

# Surface Mount Bandpass Filter

## RBPF-246+

50Ω      236 to 265 MHz



Generic photo used for illustration purposes only  
CASE STYLE: CK605

### The Big Deal

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

### Product Overview

The RBPF-246+ is a 50Ω bandpass filter fabricated using SMT technology. This bandpass filter covers from 236 to 265 MHz. The 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-246+ 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](http://www.minicircuits.com/MCLStore/terms.jsp)



# Surface Mount Bandpass Filter

## RBPF-246+

50Ω 236 to 256 MHz



Generic photo used for illustration purposes only  
CASE STYLE: CK605

### Features

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

### Applications

- Military-aircraft
- Marine communication

### Electrical Specifications at 25°C

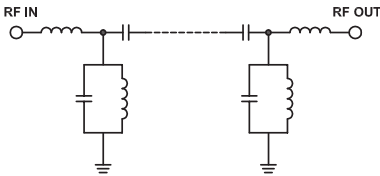
Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit	
Pass Band	Center Frequency	—	—	246	—	MHz	
	Insertion Loss	F1-F2	236-256	—	2.7	4	dB
	VSWR	F1-F2	236-256	—	1.3	1.67	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC-180	20	31	—	dB
	VSWR	DC-F3	DC-180	—	20	—	:1
Stop Band, Upper	Insertion Loss	F4-F5	315-3400	20	33	—	dB
	VSWR	F4-F5	315-3400	—	13	—	:1

### Maximum Ratings

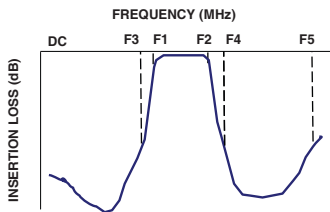
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	0.15 W

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

### Functional Schematic



### Typical Frequency Response

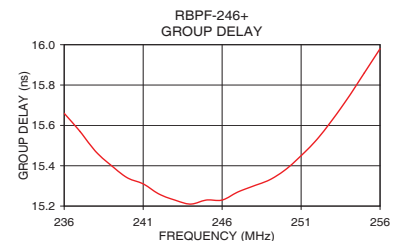
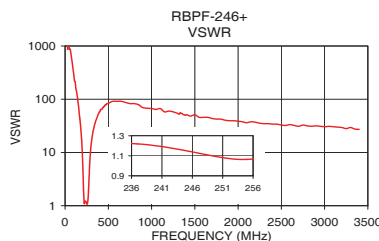
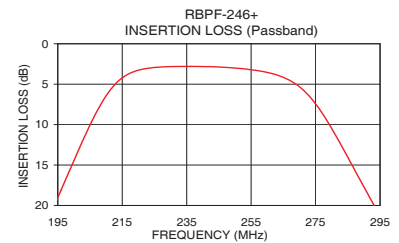
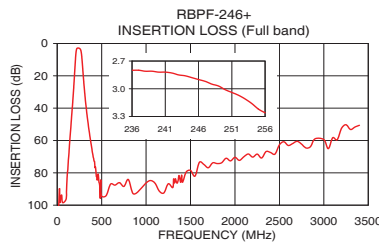


### Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	105.36	1737.18	236	15.66
150	53.97	86.86	237	15.57
180	31.90	29.96	238	15.47
182	30.29	27.16	239	15.40
193	20.83	15.39	240	15.34
198	16.28	10.62	241	15.31
207	8.47	4.26	242	15.26
228	2.85	1.18	243	15.23
236	2.80	1.22	244	15.21
246	2.90	1.14	245	15.23
256	3.26	1.07	246	15.23
272	6.04	2.11	247	15.27
288	16.26	7.73	248	15.30
294	20.59	10.56	249	15.33
310	30.88	18.11	250	15.38
315	33.72	20.49	251	15.45
390	64.98	54.29	252	15.53
1500	78.50	51.10	253	15.63
2500	62.67	32.79	254	15.74
3400	50.60	27.16	256	15.98

