Ceramic

Low Pass Filter

LFCW-332+

50Ω 10 to 3300 MHz

The Big Deal

- Very good rejection, 30 dB typical
- Rugged, ceramic construction
- Tiny size, 0.063" x 0.032" x 0.024" (0603)
- Good power handling, 2W

CASE STYLE: JC0603C

Product Overview

Mini-Circuits' LFCW-332+ is a LTCC low pass filter with a passband from 10 to 3300 MHz, supporting a variety of applications. This model provides 1.2 dB typical passband insertion loss and provides a very good stopband rejection due to strategically constructed layout with minimal interaction between components. It provides a wide operating temperature range from -55 to +125°C. Housed in a tiny 0603 ceramic form factor with wrap-around terminations, the filter is ideal for dense PCB layouts and with minimal performance variation due to parasitics.

Key Features

Feature	Advantages
Ultra-wide stopband	The LTCC lowpass filter provides a very 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 (0.063 x 0.032 x 0.024")	Saves space in dense circuit board layouts and minimizes the effects of parasitics.
Good power handling	Supports a wide range of system power requirements.
Wrap-around terminations	Provides excellent solderability and easy visual inspection

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LFCW-332+

50Ω 10 to 3300 MHz

Generic photo used for illustration purposes only

CASE STYLE: JC0603C

+RoHS Compliant

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

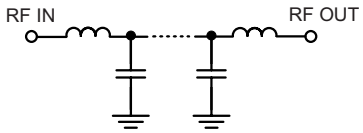
Features

- Miniature size 0603 (0.063"[1.6mm] x 0.031"[0.8mm] x 0.024"[0.6mm])
- Replaces one inductor and three capacitors
- Low cost
- Aqueous washable

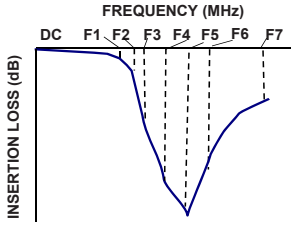
Applications

- ISM Band
- WLAN
- Bluetooth
- 5G sub 6GHz

Functional Schematic



Typical Frequency Response



Electrical Specifications[1,2] at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	DC-F1	DC - 3300	—	1.2	2.0	dB
	Freq. Cut-Off	F2	3500	—	2.0	—	dB
	Return Loss	DC-F1	DC - 3300	—	12	—	dB
Stop Band	Rejection Loss	F3-F4	4550 - 8000	25	30	—	dB

1.Tested on Evaluation Board TB-LFCW-332+
2. In application where DC voltage is present at either input or poutput port, coupling capacitors are required.

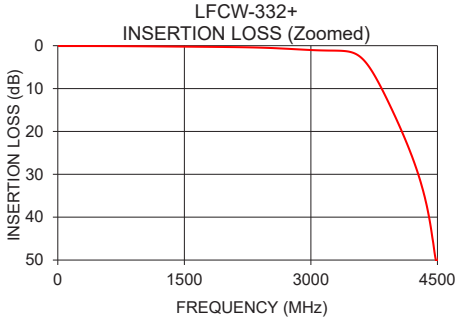
Maximum Ratings	
Operating Temperature	-55°C to 125°C
Storage Temperature	-55°C to 125°C
RF Power Input[3]	2W at 25°C

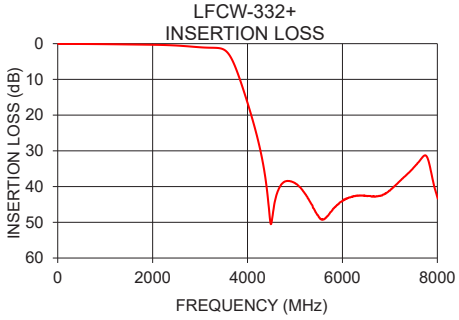
3. Refer to product storage temperature after installation
Suggestion for T&R unused product storage condition:
+5 ~ +35 °C, Humidity 45~75%RH, 12 month Max
4. Derate linearly to 0.5W at 125°C.
Permanent damage may occur if any of these limits exceeded.

