Ceramic

High Pass Filter

HFCG-2100+

50Ω 2200 to 6000 MHz



Generic photo used for illustration purposes only

CASE STYLE: GE0805C-2

The Big Deal

- Small size 2.0 mm x 1.25 mm
- High Power handling
- High rejection
- Ceramic construction

Product Overview

The HFCG-2100+ LTCC High Pass Filter is constructed with 11 layers in order to achieve a miniature size and high repeatability of performance. Wrap-around terminations minimize variations in performance due to parasitics. Covering 2200-6000 MHz, these units offer low insertion loss and good rejection.

Key Features

Feature	Advantages
Small Size (2.0 mm x 1.25 mm)	Allows for high layout density of circuit boards, while minimizing effects of parasitic.
Wrap around termination	Provides excellent solderability and easy visual inspection capability.
LTCC construction	Provides a rugged package that is well suited for tough environments including high humidity and high temperature extremes.

Notes
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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

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HFCG-2100+



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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

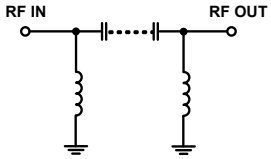
Features

- Small size
- Temperature stable
- LTCC construction
- Excellent power handling, 4W

Applications

- Transmitters / Receivers
- Global positioning system(GPS)
- Satellite broadcast applications
- Wireless local area Network

Functional Schematic



Electrical Specifications[1,2] at 25°C

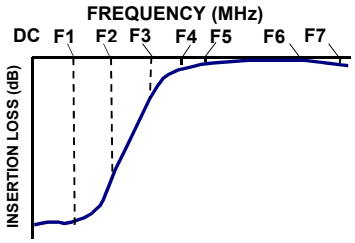
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Stop Band	Rejection Loss	DC-F1	DC-1050	40	50	-	dB
		DC-F2	DC-1320	22	33	-	dB
	Freq. Cut-Off	F3 *	2100	-	3.0	-	dB
Pass Band	Insertion Loss	F4-F7	2200-6000	-	2.0	-	dB
		F5-F6	2500-5000	-	1.0	1.8	dB
	Return Loss	F5-F6	2500-5000	-	12	-	dB

1 This component is not intended to act as a DC block. Please consult with Mini-Circuits for further details
2 Measured on Mini-Circuits Characterization Test Board TB-1090+
* Typically, a ±5% frequency deviation from the stated value may occur on a unit-to-unit basis.

Maximum Ratings	
Operating Temperature	-55°C to 125°C
Storage Temperature	-55°C to 125°C
RF Power Input*	4W at 25°C

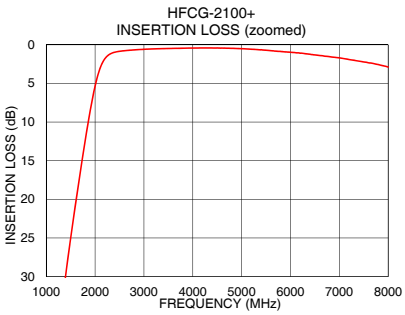
*Passband rating, derate linearly to 0.8W at 125°C ambient
Permanent damage may occur if any of these limits are exceeded.

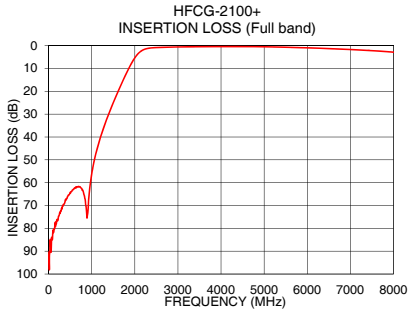
Typical Frequency Response

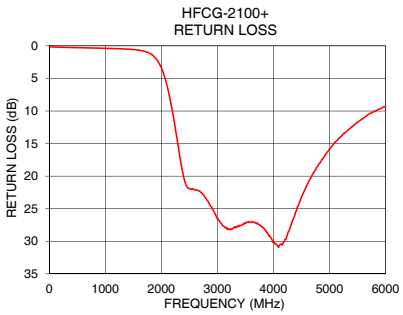


Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)
10	90.29	0.15
250	73.97	0.22
700	61.85	0.31
950	63.25	0.36
1050	51.11	0.38
1320	33.69	0.47
1380	30.65	0.49
1600	20.59	0.67
1700	16.35	0.85
1900	8.52	1.91
2100	3.07	6.05
2110	2.90	6.40
2200	1.80	10.16
2300	1.21	15.40
2500	0.84	21.94
3000	0.58	26.55
3040	0.56	26.96
5000	0.50	15.83
5600	0.76	11.12
6000	0.97	9.31







