Surface Mount

Bandpass Filter

BPF-BD1400+

50Ω 1200 to 1600 MHz

Generic photo used for illustration purposes only
CASE STYLE: TV2849

The Big Deal

- Wide bandwidth
- Rejection upto 2xF_c
- Miniature shielded package

Product Overview

The BPF-BD1400+ is a 50Ω bandpass filter fabricated using SMT technology. This bandpass filter covers from 1200-1600 MHz. This filter is built with high Q capacitors and air-coil inductors for superior performance. It has repeatable performance across 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	Rejection upto 2xF_c. This enables the filter to attenuate spurious signals and reject harmonics for broad frequency band.
Shielded case	Reduced interference with and from the surrounding components.

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CASE STYLE: TV2849

Features

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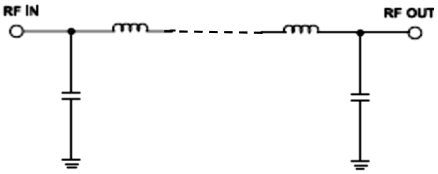
- Rejection upto 2xF_c
- Miniature shielded package

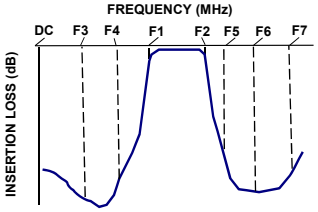
Applications

- Radio telescope applications
- Public cellular networks
- International mobile telecommunication
- Weather instruments / Radar / Satellite
- Transmitter / Receivers
- Harmonic rejection / Industrial applications

Functional Schematic



Typical Frequency Response



+RoHS Compliant

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

Electrical Specifications at 25°C

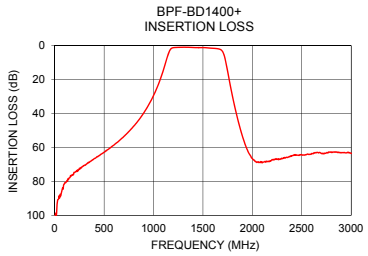
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	—	—	1400	—	MHz
	Insertion Loss	F1-F2	1200 - 1600	—	1.5	3.0	dB
	VSWR	F1-F2	1200 - 1600	—	1.67	2.0	:1
Stop Band, Lower	Rejection	DC-F3	DC - 700	40	50	—	dB
		F3-F4	700 - 1000	20	25	—	dB
Stop Band, Upper	Rejection	F5-F6	1800 - 2200	20	25	—	dB
		F6-F7	2200 - 3000	40	60	—	dB

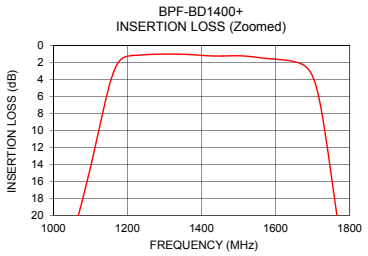
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	1 W

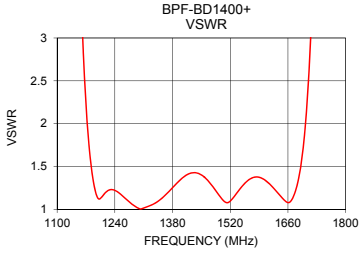
Permanent damage may occur if any of these limits are exceeded.

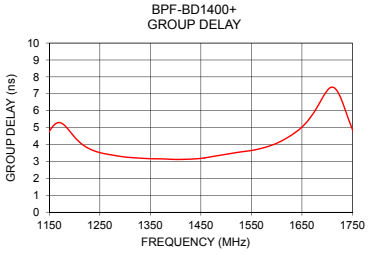
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	104.35	182.16	1200	4.44
100	81.08	559.87	1220	3.91
700	53.62	80.79	1240	3.61
995	30.09	50.64	1260	3.46
1000	29.48	49.66	1280	3.35
1068	19.96	35.51	1300	3.26
1163	3.07	2.89	1320	3.21
1200	1.26	1.12	1340	3.18
1400	1.16	1.35	1360	3.16
1500	1.21	1.12	1380	3.14
1600	1.62	1.35	1400	3.12
1691	2.95	1.50	1420	3.13
1765	19.94	10.88	1440	3.15
1800	30.21	16.17	1460	3.22
1900	53.51	28.69	1480	3.32
2000	66.66	39.76	1500	3.42
2200	67.22	57.06	1520	3.52
2600	63.63	72.44	1540	3.60
2900	63.19	57.26	1560	3.71
3000	63.61	52.23	1600	4.07









