Surface Mount

Bandpass Filter

RBPF-485+

50Ω 435 to 535 MHz

Generic photo used for illustration purposes only

CASE STYLE: CK605

The Big Deal

- Better passband insertion loss and return loss
- High rejection
- Miniature shielded package

Product Overview

The RBPF-485+ is a 50Ω bandpass filter fabricated using SMT technology. This bandpass filter covers from 435-535 MHz. This filter is built with high Q capacitors, chip inductors and wire wound inductors for superior performance. In addition it has repeatable performance across production lots and consistent performance across temperature.

Key Features

Feature	Advantages
Low insertion loss	Can be used in high performance applications such as radio astronomy.
Good rejection	This enables the filter to attenuate spurious signals and reject harmonics for broad frequency band.
Small size, 0.500" x 0.500" x 0.180"	The small surface mount package enables the RBPF-485+ to be used in compact designs.

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50Ω 435 to 535 MHz

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CASE STYLE: CK605

Features

- Better passband insertion loss and return loss
- High rejection
- Miniature shielded package

Applications

- Military-aircraft
- Marine communication

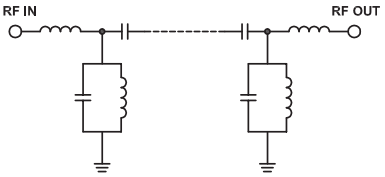
Electrical Specifications at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	—	—	485	—	MHz
	Insertion Loss	F1-F2	435-535	—	1.3	2.5	dB
	VSWR	F1-F2	435-535	—	1.3	1.67	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC-320	20	30	—	dB
	VSWR	DC-F3	DC-320	—	20	—	:1
Stop Band, Upper	Insertion Loss	F4-F5	700-3700	20	30	—	dB
	VSWR	F4-F5	700-3700	—	20	—	:1

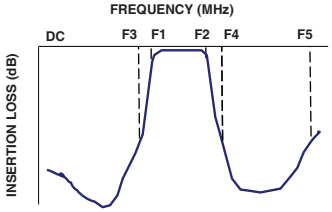
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	5W max.

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

Functional Schematic



Typical Frequency Response

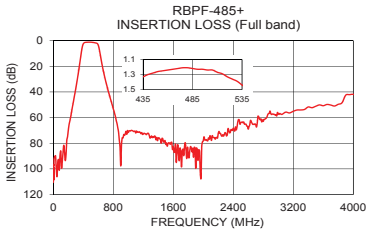


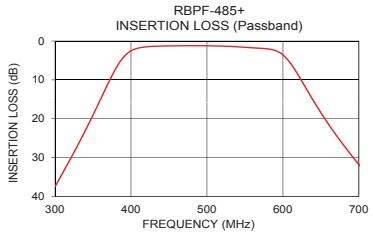
Typical Performance Data at 25°C

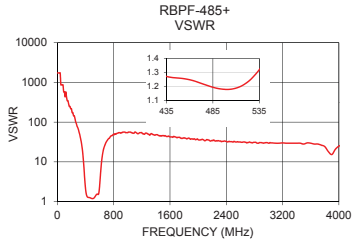
Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	110.48	1737.18	435	6.57
240	56.89	144.77	440	6.32
320	30.41	46.96	445	6.11
355	16.98	20.70	450	5.94
375	8.87	8.35	455	5.79
390	4.19	3.44	460	5.67
405	2.09	1.79	465	5.56
435	1.33	1.27	470	5.47
455	1.25	1.26	475	5.41
485	1.22	1.20	480	5.34
520	1.33	1.22	485	5.29
535	1.44	1.32	490	5.26
600	3.58	2.42	500	5.21
620	8.75	7.00	505	5.21
650	18.48	18.50	510	5.21
700	31.82	32.79	515	5.22
830	59.46	49.64	520	5.23
1330	74.85	51.10	525	5.25
2500	64.01	31.60	530	5.29
3700	50.23	28.03	535	5.32