### +RoHS Compliant

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



### Notes

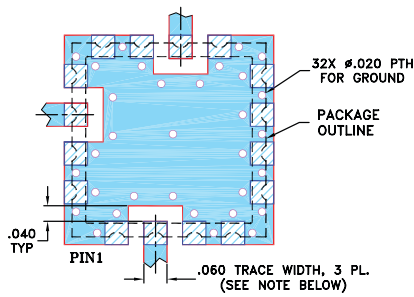
- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)



## Pad Connections

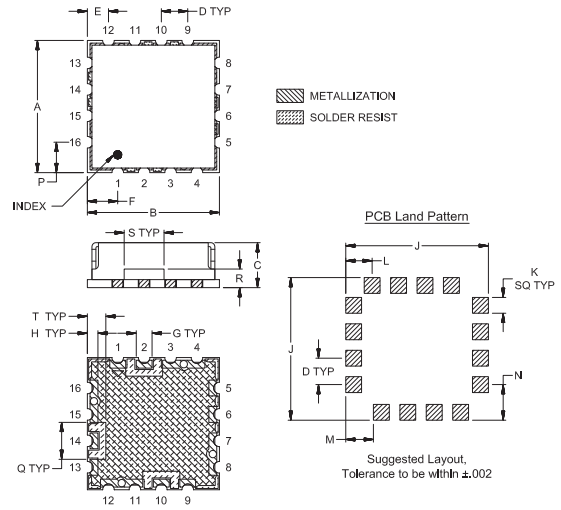
INPUT	2
OUTPUT	10
NOT CONNECTED	14
GROUND	1,3,4,5,6,7,8,9,11,12,13,15,16

**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

