

# Surface Mount Power Splitter/Combiner

## BP4U1+

4 Way-0° 50Ω

1850 to 3000 MHz



Generic photo used for illustration purposes only

CASE STYLE: XX211

### Maximum Ratings

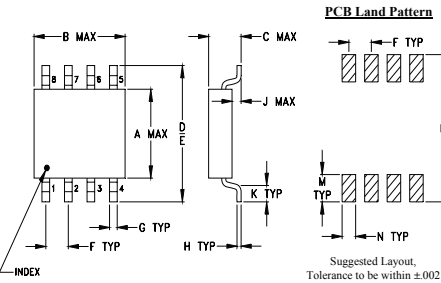
Operating Temperature	-40°C to 85°C
Storage Temperature	-65°C to 150°C
Power Input (as a splitter)	1.5W max.
Internal Dissipation	0.375W max.

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 EXTERNAL	3,6,7

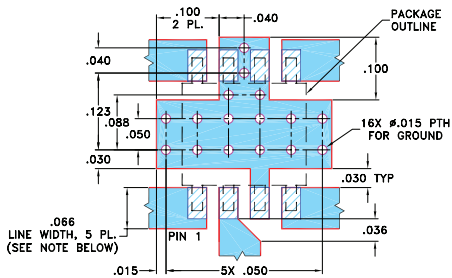
### Outline Drawing



### 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

#### 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)

### Features

- wide bandwidth, 1850-3000 MHz
- excellent output VSWR, 1.2:1 typ.
- excellent power handling, 1.5W
- aqueous washable

### Applications

- blue tooth
- IEEE 802.11b, g

### Electrical Specifications

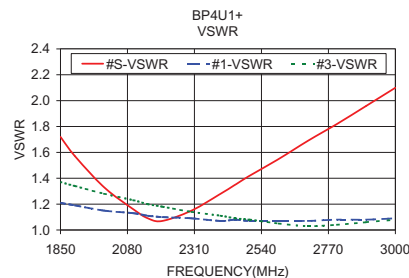
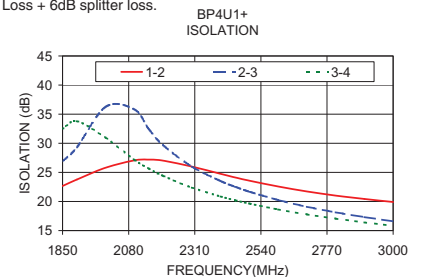
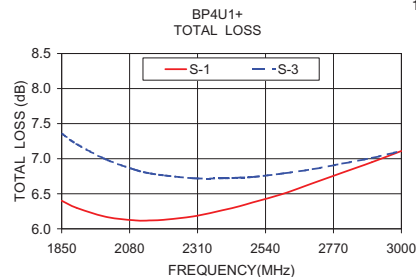
FREQ. RANGE (MHz)	ISOLATION (dB)		INSERTION LOSS (dB) ABOVE 6 dB		PHASE UNBALANCE (Degrees)	AMPLITUDE UNBALANCE (dB)	VSWR (:1) Typ.	
	Typ.	Min.	Typ.	Max.			Port S	Ports 1,2,3,4
$f_L$ - $f_U$					Max.	Max.		
1850-3000	23	15*	0.7	1.7	28	1.3	1.5	1.2

\*13 dB above 2600 MHz

### Typical Performance Data

Freq. (MHz)	Total Loss <sup>1</sup> (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						
1850.00	6.40	7.28	7.36	7.25	0.96	22.67	26.87	32.49	3.18	1.72	1.21	1.37	1.37	1.43
1900.00	6.30	7.13	7.21	7.12	0.91	23.77	29.31	33.79	4.19	1.57	1.19	1.35	1.34	1.40
2000.00	6.17	6.92	6.99	6.93	0.82	25.80	36.26	30.96	6.17	1.33	1.15	1.29	1.28	1.34
2100.00	6.12	6.78	6.84	6.82	0.72	27.06	35.82	27.14	8.09	1.16	1.13	1.24	1.23	1.30
2150.00	6.12	6.73	6.79	6.79	0.68	27.19	32.42	25.65	9.00	1.09	1.11	1.22	1.20	1.28
2200.00	6.13	6.70	6.76	6.77	0.64	27.02	29.67	24.40	9.88	1.07	1.10	1.20	1.18	1.26
2300.00	6.18	6.67	6.72	6.76	0.58	26.00	26.00	22.39	11.73	1.15	1.09	1.16	1.14	1.23
2400.00	6.27	6.67	6.72	6.79	0.53	24.75	23.51	20.86	13.53	1.28	1.07	1.13	1.11	1.20
2450.00	6.32	6.69	6.73	6.82	0.50	24.13	22.54	20.22	14.49	1.35	1.08	1.11	1.09	1.19
2500.00	6.38	6.70	6.74	6.85	0.47	23.57	21.69	19.64	15.39	1.42	1.07	1.10	1.08	1.17
2600.00	6.50	6.75	6.79	6.93	0.42	22.58	20.26	18.63	17.09	1.55	1.07	1.08	1.05	1.15
2700.00	6.65	6.82	6.85	7.02	0.37	21.72	19.10	17.78	18.77	1.69	1.07	1.06	1.03	1.12
2800.00	6.80	6.89	6.93	7.12	0.33	21.01	18.14	17.05	20.44	1.82	1.08	1.06	1.04	1.11
2900.00	6.95	6.97	7.01	7.22	0.28	20.43	17.32	16.40	22.00	1.96	1.08	1.07	1.06	1.09
3000.00	7.11	7.07	7.11	7.35	0.28	19.91	16.58	15.83	23.61	2.10	1.09	1.09	1.08	1.07

