Ceramic

Low Pass Filter

LFCG-3500+

50Ω DC to 3500 MHz

Generic photo used for illustration purposes only

CASE STYLE: GE0805C-2

The Big Deal

- Good rejection, 40 dB typical
- Rugged, ceramic construction
- Tiny size, 0.079" x 0.049" x 0.037" (0805)
- Excellent power handling, 4.5W

Product Overview

Mini-Circuits' LFCG-3500+ is an LTCC low pass filter with a passband from DC to 3500 MHz, supporting a variety of applications. This model provides 1.3 dB typical passband insertion loss and provides a very good stopband rejection due to strategically constructed layout with minimal interaction between components. It handles up to 4.5W RF input power and provides a wide operating temperature range from -55°C to 125°C. Housed in a tiny 0805 ceramic form factor with wraparound terminations, the filter is ideal for dense PCB layouts and with minimal performance variation due to parasitics.

Key Features

Feature	Advantages
Good stopband rejection, 40 dB typical	The LTCC lowpass filter provides a good stopband rejection suitable for high end applications.
LTCC Construction	Provides repeatable performance in a rugged, ceramic package well suited for tough environments such as high humidity and temperature extremes.
Tiny size (0.079" x 0.049" x 0.037")	Saves space in dense circuit board layouts and minimizes the effects of parasitics.
Excellent power handling, 4.5W	Supports a wide range of system power requirements.
Wrap-around terminations	Provides excellent solderability and easy visual inspection

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CASE STYLE: GE0805C-2

+RoHS Compliant

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

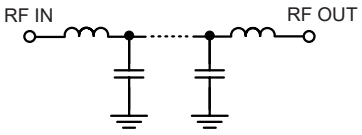
Features

- Low loss, 1.3 dB typical
- High rejection 40 dB typical
- Extremely small size 0805 (2.0 mm x 1.25 mm)
- Temperature stable
- LTCC construction

Applications

- Harmonic Rejection
- VHF/UHF transmitters / receivers
- Military radar applications
- Test and measurement
- Telecommunications & broadband wireless applications

Functional Schematic



Electrical Specifications[1,2] at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	DC-F1	DC - 3500	—	1.3	2.2	dB
	Freq. Cut-Off	F2	3970	—	3.0	—	dB
	Return Loss	DC-F1	DC - 3500	—	14	—	dB
Stop Band	Rejection Loss	F3-F4	4800 - 5000	20	35	—	dB
		F4-F5	5000 - 8500	30	38	—	dB
		F5-F6	8500 - 15000	—	25	—	dB

1 DC de-coupling capacitors are required in Applications where DC voltage and/or current is present at either input or output ports. Please contact Mini-Circuits for alternatives if DC pass from IN-OUT is required.
2 Measured on Mini-Circuits Characterization Test Board TB-799+

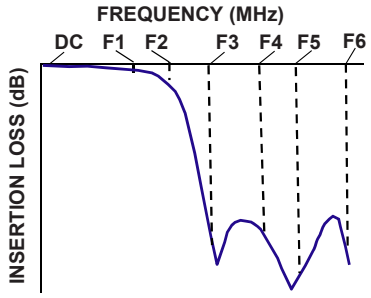
Maximum Ratings	
Operating Temperature	-55°C to 125°C
Storage Temperature	-55°C to 125°C
RF Power Input*	4.5W @ 25°C

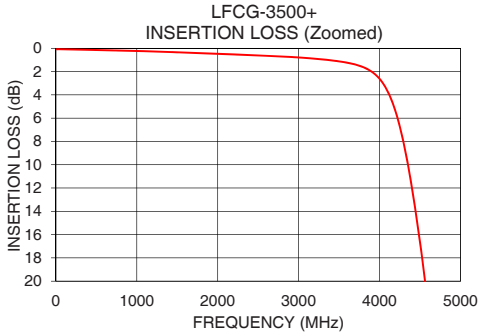
*Passband rating, derate linearly to 1W at 125°C ambient
Permanent damage may occur if any of these limits are exceeded.

