CERAMIC

Bandpass Filter & Balun BBFCG2-372+

50Ω 3300 to 4000 MHz

THE BIG DEAL

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



Generic photo used for illustration purposes only

CASE STYLE: GE0805C-15

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

APPLICATIONS

- Telecommunications
- 5G sub 6GHz

PRODUCT OVERVIEW

Mini-Circuits' BBFCG2-372+ is a tiny ceramic RF balun filter with an impedance ratio of 1:2, covering a variety of wireless communications applications from 3300 to 4000 MHz. This model provides low insertion loss, low phase unbalance (relative to 180°), low amplitude unbalance. 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 filter and balun in one tiny package
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.

CERAMIC

Bandpass Filter & Balun BBFCG2-372+

ELECTRICAL SPECIFICATIONS AT 25°C

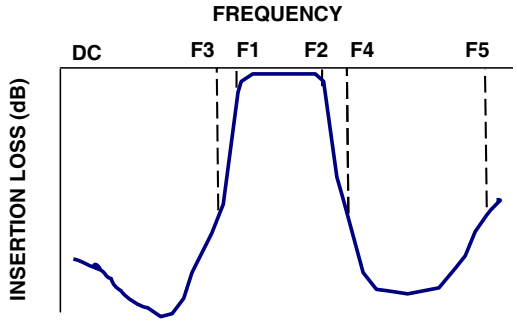
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Impendance Ratio		—	—		2		
Insertion Loss*		F1-F2	3300 - 4000	—	2.5	3	dB
Return Loss	Unbalanced Port	F1-F2	3300 - 4000	8.5	13	—	dB
	Balanced Port*	F1-F2	3300 - 4000	8.5	13	—	
Stopband Rejection		DC-F3	DC - 2598	20	23	—	dB
		F4-F5	4847 - 5548	30	—	—	
			7796 - 8498	15	31	—	
Amplitude Unbalance ±		F1-F2	3300 - 4000	-1.5	—	1.5	dB
Phase Unbalance		F1-F2	3300 - 4000	-13	—	13	Degree
CMRR		F1-F2	3300 - 4000	—	24	—	dB

* Single ended - Differential (2-port) measurement.

MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-55°C to 125°C
Storage Temperature	-55°C to 125°C
RF Power Input	0.5W at 25°C

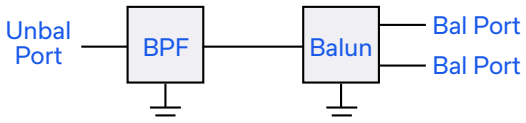
TYPICAL FREQUENCY RESPONSE



DC INTERFACE TABLE

Unbalance Port - GND	DC short
Unbalance Port - Balance Ports	DC open
Balance port - GND	DC open
Balance port-Balance Port	DC short

FUNCTIONAL SCHEMATIC



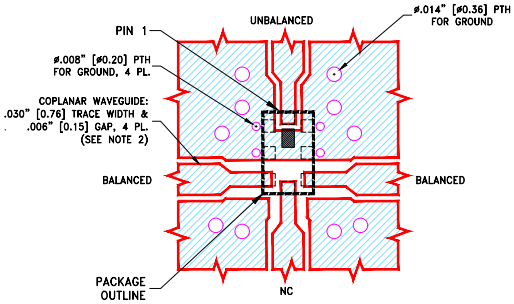
Bandpass Filter & Balun BBFCG2-372+

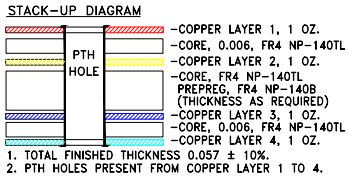
PAD CONNECTIONS

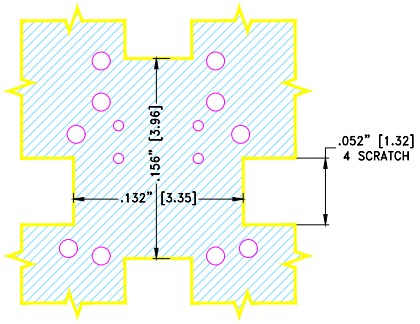
UNBALANCED PORT	1
BALANCED PORT	4,6
GROUND	2,3,7,8
NOT CONNECT OR GND	5

PRODUCT MARKING: N/A

DEMO BOARD MCL P/N: TB-BBFCG2-372+
SUGGESTED PCB LAYOUT (PL-724)





