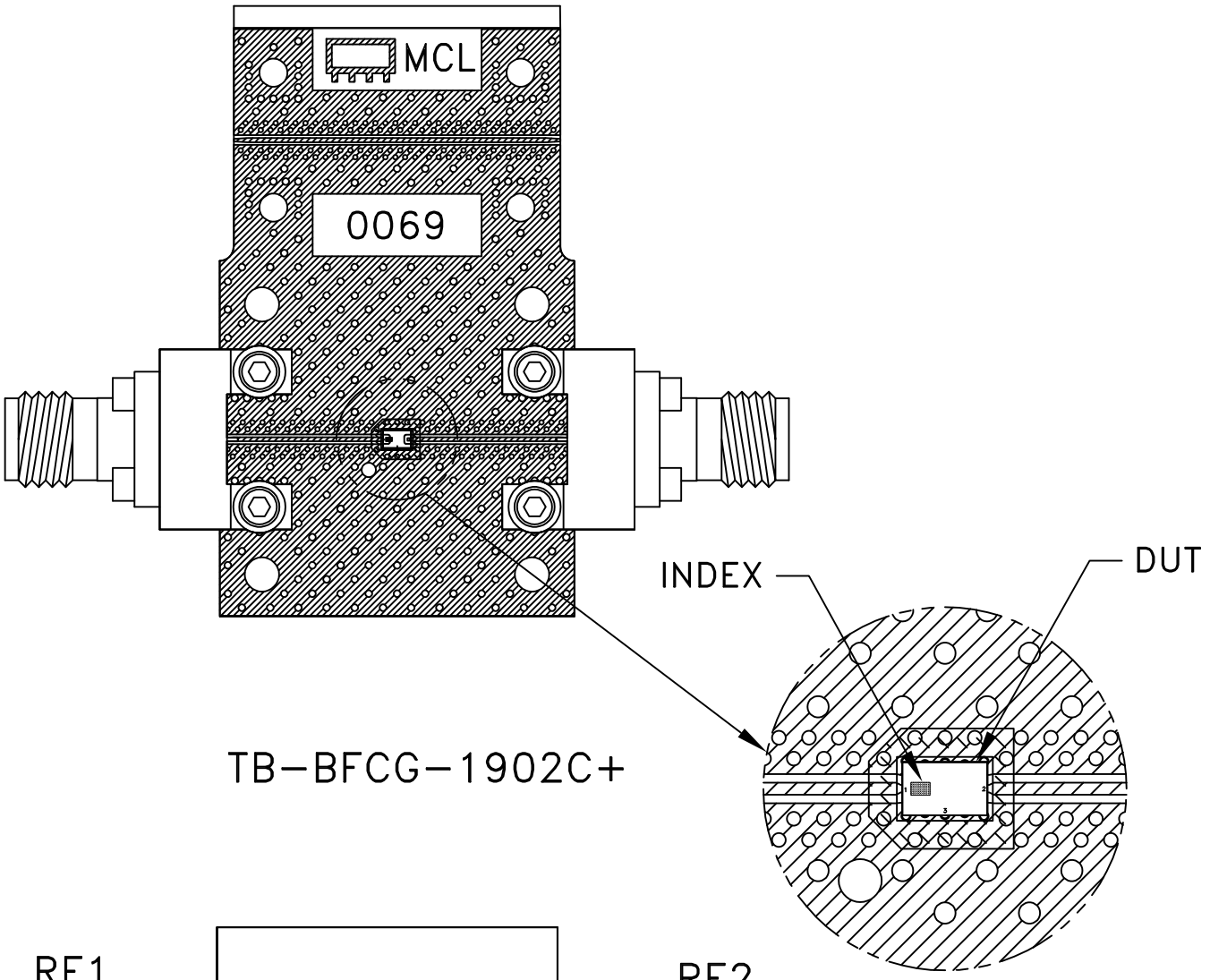
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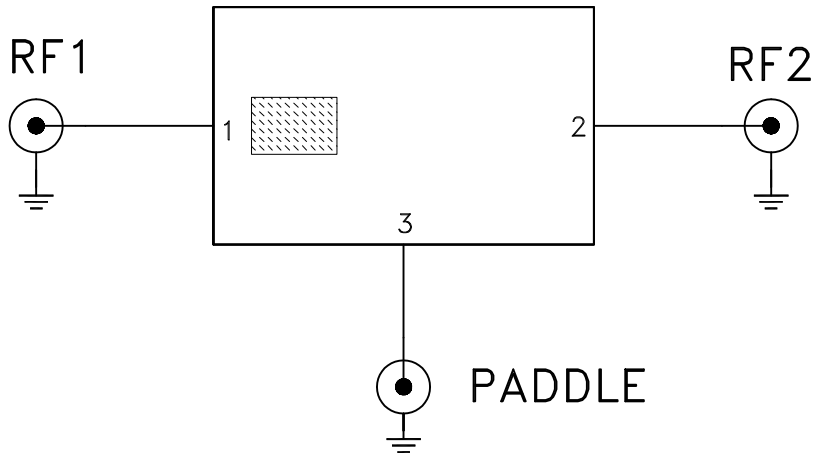
PL, GE0805C-13, TB-BFCG-XXXXC+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-689	OR

FILE:	SCALE:	SHEET:
98PL689	15:1	1 OF 1

Evaluation Board and Circuit





Schematic Diagram

Notes:

1. 50 Ohm 2.40mm Female end launch connectors.
2. PCB Material: RO4350 or equivalent,
   Dielectric Constant=3.5, Thickness=.0066 inch.

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Mini-Circuits

Environmental Specifications ENV06T8

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	

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