

Surface Mount Low Pass Filter

RLPF-1520+

50Ω

DC to 1520 MHz

The Big Deal

- High rejection
- Fast roll-off
- Wide passband
- Miniature shielded package



CASE STYLE: CK605

Product Overview

The RLPF-1520+ is a lowpass filter in a shielded package (size of 0.500" x 0.500" x 0.180") fabricated using SMT technology. Covering DC to 1520 MHz band width, these units offer good matching within the passband and high rejection. This model uses a miniature high Q capacitors and chip inductors for high reliability. In addition it has repeatable performance across production lots and consistent performance across temperature.

Key Features

Feature	Advantages
Fast roll-off	Fast roll-off, this will attenuate frequencies closer to the passband with good rejection.
Good ultimate rejection	This enables the filters to attenuate spurious signals and reject harmonics for broadband frequency.
Small size, 0.500" x 0.500" x 0.180"	The small surface mount package enables the RLPF-1520+ to be used in compact designs.

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



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CASE STYLE: CK605

Features

- High rejection
- Fast roll-off
- Wide passband
- Miniature shielded package

Applications

- Military-aircraft
- Marine communication

Electrical Specifications at 25°C

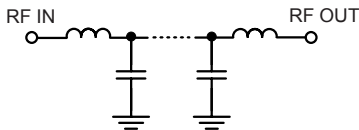
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	DC-F1	DC-1520	—	1.2	2.0	dB
	Freq. Cut-Off	F2	1620	—	3.0	—	dB
	VSWR	DC-F1	DC-1520	—	1.3	1.92	:1
Stop Band	Rejection Loss	F3-F4	1870-3200	20	31	—	dB
	VSWR	F3-F4	1870-3200	—	20	—	:1

Maximum Ratings

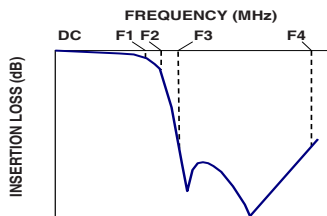
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	1.5W max.

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

Functional Schematic



Typical Frequency Response

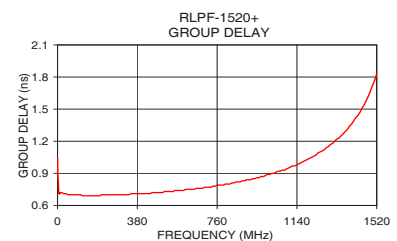
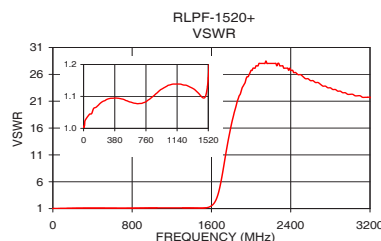
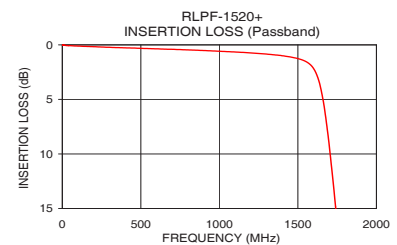
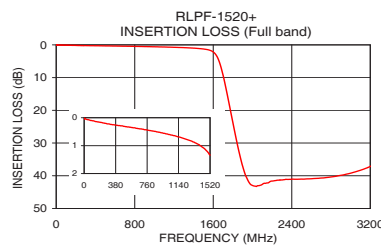


Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	0.02	1.00	1	0.93
30	0.06	1.02	50	0.70
120	0.12	1.04	200	0.69
330	0.24	1.09	300	0.70
840	0.48	1.09	400	0.71
1400	1.00	1.12	500	0.72
1520	1.34	1.10	600	0.74
1620	2.73	1.85	700	0.77
1630	3.14	2.09	800	0.80
1680	6.92	4.62	850	0.82
1730	13.36	9.58	900	0.84
1780	20.77	14.74	1000	0.89
1850	30.99	20.22	1100	0.95
1870	33.60	21.46	1200	1.04
1900	37.14	22.87	1250	1.10
2000	42.97	26.74	1300	1.17
2250	41.38	28.03	1350	1.25
2500	41.02	25.94	1400	1.36
2850	40.16	23.18	1500	1.72
3200	37.16	21.73	1520	1.83