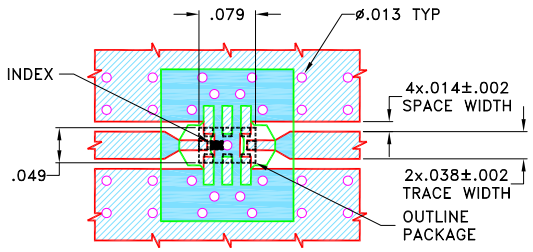
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Pad Connections

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

Product Marking: LD

Demo Board MCL P/N: TB-1090+
Suggested PCB Layout (PL-615)

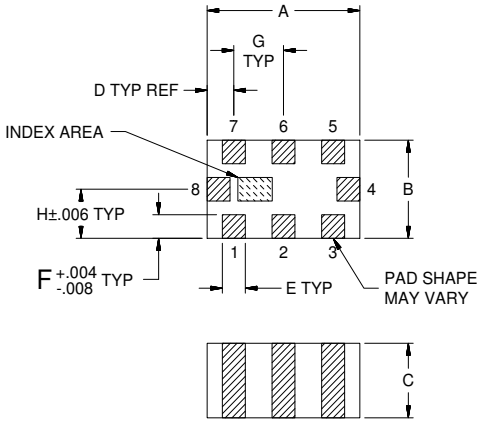


NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .020"±.0015". COPPER: 1/2 Oz. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	Wt.
.079	**.049**	**.037**	**.014**	**.012**	**.012**	**.026**	**.025**	grams
2.00	1.25	0.95	0.35	0.30	0.30	0.65	0.63	.008

Note: Please refer to case style drawing for details

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Ceramic High Pass Filter HFCG-2100+

