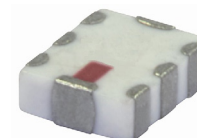


Ceramic

Dual Low Pass Filter

DLFCV-1600+

50Ω DC to 1600 MHz



Generic photo used for illustration purposes only
CASE STYLE: JV1210C-6

The Big Deal

- Differential operation
- Fast roll off
- Small size
- Very wide stopband, up to 10000 MHz

Product Overview

Mini-Circuits' DLFCV-1600+ is an LTCC dual low pass filter with a passband from DC to 1600 MHz. This can also operate as balanced input / output filter. This model is ideal for applications requiring filtering of balanced signals on dual 50Ω lines such as DACs/ADCs, systems with very low noise requirements and more. The filter provides low insertion loss in the passband, fast roll off in the transition, and a very wide stopband up to 10000 MHz, making it suitable for use in wideband systems with many harmonics and spurious products. The unit comes housed in a tiny, rugged 1210 ceramic package, with wraparound terminations for excellent solderability.

Key Features

Feature	Advantages
Dual filter	Allows filtering of balanced signals in a single, tiny component. Eliminates the need for binning and matching of separate discrete components.
Tiny size (0.126" x 0.098" x 0.039")	Saves space in dense circuit board layouts and minimizes the effects of parasitics.
Fast roll off	Provides sharp rejection at frequencies close to the passband.
Ultra-wide stopband	Provides excellent rejection over a wide band, ideal for blocking harmonics in wide-band communications systems.
Wrap-around terminations	Provides excellent solderability and easy visual inspection.

Notes

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Dual Low Pass Filter

DLFCV-1600+

50Ω DC to 1600 MHz

Maximum Ratings

Operating Temperature -55°C to 100°C

Storage Temperature -55°C to 100°C

RF Power Input* 3 W Max. at 25°C

* Passband rating, derate linearly to 1.5W at 85°C ambient. Permanent damage may occur if any of these limits are exceeded.

Pin Connections

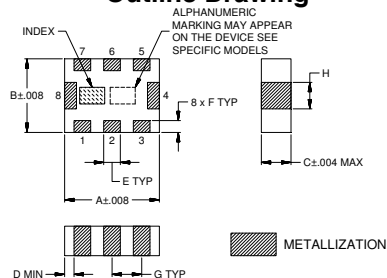
RF IN1, RF IN2 1, 3

RF OUT1, RF OUT2 7, 5

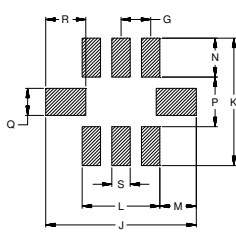
GROUND 2, 4, 6, 8

Product Marking: KU

Outline Drawing



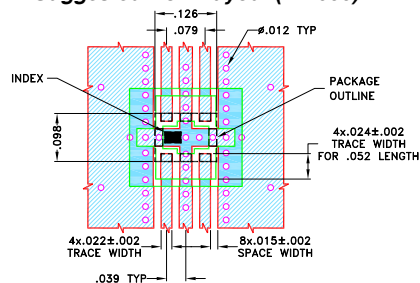
PCB LAND PATTERN



Outline Dimensions (inch mm)

A	B	C	D	E	F	G	H	J
.126	.098	.039	.004	.022	.016	.039	.035	.200
3.20	2.50	1.00	0.10	0.56	0.40	1.00	0.90	5.08
K	L	M	N	P	Q	R	S	Wt.
.170	.103	.048	.052	.066	.036	.053	.024	grams
4.32	2.62	1.23	1.32	1.68	0.92	1.35	0.62	0.03

Note: Please refer to case style drawing for details

Demo Board MCL P/N: TB-1074+
Suggested PCB Layout (PL-600)

NOTES:

- TRACE WIDTH IS SHOWN FOR ROGERS (R04350B) WITH DIELECTRIC THICKNESS .010"±.001". COPPER: 1/20z. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH 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 SOLDERMASK

Notes

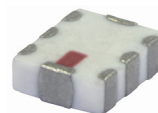
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Features

- Low insertion loss
- Small size
- Excellent return loss
- High rejection

Applications

- Military Radio communication
- VHF/UHF transmitters/receivers
- Harmonic rejection
- Output of the A/D convertor



Generic photo used for illustration purposes only

CASE STYLE: JV1210C-6

+RoHS Compliant

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

Electrical Specifications^(1,2) at 25°C

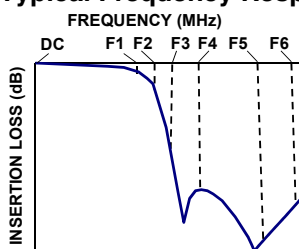
Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	DC-F1	DC-1600	—	1.5	2.5 dB
	Freq. Cut-Off	F2 *	1800	—	3.0	dB
	Amp Unbalance	DC-F1	DC-1600	—	0.2	dB
	Pha Unbalance	DC-F1	DC-1600	—	3.0	deg
	VSWR	DC-F1	DC-1600	—	1.5	:1
Stop Band	Insertion Loss	F3-F4	2400-4900	35	50	dB
		F4-F5	4900-7000	—	33	dB
		F5-F6	7000-10000	—	25	dB
	Isolation (between filters)	F3-F4	2400-4900	—	50	dB
	VSWR	F3-F4	2400-4900	—	20	:1

1 In Applications where DC voltage and/or current is present at either input or output ports, DC de-coupling capacitors are required. If DC pass from IN-OUT is required, please contact Mini-Circuits for alternatives.

