Surface Mount

Power Splitter/Combiner

4 Way-0° 50Ω 1710 to 1990 MHz

BP4P+

Generic photo used for illustration purposes only

CASE STYLE: XX211

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

Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
7"	20, 50, 100, 200, 500, 1000
13"	2000

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-65°C to 150°C
Power Input (as a splitter)	1.5W max.
Internal Dissipation	0.375W max.

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

Pin Connections

SUM PORT	2
PORT 1	1
PORT 2	8
PORT 3	5
PORT 4	4
GROUND	3,6,7

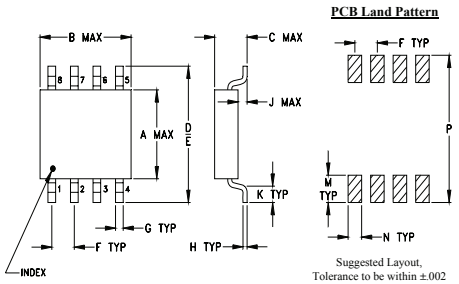
Features

- low insertion loss, 0.8 dB typ.
- excellent output VSWR, 1.25:1typ.
- aqueous washable
- excellent power handling, 1.5W

Applications

- PCS/DCS
- GSM
- WCDMA

Outline Drawing

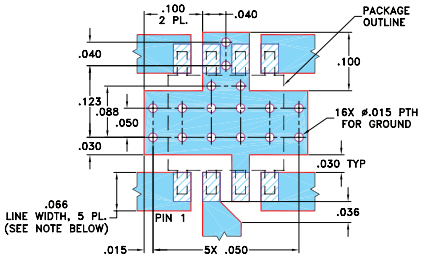


Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.163	.210	.077	.250	.220	.050	.017
4.14	5.33	1.96	6.35	5.59	1.27	0.43

H	J	K	M	N	P	wt
.009	.025	.030	.050	.030	.270	grams
0.23	0.64	0.76	1.27	0.76	6.86	0.10

Demo Board MCL P/N: TB-231
Suggested PCB Layout (PL-113)



NOTES: 1.TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.030" ± 0.002"; 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

Electrical Specifications

FREQ. RANGE (MHz)	ISOLATION (dB)		INSERTION LOSS (dB) ABOVE 6 dB		PHASE UNBALANCE (Degrees)	AMPLITUDE UNBALANCE Δ (dB)	VSWR (:1) Typ.	
							Ports S	Ports 1,2,3,4
f_L-f_U	Typ.	Min.	Typ.	Max.	Max.	Max.		
1710-1990	23	19*	0.8	1.3	15	0.5	1.2	1.25

*18 dB min. above 1900 MHz.

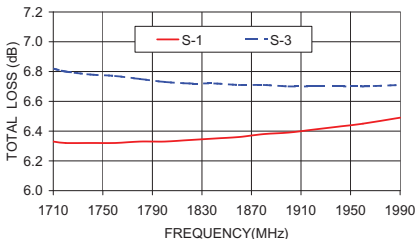
Δ Measurements relative to port 2.