### 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](http://www.minicircuits.com/MCLStore/terms.jsp)

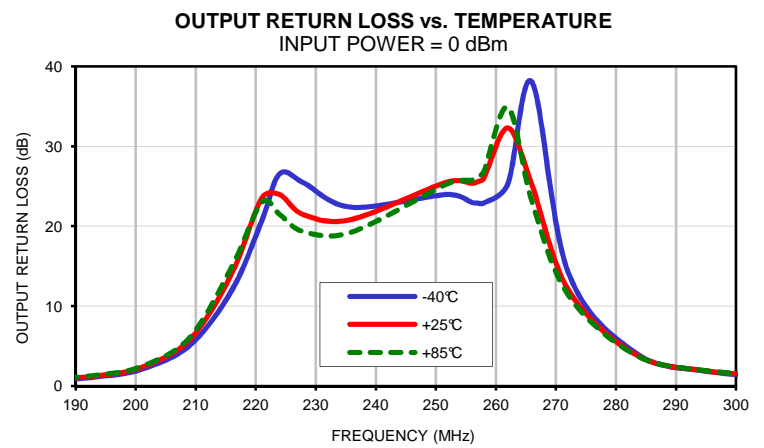
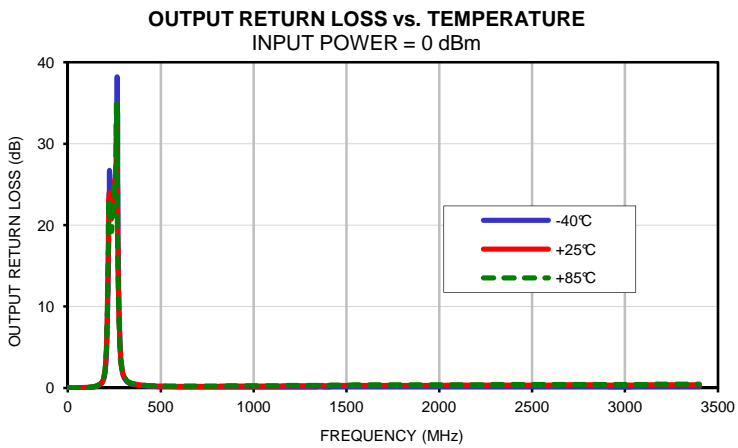
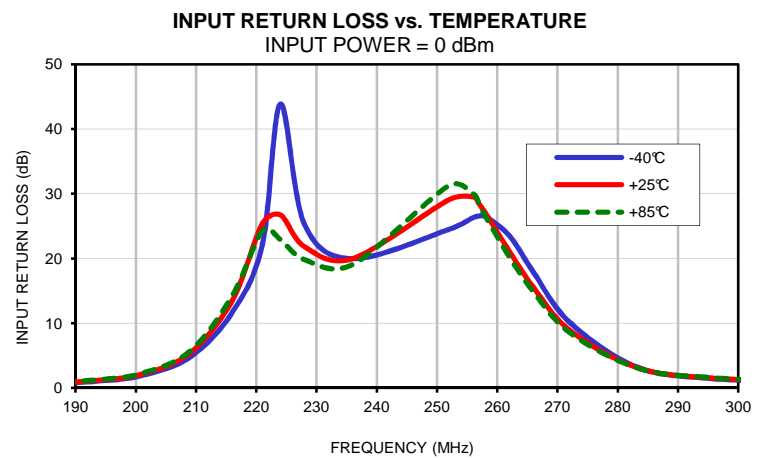
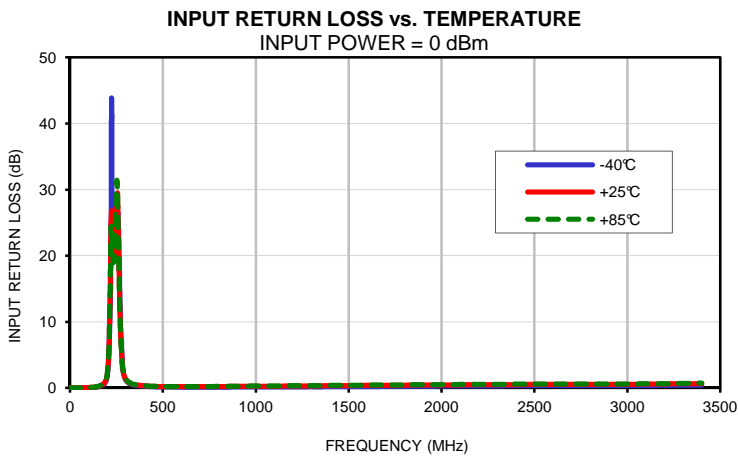
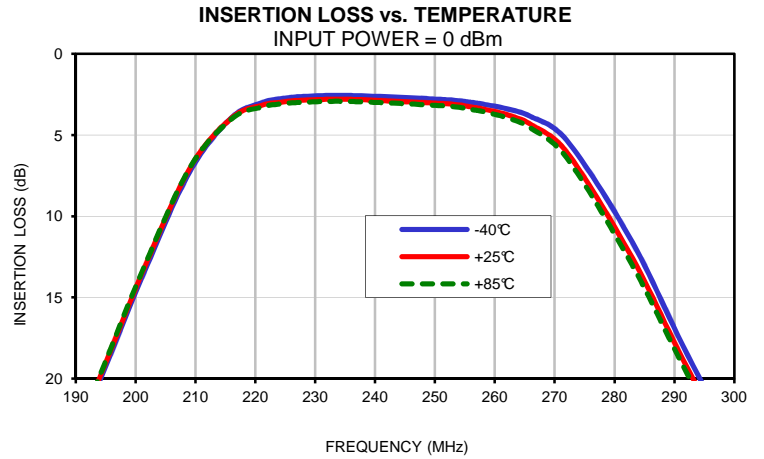
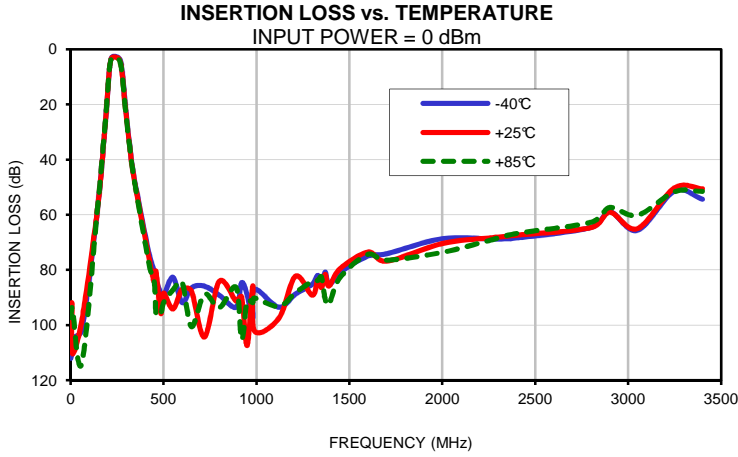
*Typical Performance Data*