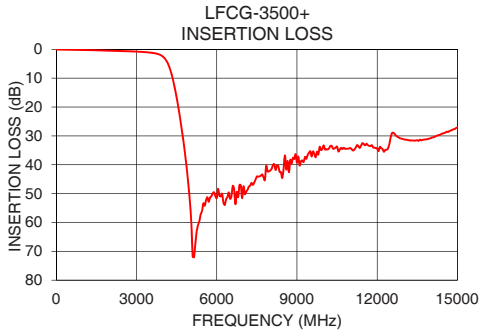
Typical Performance Data at 25°C

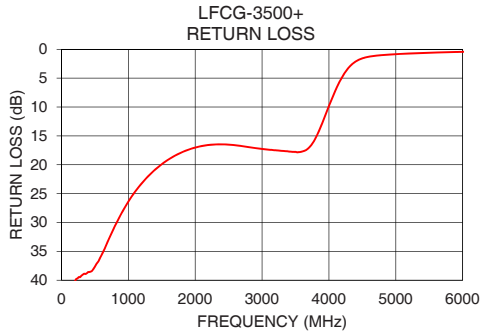
Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)
10	0.08	44.54
100	0.08	43.26
1000	0.23	26.40
1600	0.37	19.10
2200	0.53	16.57
2800	0.71	16.95
3500	1.13	17.78
3970	2.40	10.73
4000	2.63	9.85
4045	3.04	8.55
4575	20.70	1.34
4730	30.19	1.08
4800	35.09	1.00
5000	53.22	0.84
8200	41.80	0.22
8500	41.36	0.23
9000	39.27	0.23
10000	33.31	0.32
12000	34.35	0.34
15000	27.11	0.68

Typical Frequency Response









Notes

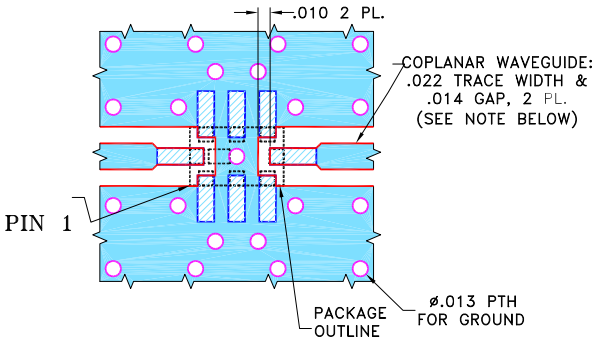
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

Pad Connections

INPUT	8
OUTPUT	4
GROUND	1,2,3,5,6,7

Product Marking: LL

Demo Board MCL P/N: TB-799+
Suggested PCB Layout (PL-429)



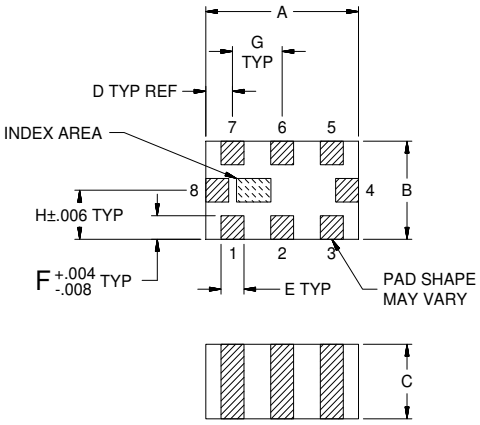
NOTES:

1. COPLANAR WAVEGUIDE IS 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.

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	Wt.
.079	**.049**	**.037**	**.014**	**.012**	**.012**	**.026**	grams
2.00	1.25	0.95	0.35	0.30	0.30	0.65	.008

