Ceramic Balun

RF Transformer

BLGE4-252R+

50Ω 2400 to 2500 MHz 1:4 Ratio

The Big Deal

- Band optimized for Bluetooth, Zigbee and low band Wi-Fi
- Tiny size, 0805
- Low insertion loss, 0.5 dB
- Low unbalance, 0.4 dB, 4°
- Low cost

CASE STYLE: GE0805C-9

Product Overview

Mini-Circuits BLGE4-252R+ is a miniature ceramic RF balun transformer with an impedance ratio (secondary/primary) of 1:4. This model covers the 2400 to 2500 MHz frequency band and has been performance optimized for use in Bluetooth, Zigbee and low band Wi-Fi applications. This model provides low insertion loss, low amplitude unbalance, and RF input power handling up to 2W. Fabricated using LTCC technology, it comes housed in a tiny package (0.08 x 0.05 x 0.04”) and is suitable for high-volume production.

Key Features

Feature	Advantages
Low insertion loss, 0.5 dB	Enables excellent signal power transmission from input to output.
Low unbalance, 0.5 dB, 2°	Low unbalance can improve a system’s electromagnetic compatibility by rejecting unwanted common-mode noise.
2W power handling	Supports a wide range of power requirements
DC Isolation	Provides DC isolation between circuits and efficient AC transmission, eliminating the need for external DC biasing components.
Tiny size, 0805	Accommodates tight space requirements for dense PCB layouts.

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 Balun

RF Transformer

BLGE4-252R+

50Ω 2400 to 2500 MHz 1:4 Ratio

Generic photo used for illustration purposes only

CASE STYLE: GE0805C-9

+RoHS Compliant

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

Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
7"	20, 50, 100, 200, 500,1000, 4000

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature*	-55°C to 100°C
Input RF Power	2W

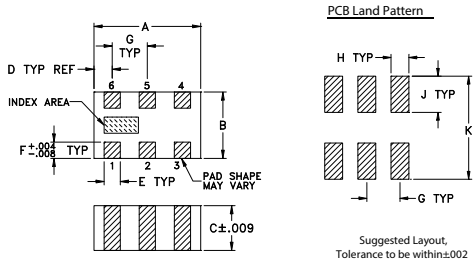
*Refer to product storage temperature after installation.
Suggestion for T&R unused product storage condition: +5~+35°C, Humidity 45~75%RH, 12 Month max.
Permanent damage may occur if any of these limits are exceeded.

Pad Connections

PRIMARY DOT (Unbalanced Port)	1
PRIMARY (GND) or DC Feed	2
SECONDARY DOT (Balanced)	4
SECONDARY (Balanced)	3
NO CONNECTION	6
NOT USED (GND Externally)	5

Pads 2,3,4 are DC-connected internally

Outline Drawing



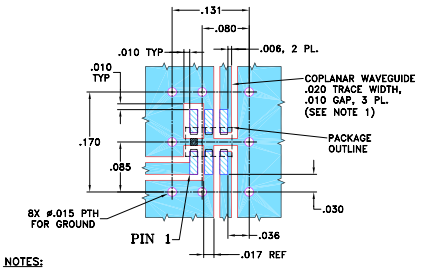
Suggested Layout, Tolerance to be within±002

Outline Dimensions (inch / mm)

A	B	C	D	E	F
.079	.049	.033	.014	.012	.012
2.0	1.24	0.84	0.36	0.30	0.30

G	H	J	K	wt
.026	.014	.039	.110	grams
0.66	0.36	1.00	2.80	.008

Evaluation Board MCL P/N: TB-BLGE4-252R+
Suggested PCB Layout (PL-264)



NOTES:
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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

Features

- low phase unbalance, 4 deg. and amplitude unbalance, 0.4 dB typ.
- miniature size 0805 (2.0x1.2 mm)
- LTCC construction
- low cost
- aqueous washable

