CERAMIC

Bandpass Filter & Balun BBFCG1-252+

50Ω 2400 to 2500 MHz

THE BIG DEAL

- Tiny size, (0805)
- Compact design includes Balun & Filter in one package
- Low cost



Generic photo used for illustration purposes only

CASE STYLE: GE0805C-2

+RoHS Compliant

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

APPLICATIONS

- ISM Band
- Bluetooth
- Zigbee
- WiFi / WLAN

PRODUCT OVERVIEW

Mini-Circuits' BBFCG1-252+ is a tiny ceramic RF balun filter with an impedance ratio of 1:1, covering a variety of wireless communications applications from 2400 to 2500 MHz. This model provides low insertion loss, low phase unbalance (relative to 180°), low amplitude unbalance, and RF input power handling up to 1W. It provides DC isolation from input to output allowing it to be used for DC biasing of external circuits at the output. Fabricated using LTCC technology, the unit comes housed in a tiny, rugged ceramic package (0.079" x 0.049" x 0.037") suitable for harsh operating environments.

KEY FEATURES

Feature	Advantages
Compact Design	Integrates fiter and balun in one tiny package
1W power handling	Supports a wide range of power requirements
DC Isolated from input to output	Can be used to DC bias external circuits at the output.
Tiny size, 0805	Accommodates tight space requirements for dense PCB layouts.
LTCC construction	LTCC process enables tiny size and low cost, suitable for high-volume production. Rugged ceramic package provides excellent reliability in harsh operating environments.

Bandpass Filter & Balun BBFCG1-252+

ELECTRICAL SPECIFICATIONS AT 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Impedance Ratio					1		
Pass Band	Insertion Loss[1]	F1-F2	2400 - 2500	—	—	3.5	dB
	Return Loss	F1-F2	2400 - 2500	7.5	15	—	
Stop Band, Lower	Rejection	DC- F3	DC - 1800	29	35	—	dB
Stop Band, Upper	Rejection	F4-F5	3500 - 6600	24	—	—	dB
		F5-F6	6600 - 8000	20	—	—	
Amplitude Unbalance		F1-F2	2400 - 2500	—	—	1.8	dB
Phase Unbalance		F1-F2	2400 - 2500	—	—	12	Degree

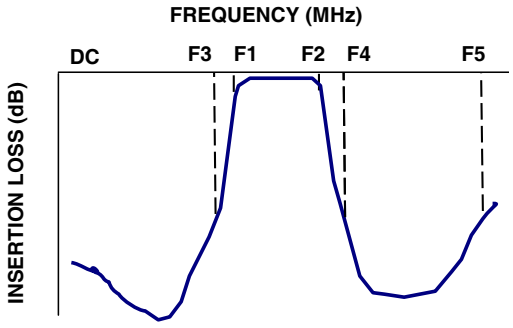
1.Tested on Evaluation Board TB-BBFCG1-252+

MAXIMUM RATINGS

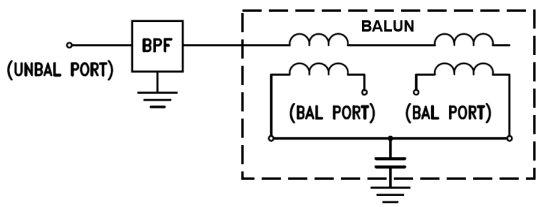
Parameter	Ratings
Operating Temperature	-55°C to 125°C
Storage Temperature[2]	-55°C to 125°C
RF Power Input[3]	1W at 25°C

2.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
3.Derate linearly to 0.25W at 125°C.
Permanent damage may occur if any of these limits exceeded.