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



### 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)



# 4 Way-0° Power Splitter/Combiner

# BP4U1+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER = 0dBm @Temperature = +25°C

FREQ. (MHz)	TOTAL LOSS <sup>1</sup> (dB)				AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION (dB)			VSWR (:1)				
	S-1	S-2	S-3	S-4			1-2	2-3	3-4	S	1	2	3	4
1000	13.92	15.76	15.83	15.15	1.91	22.41	12.61	13.86	15.08	13.66	1.53	1.78	1.83	1.91
1100	12.41	14.11	14.19	13.54	1.79	18.45	13.00	14.23	15.59	10.58	1.50	1.75	1.79	1.87
1150	11.71	13.36	13.44	12.79	1.73	16.62	13.24	14.45	15.89	9.29	1.48	1.72	1.77	1.84
1200	11.06	12.65	12.74	12.10	1.68	14.89	13.51	14.72	16.26	8.13	1.46	1.70	1.75	1.81
1250	10.45	11.99	12.07	11.45	1.63	13.21	13.82	15.03	16.66	7.12	1.44	1.68	1.72	1.78
1300	9.88	11.37	11.45	10.85	1.57	11.61	14.17	15.38	17.14	6.23	1.42	1.65	1.69	1.75
1350	9.35	10.79	10.88	10.29	1.52	10.01	14.56	15.79	17.68	5.46	1.39	1.62	1.66	1.71
1400	8.86	10.25	10.34	9.77	1.47	8.51	15.01	16.25	18.30	4.78	1.36	1.59	1.63	1.67
1450	8.42	9.76	9.85	9.30	1.43	7.21	15.52	16.78	19.03	4.19	1.34	1.55	1.59	1.63
1500	8.02	9.32	9.40	8.88	1.38	5.90	16.08	17.40	19.86	3.69	1.31	1.52	1.55	1.59
1550	7.66	8.92	9.00	8.50	1.33	4.63	16.71	18.10	20.82	3.26	1.28	1.48	1.51	1.54
1600	7.34	8.55	8.63	8.16	1.29	3.42	17.41	18.88	21.92	2.88	1.25	1.44	1.46	1.50
1650	7.06	8.23	8.31	7.86	1.24	2.19	18.18	19.79	23.20	2.56	1.22	1.40	1.42	1.45
1700	6.83	7.95	8.03	7.60	1.20	1.37	19.05	20.83	24.72	2.28	1.19	1.36	1.37	1.41
1750	6.62	7.71	7.78	7.38	1.16	0.99	19.99	22.00	26.48	2.04	1.16	1.32	1.33	1.37
1800	6.46	7.50	7.57	7.20	1.11	2.00	21.03	23.37	28.55	1.83	1.13	1.28	1.29	1.32
1850	6.32	7.33	7.39	7.04	1.08	3.26	22.15	24.95	30.69	1.65	1.10	1.24	1.25	1.29
1890	6.23	7.21	7.28	6.95	1.05	4.22	23.12	26.37	32.15	1.53	1.08	1.22	1.21	1.26
1900	6.21	7.18	7.25	6.92	1.04	4.43	23.37	26.75	32.41	1.50	1.08	1.21	1.21	1.25
1950	6.13	7.06	7.13	6.83	1.00	3.74	24.67	28.84	32.52	1.36	1.06	1.18	1.17	1.21
2000	6.07	6.97	7.04	6.76	0.97	6.74	26.00	30.93	31.00	1.25	1.04	1.15	1.14	1.18
2050	6.04	6.91	6.97	6.72	0.93	7.92	27.29	32.39	29.09	1.15	1.03	1.13	1.10	1.15
2100	6.02	6.86	6.93	6.69	0.91	8.95	28.36	32.31	27.27	1.08	1.04	1.12	1.08	1.12
2150	6.02	6.83	6.90	6.68	0.88	10.03	29.07	30.76	25.67	1.07	1.05	1.11	1.07	1.10
2180	6.03	6.82	6.88	6.69	0.85	10.71	29.22	29.64	24.87	1.11	1.07	1.11	1.07	1.08
2200	6.03	6.81	6.88	6.69	0.85	11.15	29.21	28.90	24.38	1.14	1.07	1.11	1.07	1.07
2250	6.06	6.82	6.89	6.72	0.83	12.24	28.88	27.18	23.25	1.21	1.09	1.11	1.08	1.06
2280	6.08	6.83	6.90	6.74	0.82	12.84	28.49	26.23	22.68	1.26	1.10	1.12	1.10	1.05
2300	6.10	6.83	6.90	6.75	0.81	13.20	28.20	25.62	22.30	1.30	1.11	1.13	1.10	1.05
2350	6.14	6.86	6.93	6.80	0.79	14.13	27.40	24.38	21.47	1.38	1.13	1.14	1.13	1.04
2400	6.20	6.89	6.96	6.85	0.76	15.10	26.55	23.25	20.70	1.47	1.15	1.16	1.16	1.05
2450	6.26	6.93	7.00	6.91	0.75	16.07	25.73	22.28	20.04	1.56	1.16	1.18	1.19	1.06
2480	6.30	6.96	7.03	6.95	0.74	16.60	25.26	21.77	19.67	1.61	1.17	1.20	1.20	1.07
2490	6.31	6.97	7.04	6.97	0.73	16.77	25.12	21.60	19.55	1.63	1.18	1.20	1.21	1.07
2500	6.32	6.98	7.05	6.98	0.73	16.94	24.97	21.43	19.44	1.65	1.18	1.21	1.21	1.08
2550	6.39	7.03	7.10	7.04	0.71	17.79	24.26	20.63	18.88	1.74	1.20	1.23	1.24	1.09
2580	6.44	7.06	7.14	7.09	0.70	18.32	23.86	20.18	18.58	1.79	1.21	1.25	1.26	1.10
2600	6.46	7.08	7.16	7.11	0.70	18.67	23.59	19.90	18.38	1.83	1.21	1.26	1.27	1.11
2650	6.54	7.14	7.22	7.19	0.68	19.52	22.95	19.26	17.90	1.92	1.23	1.28	1.30	1.13
2680	6.58	7.18	7.26	7.24	0.68	20.01	22.62	18.90	17.63	1.97	1.24	1.29	1.32	1.14
2700	6.62	7.20	7.28	7.27	0.66	20.33	22.38	18.67	17.46	2.01	1.25	1.31	1.33	1.15
2750	6.69	7.26	7.35	7.34	0.65	21.11	21.85	18.15	17.06	2.10	1.27	1.33	1.36	1.16
2780	6.74	7.29	7.39	7.40	0.65	21.55	21.54	17.84	16.83	2.15	1.27	1.34	1.38	1.17
2800	6.78	7.31	7.41	7.42	0.65	21.86	21.35	17.65	16.68	2.18	1.28	1.35	1.39	1.18
2850	6.85	7.38	7.47	7.50	0.64	22.55	20.87	17.19	16.33	2.27	1.30	1.38	1.41	1.20
2880	6.91	7.42	7.51	7.55	0.64	22.94	20.62	16.93	16.14	2.32	1.31	1.39	1.42	1.21
2900	6.94	7.44	7.53	7.58	0.64	23.22	20.46	16.76	16.02	2.36	1.31	1.40	1.44	1.22
2950	7.02	7.50	7.60	7.65	0.63	24.03	20.05	16.35	15.70	2.44	1.33	1.42	1.46	1.23
2980	7.07	7.53	7.63	7.70	0.63	24.29	19.82	16.12	15.53	2.48	1.34	1.43	1.47	1.24
3000	7.10	7.55	7.65	7.73	0.62	24.56	19.66	15.97	15.41	2.51	1.34	1.44	1.48	1.25
3050	7.19	7.60	7.71	7.80	0.60	25.19	19.31	15.61	15.13	2.60	1.35	1.46	1.50	1.26
3100	7.28	7.66	7.76	7.87	0.59	25.86	18.97	15.26	14.86	2.68	1.36	1.48	1.53	1.28
3150	7.36	7.71	7.82	7.95	0.58	26.44	18.65	14.94	14.61	2.75	1.38	1.49	1.54	1.29

