



Mini-Circuits®

CERAMIC

Low Pass Filter

LFCN-180+

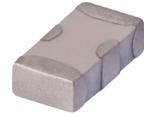
50Ω DC¹ to 180 MHz

FEATURES

- Excellent Power Handling, 8 W
- Small Size
- 7 Sections
- Temperature Stable
- Hermetically Sealed
- LTCC Construction
- Protected by U.S Patent 6,943,646

APPLICATIONS

- Harmonic Rejection
- VHF/UHF Transmitters/Receivers
- Lab Use



Generic photo used for illustration purposes only

CASE STYLE: FV1206

+RoHS CompliantThe +Suffix identifies RoHS Compliance.
See our website for methodologies and qualificationsELECTRICAL SPECIFICATIONS^{1,2} AT +25°C

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Passband	Insertion Loss	DC-F1	DC-180		1.0	dB
	Freq. Cut-Off	F2	270	3.0		dB
	VSWR	DC-F1	DC-180	1.2		:1
Stopband	Rejection Loss	F3-F4	370-525	20		
		F4-F5	525-2350	40		dB
		F5-F6	2350-6400	20		
	VSWR	F3-F6	370-6400	17		:1

1. In Application where DC voltage is present at either input or output ports, coupling capacitors are required.

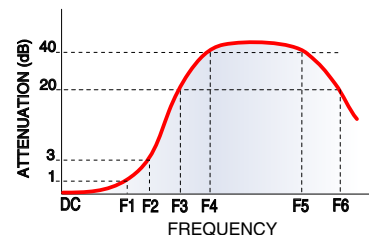
2. Measured on Mini-Circuits Characterization Test Board TB-LFCN-180+.

ABSOLUTE MAXIMUM RATINGS

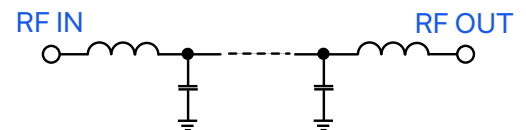
Parameter	Ratings
Operating Temperature	-55°C to +100°C
Storage Temperature	-55°C to +100°C
RF Power Input ³	8 W max. at +25°C

3. Passband rating, derate linearly to 3 W at +100°C ambient.
Permanent damage may occur if any of these limits are exceeded.

TYPICAL FREQUENCY RESPONSE



FUNCTIONAL SCHEMATIC

REV. I
ECO-023234
LFCN-180+
MCL NY
250613

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PIN CONNECTIONS

RF IN	1
RF OUT	3
GROUND	2,4

PRODUCT MARKING: RB

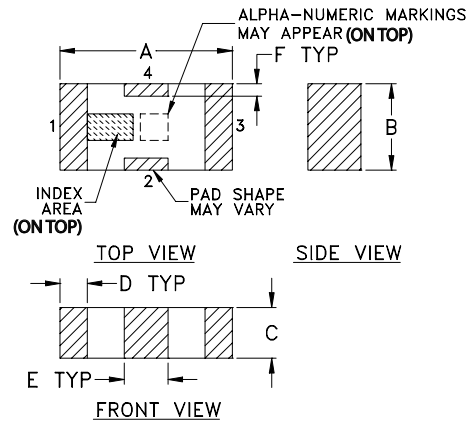
DEMO BOARD MCL P/N: TB-LFCN-180+
SUGGESTED PCB LAYOUT (PL-137)



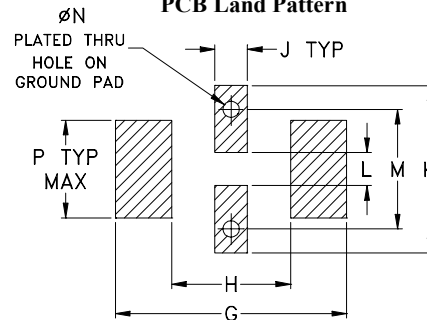
NOTES: 1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH THICKNESS .020" ± .0015".
COPPER: 1/2 OZ. EACH SIDE.
FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.

