Ceramic

Low Pass Filter

LFCG-400+

50Ω DC to 400 MHz

Generic photo used for illustration purposes only
CASE STYLE: GE0805C-2

The Big Deal

- Good rejection, 30 dB typical
- Rugged, ceramic construction
- Tiny size, 0.079" x 0.049" x 0.037" (0805)
- Excellent power handling, 3.5W

Product Overview

Mini-Circuits' LFCG-400+ is an LTCC low pass filter with a passband from DC to 400 MHz, supporting a variety of applications. This model provides 1 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 3.5W 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, 30 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.
High power handling, 3.5W	Supports a wide range of system power requirements.
Wrap-around terminations	Provides excellent solderability and easy visual inspection

Ceramic

Low Pass Filter

LFCG-400+

50Ω DC to 400 MHz

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

Features

- Low loss, 1dB typical
- High rejection 30 dB typical
- Excellent power handling, 3.5W
- Extremely small size 0805 (2.0mm x 1.25mm)
- Temperature stable
- LTCC construction

Applications

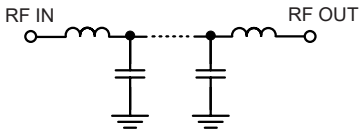
- Harmonic Rejection
- VHF/UHF transmitters / receivers
- RF suppression for DC lines on PCB
- Anti-aliasing for A/D converter

Electrical Specifications[1,2] at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	DC-F1	DC - 400	—	1.0	1.8	dB
	Freq. Cut-Off	F2	520	—	3.0	—	dB
	Return Loss	DC-F1	DC - 400	—	18	—	dB
Stop Band	Rejection Loss	F3-F4	800 - 2500	25	30	—	dB
		F4-F5	2500 - 4500	—	20	—	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+

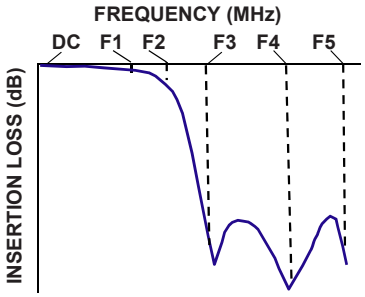
Functional Schematic



Maximum Ratings	
Operating Temperature	-55°C to 125°C
Storage Temperature	-55°C to 125°C
RF Power Input*	3.5W max.@25°C

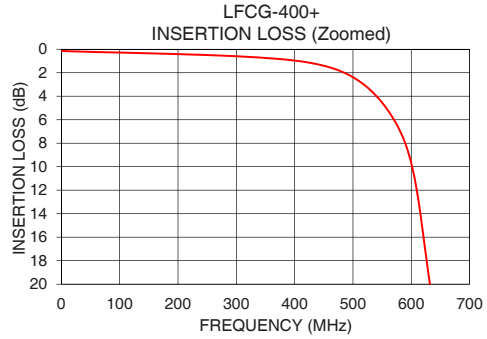
*Passband rating, derate linearly to 0.6W at 125°C ambient
Permanent damage may occur if any of these limits are exceeded.

