LTCC SMT

Low Pass Filter

LFCG-2275+

50Ω DC to 2275 MHz

THE BIG DEAL

- Low Insertion Loss, 0.9dB Typ.
- Good Return Loss, 15dB Typ.
- Stop Band Rejection, 45dB Typ.
- 0805 Surface Mount Footprint
- Power Handling: 4.5 Watts

Generic photo used for illustration purposes only

CASE STYLE: GE0805C-2

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

APPLICATIONS

- ISM Applications
- Communications, Radar, and Defense Systems
- Test and Measurement Equipment
- LTE & 5G MIMO Infrastructure

PRODUCT OVERVIEW

LFCG-2275+ is a miniature low temperature co-fired ceramic (LTCC) low pass filter with a DC to 2275 MHz passband supporting a variety of applications. This model provides 0.9 dB typical insertion loss over a wide band due to its rugged monolithic construction. Housed in a tiny 0805 ceramic form factor with inspectable wrap-around terminations, the filter is ideal for dense signal chain PCB layouts where it complements MMIC size and performance. The LTCC fabrication process assures minimal RF performance variation while delivering a product that is well suited for environmental extremes of high humidity and temperature.

KEY FEATURES

Feature	Advantages
Ultra-wide stopband	The LTCC lowpass filter provides a very good stopband rejection to 10 GHz 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.
Small size, 0805	Saves space in dense circuit board layouts and minimizes the effects of parasitics.
Wrap-around terminations	Provides excellent solderability and easy visual inspection
Rugged Power handling	Handles up to 4.5 Watts in a small 0805 package.

REV. B
ECO-016177
LFCG-2275+
EDU4468
URJ
221220

Low Pass Filter

LFCG-2275+

ELECTRICAL SPECIFICATIONS[1,2] AT 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Passband	Insertion Loss	DC-F1	DC - 2275	—	0.9	2.0	dB
	Freq. Cut-Off	F2(note 3)	2700	—	3	—	dB
	Return Loss	DC-F1	DC - 2275	—	15	—	dB
Stop Band	Rejection	F3-F4	3300 - 4000	20	45	—	dB
		F4-F5	4000 - 7000	35	48	—	
		F5-F6	7000 - 10000	—	25	—	

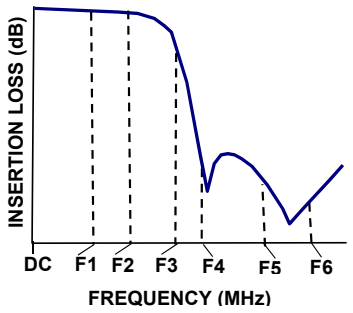
1. DC blocking capacitors are required in applications where DC voltage and/or current is present at either input or output ports. Please contact Mini-Circuits for alternatives if DC pass from IN-OUT is required.
2. Measured on Mini-Circuits Characterization Test Board TB-LFCG-2275+
3. Typically, a ±5% frequency deviation from the stated value may occur on a unit-to-unit basis.

ABSOLUTE MAXIMUM RATINGS[1]

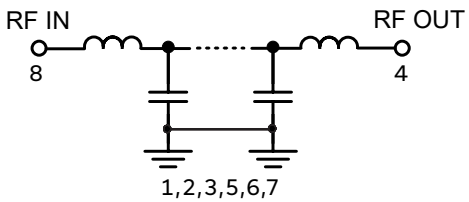
Parameter	Ratings
Operating temperature	-55°C to 125°C
Storage temperature	-55°C to 125°C
RF Power Input[2]	4.5W @25°C

1. Permanent damage may occur if any of these limits are exceeded.
2. Power rating applies only to signals within the passband. Power rating above +25°C should be derated linearly to 1W at +125°C.

TYPICAL FREQUENCY RESPONSE



FUNCTIONAL DIAGRAM



Low Pass Filter

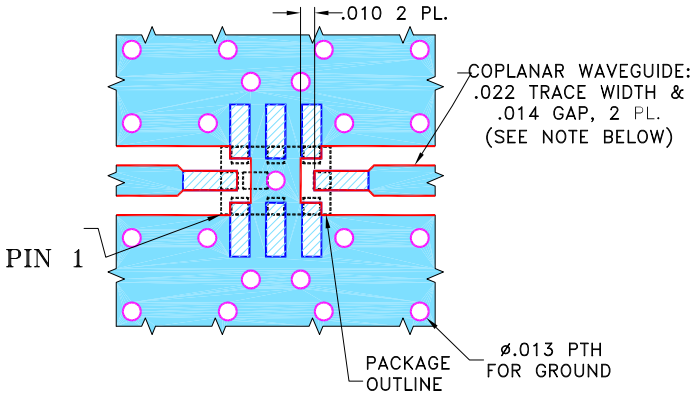
LFCG-2275+

PAD CONNECTIONS

RF IN	8
RF OUT	4
GROUND	1,2,3,5,6,7

PRODUCT MARKING: VZ

DEMO BOARD MCL P/N: TB-LFCG-2275+
SUGGESTED PCB LAYOUT (PL-429)