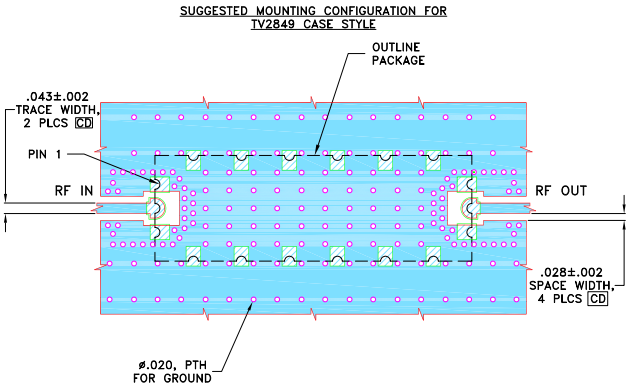
Notes

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	11
GROUND	1, 3-10, 12-18

Demo Board MCL P/N: TB-1108+
Suggested PCB Layout (PL-640)



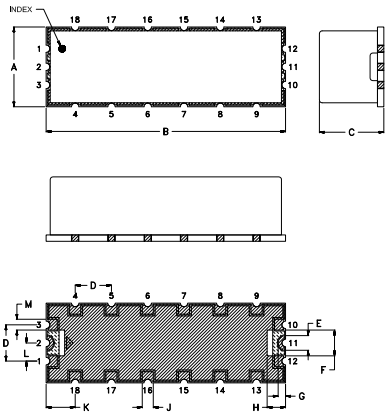
NOTES:

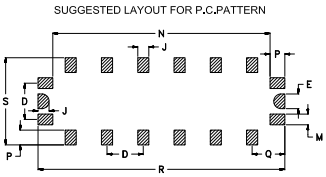
1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .020"±.0015". COPPER: 1/2 OZ. EACH SIDE.
   FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

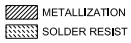
DENOTES PCB COPPER LAYOUT WITH SMOBC
(SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

Outline Drawing







Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K
.433	**1.299**	**.350**	**.197**	**.079**	**.140**	**.040**	**.100**	**.060**	**.157**
11.00	33.00	8.89	5.00	2.02	3.56	1.02	2.54	1.52	4.00

L	M	N	P	Q	R	S	Wt.
.098	**.058**	**1.179**	**.080**	**.177**	**1.339**	**.473**	grams
2.50	1.48	29.95	2.03	4.51	34.02	12.02	4

