Surface Mount

Bandpass Filter

CBP-1880E+

50Ω 1780 to 1980 MHz

Generic photo used for illustration purposes only

CASE STYLE: LW1611

The Big Deal

- Low-profile shielded package
- Low passband Insertion Loss
- Excellent Rejection

Product Overview

CBP-1880E+ is a ceramic-coaxial-resonator based bandpass filter in a shielded package (size of 0.638" x 0.434" x 0.105") fabricated using SMT technology. This filter offers outstanding close in rejection, low insertion loss and high power handling for use in broadband, fixed wireless, image rejection and point-to-point radio. In addition, this model uses low profile resonators which gives very good size advantage.

Key Features

Feature	Advantages
High Selectivity	The CBP-1880E+ filter incorporates High-Q ceramic resonators that enables sharp rejection near passband.
Low Passband VSWR	This filter maintains typical VSWR over a wide passband frequency range making this filter easier to integrate into receiver and transmitter RF chains with less concerns for in band frequency ripple.
Rugged construction	The CBP-1880E+ has been qualified over wide range of thermal, mechanical and environmental conditions including withstanding the stress of extensive solder reflow cycles.

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CASE STYLE: LW1611

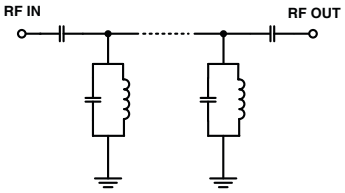
Features

- Low Insertion loss
- Minimal Insertion loss variation over operating temperature
- Low-profile shielded package

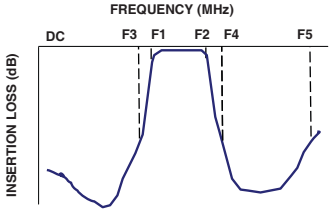
Applications

- Cordless telephony system
- Public cellular networks, GSM
- Wireless audio applications
- PCS broadband

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

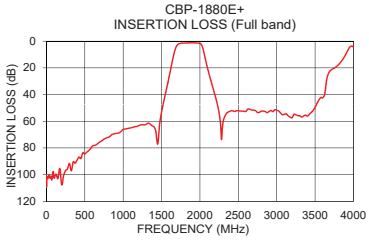
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	—	—	1880	—	MHz
	Insertion Loss	F1-F2	1780-1980	—	1.5	3	dB
	VSWR	F1-F2	1780-1980	—	1.5	2.3	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC-1550	20	37	—	dB
	VSWR	DC-F3	DC-1550	—	25	—	:1
Stop Band, Upper	Insertion Loss	F4-F5	2150-3300	20	30	—	dB
	VSWR	F4-F5	2150-3300	—	14	—	:1

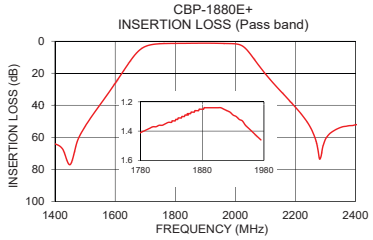
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input*	6.3W max. at 25°C

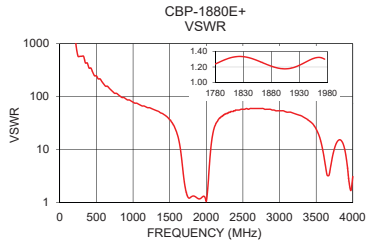
*Derate linearly to 3.1W at 85°C
Permanent damage may occur if any of these limits are exceeded.

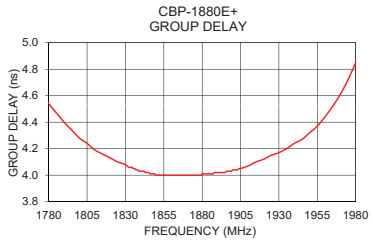
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	99.93	1737.18	1780	4.54
80	100.42	1737.18	1780	4.54
500	84.52	248.17	1790	4.40
1550	39.63	29.46	1800	4.28
1560	37.02	28.03	1810	4.19
1600	26.31	20.22	1820	4.13
1624	19.61	15.39	1840	4.03
1650	12.42	9.58	1860	4.00
1660	9.89	7.44	1880	4.01
1780	1.41	1.24	1887	4.01
1880	1.25	1.21	1890	4.02
1980	1.48	1.27	1900	4.04
2025	3.20	2.28	1910	4.07
2040	5.78	4.51	1920	4.12
2070	13.16	13.39	1940	4.24
2150	31.09	34.07	1960	4.44
2160	33.08	36.20	1965	4.52
2180	37.17	39.49	1970	4.61
2200	41.30	41.37	1975	4.72
3300	55.89	43.44	1980	4.85