<sup>1</sup>Total Loss = Insertion Loss + 6dB Splitter Loss

REV. X2  
BP4U1+  
100705

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# 4 Way-0° Power Splitter/Combiner

# BP4U1+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER = 0dBm @Temperature = -40°C

FREQ. (MHz)	TOTAL LOSS <sup>1</sup> (dB)				AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION (dB)			VSWR (:1)				
	S-1	S-2	S-3	S-4			1-2	2-3	3-4	S	1	2	3	4
1000	13.90	15.70	15.78	15.12	1.87	22.38	12.47	13.71	14.92	15.74	1.53	1.79	1.83	1.92
1100	12.38	14.05	14.13	13.49	1.75	18.34	12.85	14.05	15.41	11.92	1.50	1.75	1.80	1.87
1150	11.68	13.29	13.38	12.75	1.70	16.53	13.07	14.27	15.69	10.38	1.48	1.73	1.77	1.84
1200	11.03	12.59	12.67	12.06	1.65	14.65	13.33	14.51	16.04	9.06	1.45	1.71	1.75	1.81
1250	10.40	11.92	12.00	11.39	1.60	12.93	13.64	14.82	16.45	7.84	1.44	1.69	1.73	1.78
1300	9.81	11.27	11.36	10.77	1.55	11.31	13.99	15.17	16.92	6.78	1.42	1.66	1.70	1.75
1350	9.28	10.69	10.78	10.21	1.50	9.64	14.38	15.56	17.45	5.91	1.39	1.63	1.67	1.71
1400	8.79	10.15	10.24	9.68	1.46	8.12	14.81	16.02	18.05	5.15	1.37	1.60	1.64	1.67
1450	8.33	9.65	9.74	9.21	1.41	6.66	15.31	16.54	18.76	4.47	1.34	1.57	1.61	1.64
1500	7.92	9.20	9.29	8.78	1.36	5.28	15.88	17.14	19.59	3.92	1.32	1.54	1.57	1.60
1550	7.55	8.79	8.88	8.39	1.32	3.91	16.49	17.83	20.52	3.43	1.30	1.50	1.53	1.56
1600	7.22	8.41	8.50	8.03	1.27	3.19	17.17	18.59	21.59	3.01	1.26	1.45	1.49	1.52
1650	6.94	8.09	8.18	7.73	1.24	2.63	17.93	19.46	22.82	2.67	1.23	1.41	1.44	1.47
1700	6.70	7.82	7.90	7.47	1.19	2.12	18.78	20.45	24.29	2.38	1.20	1.38	1.40	1.42
1750	6.49	7.56	7.64	7.24	1.15	2.82	19.71	21.60	25.99	2.11	1.17	1.34	1.35	1.38
1800	6.32	7.34	7.42	7.05	1.10	3.50	20.69	22.94	27.89	1.89	1.14	1.29	1.30	1.34
1850	6.17	7.15	7.23	6.89	1.06	4.22	21.82	24.44	30.02	1.70	1.11	1.25	1.25	1.29
1890	6.08	7.03	7.11	6.79	1.03	4.86	22.79	25.78	31.53	1.56	1.09	1.23	1.22	1.27
1900	6.05	7.00	7.08	6.76	1.03	5.11	23.02	26.18	31.85	1.53	1.09	1.22	1.21	1.26
1950	5.97	6.89	6.97	6.66	1.00	6.25	24.37	28.11	32.16	1.39	1.06	1.18	1.18	1.22
2000	5.91	6.79	6.88	6.59	0.97	7.39	25.68	30.06	30.96	1.27	1.04	1.16	1.14	1.19
2050	5.87	6.71	6.79	6.54	0.92	8.57	27.00	31.52	29.00	1.16	1.04	1.14	1.10	1.15
2100	5.85	6.66	6.74	6.51	0.89	9.79	28.19	31.74	27.21	1.08	1.05	1.11	1.08	1.12
2150	5.84	6.63	6.72	6.50	0.87	10.93	28.93	30.46	25.78	1.05	1.06	1.11	1.05	1.09
2180	5.85	6.63	6.71	6.50	0.87	11.74	29.24	29.44	25.01	1.09	1.07	1.11	1.05	1.08
2200	5.85	6.63	6.71	6.51	0.86	12.06	29.36	28.80	24.44	1.12	1.08	1.11	1.05	1.07
2250	5.87	6.62	6.70	6.53	0.83	13.10	29.06	27.16	23.22	1.20	1.10	1.11	1.08	1.06
2280	5.89	6.63	6.70	6.55	0.81	13.70	28.70	26.26	22.59	1.26	1.11	1.12	1.10	1.06
2300	5.91	6.63	6.72	6.57	0.80	14.23	28.40	25.66	22.22	1.29	1.12	1.14	1.11	1.05
2350	5.95	6.65	6.73	6.61	0.79	15.15	27.53	24.35	21.34	1.37	1.14	1.15	1.14	1.06
2400	6.00	6.69	6.77	6.65	0.77	16.07	26.63	23.25	20.58	1.47	1.16	1.17	1.18	1.07
2450	6.05	6.73	6.81	6.71	0.76	17.10	25.75	22.09	19.94	1.55	1.18	1.21	1.21	1.08
2480	6.09	6.76	6.84	6.75	0.76	17.57	25.33	21.68	19.61	1.61	1.19	1.22	1.23	1.09
2490	6.10	6.77	6.84	6.76	0.74	17.75	25.18	21.55	19.51	1.63	1.19	1.23	1.23	1.09
2500	6.11	6.78	6.86	6.78	0.75	18.02	24.99	21.36	19.37	1.65	1.20	1.23	1.24	1.10
2550	6.18	6.82	6.91	6.84	0.73	18.85	24.23	20.56	18.76	1.74	1.22	1.25	1.27	1.11
2580	6.23	6.86	6.95	6.90	0.72	19.37	23.83	20.16	18.42	1.80	1.23	1.27	1.30	1.12
2600	6.26	6.88	6.97	6.93	0.71	19.78	23.56	19.87	18.25	1.84	1.24	1.28	1.32	1.13
2650	6.33	6.94	7.03	7.00	0.71	20.70	22.99	19.17	17.80	1.93	1.26	1.31	1.35	1.15
2680	6.37	6.98	7.08	7.05	0.71	21.22	22.56	18.82	17.52	1.99	1.26	1.32	1.38	1.16
2700	6.39	7.00	7.11	7.06	0.72	21.49	22.30	18.59	17.34	2.02	1.27	1.34	1.38	1.17
2750	6.47	7.06	7.16	7.14	0.69	22.13	21.77	18.05	16.93	2.12	1.29	1.37	1.41	1.19
2780	6.53	7.10	7.21	7.20	0.68	22.73	21.48	17.75	16.71	2.17	1.31	1.39	1.44	1.20
2800	6.55	7.12	7.23	7.22	0.68	23.02	21.25	17.54	16.54	2.21	1.32	1.40	1.45	1.21
2850	6.63	7.19	7.29	7.29	0.66	23.62	20.74	17.07	16.17	2.30	1.33	1.42	1.48	1.23
2880	6.69	7.23	7.33	7.35	0.67	24.01	20.48	16.80	16.01	2.35	1.33	1.43	1.49	1.24
2900	6.72	7.25	7.35	7.37	0.65	24.32	20.31	16.64	15.87	2.40	1.34	1.44	1.50	1.25
2950	6.81	7.31	7.43	7.46	0.65	25.02	19.87	16.22	15.56	2.50	1.35	1.46	1.52	1.26
2980	6.87	7.35	7.47	7.50	0.63	25.38	19.68	15.99	15.36	2.54	1.37	1.46	1.52	1.27
3000	6.90	7.37	7.49	7.53	0.64	25.66	19.54	15.82	15.26	2.58	1.37	1.47	1.54	1.27
3050	6.98	7.41	7.54	7.60	0.62	26.29	19.13	15.48	14.97	2.66	1.38	1.49	1.56	1.29
3100	7.07	7.45	7.59	7.69	0.62	26.75	18.76	15.11	14.67	2.74	1.38	1.50	1.57	1.30
3150	7.16	7.50	7.65	7.77	0.61	27.47	18.41	14.77	14.43	2.83	1.39	1.50	1.58	1.30

