

Surface Mount Band Stop Filter

BSF-C4768+

50Ω 47 to 68 MHz

The Big Deal

- High rejection, 46 dB typical
- Stopband (47 to 68 MHz)
- Miniature shielded package



CASE STYLE: HU1186

Product Overview

The BSF-C4768+ is stopband filter fabricated using SMT Technology. Covering 47 to 68 MHz stopband, this units offer good rejection. This unit uses a miniature high Q capacitors and wire welded inductors for high reliability. It has repeatable performance across production lots and consistent performance across temperature.

Key Features

Feature	Advantages
High rejection, 46 dB typical	BSF-C4768+ enables the filter to attenuate spurious signals and reject harmonics for broadband of frequencies.
Shielded package	Shielded package (Size of .087" x 0.80" x 0.25") reduced interface with and from the surrounding components.
Application	Can be used in broadcast and FM system

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



Surface Mount Band Stop Filter

50Ω 47 to 68 MHz

BSF-C4768+



CASE STYLE: HU1186

Features

- High rejection, 46 dB typical
- Aqueous washable
- Miniature shielded package

Applications

- FM radio
- Broadcast system
- Lab use

Electrical Specifications at 25°C

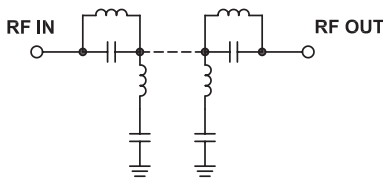
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band, Lower	Insertion Loss	DC-F1	DC - 32	-	0.4	1.5	dB
	VSWR	DC-F1	DC - 32	-	1.3	1.7	:1
Stop Band	Rejection	F4-F5	47 - 68	30	46	-	dB
	VSWR	F4-F5	47 - 68	-	9	-	:1
Pass Band, Upper	Insertion Loss	F2-F3	95-1200	-	0.6	1.5	dB
	VSWR	F2-F3	95-1200	-	1.3	1.7	:1

Maximum Ratings

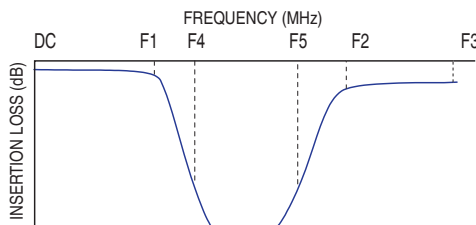
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	250 mW max.

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

Functional Schematic



Typical Frequency Response

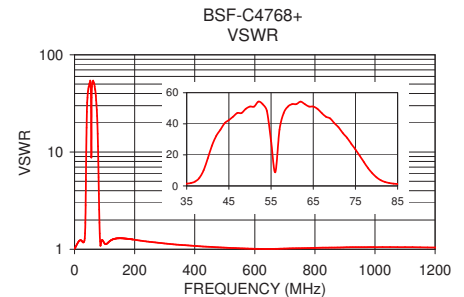
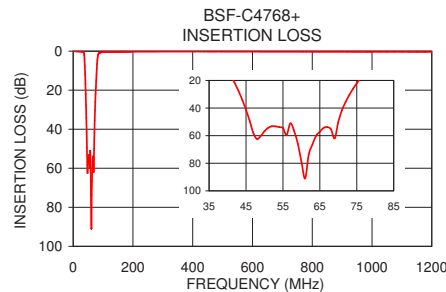


Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
1	0.03	1.02
15	0.12	1.21
32	0.33	1.20
36	1.08	1.87
38	4.22	5.17
39	7.62	10.02
40	11.96	17.75
43	27.82	36.20
47	58.12	46.96
56	59.54	8.81
68	55.41	44.55
71	41.57	37.77
75	22.06	23.49
78	11.92	11.46
80	6.59	5.52
81	4.59	3.71
95	0.58	1.22
120	0.34	1.23
600	0.23	1.01
1200	0.42	1.04

+RoHS Compliant

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



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REV. A
M160153
BSF-C4768+
EDU1280
URJ/NY
161230
Page 2 of 3

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

NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030"±.003". 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 SOLDERMASK

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

A	B	C	D	E	F	G	H
.870	.800	.25	.100	.097	--	.060	.040
22.10	20.32	6.35	2.54	2.46	--	1.52	1.02
J	K	L	M	N	P		wt
.105	.910	--	.060	.060	--		grams
2.67	23.11	--	1.52	1.52	--		2.85

Notes

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B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' applicable established test performance criteria and measurement instructions.