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



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

OUTLINE DIMENSIONS (Inches mm)

A	B	C	D	E	F	G	
.126	.063	.037	.020	.032	.009	.169	
3.20	1.60	0.94	0.51	0.81	0.23	4.29	
H	J	K	L	M	N	P	wt
.087	.024	.122	.024	.087	.012	.071	grams
2.21	0.61	3.10	0.61	2.21	0.30	1.80	.020

TAPE & REEL INFORMATION: F71



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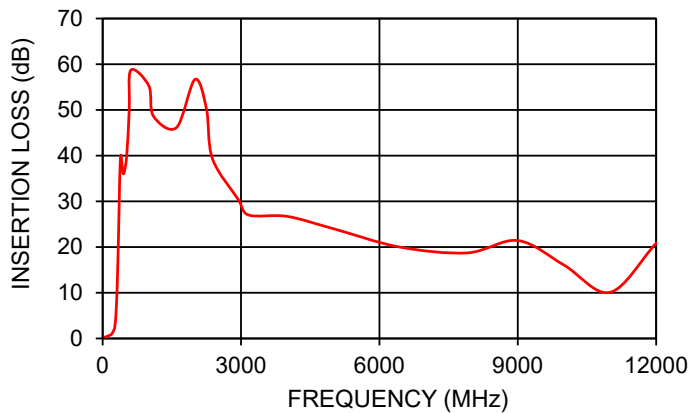
50Ω

DC¹ to 180 MHz

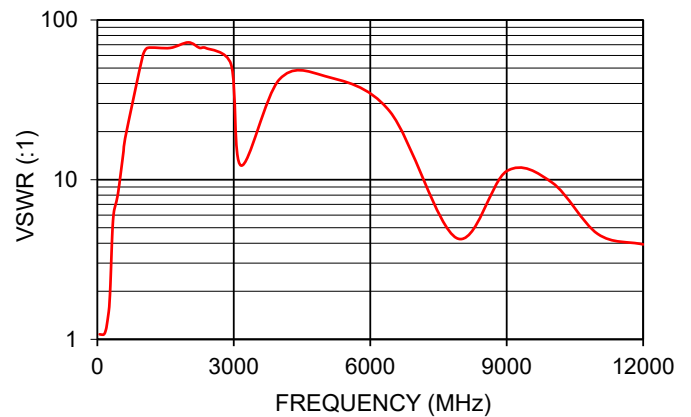
TYPICAL PERFORMANCE DATA AT +25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
40	0.29	1.08
100	0.47	1.08
180	0.85	1.14
235	1.55	1.39
270	3.15	1.82
300	7.47	2.89
325	14.93	4.47
350	25.55	5.79
370	35.04	6.37
525	40.41	11.85
950	64.01	54.29
1700	47.93	69.49
2350	42.01	64.35
4500	25.94	28.49
6400	20.10	27.16
8500	33.14	8.12
12000	20.84	3.93

INSERTION LOSS



VSWR



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.
- 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/terms/viewterm.html