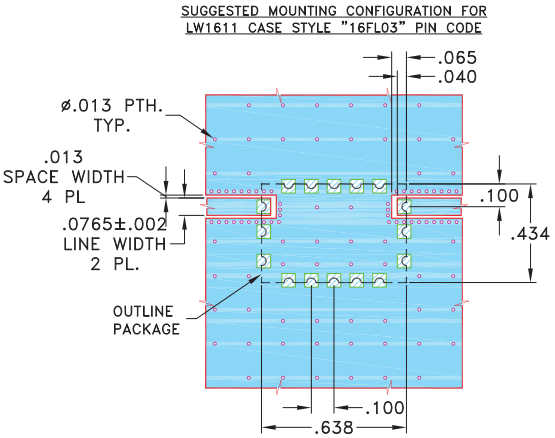
Notes

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	1
OUTPUT	11
GROUND	2,3,4,5,6,7,8,9,10,12,13,14,15,16

Demo Board MCL P/N: TB-611+
Suggested PCB Layout (PL-338)

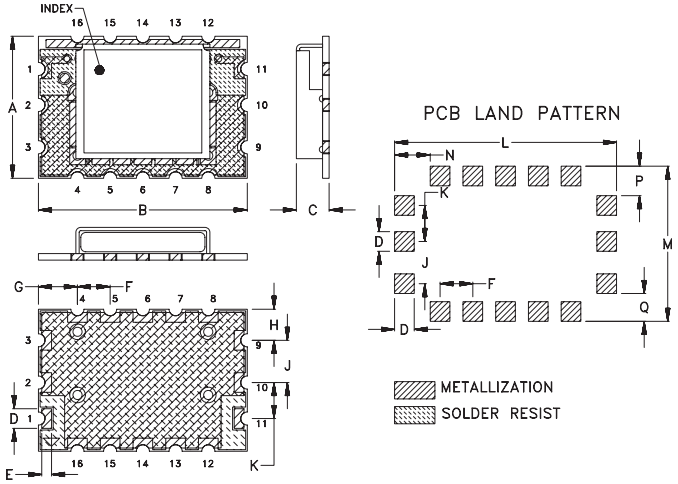


NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .060"±.004". COPPER: 1/2 OZ. EACH SIDE.
   FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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	L	M
.434	**.638**	**.120**	**.060**	**.030**	**.100**	**.119**	**.095**	**.129**	**.110**	**.678**	**.474**
11.02	16.21	3.05	1.52	0.76	2.54	3.02	2.41	3.28	2.79	17.22	12.04

N	P	Q	wt,
.109	**.090**	**.085**	grams
2.77	2.29	2.16	0.8

Note: Please refer to case style drawing for details.