Typical Performance Data

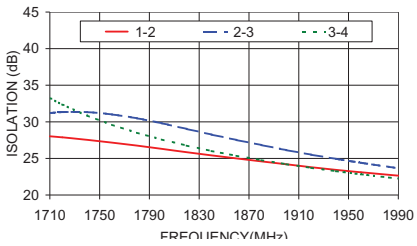
Freq. (MHz)	Total Loss[1] (dB)				Amp. Unbal. (dB)	Isolation (dB)			Phase Unbal. (deg.)	VSWR S	VSWR 1	VSWR 2	VSWR 3	VSWR 4
	S-1	S-2	S-3	S-4		1-2	2-3	3-4						
1710.00	6.33	6.64	6.82	6.82	0.50	28.02	31.20	33.25	6.48	1.14	1.22	1.28	1.24	1.29
1720.00	6.32	6.63	6.80	6.81	0.49	27.88	31.33	32.37	6.67	1.12	1.22	1.28	1.24	1.29
1740.00	6.32	6.61	6.78	6.80	0.48	27.54	31.32	30.86	7.05	1.09	1.21	1.27	1.23	1.28
1760.00	6.32	6.59	6.77	6.78	0.46	27.16	31.01	29.59	7.43	1.06	1.21	1.27	1.22	1.27
1780.00	6.33	6.57	6.75	6.77	0.45	26.75	30.48	28.51	7.82	1.05	1.20	1.26	1.22	1.26
1800.00	6.33	6.56	6.73	6.76	0.43	26.31	29.80	27.58	8.19	1.05	1.20	1.26	1.21	1.26
1820.00	6.34	6.55	6.72	6.76	0.42	25.85	29.03	26.75	8.56	1.07	1.19	1.25	1.21	1.25
1840.00	6.35	6.54	6.72	6.76	0.41	25.41	28.25	26.01	8.93	1.10	1.19	1.25	1.20	1.24
1860.00	6.36	6.54	6.71	6.76	0.39	25.00	27.52	25.36	9.30	1.13	1.19	1.24	1.20	1.24
1880.00	6.38	6.54	6.71	6.76	0.38	24.59	26.83	24.76	9.67	1.16	1.19	1.24	1.19	1.23
1900.00	6.39	6.53	6.70	6.76	0.36	24.20	26.14	24.21	10.04	1.19	1.18	1.24	1.19	1.23
1920.00	6.41	6.53	6.70	6.76	0.35	23.80	25.51	23.71	10.41	1.22	1.18	1.23	1.18	1.22
1940.00	6.43	6.53	6.70	6.77	0.34	23.43	24.93	23.25	10.77	1.25	1.17	1.23	1.18	1.22
1960.00	6.45	6.54	6.70	6.78	0.32	23.11	24.40	22.83	11.13	1.28	1.17	1.22	1.18	1.21
1990.00	6.49	6.54	6.71	6.79	0.30	22.65	23.66	22.24	11.70	1.33	1.17	1.22	1.17	1.21

1. Total Loss = Insertion Loss + 6dB splitter loss.

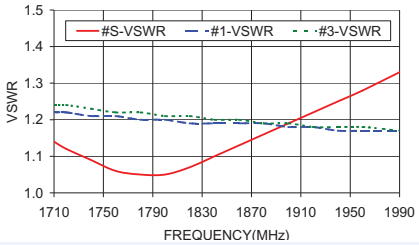
BP4P+
TOTAL LOSS



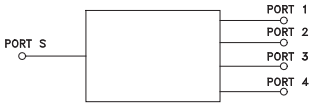
BP4P+
ISOLATION



BP4P+
VSWR



electrical schematic



ESD Rating
Human Body Model (HBM): Class 1A (250 v to <500 v) in accordance with ANSI/ESD STM 5.1 - 2001
Machine Model (MM): Class M1 (< 100 v) in accordance with ANSI/ESD STM 5.2 - 1999 (pass 50V)