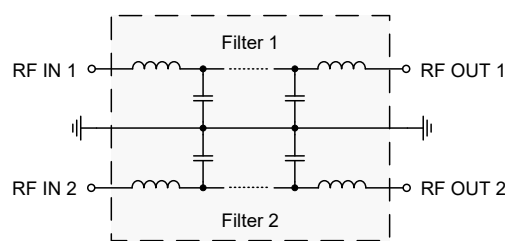
2 Measured on Mini-Circuits Characterization Test Board TB-1074+

* Typically, a ±5% frequency deviation from the stated value may occur on a unit-to-unit basis.

Typical Frequency Response

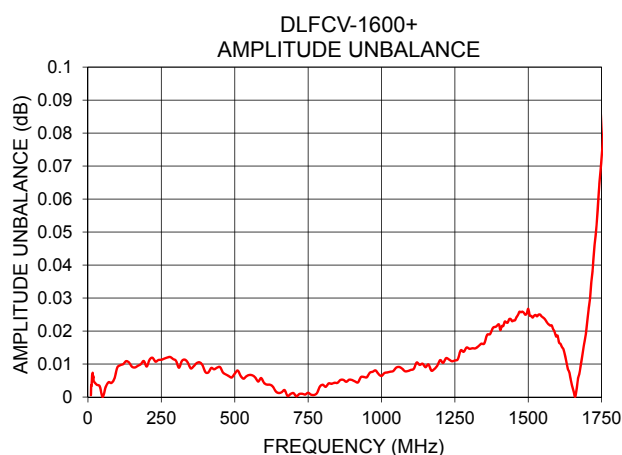
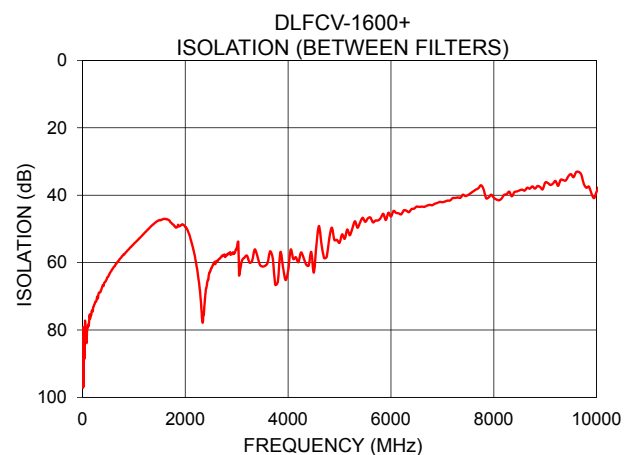
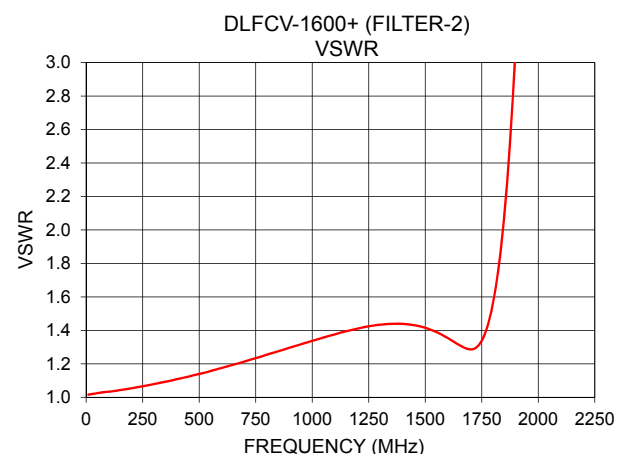
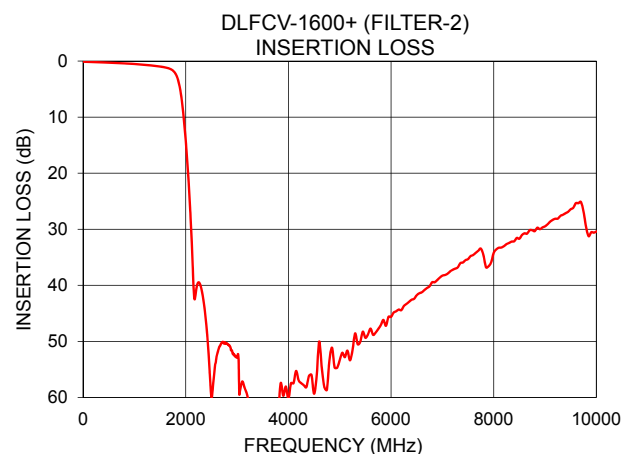
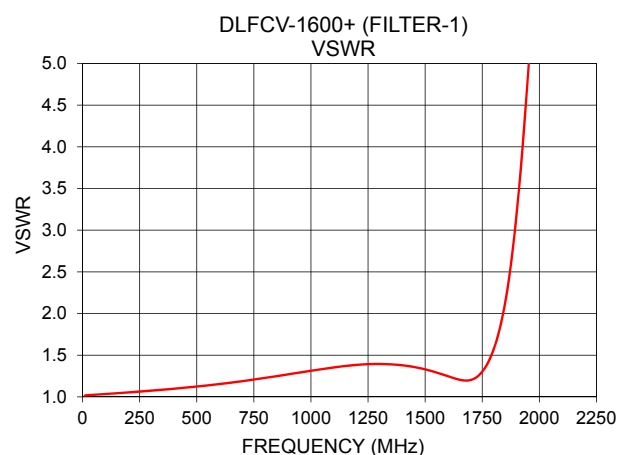
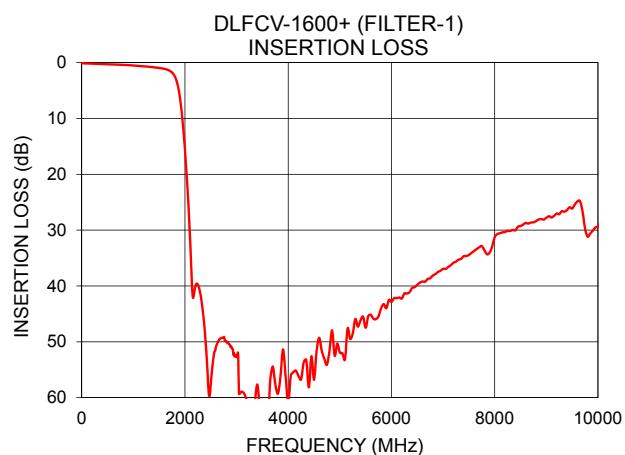