Applications

- ISM Band
- WLAN/Wi-Fi
- Bluetooth
- Zigbee

Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio			4		
Frequency Range		2400	—	2500	MHz
Insertion Loss*	2400 - 2500	—	0.5	1.2	dB
Amplitude Unbalance	2400 - 2500	—	0.4	1.6	dB
Phase Unbalance†	2400 - 2500	—	4	10	Degree
Unbalance Return Loss	2400 - 2500	11	25	—	dB

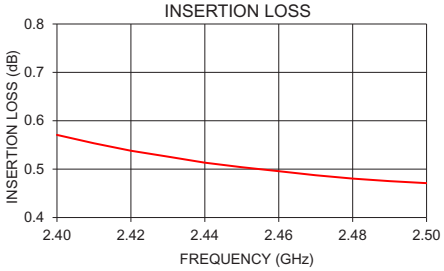
* Tested on Evaluation Board TB-BLGE4-252R+

Typical Performance Data at 25°C**

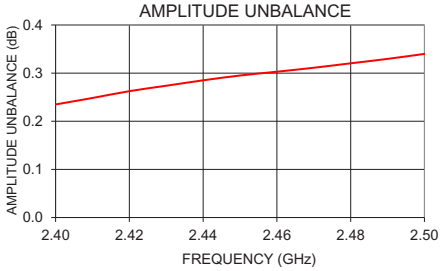
FREQUENCY (GHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
2.40	0.57	17.95	0.23	2.32
2.41	0.55	18.85	0.25	2.38
2.42	0.54	19.85	0.26	2.42
2.43	0.53	20.98	0.27	2.45
2.44	0.51	22.23	0.29	2.52
2.45	0.50	23.68	0.30	2.60
2.46	0.50	25.38	0.30	2.71
2.47	0.49	27.45	0.31	2.83
2.48	0.48	30.13	0.32	2.94
2.49	0.48	33.83	0.33	3.02
2.50	0.47	39.18	0.34	3.08

** Measured with Agilent E5071B network analyzer using impedance conversion and port extension.

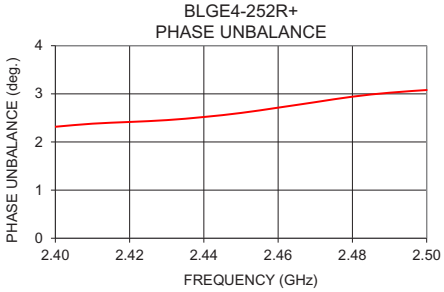
BLGE4-252R+
INSERTION LOSS



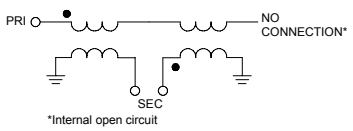
BLGE4-252R+
AMPLITUDE UNBALANCE



BLGE4-252R+
PHASE UNBALANCE



Configuration J



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REV. OR
M172548
BLGE4-252R+
AV/CP/AM
200918

LTCC Balun

RF Transformer BLGE4-252R+

Typical Performance Data

FREQUENCY (MHz)	AVERAGE INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE[1] (deg.)
2400	0.57	17.95	0.23	2.32
2402	0.57	18.12	0.24	2.34
2405	0.56	18.39	0.24	2.34
2407	0.56	18.57	0.25	2.35
2410	0.55	18.85	0.25	2.38
2413	0.55	19.14	0.25	2.39
2415	0.55	19.34	0.26	2.40
2418	0.54	19.64	0.26	2.40
2421	0.54	19.96	0.26	2.42
2423	0.53	20.17	0.27	2.42
2426	0.53	20.52	0.27	2.44
2428	0.53	20.74	0.27	2.43
2431	0.52	21.09	0.28	2.46
2434	0.52	21.46	0.28	2.47
2436	0.52	21.71	0.28	2.48
2439	0.51	22.10	0.28	2.50
2442	0.51	22.51	0.29	2.53
2444	0.51	22.78	0.29	2.54
2447	0.51	23.23	0.29	2.56
2450	0.50	23.68	0.30	2.60
2452	0.50	24.00	0.30	2.61
2455	0.50	24.49	0.30	2.65
2457	0.50	24.83	0.30	2.66
2460	0.50	25.38	0.30	2.71
2463	0.49	25.94	0.30	2.75
2465	0.49	26.35	0.31	2.77
2468	0.49	27.00	0.31	2.80
2471	0.49	27.69	0.31	2.84
2473	0.48	28.18	0.31	2.87
2476	0.48	28.96	0.31	2.90
2478	0.48	29.52	0.32	2.91
2481	0.48	30.44	0.32	2.95
2484	0.48	31.48	0.33	2.97
2486	0.48	32.18	0.33	2.99
2489	0.48	33.39	0.33	3.00
2492	0.47	34.74	0.33	3.02
2494	0.47	35.72	0.33	3.04
2497	0.47	37.35	0.34	3.05
2500	0.47	39.18	0.34	3.08