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

REV. C
M151107
ED-12348C/8+
RS/LC/CP/AM
BP4P+
150619

4 Way-0° Power Splitter/Combiner BP4P+

Typical Performance Data

FREQ. (MHz)	TOTAL LOSS[1] (dB)				AMP. UNBAL. (dB)	ISOLATION (dB)			PHASE UNBAL. (deg.)
	S-1	S-2	S-3	S-4		1-2	2-3	3-4	
1200.0	8.54	9.31	9.51	9.40	0.96	16.69	15.34	17.81	4.31
1250.0	8.07	8.79	8.98	8.88	0.92	17.59	16.16	18.88	3.09
1300.0	7.66	8.34	8.53	8.44	0.87	18.63	17.11	20.14	1.95
1350.0	7.33	7.96	8.15	8.07	0.83	19.81	18.20	21.66	0.86
1400.0	7.05	7.63	7.83	7.75	0.78	21.15	19.45	23.50	0.72
1450.0	6.82	7.36	7.55	7.49	0.73	22.64	20.90	25.80	1.42
1500.0	6.65	7.15	7.33	7.29	0.69	24.25	22.57	28.84	2.37
1550.0	6.52	6.97	7.16	7.12	0.64	25.88	24.50	33.27	3.35
1600.0	6.42	6.83	7.02	6.99	0.59	27.33	26.75	41.16	4.36
1650.0	6.36	6.73	6.91	6.90	0.55	28.14	29.08	41.87	5.35
1700.0	6.33	6.65	6.83	6.83	0.50	28.13	31.00	34.24	6.30
1710.0	6.33	6.64	6.82	6.82	0.50	28.02	31.20	33.25	6.48
1720.0	6.32	6.63	6.80	6.81	0.49	27.88	31.33	32.37	6.67
1730.0	6.32	6.62	6.79	6.81	0.48	27.72	31.37	31.58	6.86
1740.0	6.32	6.61	6.78	6.80	0.48	27.54	31.32	30.86	7.05
1750.0	6.32	6.60	6.77	6.79	0.47	27.35	31.21	30.19	7.24
1760.0	6.32	6.59	6.77	6.78	0.46	27.16	31.01	29.59	7.43
1770.0	6.32	6.58	6.76	6.78	0.46	26.96	30.77	29.04	7.63
1780.0	6.33	6.57	6.75	6.77	0.45	26.75	30.48	28.51	7.82
1790.0	6.33	6.57	6.74	6.77	0.44	26.53	30.15	28.02	8.01
1800.0	6.33	6.56	6.73	6.76	0.43	26.31	29.80	27.58	8.19
1810.0	6.33	6.56	6.73	6.76	0.43	26.08	29.44	27.16	8.37
1820.0	6.34	6.55	6.72	6.76	0.42	25.85	29.03	26.75	8.56
1830.0	6.34	6.55	6.72	6.76	0.41	25.63	28.65	26.38	8.74
1840.0	6.35	6.54	6.72	6.76	0.41	25.41	28.25	26.01	8.93
1850.0	6.36	6.54	6.71	6.76	0.40	25.20	27.88	25.67	9.12
1860.0	6.36	6.54	6.71	6.76	0.39	25.00	27.52	25.36	9.30
1870.0	6.37	6.54	6.71	6.76	0.39	24.79	27.17	25.05	9.49
1880.0	6.38	6.54	6.71	6.76	0.38	24.59	26.83	24.76	9.67
1890.0	6.39	6.53	6.70	6.76	0.37	24.39	26.49	24.48	9.86
1900.0	6.39	6.53	6.70	6.76	0.36	24.20	26.14	24.21	10.04
1910.0	6.40	6.53	6.70	6.76	0.36	23.99	25.82	23.96	10.22
1920.0	6.41	6.53	6.70	6.76	0.35	23.80	25.51	23.71	10.41
1930.0	6.42	6.53	6.70	6.77	0.35	23.61	25.20	23.48	10.58
1940.0	6.43	6.53	6.70	6.77	0.34	23.43	24.93	23.25	10.77
1950.0	6.44	6.53	6.70	6.77	0.33	23.27	24.66	23.03	10.95
1960.0	6.45	6.54	6.70	6.78	0.32	23.11	24.40	22.83	11.13
1970.0	6.46	6.54	6.70	6.78	0.32	22.96	24.15	22.62	11.32
1980.0	6.47	6.54	6.71	6.78	0.31	22.80	23.89	22.43	11.50
1990.0	6.49	6.54	6.71	6.79	0.30	22.65	23.66	22.24	11.70
2000.0	6.50	6.55	6.71	6.79	0.30	22.49	23.42	22.06	11.89
2050.0	6.56	6.56	6.72	6.82	0.26	21.80	22.37	21.23	12.80
2100.0	6.63	6.59	6.75	6.86	0.27	21.20	21.44	20.52	13.70
2200.0	6.78	6.65	6.80	6.94	0.29	20.21	19.96	19.35	15.49
2300.0	6.94	6.72	6.87	7.04	0.32	19.44	18.78	18.42	17.28
2400.0	7.11	6.81	6.95	7.14	0.34	18.83	17.82	17.65	19.06
2500.0	7.28	6.90	7.03	7.25	0.38	18.35	17.00	16.99	20.86
2600.0	7.45	6.99	7.12	7.36	0.46	17.96	16.30	16.41	22.59
2800.0	7.78	7.18	7.32	7.60	0.59	17.37	15.13	15.43	25.97
3000.0	8.09	7.39	7.53	7.84	0.70	16.95	14.17	14.59	29.18
3200.0	8.39	7.60	7.77	8.09	0.79	16.58	13.35	13.84	32.19