Note: Please refer to case style drawing for details

Band Pass Filter BPF-BD1400+

Typical Performance Data

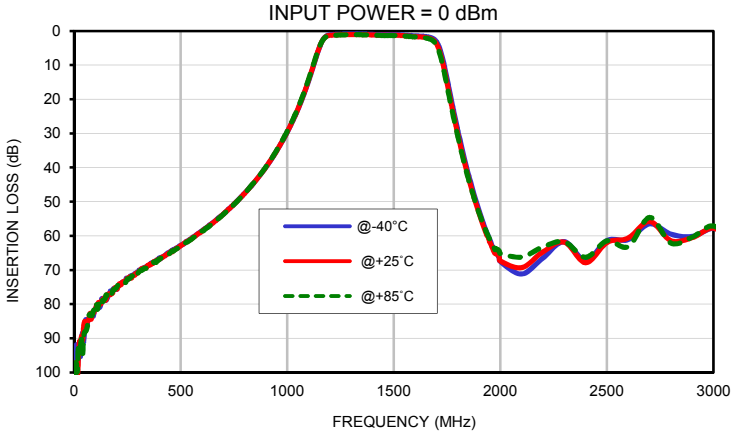
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
10	91.96	98.34	96.07	0.12	0.12	0.12	0.10	0.10	0.10
50	86.04	85.03	88.18	0.08	0.08	0.08	0.07	0.07	0.06
100	81.26	81.42	82.03	0.06	0.07	0.07	0.05	0.06	0.06
150	78.86	78.70	77.32	0.05	0.06	0.07	0.04	0.05	0.05
200	75.68	75.66	75.10	0.05	0.06	0.07	0.04	0.06	0.06
250	72.86	72.43	72.62	0.05	0.07	0.08	0.04	0.06	0.07
300	70.51	70.71	70.85	0.06	0.08	0.09	0.06	0.08	0.08
350	68.60	68.65	68.96	0.07	0.10	0.10	0.07	0.10	0.10
400	66.47	66.75	66.77	0.09	0.12	0.12	0.09	0.12	0.12
450	64.74	64.96	65.04	0.11	0.14	0.14	0.10	0.14	0.13
500	62.90	62.88	63.21	0.13	0.17	0.17	0.12	0.16	0.15
550	60.79	60.99	61.00	0.14	0.19	0.19	0.14	0.19	0.18
600	58.55	58.69	58.59	0.17	0.21	0.21	0.16	0.21	0.19
650	56.21	56.30	56.33	0.19	0.24	0.24	0.19	0.23	0.22
700	53.63	53.65	53.67	0.22	0.27	0.27	0.21	0.25	0.24
750	50.70	50.75	50.77	0.23	0.29	0.29	0.22	0.27	0.26
800	47.52	47.58	47.54	0.26	0.31	0.31	0.24	0.29	0.28
850	43.97	44.01	43.95	0.28	0.33	0.34	0.26	0.31	0.30
900	39.91	39.89	39.79	0.29	0.35	0.36	0.28	0.33	0.33
995	30.22	30.15	29.96	0.33	0.40	0.43	0.32	0.39	0.40
1000	29.62	29.55	29.36	0.34	0.41	0.43	0.33	0.39	0.41
1068	20.18	20.01	19.74	0.45	0.55	0.60	0.44	0.53	0.58
1100	14.65	14.43	14.15	0.68	0.81	0.89	0.66	0.78	0.87
1163	3.08	3.04	3.04	5.78	6.49	6.82	5.69	6.37	6.69
1200	1.10	1.26	1.34	28.02	28.01	28.79	25.06	24.80	24.50
1250	0.93	1.08	1.15	20.02	20.77	20.80	20.09	20.84	21.06
1300	0.86	1.01	1.08	33.13	33.44	31.06	58.35	56.04	36.34
1350	0.87	1.03	1.10	25.98	25.55	25.16	26.52	25.80	25.21
1400	0.99	1.15	1.21	17.18	17.16	17.68	16.78	16.71	17.27
1450	1.09	1.24	1.29	15.42	15.97	17.09	14.95	15.43	16.68
1500	1.04	1.21	1.30	24.47	26.84	29.66	22.70	24.13	27.30
1550	1.19	1.39	1.48	19.43	19.09	19.85	18.71	18.30	19.21
1600	1.42	1.64	1.73	16.29	16.71	17.75	15.65	15.98	17.17
1650	1.62	1.90	2.06	24.79	26.20	25.50	23.60	24.56	25.13
1680	2.08	2.47	2.68	20.82	19.68	19.70	19.99	18.92	19.70
1690	2.46	2.94	3.20	15.08	14.31	14.20	14.78	14.04	14.24
1700	3.13	3.74	4.10	10.72	10.15	9.94	10.66	10.13	10.06
1720	6.00	6.98	7.65	4.90	4.73	4.59	5.08	4.94	4.80
1740	11.10	12.34	13.18	2.32	2.38	2.39	2.55	2.65	2.60
1760	17.18	18.46	19.30	1.38	1.51	1.56	1.61	1.76	1.74
1780	23.26	24.51	25.25	1.00	1.13	1.18	1.20	1.35	1.32
1800	29.03	30.22	30.86	0.80	0.92	0.97	0.97	1.10	1.08
1820	34.47	35.58	36.09	0.69	0.80	0.84	0.82	0.95	0.92
1840	39.56	40.63	40.99	0.60	0.71	0.75	0.72	0.83	0.80
1860	44.21	45.20	45.49	0.54	0.64	0.68	0.64	0.74	0.72
1880	48.61	49.52	49.58	0.50	0.59	0.63	0.58	0.67	0.65
1900	52.63	53.43	53.36	0.46	0.55	0.58	0.53	0.62	0.60
1920	56.41	57.15	56.82	0.43	0.51	0.55	0.48	0.57	0.55
1950	61.22	61.86	60.94	0.39	0.48	0.51	0.44	0.52	0.51
2000	67.57	67.40	65.20	0.35	0.43	0.46	0.37	0.44	0.44
2100	71.19	69.31	66.24	0.27	0.35	0.39	0.27	0.35	0.36
2200	66.45	64.68	63.24	0.22	0.30	0.34	0.21	0.29	0.32
2300	61.71	61.87	61.76	0.19	0.28	0.32	0.16	0.24	0.29
2400	67.24	67.88	66.29	0.16	0.25	0.30	0.14	0.23	0.28
2500	61.40	61.96	61.47	0.14	0.24	0.29	0.14	0.23	0.27
2600	61.09	60.65	63.15	0.15	0.25	0.30	0.16	0.26	0.28
2700	56.49	55.78	54.62	0.15	0.25	0.30	0.21	0.31	0.29
2800	59.50	61.41	62.12	0.17	0.26	0.31	0.29	0.40	0.29
2900	60.17	60.55	60.38	0.18	0.29	0.33	0.41	0.52	0.30
3000	57.80	57.79	57.12	0.21	0.31	0.34	0.58	0.70	0.31