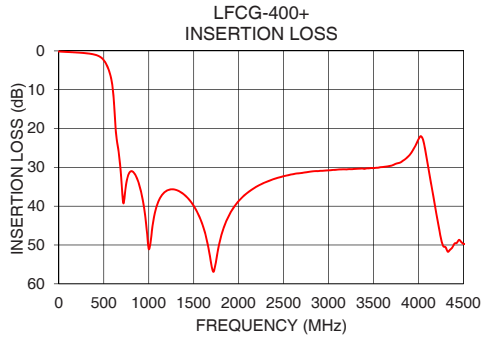
Typical Frequency Response

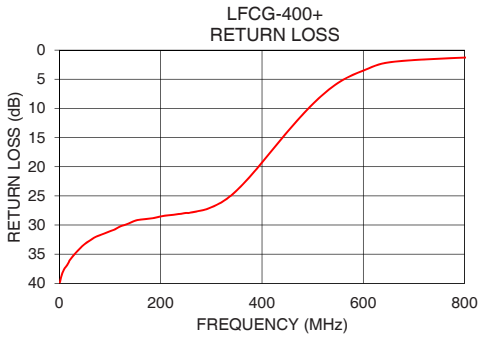


Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)
1	0.17	39.85
50	0.22	33.26
100	0.28	31.06
200	0.41	28.53
400	0.96	19.28
500	2.38	9.27
520	3.05	7.65
600	9.68	3.52
635	20.85	2.36
685	30.11	1.80
800	31.03	1.28
900	34.94	0.97
1000	51.02	0.73
1500	39.92	0.31
2000	38.68	0.22
2500	32.28	0.19
3000	30.77	0.17
3500	30.20	0.16
4000	22.73	0.43
4500	49.74	0.17







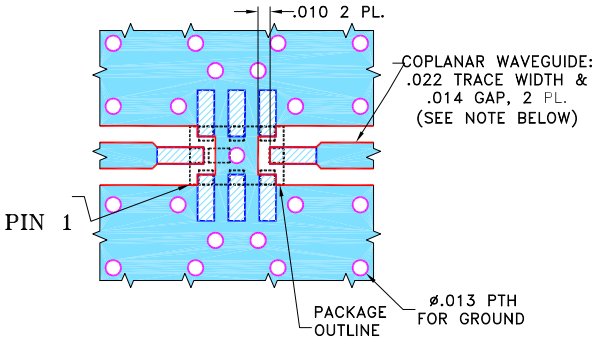
Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's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

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



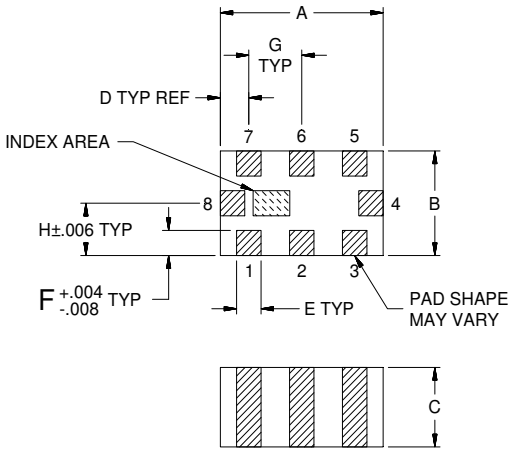
NOTES:

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-400+

Typical Performance Data

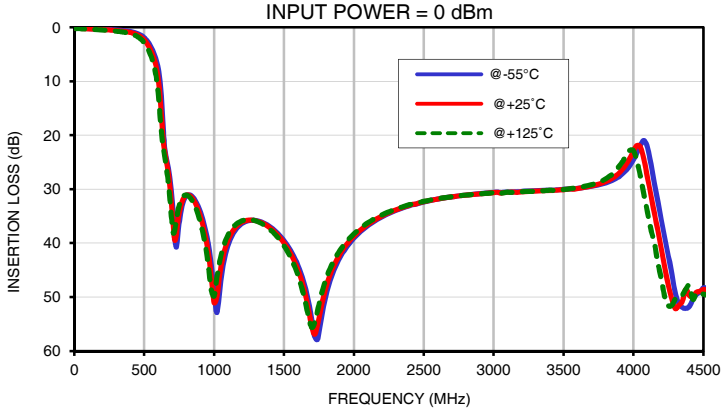
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C
1	0.15	0.17	0.20	37.65	35.17	33.68	40.45	37.77	35.60
50	0.20	0.23	0.28	36.95	34.33	32.98	35.65	33.67	32.42
100	0.25	0.29	0.35	34.24	32.50	31.12	32.72	31.20	29.93
150	0.30	0.36	0.43	32.53	31.17	30.01	30.78	29.56	28.51
200	0.36	0.42	0.50	31.59	30.49	29.49	29.68	28.65	27.68
250	0.42	0.50	0.60	30.84	29.96	29.11	29.12	28.22	27.31
300	0.50	0.60	0.72	28.83	28.14	27.52	28.30	27.57	26.85
350	0.61	0.74	0.90	25.06	24.51	23.93	25.19	24.66	24.09
400	0.79	0.96	1.17	19.99	19.49	18.86	20.04	19.58	18.95
450	1.14	1.38	1.69	14.84	14.36	13.74	14.75	14.26	13.61
500	1.92	2.32	2.87	10.06	9.70	9.27	9.86	9.42	8.90
520	2.46	2.98	3.66	8.45	8.19	7.93	8.15	7.77	7.35
550	3.69	4.43	5.42	6.64	6.67	6.88	5.99	5.73	5.48
600	7.51	9.33	12.05	8.59	12.03	16.23	3.66	3.58	3.50
635	17.91	20.51	22.05	7.36	5.39	4.25	2.32	2.39	2.54
685	28.16	29.77	32.07	1.60	1.69	1.82	1.57	1.80	2.05
700	31.88	34.14	36.49	1.36	1.48	1.64	1.48	1.71	1.97
800	31.33	31.13	31.08	0.86	1.01	1.18	1.09	1.29	1.51
900	34.05	34.84	35.95	0.71	0.86	1.01	0.80	0.97	1.15
1000	48.85	51.00	49.83	0.62	0.76	0.91	0.60	0.74	0.89
1100	40.40	39.46	38.51	0.54	0.67	0.81	0.47	0.58	0.71
1200	36.36	36.10	35.86	0.47	0.60	0.73	0.37	0.47	0.57
1300	35.83	35.85	35.90	0.42	0.54	0.67	0.31	0.40	0.49
1400	36.96	37.17	37.45	0.36	0.48	0.61	0.27	0.35	0.43
1500	39.52	39.95	40.49	0.33	0.45	0.57	0.25	0.32	0.39
1600	44.13	44.94	45.96	0.29	0.40	0.52	0.22	0.29	0.35
1700	54.27	55.58	55.65	0.26	0.38	0.49	0.20	0.27	0.33
1800	49.77	48.25	46.74	0.23	0.34	0.45	0.19	0.25	0.30
1900	42.71	42.06	41.36	0.19	0.31	0.42	0.18	0.24	0.30
2000	39.10	38.72	38.29	0.19	0.29	0.40	0.17	0.23	0.28
2100	36.77	36.53	36.25	0.18	0.28	0.39	0.16	0.22	0.27
2200	35.15	34.99	34.79	0.15	0.26	0.36	0.16	0.22	0.27
2300	33.96	33.86	33.72	0.15	0.25	0.35	0.16	0.22	0.27
2400	33.04	32.97	32.86	0.14	0.24	0.33	0.14	0.20	0.25
2500	32.38	32.33	32.26	0.12	0.22	0.31	0.14	0.20	0.25
2600	31.84	31.83	31.77	0.11	0.21	0.29	0.13	0.19	0.25
2700	31.42	31.44	31.42	0.11	0.21	0.29	0.13	0.20	0.25
2800	31.08	31.11	31.11	0.10	0.19	0.27	0.12	0.19	0.25
2900	30.83	30.88	30.88	0.10	0.19	0.27	0.11	0.19	0.25
3000	30.58	30.65	30.65	0.09	0.18	0.25	0.10	0.17	0.24
3050	30.65	30.73	30.75	0.10	0.19	0.26	0.10	0.18	0.25
3100	30.52	30.57	30.56	0.08	0.17	0.24	0.10	0.18	0.25
3150	30.49	30.56	30.60	0.09	0.18	0.25	0.10	0.18	0.25
3200	30.40	30.47	30.50	0.08	0.17	0.24	0.09	0.17	0.25
3250	30.36	30.44	30.44	0.08	0.17	0.24	0.09	0.17	0.25
3300	30.30	30.38	30.40	0.09	0.18	0.24	0.08	0.17	0.25
3350	30.25	30.33	30.28	0.08	0.17	0.23	0.08	0.17	0.25
3400	30.20	30.27	30.20	0.07	0.16	0.22	0.07	0.16	0.25
3450	30.12	30.19	30.19	0.07	0.16	0.22	0.06	0.15	0.24
3500	30.05	30.11	30.07	0.08	0.17	0.23	0.06	0.16	0.26
3550	29.96	29.97	29.90	0.08	0.17	0.23	0.06	0.15	0.25
3600	29.86	29.88	29.81	0.08	0.17	0.23	0.06	0.16	0.26
3700	29.48	29.42	29.18	0.07	0.16	0.24	0.06	0.16	0.28
3800	28.84	28.59	28.11	0.10	0.20	0.28	0.06	0.18	0.30
3900	27.63	26.98	25.68	0.12	0.26	0.43	0.07	0.20	0.37
4000	24.57	22.95	22.89	0.33	0.74	1.25	0.14	0.38	0.68
4100	22.18	27.82	34.24	1.19	0.64	0.43	0.48	0.36	0.38
4200	35.74	41.12	46.75	0.21	0.25	0.29	0.10	0.19	0.33
4300	49.32	52.14	50.32	0.11	0.19	0.26	0.04	0.17	0.32
4500	48.30	48.60	49.46	0.07	0.17	0.25	0.02	0.16	0.32