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Band Stop Filter

BSF-C4768+

Typical Performance Data

FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
(MHz)	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
0.5	0.02	0.02	0.03	45.25	44.75	44.65	45.56	45.00	44.81
10.0	0.06	0.07	0.08	21.94	21.76	21.64	21.95	21.78	21.68
15.0	0.11	0.12	0.13	19.51	19.38	19.30	19.51	19.39	19.32
20.0	0.13	0.14	0.15	19.29	19.22	19.20	19.31	19.24	19.22
25.0	0.13	0.14	0.16	23.65	23.81	23.95	23.68	23.87	24.01
26.0	0.13	0.15	0.17	26.23	26.55	26.81	26.25	26.63	26.90
27.0	0.14	0.16	0.18	30.76	31.52	32.15	30.88	31.73	32.40
28.0	0.16	0.17	0.20	44.62	51.60	70.39	45.32	53.79	66.95
29.0	0.18	0.20	0.22	33.83	32.43	31.52	33.77	32.23	31.30
30.0	0.20	0.23	0.26	26.43	25.70	25.23	26.35	25.57	25.07
31.0	0.25	0.28	0.31	22.49	22.00	21.67	22.41	21.86	21.51
32.0	0.31	0.34	0.38	20.21	19.82	19.61	20.06	19.63	19.38
35.0	0.53	0.59	0.67	20.25	20.05	20.00	18.36	17.99	17.62
40.0	15.63	16.10	16.63	0.74	0.78	0.83	0.64	0.67	0.70
41.0	21.79	22.29	22.85	0.52	0.56	0.61	0.44	0.48	0.52
45.0	53.40	53.92	54.71	0.31	0.34	0.38	0.29	0.31	0.34
46.0	58.55	58.83	58.57	0.30	0.33	0.36	0.27	0.29	0.32
47.0	56.51	56.06	55.73	0.27	0.30	0.33	0.26	0.28	0.31
48.0	52.67	52.42	52.22	0.26	0.29	0.32	0.24	0.27	0.29
50.0	48.87	48.75	48.65	0.25	0.27	0.30	0.23	0.25	0.28
51.0	48.43	48.51	48.43	0.24	0.27	0.30	0.23	0.25	0.27
52.0	48.94	48.98	48.94	0.23	0.25	0.29	0.23	0.24	0.26
53.0	50.40	50.44	50.33	0.23	0.25	0.28	0.23	0.25	0.27
54.0	53.17	53.50	53.40	0.23	0.25	0.28	0.24	0.26	0.28
55.0	58.17	55.63	54.06	0.22	0.25	0.28	0.35	0.40	0.45
56.0	48.06	48.62	49.46	0.24	0.26	0.28	0.31	0.30	0.30
57.0	56.08	56.91	57.19	0.22	0.24	0.27	0.22	0.24	0.26
58.0	66.45	66.97	66.68	0.22	0.24	0.28	0.22	0.24	0.26
60.0	63.24	64.49	64.18	0.22	0.25	0.29	0.22	0.24	0.27