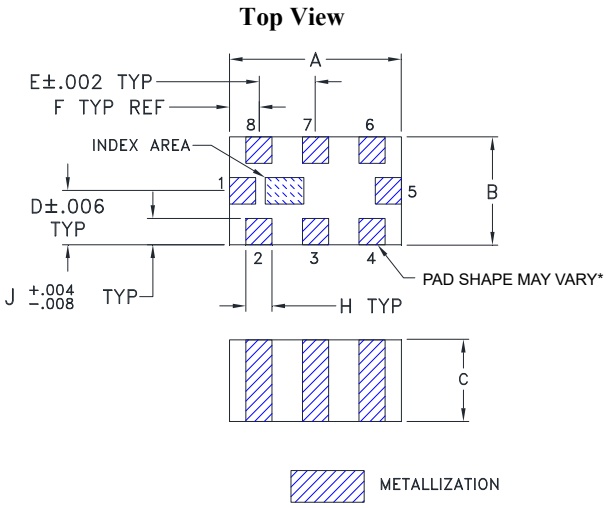


TOP VIEW TO LAYER 2

NOTES:
1. PCB IS MULTILAYER PCB, SEE STACK-UP DIAGRAM.
2. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR FR4 NP-140TL WITH DIELECTRIC THICKNESS .006"±.0005"; COPPER: 1 OZ. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
3. COPPER LAYERS 3,4 OF THE PCB IS CONTINUOUS GROUND PLANES.

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

OUTLINE DRAWING



*During the manufacturing process, the pad shape may not be rectangular and may take on a more semi-circle shape. However, the pad dimensions reflect this, with the pad shape being within the specified lengths. The metallization compensates accordingly and so performance will not be affected. In addition, solderability will not be influenced by the pad shape.

OUTLINE DIMENSIONS (Inches / mm)

A	B	C	D	E	F	G	H	J	wt
.079	.049	.037	.025	.026	.014	.110	.012	.010	grams
2.00	1.25	0.95	0.63	0.65	0.35	2.80	0.30	0.25	.008

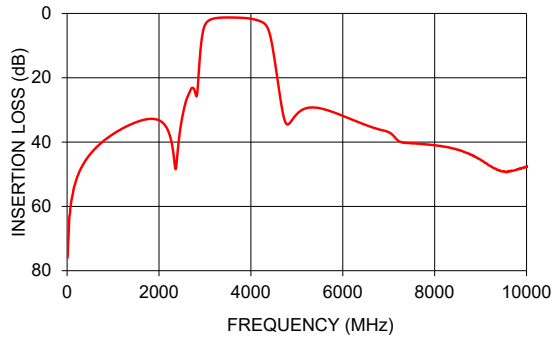
CERAMIC

Bandpass Filter & Balun BBFCG2-372+

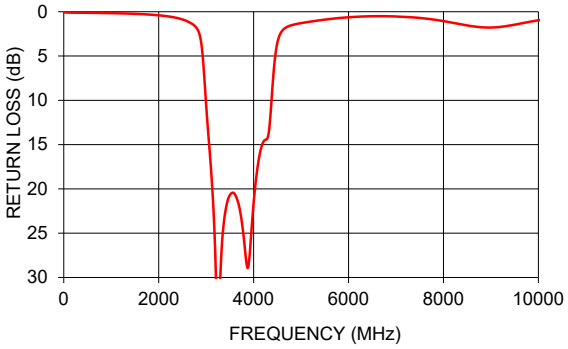
TYPICAL PERFORMANCE DATA

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)	Amplitude Unbalance (dB)	Phase Unbalance (Deg.)
10	75.96	0.04	3.49	88.81
1000	37.52	0.16	5.96	27.75
2598	26.75	1.06	1.94	5.62
2700	23.39	1.36	1.56	6.71
3300	1.36	29.80	0.24	6.12
4000	1.65	21.60	0.84	2.69
4847	34.09	1.45	6.54	36.35
5548	29.64	0.86	0.97	27.44
6000	31.85	0.63	1.77	32.04
7000	36.94	0.54	7.95	155.62
7796	40.72	0.89	8.42	35.44
8497	42.31	1.54	6.52	171.12