[1] Relative to 180°

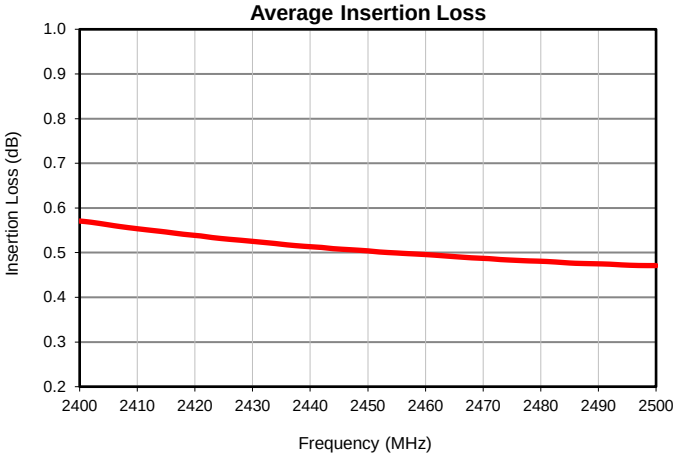
LTCC Balun

RF Transformer

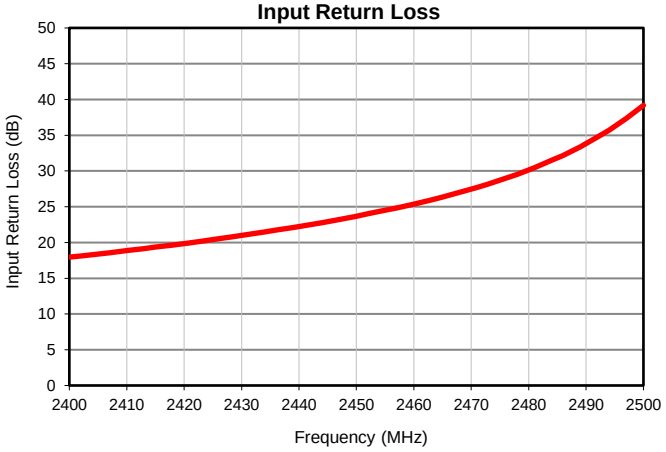
BLGE4-252R+

Typical Performance Data

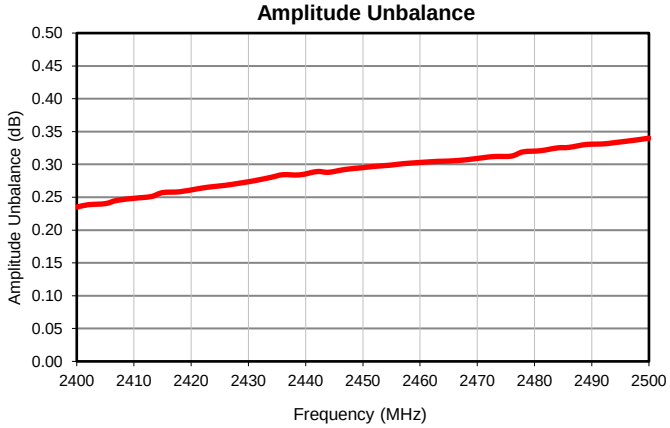
Average Insertion Loss



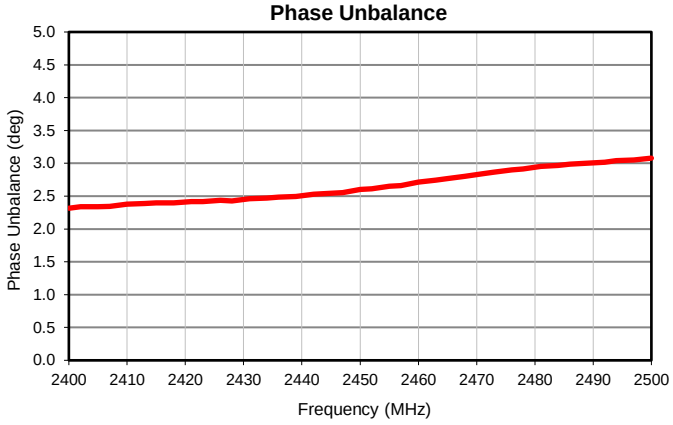
Input Return Loss



Amplitude Unbalance

