

Ceramic

# Low Pass Filter

LFCW-133+

50Ω

DC to 13.25 GHz

## The Big Deal

- Small size 0603 (1.6 x 0.8 mm)
- Low insertion Loss, 2.2 dB typical
- Rejection 20 dB typical from 14.76 to 17 GHz
- Good power handling, 12.6W



CASE STYLE: JC0603C-1

## Product Overview

Mini-Circuits' LFCW-133+ is a Low Temperature Co-fired Ceramic (LTCC) low pass filter, designed in a very small, 0603 package. The multilayer construction provides high repeatability of performance. Small, wrap-around terminations minimize variations in performance due to parasitics. Covering DC – 13.25 GHz, these units offer low insertion loss, good rejection, and excellent power handling capability.

## Key Features

Feature	Advantages
Small size 0603 (1.6 x 0.8 mm)	Allows for high layout density of circuit boards while minimizing the effects of parasitics.
Stop band rejection 20dB typical over 14.76 - 17 GHz	Provides good rejection in a tiny package, saving PCB space for customers.
Wrap-around terminations	Provides excellent solderability and easy visual inspection.
LTCC construction	Rugged package, well-suited for tough environments including high humidity and high temperature extremes.



# Ceramic Low Pass Filter

## LFCW-133+

50Ω DC<sup>1</sup> to 13.25 GHz

### Features

- Good power handling, 12.6W
- Small size 0603 (1.6 x 0.8 mm)
- 7 sections
- Temperature stable
- LTCC construction

### Applications

- Harmonic Rejection
- VHF/UHF transmitters / receivers
- lab use



CASE STYLE: JC0603C-1

**+RoHS Compliant**

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

### Electrical Specifications<sup>1,2</sup> at 25°C

Parameter	F#	Frequency (GHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	DC - F1	DC - 13.25		2.5	dB
	Freq. cut-off	F2	13.65	—	3.0	dB
	VSWR	DC - F1	DC - 13.25	—	2.7	:1
Stop Band	Rejection Loss	F3	14.76	—	20	dB
		F4 - F5	14.91 - 15.41	19	24	:1
		F6	17	—	20	dB

<sup>1</sup> In Application where DC voltage is present at either input or output port, coupling capacitors are required.

<sup>2</sup> Measured on Mini-Circuits Characterization Test Board TB-720+

### Maximum Ratings

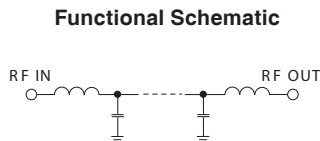
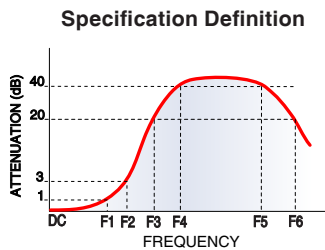
Operating Temperature	-55°C to +100°C
Storage Temperature	-55°C to +100°C
RF Power Input*	12.6W at 25°C

\*Passband rating, derate linearly to 6.3W at 100°C ambient (Reference AN-75-005)

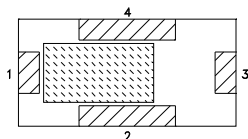
Permanent damage may occur if any of these limits are exceeded.

### Typical Performance Data at 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)
0.01	0.08	1.07
0.50	0.12	1.08
1.00	0.17	1.18
3.00	0.57	1.72
5.00	0.66	1.74
7.00	0.50	1.37
10.00	0.78	1.50
12.82	1.20	1.30
13.25	1.57	1.46
13.65	2.29	1.40
14.91	26.98	20.50
15.41	48.34	26.13
16.00	33.38	26.98
16.50	25.56	23.93
17.00	20.65	21.16
18.50	14.50	17.10
20.00	13.20	16.80

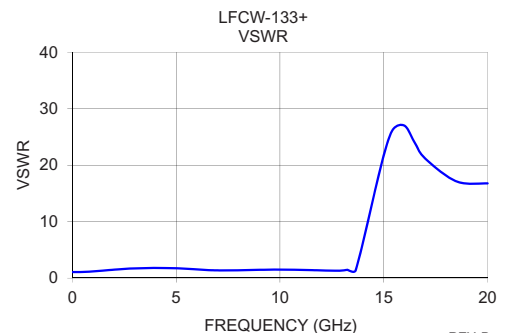
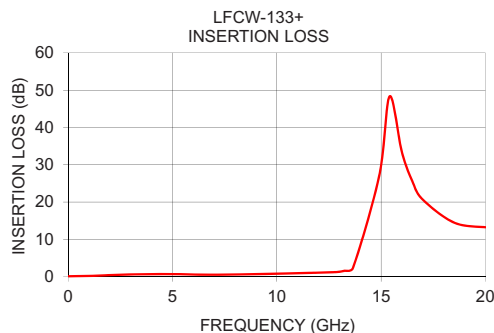


### Top View



### Pad Connections

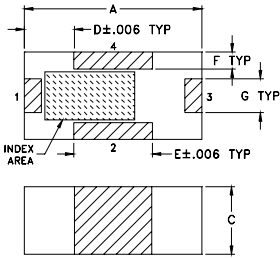
Input	1
Output	3
Ground	2,4



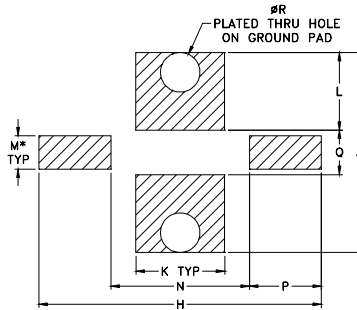
# Low Pass Filter

# LFCW-133+

## Outline Drawing

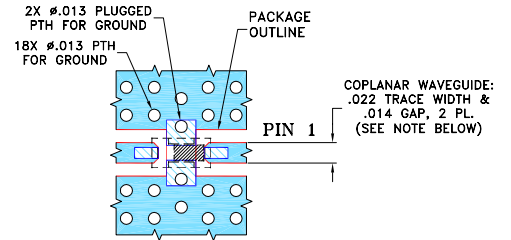


## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

## Demo Board MCL P/N: TB-720+ Suggested PCB Layout (PL-412)



### NOTES:

- TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS  $.010" \pm .001"$ , COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
  - 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.

## Pad Connections

Input	1
Output	3
Ground	2,4

## Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	J
.063	.031	.024	.018	.028	.006	.012	.100	.071
1.60	0.79	0.61	0.46	0.71	0.15	0.30	2.54	1.80
K	L	M	N	P	Q	R	wt	
.032	.028	.012	.049	.026	.016	.014	grams	
0.81	0.71	0.30	1.24	0.66	0.41	0.36	0.005	

## Additional Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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