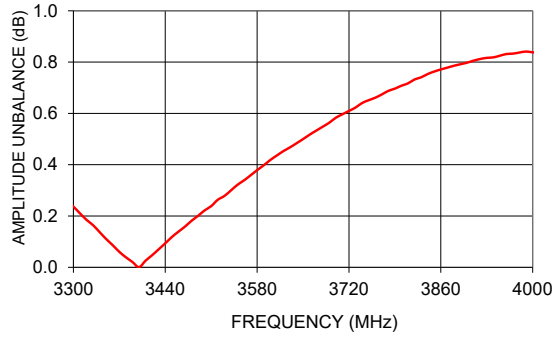
BBFCG2-372+
INSERTION LOSS



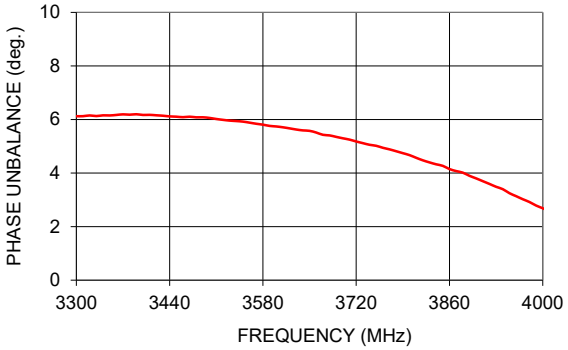
BBFCG2-372+
RETURN LOSS



BBFCG2-372+
AMPLITUDE UNBALANCE



BBFCG2-372+
PHASE UNBALANCE



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.
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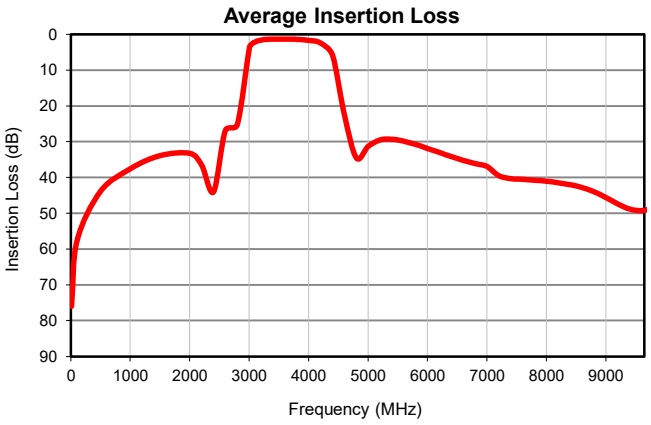
Ceramic Bandpass Filter & Balun BBFCG2-372+