Functional Schematic



Typical Performance Data at 25°C

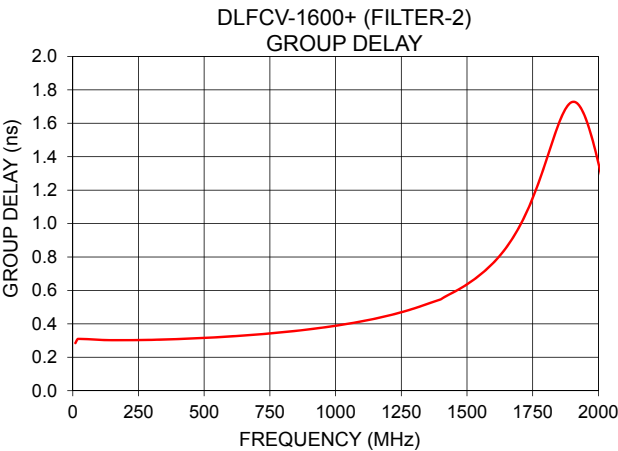
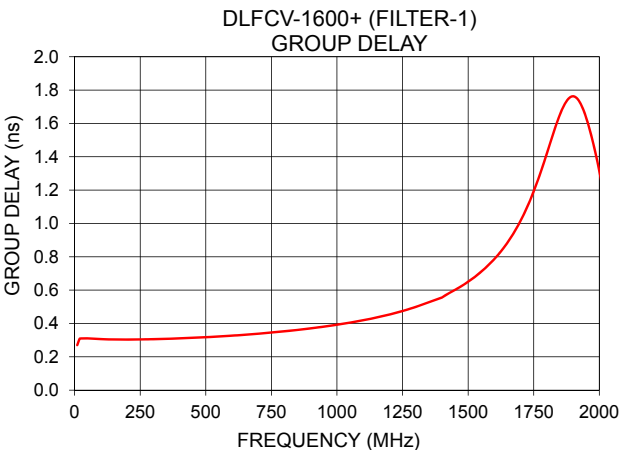
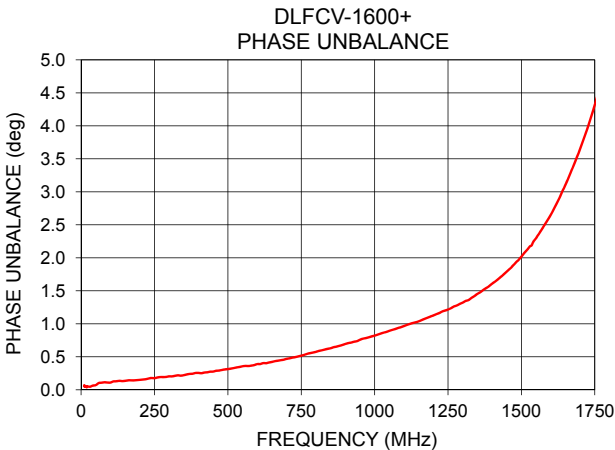
Freq. (MHz)	Insertion Loss		Isolation (between filters) (dB)	VSWR		Freq. (MHz)	Amp Unbal. (dB)	Phase Unbal. (deg)	Group Delay	
	Filter1 (dB)	Filter2 (dB)		Filter1 (:1)	Filter2 (:1)				Filter1 (ns)	Filter2 (ns)
10.0	0.11	0.11	97.17	1.01	1.02	10.0	0.001	0.06	0.27	0.28
100.0	0.16	0.15	79.47	1.03	1.03	40.0	0.003	0.06	0.31	0.31
500.0	0.29	0.28	64.19	1.12	1.14	60.0	0.003	0.10	0.31	0.31
1000.0	0.51	0.52	54.46	1.31	1.34	100.0	0.009	0.11	0.31	0.30
1600.0	1.12	1.13	47.06	1.25	1.35	140.0	0.010	0.13	0.30	0.30
1750.0	1.77	1.69	48.55	1.30	1.34	200.0	0.009	0.15	0.30	0.30
1800.0	2.40	2.24	49.26	1.57	1.57	260.0	0.012	0.19	0.30	0.30
1850.0	3.66	3.35	49.31	2.13	2.09	300.0	0.011	0.20	0.31	0.30
2000.0	15.61	14.23	49.44	6.83	6.30	350.0	0.009	0.22	0.31	0.31
2030.0	19.63	17.93	49.95	8.02	7.17	400.0	0.008	0.26	0.31	0.31
2040.0	21.11	19.28	50.22	8.41	7.44	450.0	0.009	0.28	0.31	0.31
2100.0	31.81	28.91	52.86	10.69	8.88	500.0	0.007	0.31	0.32	0.32
2110.0	34.01	30.88	53.31	11.09	9.12	600.0	0.004	0.39	0.33	0.32
2200.0	40.13	41.07	59.35	14.81	11.38	700.0	0.001	0.47	0.34	0.34
2400.0	49.99	47.01	68.22	24.62	18.15	800.0	0.004	0.57	0.35	0.35
4000.0	60.95	60.23	62.51	166.94	94.53	900.0	0.005	0.69	0.37	0.37
4900.0	52.49	54.64	53.28	727.75	76.18	1000.0	0.006	0.82	0.39	0.39
6000.0	42.85	45.63	46.32	97.47	66.67	1250.0	0.011	1.21	0.47	0.47
7000.0	36.93	38.27	42.09	78.40	49.21	1300.0	0.015	1.32	0.50	0.49
8000.0	31.26	34.21	40.75	129.24	29.12	1400.0	0.022	1.61	0.56	0.55
9000.0	27.80	29.48	36.25	87.60	129.96	1500.0	0.027	2.02	0.65	0.64
10000.0	29.35	30.41	38.94	153.05	156.98	1600.0	0.019	2.65	0.79	0.76