61.0	62.84	63.55	64.06	0.23	0.26	0.29	0.22	0.25	0.27
62.0	64.31	64.80	67.91	0.23	0.26	0.29	0.23	0.26	0.28
63.0	72.48	74.03	80.75	0.24	0.26	0.30	0.24	0.26	0.28
64.0	69.05	65.42	64.88	0.25	0.28	0.32	0.25	0.27	0.30
65.0	60.54	59.37	58.54	0.26	0.29	0.33	0.26	0.28	0.31
66.0	55.72	55.13	55.52	0.27	0.30	0.35	0.27	0.29	0.32
67.0	53.97	53.98	54.20	0.29	0.32	0.37	0.28	0.31	0.33
68.0	54.52	54.50	55.03	0.30	0.34	0.38	0.30	0.33	0.36
70.0	55.57	53.61	52.30	0.35	0.39	0.45	0.34	0.37	0.40
75.0	24.31	23.92	23.48	0.59	0.67	0.77	0.54	0.59	0.65
80.0	8.94	8.77	8.58	2.01	2.21	2.44	1.79	1.93	2.11
85.0	1.85	1.91	1.96	10.28	10.58	11.03	9.31	9.51	9.81
90.0	0.78	0.84	0.90	21.39	21.71	21.97	20.07	20.26	20.47
95.0	0.57	0.61	0.66	23.45	23.73	23.93	25.94	26.29	26.79
100.0	0.47	0.50	0.54	25.60	25.90	25.97	32.72	33.86	34.94
110.0	0.39	0.41	0.44	21.76	22.56	22.87	22.52	23.52	23.98
120.0	0.37	0.39	0.40	18.56	19.36	19.78	18.66	19.47	19.93
150.0	0.33	0.34	0.35	16.48	17.12	17.61	16.44	17.07	17.57
200.0	0.27	0.30	0.31	17.99	17.88	18.15	17.92	17.81	18.07
300.0	0.22	0.28	0.31	23.00	20.64	19.70	22.92	20.57	19.63
400.0	0.23	0.27	0.32	25.76	23.17	21.26	25.64	23.10	21.19
500.0	0.24	0.30	0.34	27.00	25.21	23.15	27.04	25.34	23.25
600.0	0.26	0.32	0.37	27.86	26.44	24.74	28.64	27.32	25.49
650.0	0.26	0.33	0.38	27.64	26.52	25.03	29.19	28.17	26.48
700.0	0.27	0.35	0.39	27.57	26.56	25.25	29.84	29.10	27.55
800.0	0.29	0.37	0.42	26.39	25.49	24.79	30.30	30.03	29.37
900.0	0.33	0.42	0.48	24.36	24.03	23.70	28.30	29.44	30.13
1000.0	0.36	0.46	0.52	22.55	22.66	22.47	26.26	28.12	29.33
1100.0	0.40	0.51	0.59	21.40	21.57	21.39	25.27	27.05	28.14
1200.0	0.46	0.57	0.67	20.63	20.88	20.71	24.75	26.58	27.67
1600.0	1.01	1.23	1.42	22.36	20.86	19.37	34.75	30.20	27.31
2000.0	3.49	3.68	3.77	9.42	9.33	9.25	16.96	17.32	17.18