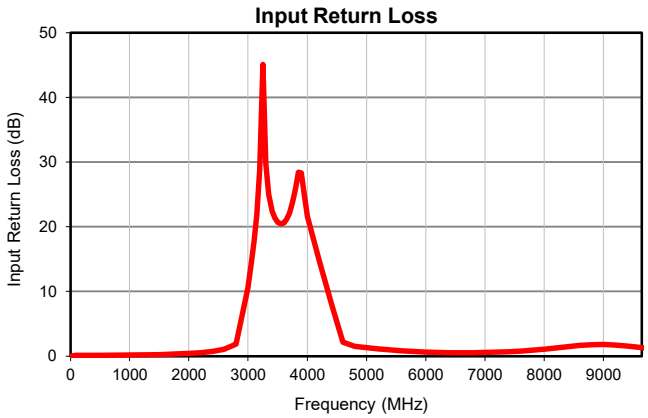
Typical Performance Data

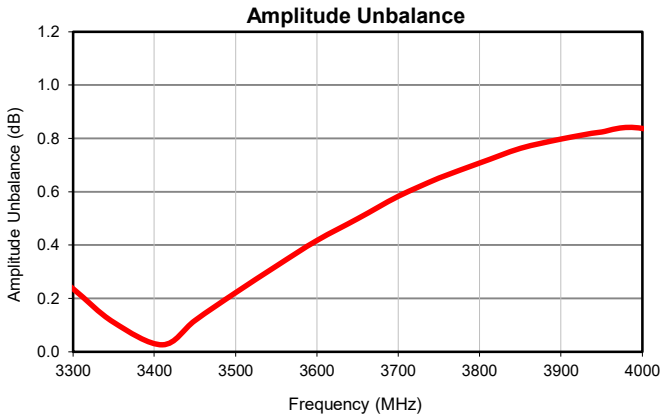
FREQUENCY (MHz)	INSERTION LOSS (dB)	RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)
10	75.96	0.04	3.49	88.81
100	57.75	0.10	1.04	12.75
500	43.82	0.12	4.02	29.42
1000	37.52	0.16	5.96	27.75
1500	33.84	0.24	5.99	23.30
2000	33.24	0.41	5.34	20.91
2200	36.51	0.53	5.36	22.05
2400	43.95	0.72	5.51	5.88
2598	26.75	1.06	1.94	5.62
2800	25.22	1.85	2.85	15.36
3000	3.63	10.52	1.06	3.91
3050	2.59	14.12	0.91	4.71
3100	2.07	17.60	0.75	5.28
3150	1.76	21.91	0.62	5.66
3200	1.56	28.84	0.49	5.89
3250	1.44	45.11	0.36	6.04
3300	1.36	29.80	0.24	6.12
3350	1.31	24.99	0.11	6.15
3410	1.28	22.38	0.03	6.17
3450	1.27	21.38	0.12	6.10
3500	1.26	20.69	0.22	6.06
3550	1.26	20.43	0.32	5.92
3600	1.27	20.57	0.42	5.74
3650	1.28	21.14	0.50	5.58
3700	1.30	22.10	0.58	5.30
3750	1.33	23.68	0.65	5.02
3800	1.36	25.89	0.71	4.67
3850	1.40	28.40	0.76	4.27
3900	1.46	28.33	0.80	3.80
3950	1.54	25.03	0.82	3.25
4000	1.65	21.60	0.84	2.69
4200	2.40	14.75	0.69	0.48
4400	5.86	8.27	0.19	5.17
4600	22.47	2.17	4.62	12.20
4800	34.53	1.52	9.35	41.65
5000	31.31	1.29	2.17	10.19
5200	29.50	1.12	0.37	9.41
5400	29.28	0.96	0.48	21.20
5600	29.83	0.83	1.12	29.01
5800	30.76	0.71	1.68	33.22
6000	31.85	0.63	1.77	32.04
6200	33.00	0.56	1.08	25.69
6400	34.14	0.52	1.34	15.60
6600	35.18	0.50	6.82	5.43
6800	36.12	0.51	27.98	48.58
7000	36.94	0.54	7.95	155.62
7200	39.49	0.59	1.32	143.67
7400	40.27	0.66	2.83	112.82
7600	40.47	0.76	0.45	60.85
7796	40.72	0.89	8.42	35.44
8000	41.00	1.06	32.10	143.16
8200	41.45	1.25	12.24	168.81
8400	42.00	1.45	7.81	169.84
8600	42.77	1.63	5.46	171.94
8800	44.00	1.75	3.94	174.16
9000	45.54	1.78	2.86	176.54
9200	47.35	1.71	2.12	179.33
9400	48.83	1.56	1.65	177.94
9600	49.22	1.36	1.38	175.40
9800	48.51	1.15	1.28	173.63
10000	47.51	0.96	1.29	172.21

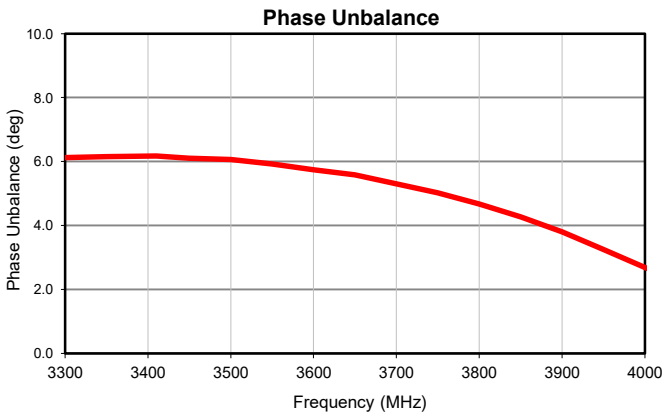
Ceramic Bandpass Filter & Balun BBFCG2-372+