Band Pass Filter CBP-1880E+

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	101.52	99.93	98.19	0.00	0.00	0.00	0.00	0.00	0.00
10	109.32	102.23	104.82	0.00	0.00	0.00	0.00	0.00	0.00
90	102.87	97.69	104.59	0.00	0.00	0.00	0.00	0.01	0.00
175	96.26	95.38	107.00	0.00	0.01	0.01	0.00	0.01	0.01
350	91.37	90.35	95.58	0.01	0.04	0.04	0.01	0.03	0.03
525	84.33	83.26	82.07	0.04	0.08	0.08	0.04	0.07	0.07
675	75.69	76.42	77.11	0.08	0.12	0.12	0.08	0.11	0.12
825	71.21	71.55	71.73	0.12	0.17	0.17	0.12	0.17	0.18
950	68.66	68.65	68.69	0.15	0.20	0.21	0.16	0.21	0.21
1075	64.96	65.23	65.01	0.19	0.24	0.24	0.19	0.25	0.25
1325	61.48	61.43	61.47	0.26	0.32	0.33	0.28	0.34	0.35
1450	78.11	77.12	77.06	0.31	0.40	0.42	0.34	0.43	0.45
1510	50.65	50.35	50.06	0.38	0.48	0.51	0.42	0.52	0.55
1540	42.54	42.22	42.03	0.43	0.56	0.59	0.48	0.60	0.63
1550	39.92	39.63	39.44	0.46	0.59	0.62	0.51	0.63	0.67
1575	33.33	33.07	32.91	0.54	0.69	0.73	0.61	0.75	0.80
1590	29.28	29.04	28.91	0.62	0.78	0.83	0.69	0.85	0.91
1605	25.15	24.93	24.80	0.72	0.90	0.95	0.81	0.99	1.06
1624	19.82	19.61	19.51	0.93	1.13	1.20	1.05	1.27	1.35
1638	15.87	15.69	15.60	1.18	1.42	1.50	1.36	1.62	1.72
1650	12.56	12.42	12.36	1.54	1.82	1.92	1.78	2.09	2.21
1670	7.67	7.63	7.61	2.75	3.13	3.27	3.12	3.56	3.73
1694	3.77	3.89	3.93	5.90	6.38	6.59	6.46	6.99	7.26
1710	2.48	2.66	2.71	8.99	9.48	9.71	9.59	10.15	10.45
1735	1.60	1.80	1.87	14.67	15.12	15.33	15.40	16.14	16.46
1780	1.20	1.41	1.47	19.98	19.44	19.51	22.43	22.08	22.33
1810	1.17	1.36	1.42	17.32	17.11	17.28	18.16	18.02	18.25
1834	1.15	1.33	1.39	16.79	16.99	17.15	17.18	17.46	17.66
1845	1.13	1.31	1.37	17.07	17.45	17.62	17.32	17.78	17.99
1857	1.11	1.29	1.34	17.68	18.29	18.46	17.77	18.44	18.62
1863	1.10	1.27	1.33	18.07	18.80	18.95	18.07	18.86	19.00
1871	1.08	1.26	1.32	18.65	19.55	19.66	18.56	19.49	19.56
1880	1.07	1.25	1.31	19.35	20.42	20.45	19.16	20.20	20.17
1899	1.06	1.24	1.30	20.64	21.77	21.63	20.34	21.31	21.16
1940	1.12	1.32	1.39	18.89	18.84	18.62	18.98	18.99	18.76
1960	1.18	1.40	1.47	17.45	17.21	17.09	17.64	17.46	17.36
1980	1.25	1.48	1.56	18.67	18.44	18.59	18.47	18.30	18.44
2000	1.39	1.66	1.75	35.36	32.44	31.07	21.85	21.14	20.77
2025	2.76	3.20	3.37	8.40	8.16	8.01	7.90	7.61	7.46
2035	4.25	4.78	4.98	5.04	4.98	4.92	4.79	4.69	4.63
2045	6.32	6.90	7.11	3.07	3.12	3.12	2.94	2.96	2.96
2070	12.62	13.16	13.34	1.17	1.30	1.33	1.14	1.25	1.29
2090	17.62	18.09	18.24	0.73	0.86	0.88	0.73	0.85	0.87
2120	24.48	24.89	25.01	0.50	0.61	0.63	0.52	0.62	0.65
2150	30.73	31.09	31.20	0.41	0.51	0.52	0.43	0.52	0.54
2185	37.83	38.21	38.29	0.35	0.44	0.45	0.37	0.46	0.48
2215	44.16	44.53	44.63	0.32	0.41	0.42	0.35	0.43	0.44
2235	48.94	49.44	49.66	0.30	0.39	0.40	0.33	0.41	0.42
2260	57.45	57.99	58.38	0.29	0.37	0.37	0.31	0.39	0.41
2285	71.55	71.94	70.63	0.27	0.36	0.37	0.30	0.38	0.39
2310	58.56	58.52	58.03	0.26	0.34	0.35	0.28	0.37	0.38
2345	54.21	54.24	53.92	0.24	0.33	0.34	0.28	0.36	0.37
2625	51.13	50.87	51.29	0.19	0.29	0.31	0.21	0.31	0.33
2875	53.44	53.58	52.23	0.18	0.30	0.32	0.19	0.31	0.33
3300	56.22	55.89	55.08	0.25	0.40	0.43	0.28	0.41	0.44
3625	41.29	39.80	38.95	2.91	3.43	3.66	5.75	6.58	6.95
3675	24.05	24.11	23.97	5.06	5.45	5.55	3.05	3.20	3.21
3875	12.52	12.32	12.20	1.20	1.44	1.52	1.05	1.26	1.32
3925	7.19	6.98	6.86	2.97	3.54	3.78	2.70	3.18	3.39
4000	4.02	4.50	4.71	6.28	5.81	5.54	5.69	5.29	5.06