TYPICAL FREQUENCY RESPONSE



FUNCTIONAL SCHEMATIC



Bandpass Filter & Balun BBFCG1-252+

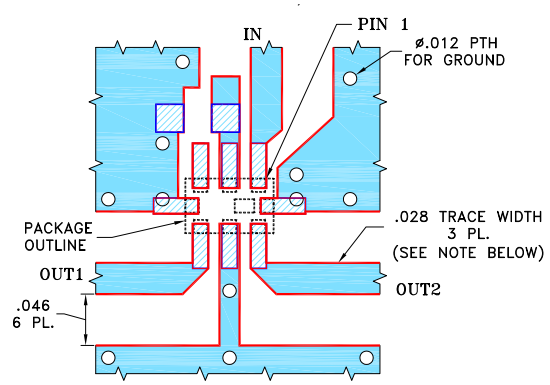
PAD CONNECTIONS

UNBALANCED PORT	1
BALANCED PORT	5,7
GROUND	4,6,8
NC	3
NC or DC Feed	2

PRODUCT MARKING: N/A

DEMO BOARD MCL P/N: TB-BBFCG1-252+

SUGGESTED PCB LAYOUT (PL-551)



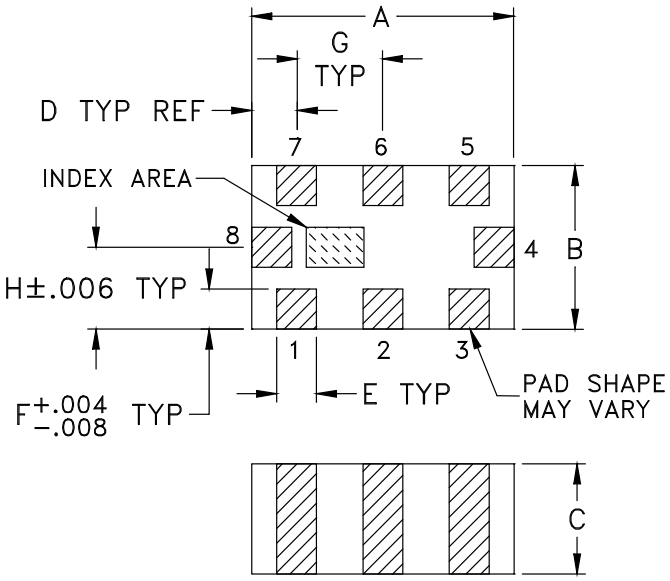
NOTES:

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 (Inches / mm)

A	B	C	D	E
.079	.049	.037	.014	.012
2.01	1.24	0.94	0.36	0.30

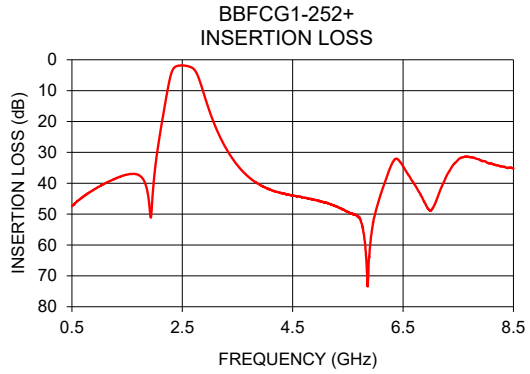
F	G	H	wt
.012	.026	.025	grams
0.30	0.66	0.64	.008