Typical Performance Data







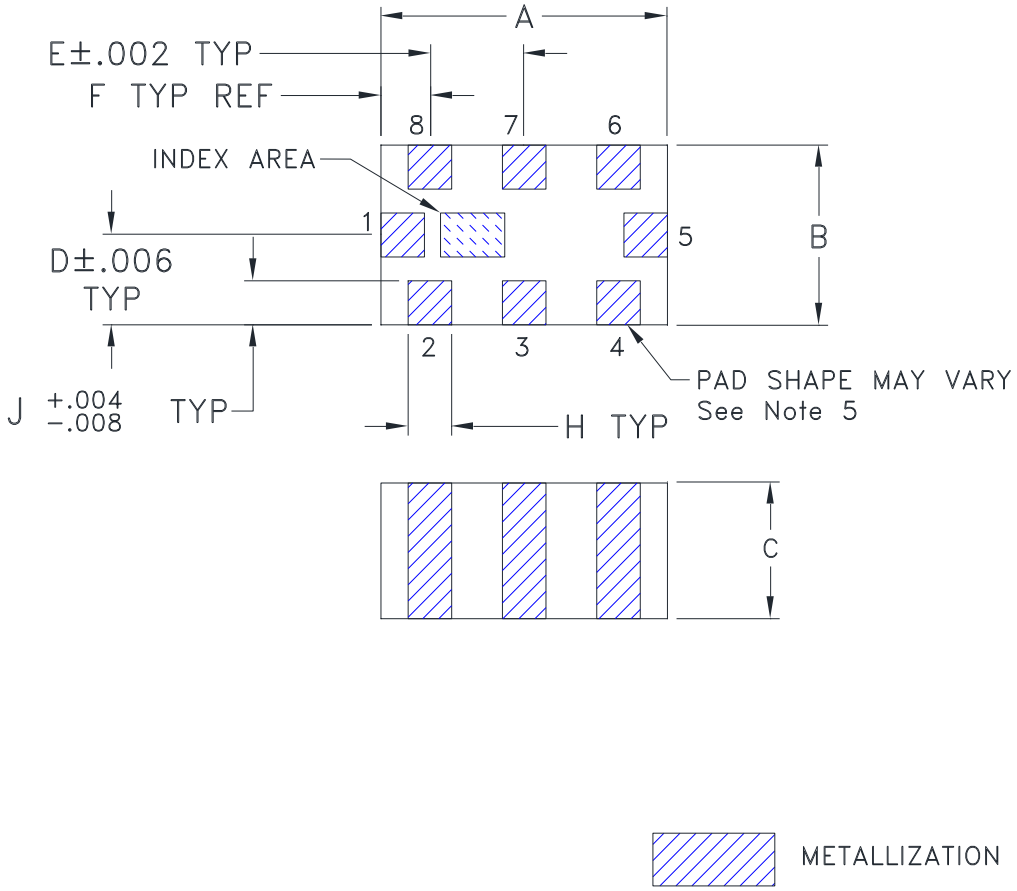


Case Style GE

GE0805C-15

Outline Dimensions

Top View



CASE#	A	B	C	D	E	F	G	H	J	WT, GRAM
GE0805C-15	.079 (2.00)	.049 (1.25)	.037 (0.95)	.025 (0.63)	.026 (0.65)	.014 (0.35)	.110 (2.80)	.012 (0.30)	.010 (0.25)	.008

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 model , (+) suffix.
   For RoHS-5 Case Styles: Tin-lead plate over Nickel plate. All model ,no (+) suffix.
3. Pad tolerance to be non-cumulative. Minimum spacing between each pad is .004(0.1).
4. Pin numbers do not appear on unit. For reference only.
5. During the manufacturing process, the pad shape may not be rectangular and may take on a more semi-circle shape. However, the pad dimensions reflect this, with the pad shape being within the specified lengths. The metallization compensates accordingly and so performance will not be affected. In addition, solderability will not be influenced by the pad shape

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Tape & Reel Packaging TR-F114

DEVICE ORIENTATION IN T&R

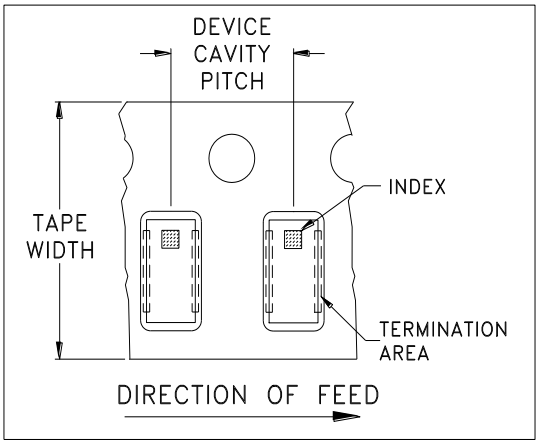


ILLUSTRATION 1

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

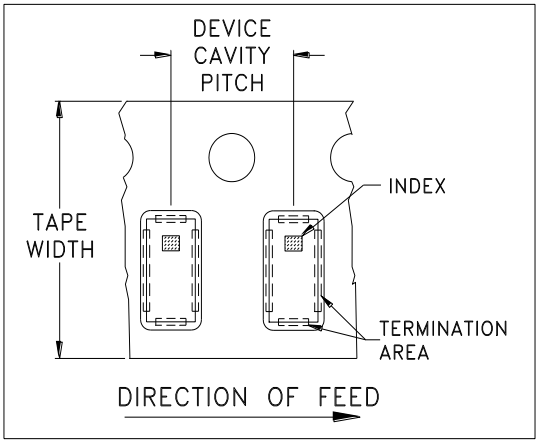


ILLUSTRATION 2

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.