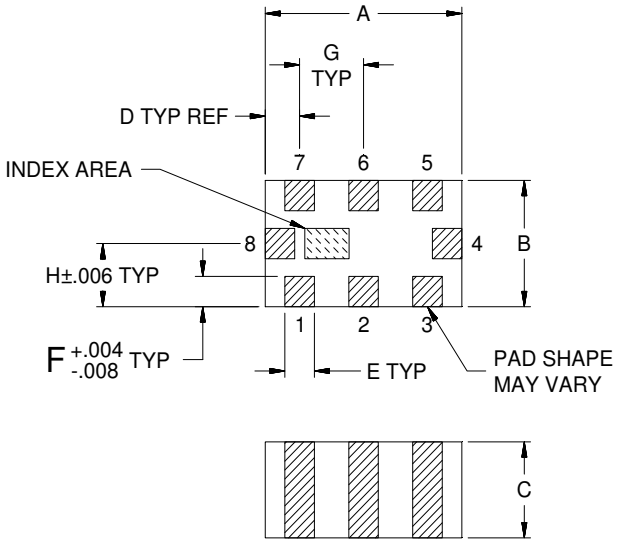
NOTES:

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 (Inches / mm)

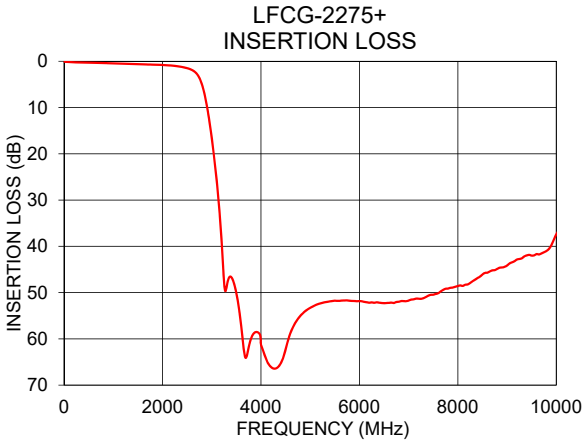
A	B	C	D	E	F	G	H	Wt.
.079	**.049**	**.037**	**.014**	**.012**	**.012**	**.026**	**.025**	grams
2.00	1.25	0.95	0.35	0.30	0.30	0.65	0.63	.008

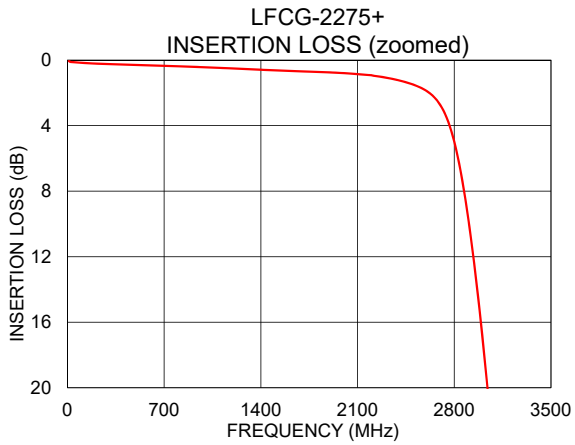
Low Pass Filter

LFCG-2275+

TYPICAL PERFORMANCE DATA AT 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)
10	0.07	46.93
100	0.17	40.39
1000	0.44	21.26
1500	0.63	17.38
2000	0.80	23.51
2275	1.03	25.34
2700	2.76	13.29
2910	10.20	3.39
3050	20.87	1.73
3150	31.61	1.33
3300	48.86	1.05
4000	61.24	0.72
5000	53.30	0.59
7000	51.72	0.49
10000	37.40	0.44