Note: Please refer to case style drawing for details

Ceramic Low Pass Filter LFCG-3500+

Typical Performance Data

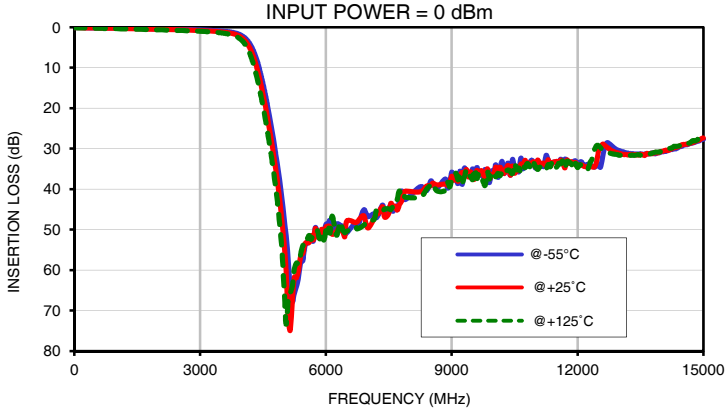
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C
10	0.08	0.09	0.10	41.17	45.07	42.54	40.10	44.99	42.01
60	0.09	0.10	0.12	45.77	41.64	39.84	43.20	40.71	38.98
100	0.09	0.11	0.14	42.33	40.04	38.49	40.35	38.77	37.29
300	0.12	0.15	0.20	38.15	38.97	39.57	33.17	33.01	32.66
500	0.14	0.18	0.24	38.41	41.65	47.58	29.60	29.08	28.63
700	0.16	0.21	0.28	33.58	35.46	36.97	26.30	25.91	25.53
900	0.18	0.25	0.32	28.45	29.24	29.64	23.51	23.21	22.84
1100	0.21	0.28	0.37	24.73	25.10	25.34	21.42	21.11	20.79
1300	0.24	0.33	0.42	21.88	22.13	22.34	19.70	19.42	19.14
1500	0.29	0.38	0.48	19.76	19.94	20.17	18.35	18.08	17.82
1700	0.33	0.42	0.53	18.21	18.41	18.66	17.34	17.12	16.89
1900	0.37	0.48	0.59	17.12	17.31	17.58	16.65	16.45	16.24
2100	0.41	0.53	0.65	16.46	16.64	16.92	16.24	16.07	15.89
2300	0.46	0.58	0.71	16.14	16.31	16.58	16.04	15.93	15.80
2500	0.50	0.63	0.78	16.15	16.30	16.54	16.12	16.04	15.98
2700	0.55	0.69	0.85	16.36	16.51	16.74	16.25	16.25	16.30
2900	0.61	0.76	0.93	16.77	16.93	17.16	16.50	16.61	16.81
3100	0.69	0.85	1.04	17.22	17.36	17.63	16.85	17.04	17.45
3300	0.79	0.97	1.19	17.65	17.77	18.06	17.48	17.83	18.54
3500	0.92	1.13	1.39	18.11	18.17	18.29	18.96	19.66	21.00
3700	1.13	1.40	1.73	17.78	17.45	16.84	20.86	21.83	22.35
3970	1.91	2.39	3.02	11.91	10.99	10.03	13.71	12.86	11.87
4100	2.91	3.67	4.67	8.08	7.27	6.52	9.59	8.91	8.36
4300	6.51	8.13	10.16	3.62	3.24	3.00	5.55	5.37	5.42
4500	13.89	16.51	19.56	1.56	1.60	1.70	3.60	3.69	3.82
4570	17.33	20.22	23.56	1.26	1.35	1.50	3.13	3.23	3.35
4735	26.75	30.30	34.41	0.87	1.03	1.21	2.21	2.33	2.43
4800	30.96	34.85	39.46	0.78	0.95	1.12	1.92	2.05	2.15
5000	46.50	52.98	63.73	0.60	0.77	0.93	1.29	1.42	1.52
5500	54.09	53.55	54.10	0.35	0.50	0.63	0.59	0.71	0.83
5700	52.82	52.56	50.94	0.29	0.44	0.56	0.46	0.59	0.72
5900	50.83	49.93	50.96	0.24	0.39	0.51	0.37	0.51	0.65
6100	47.78	49.31	50.83	0.20	0.34	0.47	0.31	0.45	0.62
6300	48.61	49.64	49.66	0.18	0.32	0.45	0.28	0.43	0.62
6500	50.79	47.87	50.42	0.15	0.31	0.44	0.25	0.42	0.62
6700	48.47	48.26	49.25	0.13	0.29	0.45	0.22	0.40	0.64
6900	45.16	46.57	48.94	0.14	0.29	0.45	0.22	0.40	0.64
7200	47.07	46.11	45.31	0.12	0.29	0.48	0.20	0.40	0.70
7400	45.96	46.90	44.88	0.11	0.29	0.50	0.21	0.41	0.71
7500	44.87	46.06	44.88	0.12	0.30	0.50	0.20	0.41	0.71
7700	45.06	45.18	42.59	0.13	0.30	0.55	0.19	0.41	0.75
7900	42.55	40.51	42.00	0.12	0.34	0.56	0.20	0.43	0.75
8500	38.01	39.18	38.91	0.18	0.38	0.67	0.21	0.44	0.78
8650	39.72	38.96	40.46	0.16	0.38	0.66	0.19	0.43	0.75
8850	37.49	38.74	40.30	0.17	0.40	0.67	0.20	0.42	0.73
8900	39.75	39.05	38.27	0.16	0.37	0.70	0.18	0.40	0.75
9000	35.83	36.82	37.82	0.19	0.43	0.73	0.20	0.44	0.75
10000	36.09	36.38	36.03	0.17	0.41	0.72	0.15	0.35	0.60
10500	35.25	36.09	33.62	0.17	0.37	0.71	0.11	0.31	0.51
11000	34.81	34.51	34.45	0.16	0.35	0.66	0.10	0.27	0.43
11500	33.39	33.15	34.54	0.17	0.43	0.61	0.09	0.27	0.39
12000	33.98	34.09	34.68	0.11	0.35	0.53	0.08	0.27	0.41
12500	34.12	30.68	29.24	0.21	0.46	0.54	0.13	0.46	0.59
13000	30.47	31.18	31.64	0.12	0.32	0.49	0.06	0.30	0.56
13500	31.27	31.41	31.60	0.18	0.38	0.56	0.04	0.32	0.67
14000	30.79	30.69	30.67	0.26	0.51	0.76	0.01	0.33	0.78
14500	29.37	29.00	29.25	0.54	1.03	1.15	0.00	0.34	0.85
14600	29.01	28.89	28.71	0.75	0.91	1.12	0.00	0.36	0.87
14700	28.72	28.59	28.40	0.67	0.82	1.14	0.01	0.35	0.88
15000	27.66	27.36	27.22	0.49	0.84	1.30	0.02	0.37	0.91