FREQ.  (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	112.04	105.36	97.28	0.00	0.00	0.00	0.01	0.01	0.00
7	110.09	91.91	93.62	0.00	0.00	0.01	0.00	0.00	0.01
10	104.58	110.39	93.61	0.01	0.01	0.02	0.00	0.01	0.01
60	101.93	98.43	113.91	0.01	0.02	0.02	0.01	0.02	0.02
145	57.93	57.64	57.49	0.13	0.17	0.19	0.13	0.17	0.18
180	32.10	31.90	31.74	0.51	0.58	0.63	0.52	0.59	0.65
182	30.47	30.29	30.12	0.55	0.64	0.68	0.57	0.67	0.71
187	26.28	26.09	25.94	0.71	0.80	0.87	0.76	0.86	0.92
194	20.13	19.92	19.81	1.08	1.21	1.29	1.17	1.31	1.38
201	13.80	13.56	13.46	1.92	2.14	2.26	2.09	2.33	2.44
209	7.27	7.06	7.03	4.76	5.39	5.67	5.07	5.78	6.06
216	3.93	3.95	4.01	11.67	13.49	14.23	11.94	14.05	14.89
221	3.02	3.17	3.28	22.11	25.38	24.28	20.67	23.52	22.97
224	2.77	2.98	3.09	43.86	26.75	22.93	26.56	23.95	21.46
228	2.62	2.85	2.98	25.28	21.84	19.83	25.42	21.42	19.30
236	2.56	2.80	2.93	19.97	19.99	19.08	22.36	20.85	19.26
252	2.82	3.07	3.21	24.51	29.08	31.29	23.97	25.56	25.32
256	2.98	3.26	3.42	26.33	29.50	30.01	22.97	25.36	25.76
257	3.03	3.32	3.48	26.57	28.42	28.30	22.88	25.59	26.17
258	3.09	3.39	3.55	26.49	27.07	26.56	22.90	26.00	26.82
262	3.38	3.74	3.93	23.54	21.14	20.28	25.32	32.29	34.89
266	3.86	4.34	4.57	17.89	15.56	14.86	38.03	25.16	23.10
272	5.31	6.04	6.40	10.15	8.94	8.56	14.32	12.11	11.45
283	11.62	12.59	13.04	3.30	3.20	3.17	4.27	4.05	3.98
295	20.51	21.29	21.65	1.50	1.58	1.62	1.84	1.89	1.91
315	33.17	33.72	33.97	0.77	0.86	0.90	0.87	0.95	0.99
345	47.83	48.36	48.51	0.43	0.50	0.53	0.45	0.53	0.56
425	75.06	76.81	78.96	0.21	0.27	0.28	0.22	0.27	0.29
450	80.18	84.50	84.19	0.18	0.24	0.25	0.19	0.25	0.27