Ceramic Low Pass Filter

LFCN-180+

Typical Performance Data

FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURNLOSS (dB)		
	@ -55° C	@ +25° C	@ +100° C	@ -55° C	@ +25° C	@ +100° C	@ -55° C	@ +25° C	@ +100° C
40	0.25	0.30	0.33	31.50	30.27	28.62	32.24	30.86	29.29
50	0.24	0.29	0.33	30.49	29.51	28.04	31.30	30.39	28.90
60	0.27	0.32	0.36	29.73	28.94	27.63	30.76	30.11	28.76
80	0.33	0.38	0.42	28.64	27.92	26.89	30.38	29.73	28.72
100	0.39	0.45	0.49	27.94	27.14	26.32	30.83	29.84	28.99
120	0.45	0.52	0.57	27.38	26.54	25.90	32.17	30.50	29.70
140	0.53	0.60	0.66	26.47	25.89	25.57	32.31	30.87	30.45
150	0.57	0.65	0.71	25.78	25.47	25.40	30.96	30.29	30.41
160	0.61	0.70	0.77	24.97	24.95	25.19	29.08	29.10	29.80
170	0.66	0.76	0.83	24.05	24.27	24.81	27.08	27.45	28.51
180	0.72	0.82	0.90	23.02	23.34	24.10	25.15	25.58	26.66
200	0.87	0.98	1.07	20.53	20.75	21.42	21.70	21.88	22.53
235	1.35	1.50	1.62	14.48	14.49	14.55	16.23	16.28	16.30
250	1.78	1.94	2.07	11.51	11.64	11.66	13.81	14.15	14.20
270	2.86	2.98	3.12	7.67	8.01	8.11	10.41	11.25	11.65
290	5.14	5.11	5.20	4.44	4.87	5.07	7.16	8.17	8.93
310	9.44	9.16	9.13	2.40	2.74	2.94	4.76	5.52	6.18
325	14.17	13.67	13.55	1.63	1.89	2.05	3.68	4.21	4.68
340	19.98	19.26	19.05	1.27	1.48	1.61	3.04	3.44	3.77
350	24.27	23.44	23.18	1.15	1.34	1.46	2.78	3.14	3.42
370	32.88	32.13	31.92	1.01	1.18	1.30	2.46	2.82	3.07
500	38.14	37.94	37.86	0.74	0.87	0.98	1.51	1.75	1.97
525	40.68	40.29	40.09	0.70	0.81	0.93	1.30	1.51	1.70
560	46.53	45.47	45.14	0.66	0.77	0.88	1.07	1.24	1.38
580	51.82	50.21	49.42	0.61	0.73	0.82	0.95	1.10	1.23
610	59.30	59.40	58.11	0.58	0.69	0.80	0.80	0.94	1.05
660	49.61	50.27	50.56	0.51	0.62	0.70	0.63	0.74	0.83
900	61.37	58.26	56.67	0.30	0.37	0.44	0.32	0.38	0.41
950	63.11	66.70	66.78	0.29	0.36	0.42	0.31	0.35	0.39
1500	44.74	45.11	45.35	0.18	0.22	0.26	0.30	0.33	0.36
2350	40.05	42.54	43.81	0.47	0.43	0.41	0.25	0.29	0.35
3150	27.99	27.24	27.59	0.37	0.46	0.55	1.44	1.28	1.39
5000	24.17	24.39	24.35	0.80	1.00	1.24	0.33	0.45	0.62
6400	19.23	19.54	19.68	0.41	0.58	0.76	0.67	0.67	0.74
7000	18.24	18.24	18.34	0.44	0.68	0.93	1.30	1.23	1.26
8500	26.55	28.02	29.51	2.08	2.20	2.00	2.15	2.15	2.44
10000	21.03	18.94	16.59	2.07	2.52	2.60	1.51	1.78	2.03
11000	12.67	11.44	11.66	4.99	4.88	4.23	4.07	4.30	4.29
13000	22.41	19.94	18.28	3.24	3.91	5.05	3.66	4.33	4.93
15000	12.07	11.25	11.48	1.40	1.91	2.15	6.00	4.50	4.25
16000	20.47	29.23	31.69	2.66	2.79	3.29	10.83	13.31	14.90
18000	14.46	12.51	10.28	3.93	3.89	4.02	4.75	6.50	8.54

REV. X1
LFCN-180+
071008
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IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED • RoHS compliant