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Dual Low Pass Filter

Typical Performance Data

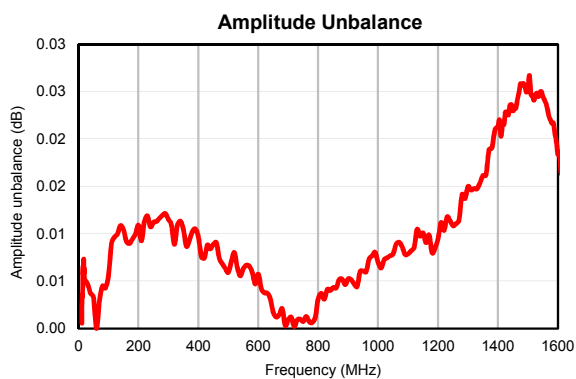
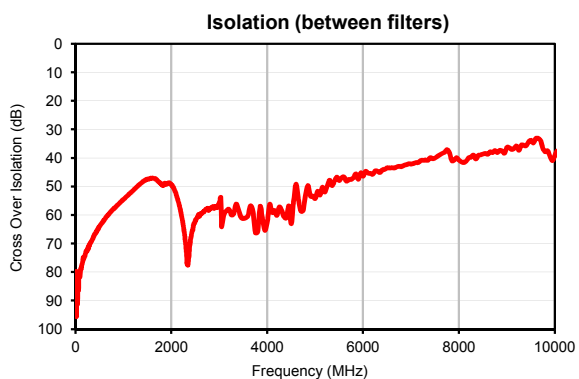
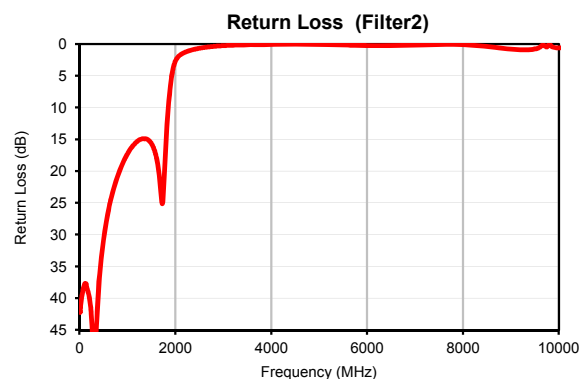
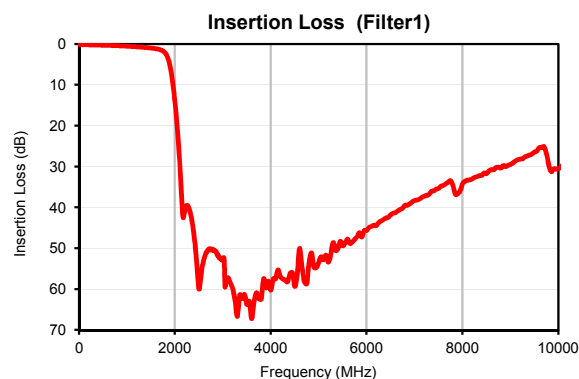
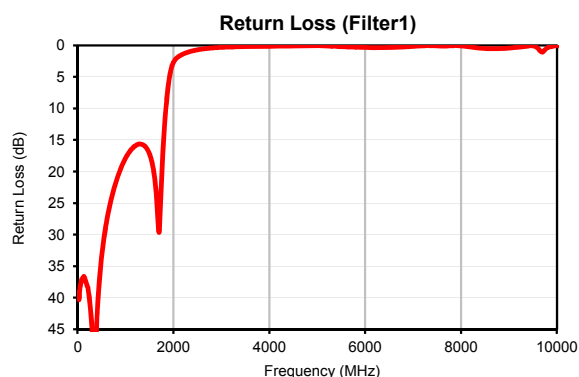
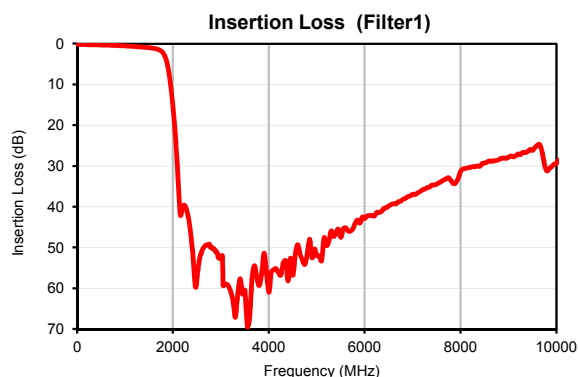
DLFCV-1600+