Typical Performance Data

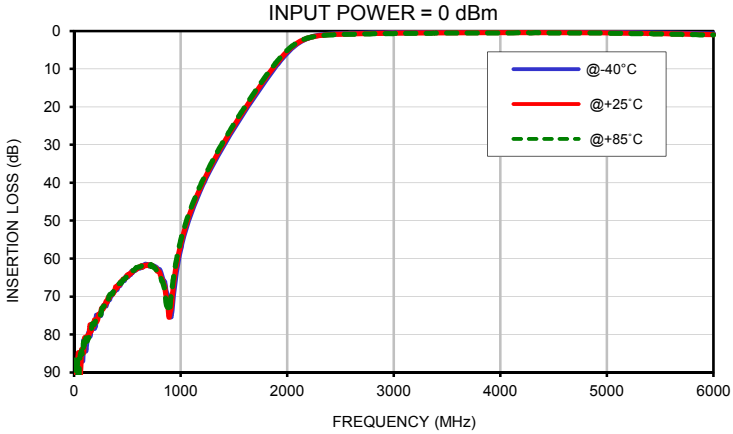
FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
10	98.33	90.29	86.71	0.12	0.15	0.17	0.12	0.15	0.17
100	83.27	80.88	83.56	0.14	0.18	0.20	0.13	0.17	0.19
200	77.65	76.12	76.48	0.17	0.21	0.23	0.17	0.21	0.23
300	72.47	71.29	71.16	0.19	0.24	0.26	0.19	0.24	0.26
400	68.19	67.73	67.72	0.20	0.26	0.29	0.20	0.26	0.29
500	64.88	64.29	64.23	0.22	0.28	0.31	0.21	0.28	0.32
600	62.57	62.37	62.29	0.23	0.30	0.33	0.23	0.30	0.34
700	61.84	61.85	61.71	0.25	0.31	0.36	0.25	0.32	0.36
800	62.89	63.65	64.05	0.26	0.33	0.38	0.26	0.34	0.39
900	75.00	74.29	72.63	0.28	0.36	0.40	0.28	0.37	0.41
1000	57.50	56.25	55.24	0.30	0.38	0.43	0.30	0.39	0.45
1050	52.11	51.11	50.35	0.30	0.38	0.44	0.31	0.40	0.46
1200	41.02	40.36	39.77	0.33	0.42	0.48	0.34	0.44	0.51
1320	34.28	33.69	33.14	0.36	0.47	0.54	0.37	0.49	0.57
1430	28.87	28.25	27.73	0.41	0.53	0.60	0.42	0.56	0.64
1500	25.62	25.00	24.48	0.44	0.56	0.65	0.45	0.60	0.69
1620	20.34	19.72	19.22	0.54	0.69	0.80	0.57	0.74	0.87
1700	16.97	16.35	15.86	0.67	0.85	0.98	0.72	0.91	1.06
1800	12.90	12.29	11.84	0.95	1.19	1.37	1.02	1.29	1.49
1900	9.07	8.52	8.14	1.55	1.91	2.18	1.66	2.06	2.37
2000	5.75	5.34	5.07	2.80	3.37	3.82	2.99	3.63	4.13
2100	3.28	3.07	2.95	5.16	6.05	6.72	5.53	6.52	7.29
2200	1.81	1.80	1.79	9.03	10.16	11.05	9.77	11.10	12.23
2300	1.12	1.21	1.26	14.27	15.40	16.39	16.07	17.64	19.21
2400	0.84	0.96	1.03	19.57	20.20	20.77	24.16	24.90	25.73
2470	0.74	0.87	0.95	21.51	21.78	21.87	25.90	25.55	25.01
2500	0.71	0.84	0.92	21.73	21.94	21.93	25.05	24.75	24.20
2700	0.58	0.71	0.78	22.40	22.47	22.60	22.50	22.64	22.68
2800	0.53	0.66	0.73	23.35	23.44	23.71	23.02	23.27	23.56
2900	0.49	0.61	0.68	24.76	24.83	25.08	24.03	24.41	24.90
2960	0.47	0.59	0.67	25.76	25.77	25.97	24.70	25.15	25.68
3100	0.42	0.55	0.62	27.56	27.63	27.29	25.76	26.68	27.25
3200	0.40	0.53	0.60	27.97	28.12	27.37	26.13	27.33	27.71
3300	0.38	0.51	0.58	28.08	27.88	26.96	26.43	27.43	27.62
3400	0.37	0.49	0.57	28.45	27.57	26.67	26.74	27.27	27.42
3500	0.34	0.47	0.55	28.16	27.21	26.44	26.78	27.22	27.42
3600	0.33	0.46	0.53	27.50	27.05	26.39	26.77	27.58	27.90
3700	0.32	0.45	0.53	27.14	27.31	26.85	26.71	28.24	28.76
3800	0.31	0.44	0.51	27.58	27.83	27.57	27.59	29.33	30.18
3900	0.30	0.43	0.50	29.03	28.80	28.60	29.95	31.60	32.97
4000	0.29	0.42	0.49	30.58	30.03	29.79	33.43	35.61	38.66
4100	0.28	0.41	0.49	31.08	30.70	30.39	35.63	38.47	41.66
4200	0.28	0.41	0.48	29.77	29.86	29.49	32.71	34.32	34.31
4250	0.27	0.40	0.48	28.65	28.91	28.50	30.27	31.48	31.41
4450	0.27	0.41	0.49	23.98	24.33	24.15	24.28	24.95	24.95
4500	0.27	0.41	0.49	22.65	23.17	23.06	23.00	23.88	23.91
4600	0.29	0.42	0.49	20.52	21.30	21.26	20.85	21.86	21.90
4700	0.31	0.44	0.51	18.90	19.69	19.69	19.25	20.12	20.17
4750	0.31	0.44	0.52	18.34	19.00	19.07	18.58	19.33	19.45
4900	0.34	0.48	0.55	16.46	17.05	17.22	16.48	17.13	17.35
5000	0.37	0.50	0.57	15.25	15.83	16.08	15.25	15.92	16.17
5100	0.40	0.53	0.61	14.33	14.75	14.96	14.44	14.95	15.21
5310	0.47	0.61	0.69	12.75	13.05	13.24	12.88	13.25	13.45
5300	0.47	0.61	0.68	12.86	13.18	13.34	12.94	13.34	13.52
5400	0.50	0.65	0.72	12.11	12.42	12.57	12.24	12.60	12.76
5500	0.55	0.70	0.78	11.49	11.73	11.86	11.65	11.96	12.10
5650	0.63	0.78	0.86	10.68	10.84	10.95	10.71	10.95	11.07
5700	0.65	0.82	0.90	10.36	10.48	10.59	10.42	10.63	10.73
5800	0.70	0.87	0.94	9.97	10.05	10.18	10.05	10.16	10.28
6000	0.80	0.97	1.05	9.14	9.31	9.38	9.29	9.48	9.53