Typical Performance Data

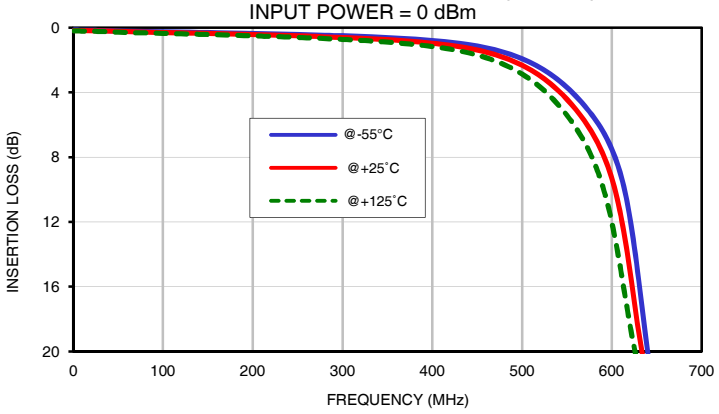
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-55°C	@+25˚C	@+125˚C
1	0.72	0.76	0.78
5	0.72	0.76	0.77
20	0.71	0.74	0.75
30	0.71	0.74	0.75
40	0.72	0.73	0.75
50	0.72	0.73	0.75
60	0.72	0.73	0.75
70	0.72	0.73	0.74
80	0.72	0.73	0.74
90	0.72	0.73	0.74
100	0.72	0.73	0.75
110	0.72	0.73	0.75
120	0.72	0.73	0.75
130	0.73	0.74	0.75
140	0.73	0.74	0.76
150	0.73	0.74	0.76
160	0.74	0.75	0.77
170	0.75	0.76	0.77
180	0.75	0.76	0.78
190	0.76	0.77	0.78
200	0.76	0.77	0.79
210	0.77	0.78	0.80
220	0.78	0.79	0.81
230	0.79	0.81	0.82
240	0.81	0.82	0.84
250	0.82	0.83	0.85
260	0.83	0.84	0.86
270	0.84	0.86	0.88
280	0.86	0.87	0.90
290	0.88	0.89	0.91
300	0.89	0.91	0.93
310	0.91	0.93	0.95
320	0.93	0.95	0.98
330	0.95	0.97	1.00
340	0.98	1.00	1.03
350	1.00	1.02	1.06
360	1.03	1.05	1.09
370	1.06	1.09	1.12
380	1.09	1.12	1.16
390	1.13	1.16	1.20
400	1.17	1.20	1.25