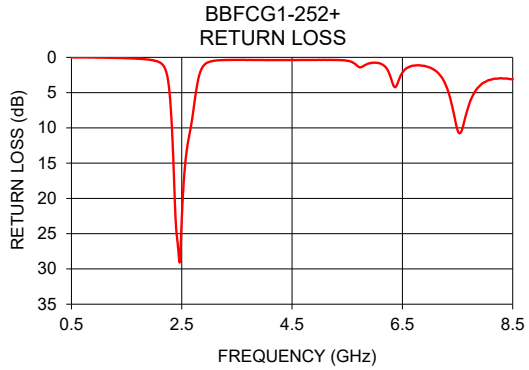
CERAMIC

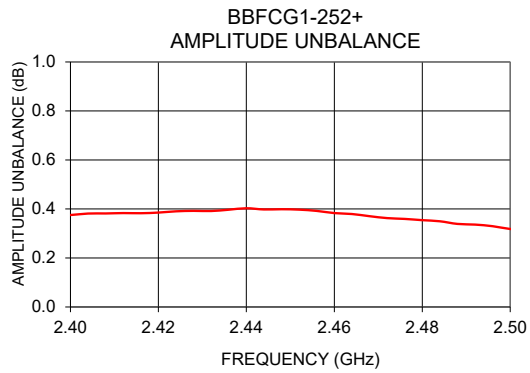
Bandpass Filter & Balun BBFCG1-252+

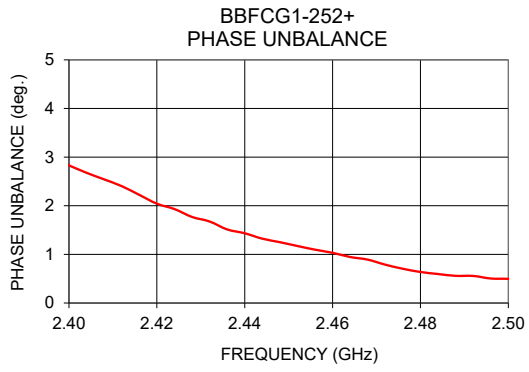
TYPICAL PERFORMANCE DATA

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)	Amplitude Unbalance (dB)	Phase Unbalance (Deg.)
0.50	47.45	0.01	5.69	156.12
0.70	44.41	0.01	5.95	161.63
1.00	41.01	0.04	6.31	165.18
1.50	37.18	0.13	6.50	167.44
2.00	36.33	0.45	3.63	156.15
2.40	2.05	24.38	0.38	2.83
2.45	1.87	28.71	0.40	1.17
2.50	1.83	22.94	0.32	0.50
3.50	34.20	0.35	3.82	175.71
4.80	45.05	0.37	1.36	179.32
4.90	45.38	0.37	1.36	179.13
5.00	45.90	0.36	1.35	178.90
5.90	60.87	0.85	0.25	177.26
7.20	41.18	2.70	0.24	174.36
7.50	32.30	10.33	0.14	174.80
8.50	35.24	3.11	0.42	175.67