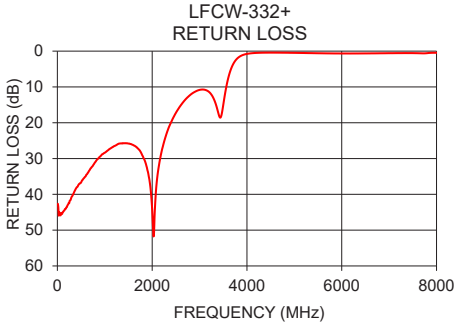
Typical Performance Data[4] at 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)
10	0.08	42.63
100	0.08	45.49
200	0.08	43.58
500	0.09	36.67
1000	0.14	28.39
1200	0.17	26.53
1600	0.24	26.23
1800	0.27	29.30
2000	0.31	44.12
2500	0.52	17.26
3000	1.02	10.84
3300	1.16	13.34
4000	16.57	0.77
4550	46.21	0.42
5000	39.06	0.48
6000	44.00	0.66
7000	41.14	0.57
8000	42.92	0.46

4. Measured with Agilent E5071B network analyzer using port extension.







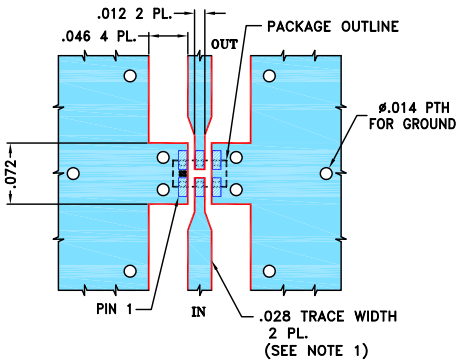
Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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	2
OUTPUT	5
GROUND	1,3,4,6

Product Marking: N/A

Evaluation Board MCL P/N: TB-LFCW-332+
Suggested PCB Layout (PL-554)

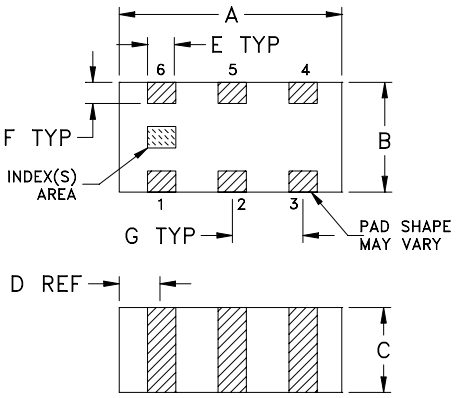


NOTES:
1. TRACE WIDTH IS SHOWN FOR FR4, GRADE IT-180TC (ITEQ CORP.) WITH DIELECTRIC THICKNESS .016±.0015. COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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)

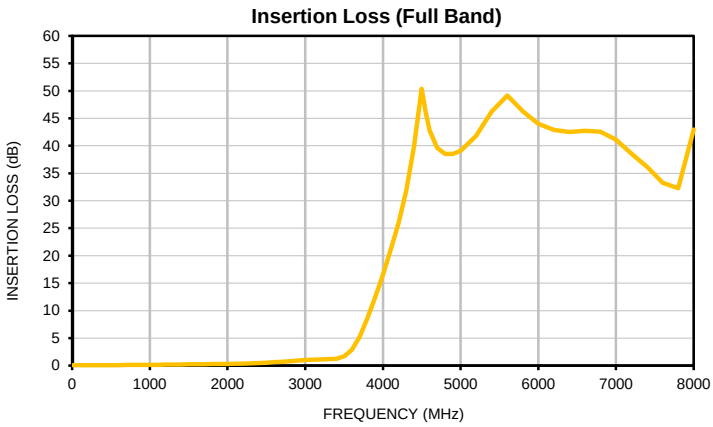
A	B	C	D	E	F	G	wt
.063	.031	.024	.012	.008	.006	.020	grams
1.60	0.79	0.61	0.30	0.20	0.15	0.51	0.005