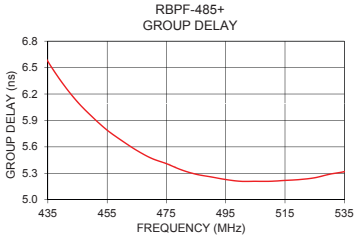
+RoHS Compliant

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









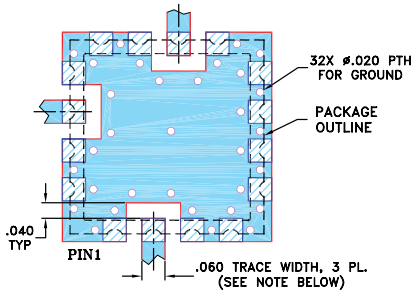
Notes

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

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)

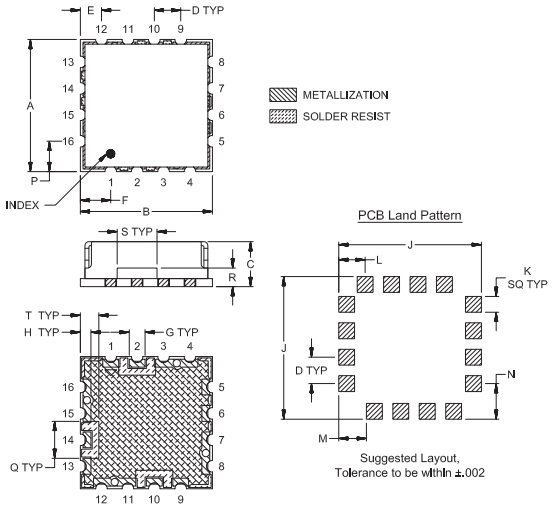


NOTES: 1. TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

Note: Please refer to case style drawing for details

Band Pass Filter RBPF-485+

Typical Performance Data

FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40℃	@+25˚C	@+85˚C	@-40℃	@+25˚C	@+85˚C	@-40℃	@+25˚C	@+85˚C
1	106.42	110.48	94.43	0.00	0.00	0.00	0.00	0.00	0.00
100	93.36	86.20	92.20	0.02	0.03	0.03	0.03	0.03	0.04
190	73.13	75.08	74.42	0.06	0.08	0.10	0.06	0.08	0.10
240	56.76	56.89	56.51	0.10	0.12	0.15	0.11	0.14	0.16
320	30.47	30.41	30.34	0.33	0.37	0.42	0.33	0.39	0.43
325	28.66	28.61	28.53	0.36	0.41	0.45	0.37	0.44	0.48
345	21.12	21.01	20.93	0.55	0.63	0.69	0.59	0.69	0.74
360	15.09	14.93	14.83	0.90	1.02	1.11	0.97	1.11	1.20
380	7.22	7.06	6.92	2.49	2.81	3.06	2.66	3.06	3.34
395	3.25	3.22	3.17	6.17	6.91	7.54	6.50	7.45	8.25
425	1.27	1.42	1.51	16.13	17.33	18.45	16.50	18.14	19.83
430	1.21	1.36	1.46	16.89	18.01	19.03	17.24	18.79	20.29
435	1.18	1.33	1.43	17.36	18.42	19.29	17.73	19.17	20.49
485	1.04	1.22	1.33	21.02	21.01	20.61	23.14	24.41	24.50
490	1.05	1.23	1.34	21.47	21.35	20.91	23.87	25.21	25.22
500	1.05	1.24	1.35	21.92	21.66	21.21	24.55	25.91	25.89
510	1.08	1.27	1.39	21.44	21.25	20.93	23.65	24.79	24.90
535	1.24	1.44	1.57	16.89	17.20	17.38	17.58	18.35	18.87
550	1.41	1.62	1.75	14.15	14.65	15.04	14.65	15.53	16.26
595	2.32	2.91	3.36	11.25	9.87	8.88	16.70	14.02	12.22
610	4.85	5.76	6.45	4.70	4.29	3.99	5.68	5.23	4.88
630	11.16	12.07	12.74	1.57	1.63	1.65	1.83	1.91	1.93
660	20.74	21.46	21.98	0.69	0.79	0.85	0.76	0.87	0.94
670	23.54	24.23	24.71	0.58	0.70	0.75	0.65	0.76	0.82