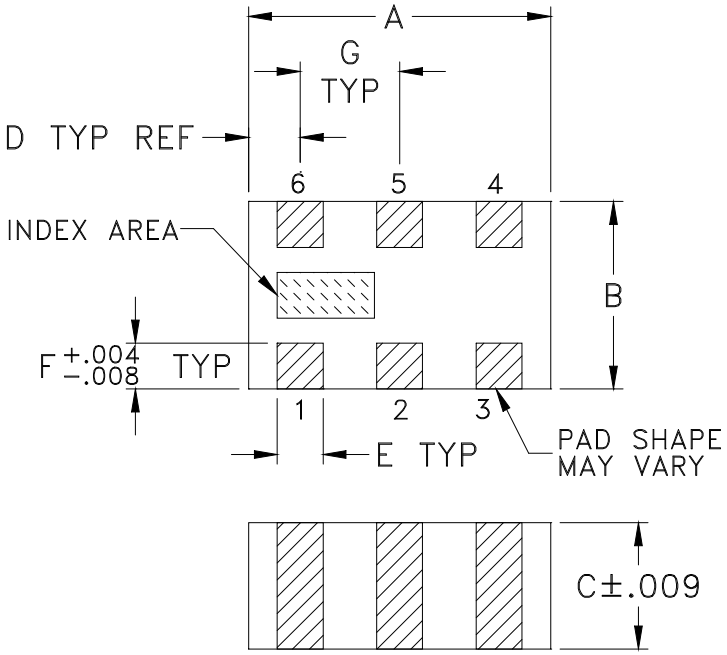


Phase Unbalance

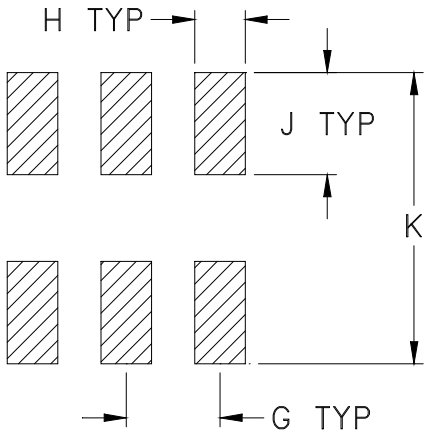


GE0805C-9

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	WT.GRAM
GE0805C-9	.079 (2.00)	.049 (1.25)	.037 (0.95)	.014 (0.35)	.012 (0.30)	.012 (0.30)	.026 (0.65)	.014 (0.35)	.039 (1.00)	.110 (2.80)	.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.