460	83.71	80.71	96.13	0.17	0.23	0.24	0.18	0.24	0.25
485	88.45	95.72	96.08	0.14	0.21	0.22	0.16	0.22	0.24
500	89.63	88.41	91.94	0.14	0.21	0.22	0.15	0.22	0.23
550	82.65	94.16	87.29	0.13	0.19	0.20	0.13	0.20	0.21
600	91.82	87.02	84.60	0.12	0.19	0.21	0.12	0.19	0.21
650	86.50	87.61	100.57	0.12	0.19	0.21	0.12	0.20	0.21
720	85.89	104.33	88.78	0.11	0.20	0.22	0.11	0.19	0.21
800	89.13	84.11	93.68	0.11	0.21	0.23	0.10	0.20	0.22
890	93.55	91.25	86.32	0.14	0.24	0.27	0.12	0.23	0.26
920	84.66	89.82	105.22	0.14	0.24	0.27	0.10	0.22	0.24
950	89.07	107.39	91.13	0.13	0.24	0.27	0.12	0.23	0.26
980	97.45	85.80	91.86	0.15	0.26	0.29	0.12	0.23	0.26
990	87.00	102.23	90.18	0.15	0.27	0.30	0.11	0.23	0.26
1120	93.52	97.57	93.23	0.15	0.27	0.31	0.11	0.24	0.28
1210	88.74	82.28	88.29	0.16	0.30	0.34	0.12	0.26	0.30
1300	85.18	89.16	84.15	0.18	0.32	0.36	0.12	0.27	0.31
1330	81.98	83.60	83.79	0.16	0.31	0.36	0.10	0.25	0.30
1350	85.43	86.38	82.60	0.17	0.32	0.36	0.13	0.28	0.32
1370	80.78	81.62	90.64	0.19	0.34	0.38	0.13	0.29	0.33
1390	85.40	85.82	92.51	0.20	0.35	0.39	0.11	0.28	0.31
1450	80.90	79.54	82.71	0.21	0.36	0.40	0.14	0.30	0.35
1600	74.96	73.49	74.34	0.22	0.38	0.42	0.14	0.31	0.37
1700	74.15	76.84	76.47	0.23	0.40	0.45	0.13	0.31	0.37
2000	68.66	70.42	73.63	0.28	0.45	0.50	0.13	0.32	0.38
2250	68.75	68.42	69.38	0.31	0.49	0.55	0.13	0.34	0.40
2400	68.40	67.41	66.78	0.33	0.51	0.57	0.15	0.35	0.43
2800	64.59	64.65	62.72	0.35	0.55	0.61	0.16	0.37	0.44
2900	58.80	59.01	57.36	0.36	0.55	0.61	0.13	0.35	0.43
3050	65.63	65.04	60.20	0.35	0.56	0.61	0.13	0.36	0.43
3250	51.37	50.25	51.67	0.39	0.62	0.67	0.16	0.40	0.47
3400	54.34	50.60	51.51	0.39	0.64	0.75	0.16	0.39	0.46