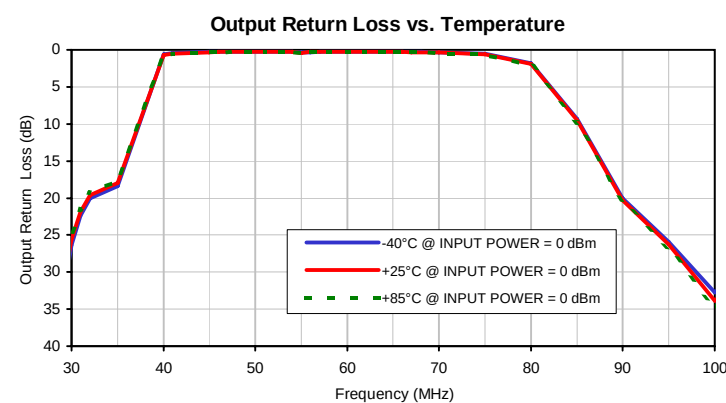
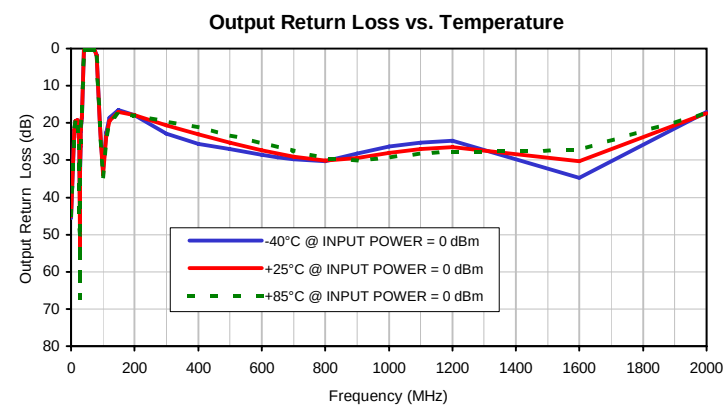
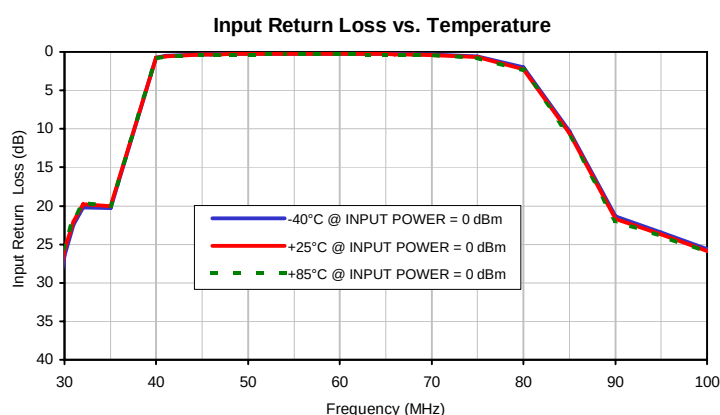
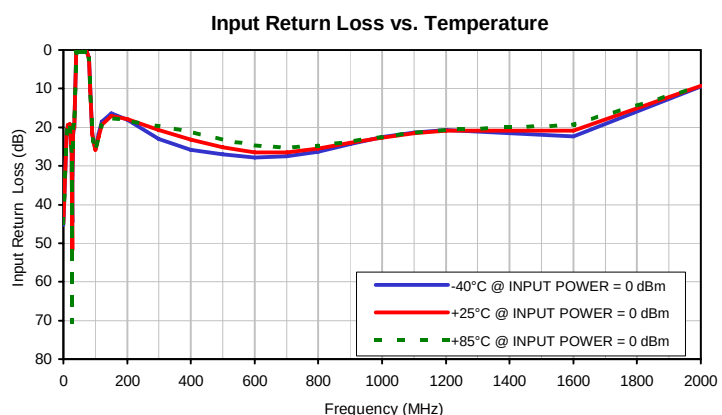
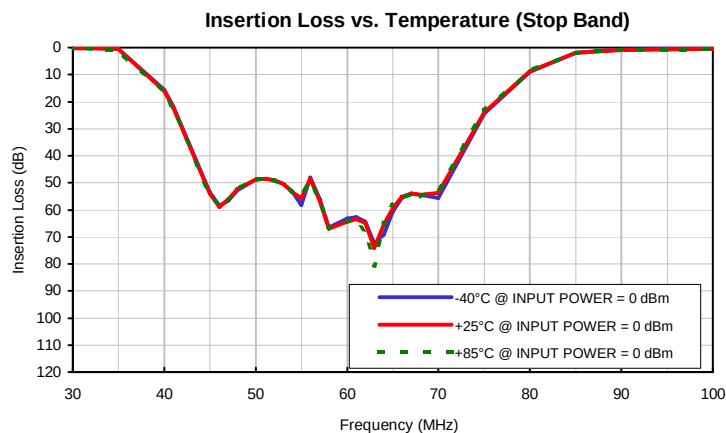
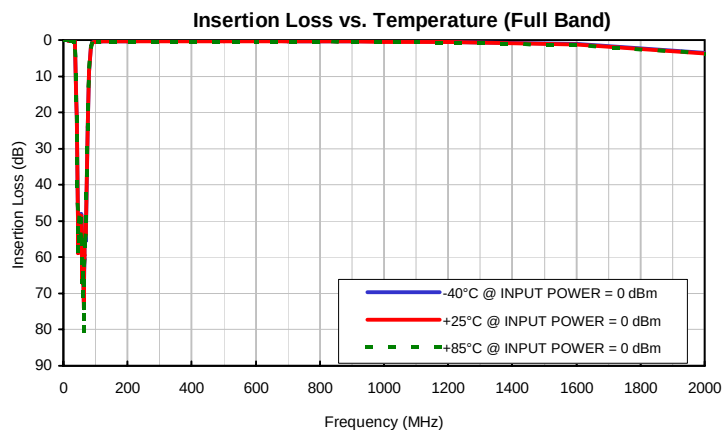
Band Stop Filter