+RoHS Compliant

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



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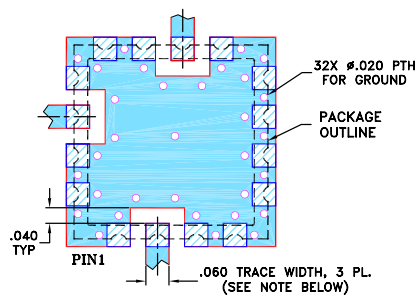
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RLPF-1520+
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Page 2 of 3

Pad Connections

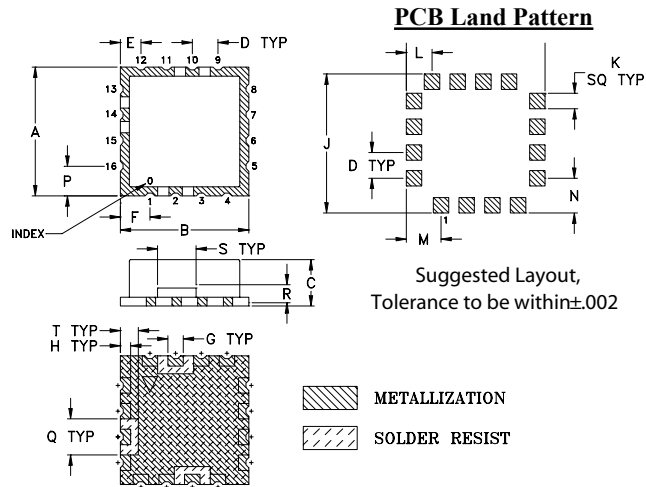
INPUT	2
OUTPUT	10
NOT CONNECTED	14
GROUND	1,3,4,5,6,7,8,9,11,12,13,15,16

Demo Board MCL P/N: TB-10+
Suggested PCB Layout (PL-012)



- NOTES: 1. TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH 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	H	J	
.500	.500	.180	.100	.080	.115	.060	.040	.540	
12.7	12.7	4.57	2.54	2.03	2.92	1.52	1.02	13.72	
K	L	M	N	P	Q	R	S	T	wt.
.060	.100	.135	.135	.115	.140	.070	.150	.070	grams
1.52	2.54	3.43	3.43	2.92	3.56	1.78	3.81	1.78	1.0