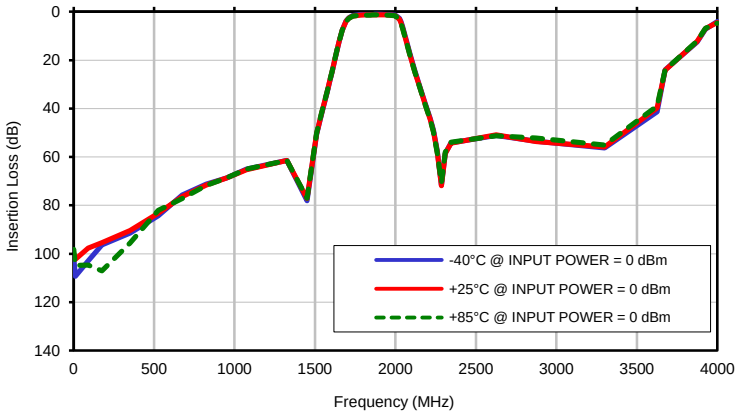
Typical Performance Data

FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25˚C	@+85˚C
1780	4.58	4.54	4.52
1785	4.50	4.47	4.45
1790	4.44	4.40	4.39
1795	4.37	4.34	4.33
1800	4.31	4.28	4.27
1805	4.27	4.24	4.23
1810	4.22	4.19	4.19
1815	4.18	4.16	4.15
1820	4.15	4.13	4.12
1825	4.12	4.10	4.09
1830	4.09	4.08	4.07
1832	4.08	4.06	4.06
1834	4.07	4.06	4.05
1836	4.06	4.05	4.04
1837	4.06	4.04	4.04
1839	4.05	4.03	4.03
1841	4.04	4.03	4.02
1842	4.04	4.03	4.02
1844	4.03	4.02	4.01
1847	4.02	4.01	4.01
1848	4.02	4.01	4.00
1849	4.02	4.01	4.00
1851	4.01	4.00	4.00
1852	4.01	4.00	4.00
1855	4.01	4.00	3.99
1858	4.01	4.00	3.99
1860	4.00	4.00	3.99
1862	4.00	4.00	3.99
1864	4.01	4.00	3.99
1868	4.00	4.00	3.99
1871	4.01	4.00	3.99
1873	4.01	4.00	4.00
1875	4.01	4.00	4.00
1877	4.01	4.00	4.00
1880	4.01	4.01	4.00
1884	4.01	4.01	4.01
1888	4.02	4.02	4.01
1890	4.02	4.02	4.01
1892	4.02	4.02	4.01
1895	4.03	4.02	4.02
1898	4.04	4.03	4.03
1899	4.04	4.03	4.03
1900	4.04	4.04	4.03
1903	4.05	4.04	4.04
1904	4.05	4.05	4.04
1910	4.07	4.07	4.06
1915	4.10	4.10	4.09
1920	4.12	4.12	4.12
1925	4.15	4.15	4.14
1930	4.18	4.17	4.17
1935	4.21	4.20	4.20
1940	4.24	4.24	4.23
1945	4.28	4.27	4.27
1950	4.32	4.32	4.32
1955	4.37	4.37	4.37
1960	4.43	4.44	4.44
1965	4.51	4.52	4.52
1970	4.60	4.61	4.61
1975	4.70	4.72	4.73
1980	4.83	4.85	4.87

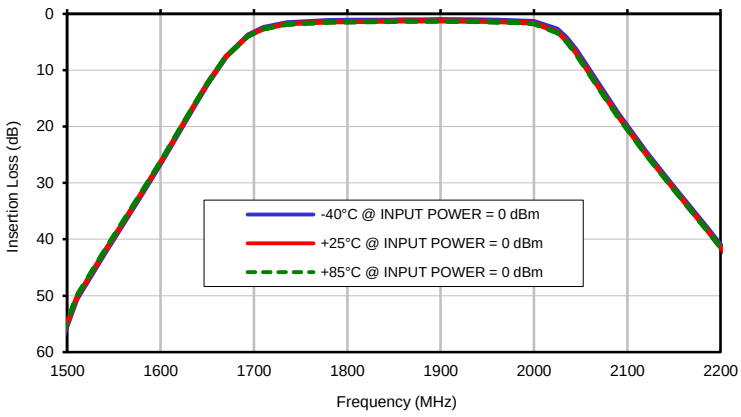
Band Pass Filter CBP-1880E+

Typical Performance Curves

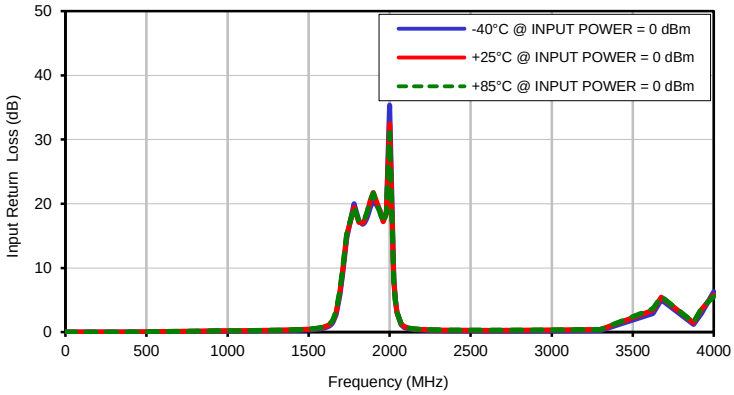
Insertion Loss vs. Temperature (Full Band)