Typical Performance Data

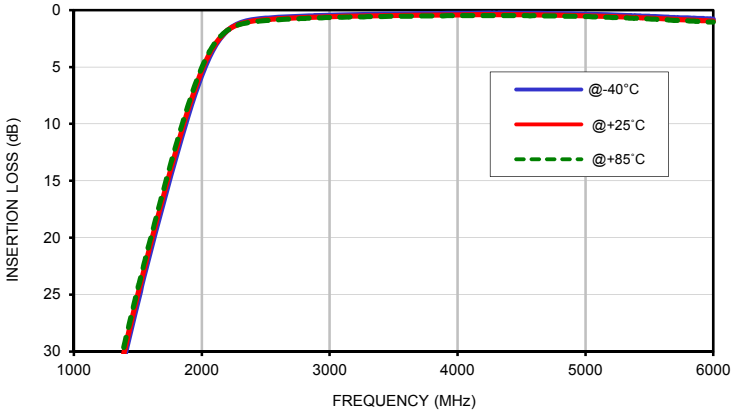
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
2000	0.65	0.66	0.66
2100	0.70	0.69	0.67
2200	0.66	0.63	0.61
2300	0.56	0.53	0.51
2400	0.47	0.44	0.42
2500	0.40	0.38	0.36
2600	0.34	0.33	0.32
2700	0.31	0.29	0.28
2800	0.28	0.27	0.26
2900	0.26	0.24	0.24
3000	0.24	0.23	0.22
3100	0.22	0.21	0.20
3200	0.21	0.20	0.19
3300	0.20	0.18	0.18
3400	0.19	0.17	0.17
3500	0.18	0.16	0.16
3600	0.17	0.16	0.15
3700	0.16	0.15	0.14
3800	0.16	0.14	0.14
3900	0.15	0.14	0.13
4000	0.14	0.13	0.13
4100	0.14	0.13	0.12
4200	0.14	0.13	0.12
4300	0.13	0.12	0.11
4400	0.13	0.12	0.11
4500	0.13	0.12	0.11
4600	0.12	0.11	0.11
4700	0.12	0.11	0.10
4800	0.12	0.11	0.10
4900	0.11	0.10	0.10
5000	0.11	0.10	0.10
5100	0.11	0.10	0.09
5200	0.11	0.10	0.09
5300	0.10	0.10	0.09
5400	0.10	0.09	0.09
5500	0.10	0.09	0.09
5600	0.10	0.09	0.08
5700	0.10	0.09	0.09
5800	0.10	0.09	0.09
5900	0.10	0.09	0.08
6000	0.09	0.09	0.08