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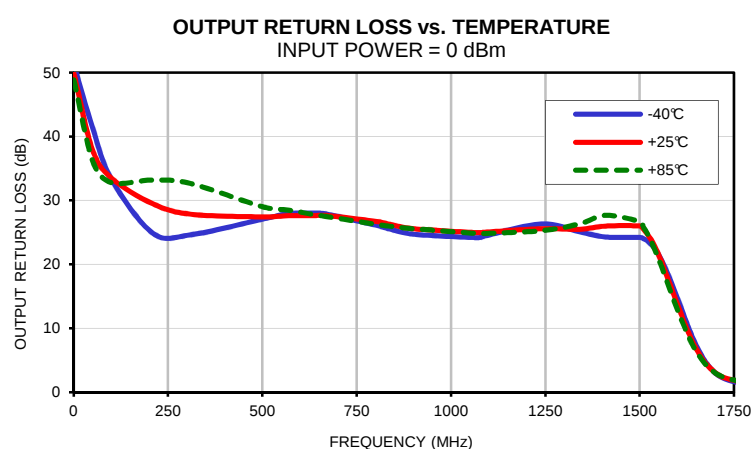
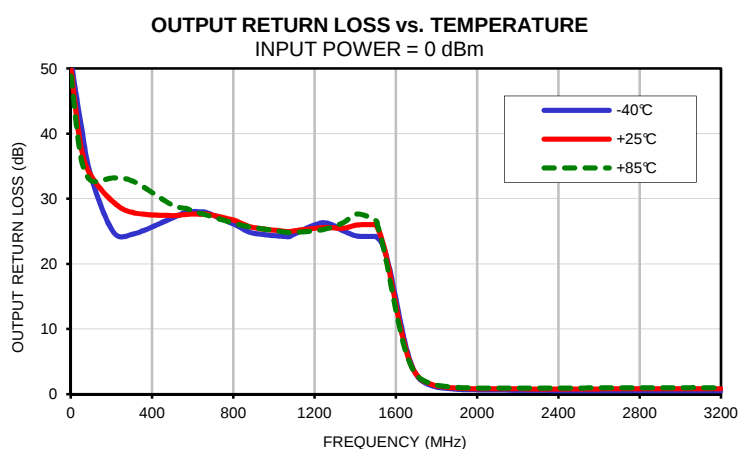
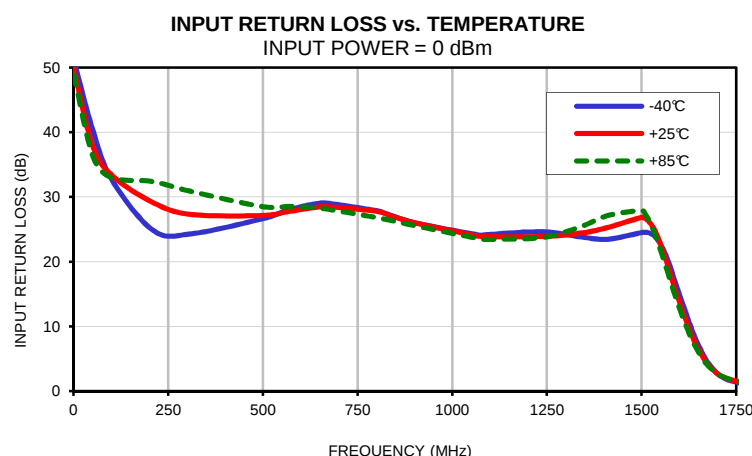
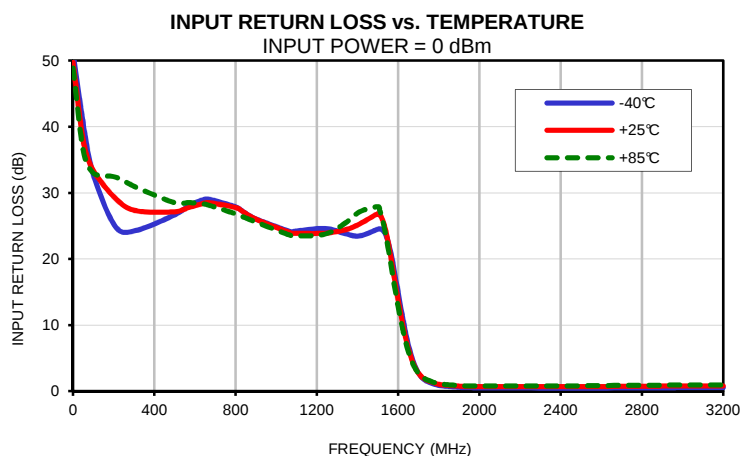
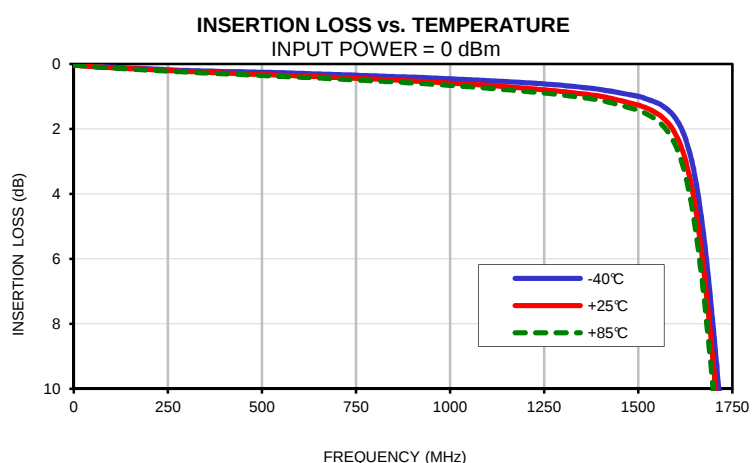
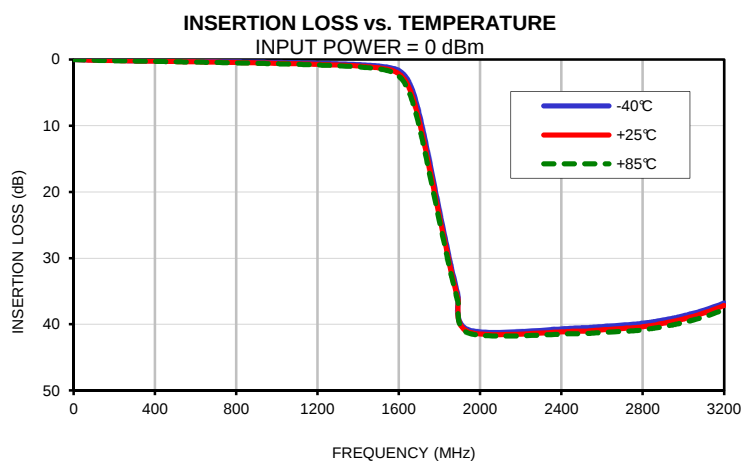
Typical Performance Data

FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	0.02	0.03	0.03	51.18	49.75	48.87	51.28	49.84	48.86
50	0.06	0.07	0.08	40.51	38.00	36.46	41.39	37.92	36.22
100	0.09	0.11	0.12	32.77	33.42	32.99	33.33	33.49	32.77
210	0.15	0.17	0.19	24.84	29.13	32.37	24.86	29.46	33.19
310	0.20	0.23	0.25	24.30	27.30	30.86	24.61	27.84	32.64
500	0.25	0.32	0.35	26.66	27.14	28.50	27.05	27.42	29.01
570	0.27	0.35	0.39	28.05	27.78	28.53	27.94	27.62	28.48
640	0.30	0.38	0.42	28.95	28.39	28.34	28.00	27.63	27.73
670	0.31	0.40	0.44	29.03	28.51	28.12	27.86	27.65	27.48
800	0.36	0.46	0.52	27.88	27.78	26.83	26.13	26.73	26.26
840	0.38	0.48	0.54	27.11	27.08	26.34	25.49	26.23	25.94
900	0.40	0.52	0.58	26.04	26.02	25.58	24.71	25.57	25.57
1070	0.49	0.63	0.71	24.12	23.95	23.56	24.17	24.95	24.82
1090	0.50	0.64	0.73	24.18	23.88	23.46	24.43	25.03	24.81
1240	0.60	0.78	0.88	24.62	23.90	23.75	26.31	25.57	25.26
1340	0.70	0.90	1.01	23.82	24.42	25.43	25.08	25.48	26.31
1410	0.80	1.01	1.14	23.47	25.28	27.12	24.27	25.98	27.66
1500	0.99	1.26	1.42	24.50	26.85	27.91	24.22	25.99	26.68
1510	1.02	1.30	1.47	24.55	26.66	27.30	24.01	25.48	25.84
1520	1.06	1.34	1.52	24.45	26.16	26.33	23.68	24.78	24.83
1530	1.10	1.39	1.58	24.16	25.34	25.05	23.17	23.88	23.65
1540	1.14	1.45	1.65	23.60	24.17	23.52	22.47	22.78	22.31
1550	1.19	1.52	1.73	22.71	22.71	21.80	21.56	21.50	20.85
1560	1.25	1.60	1.83	21.51	21.04	20.00	20.44	20.08	19.30
1570	1.33	1.70	1.95	20.04	19.23	18.14	19.14	18.54	17.68
1580	1.42	1.82	2.10	18.40	17.40	16.31	17.73	16.95	16.07
1590	1.53	1.97	2.28	16.69	15.58	14.54	16.21	15.33	14.46
1600	1.68	2.17	2.52	14.94	13.81	12.84	14.67	13.74	12.90
1610	1.87	2.41	2.81	13.22	12.12	11.24	13.10	12.18	11.40
1620	2.12	2.73	3.18	11.54	10.52	9.75	11.54	10.68	9.98
1630	2.45	3.14	3.65	9.94	9.04	8.38	10.03	9.26	8.65
1650	3.41	4.27	4.91	7.10	6.49	6.05	7.30	6.79	6.38
1680	5.85	6.92	7.72	4.01	3.82	3.67	4.28	4.16	4.02
1720	10.83	11.95	12.79	1.96	2.06	2.09	2.23	2.36	2.40
1790	21.35	22.26	22.98	0.94	1.11	1.20	1.16	1.35	1.45
1850	30.26	30.99	31.57	0.70	0.86	0.95	0.88	1.06	1.16
1860	31.62	32.34	32.89	0.67	0.83	0.93	0.85	1.03	1.13
1870	32.92	33.60	34.08	0.65	0.81	0.91	0.82	0.99	1.10
1880	34.21	34.84	35.29	0.63	0.79	0.89	0.80	0.97	1.07
1890	35.45	36.03	36.48	0.61	0.78	0.87	0.77	0.95	1.05
1950	40.91	41.22	41.41	0.52	0.69	0.79	0.67	0.85	0.95
2475	40.57	41.05	41.42	0.44	0.67	0.80	0.52	0.77	0.94
2500	40.53	41.02	41.39	0.44	0.67	0.81	0.52	0.78	0.94
2525	40.53	41.03	41.40	0.44	0.68	0.81	0.52	0.78	0.94
2550	40.46	40.96	41.34	0.45	0.69	0.83	0.53	0.79	0.95
2775	39.95	40.47	40.94	0.49	0.74	0.88	0.54	0.82	0.98
2800	39.82	40.37	40.86	0.49	0.74	0.89	0.55	0.82	0.98
2825	39.74	40.26	40.73	0.49	0.75	0.89	0.55	0.82	0.99
2850	39.63	40.16	40.62	0.50	0.75	0.90	0.55	0.82	0.99
2900	39.37	39.86	40.38	0.50	0.76	0.90	0.55	0.83	0.99
2950	39.08	39.56	40.08	0.51	0.77	0.92	0.55	0.83	0.99
2975	38.91	39.40	39.92	0.52	0.78	0.92	0.55	0.83	1.00
3000	38.72	39.21	39.73	0.52	0.78	0.93	0.55	0.83	1.00
3025	38.53	39.00	39.55	0.52	0.78	0.93	0.55	0.83	0.99
3075	38.12	38.56	39.13	0.53	0.79	0.94	0.55	0.83	1.00
3100	37.90	38.31	38.90	0.53	0.79	0.94	0.55	0.83	0.99
3125	37.64	38.06	38.64	0.53	0.80	0.94	0.55	0.83	0.99
3150	37.37	37.77	38.36	0.53	0.80	0.94	0.55	0.83	0.99
3175	37.09	37.49	38.09	0.53	0.80	0.94	0.55	0.83	0.99
3200	36.78	37.16	37.77	0.53	0.80	0.94	0.55	0.83	0.99

