# Ceramic **\_ow Pass Filter**

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



### **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.		

## 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-Circuit's website at www.minicircuits.com/MCLStore/terms.jsp





# Ceramic Low Pass Filter

#### DC<sup>1</sup> to 13.25 GHz **50**O

#### **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



LFCW-133+

Generic photo used for illustration purposes only 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#	F# Frequency (GHz)		Тур.	Max.	Unit
	Insertion Loss	DC - F1	DC - 13.25			2.5	dB
Pass Band	Freq. Cut-Off	F2	13.65	_	3.0	_	dB
	VSWR	DC - F1	DC - 13.25	—	2.7	—	:1
		F3	14.76	—	20	—	dB
Stop Band	Rejection Loss	F4 - F5	14.91 - 15.41	19	24	_	:1
		F6	17	_	20	_	dB

1. In Application where DC voltage is present at either input or output port, coupling capacitors are required. 2. Measured on Mini-Circuits Characterization Test Board TB-720+

#### **Functional Schematic**



#### **Typical Frequency Response**



Maximum Ratings			
Operating Temperature	-55°C to 100°C		
Storage Temperature	-55°C to 100°C		
RF Power Input <sup>3</sup>	12.6W at 25°C		
Passhand rating derate linearly to	6 3W/ at 100°C ambient (Reference	0 4	

3. <u>AN-75-005)</u> Permanent damage may occur if any of these limits are exceeded.

#### Typical Performance Data<sup>4</sup> at 25°C

<i></i>			
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	

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



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#### **Pad Connections**

INPUT	1
OUTPUT	3
GROUND	2,4

#### **Product Marking: N/A**

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



#### NOTES:

- TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .010" ± .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.

#### **Outline Drawing**







#### Outline Dimensions ( inch )

А	В	С	D	Е	F	G	wt
.063	.031	.024	.018	.028	.006	.012	grams
1.60	0.79	0.61	0.46	0.71	0.15	0.30	0.005

Notes

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