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Tape & Reel Packaging TR-F114

DEVICE ORIENTATION IN T&R

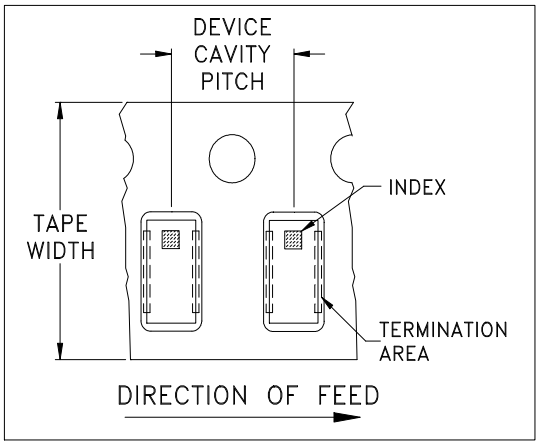

ILLUSTRATION 1

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

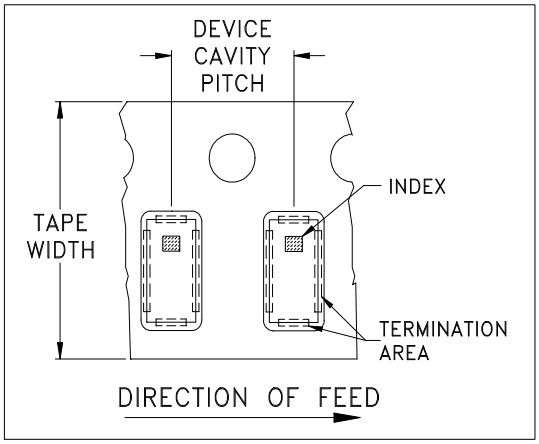

ILLUSTRATION 2

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	JV1210C-1
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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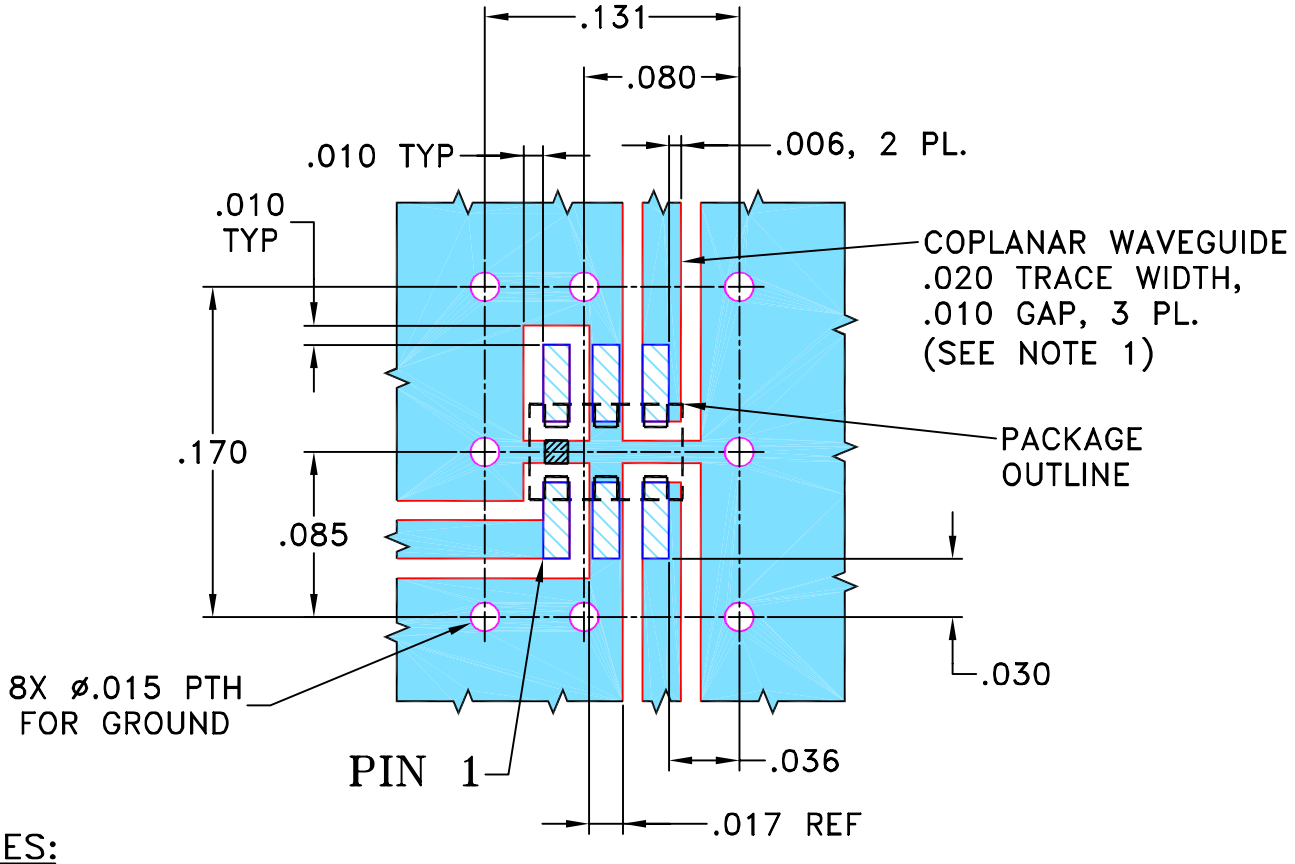
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M109549	NEW RELEASE	01/31/07	PW	DJ