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 Low Pass Filter LFCG-2275+

Typical Performance Data

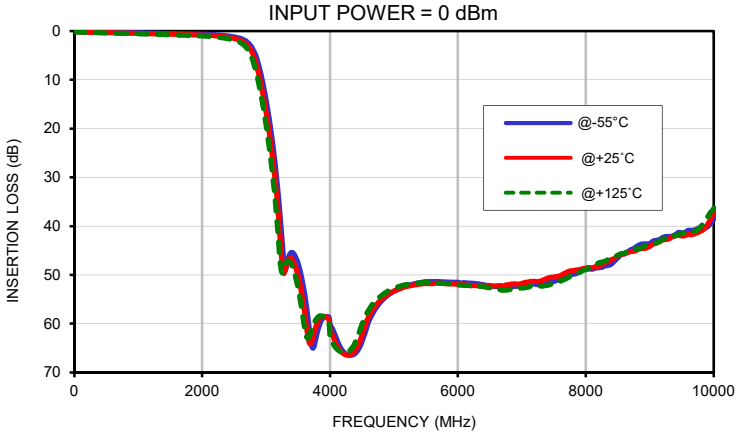
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C
10	0.05	0.07	0.08	50.84	46.93	44.43	50.68	47.47	43.52
40	0.10	0.13	0.14	47.38	43.53	41.55	45.85	42.56	40.21
100	0.13	0.17	0.19	43.24	40.39	39.06	41.03	38.65	37.29
140	0.15	0.19	0.22	40.37	38.67	37.68	37.63	36.22	35.19
180	0.16	0.21	0.24	38.62	38.00	37.37	35.36	34.66	33.86
220	0.17	0.22	0.26	36.87	37.37	37.20	33.26	33.18	32.60
260	0.18	0.24	0.28	35.38	36.80	37.12	31.53	31.86	31.43
300	0.19	0.25	0.29	34.37	36.39	37.18	30.23	30.75	30.39
340	0.20	0.26	0.31	33.46	35.81	37.02	29.09	29.68	29.36
380	0.21	0.27	0.32	32.70	35.11	36.59	28.12	28.68	28.37
420	0.22	0.28	0.33	32.04	34.32	35.92	27.35	27.81	27.50
460	0.22	0.29	0.35	31.31	33.36	34.94	26.61	26.97	26.67
500	0.23	0.30	0.36	30.49	32.32	33.75	25.91	26.20	25.92
540	0.24	0.31	0.37	29.59	31.21	32.46	25.27	25.49	25.24
580	0.25	0.32	0.39	28.60	30.07	31.14	24.62	24.81	24.62
620	0.25	0.33	0.40	27.60	28.96	29.87	23.98	24.17	24.04
660	0.26	0.34	0.41	26.63	27.91	28.68	23.40	23.58	23.50
700	0.27	0.35	0.42	25.68	26.88	27.54	22.81	23.00	22.98
800	0.29	0.38	0.46	23.67	24.64	25.10	21.49	21.69	21.74
900	0.32	0.41	0.49	22.03	22.79	23.10	20.32	20.50	20.55
1000	0.34	0.44	0.53	20.66	21.26	21.50	19.28	19.44	19.47
1100	0.37	0.48	0.57	19.54	20.02	20.23	18.39	18.52	18.55
1200	0.40	0.52	0.62	18.63	19.01	19.22	17.64	17.75	17.79
1300	0.44	0.55	0.66	17.90	18.22	18.42	17.06	17.14	17.19
1400	0.47	0.59	0.71	17.36	17.66	17.84	16.65	16.72	16.78
1500	0.50	0.63	0.75	17.06	17.38	17.54	16.45	16.52	16.61
2000	0.62	0.80	0.98	22.79	23.51	24.24	20.92	21.30	21.31
2275	0.80	1.03	1.27	25.63	25.34	24.86	22.69	21.83	20.84
2700	2.16	2.76	3.52	13.85	13.29	12.42	10.57	9.92	9.18
2910	8.30	10.20	12.32	3.63	3.39	3.28	3.44	3.50	3.76
3050	18.12	20.87	23.90	1.60	1.73	1.87	2.44	2.86	3.39
3150	28.01	31.61	35.84	1.14	1.33	1.49	2.29	2.70	3.16
3300	49.06	48.86	47.77	0.86	1.05	1.22	1.89	2.18	2.48
3400	45.37	46.70	47.95	0.77	0.96	1.12	1.56	1.79	2.02
3500	47.67	50.16	52.68	0.71	0.90	1.05	1.27	1.46	1.65
3600	53.67	57.43	60.73	0.67	0.85	0.99	1.03	1.20	1.36
3700	63.59	64.00	61.57	0.64	0.82	0.95	0.85	1.00	1.14
3800	61.72	59.88	58.76	0.62	0.78	0.90	0.71	0.85	0.97
3900	58.73	58.52	58.56	0.59	0.76	0.87	0.60	0.72	0.84
4000	60.13	61.24	62.74	0.57	0.72	0.83	0.47	0.58	0.68
4200	65.56	66.06	65.91	0.55	0.70	0.79	0.37	0.48	0.57
4400	66.00	65.32	63.68	0.52	0.66	0.75	0.27	0.37	0.46
4600	59.72	58.70	57.27	0.50	0.63	0.71	0.20	0.30	0.39
4800	55.37	55.02	54.24	0.47	0.60	0.67	0.15	0.25	0.34
5000	53.35	53.30	52.74	0.46	0.59	0.65	0.11	0.21	0.32
5200	52.23	52.36	51.95	0.45	0.58	0.64	0.08	0.19	0.30
5400	51.58	51.89	51.60	0.45	0.58	0.64	0.05	0.17	0.29
5600	51.35	51.78	51.55	0.44	0.57	0.63	0.02	0.14	0.28
5800	51.43	51.76	51.76	0.41	0.55	0.60	0.00	0.13	0.28
6000	51.52	51.83	52.05	0.39	0.52	0.58	0.02	0.13	0.30
6200	51.72	52.18	52.12	0.37	0.51	0.58	0.03	0.13	0.31
6400	52.02	52.18	52.35	0.36	0.51	0.58	0.04	0.12	0.32
6600	52.36	52.22	52.73	0.36	0.51	0.59	0.05	0.12	0.33
6800	52.41	51.98	52.99	0.34	0.50	0.59	0.07	0.12	0.34
7000	52.16	51.72	52.66	0.32	0.49	0.58	0.07	0.12	0.35
7500	51.34	50.46	51.77	0.29	0.48	0.60	0.07	0.14	0.38
8000	48.88	48.58	48.82	0.27	0.47	0.63	0.04	0.16	0.39
8500	46.44	46.06	45.94	0.22	0.44	0.63	0.03	0.16	0.38
9000	43.54	44.14	43.87	0.20	0.43	0.66	0.00	0.17	0.36
10000	38.59	37.40	36.37	0.16	0.44	0.72	0.07	0.28	0.43