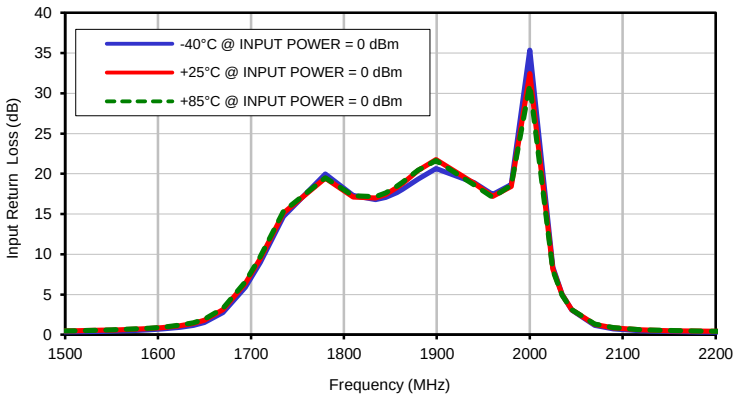
Insertion Loss vs. Temperature (Pass band)



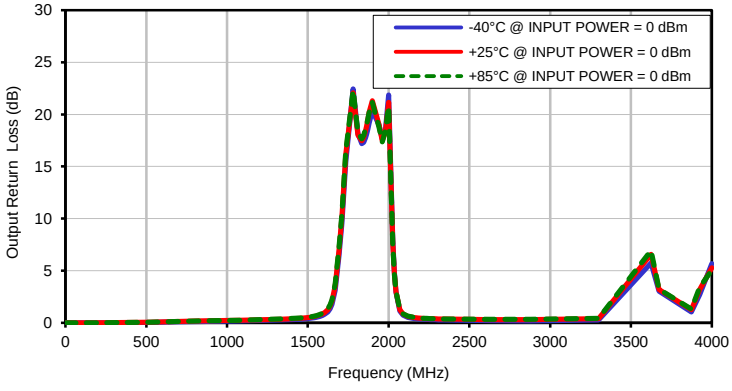
Input Return Loss vs. Temperature



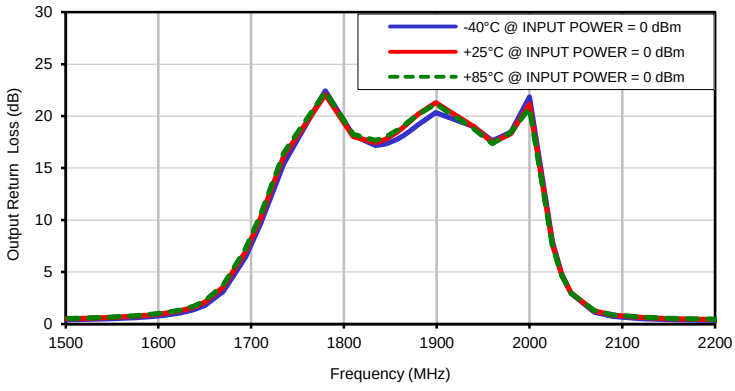
Input Return Loss vs. Temperature



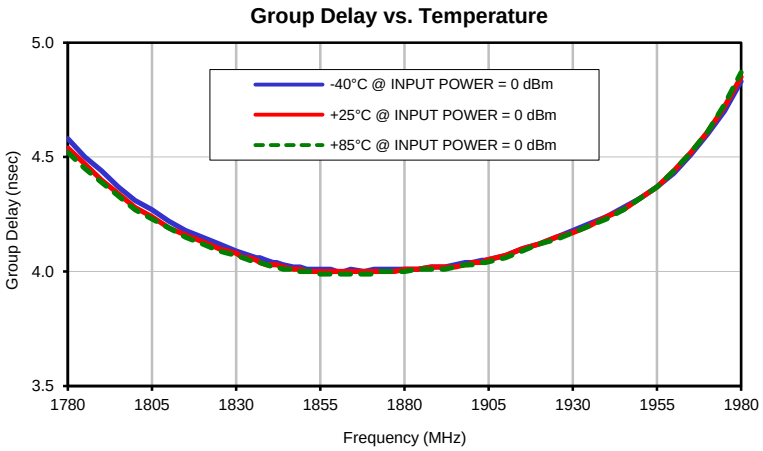
Output Return Loss vs. Temperature



Output Return Loss vs. Temperature



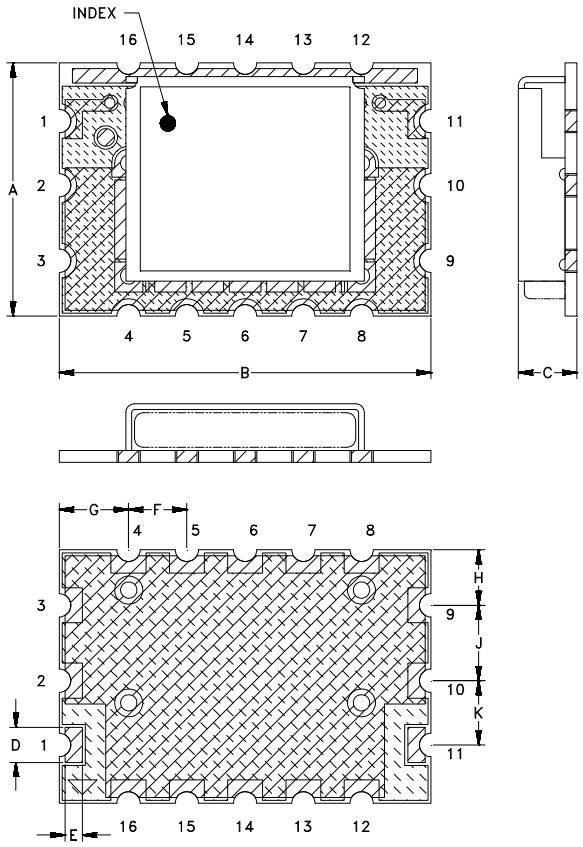
Typical Performance Curves