Typical Performance Curves

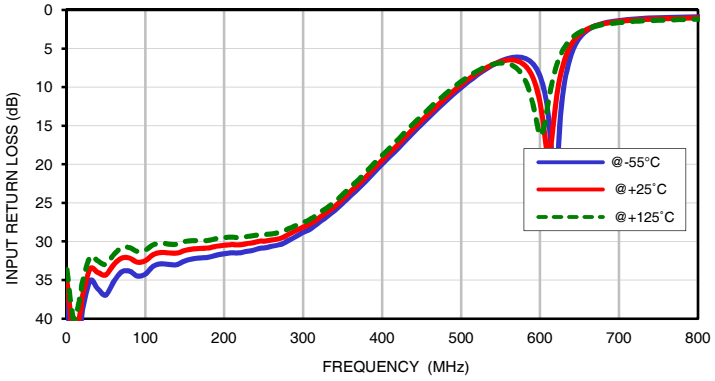
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



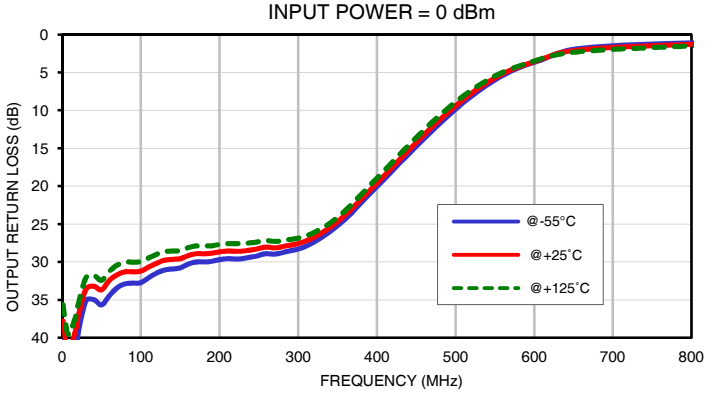
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



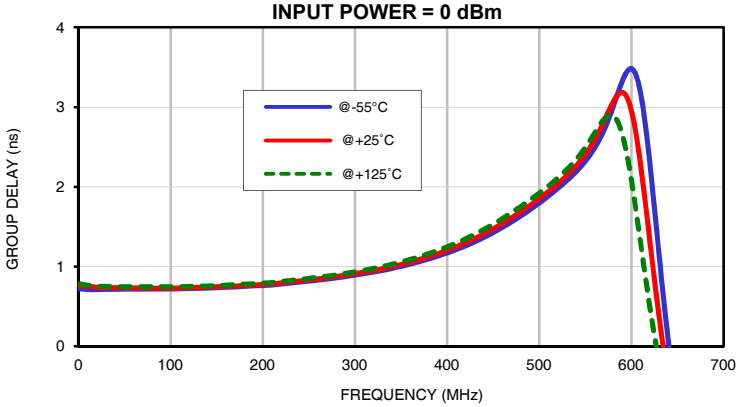
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