Typical Performance Data

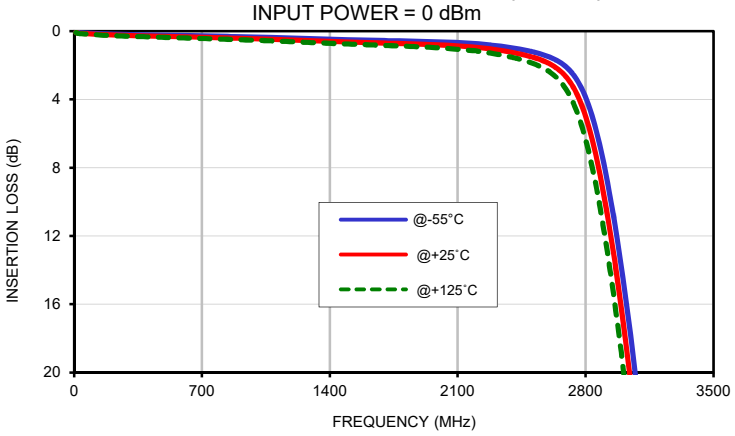
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-55°C	@+25°C	@+125°C
10	0.22	0.26	0.25
40	0.21	0.23	0.23
80	0.21	0.22	0.23
120	0.21	0.22	0.22
160	0.21	0.21	0.22
200	0.21	0.21	0.22
240	0.21	0.21	0.22
280	0.21	0.21	0.22
320	0.21	0.21	0.22
360	0.21	0.21	0.22
400	0.21	0.21	0.22
440	0.21	0.21	0.22
480	0.21	0.21	0.22
520	0.21	0.21	0.22
560	0.21	0.22	0.22
600	0.21	0.22	0.22
640	0.21	0.22	0.22
680	0.22	0.22	0.22
720	0.22	0.22	0.22
760	0.22	0.22	0.23
800	0.22	0.22	0.23
840	0.22	0.23	0.23
880	0.22	0.23	0.23
920	0.22	0.23	0.23
960	0.23	0.23	0.23
1000	0.23	0.23	0.24
1040	0.23	0.23	0.24
1080	0.23	0.24	0.24
1120	0.24	0.24	0.24
1160	0.24	0.24	0.25
1200	0.24	0.24	0.25
1300	0.25	0.25	0.26
1400	0.26	0.26	0.27
1500	0.27	0.27	0.28
1600	0.28	0.28	0.29
1700	0.29	0.30	0.31
1800	0.31	0.32	0.33
1900	0.33	0.34	0.35
2000	0.36	0.37	0.38
2275	0.46	0.48	0.50