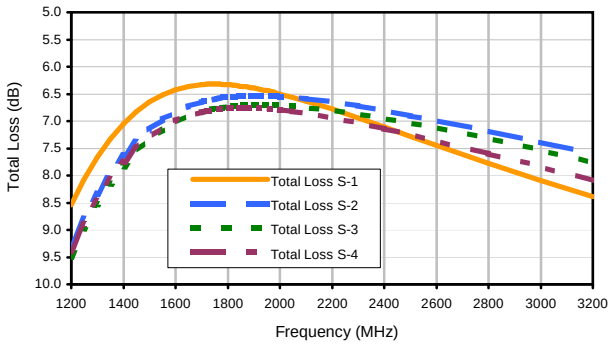
FREQ. (MHz)	VSWR (:1)				
	S	1	2	3	4
1200.0	3.90	1.49	1.49	1.49	1.62
1250.0	3.35	1.46	1.47	1.47	1.59
1300.0	2.89	1.43	1.45	1.44	1.55
1350.0	2.51	1.39	1.43	1.41	1.51
1400.0	2.20	1.36	1.41	1.39	1.47
1450.0	1.94	1.33	1.38	1.36	1.44
1500.0	1.72	1.30	1.36	1.33	1.40
1550.0	1.54	1.28	1.34	1.31	1.37
1600.0	1.39	1.26	1.32	1.29	1.34
1650.0	1.26	1.24	1.30	1.26	1.32
1700.0	1.16	1.22	1.29	1.25	1.30
1710.0	1.14	1.22	1.28	1.24	1.29
1720.0	1.12	1.22	1.28	1.24	1.29
1730.0	1.10	1.21	1.28	1.23	1.28
1740.0	1.09	1.21	1.27	1.23	1.28
1750.0	1.07	1.21	1.27	1.23	1.28
1760.0	1.06	1.21	1.27	1.22	1.27
1770.0	1.05	1.21	1.27	1.22	1.27
1780.0	1.05	1.20	1.26	1.22	1.26
1790.0	1.05	1.20	1.26	1.22	1.26
1800.0	1.05	1.20	1.26	1.21	1.26
1810.0	1.06	1.19	1.26	1.21	1.25
1820.0	1.07	1.19	1.25	1.21	1.25
1830.0	1.09	1.19	1.25	1.20	1.25
1840.0	1.10	1.19	1.25	1.20	1.24
1850.0	1.11	1.19	1.25	1.20	1.24
1860.0	1.13	1.19	1.24	1.20	1.24
1870.0	1.14	1.19	1.24	1.19	1.24
1880.0	1.16	1.19	1.24	1.19	1.23
1890.0	1.17	1.18	1.24	1.19	1.23
1900.0	1.19	1.18	1.24	1.19	1.23
1910.0	1.20	1.18	1.23	1.18	1.22
1920.0	1.22	1.18	1.23	1.18	1.22
1930.0	1.23	1.18	1.23	1.18	1.22
1940.0	1.25	1.17	1.23	1.18	1.22
1950.0	1.26	1.17	1.23	1.18	1.22
1960.0	1.28	1.17	1.22	1.18	1.21
1970.0	1.30	1.17	1.22	1.17	1.21
1980.0	1.31	1.17	1.22	1.17	1.21
1990.0	1.33	1.17	1.22	1.17	1.21
2000.0	1.34	1.17	1.22	1.17	1.20
2050.0	1.42	1.16	1.21	1.16	1.19
2100.0	1.50	1.16	1.20	1.15	1.18
2200.0	1.65	1.15	1.19	1.15	1.17
2300.0	1.80	1.14	1.19	1.14	1.15
2400.0	1.94	1.13	1.19	1.14	1.14
2500.0	2.08	1.12	1.19	1.15	1.12
2600.0	2.21	1.11	1.20	1.16	1.10
2800.0	2.48	1.08	1.22	1.19	1.07
3000.0	2.74	1.05	1.27	1.24	1.04
3200.0	3.01	1.05	1.33	1.31	1.06