<sup>1</sup>Total Loss = Insertion Loss + 6dB Splitter Loss

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# 4 Way-0° Power Splitter/Combiner

# BP4U1+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER = 0dBm @Temperature = +85°C

FREQ. (MHz)	TOTAL LOSS <sup>1</sup> (dB)				AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION (dB)			VSWR (:1)				
	S-1	S-2	S-3	S-4			1-2	2-3	3-4	S	1	2	3	4
1000	13.92	15.78	15.85	15.16	1.94	22.56	12.72	14.00	15.22	12.32	1.54	1.78	1.84	1.91
1100	12.42	14.14	14.22	13.55	1.80	18.70	13.11	14.36	15.72	9.66	1.50	1.74	1.80	1.86
1150	11.73	13.39	13.47	12.82	1.74	16.89	13.35	14.59	16.02	8.52	1.48	1.71	1.77	1.84
1200	11.08	12.69	12.76	12.12	1.68	15.14	13.61	14.84	16.39	7.51	1.46	1.69	1.75	1.80
1250	10.47	12.03	12.10	11.48	1.63	13.52	13.92	15.15	16.80	6.61	1.43	1.66	1.71	1.77
1300	9.91	11.41	11.48	10.89	1.57	12.15	14.27	15.50	17.27	5.81	1.41	1.63	1.68	1.73
1350	9.39	10.83	10.92	10.33	1.53	10.75	14.67	15.91	17.82	5.11	1.38	1.60	1.65	1.69
1400	8.90	10.31	10.38	9.82	1.48	9.40	15.12	16.38	18.45	4.51	1.35	1.57	1.61	1.65
1450	8.47	9.82	9.90	9.36	1.43	8.17	15.63	16.92	19.18	3.97	1.32	1.53	1.57	1.61
1500	8.07	9.38	9.46	8.94	1.38	6.90	16.20	17.54	20.03	3.51	1.29	1.49	1.52	1.57
1550	7.72	8.99	9.06	8.56	1.34	5.69	16.84	18.25	21.00	3.11	1.26	1.45	1.48	1.52
1600	7.41	8.63	8.70	8.22	1.29	4.53	17.55	19.05	22.14	2.76	1.23	1.41	1.43	1.48
1650	7.14	8.32	8.39	7.93	1.25	3.67	18.35	19.98	23.47	2.46	1.20	1.38	1.38	1.43
1700	6.90	8.06	8.12	7.68	1.21	3.21	19.24	21.03	25.02	2.20	1.17	1.34	1.34	1.39
1750	6.70	7.82	7.87	7.46	1.17	2.78	20.22	22.26	26.85	1.98	1.14	1.30	1.30	1.35
1800	6.55	7.62	7.67	7.28	1.13	2.36	21.25	23.70	28.93	1.79	1.11	1.27	1.26	1.31
1850	6.42	7.46	7.50	7.14	1.09	2.93	22.45	25.29	31.19	1.62	1.09	1.24	1.22	1.27
1890	6.33	7.34	7.39	7.05	1.06	3.66	23.46	26.83	32.51	1.50	1.07	1.21	1.19	1.24
1900	6.31	7.32	7.37	7.02	1.06	3.86	23.73	27.27	32.79	1.48	1.06	1.21	1.18	1.23
1950	6.24	7.21	7.26	6.93	1.03	4.93	25.10	29.33	32.34	1.35	1.04	1.19	1.15	1.20
2000	6.18	7.13	7.18	6.86	1.00	5.99	26.47	31.45	30.60	1.25	1.02	1.16	1.13	1.17
2050	6.16	7.05	7.10	6.82	0.94	5.46	27.73	32.65	28.64	1.16	1.02	1.15	1.11	1.14
2100	6.14	7.01	7.05	6.80	0.91	8.18	28.75	32.18	26.87	1.11	1.03	1.14	1.10	1.11
2150	6.15	6.98	7.03	6.80	0.89	9.27	29.29	30.40	25.50	1.11	1.05	1.13	1.10	1.09
2180	6.15	6.98	7.03	6.80	0.88	9.95	29.30	29.19	24.80	1.13	1.06	1.13	1.10	1.08