*Typical Performance Data*

FREQ.  (MHz)	GROUP DELAY		
	(nsec)		
	@-40°C	@+25°C	@+85°C
236	15.73	15.66	15.61
237	15.61	15.57	15.52
238	15.50	15.47	15.44
239	15.42	15.40	15.38
240	15.33	15.34	15.33
241	15.29	15.31	15.29
242	15.23	15.26	15.25
243	15.19	15.23	15.24
244	15.17	15.21	15.24
245	15.18	15.23	15.26
246	15.17	15.23	15.27
247	15.19	15.27	15.30
248	15.21	15.30	15.34
249	15.22	15.33	15.38
250	15.26	15.38	15.43
251	15.32	15.45	15.52
252	15.36	15.53	15.59
253	15.47	15.63	15.70
254	15.57	15.74	15.81
255	15.68	15.86	15.94
256	15.79	15.98	16.08

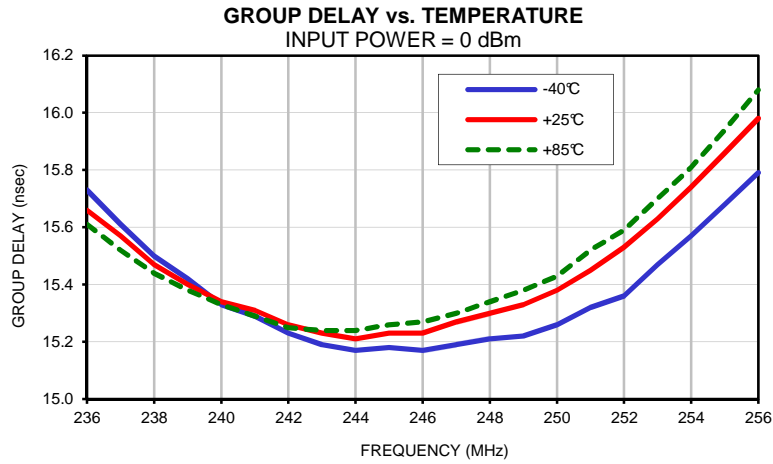
## Typical Performance Curves



# Band Pass Filter

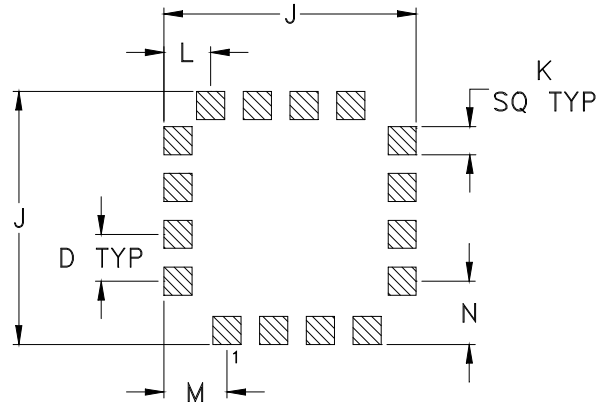
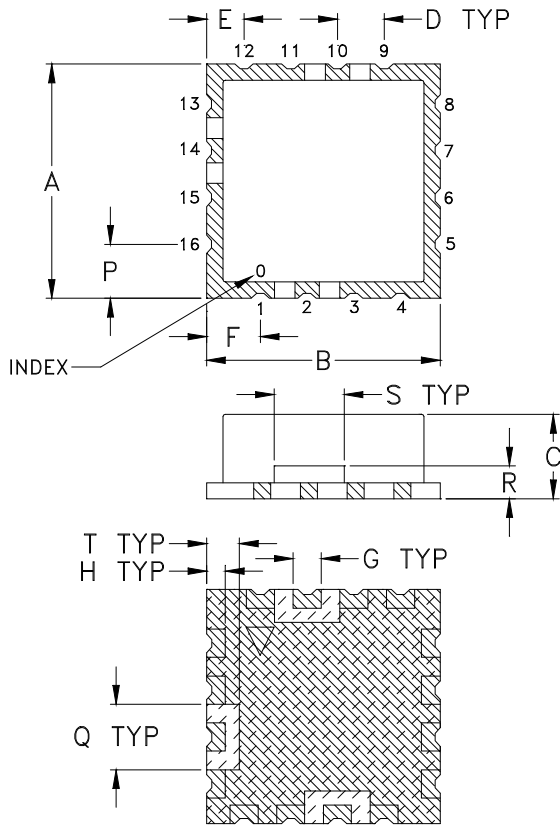
# RBPF-246+

## Typical Performance Curves



## Outline Dimensions

## 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  $\mu$  inch (.08-.13 microns) Gold over 120-240  $\mu$  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