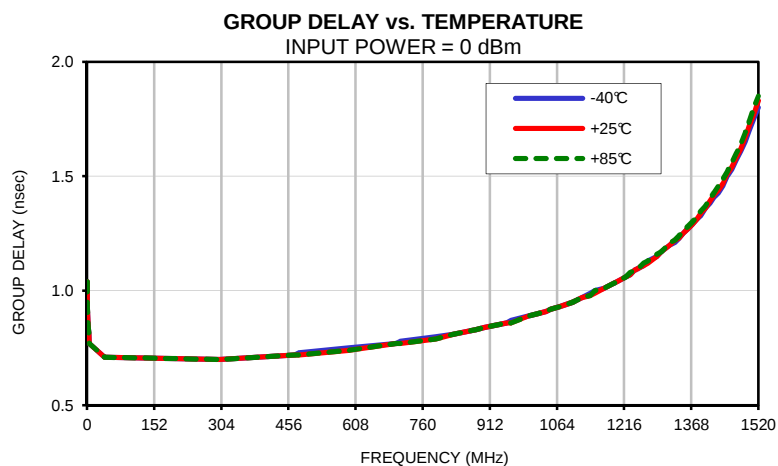
Typical Performance Data

FREQ. (MHz)	GROUP DELAY		
	(nsec)		
	@-40°C	@+25°C	@+85°C
0.5	1.04	1.04	1.04
1	0.93	0.93	0.93
3	0.84	0.84	0.84
4	0.81	0.81	0.81
5	0.77	0.77	0.77
40	0.71	0.71	0.71
300	0.70	0.70	0.70
470	0.72	0.72	0.72
480	0.73	0.72	0.72
590	0.75	0.74	0.74
700	0.77	0.77	0.77
710	0.78	0.77	0.77
790	0.80	0.79	0.79
830	0.81	0.81	0.81
880	0.83	0.83	0.83
900	0.84	0.84	0.84
950	0.86	0.86	0.86
960	0.87	0.86	0.86
1000	0.89	0.89	0.89
1020	0.90	0.90	0.90
1040	0.91	0.91	0.91
1050	0.92	0.92	0.92
1070	0.93	0.93	0.93
1100	0.95	0.95	0.95
1110	0.96	0.96	0.96
1120	0.97	0.97	0.97
1140	0.99	0.98	0.98
1150	1.00	0.99	1.00
1170	1.01	1.01	1.01
1190	1.03	1.03	1.03
1200	1.04	1.04	1.04
1220	1.06	1.06	1.06
1230	1.07	1.07	1.08
1240	1.09	1.09	1.09
1250	1.10	1.10	1.10
1260	1.11	1.11	1.12
1270	1.13	1.12	1.13
1290	1.15	1.15	1.16
1300	1.17	1.17	1.17
1320	1.20	1.20	1.21
1330	1.21	1.22	1.22
1340	1.23	1.23	1.24
1350	1.25	1.25	1.26
1360	1.27	1.27	1.28
1370	1.29	1.29	1.30
1380	1.31	1.31	1.32
1390	1.33	1.34	1.35
1400	1.36	1.36	1.37
1410	1.38	1.39	1.40
1420	1.41	1.42	1.43
1430	1.43	1.44	1.46
1440	1.46	1.47	1.49
1450	1.50	1.51	1.52
1460	1.53	1.54	1.56
1470	1.57	1.58	1.60
1480	1.61	1.62	1.64
1490	1.65	1.67	1.69
1500	1.70	1.72	1.74
1510	1.75	1.77	1.80
1520	1.80	1.83	1.85