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

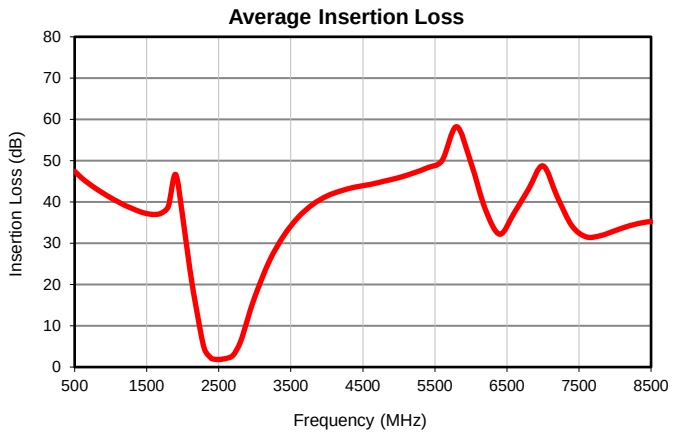
Ceramic Balance Filter BBFCG1-252+

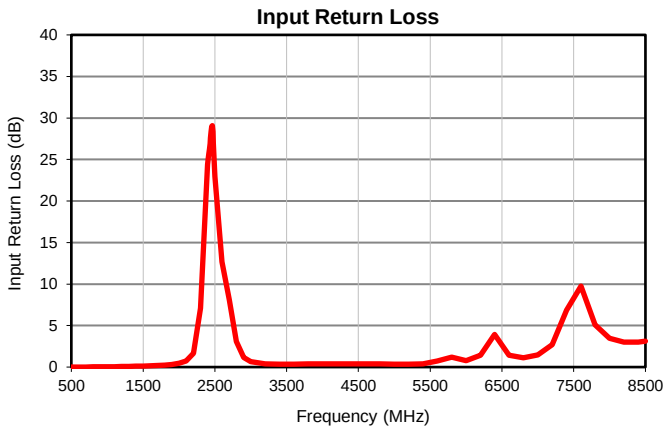
Typical Performance Data

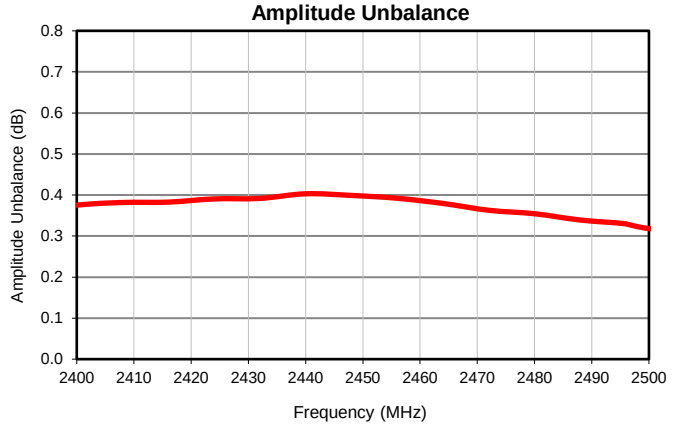
FREQUENCY (MHz)	INSERTION LOSS (dB)	RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)
500	47.45	0.01	5.69	156.12
600	45.76	0.01	5.85	159.31
700	44.41	0.01	5.95	161.63
800	43.17	0.02	6.08	163.27
900	42.07	0.03	6.14	164.44
1000	41.01	0.04	6.31	165.18
1100	40.06	0.05	6.35	165.87
1200	39.15	0.06	6.45	166.29
1300	38.41	0.08	6.56	166.73
1400	37.69	0.10	6.56	167.07
1500	37.18	0.13	6.50	167.44
1600	36.98	0.16	6.27	167.99
1700	37.28	0.19	5.66	169.78
1800	38.94	0.25	4.45	173.13
1900	46.68	0.32	1.83	178.66
2000	36.33	0.45	3.63	156.15
2100	23.57	0.72	8.21	72.13
2200	13.08	1.64	2.62	23.18
2300	4.45	7.09	0.24	8.92
2400	2.05	24.38	0.38	2.83
2408	2.01	25.09	0.38	2.54
2416	1.97	25.69	0.38	2.22
2424	1.94	26.23	0.39	1.93
2432	1.92	26.88	0.39	1.68
2440	1.90	27.59	0.40	1.43
2448	1.88	28.37	0.40	1.25
2456	1.86	28.98	0.39	1.10