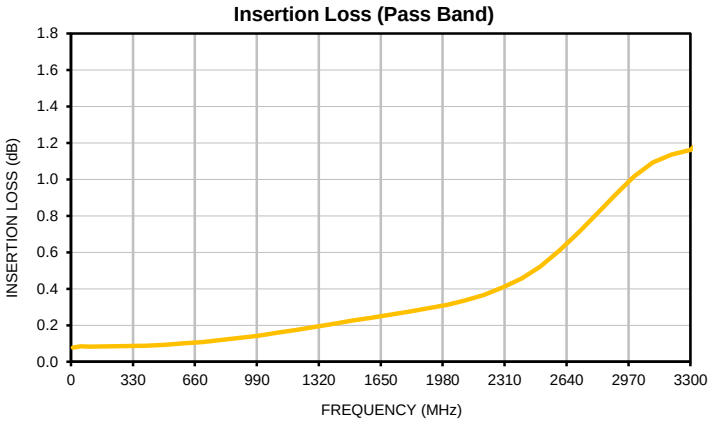
Ceramic Low Pass Filter LFCW-332+

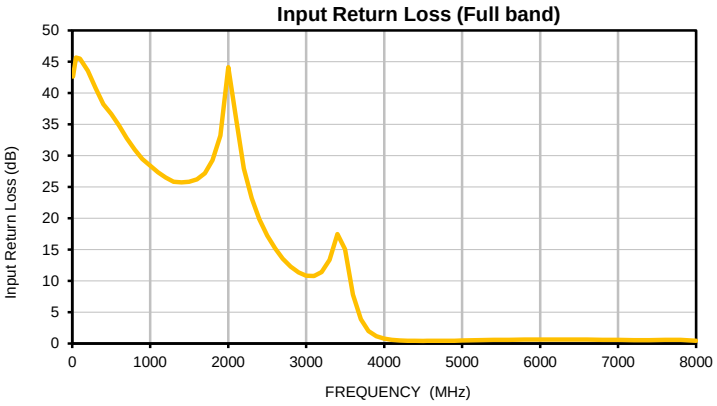
Typical Performance Data

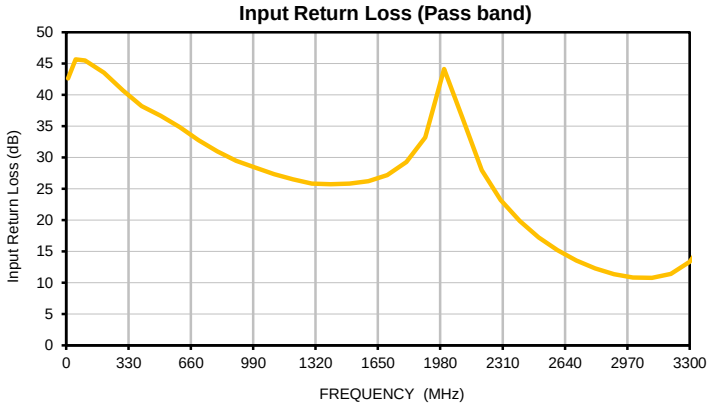
FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	OUTPUT RETURN LOSS (dB)
10	0.08	42.63	42.87
50	0.09	45.67	44.46
100	0.08	45.49	43.42
200	0.08	43.58	42.06
300	0.09	40.75	39.65
400	0.09	38.23	37.67
500	0.09	36.67	35.39
600	0.10	34.87	33.72
700	0.11	32.77	32.03
800	0.12	30.98	30.09
900	0.13	29.46	28.62
1000	0.14	28.39	27.52
1100	0.16	27.35	26.47
1200	0.17	26.53	25.64
1300	0.19	25.83	24.92
1400	0.21	25.73	24.64
1500	0.23	25.81	24.48
1600	0.24	26.23	24.61
1700	0.26	27.19	24.95
1800	0.27	29.30	25.80
1900	0.29	33.23	26.90
2000	0.31	44.12	27.84
2100	0.34	36.15	27.12
2200	0.37	27.99	24.76
2300	0.41	23.21	21.83
2400	0.46	19.85	19.16
2500	0.52	17.26	16.93
2600	0.61	15.20	15.00
2700	0.70	13.54	13.40
2800	0.81	12.27	12.15
2900	0.91	11.38	11.29
3000	1.02	10.84	10.77
3100	1.09	10.76	10.74
3200	1.14	11.40	11.47
3300	1.16	13.34	13.69
3400	1.26	17.49	20.16
3500	1.66	15.05	17.64
3600	2.86	7.81	8.34
3700	5.22	3.88	4.09
3800	8.55	2.00	2.11
3900	12.41	1.16	1.21
4000	16.57	0.77	0.81
4100	21.02	0.59	0.62
4200	25.90	0.49	0.52
4300	31.74	0.45	0.48
4400	39.92	0.43	0.47
4500	50.37	0.42	0.47
4550	46.21	0.42	0.47
4600	42.86	0.42	0.48
4700	39.65	0.43	0.50
4800	38.53	0.44	0.52
4900	38.51	0.47	0.55
5000	39.06	0.48	0.58
5200	41.80	0.52	0.63
5400	46.22	0.57	0.69
5600	49.16	0.61	0.72
5800	46.28	0.64	0.73
6000	44.00	0.66	0.72
6200	42.90	0.66	0.70
6400	42.52	0.65	0.64
6600	42.75	0.63	0.60
6800	42.55	0.60	0.55
7000	41.14	0.57	0.52
7200	38.60	0.56	0.53
7400	36.12	0.55	0.58
7600	33.24	0.58	0.71
7800	32.27	0.57	0.82
8000	42.92	0.46	0.86