FREQUENCY (MHz)	INSERTION LOSS (dB)		Isolation (between filters) (dB)	RETURN LOSS (dB)	
	Filter1	Filter2		Filter1	Filter2
10	0.11	0.11	94.56	39.26	42.21
50	0.13	0.13	80.77	38.35	39.63
100	0.16	0.15	80.20	36.92	37.90
150	0.18	0.17	76.32	36.95	38.30
250	0.21	0.20	72.02	40.46	43.15
500	0.29	0.28	63.90	33.41	30.81
750	0.38	0.38	58.50	22.88	21.76
1000	0.51	0.52	54.46	17.85	17.26
1250	0.70	0.71	50.55	15.68	15.06
1500	0.95	0.98	47.35	17.22	15.67
1600	1.12	1.13	47.05	20.59	17.73
1800	2.40	2.24	49.27	14.21	15.85
1850	3.66	3.35	49.31	9.24	10.13
1900	6.09	5.53	49.08	5.77	6.23
2000	15.61	14.23	49.49	2.65	2.66
2035	20.36	18.60	50.15	2.24	2.20
2095	30.76	27.98	52.51	1.81	1.74
2100	31.81	28.91	52.85	1.78	1.71
2150	41.86	39.88	55.64	1.55	1.48
2200	40.13	41.07	59.38	1.36	1.30
2250	39.76	39.46	63.82	1.20	1.15
2300	41.50	40.44	70.50	1.06	1.02
2350	44.81	42.99	76.22	0.94	0.91
2400	49.99	47.01	68.27	0.84	0.82
2500	57.64	59.97	61.77	0.68	0.66
2750	49.19	50.33	57.80	0.43	0.40
3000	52.60	52.86	55.73	0.29	0.25
3250	62.95	62.49	59.90	0.22	0.17
3500	60.50	63.73	61.19	0.17	0.12
3750	57.56	62.30	66.10	0.15	0.08
4000	60.95	60.23	62.44	0.13	0.07
4250	56.73	57.46	57.16	0.10	0.04
4500	56.81	59.33	62.96	0.06	0.01
4900	52.49	54.64	53.28	0.01	0.04
5000	51.93	53.36	54.14	0.04	0.07
5250	48.55	51.52	49.81	0.10	0.10
5500	47.48	49.36	47.87	0.18	0.14
5750	45.42	47.79	47.47	0.24	0.19
6000	42.85	45.63	46.34	0.31	0.22
6200	42.25	44.43	45.67	0.33	0.23
6400	40.37	42.58	44.13	0.32	0.23
6600	39.21	41.25	43.38	0.29	0.23
6800	38.15	39.46	42.99	0.22	0.20
7000	36.93	38.27	42.08	0.14	0.16
7200	35.85	37.22	40.87	0.04	0.13
7400	34.67	35.93	39.88	0.04	0.08
7600	33.74	34.59	38.88	0.07	0.06
7800	33.58	34.62	38.18	0.05	0.03
8000	31.26	34.21	40.75	0.07	0.10
8200	30.33	33.01	39.91	0.25	0.18
8400	30.05	32.14	39.12	0.42	0.30
8600	28.72	30.73	38.64	0.51	0.48
8800	28.39	30.34	38.06	0.50	0.65
9000	27.80	29.48	36.26	0.39	0.80
9200	27.03	28.13	35.78	0.26	0.89
9400	26.41	27.14	35.64	0.11	0.90
9600	24.87	25.36	33.18	0.42	0.51
9800	31.16	29.62	37.78	0.37	0.00
9900	30.10	30.53	39.55	0.14	0.53
10000	29.35	30.41	38.96	0.04	0.60