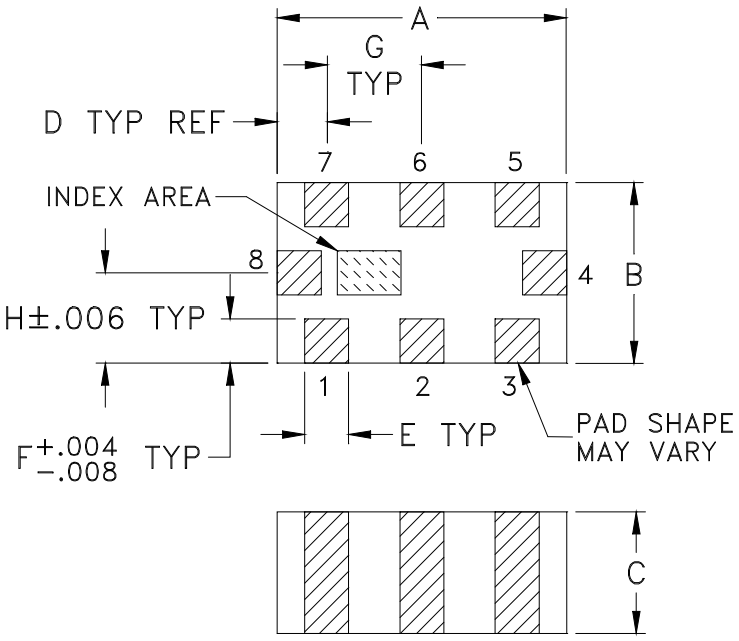
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



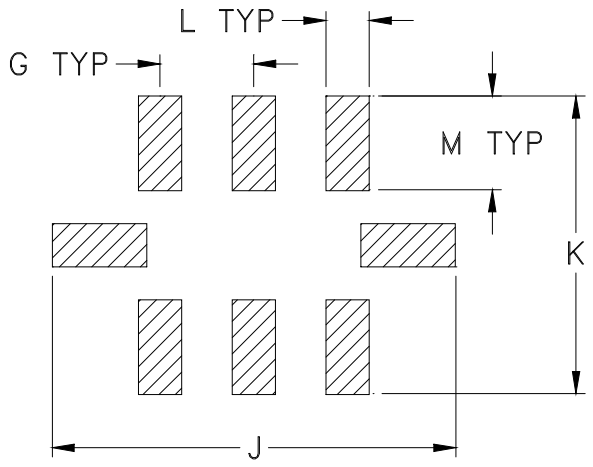
Case Style GE

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

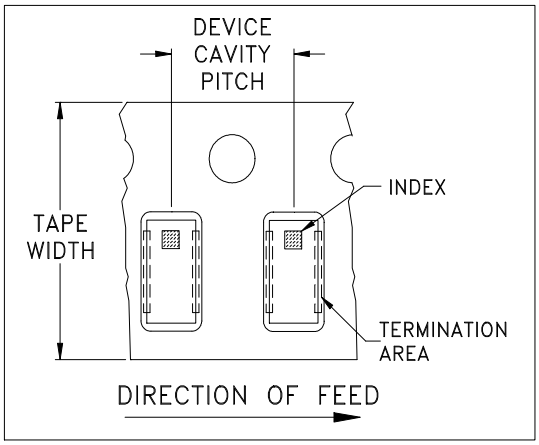


ILLUSTRATION 1

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

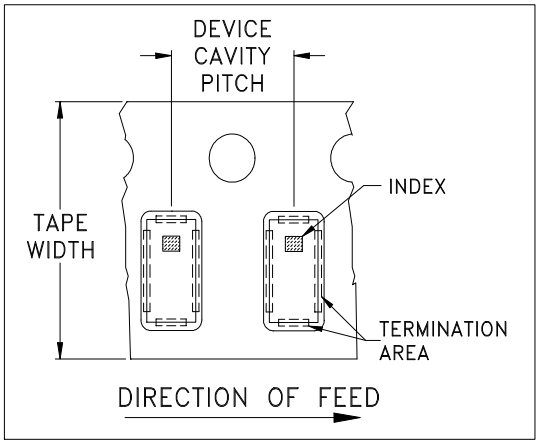


ILLUSTRATION 2

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	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.