SUGGESTED MOUNTING CONFIGURATION FOR GE0805C-1 CASE STYLE, "ry" PIN CONNECTION.



NOTES:

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .010" ± .001". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND 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	PW	01/30/07
TOLERANCES ON:	CHECKED	IL	01/31/07
2 PL DECIMALS ±	APPROVED	DJ	01/31/07
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

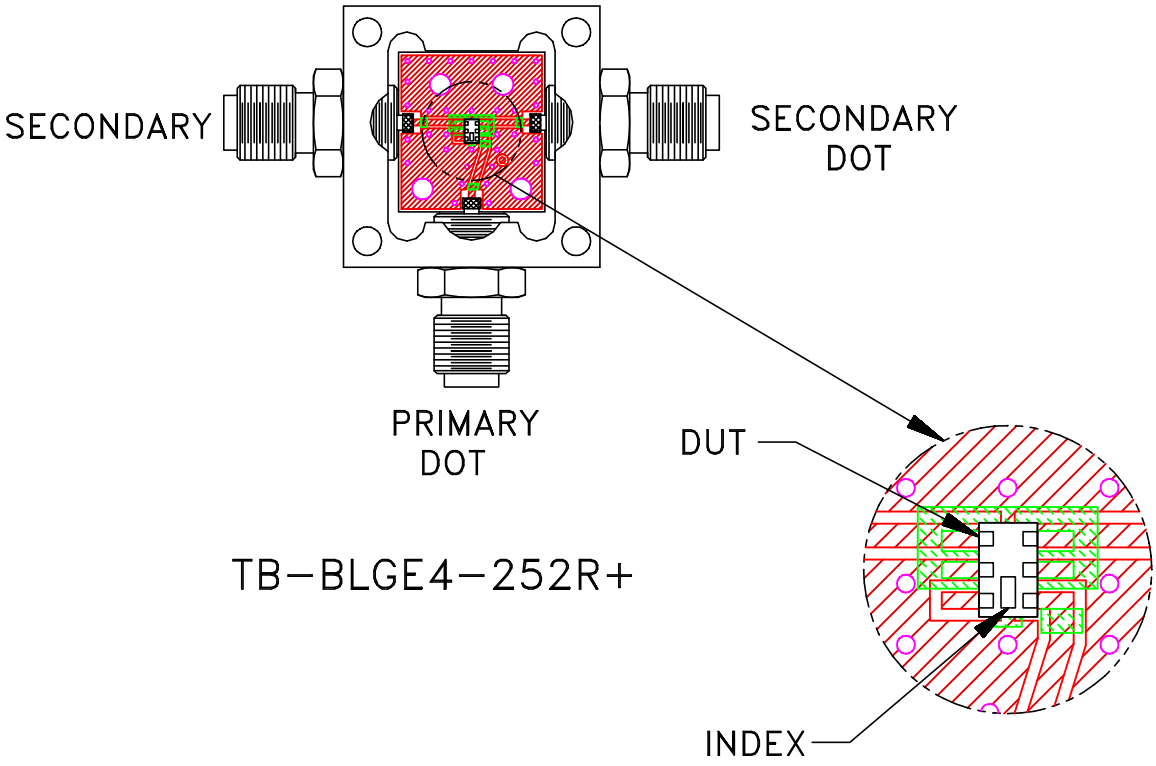
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