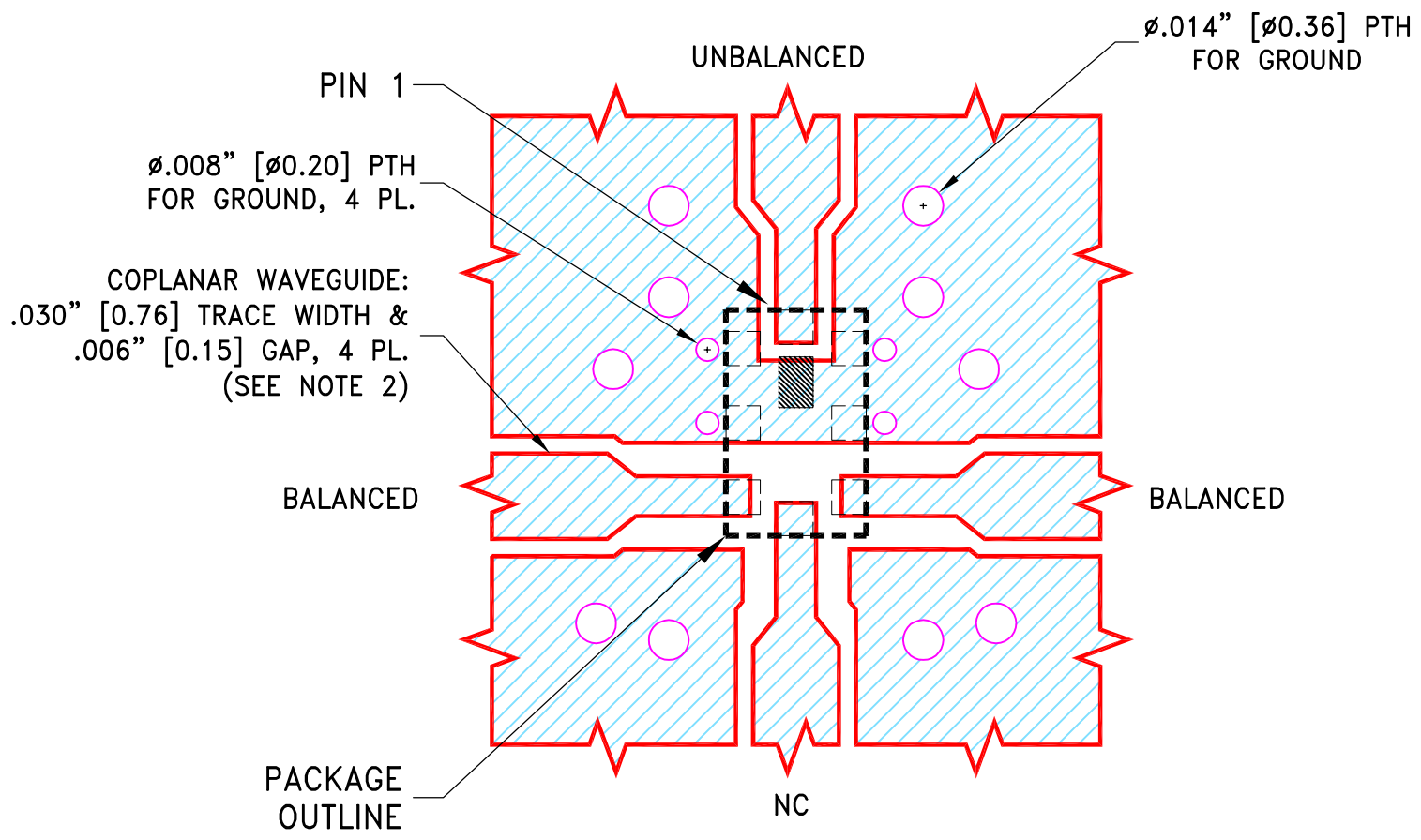
Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