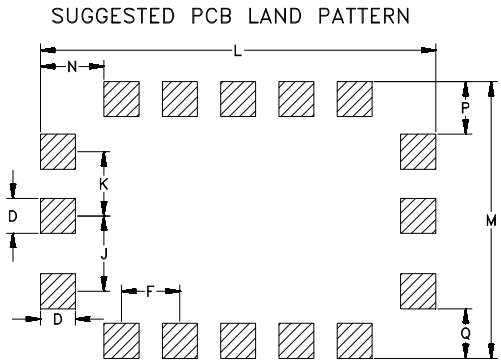


Case Style LW

LW1611

Outline Dimensions





CASE#	A	B	C	D	E	F	G	H	J	K	L	M
LW1611	.434 (11.02)	.638 (16.21)	.120 (3.05)	.060 (1.52)	.030 (.76)	.100 (2.54)	.119 (3.02)	.095 (2.41)	.129 (3.28)	.110 (2.79)	.678 (17.22)	.474 (12.04)

CASE#	N	P	Q	WT. GRAMS
LW1611	.109 (2.77)	.090 (2.29)	.085 (2.16)	0.8

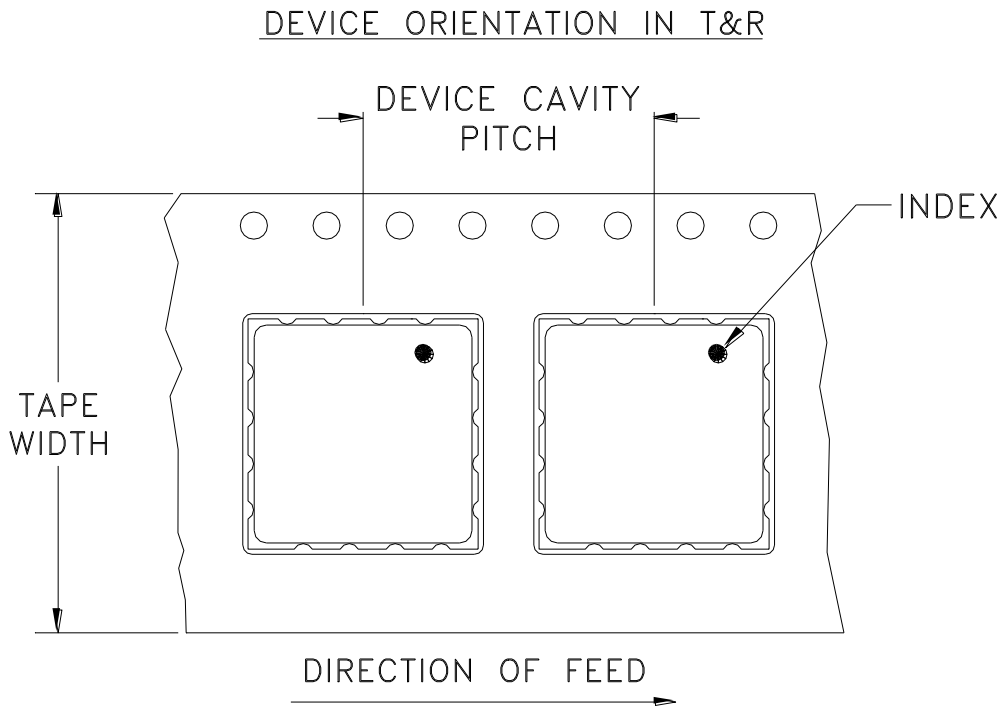
Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3PL. ± .015