700	31.22	31.82	32.23	0.43	0.53	0.58	0.46	0.56	0.61
740	40.19	40.76	41.10	0.34	0.44	0.48	0.34	0.44	0.49
770	46.39	46.93	47.28	0.29	0.38	0.43	0.30	0.39	0.44
860	68.06	67.87	69.14	0.23	0.33	0.37	0.23	0.32	0.36
880	74.35	77.35	76.48	0.22	0.32	0.36	0.22	0.31	0.36
900	83.57	97.70	83.99	0.22	0.33	0.37	0.22	0.32	0.37
950	73.18	73.91	71.56	0.21	0.31	0.36	0.20	0.30	0.36
1070	69.88	70.88	70.64	0.21	0.33	0.37	0.21	0.32	0.38
1400	77.52	75.93	78.26	0.22	0.36	0.43	0.23	0.36	0.42
1440	77.92	80.03	81.11	0.24	0.38	0.44	0.25	0.38	0.45
1580	81.71	79.27	81.38	0.24	0.39	0.46	0.25	0.40	0.46
1640	84.81	94.92	87.31	0.26	0.42	0.49	0.26	0.42	0.49
1680	82.17	93.60	98.38	0.26	0.41	0.49	0.27	0.43	0.50
1750	95.91	82.68	99.74	0.27	0.44	0.52	0.28	0.43	0.51
1780	84.51	91.96	91.83	0.27	0.44	0.51	0.28	0.45	0.52
1820	88.44	85.92	87.26	0.28	0.44	0.52	0.28	0.43	0.51
1900	87.89	99.65	81.46	0.29	0.46	0.54	0.29	0.45	0.53
1910	82.73	83.87	83.52	0.30	0.46	0.54	0.29	0.45	0.53
1970	81.63	107.25	81.87	0.31	0.48	0.56	0.29	0.46	0.54
2030	87.01	77.63	80.91	0.31	0.49	0.57	0.31	0.48	0.56
2210	73.28	70.82	72.77	0.33	0.51	0.60	0.32	0.49	0.58
2220	71.44	72.33	69.68	0.32	0.49	0.59	0.33	0.49	0.59
2250	72.13	74.54	73.00	0.35	0.52	0.62	0.34	0.51	0.60
2290	74.34	71.72	74.13	0.33	0.51	0.60	0.34	0.51	0.59
2310	73.10	74.36	71.46	0.34	0.52	0.61	0.34	0.51	0.60
2430	66.93	67.27	71.72	0.36	0.54	0.63	0.34	0.51	0.60
2470	62.15	61.55	63.03	0.36	0.54	0.64	0.37	0.54	0.64
2610	67.56	67.06	67.31	0.38	0.56	0.66	0.36	0.52	0.63
2650	64.34	64.35	64.10	0.37	0.55	0.65	0.37	0.54	0.65
2700	65.84	65.66	65.13	0.38	0.57	0.67	0.38	0.56	0.65
2740	60.65	59.49	59.50	0.36	0.56	0.65	0.36	0.54	0.65
2750	61.61	61.12	60.55	0.38	0.57	0.66	0.36	0.54	0.63
2870	57.30	56.87	56.68	0.38	0.57	0.69	0.39	0.56	0.67
2920	58.26	57.32	57.45	0.39	0.58	0.68	0.36	0.54	0.65
3150	57.31	56.41	56.16	0.38	0.59	0.69	0.35	0.54	0.65
3700	50.88	50.23	49.62	0.39	0.62	0.76	0.37	0.57	0.69