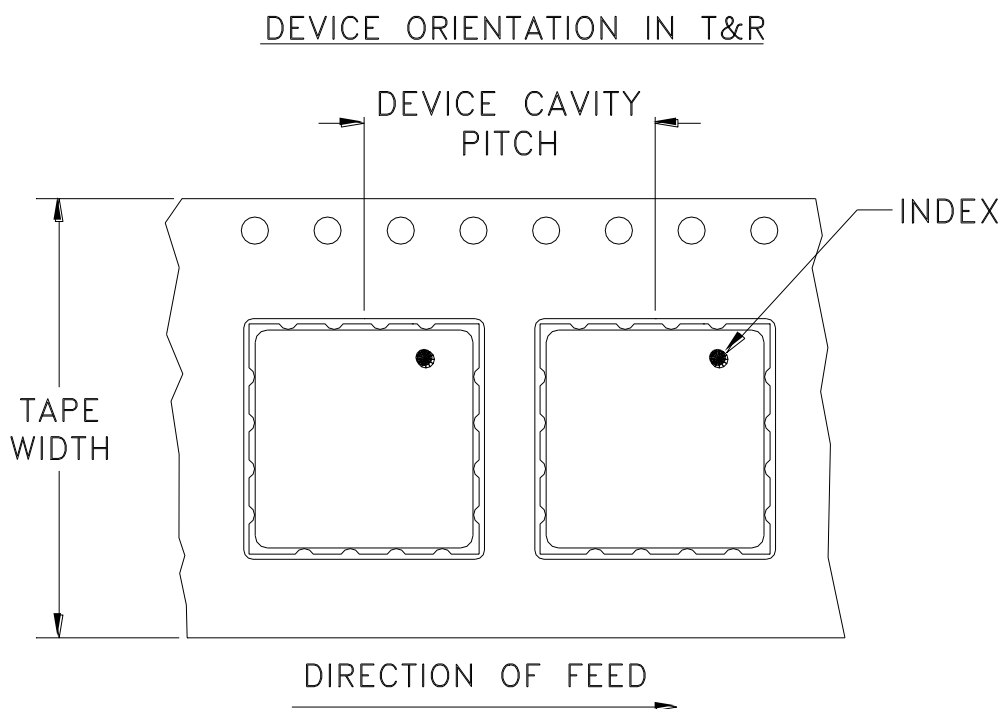


The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

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](http://www.minicircuits.com/pages/pdfs/tape.pdf)



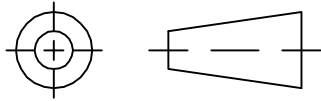
INTERNET <http://www.minicircuits.com>

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

Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified

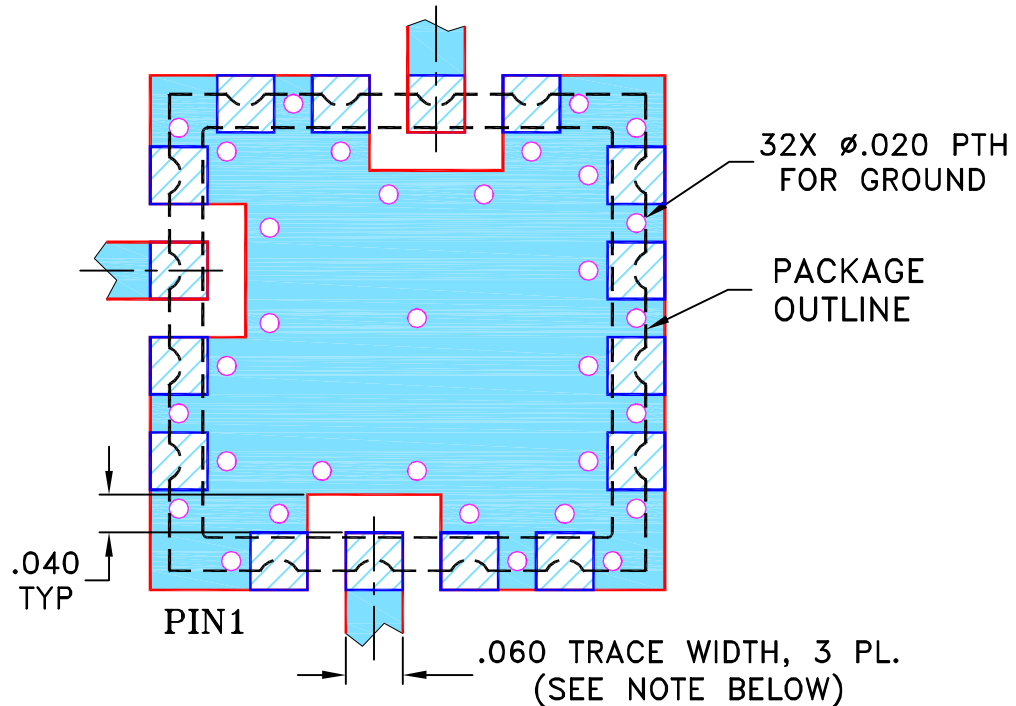
THIRD ANGLE PROJECTION



REVISIONS

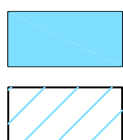
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
E	M105563	ADDED "r1" PIN CONNECTION	06/02/06	MMG	DJ
F	M105640	CORRECTED NOTE 2	06/08/06	MMG	MM
G	M124395	ADDED "RAMP"	09/09	EM	HH
G	R77589	ADDED "RAMP"	09/09	EM	HH

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)