Typical Performance Data

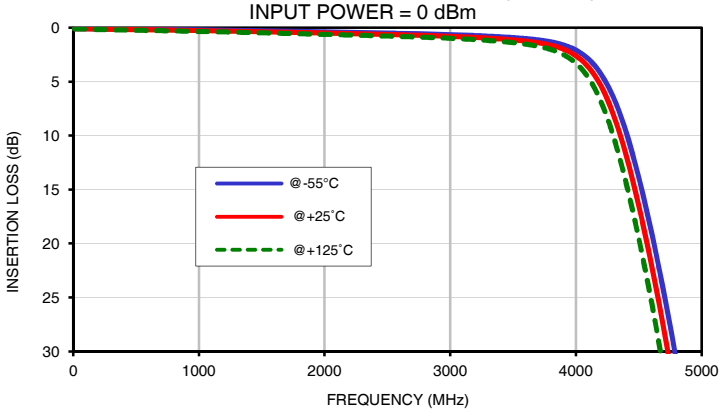
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-55°C	@+25°C	@+125°C
10	0.10	0.18	0.17
100	0.15	0.17	0.17
200	0.16	0.16	0.17
300	0.16	0.16	0.17
400	0.16	0.16	0.17
500	0.16	0.16	0.17
600	0.16	0.16	0.17
700	0.16	0.16	0.17
800	0.16	0.17	0.17
900	0.16	0.17	0.17
1000	0.17	0.17	0.17
1100	0.17	0.17	0.17
1200	0.17	0.17	0.18
1300	0.17	0.17	0.18
1400	0.17	0.18	0.18
1500	0.18	0.18	0.18
1600	0.18	0.18	0.19
1700	0.18	0.18	0.19
1800	0.18	0.19	0.19
1900	0.19	0.19	0.20
2000	0.19	0.19	0.20
2100	0.20	0.20	0.20
2200	0.20	0.20	0.21
2300	0.21	0.21	0.22
2400	0.21	0.22	0.22
2500	0.22	0.22	0.23
2600	0.23	0.23	0.24
2700	0.24	0.24	0.25
2800	0.25	0.25	0.26
2900	0.26	0.26	0.27
3000	0.27	0.27	0.28
3100	0.28	0.29	0.30
3160	0.29	0.30	0.31
3180	0.29	0.30	0.31
3200	0.30	0.30	0.32
3280	0.31	0.32	0.33
3300	0.31	0.32	0.34
3380	0.33	0.34	0.35
3400	0.33	0.34	0.36
3450	0.35	0.36	0.38
3500	0.36	0.38	0.39