[1]Total Loss = Insertion Loss + 6dB Splitter Loss

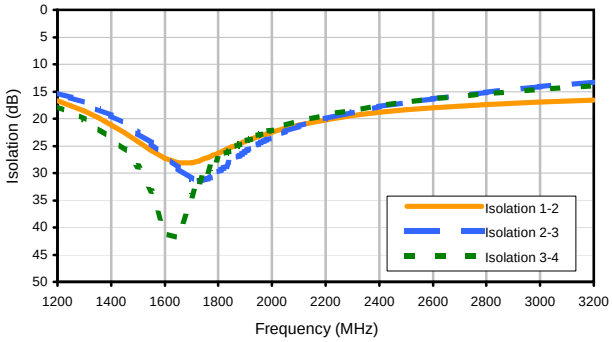
4 Way-0° Power Splitter/Combiner BP4P+

Typical Performance Curves

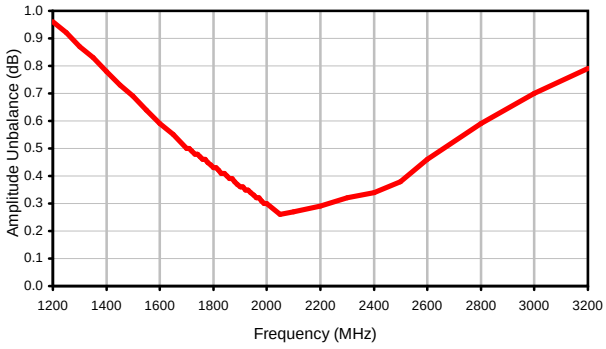
Total Loss



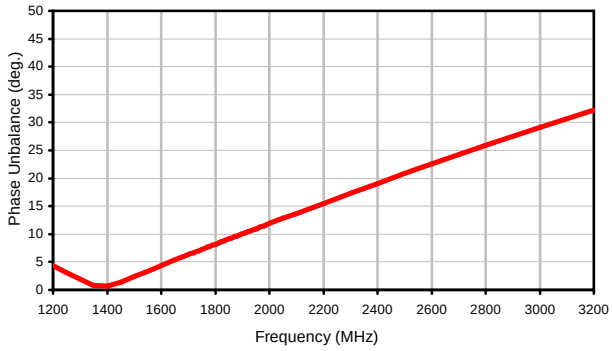
Isolation



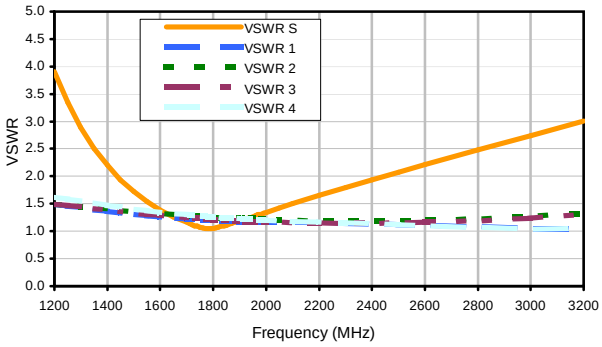
Amplitude Unbalance



Phase Unbalance



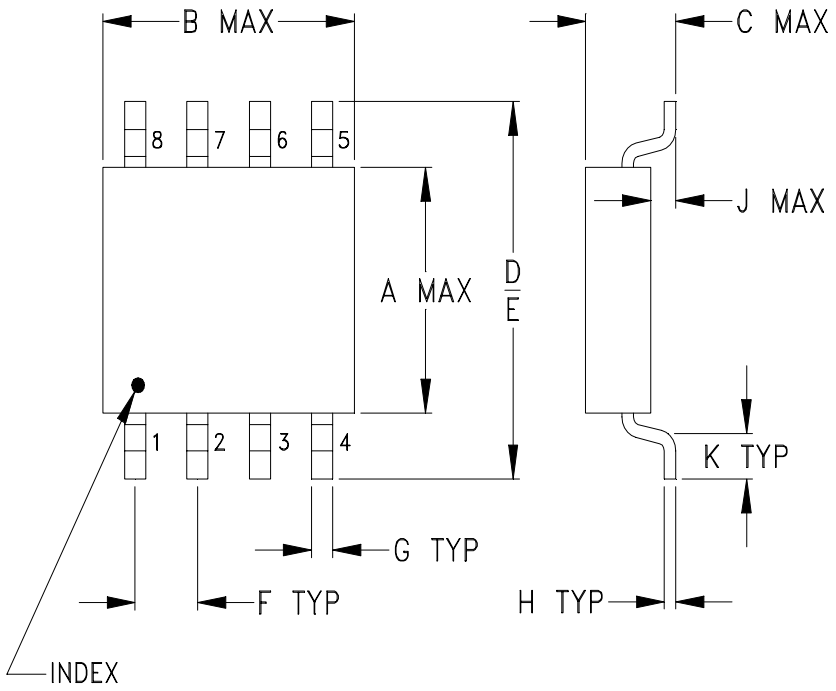
VSWR



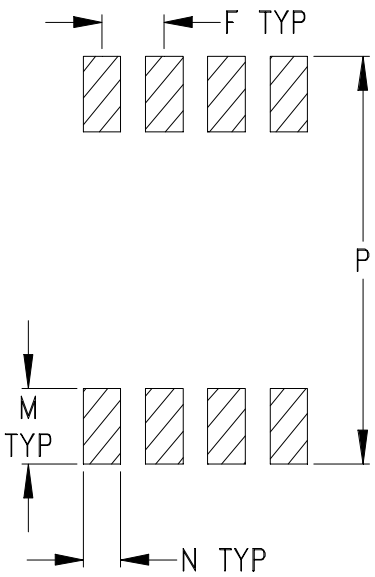
Case Style XX

XX211

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N	P
XX211	.163 (4.14)	.210 (5.33)	.077 (1.96)	.250 (6.35)	.220 (5.59)	.050 (1.27)	.017 (0.43)	.009 (0.23)	.025 (0.64)	.030 (0.76)	-- --	.050 (1.27)	.030 (0.76)	.270 (6.86)