Typical Performance Data

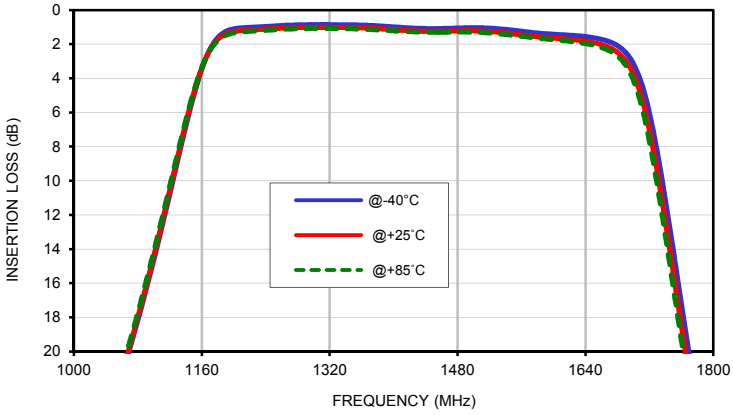
FREQ.	GROUP DELAY		
(MHz)	(nsec)		
	@-40°C	@+25°C	@+85°C
1200	4.52	4.44	4.39
1210	4.19	4.13	4.10
1220	3.94	3.90	3.87
1230	3.76	3.73	3.71
1240	3.63	3.61	3.60
1250	3.54	3.53	3.51
1260	3.47	3.46	3.44
1270	3.42	3.40	3.38
1280	3.37	3.35	3.34
1290	3.32	3.31	3.29
1300	3.28	3.26	3.25
1310	3.24	3.23	3.22
1320	3.22	3.21	3.20
1330	3.20	3.19	3.18
1340	3.19	3.18	3.17
1350	3.18	3.17	3.16
1360	3.17	3.16	3.15
1370	3.16	3.16	3.14
1380	3.15	3.15	3.14
1390	3.14	3.14	3.13
1400	3.13	3.13	3.12
1410	3.13	3.12	3.13
1420	3.12	3.13	3.13
1430	3.13	3.14	3.14
1440	3.15	3.16	3.17
1450	3.18	3.19	3.20
1460	3.21	3.22	3.24
1470	3.25	3.27	3.27
1480	3.31	3.32	3.33
1490	3.36	3.37	3.37
1500	3.42	3.43	3.42
1510	3.47	3.48	3.48
1520	3.52	3.53	3.52
1530	3.56	3.57	3.57
1540	3.60	3.61	3.61
1550	3.65	3.66	3.67
1560	3.70	3.72	3.73
1570	3.75	3.78	3.80
1580	3.83	3.85	3.88
1590	3.93	3.95	3.98
1600	4.04	4.08	4.10