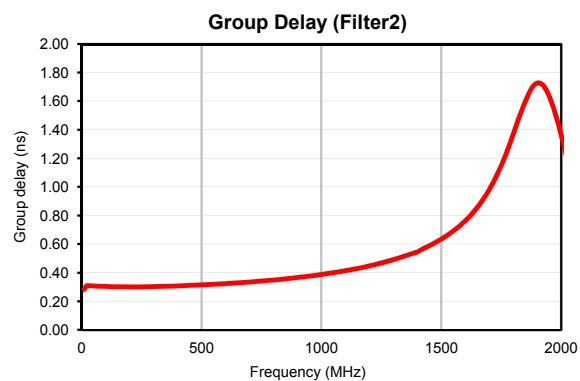
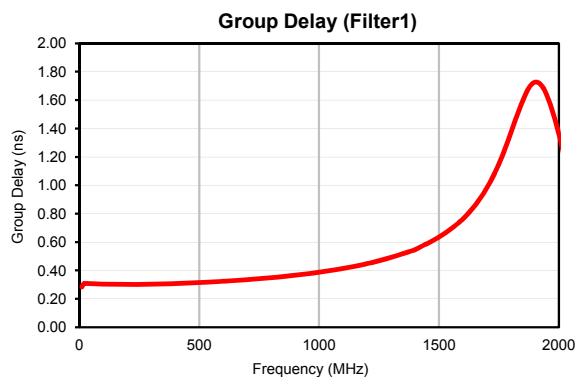
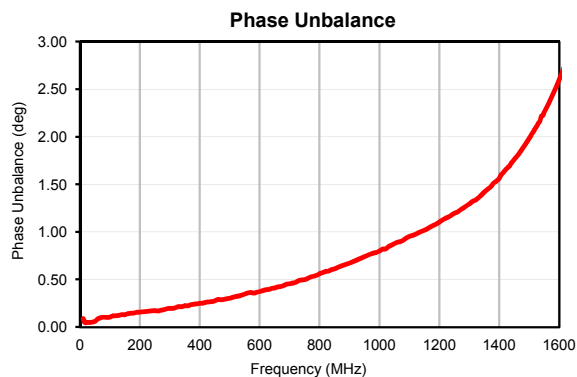
Typical Performance Data

FREQUENCY (MHz)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg)	GROUP DELAY (ns)	
			Filter1	Filter2
10	0.00	0.00	0.27	0.28
20	0.01	0.05	0.31	0.31
30	0.00	0.05	0.31	0.31
40	0.00	0.05	0.31	0.31
60	0.00	0.09	0.31	0.31
80	0.00	0.10	0.31	0.31
100	0.01	0.10	0.31	0.30
120	0.01	0.12	0.30	0.30
140	0.01	0.13	0.30	0.30
160	0.01	0.14	0.30	0.30
180	0.01	0.15	0.30	0.30
200	0.01	0.16	0.30	0.30
220	0.01	0.16	0.30	0.30
240	0.01	0.17	0.30	0.30
260	0.01	0.17	0.30	0.30
280	0.01	0.18	0.30	0.30
300	0.01	0.20	0.31	0.30
320	0.01	0.20	0.31	0.30
340	0.01	0.22	0.31	0.31
360	0.01	0.22	0.31	0.31
380	0.01	0.24	0.31	0.31
400	0.01	0.25	0.31	0.31
450	0.01	0.28	0.31	0.31
500	0.01	0.30	0.32	0.32
550	0.01	0.35	0.32	0.32
600	0.01	0.37	0.33	0.32
650	0.00	0.41	0.33	0.33
700	0.00	0.46	0.34	0.34
750	0.00	0.50	0.35	0.34
800	0.00	0.56	0.35	0.35
850	0.00	0.61	0.36	0.36
900	0.01	0.67	0.37	0.37
950	0.01	0.74	0.38	0.38
1000	0.01	0.80	0.39	0.39
1050	0.01	0.88	0.41	0.40
1100	0.01	0.96	0.42	0.42
1150	0.01	1.02	0.44	0.43
1200	0.01	1.10	0.45	0.45
1250	0.01	1.20	0.47	0.47
1300	0.02	1.30	0.50	0.49
1350	0.02	1.42	0.53	0.52
1400	0.02	1.57	0.56	0.55
1420	0.02	1.65	0.58	0.57
1440	0.02	1.73	0.59	0.58
1460	0.02	1.80	0.61	0.60
1480	0.03	1.89	0.63	0.62
1500	0.03	1.99	0.65	0.64
1520	0.02	2.09	0.67	0.66
1540	0.02	2.22	0.70	0.68
1560	0.02	2.32	0.72	0.71
1580	0.02	2.45	0.75	0.73
1600	0.02	2.61	0.79	0.76