Typical Performance Curves

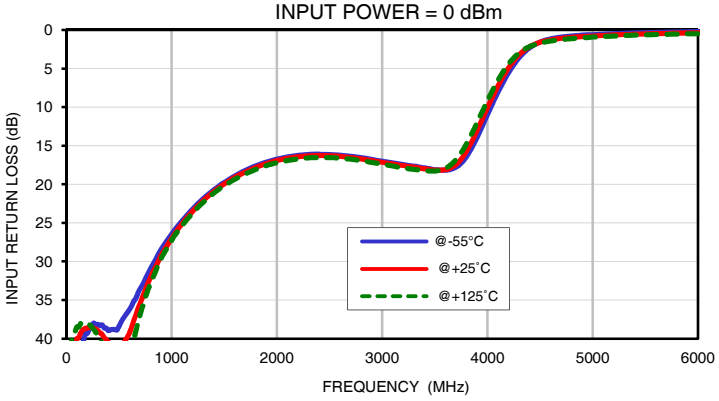
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



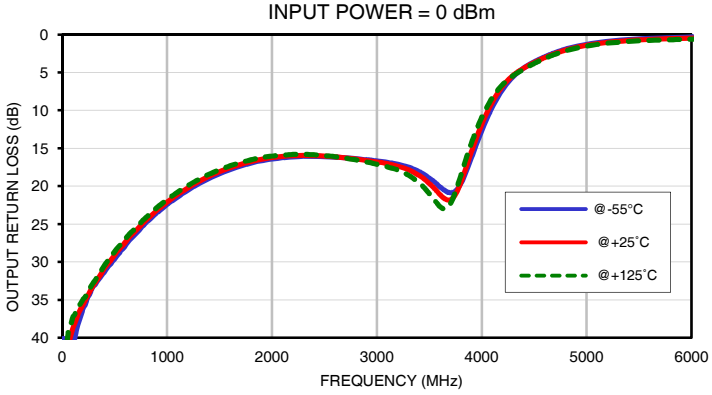
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



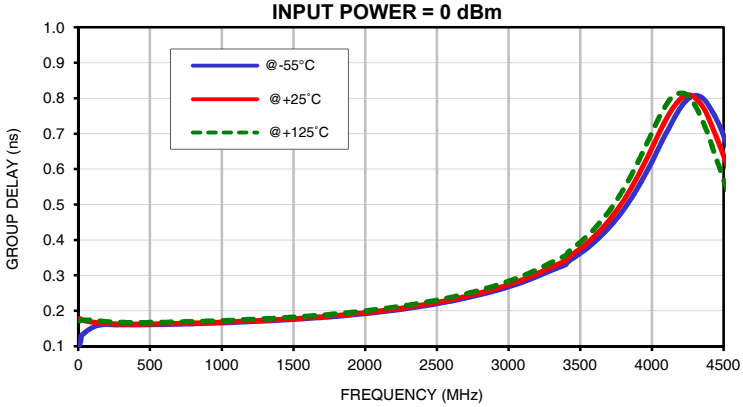
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