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see

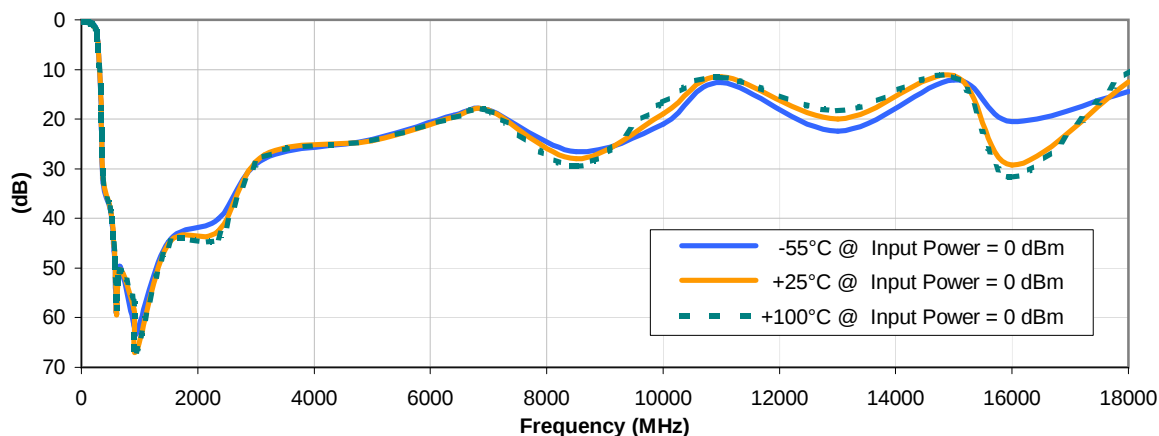


Ceramic Low Pass Filter

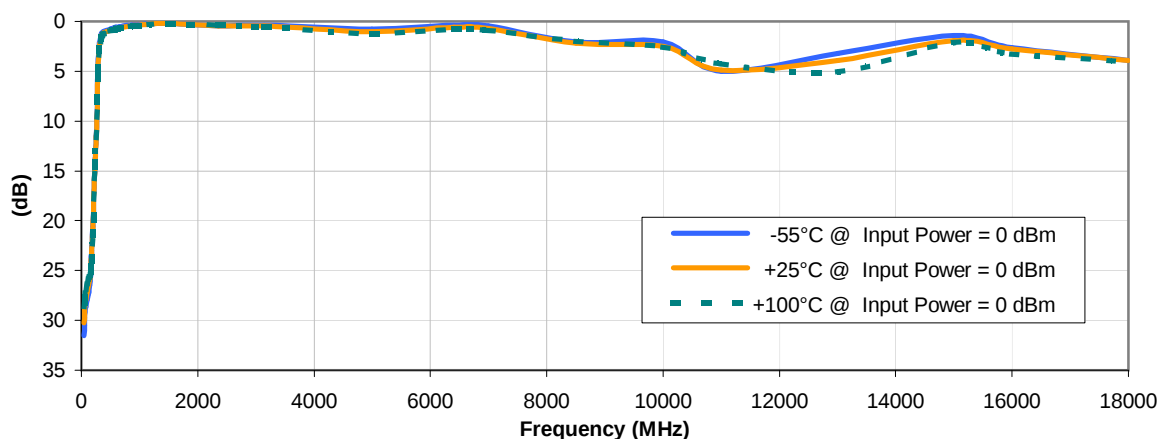
Typical Performance Curves

LFCN-180+

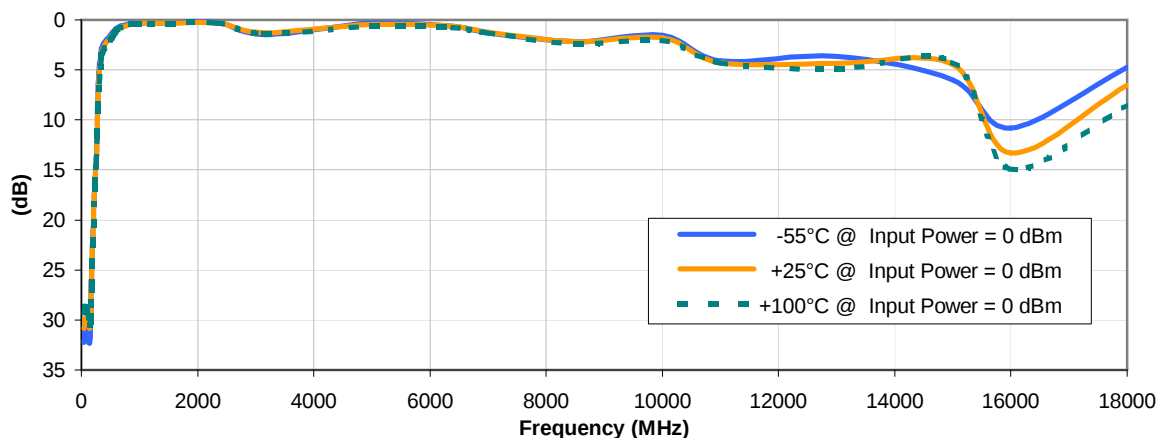
INSERTION LOSS vs. TEMPERATURE



INPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. TEMPERATURE



REV. X1
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Outline Dimensions



PCB Land Pattern



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

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N	P	WT. GRAM
FV1206	.126 (3.20)	.063 (1.60)	.037 (0.94)	.020 (0.51)	.032 (0.81)	.009 (0.23)	.169 (4.29)	.087 (2.21)	.024 (0.61)	.122 (3.10)	.024 (0.61)	.087 (2.21)	.012 (0.30)	.071 (1.80)	.020

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .01$; 3 Pl. $\pm .005$

Notes:

- Open style, ceramic base.
- Termination finish: **as shown below or indicated on Data Sheet.**
For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



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The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F71



ILLUSTRATION 1

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	3000

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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RF/IF MICROWAVE COMPONENTS

THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M88634	NEW RELEASE	08/28/03	GF	ABD
A	M102713	ADDED "...WITH SMOBC"	01/17/06	MMG	IL

**SUGGESTED MOUNTING CONFIGURATION
FOR FV1206 CASE STYLE, "nx" PIN CONNECTION**



NOTES: 1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH THICKNESS .020" $\pm$.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

TOLERANCES ON:

2 PL DECIMALS $\pm$ 3 PL DECIMALS $\pm$.005ANGLES $\pm$ FRACTIONS $\pm$

DRAWN

GF

08/27/03

CHECKED

AV

08/28/03

APPROVED

ABD

08/28/03



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, nx, FV1206, LFCN/HFCN, TB-270

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-137

REV:

A

FILE:

98PL137

SCALE:

10:1

SHEET:

1 OF 1

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

Evaluation Board and Circuit



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: ROGERS RO4350 or equivalent,
Dielectric Constant=3.5, Thickness=.020 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 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