Typical Performance Curves



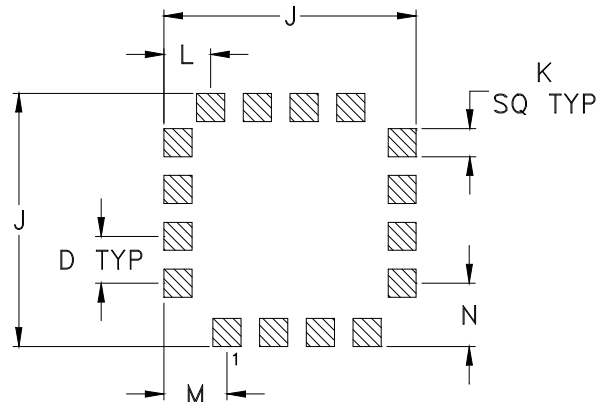
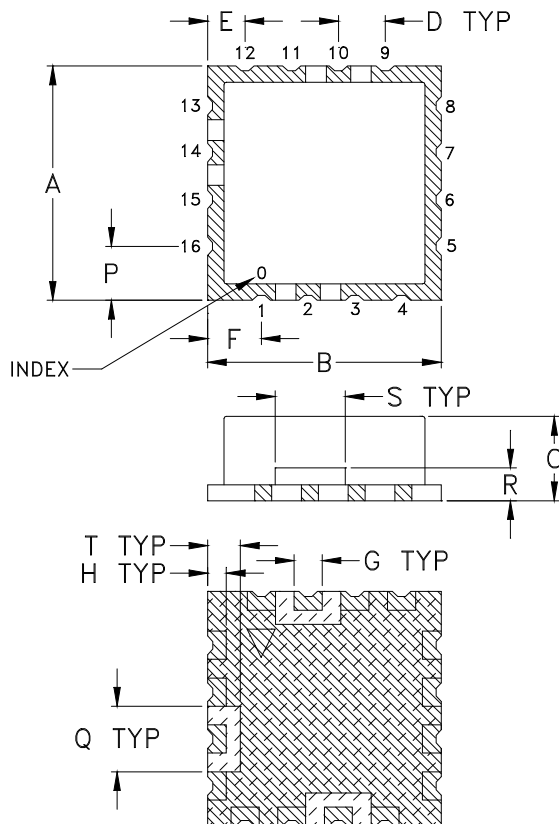
Typical Performance Curves



Outline Dimensions

CK605

PCB Land Pattern



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

CASE #	A	B	C	D	E	F	G	H	J	K
CK605	.500 (12.70)	.500 (12.70)	.180 (4.57)	.100 (2.54)	.080 (2.03)	.115 (2.92)	.060 (1.52)	.040 (1.02)	.540 (13.72)	.060 (1.52)

CASE #	L	M	N	P	Q	R	S	T	WT. GRAM
CK605	.100 (2.54)	.135 (3.43)	.135 (3.43)	.115 (2.92)	.140 (3.56)	.070 (1.78)	.150 (3.81)	.070 (1.78)	1.2 +0.5 -0.0

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .03$; 3Pl. $\pm .015$

Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- Termination finish:
For RoHS Case Styles: 3-5 μ inch (.08-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate.
All models, (+) suffix.