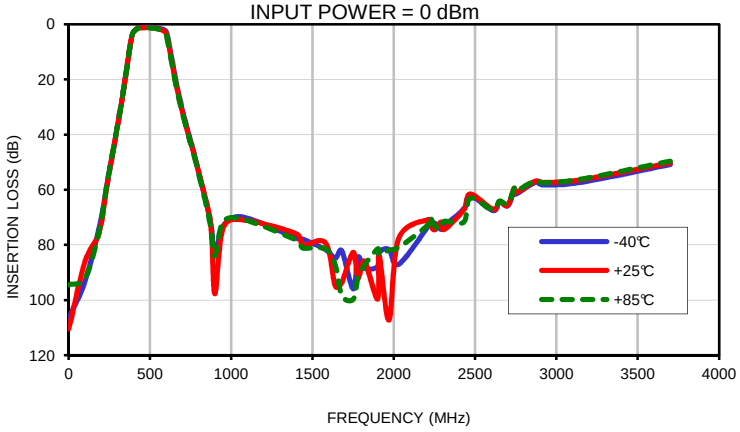
Typical Performance Data

FREQ.	GROUP DELAY		
	(nsec)		
(MHz)	@-40℃	@+25˚C	@+85˚C
435	6.62	6.57	6.53
440	6.36	6.32	6.29
445	6.15	6.11	6.09
450	5.97	5.94	5.92
455	5.81	5.79	5.78
460	5.68	5.67	5.65
465	5.58	5.56	5.55
470	5.48	5.47	5.47
475	5.41	5.41	5.40
480	5.35	5.34	5.34
485	5.30	5.29	5.30
490	5.26	5.26	5.26
495	5.23	5.23	5.24
500	5.21	5.21	5.23
505	5.21	5.21	5.22
510	5.20	5.21	5.22
515	5.21	5.22	5.23
520	5.22	5.23	5.25
525	5.23	5.25	5.28
530	5.27	5.29	5.31
535	5.30	5.32	5.36

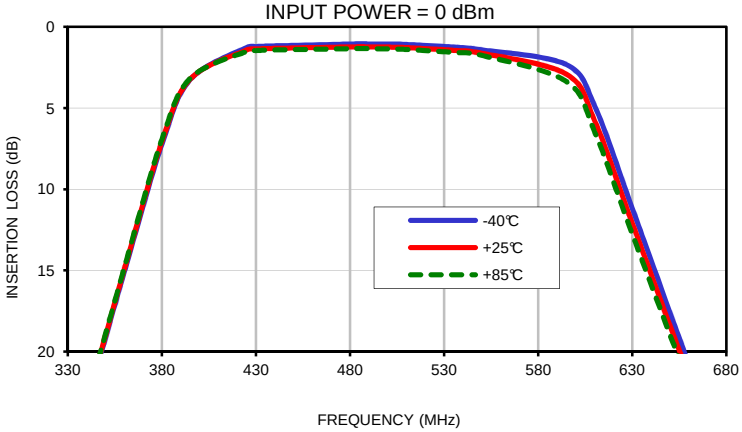
Band Pass Filter RBPF-485+

Typical Performance Curves

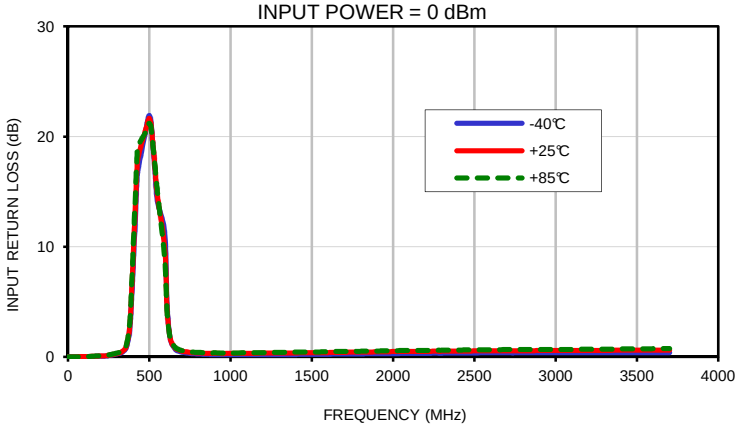
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