Typical Performance Curves

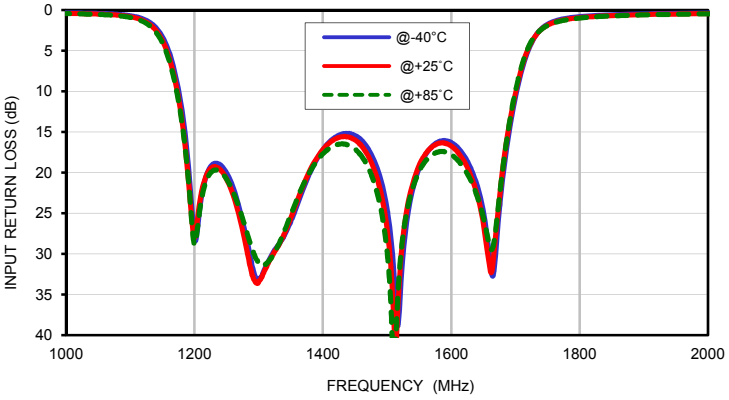
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



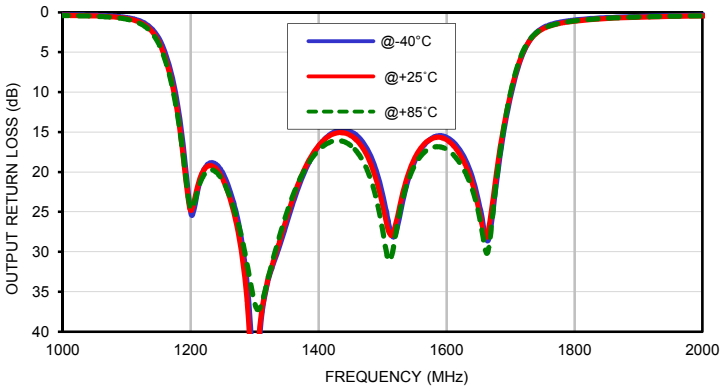
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



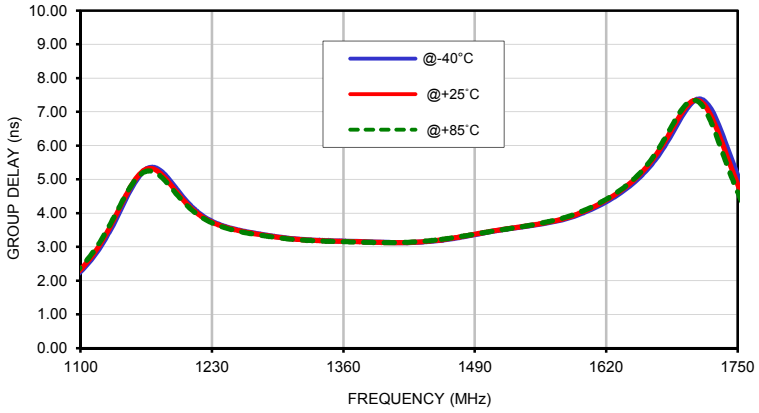
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