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.
   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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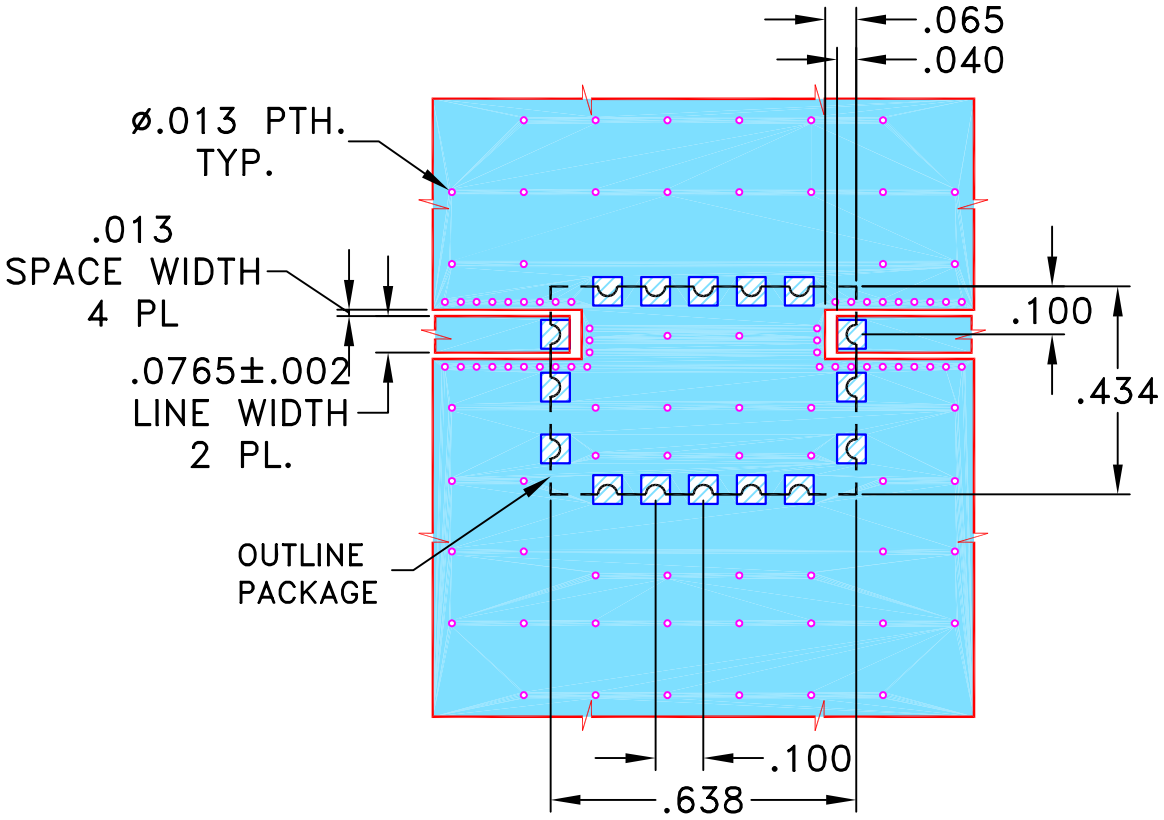
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M129915	NEW RELEASE	APR 11	MD	KG

SUGGESTED MOUNTING CONFIGURATION FOR LW1611 CASE STYLE "16FL03" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .060"±.004". 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

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	MD	16 APR 11
TOLERANCES ON:	CHECKED	MD	16 APR 11
2 PL DECIMALS ± .005"	APPROVED	KR	16 APR 11
3 PL DECIMALS ±			
ANGLES ±			
FRACTIONS ±			