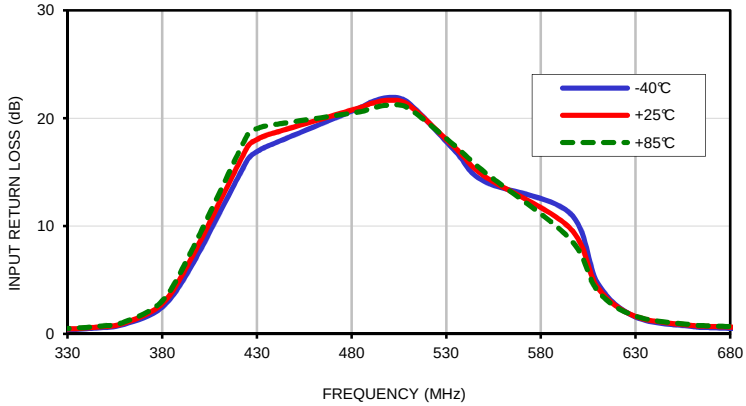
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



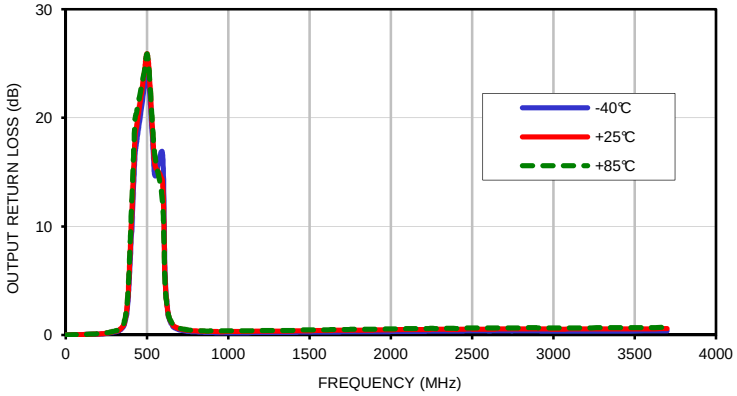
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



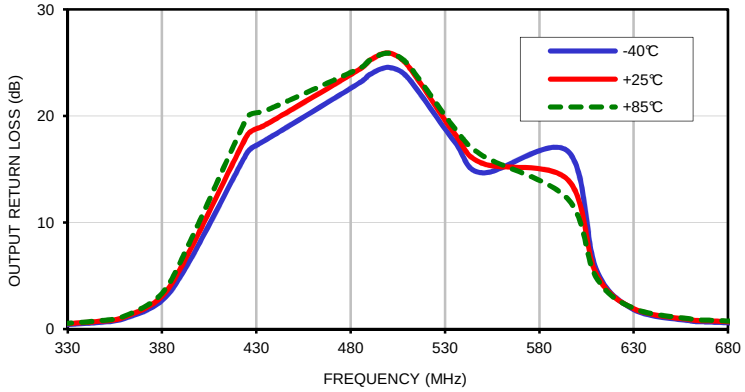
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



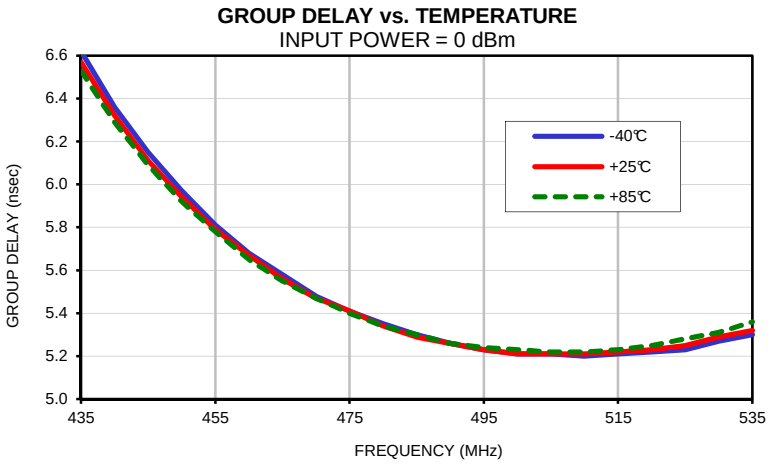
OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