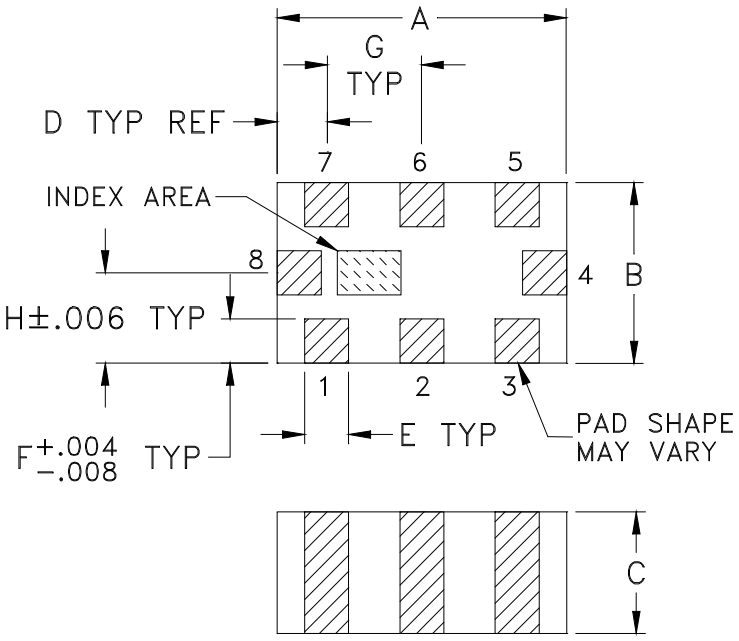
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



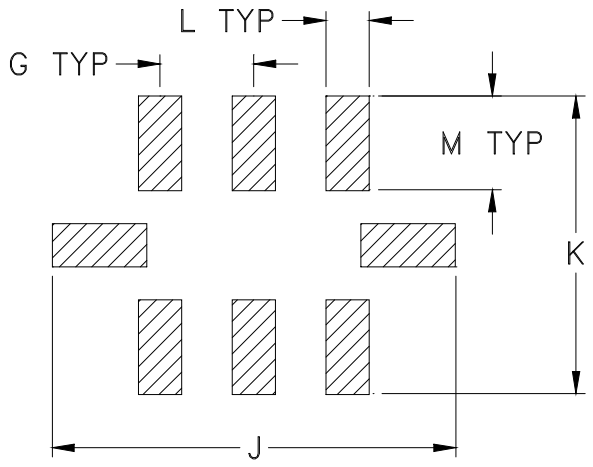
Case Style GE

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).