BSF-C4768+

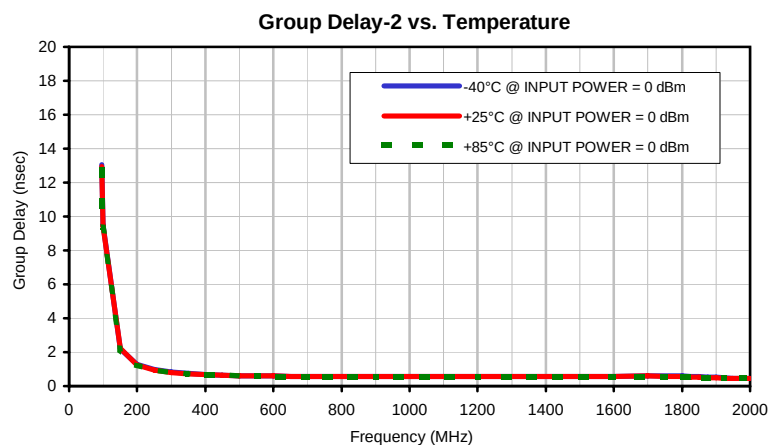
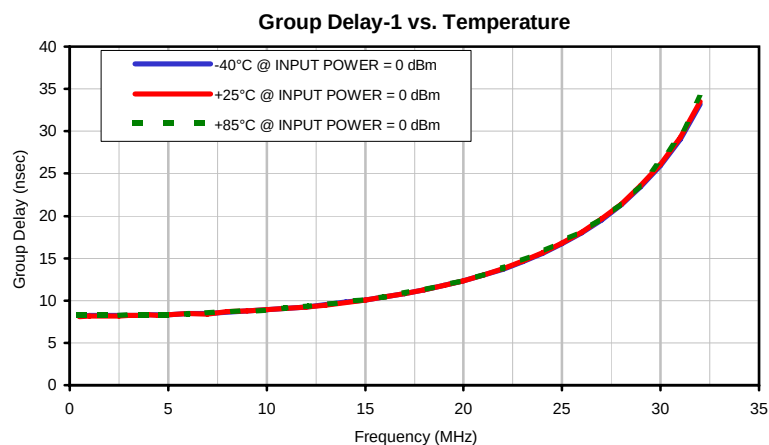
Typical Performance Data

FREQ.	GROUP DELAY-1			FREQ.	GROUP DELAY-2		
(MHz)	(nsec)			(MHz)	(nsec)		
	@-40°C	@+25°C	@+85°C		@-40°C	@+25°C	@+85°C
0.5	8.18	8.07	8.22	95.0	13.04	12.94	12.77
1.0	8.25	8.15	8.25	100.0	9.51	9.44	9.36
1.5	8.23	8.20	8.22	150.0	2.20	2.21	2.19
2.0	8.23	8.17	8.25	200.0	1.28	1.25	1.26
2.5	8.23	8.17	8.26	250.0	0.97	0.95	0.96
3.0	8.25	8.24	8.28	300.0	0.82	0.81	0.81
3.5	8.24	8.25	8.30	350.0	0.75	0.73	0.73
4.0	8.28	8.30	8.34	400.0	0.67	0.67	0.66
4.5	8.31	8.27	8.32	450.0	0.63	0.64	0.63
5.0	8.31	8.30	8.33	500.0	0.62	0.62	0.61
6.0	8.45	8.45	8.45	550.0	0.61	0.59	0.59
7.0	8.47	8.43	8.54	600.0	0.59	0.59	0.58
8.0	8.60	8.66	8.66	650.0	0.58	0.58	0.57
9.0	8.76	8.77	8.77	700.0	0.58	0.57	0.57
10.0	8.89	8.93	8.88	750.0	0.57	0.56	0.56
11.0	9.09	9.10	9.13	800.0	0.57	0.56	0.56
12.0	9.25	9.25	9.28	850.0	0.56	0.55	0.55
13.0	9.51	9.48	9.50	900.0	0.56	0.55	0.55
14.0	9.80	9.79	9.84	950.0	0.56	0.55	0.55
15.0	10.06	10.06	10.11	1000.0	0.56	0.55	0.55
16.0	10.40	10.42	10.46	1100.0	0.56	0.55	0.55
17.0	10.84	10.85	10.88	1200.0	0.56	0.55	0.55
18.0	11.28	11.27	11.29	1300.0	0.57	0.56	0.56
19.0	11.77	11.79	11.82	1400.0	0.57	0.56	0.56
20.0	12.33	12.36	12.42	1500.0	0.57	0.56	0.56
21.0	12.98	13.02	13.07	1600.0	0.58	0.57	0.57
22.0	13.72	13.78	13.84	1700.0	0.61	0.59	0.57
23.0	14.62	14.68	14.73	1750.0	0.60	0.58	0.56
24.0	15.58	15.62	15.73	1800.0	0.59	0.56	0.54
25.0	16.73	16.81	16.91	1825.0	0.58	0.54	0.52
26.0	18.01	18.08	18.22	1850.0	0.56	0.52	0.50
27.0	19.51	19.63	19.74	1875.0	0.54	0.50	0.49
28.0	21.29	21.38	21.54	1900.0	0.52	0.48	0.47
29.0	23.43	23.59	23.74	1925.0	0.49	0.46	0.46
30.0	25.91	26.11	26.30	1950.0	0.47	0.44	0.45
31.0	29.04	29.24	29.51	1975.0	0.45	0.44	0.45
32.0	33.19	33.47	33.85	2000.0	0.44	0.46	0.47