2464	1.85	29.08	0.38	0.95
2472	1.84	28.35	0.36	0.79
2480	1.84	26.99	0.35	0.64
2488	1.83	25.36	0.34	0.56
2496	1.83	23.71	0.33	0.50
2500	1.83	22.94	0.32	0.50
2600	2.08	12.67	0.18	0.40
2700	2.89	8.10	0.29	1.30
2800	6.07	3.08	0.96	0.22
2900	11.57	1.14	3.67	12.16
3000	16.99	0.64	13.14	31.29
3200	25.59	0.40	10.18	172.09
3400	31.77	0.35	4.96	174.56
3600	36.23	0.36	3.08	176.83
3800	39.35	0.37	2.19	177.89
4000	41.43	0.38	1.79	178.90
4200	42.71	0.38	1.58	179.40
4400	43.63	0.38	1.44	179.90
4600	44.24	0.38	1.39	179.63
4800	45.05	0.37	1.36	179.32
5000	45.90	0.36	1.35	178.90
5200	47.00	0.35	1.42	178.48
5400	48.31	0.40	1.62	177.26
5600	50.07	0.73	1.05	167.81
5800	58.23	1.20	0.09	176.80
6000	49.51	0.75	1.14	179.71
6200	38.23	1.43	1.01	176.69
6400	32.18	3.92	0.88	175.90
6600	37.35	1.43	0.78	175.42
6800	43.11	1.12	0.72	174.87
7000	48.74	1.45	0.56	172.88
7200	41.18	2.70	0.24	174.36
7400	34.26	6.86	0.19	174.58
7600	31.54	9.74	0.10	174.92
7800	31.84	5.08	0.00	175.01
8000	33.05	3.49	0.12	175.19
8200	34.23	3.02	0.24	175.46
8400	35.04	3.01	0.37	175.61
8500	35.24	3.11	0.42	175.67