2200	6.16	6.98	7.03	6.81	0.87	10.28	29.37	28.63	24.25	1.16	1.07	1.13	1.10	1.06
2250	6.19	6.97	7.02	6.84	0.83	11.24	28.81	27.00	23.09	1.22	1.09	1.13	1.11	1.05
2280	6.22	6.99	7.03	6.86	0.81	11.82	28.35	26.11	22.53	1.27	1.10	1.13	1.13	1.04
2300	6.24	6.98	7.05	6.89	0.81	12.31	28.06	25.53	22.18	1.30	1.10	1.14	1.13	1.04
2350	6.29	7.01	7.06	6.93	0.77	13.18	27.15	24.27	21.32	1.38	1.12	1.14	1.15	1.03
2400	6.34	7.04	7.10	6.98	0.75	14.03	26.28	23.19	20.60	1.47	1.14	1.15	1.16	1.03
2450	6.41	7.08	7.13	7.04	0.73	15.02	25.46	22.05	20.04	1.55	1.15	1.17	1.18	1.05
2480	6.45	7.11	7.17	7.09	0.72	15.52	25.09	21.68	19.68	1.60	1.16	1.17	1.19	1.06
2490	6.46	7.11	7.18	7.10	0.72	15.68	24.99	21.56	19.59	1.62	1.16	1.18	1.20	1.06
2500	6.47	7.12	7.19	7.12	0.72	15.84	24.76	21.36	19.45	1.63	1.17	1.18	1.20	1.06
2550	6.55	7.16	7.23	7.18	0.68	16.68	24.08	20.61	18.86	1.72	1.18	1.20	1.22	1.08
2580	6.60	7.20	7.26	7.24	0.66	17.20	23.67	20.19	18.54	1.77	1.18	1.22	1.23	1.08
2600	6.63	7.22	7.29	7.27	0.66	17.57	23.47	19.93	18.36	1.81	1.19	1.23	1.24	1.09
2650	6.71	7.28	7.35	7.36	0.64	18.44	22.96	19.27	17.94	1.90	1.20	1.24	1.26	1.10
2680	6.76	7.31	7.39	7.39	0.64	18.91	22.52	18.91	17.66	1.95	1.21	1.26	1.27	1.12
2700	6.79	7.33	7.41	7.42	0.63	19.20	22.27	18.69	17.48	1.98	1.21	1.27	1.28	1.12
2750	6.87	7.39	7.47	7.49	0.62	19.95	21.80	18.16	17.10	2.07	1.23	1.29	1.29	1.13
2780	6.93	7.43	7.50	7.56	0.63	20.49	21.53	17.87	16.87	2.12	1.23	1.30	1.30	1.15
2800	6.96	7.45	7.53	7.57	0.61	20.85	21.33	17.67	16.73	2.15	1.24	1.31	1.31	1.15
2850	7.03	7.51	7.58	7.65	0.62	21.46	20.89	17.19	16.38	2.24	1.25	1.33	1.33	1.17
2880	7.09	7.55	7.62	7.70	0.61	21.87	20.63	16.96	16.20	2.28	1.26	1.34	1.33	1.18
2900	7.13	7.58	7.64	7.73	0.60	22.22	20.48	16.80	16.09	2.32	1.26	1.35	1.35	1.18
2950	7.21	7.64	7.71	7.80	0.58	22.91	20.07	16.39	15.78	2.40	1.27	1.37	1.36	1.20
2980	7.26	7.68	7.75	7.84	0.58	23.36	19.91	16.17	15.59	2.44	1.29	1.38	1.37	1.21
3000	7.29	7.71	7.77	7.87	0.58	23.60	19.79	16.00	15.49	2.48	1.29	1.39	1.38	1.21
3050	7.38	7.76	7.82	7.95	0.57	24.29	19.42	15.68	15.21	2.56	1.30	1.41	1.40	1.23
3100	7.47	7.81	7.87	8.02	0.55	24.81	19.09	15.34	14.95	2.64	1.32	1.43	1.43	1.25
3150	7.56	7.87	7.93	8.09	0.53	25.53	18.81	15.02	14.71	2.71	1.33	1.46	1.45	1.26

<sup>1</sup>Total Loss = Insertion Loss + 6dB Splitter Loss

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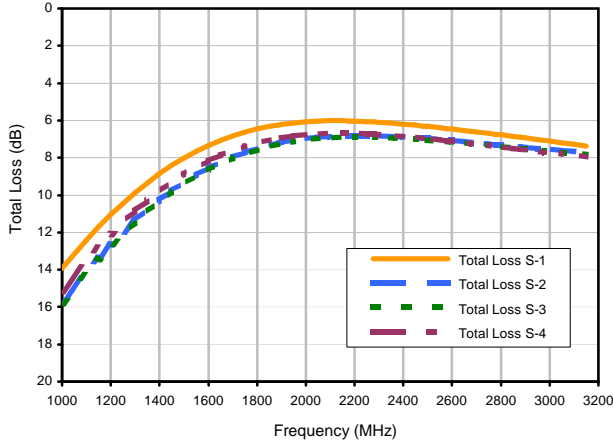