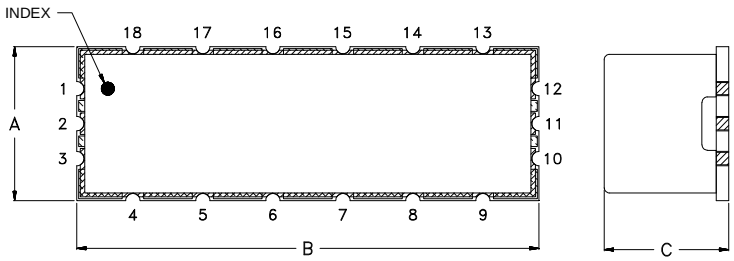
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm

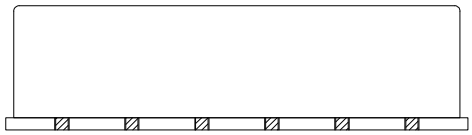


Case Style TV

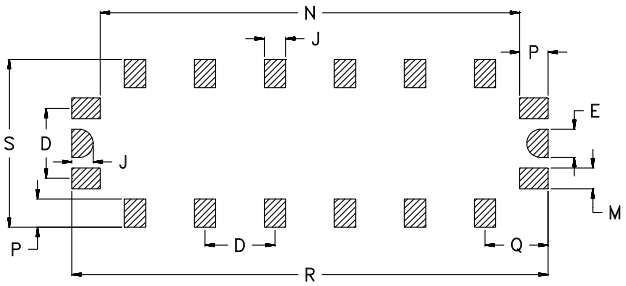
TV2849

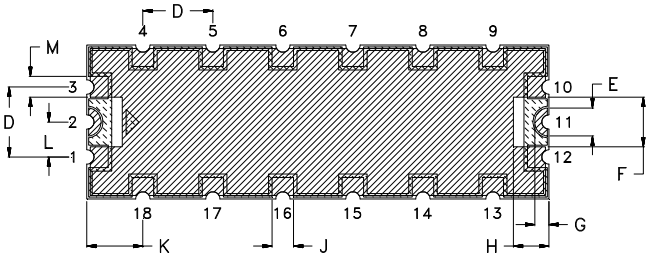
Outline Dimensions





SUGGESTED LAYOUT FOR P.C.PATTERN





METALLIZATION

SOLDER RESIST

CASE#	A	B	C	D	E	F	G	H	J	K	L	M
TV2849	.433 (11.00)	1.299 (33.00)	.350 (8.89)	.197 (5.00)	.079 (2.02)	.140 (3.56)	.040 (1.02)	.100 (2.54)	.060 (1.52)	.157 (4.00)	.098 (2.50)	.058 (1.48)

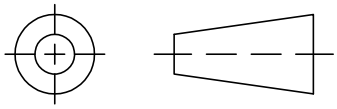
CASE#	N	P	Q	R	S	WT. GRAMS
TV2849	1.179 (29.95)	.080 (2.03)	.177 (4.51)	1.339 (34.02)	.473 (12.02)	4

Dimensions are in inches (mm). Tolerances: 2 Pl. ± --; 3 Pl. ± .030

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:
   For RoHS Case Styles: 3-5 µ inch Gold over 120-240 µ inch Nickel plate.
   For RoHS-5 Case Styles: Tin-Lead plate.