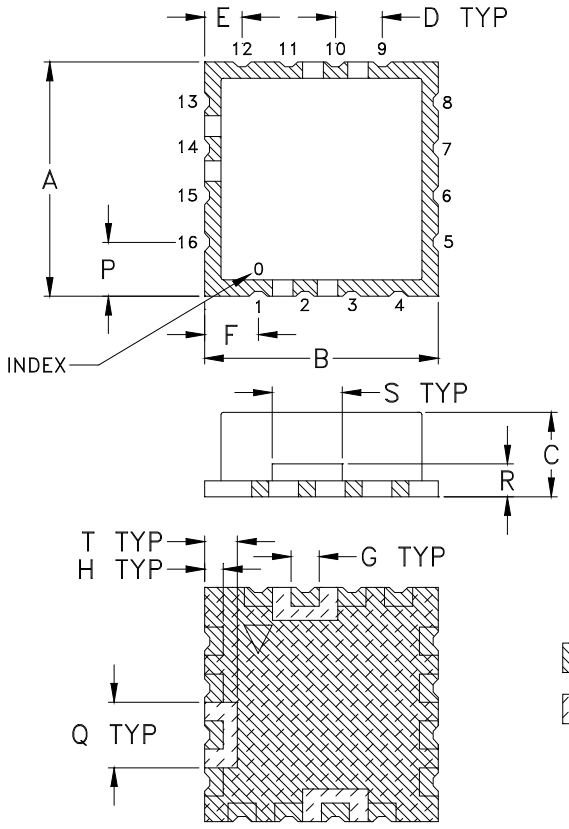
Typical Performance Curves



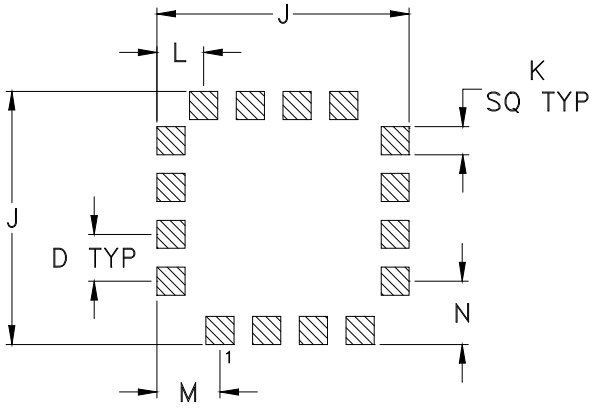
Case Style CK

CK605

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.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)