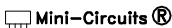
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DIMENSIONS ARE IN INCHES	AV	08/07/00
TOLERANCES ON:	SK	08/08/00
2 PL DECIMALS ±	DB	08/08/00
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		

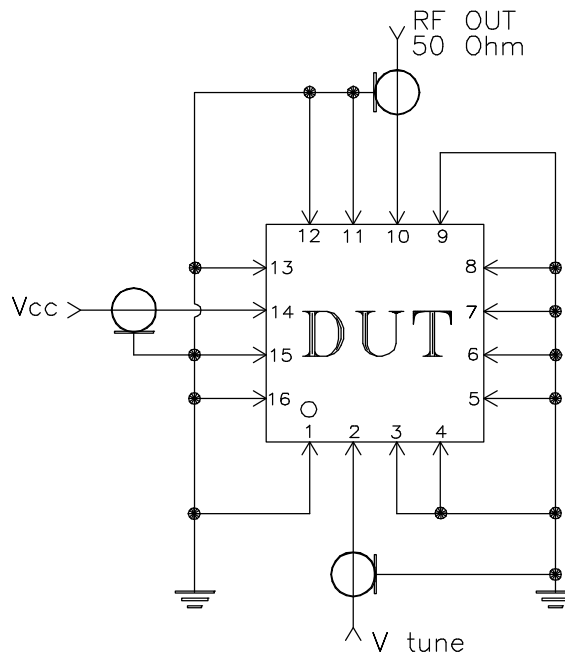
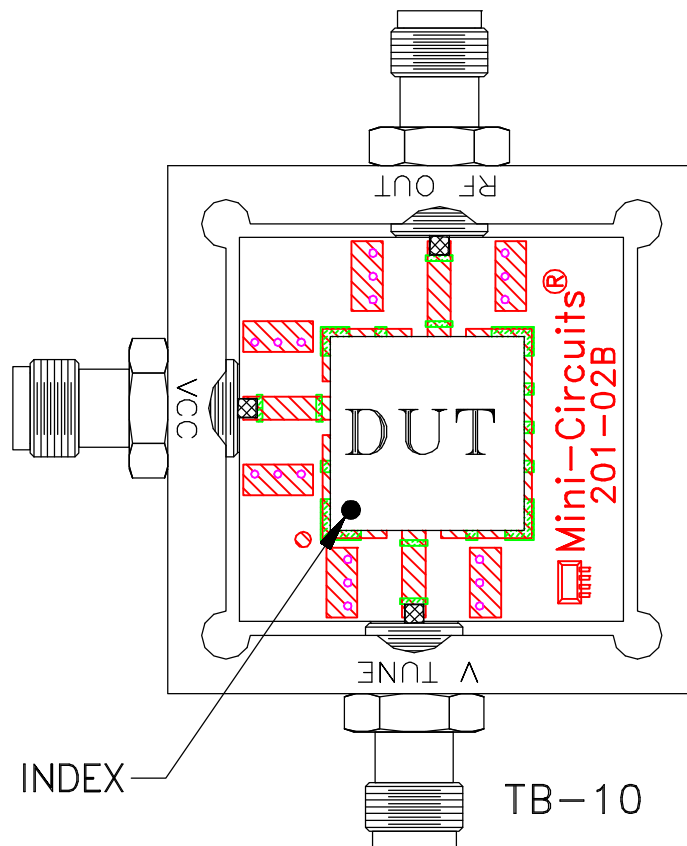
 **Mini-Circuits®** 13 Neptune Avenue  
Brooklyn NY 11235

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	

 Mini-Circuits®  
THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS. EXCEPT FOR USE EXPRESSLY GRANTED, IN WRITING, TO ITS VENDORS, VENDEE AND THE UNITED STATES GOVERNMENT, MINI-CIRCUITS RESERVES ALL PROPRIETARY DESIGN, USE, MANUFACTURING AND REPRODUCTION RIGHTS THERETO. THESE CONTENTS SHALL NOT BE USED, DUPLICATED OR DISCLOSED TO ANY OUTSIDE PARTY, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF MINI-CIRCUITS.


# 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