Typical Performance Curves

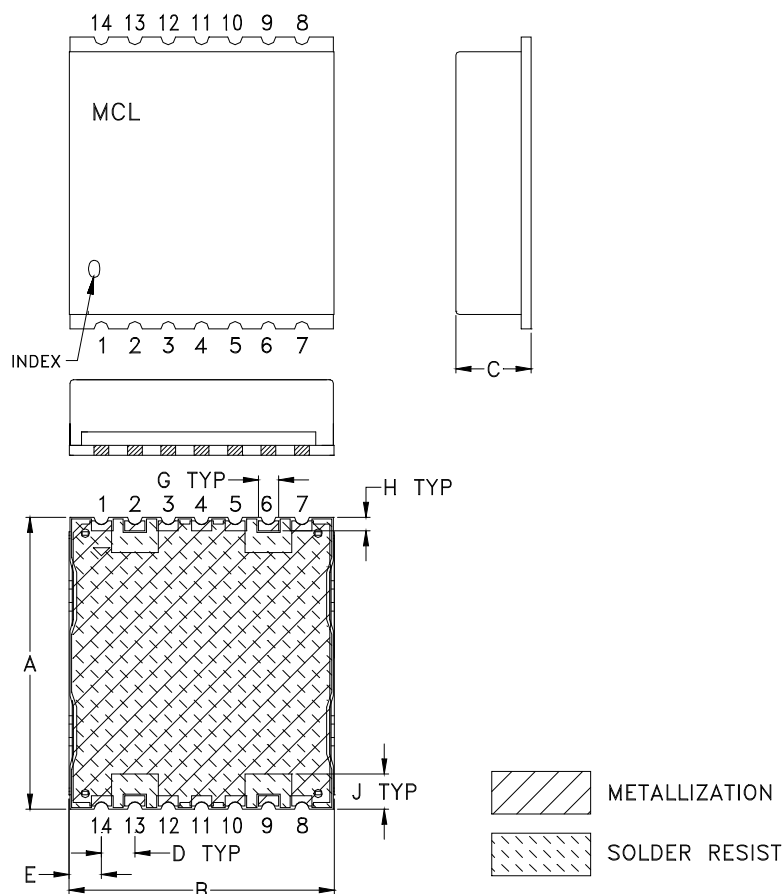


Typical Performance Curves

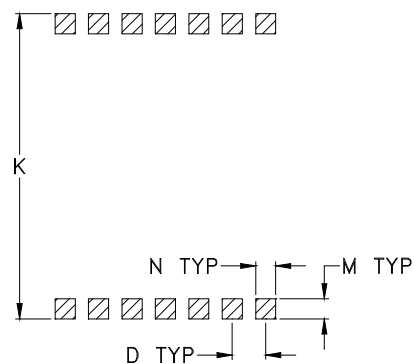


Outline Dimensions

HU1186



PCB Land Pattern



Suggested Layout,
Tolerance to be within ± 0.002

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P	WT, GRAM
HU1186	.870 (22.10)	.800 (20.32)	.25 (6.35)	.100 (2.54)	.097 (2.46)	-	.060 (1.52)	.040 (1.02)	.105 (2.67)	.910 (23.11)	-	.060 (1.52)	.060 (1.52)	-	2.85

Dimensions are in inches (mm). Tolerances: 2PL. +/- .03; 3PL. +/- .015

Notes:

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

For RoHS Case Styles: 2-5 μ inch (.05-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate.
For RoHS-5 Case Styles: Tin-Lead plate.