Typical Performance Curves

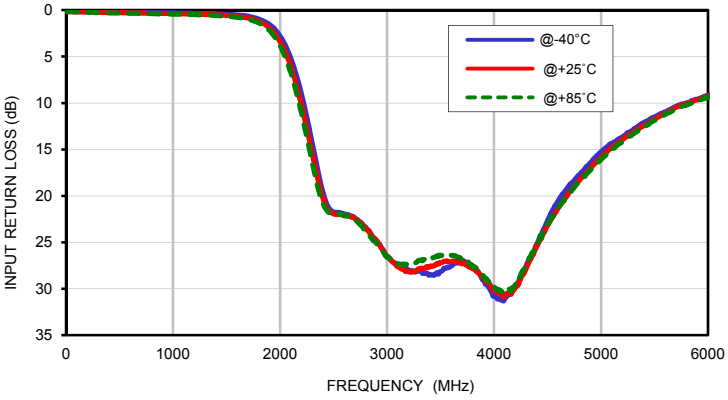
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



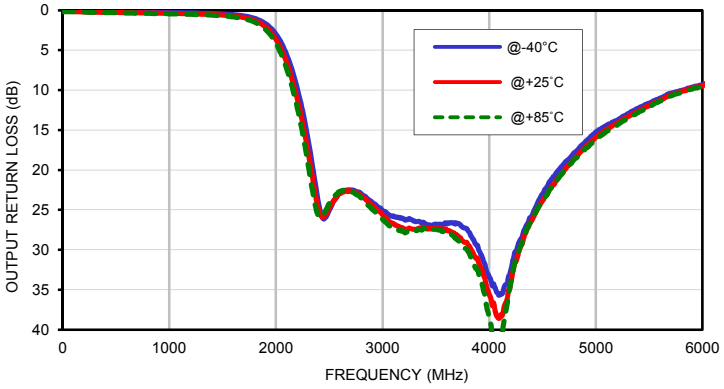
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



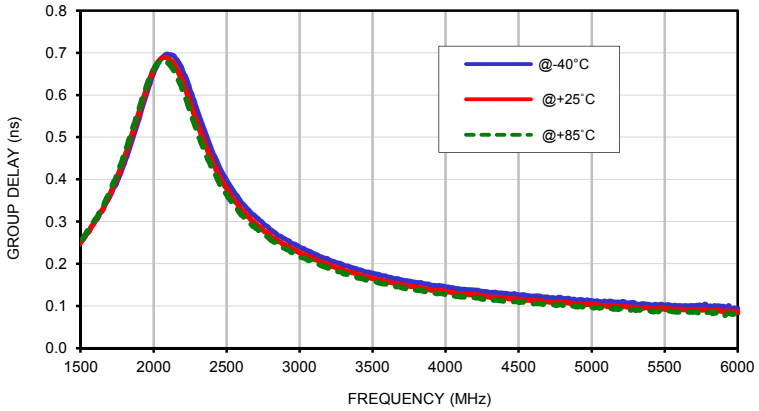
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



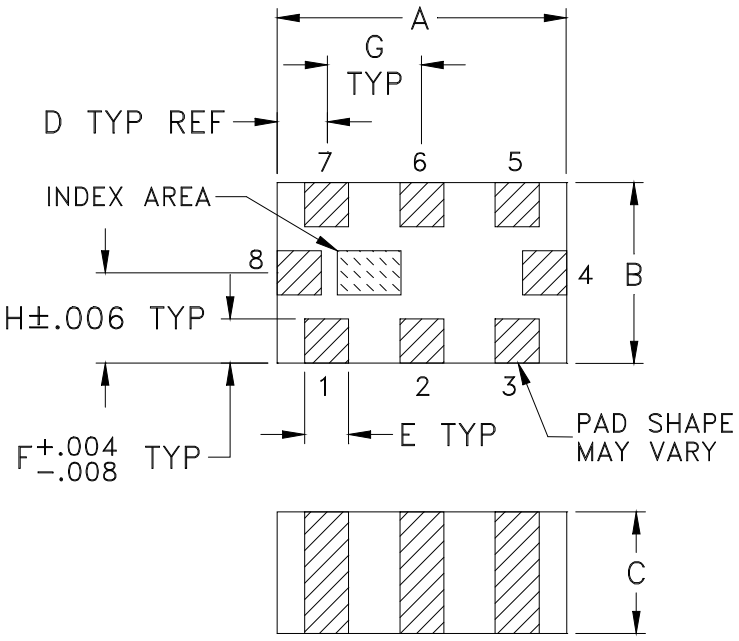
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