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

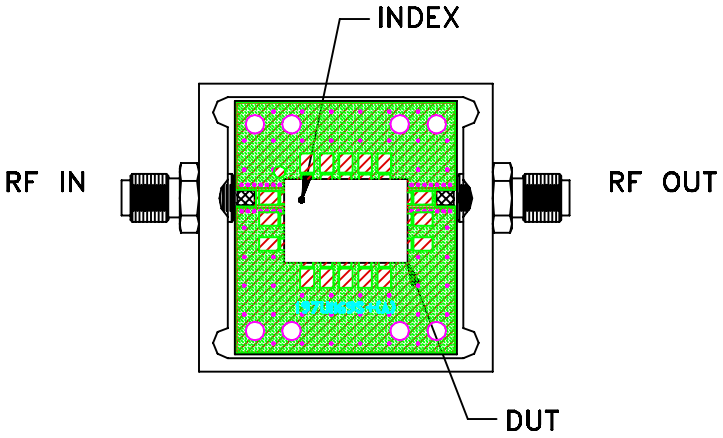
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

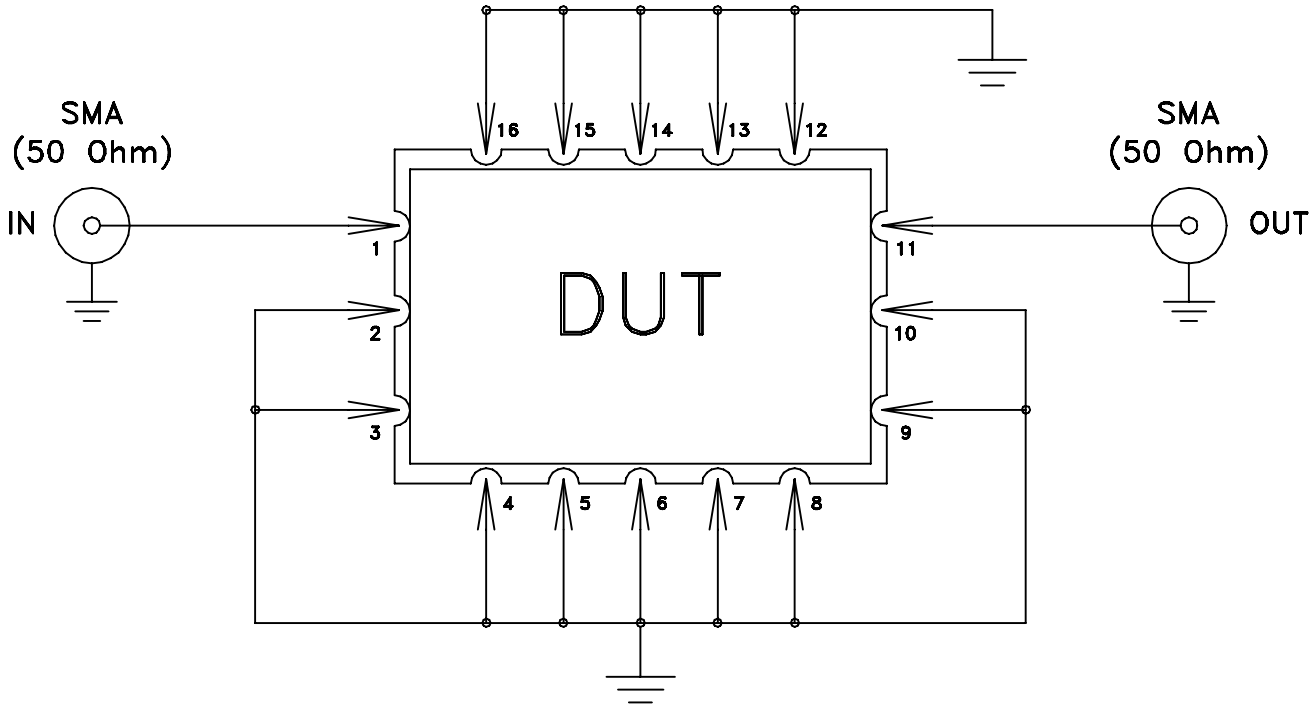
PL, 16FL03, LW1611, CSCR

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-338	OR

FILE:	SCALE:	SHEET:
98PL338	2.5:1	1 OF 1

Evaluation Board and Circuit





Schematic Diagram

Notes:
1. 50 Ohm SMA Female connectors.
2. PCB Material: ROGERS (R04350B) or equivalent, Dielectric Constant=3.5, Thickness=.060 inch.

Mini-Circuits®

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Environmental Specifications ENV54

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, 96 hours, 40°C	MIL-STD-202, Method 103B, Condition B, Except 50°C
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, 10-2000 Hz, 4 times in each of three axes (total 12)	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