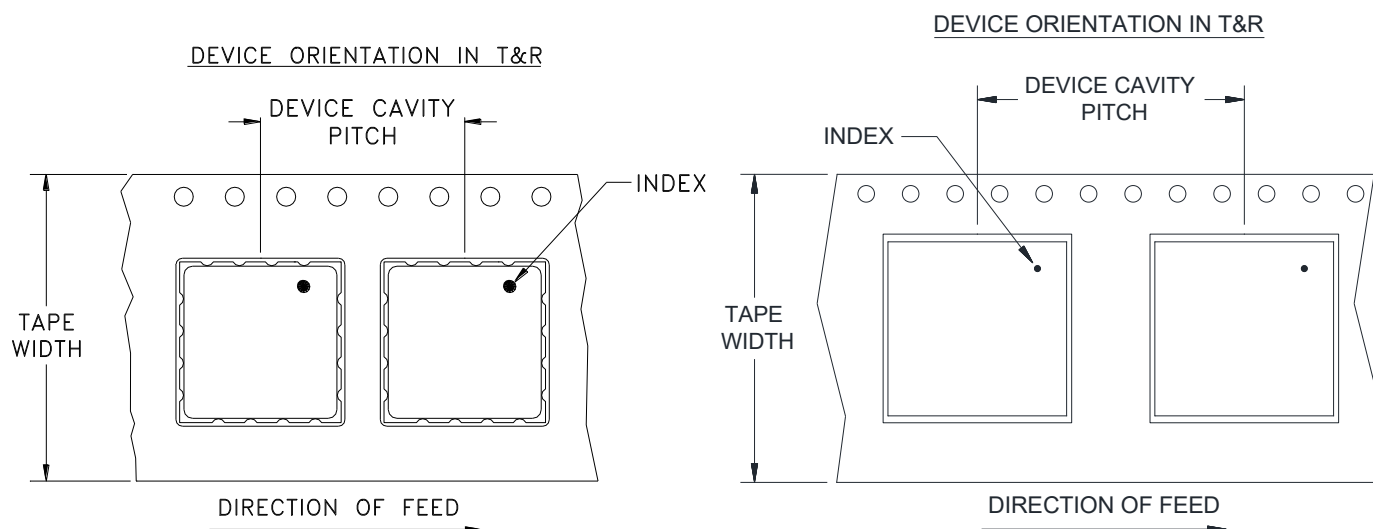
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F37



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
24	16	7	Small quantity standards (see note)	10
				20
				50
				100
		13	Standard	200
				500

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



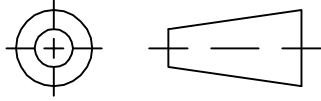
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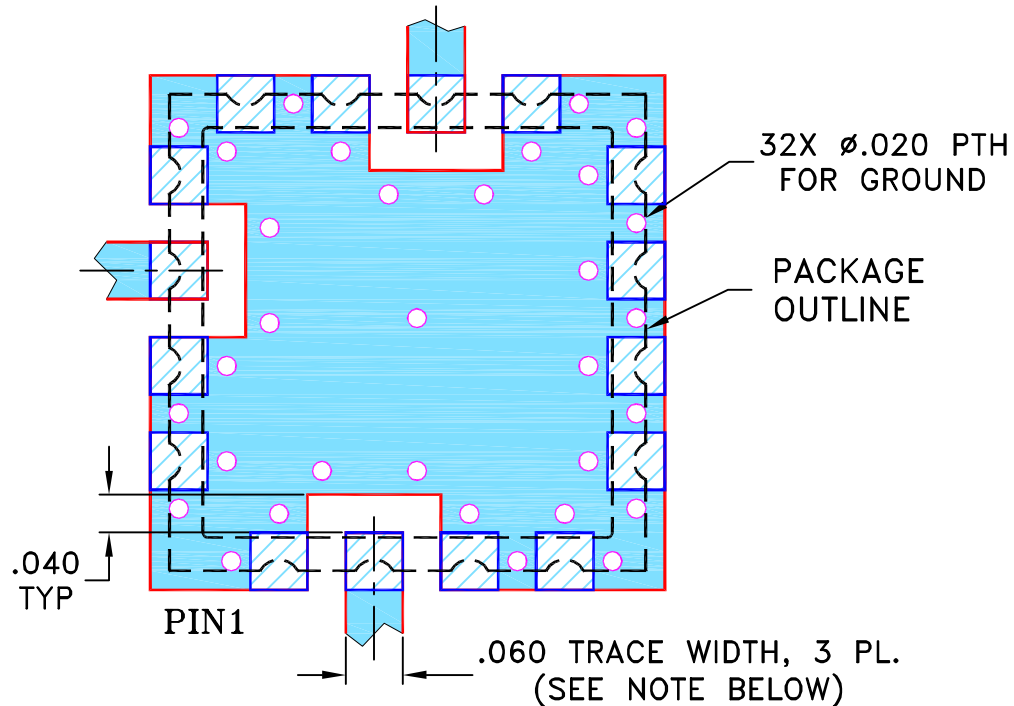
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
E	M105563	ADDED "rl" PIN CONNECTION	06/02/06	MMG	DJ
F	M105640	CORRECTED NOTE 2	06/08/06	MMG	MM
G	M124395	ADDED "RAMP"	09/09	EM	HH
G	R77589	ADDED "RAMP"	09/09	EM	HH