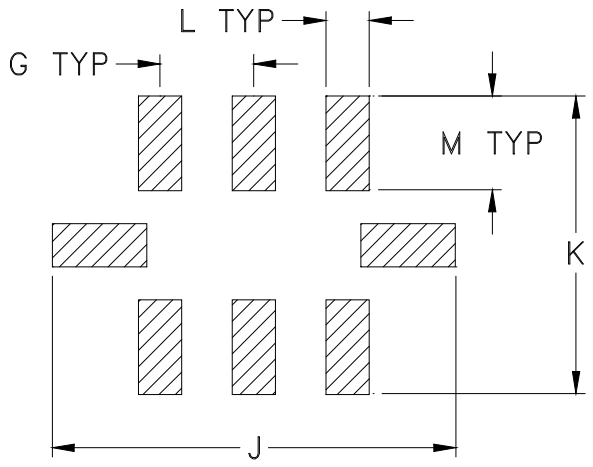
Case Style GE

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).

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Tape & Reel Packaging TR-F114

DEVICE ORIENTATION IN T&R

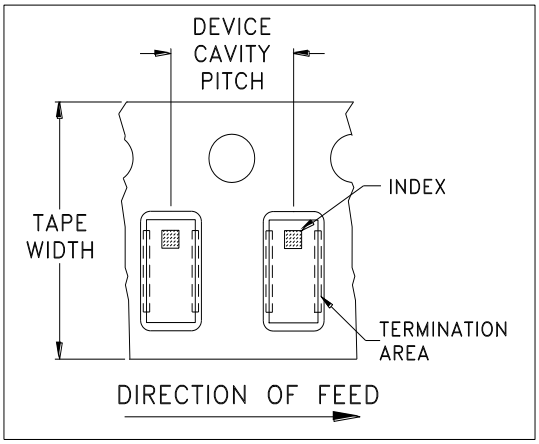


ILLUSTRATION 1

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

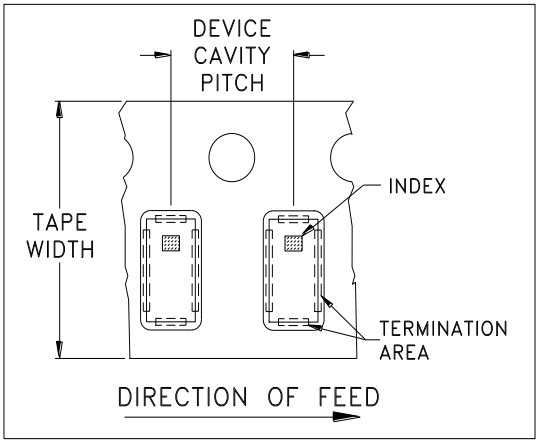


ILLUSTRATION 2

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.