Typical Performance Curves

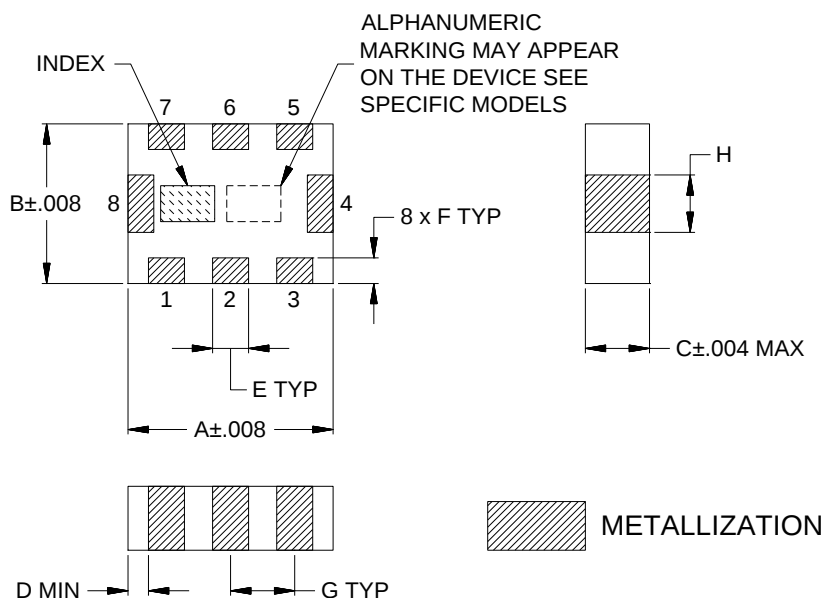


Typical Performance Curves

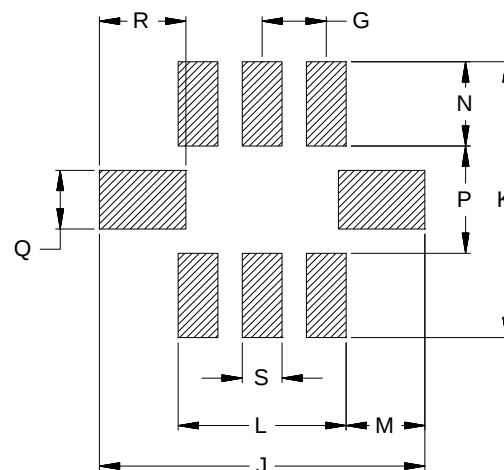


Outline Dimensions

JV1210C-6



PCB LAND PATTERN



SUGGESTED LAYOUT
TOLERANCE TO BE WITHIN $\pm .002$

CASE#	A	B	C	D	E	F	G	H	J	K	L	M
JV1210C-6	.126 (3.20)	.098 (2.50)	.039 (1.00)	.004 (0.10)	.022 (0.56)	.016 (0.40)	.039 (1.00)	.035 (0.90)	.200 (5.08)	.170 (4.32)	.103 (2.62)	.048 (1.23)

CASE#	N	P	Q	R	S	WT.GRAM
JV1210C-6	.052 (1.32)	.066 (1.68)	.036 (0.92)	.053 (1.35)	.024 (0.62)	0.03

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.
- Pad tolerance is non-cumulative. Minimum spacing between each pad is .004.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F74

DEVICE ORIENTATION IN T&R

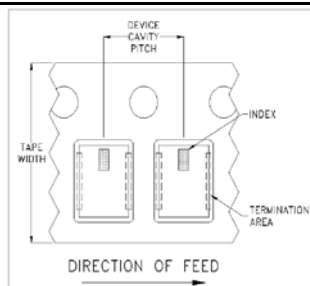


ILLUSTRATION 1

Applicable Case Styles

GE0805C-1
GE0805C-1AP
JV1210C-1
GU2939

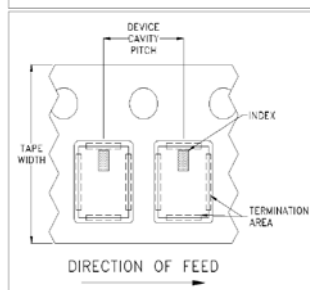


ILLUSTRATION 2

Applicable Case Styles

JV1210C
JV1210C-2
JV1210C-3
JV1210C-4
JV1210C-5
JV1210C-6
JV1210C-11

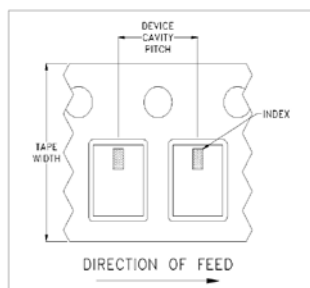


ILLUSTRATION 3

Applicable Case Styles

JC0603C-8
JV1210C-7
JV1210C-8
JV1210C-9
JV1210C-10
JV1210C-13
GE0805C-13

Tape Width, mm	Device Cavity Pitch, mm	Real Size, inches	Devices per Reel	
8	4	7	Small quantity standards (see note)	20
				50
				100
				200
				500
				1000
			Standard	2000
				4000

Note: Small reel availability varies by model. Refer to pricing and availability on individual model dashboard.