Tape & Reel Packaging TR-F114

DEVICE ORIENTATION IN T&R

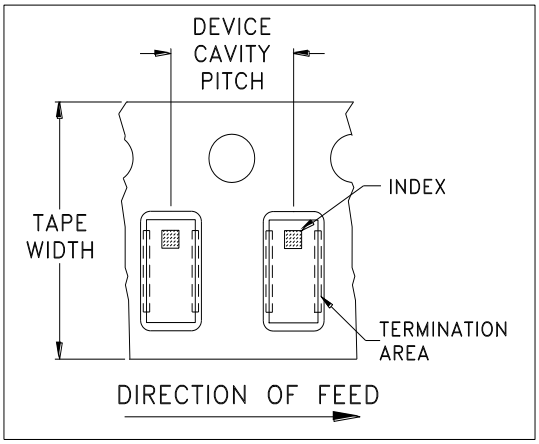


ILLUSTRATION 1

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

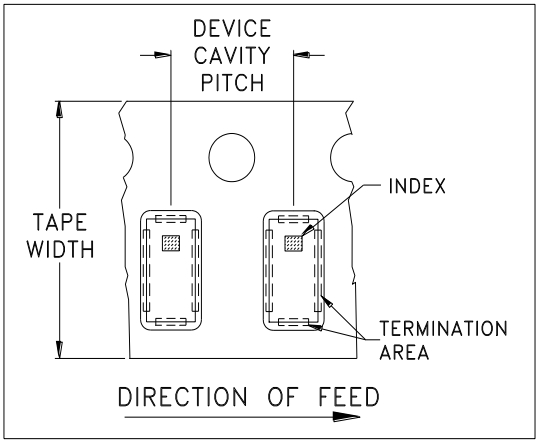


ILLUSTRATION 2

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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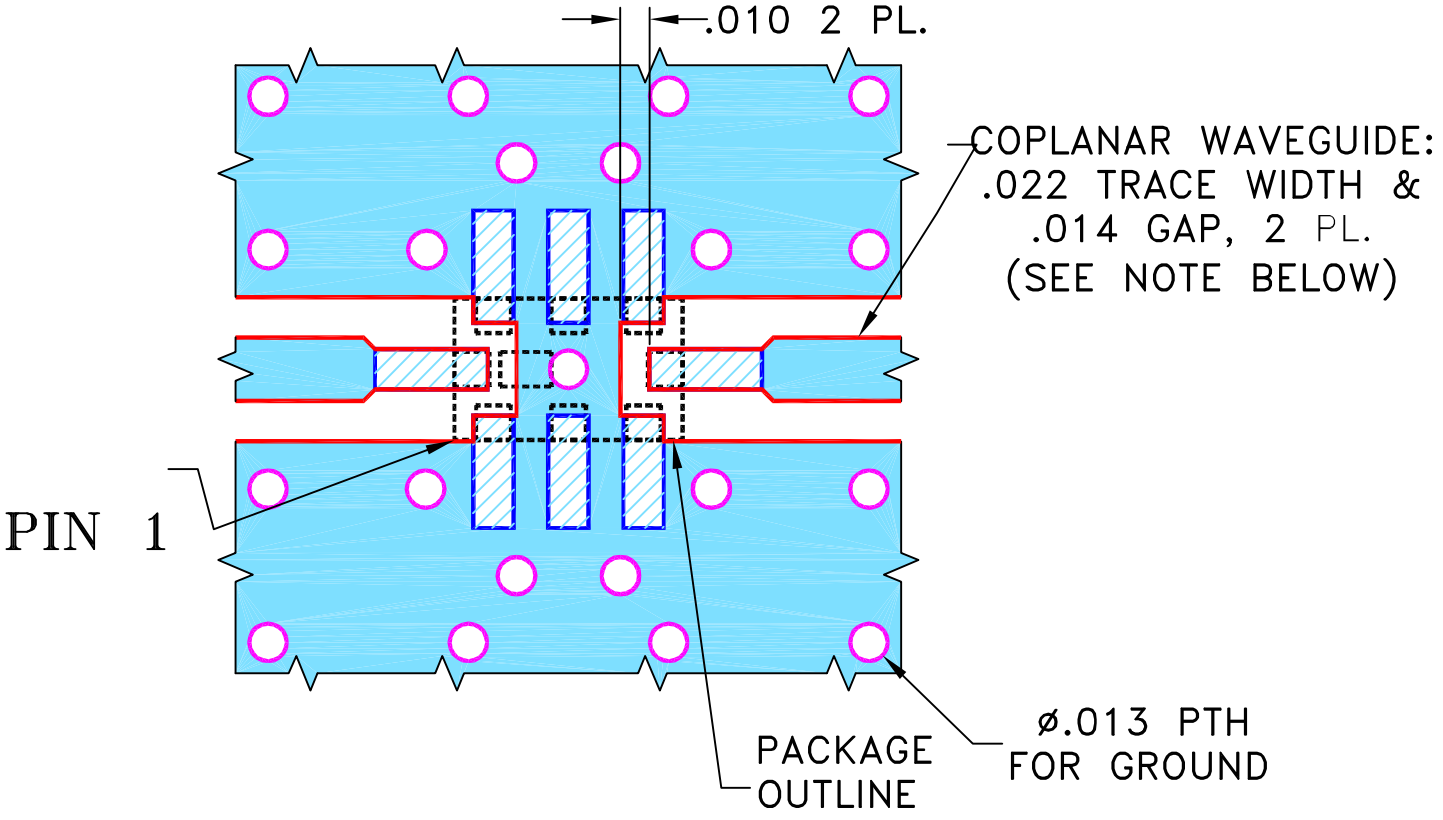
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M148457	NEW RELEASE	10/14/14	GF	MY

SUGGESTED MOUNTING CONFIGURATION FOR GE0805C-4 CASE STYLE, "08FL07" PIN CODE



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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.