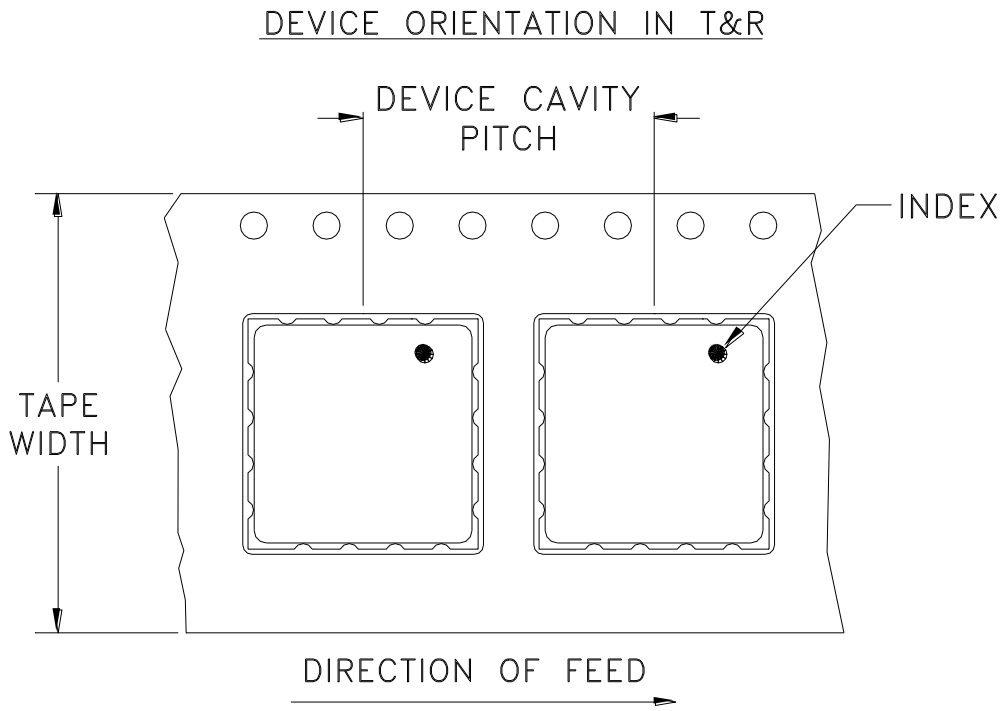
CASE #	L	M	N	P	Q	R	S	T	WT. GRAM	
CK605	.100 (2.54)	.135 (3.43)	.135 (3.43)	.115 (2.92)	.140 (3.56)	.070 (1.78)	.150 (3.81)	.070 (1.78)	1.2	+0.5 -0.0

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

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. 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.

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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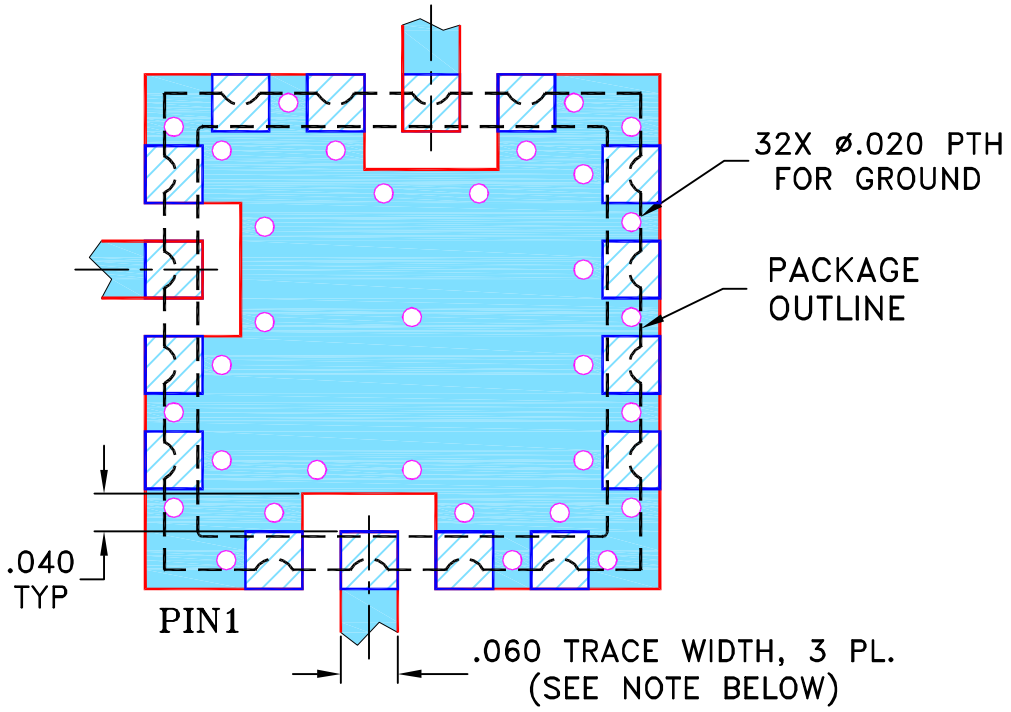
THIRD ANGLE PROJECTION