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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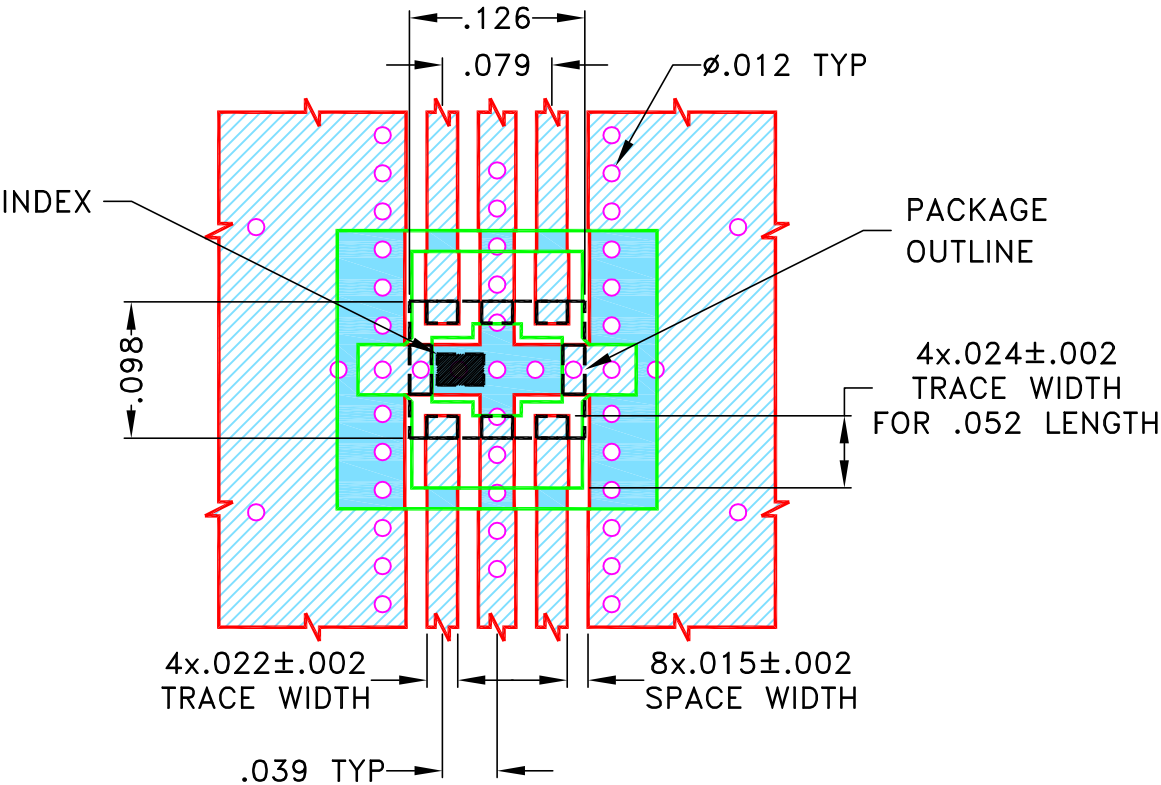
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THIRD ANGLE PROJECTION		REVISIONS				
		REV OR	ECN No. M169000	DESCRIPTION NEW RELEASE	DATE AUG 18	DR DDR
						AUTH VC

SUGGESTED MOUNTING CONFIGURATION FOR
JV1210C-6 CASE STYLE "08FL08" PIN CODE



NOTES:

- TRACE WIDTH IS SHOWN FOR ROGERS (R04350B) WITH DIELECTRIC THICKNESS .010"±.001". COPPER: 1/20oz. EACH SIDE.
FOR OTHER MATERIALS TRACE WIDTH 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 SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS		DATE	Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235	
DIMENSIONS ARE IN INCHES TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005" ANGLES ± FRACTIONS ±	DRAWN	DDR	18 AUG 18			
	CHECKED	MD	18 AUG 18			
	APPROVED	RKS	18 AUG 18			
					PL, 08FL08, JV1210C-6 DLFCV, TB-1074+, 50 OHM	
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					DRAWING NO: 98-PL-600	
					REV: OR	
ASHEETA1.DWG REV:A DATE:01/12/95					FILE: 98PL600	SCALE: 7:1
					SHEET: 1 OF 1	

Evaluation Board and Circuit

TB-1074+

RF OUT1

RF OUT2

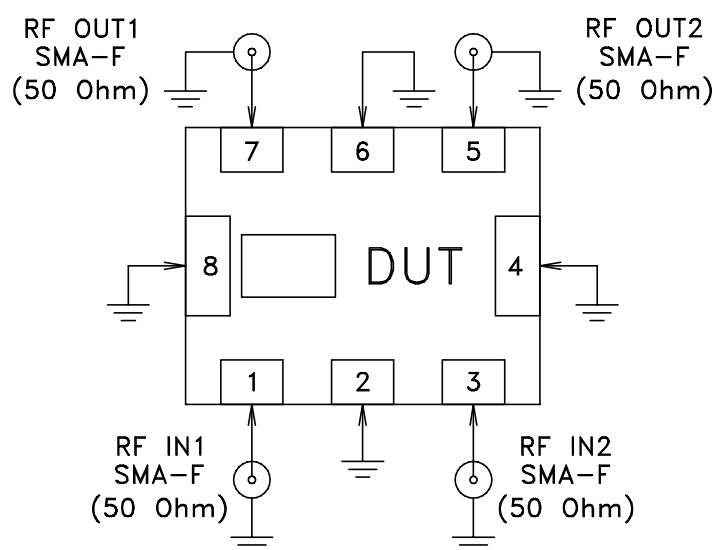
INDEX

DUT

RF IN1

RF IN2

Schematic diagram



Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: ROGERS (R04350B), OR Equivalent
Dielectric Constant=3.48, Thickness=.010inch.

 **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