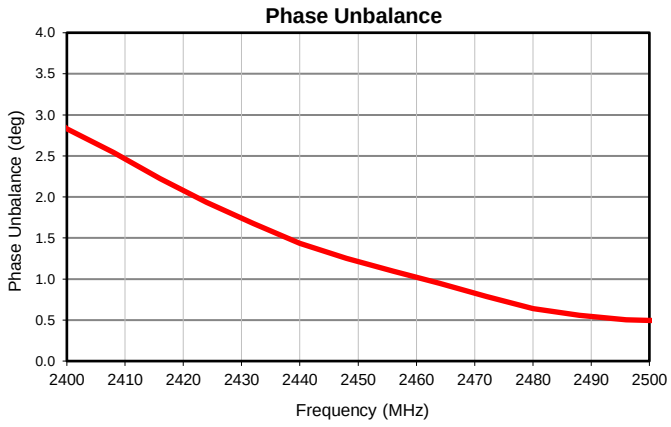
Ceramic Balance Filter BBFCG1-252+

Typical Performance Data





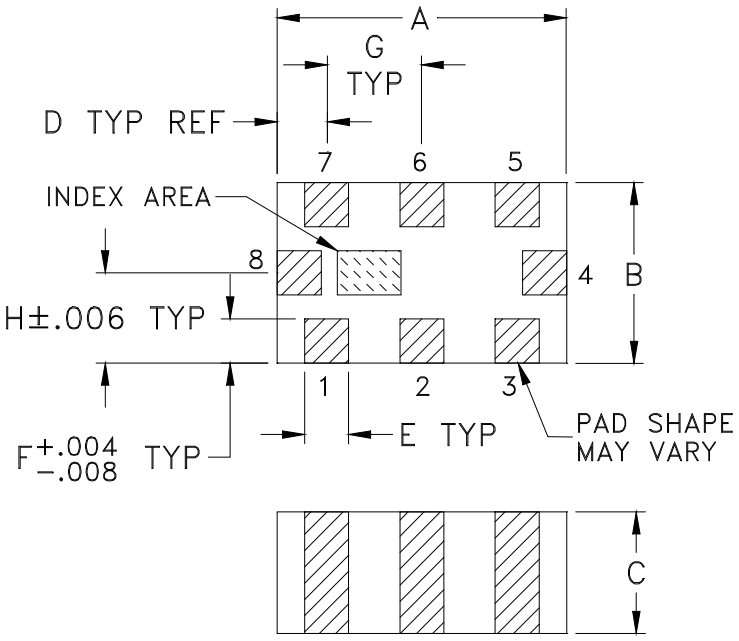




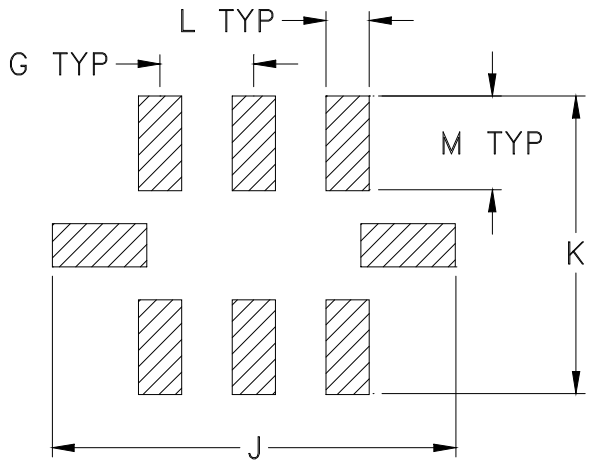
Case Style GE

GE0805C-2

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	L
GE0805C-2	.079 (2.00)	.049 (1.25)	.037 (0.95)	.014 (0.35)	.012 (0.30)	.012 (0.30)	.026 (0.65)	.025 (0.63)	.134 (3.40)	.110 (2.80)	.014 (0.35)

CASE #	M	WT. GRAM
GE0805C-2	.039 (1.00)	.008

Dimensions are in inches (mm). Tolerances: 2Pl. ± .01; 3 Pl. ± .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 over Nickel plate. All models, no (+) suffix.
3. Pad tolerance to be non-cumulative. Minimum spacing between each pad is .004 (0.1).