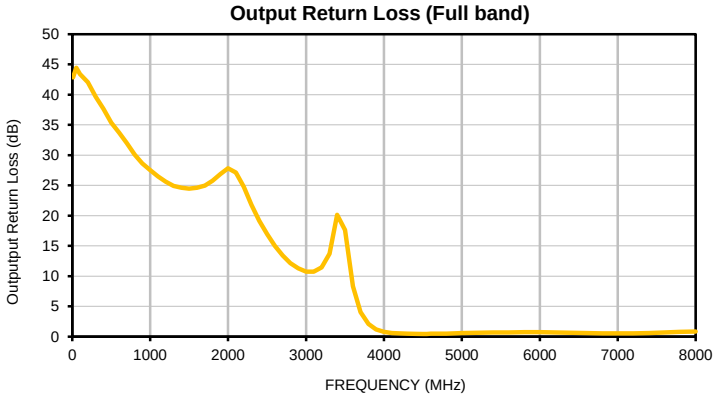
Typical Performance Curves

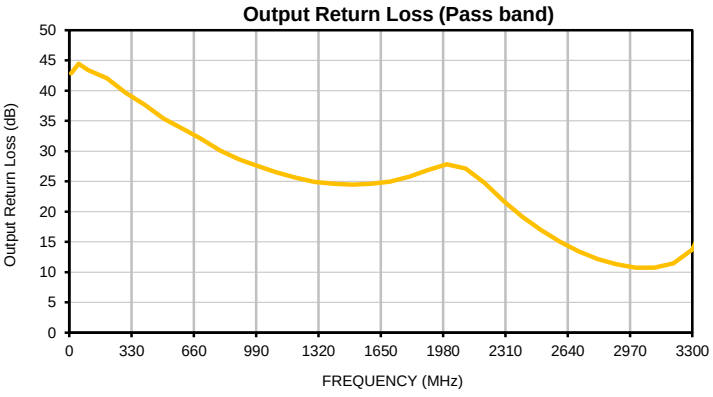






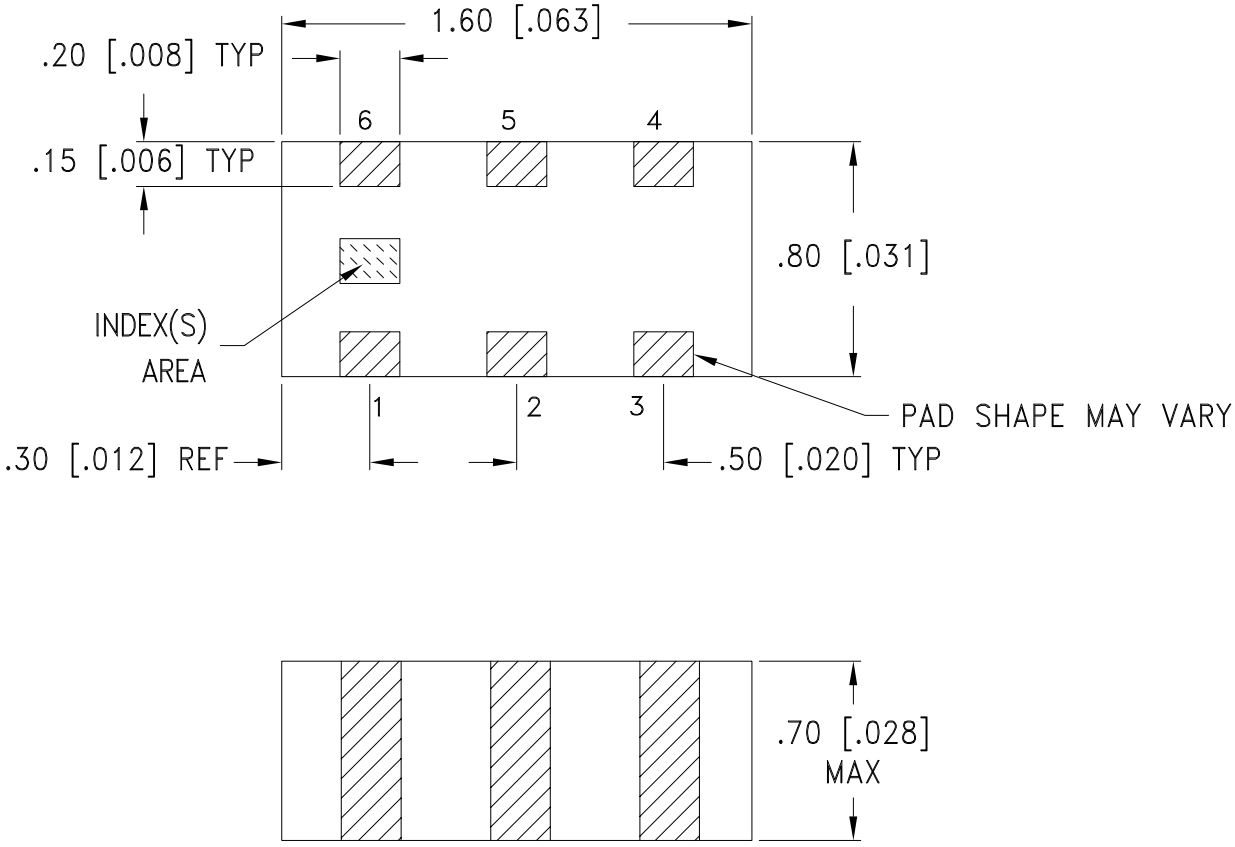






Case Style JC

Outline Dimensions JC0603C



METALLIZATION

Weight: .005 grams

Dimensions are in mm [inch]. Tolerances: ±0.13 mm

Notes:

1. Open style, ceramic base.
2. Termination finish:
   For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.

Tape & Reel Packaging TR-F114

DEVICE ORIENTATION IN T&R

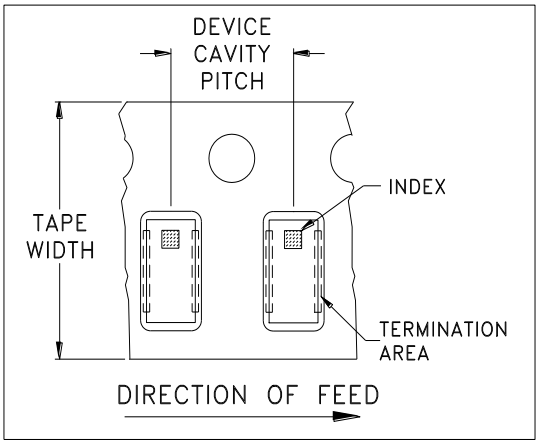


ILLUSTRATION 1

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

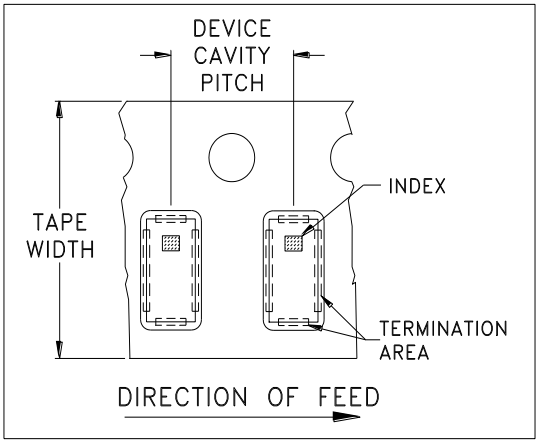


ILLUSTRATION 2

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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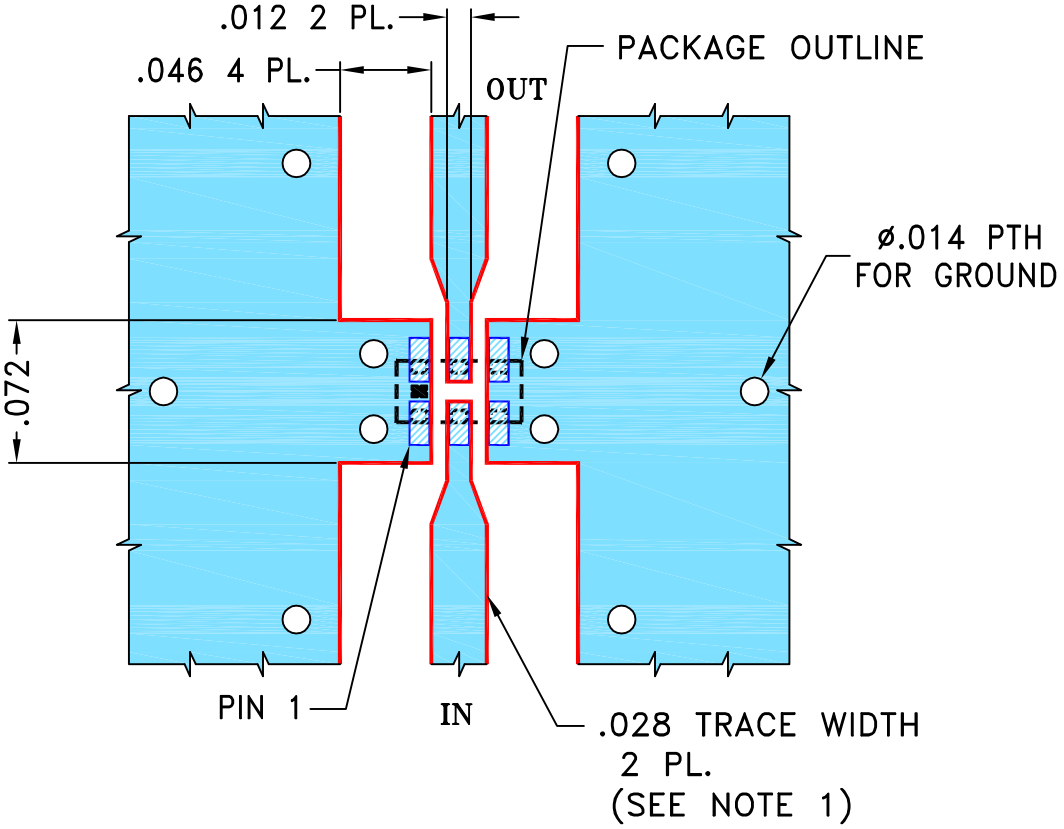
Mini-Circuits ISO 9001 & ISO 14001 Certified

THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M168200	NEW RELEASE	05/31/18	NP	SL

SUGGESTED MOUNTING CONFIGURATION
FOR JC0603C CASE STYLE, "06FL12" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR FR4, GRADE IT-180TC (ITEQ CORP.) WITH DIELECTRIC THICKNESS .016±.0015. COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & 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	NP	05/30/18
TOLERANCES ON:	CHECKED	GF	05/30/18
2 PL DECIMALS ±	APPROVED	SL	05/31/18
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

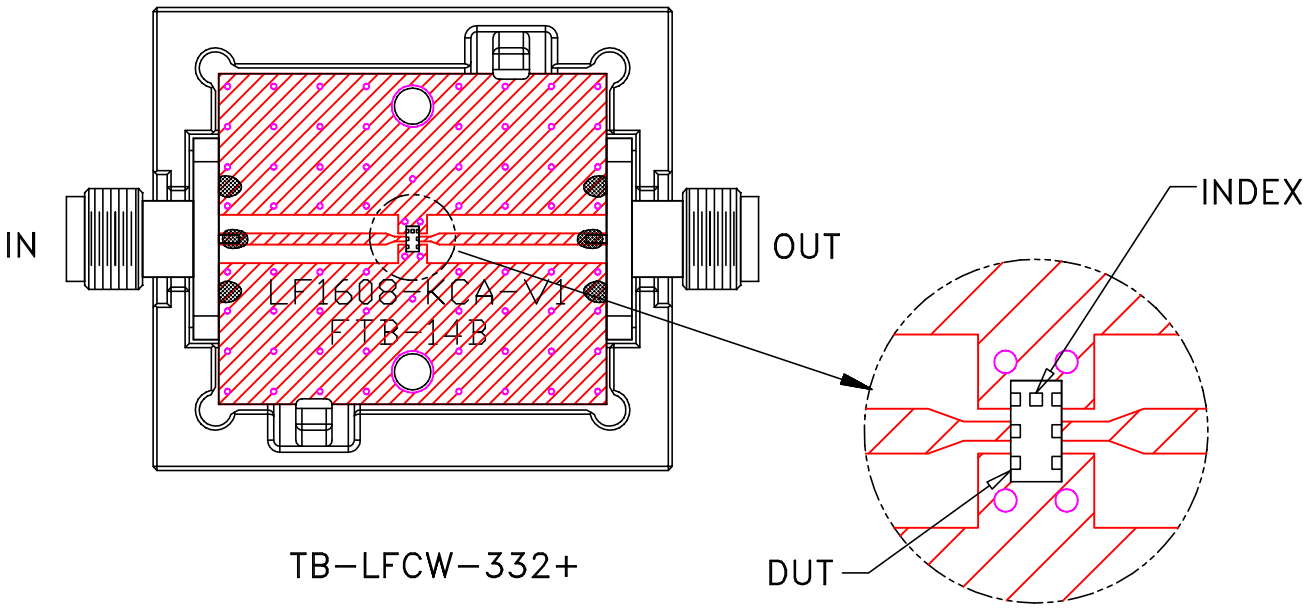
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 06FL12, JC0603C, TB-1020+

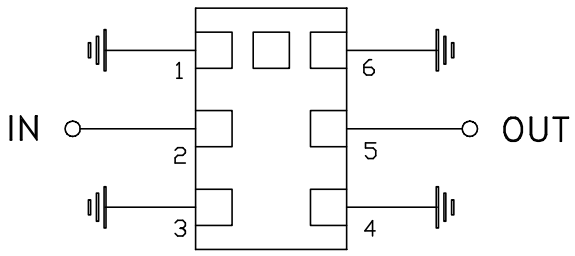
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-554	OR

FILE:	SCALE:	SHEET:
98PL554	10:1	1 OF 1

Evaluation Board and Circuit



TB-LFCW-332+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: FR4 or equivalent,
   Dielectric Constant=4.5, Thickness=.016 inch.

Mini-Circuits®

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: 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