Mini-Circuits®
ISO 9001 ISO 14001 CERTIFIED

ALL NEW
minicircuits.com

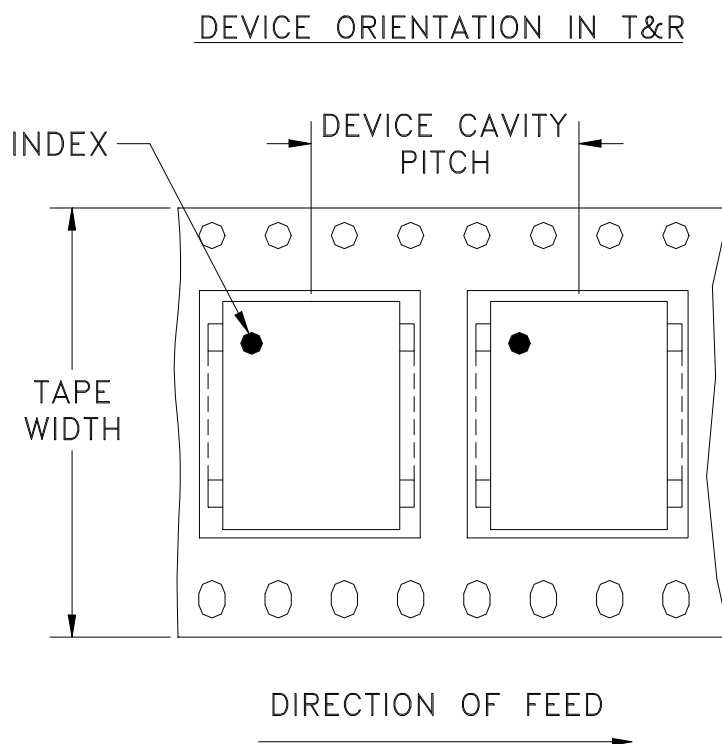
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F21



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	32	13	200

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.

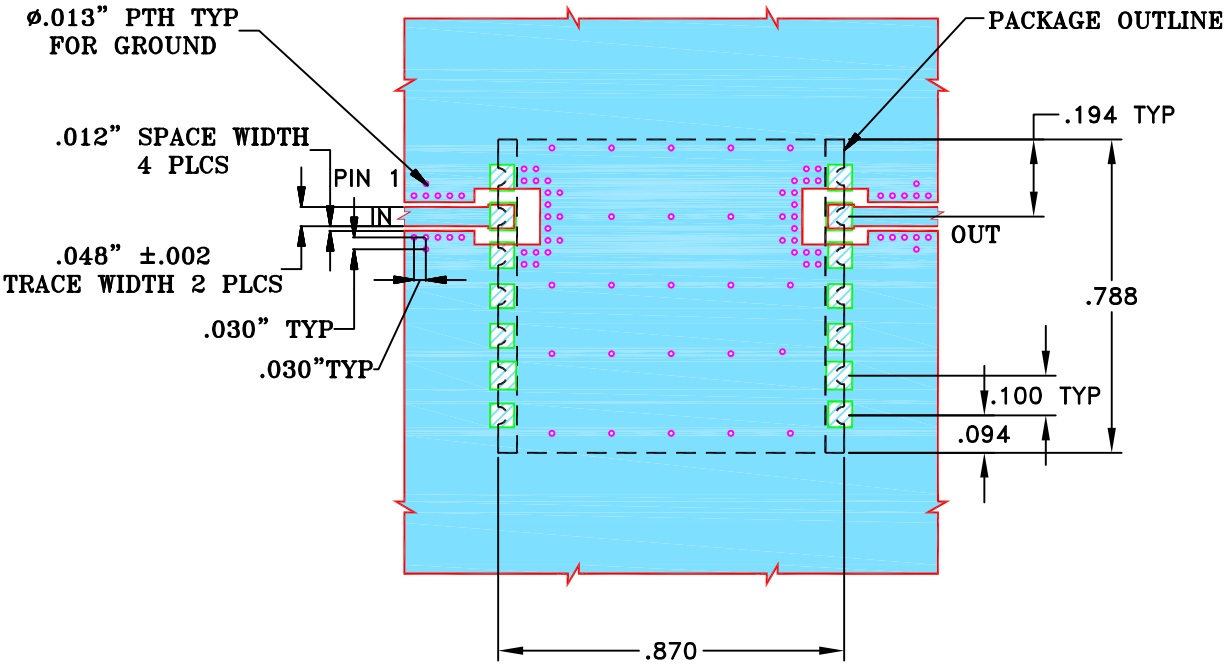
Go to: www.minicircuits.com/pages/pdfs/tape.pdf



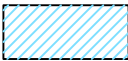
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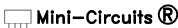
THIRD ANGLE PROJECTION		REVISIONS				
		REV OR	ECN No. M132023	DESCRIPTION NEW RELEASE	DATE MAY 11	DR MD
						AUTH KG