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Tape & Reel Packaging TR-F114

DEVICE ORIENTATION IN T&R

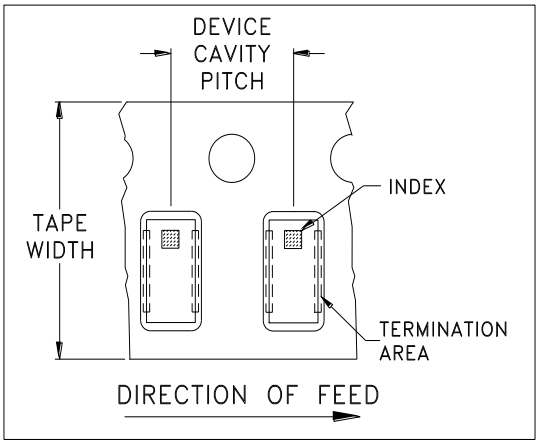


ILLUSTRATION 1

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

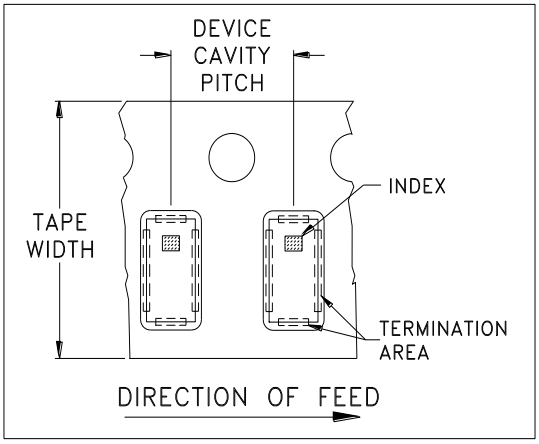


ILLUSTRATION 2

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

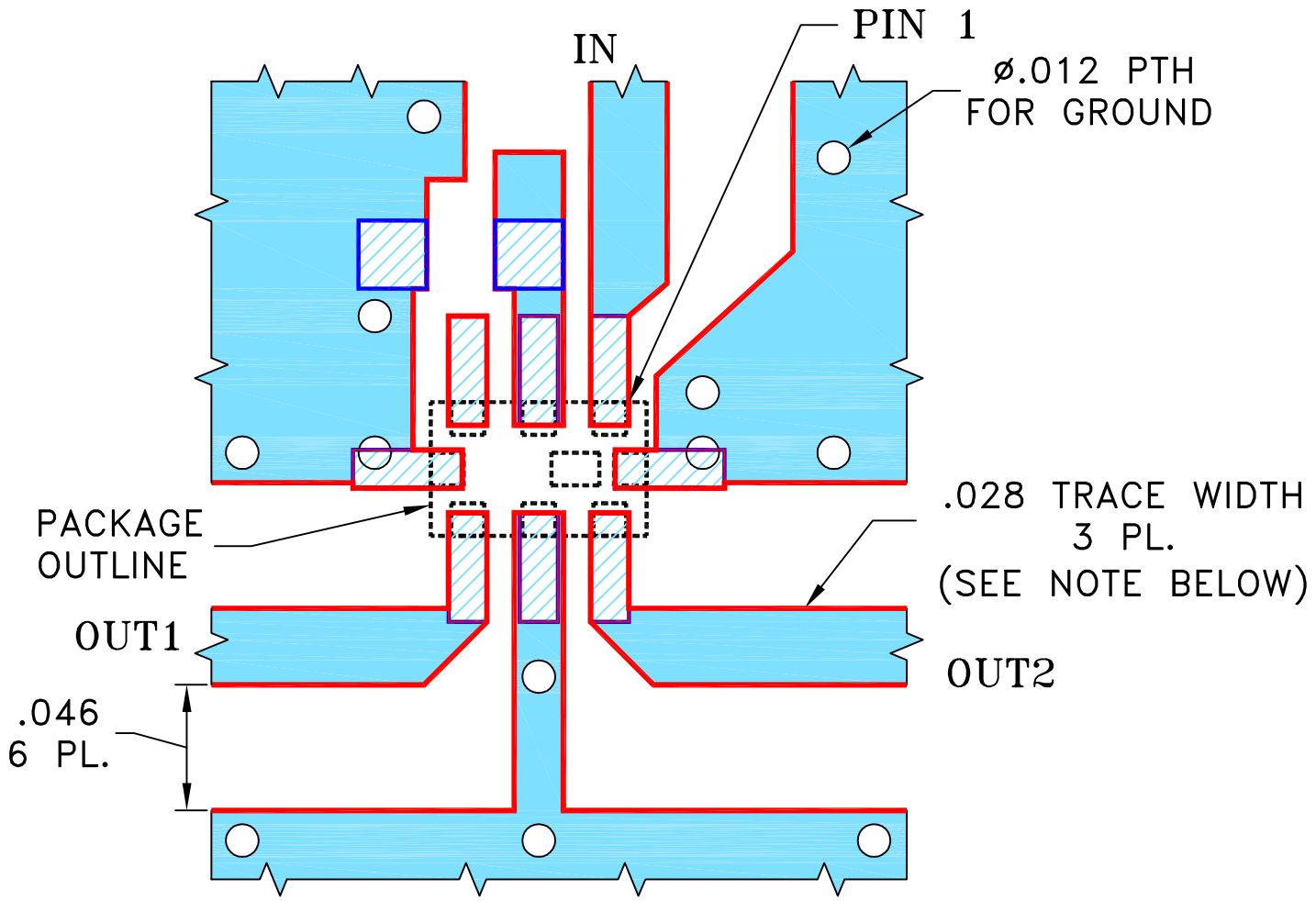
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THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M168200	NEW RELEASE	05/31/18	NP	SL

SUGGESTED MOUNTING CONFIGURATION
FOR GE0805C-2 CASE STYLE, "08TJ01" 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 ±			