Typical Performance Curves

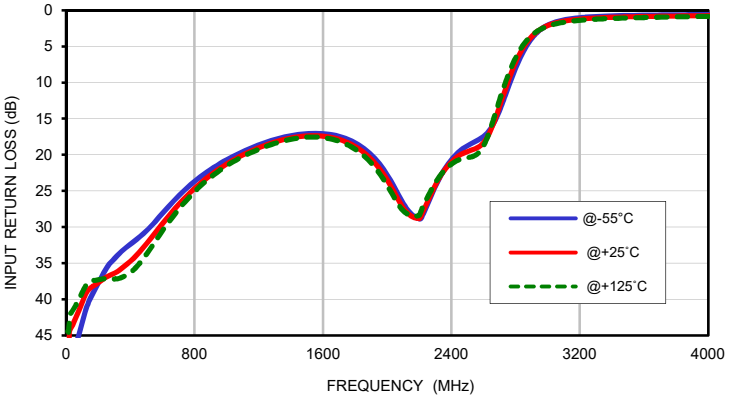
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



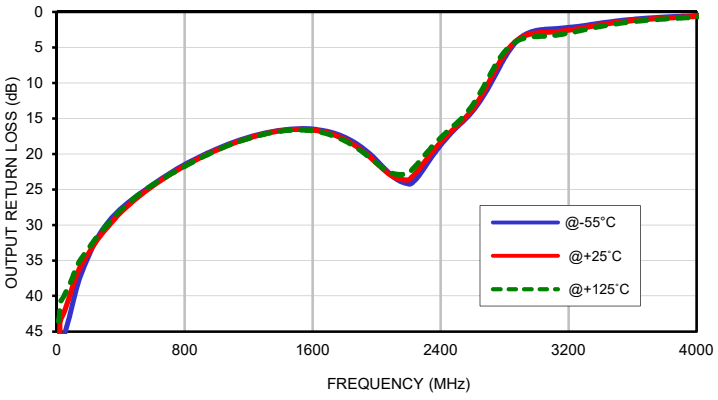
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



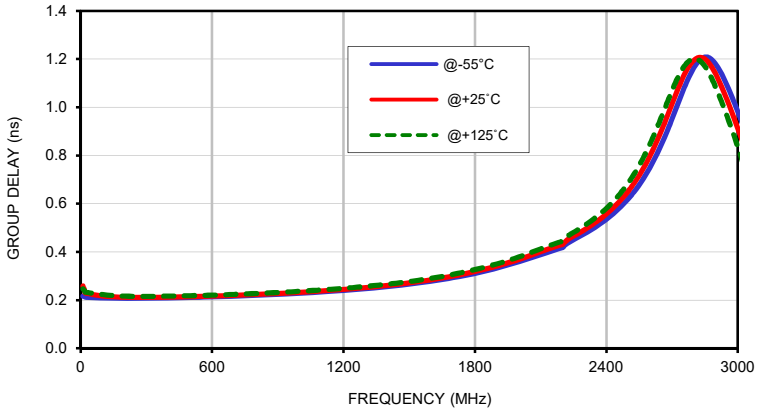
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm

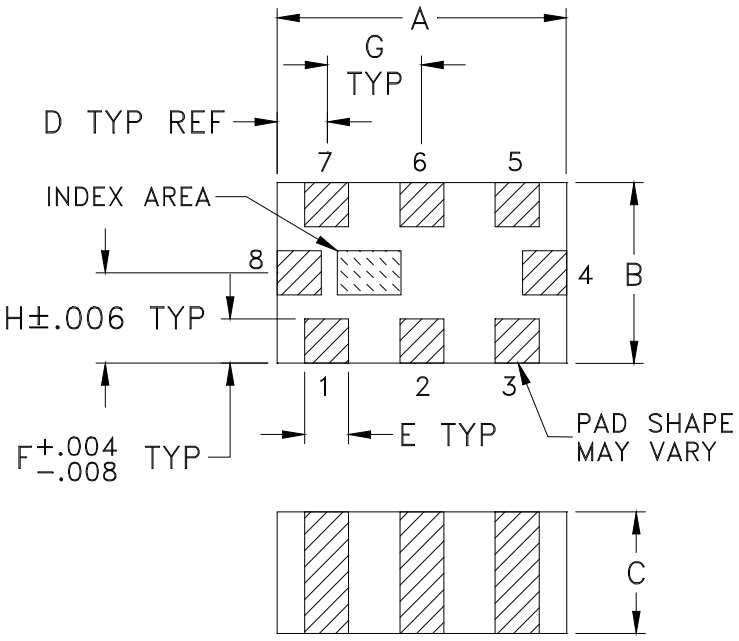


GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm

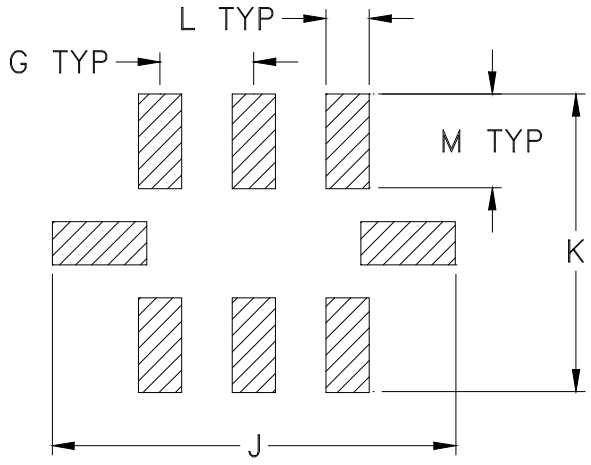


GE0805C-2

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

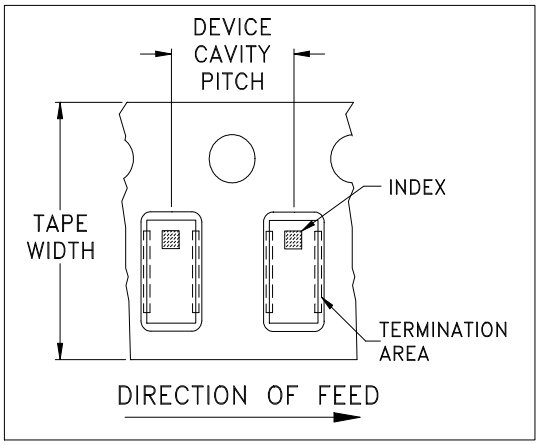


ILLUSTRATION 1