CASE #	Q	R	S	WT. GRAM
XX211	-- --	-- --	-- --	.10

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

Notes:

1. Case material: Plastic.
2. Termination finish:
   For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier. All models, (+) suffix. ⊗
   For RoHS-5 Case Styles: Tin-Lead plate. All models, No (+) suffix.
3. Special Tolerances: Termination width ± .005 inch, termination thickness ± .003 inch.

⊗ Model BP4C+ will be supplied with either Tin finish or Tin-Silver-Nickel finish until Tin finish inventory is depleted.

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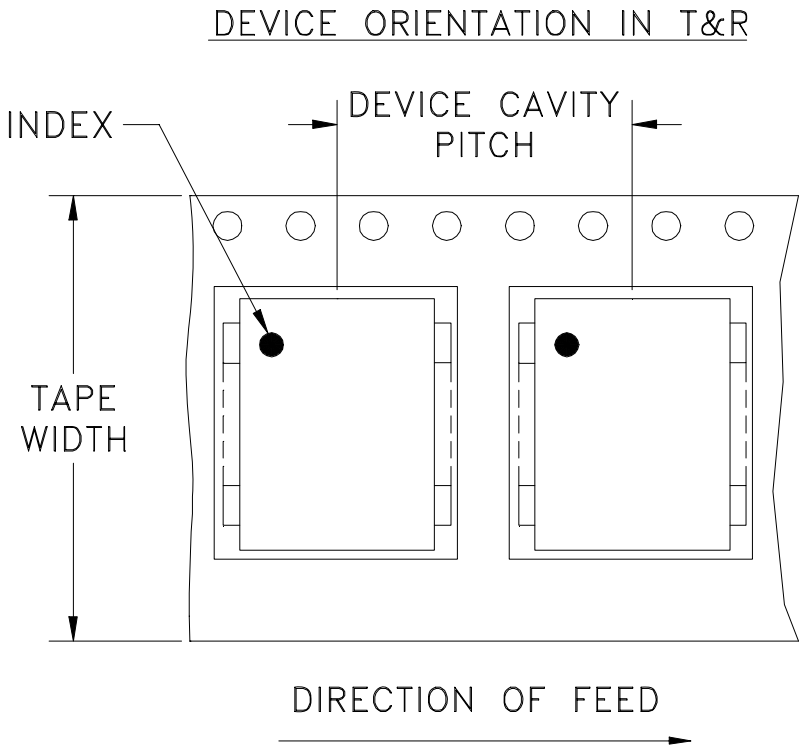
Tape & Reel Packaging TR-F16