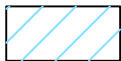
SUGGESTED MOUNTING CONFIGURATION FOR
CK605 CASE STYLE, "kg/rl/16AM01" PIN CONNECTION

NOTES:

- TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .030" $\pm$.002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE BOTTOM 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

AV

08/07/00

CHECKED

SK

08/08/00

APPROVED

DB

08/08/00

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



Mini-Circuits® 13 Neptune Avenue
Brooklyn NY 11235

PL,kg/rl/16AM01,CK605,ROS/LAVI/RAMP

SIZE
A

CODE IDENT
15542

DRAWING NO:
98-PL-012

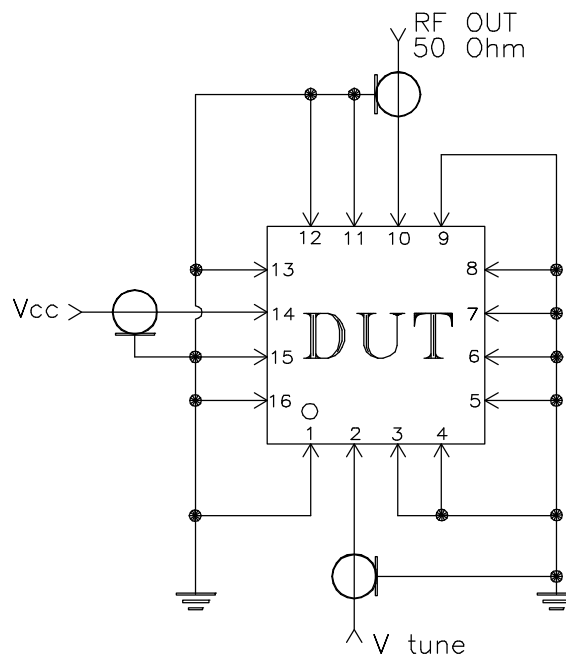
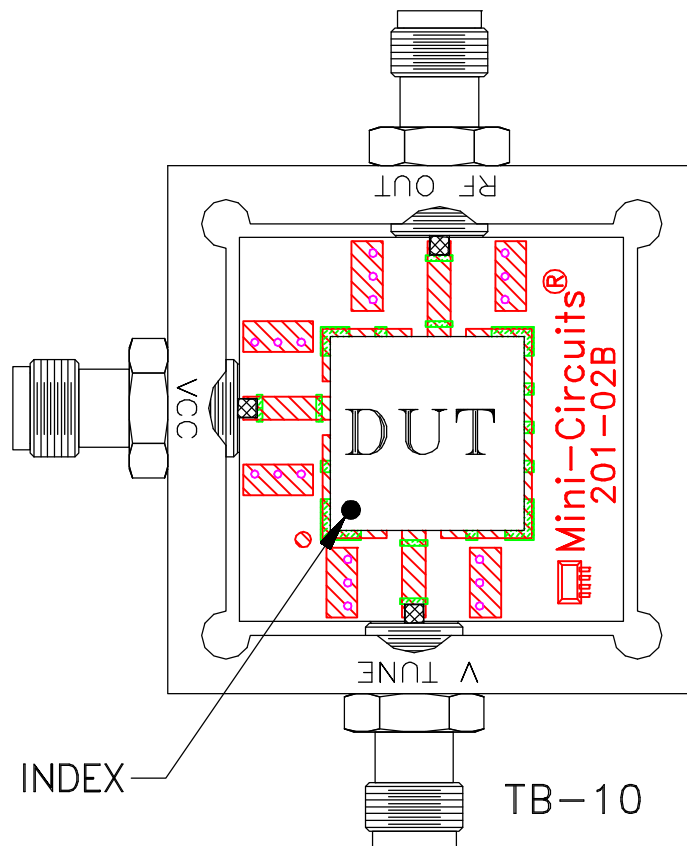
REV:
G

FILE: 98PL012

SCALE: 5:1

SHEET: 1 OF 1

Evaluation Board and Circuit



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.030 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	-40° to 85° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
HAST	130°C, 85% RH, 96 hours	JESD22-A110
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
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process, 245°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, 20-2000 Hz, 4 times in each of three axes (total 12)	MIL-STD-883, Method 2007.3, Condition A
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215