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:

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 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	DRAWN	AV	08/07/00
TOLERANCES ON:	CHECKED	SK	08/08/00
2 PL DECIMALS ±	APPROVED	DB	08/08/00
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

Mini-Circuits®

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

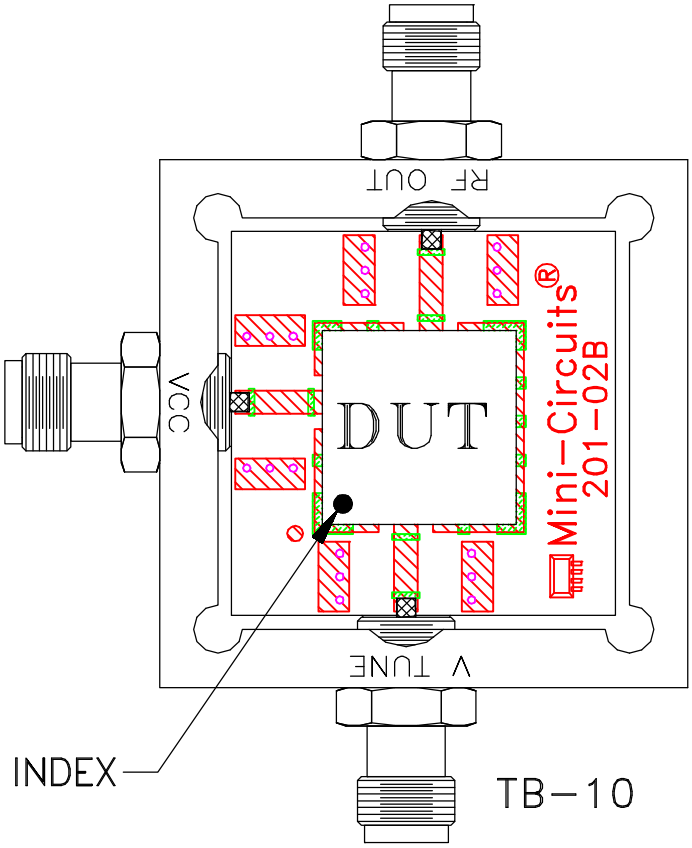
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

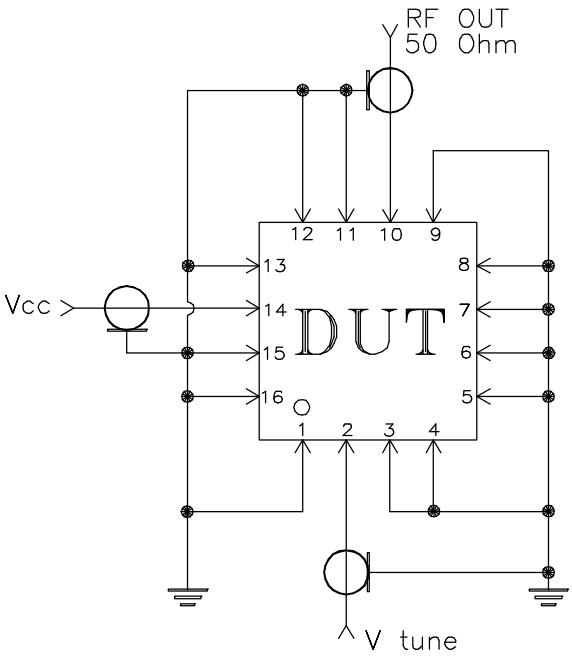
PL,kg/rl/16AM01,CK605,ROS/LAVI/RAMP

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-012	G

FILE:	SCALE:	SHEET:
98PL012	5:1	1 OF 1

Evaluation Board and Circuit





Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.

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Environmental Specifications ENV44

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