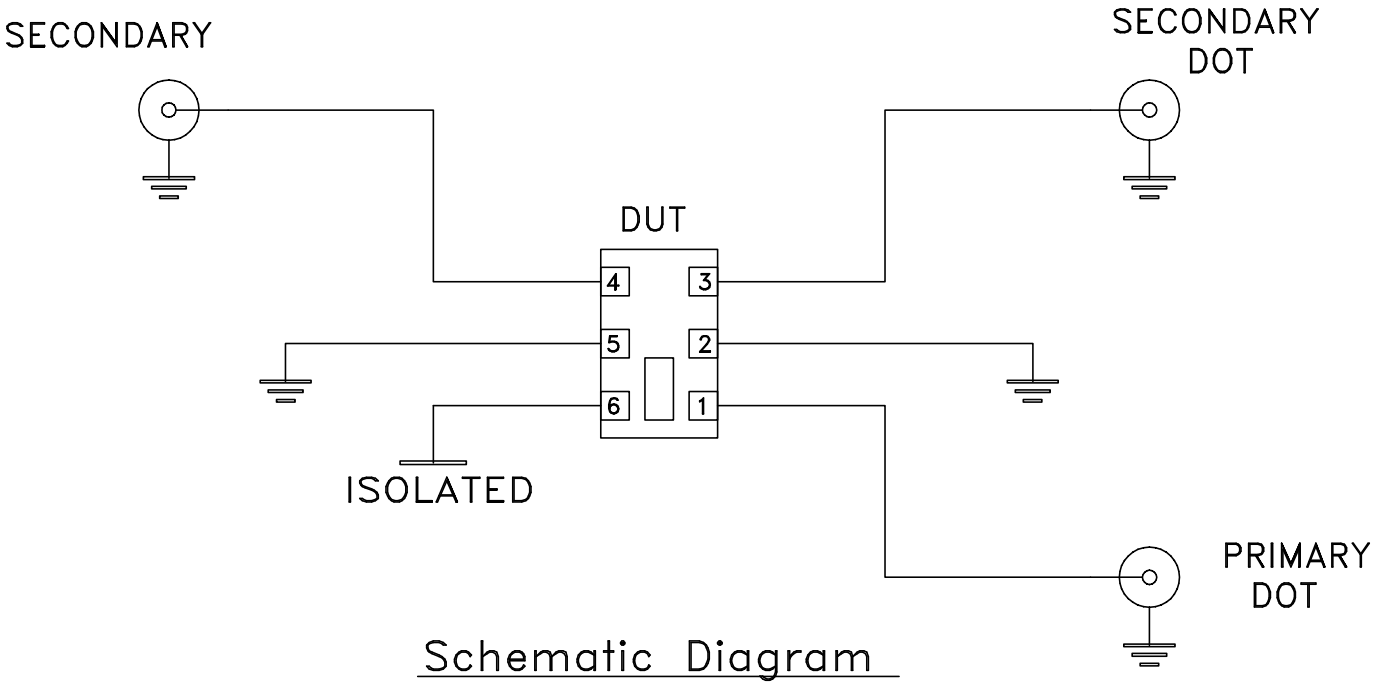
PL, ry, GE0805C-1, NCS, TB-419+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-264	OR

FILE:	SCALE:	SHEET:
98PL264	10:1	1 OF 1

Evaluation Board and Circuit





Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.010 inch.

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Mini-Circuits

Environmental Specifications ENV06T2

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	-40° to 85° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° 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
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, 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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