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

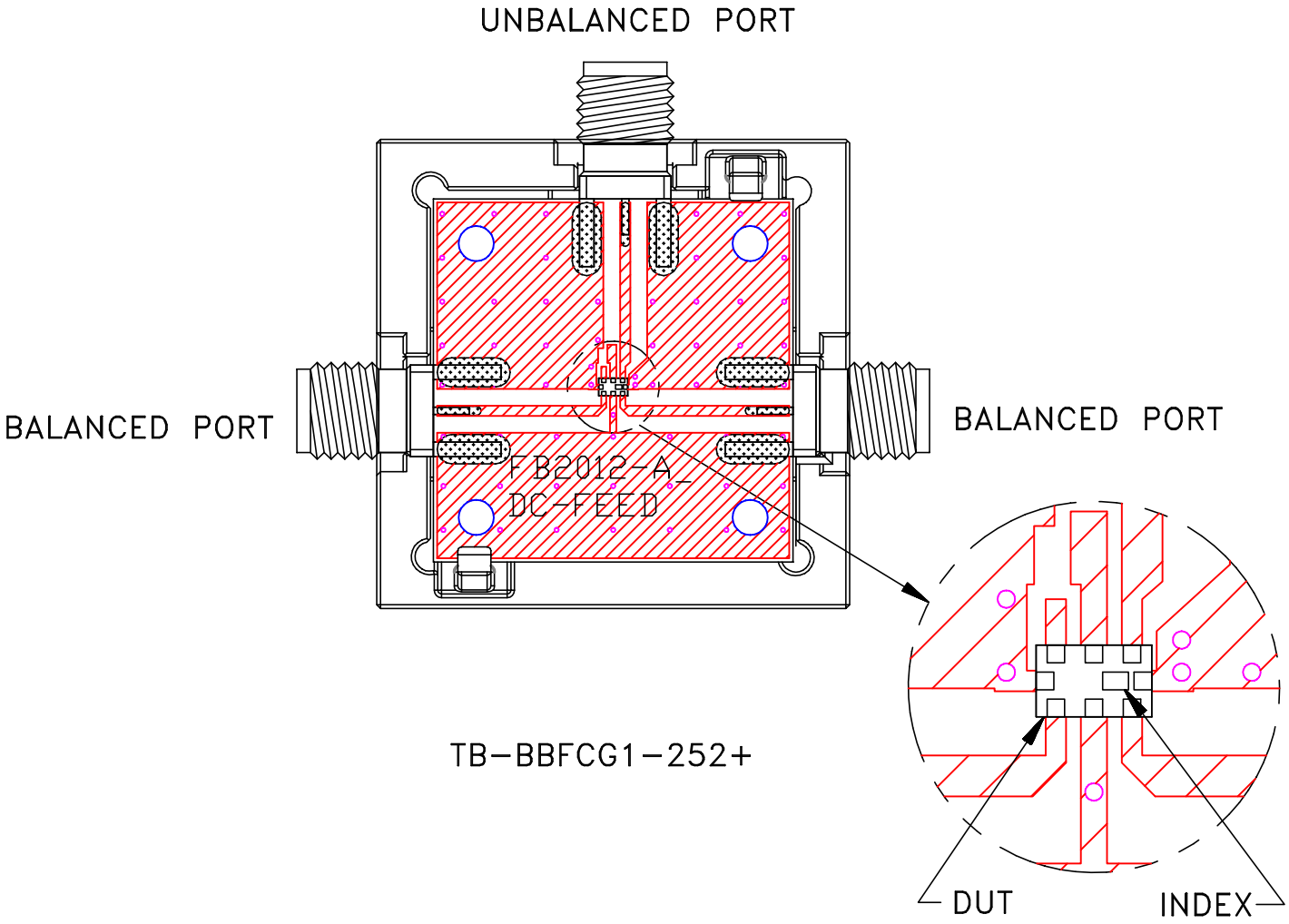
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 08TJ01, GE0805C-2, TB-1034+

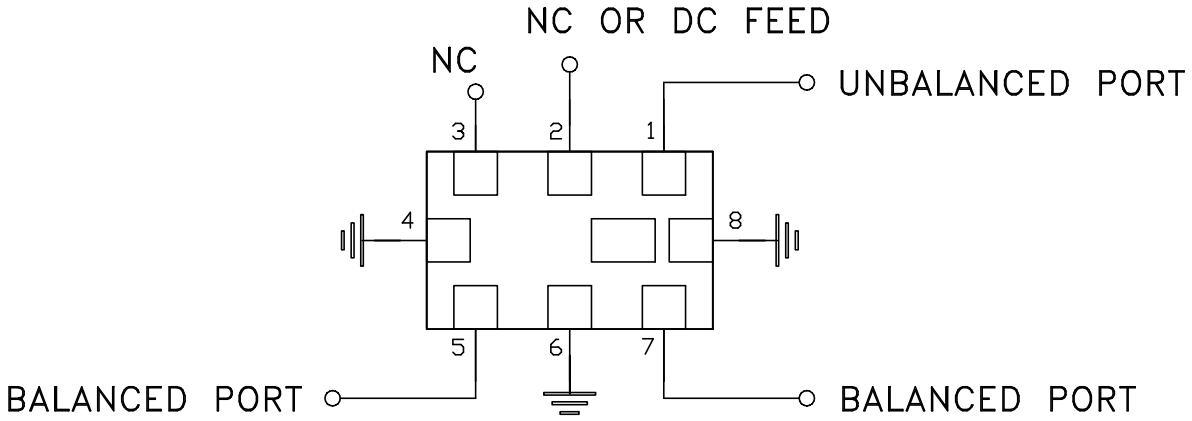
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-551	OR

FILE:	SCALE:	SHEET:
98PL551	15:1	1 OF 1

Evaluation Board and Circuit



TB-BBFCG1-252+



Schematic Diagram

Notes:

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

Mini-Circuits®

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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
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

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