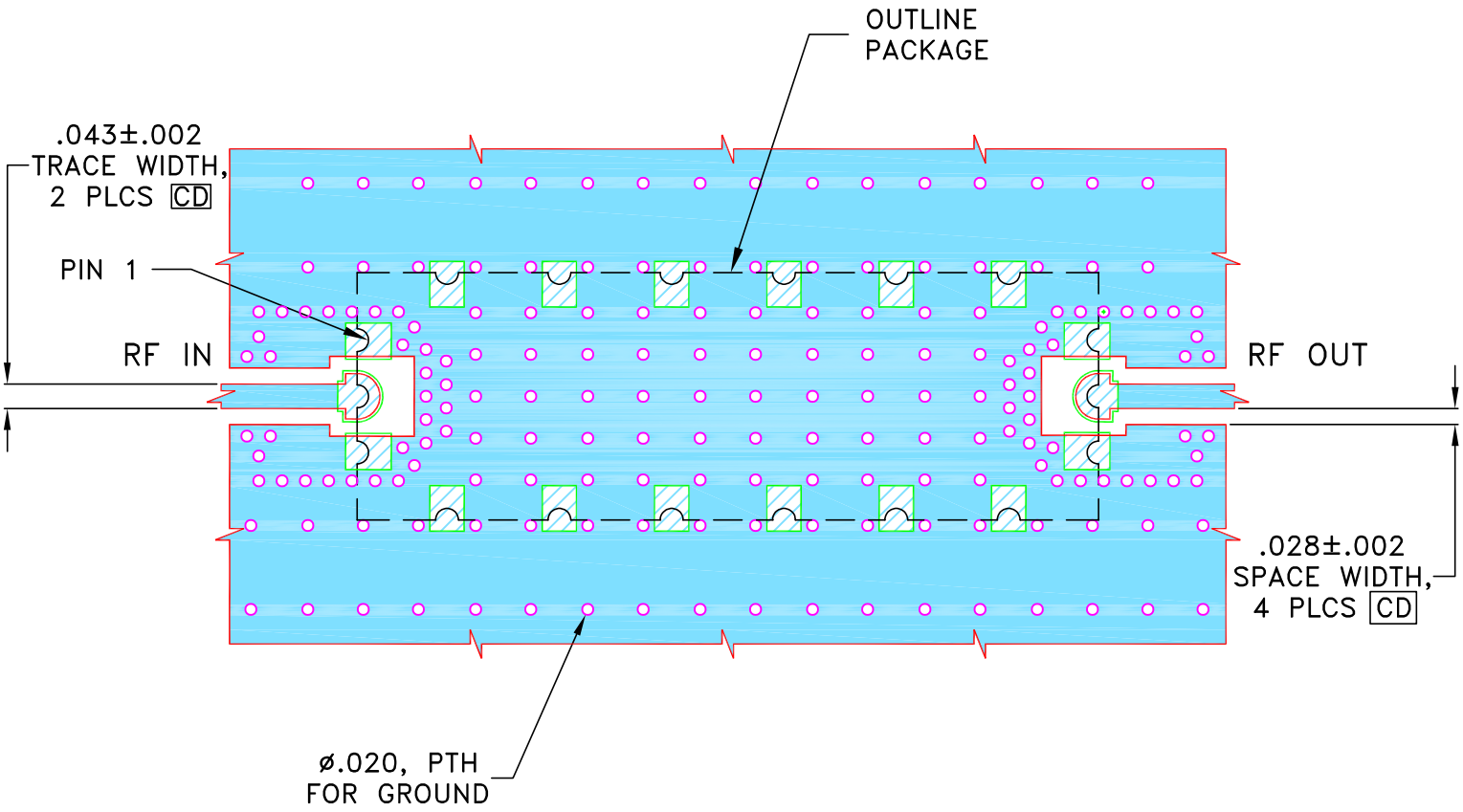
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M174627	NEW RELEASE	JUN 19	ES	VC

SUGGESTED MOUNTING CONFIGURATION FOR TV2849 CASE STYLE



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DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	ES	14 JUN 19
TOLERANCES ON:	CHECKED	TM	14 JUN 19
2 PL DECIMALS ±	APPROVED	KKK	14 JUN 19
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

PL, TV2849, BPF, TB-1108+, 50 Ohm

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-640	OR
FILE: 98PL640		SCALE: 3:1	SHEET: 1 OF 1

Mini-Circuits

Environmental Specifications ENV02T1

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
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 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, 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
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