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	GF	10/01/14
TOLERANCES ON:	CHECKED	IL	10/14/14
2 PL DECIMALS ±	APPROVED	MY	10/14/14
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

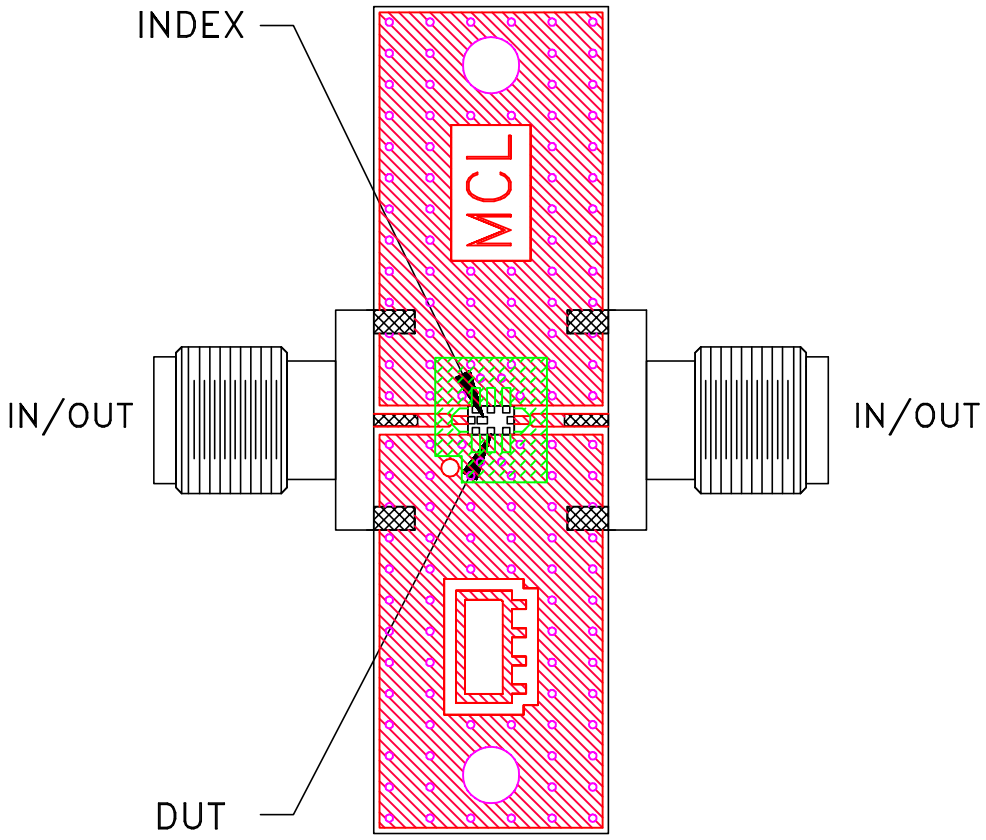
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 08FL07, GE0805C-4, TB-799+

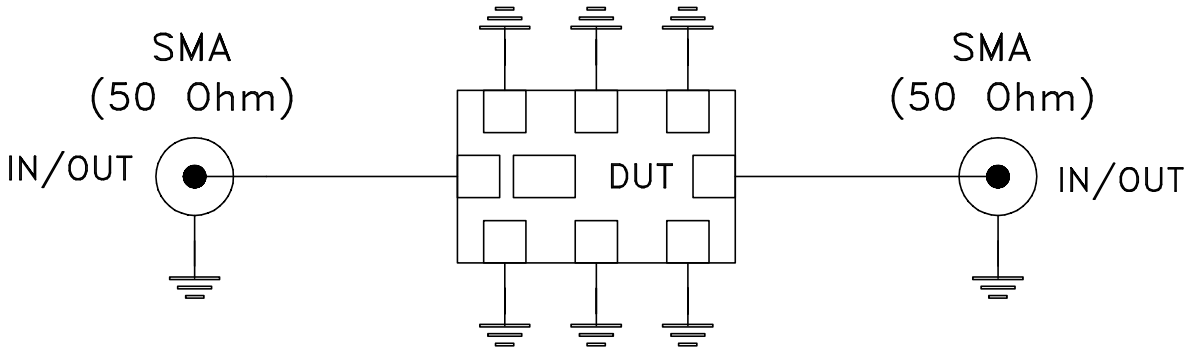
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-429	OR

FILE:	SCALE:	SHEET:
98PL429	15:1	1 OF 1

Evaluation Board and Circuit



TB-799+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: RO4350 or equivalent,
   Dielectric Constant=3.5, Thickness=.010 inch.

Mini-Circuits®

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Environmental Specifications ENV06

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 100°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
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