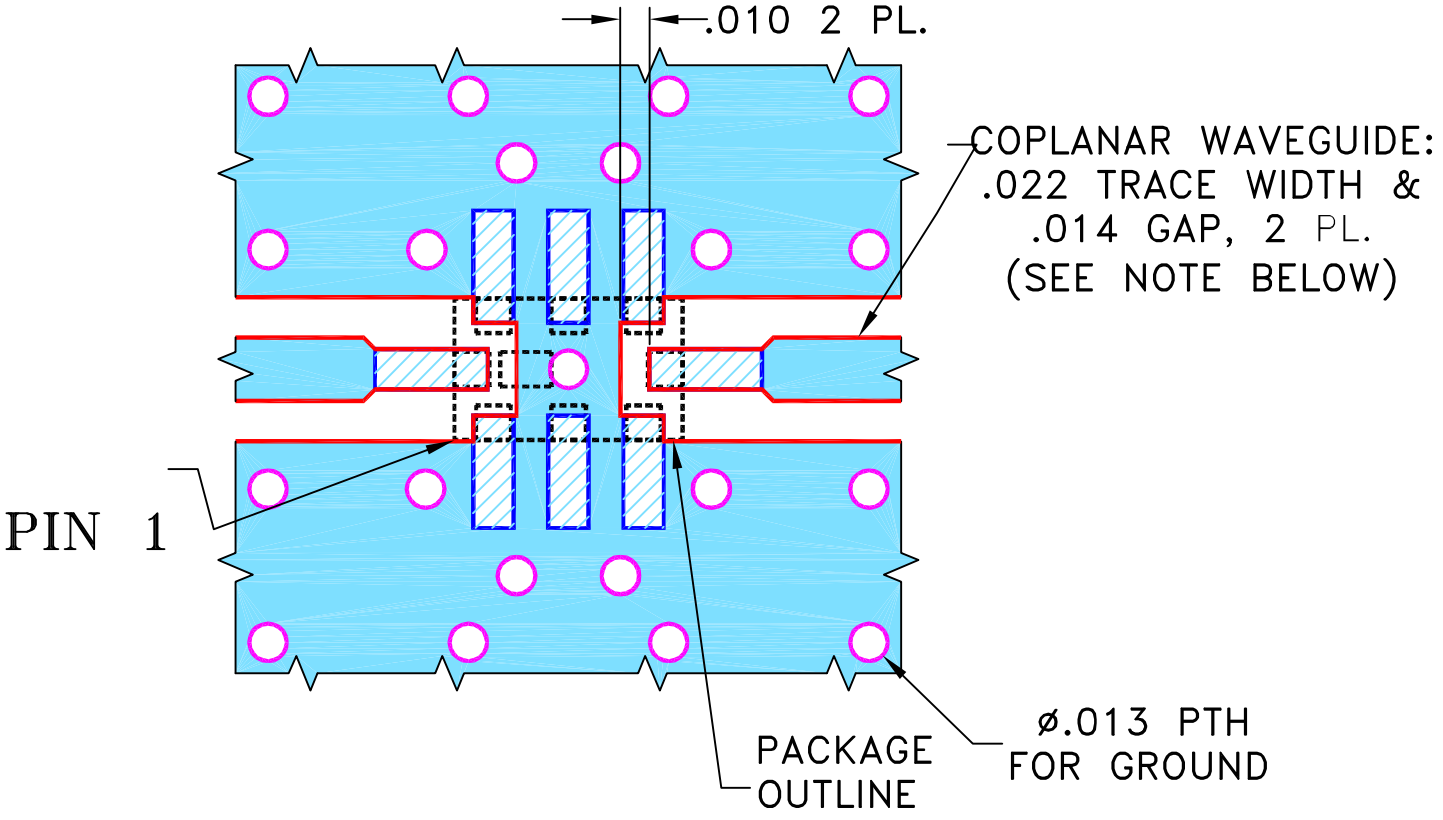
Go to: www.minicircuits.com/pages/pdfs/tape.pdf

Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

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



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.