SUGGESTED MOUNTING CONFIGURATION FOR
HU1186 CASE STYLE "14FL05" PIN CODE

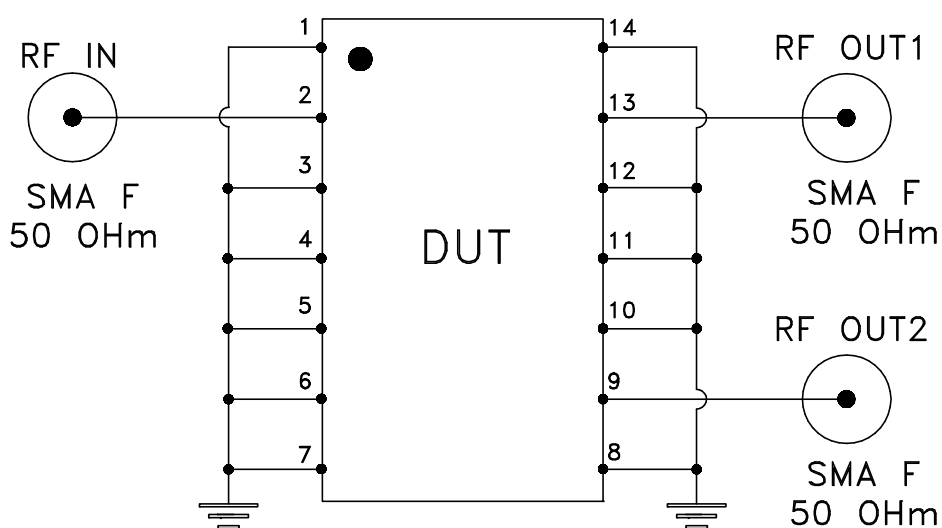
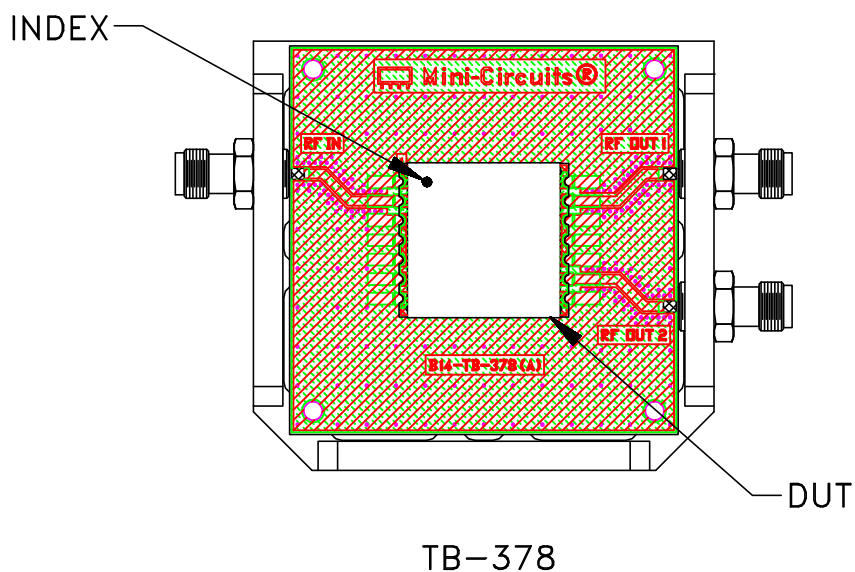


- NOTES:
- TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030"±.003". COPPER: 1/2 OZ. EACH SIDE.
FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 - BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

-  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 PL, 14FL05, HU1186, BSF-C, TB-378S+, 50Ω	
DIMENSIONS ARE IN INCHES	DRAWN	MD	24 MAY 11			
	CHECKED	MD	24 MAY 11			
	APPROVED	AKR	24 MAY 11			
TOLERANCES ON:					SIZE A CODE IDENT 15542 DRAWING NO: 98-PL-347 REV: OR	
2 PL DECIMALS ±						
3 PL DECIMALS ± .005"					FILE: 98PL347 SCALE: 2:1 SHEET: 1 OF 1	
ANGLES ±						
FRACTIONS ±						
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ASHEETA1.DWG REV:A DATE:01/12/95						

Evaluation Board and Circuit



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: ROGERS R04350 or equivalent,
Dielectric Constant=3.48, 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	-65° to 150° C Ambient Environment	Individual Model Data Sheet
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102-C, Condition C
Temperature Cycling	-65° to 150°C, 100 cycles	JESD22-A104
Temperature Humidity	85°C/ 85% RH, 168 hours	JESD22-113
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 240°C peak (Non-RoHS) or 260°C (RoHS)	J-STD-020
Solderability	10X magnification, 95% coverage	JESD22-B102, Method 1: Dip and Look Test
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
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