# 4 Way-0° Power Splitter/Combiner

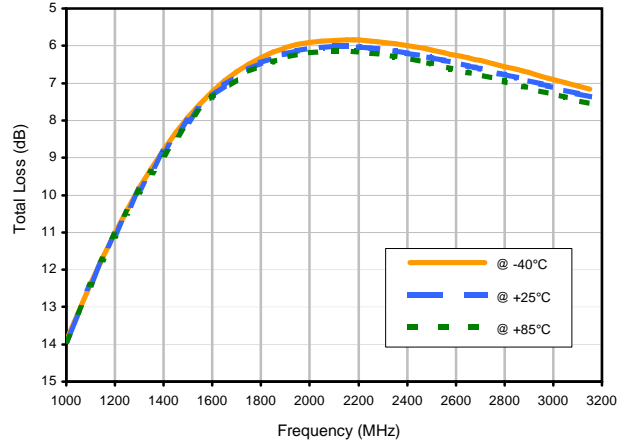
BP4U1+

## Typical Performance Curves

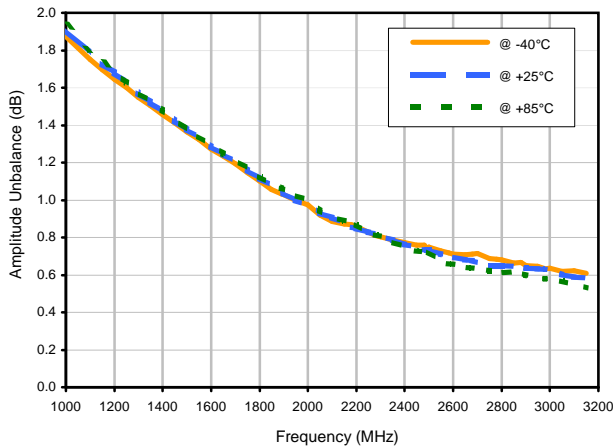
Total Loss



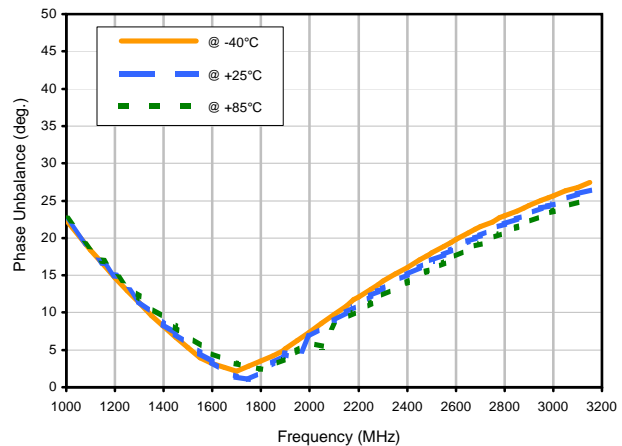
Total Loss S-1 vs. TEMPERATURE



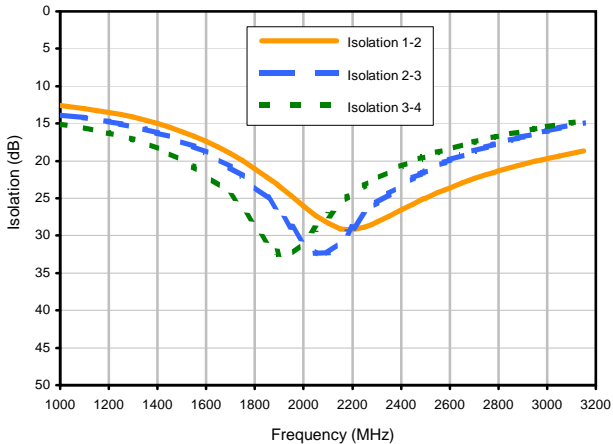
Amplitude Unbalance vs. TEMPERATURE



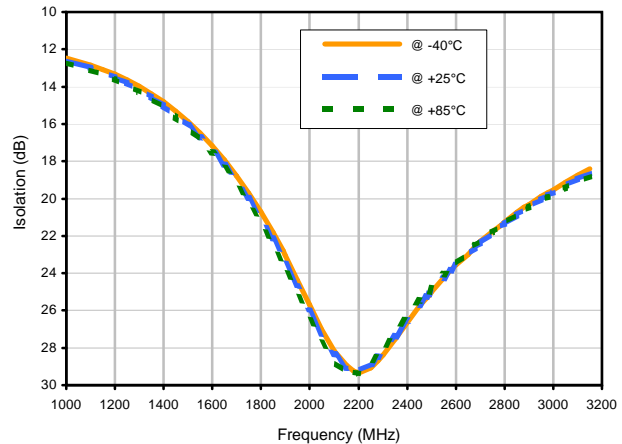
Phase Unbalance vs. TEMPERATURE



Isolation



Isolation 1-2 vs. TEMPERATURE



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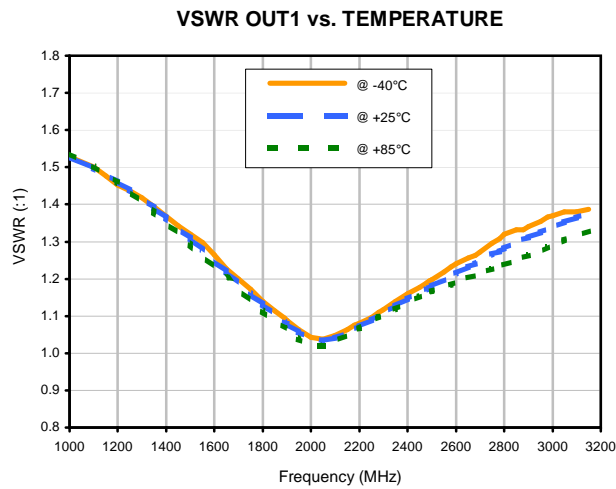
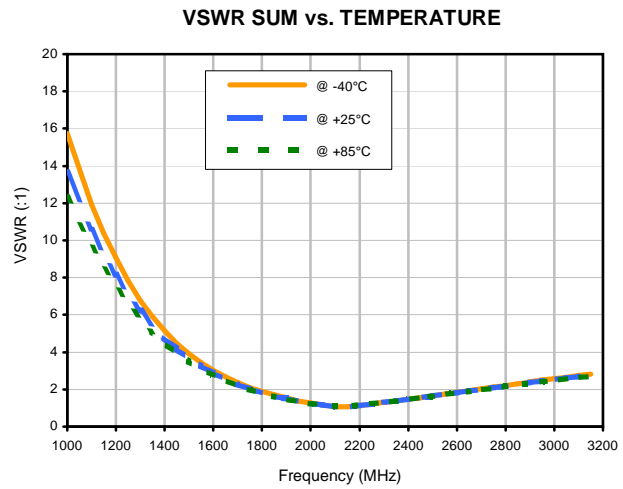
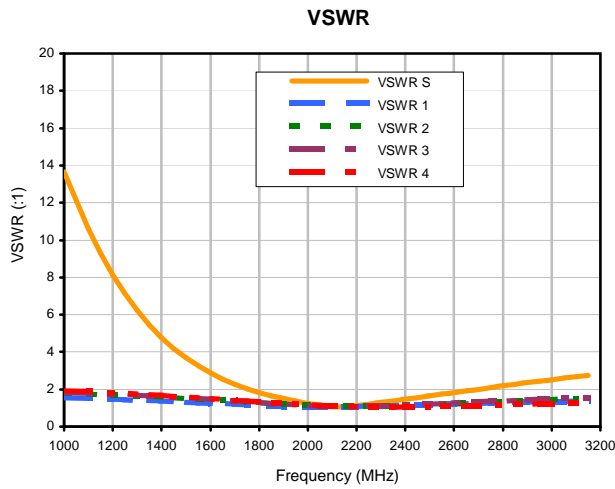
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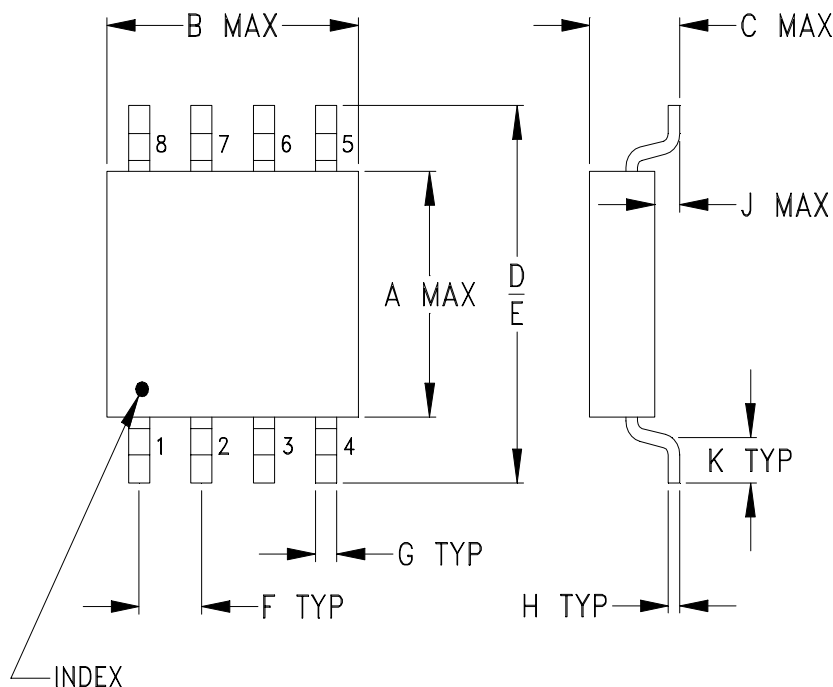
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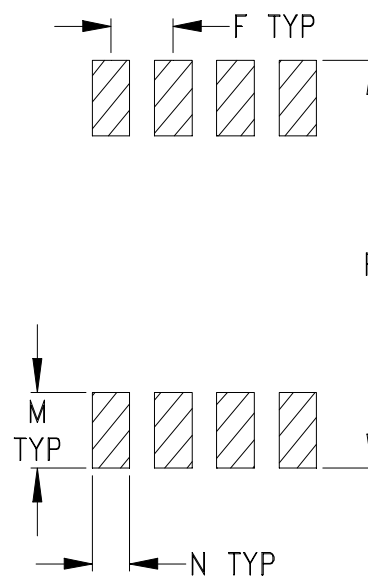