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
12	8	7	Small quantity standards (see note)	20
				50
				100
				200
				500
			Standard	1000*
		13	Standard	2000**

Note : Please Consult individual model data sheet to determine device per reel availability
* BP models only
** MSW and MSWA models

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

Mini-Circuits®
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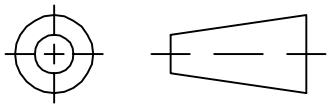
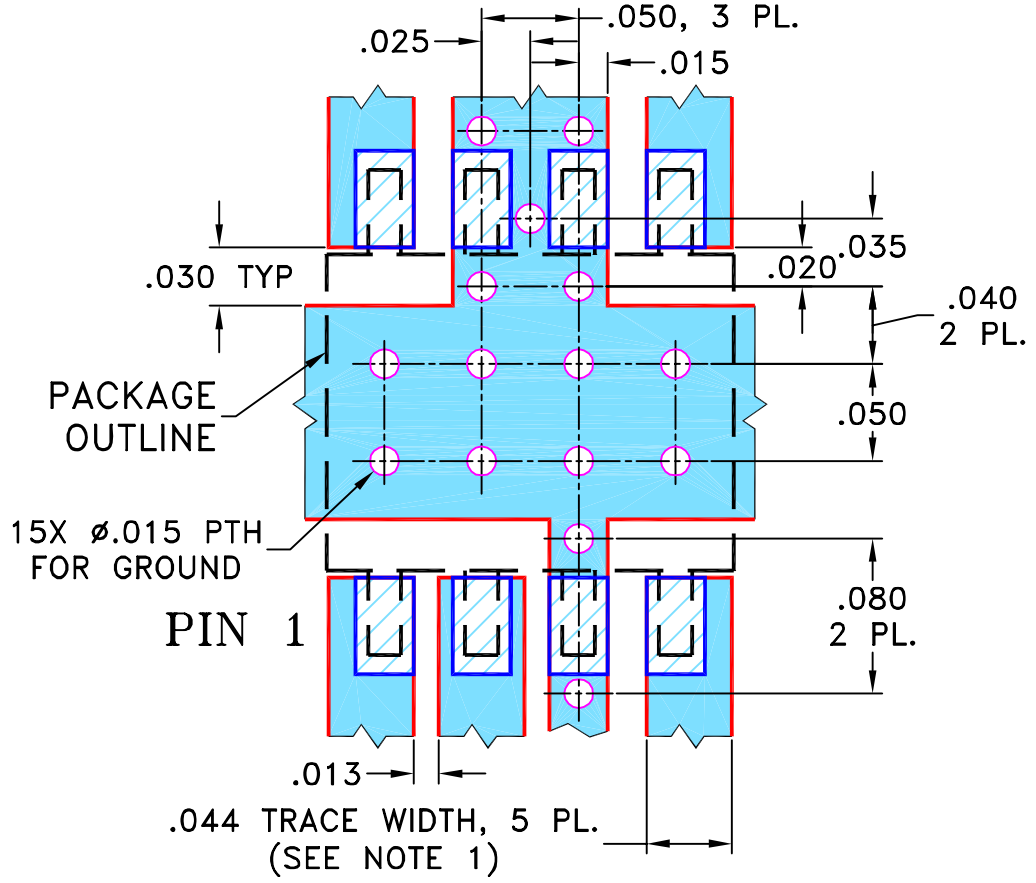
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M83023	NEW RELEASE	01/28/03	MMG	HY
A	M102713	ADDED "...WITH SMOBC"	01/14/06	GF	IL
B	M104061	UPDATED DWG. PER B14-TB-231 (REV. A)	04/20/06	MMG	YB