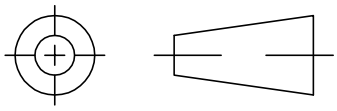
Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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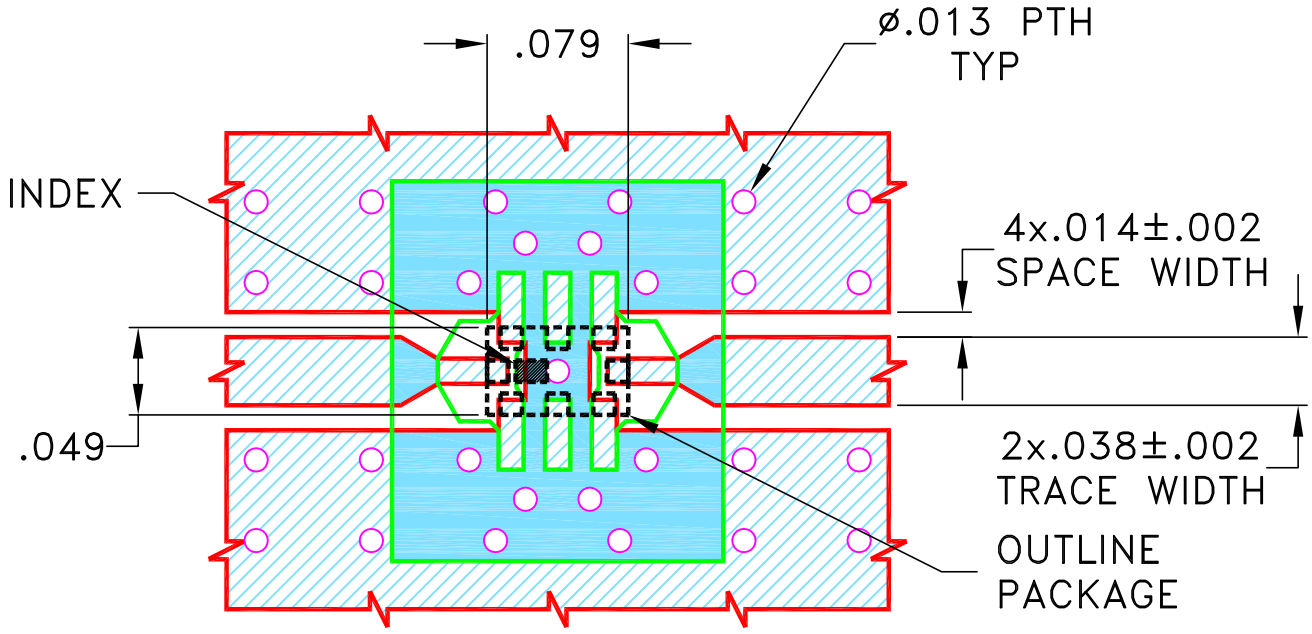
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THIRD ANGLE PROJECTION



REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M171090	NEW RELEASE	MAR 19	DDR	VC

SUGGESTED MOUNTING CONFIGURATION FOR GE0805C-2 CASE STYLE "08FL07" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .020"±.0015". COPPER: 1/2 Oz. EACH SIDE.
   FOR OTHER MATERIALS TRACE WIDTH 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 SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	DDR	01 MAR 19
TOLERANCES ON:	CHECKED	RV	01 MAR 19
2 PL DECIMALS ±	APPROVED	RKS	01 MAR 19
3 PL DECIMALS ± .005"			
ANGLES ±			
FRACTIONS ±			

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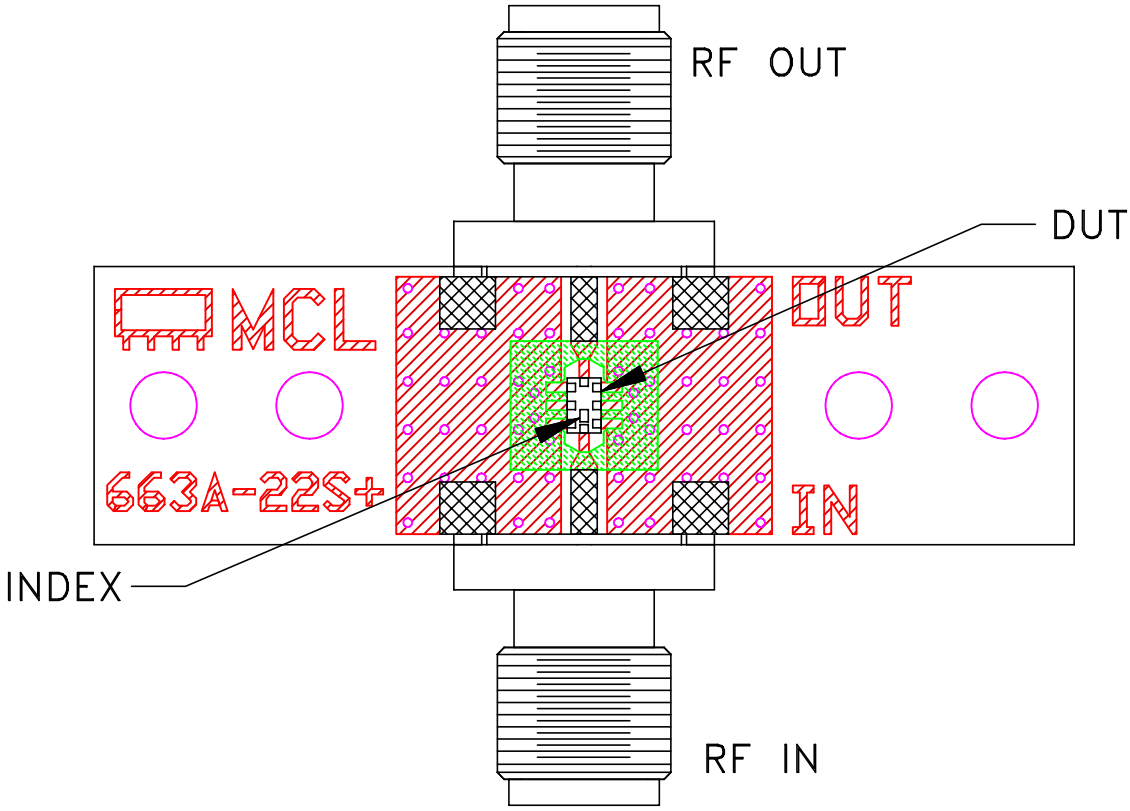
Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