## Typical Performance Curves



### Outline Dimensions



### PCB Land Pattern



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

CASE #	A	B	C	D	E	F	G	H	J	K	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.  $\pm .03$ ; 3 Pl.  $\pm .015$

#### Notes:

- Case material: Plastic.
  - Termination finish:  
For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier. All models, (+) suffix.  $\otimes$   
For RoHS-5 Case Styles: Tin-Lead plate. All models, No (+) suffix.
  - Special Tolerances: Termination width  $\pm .005$  inch, termination thickness  $\pm .003$  inch.
- $\otimes$  Model BP4C+ will be supplied with either Tin finish or Tin-Silver-Nickel finish until Tin finish inventory is depleted.



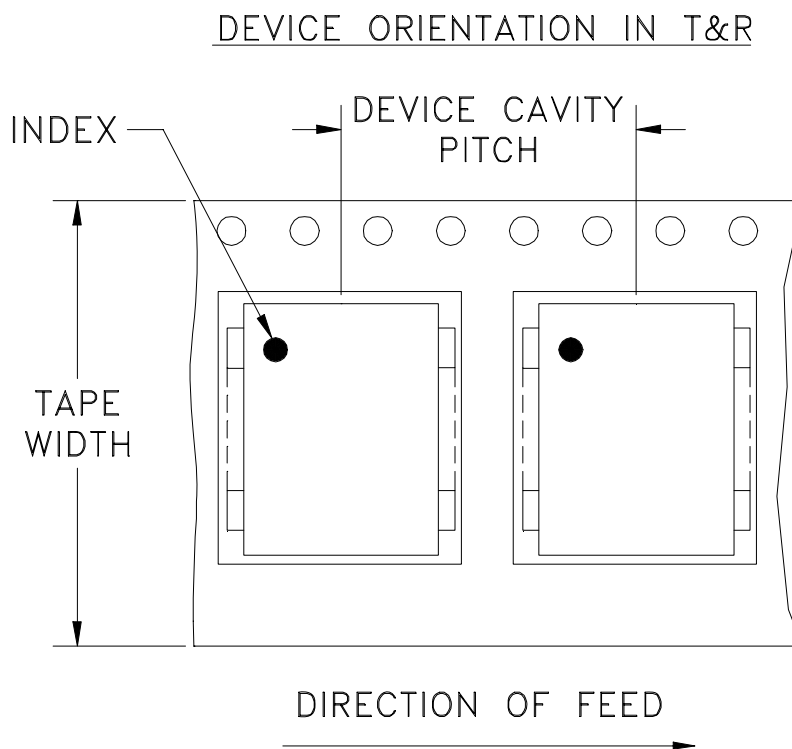
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# Tape & Reel Packaging TR-F16



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.