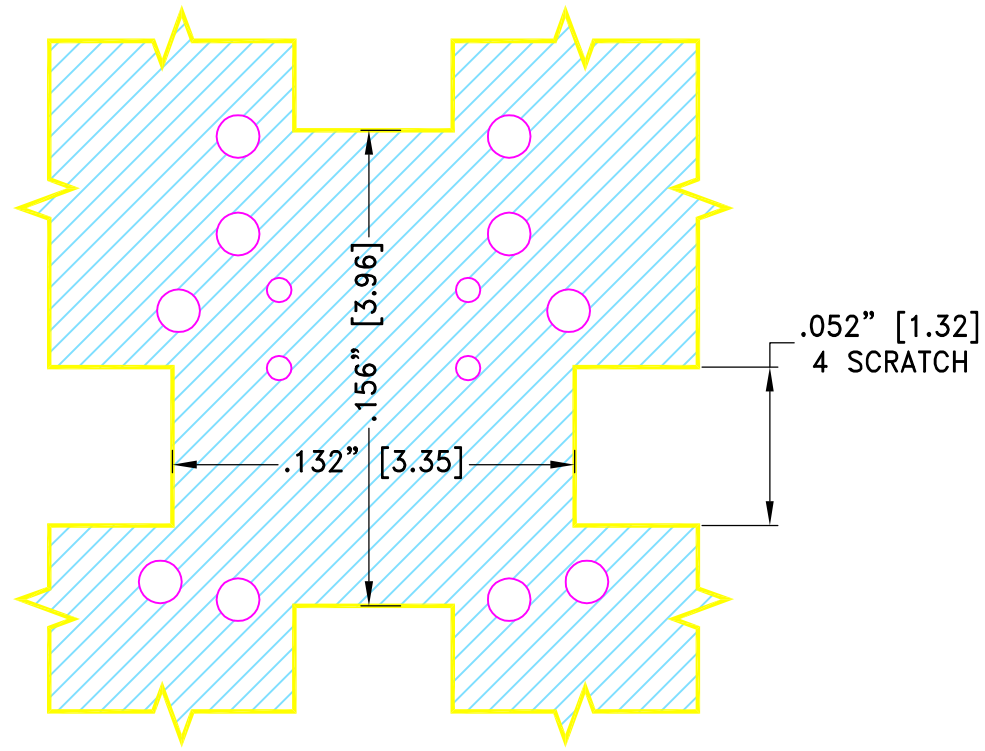
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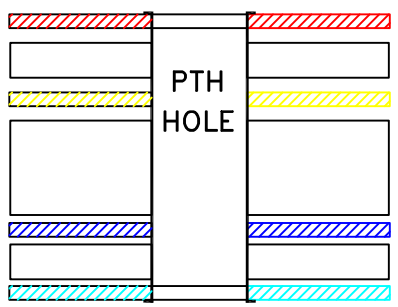
SUGGESTED MOUNTING CONFIGURATION
FOR GE0805C-15 CASE STYLE





TOP VIEW TO LAYER 2

STACK-UP DIAGRAM



- –COPPER LAYER 1, 1 OZ.
- –CORE, 0.006, FR4 NP-140TL
- –COPPER LAYER 2, 1 OZ.
- –CORE, FR4 NP-140TL PREPREG, FR4 NP-140B (THICKNESS AS REQUIRED)
- –COPPER LAYER 3, 1 OZ.
- –CORE, 0.006, FR4 NP-140TL
- –COPPER LAYER 4, 1 OZ.

1. TOTAL FINISHED THICKNESS 0.057 ± 10%.⊗
2. PTH HOLES PRESENT FROM COPPER LAYER 1 TO 4.

NOTES:

1. PCB IS MULTILAYER PCB, SEE STACK-UP DIAGRAM.
2. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR FR4 NP-140TL WITH DIELECTRIC THICKNESS .006"±.0005"; COPPER: 1 OZ. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
3. COPPER LAYERS 3,4 OF THE PCB IS CONTINUOUS GROUND PLANES.

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
0R	ECO-010908	NEW RELEASE	12/02/21	ITG	IL

REVISIONS

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± 1° FRACTIONS ±	DRAWN	ITG	12/02/21
	CHECKED	GF	12/02/21
	APPROVED	IL	12/02/21

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BSHEETA1.DWG REV:A DATE:01/12/94