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

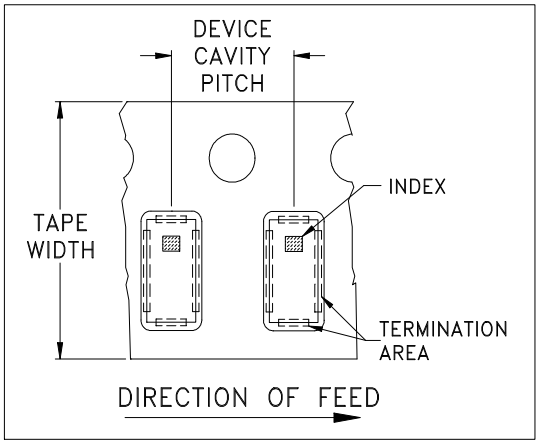


ILLUSTRATION 2

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

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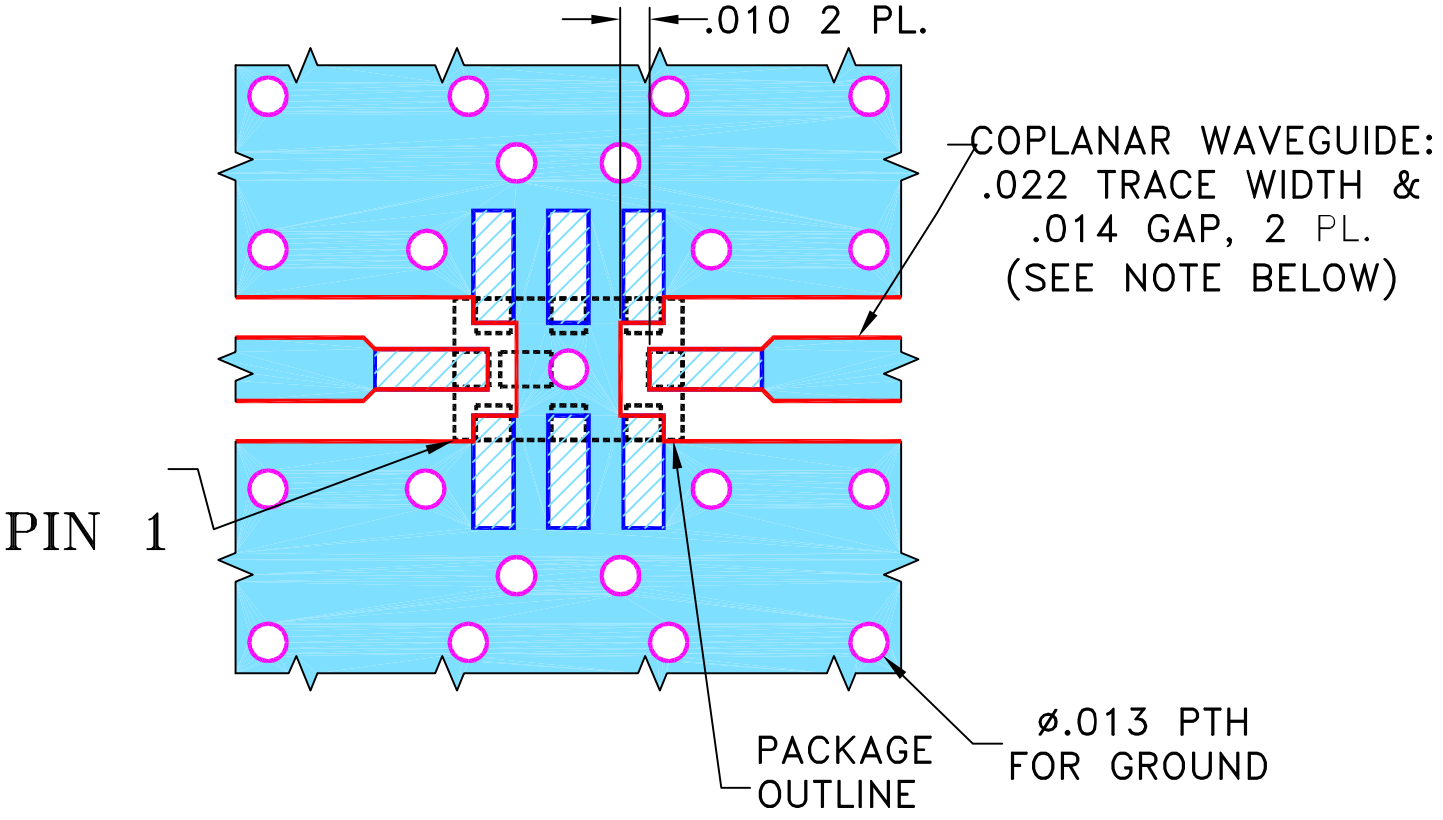
THIRD ANGLE PROJECTION