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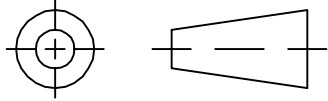
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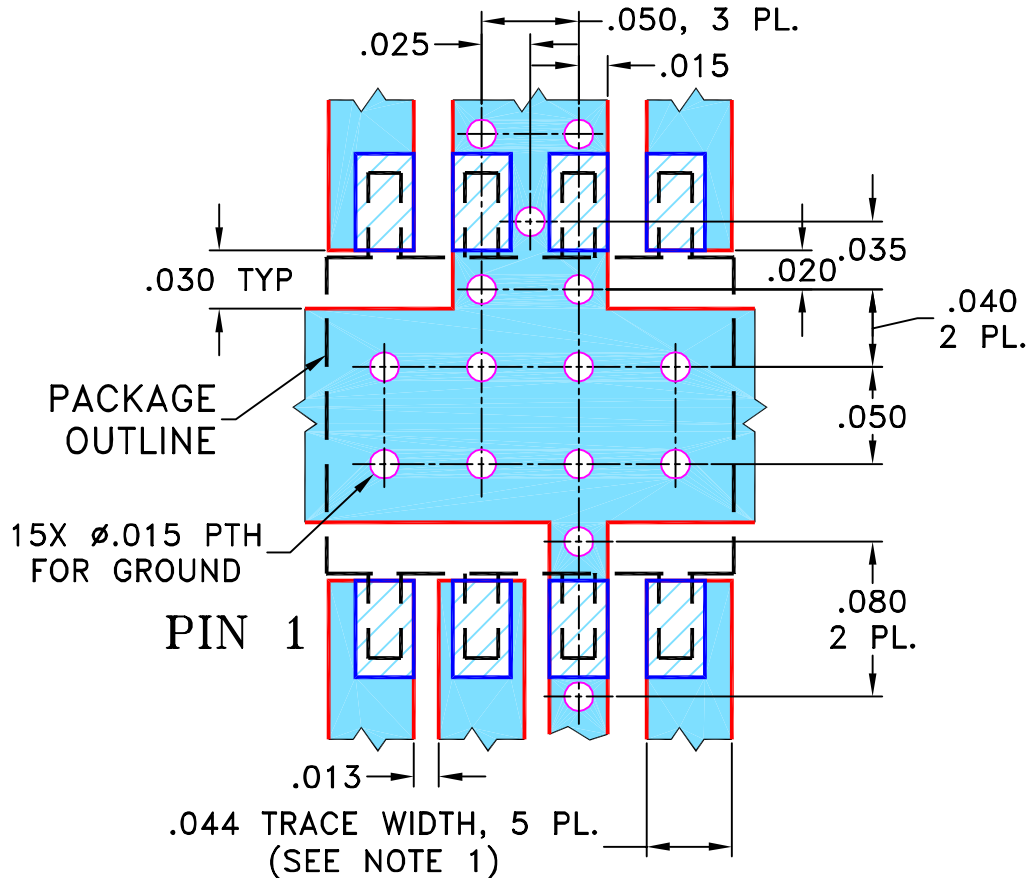
THIRD ANGLE PROJECTION



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 R04350B 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 ±		

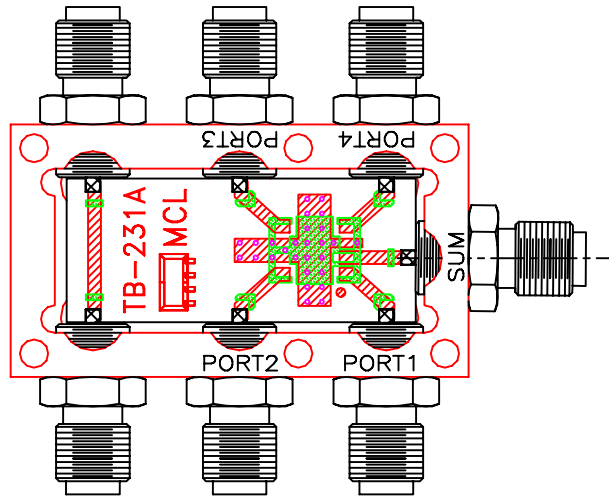
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PL, js, XX211, BP4P/BP4C, TB-231

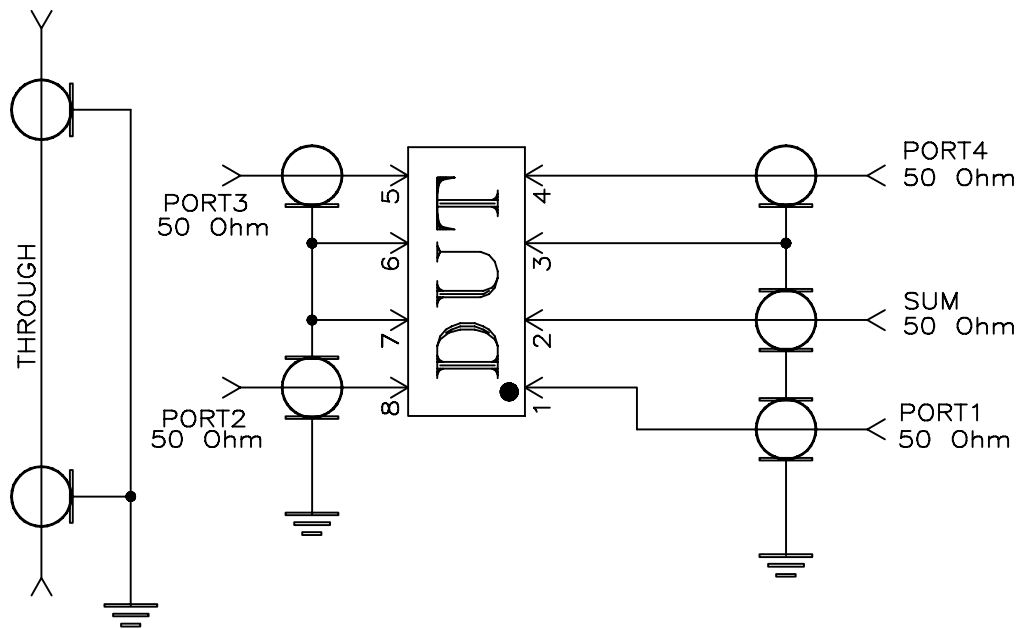
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SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-113	B
FILE:	98PL113	SCALE:	10:1
		SHEET:	1 OF 1

# Evaluation Board and Circuit




TB-231



Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.020 inch.

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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