SUGGESTED MOUNTING CONFIGURATION FOR XX211 CASE STYLE, "js" PIN CONNECTION



NOTES: 1.TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.020" ± 0.0015"; 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 SOLDER MASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	MMG	01/23/03
TOLERANCES ON:	CHECKED	AV	01/28/03
2 PL DECIMALS ±	APPROVED	HY	01/28/03
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

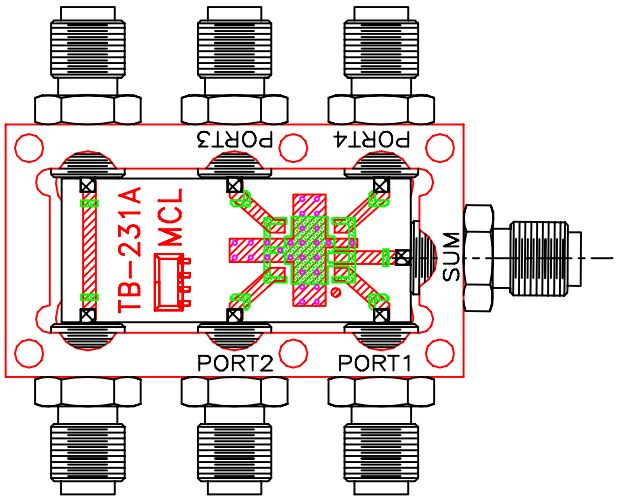
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, js, XX211, BP4P/BP4C, TB-231

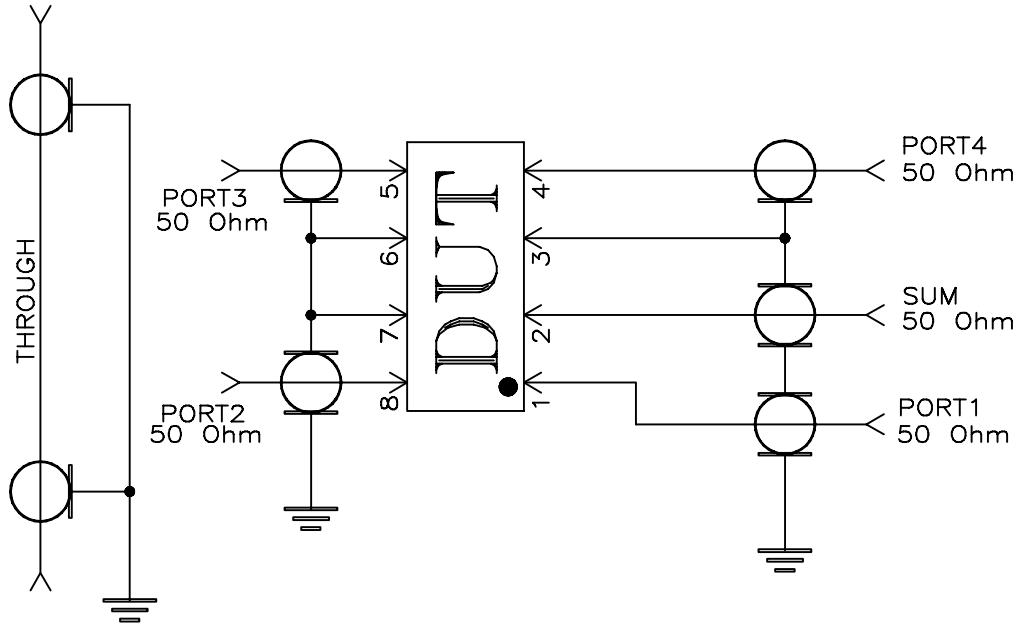
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-113	B

FILE:	SCALE:	SHEET:
98PL113	10:1	1 OF 1

Evaluation Board and Circuit



TB-231



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.020 inch.

Mini-Circuits®

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Environmental Specifications ENV12

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