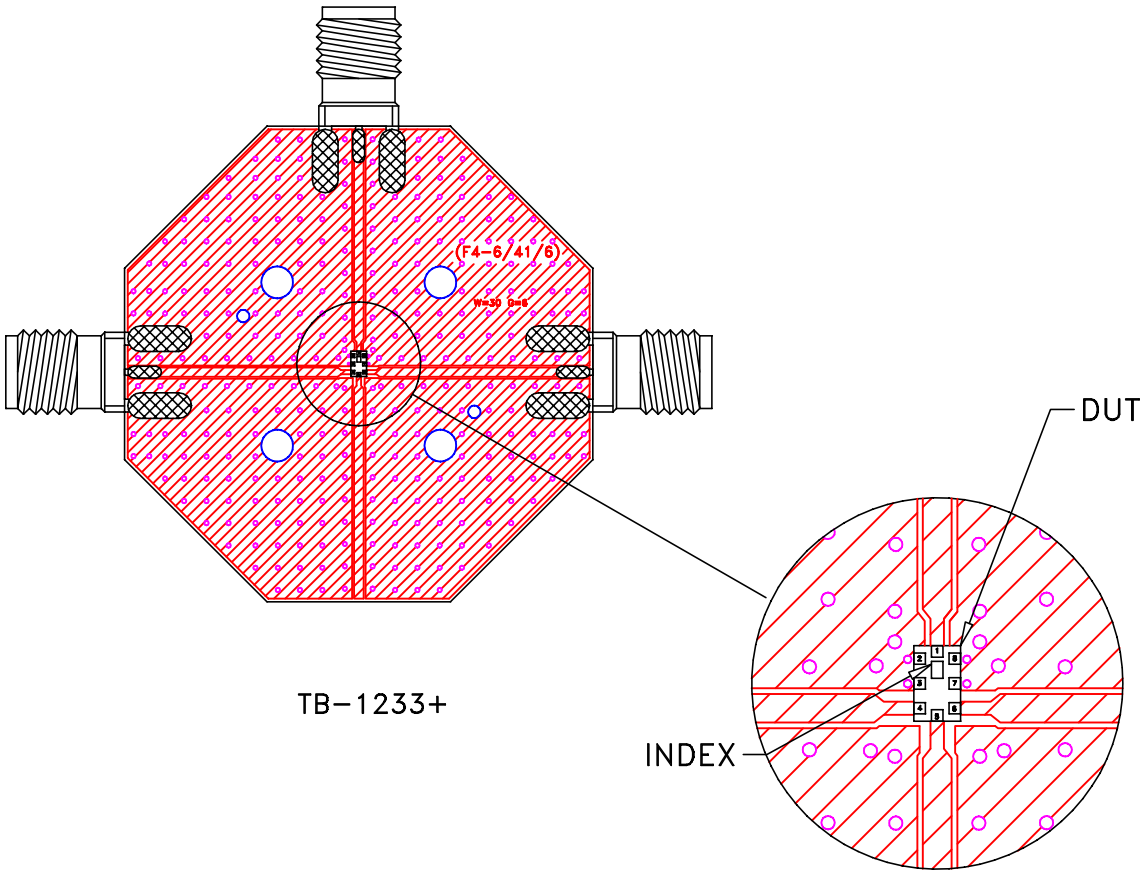
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, GE0805C-15, TB-1233+

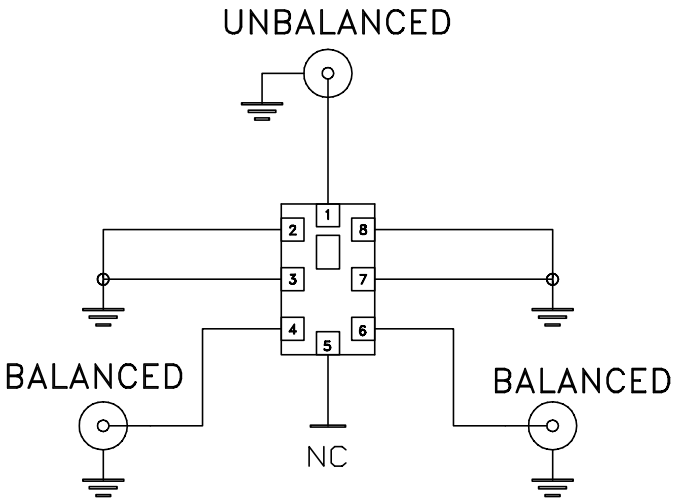
SIZE	CODE IDENT	DRAWING NO:	REV:
B	15542	98-PL-724	0R
FILE: 98PL724		SCALE: 15:1	SHEET: 1 OF 1

THIRD ANGLE PROJECTION

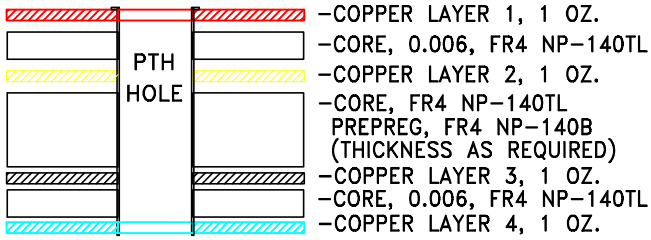
Evaluation Board and Circuit



TB-1233+



Schematic Diagram



Stack-up Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: FR4 or equivalent,
   Dielectric Constant=4.5,
   Total finished Thickness = .057 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
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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