PL, 08FL07, GE0805C-2
TB-1090+, 50 OHM

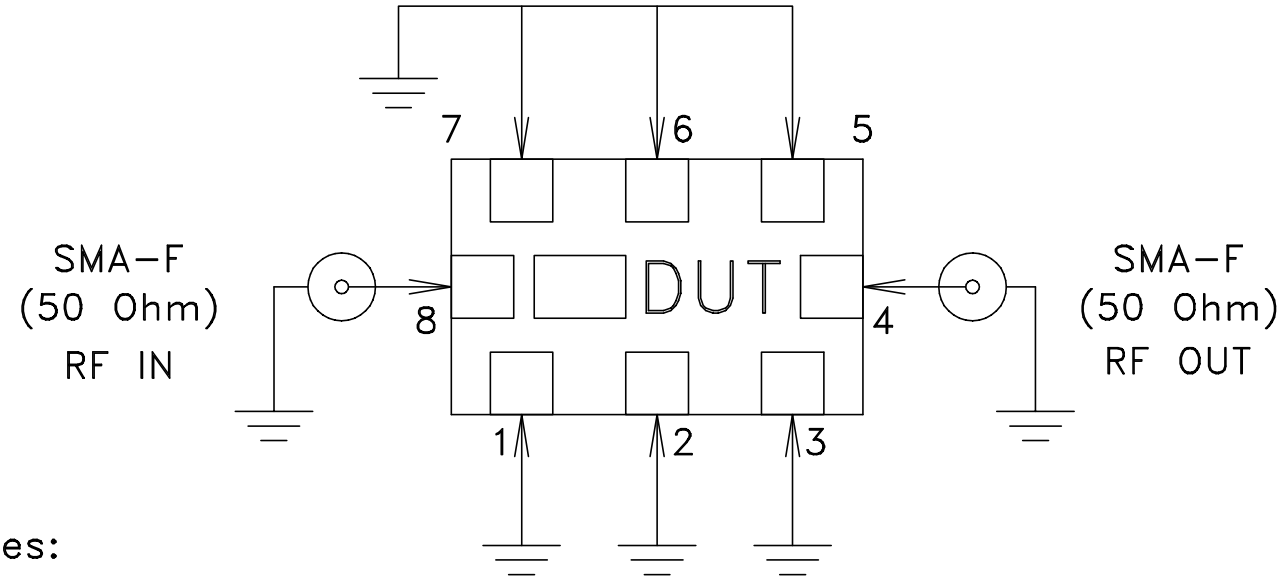
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-615	OR
FILE: 98PL615		SCALE: 9:1	SHEET: 1 OF 1

Evaluation Board and Circuit

TB-1090+



Schematic diagram



Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: ROGERS (RO4350B), OR Equivalent
   Dielectric Constant=3.48, Thickness=.020inch.

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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

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