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

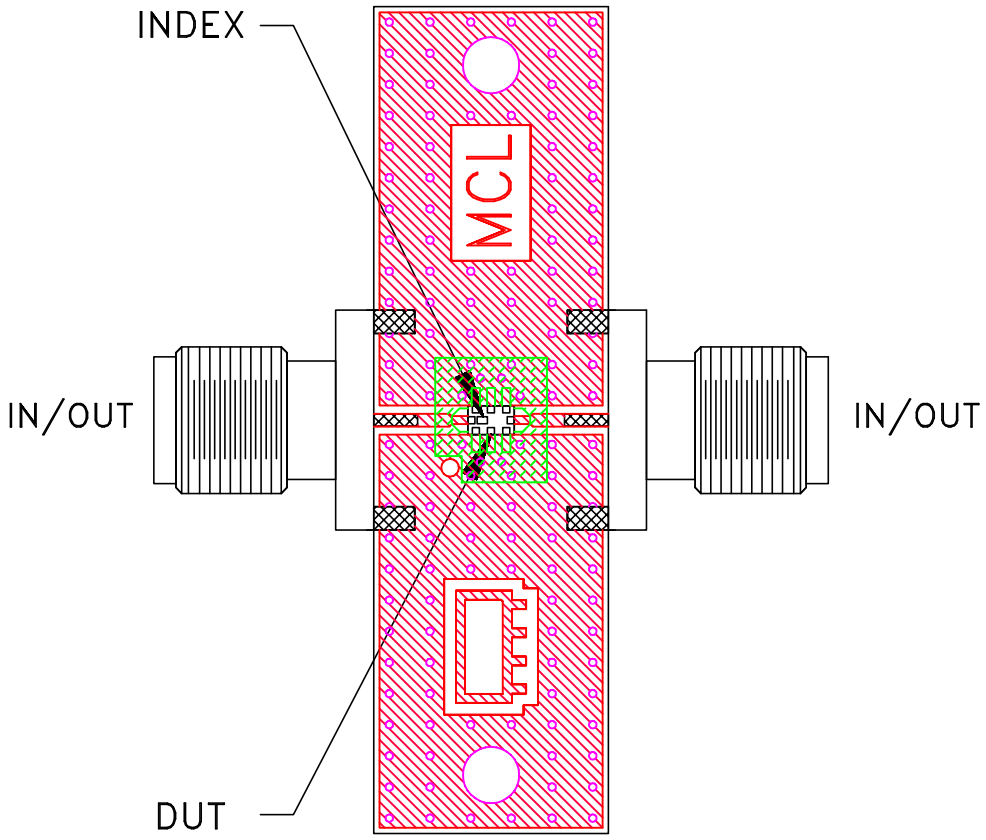
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

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

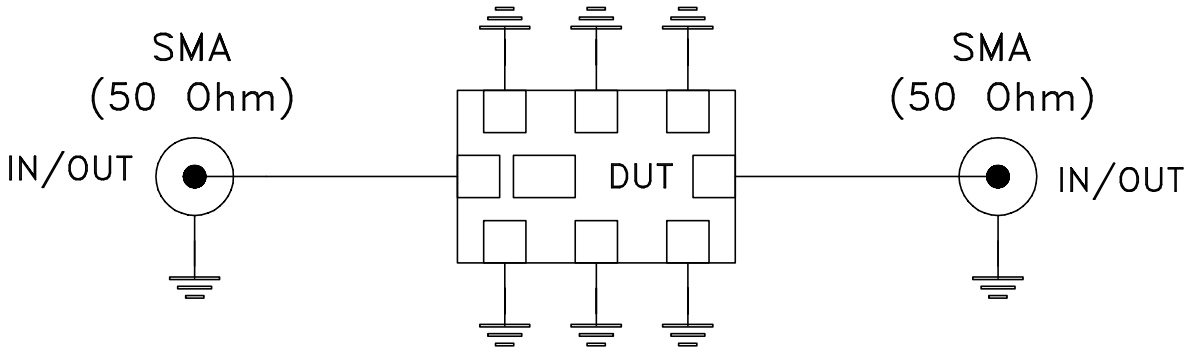
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-429	OR

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®

Mini-Circuits

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