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

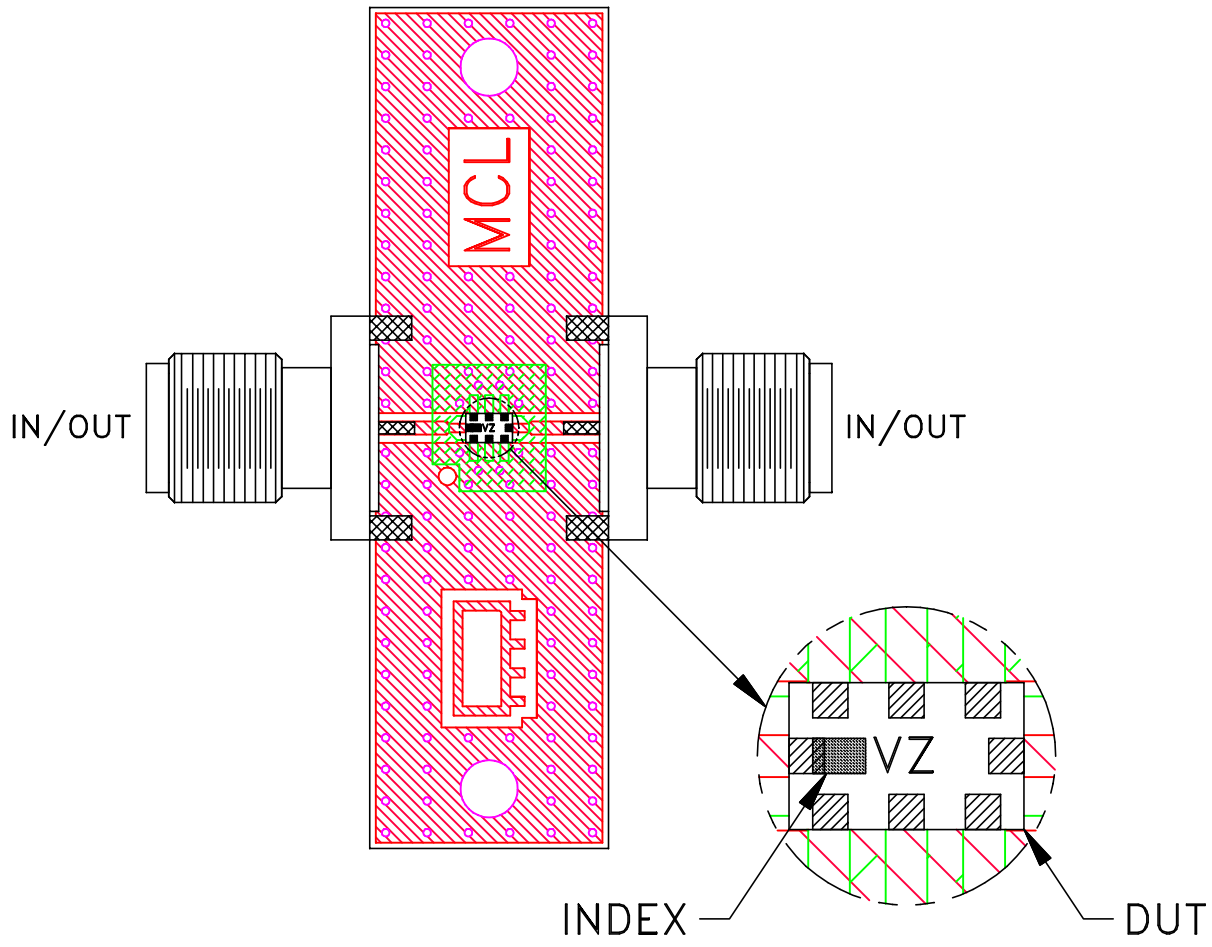
PL, 08FL07, GE0805C-4, TB-799+

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

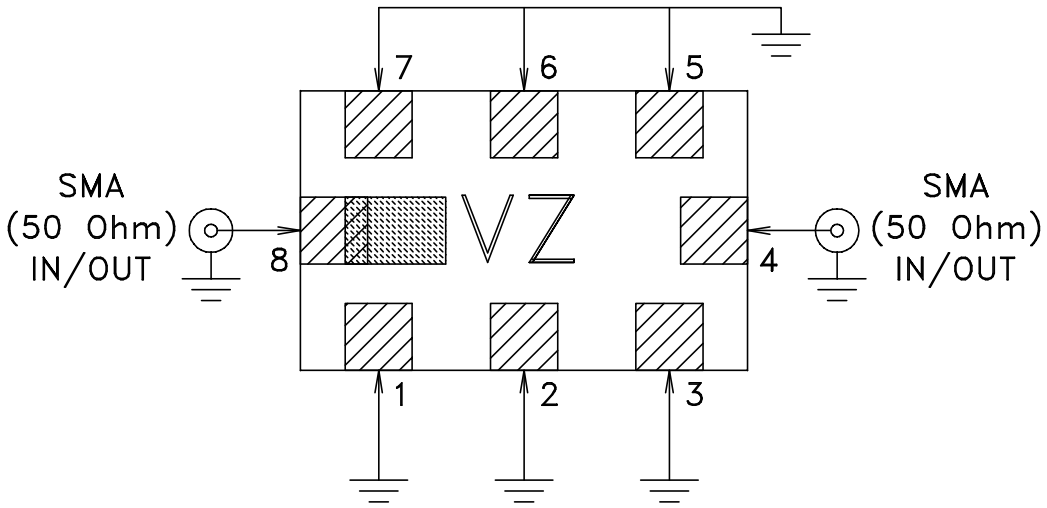
FILE:	SCALE:	SHEET:
98PL429	15:1	1 OF 1

Evaluation Board and Circuit

TB-LFCG-2275+



Schematic diagram



Notes:

1. PCB Material: ROGERS (RO4350) OR Equivalent, Dielectric Constant=3.5
Dielectric Thickness: .010 inch
2. 50 Ohm SMA Female Connectors.

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Environmental Specifications ENV126

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 245° - 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