Surface Mount

Power Splitter/Combiner

2 Way-90° 50Ω 16 to 30 MHz

JYPQ-30+
JYPQ-30

Generic photo used for illustration purposes only

CASE STYLE: BJ293

+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"	10, 20, 50, 100, 200
13"	500

Maximum Ratings

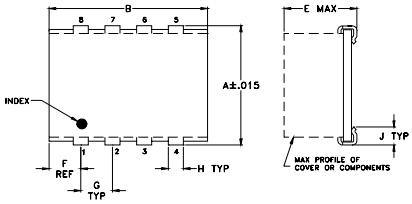
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	1W max.

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

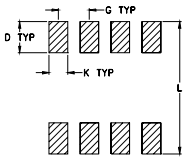
Pin Connections

SUM PORT	8
PORT 1 (+90°)	1
PORT 2 (0°)	4
GROUND	2,3,6,7
50 OHM TERM EXTERNAL	5

Outline Drawing



PCB Land Pattern



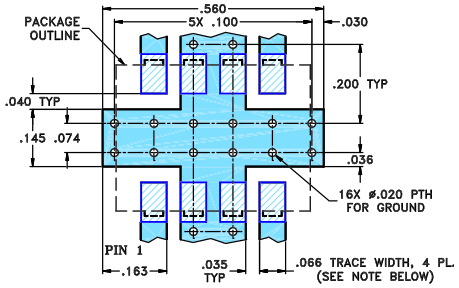
Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.395	.500	--	.100	.230	.100	.100
10.03	12.70	--	2.54	5.84	2.54	2.54

H	J	K	L	wt
.047	.065	.065	.425	grams
1.19	1.65	1.65	10.80	0.80

Demo Board MCL P/N: TB-216
Suggested PCB Layout (PL-100)



NOTE:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350 WITH DIELECTRIC THICKNESS .030" ± .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

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

Features

- low insertion loss, 0.2 dB typ.
- good isolation, 28 dB typ.

Applications

- HF
- radio communication
- instrumentation
- modulators

Electrical Specifications

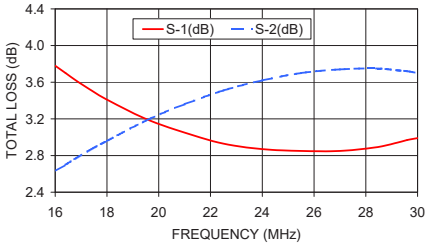
FREQ. RANGE (MHz)	ISOLATION (dB)		INSERTION LOSS (dB) Avg. of Coupled Outputs ABOVE 3 dB		PHASE UNBALANCE (Degrees)	AMPLITUDE UNBALANCE (dB)
f_L-f_U	Typ.	Min.	Typ.	Max.	Max.	Max.
16-30	28	20	0.2	0.7	3	1.5

Typical Performance Data

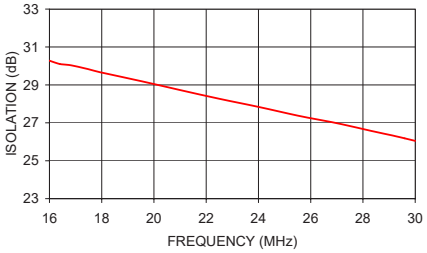
Frequency (MHz)	Total Loss[1] (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
	S-1	S-2						
16.00	3.78	2.63	1.15	30.28	89.48	1.15	1.04	1.14
16.40	3.70	2.70	1.00	30.10	89.43	1.15	1.04	1.14
16.80	3.62	2.77	0.85	30.04	89.44	1.15	1.04	1.15
17.40	3.51	2.87	0.64	29.86	89.41	1.15	1.04	1.15
18.00	3.41	2.96	0.45	29.65	89.46	1.15	1.04	1.15
19.50	3.20	3.18	0.03	29.20	89.52	1.16	1.04	1.15
21.00	3.05	3.36	0.31	28.73	89.55	1.16	1.05	1.16
22.50	2.93	3.51	0.58	28.27	89.61	1.17	1.05	1.16
24.00	2.87	3.62	0.75	27.84	89.77	1.18	1.05	1.17
25.50	2.85	3.70	0.86	27.38	89.94	1.19	1.05	1.18
27.00	2.85	3.74	0.89	26.98	90.19	1.20	1.06	1.18
28.40	2.89	3.75	0.87	26.55	90.32	1.21	1.06	1.19
29.20	2.94	3.73	0.79	26.31	90.50	1.21	1.06	1.20
29.60	2.97	3.72	0.75	26.18	90.61	1.22	1.06	1.20
30.00	2.99	3.70	0.70	26.05	90.72	1.22	1.07	1.21

1. Total Loss = Insertion Loss + 3dB splitter loss.

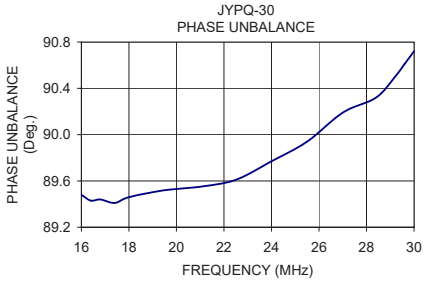
JYPQ-30
TOTAL LOSS



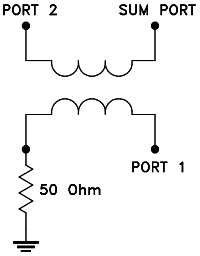
JYPQ-30
ISOLATION



JYPQ-30
PHASE UNBALANCE



electrical schematic



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

2 Way-90° Power Splitter/Combiner JYPQ-30

Typical Performance Data

TEST CONDITIONS: INPUT POWER = -10dBm @Temperature = +25°C

FREQ. (MHz)	TOTAL LOSS[1] (dB)			AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION (dB)	VSWR (:1)		
	S-1	S-2	AVG.			1-2	S	1	2
10	5.56	1.52	3.54	4.04	89.35	39.77	1.03	1.06	1.03
11	5.07	1.75	3.41	3.32	89.34	39.86	1.03	1.06	1.03
12	4.66	1.96	3.31	2.70	89.30	40.01	1.03	1.07	1.03
13	4.31	2.16	3.24	2.15	89.29	40.30	1.03	1.07	1.03
14	4.01	2.35	3.18	1.66	89.27	40.67	1.03	1.07	1.03
15	3.76	2.52	3.14	1.24	89.26	41.02	1.03	1.07	1.03
16	3.55	2.69	3.12	0.86	89.28	41.53	1.03	1.07	1.03
17	3.38	2.84	3.11	0.54	89.28	42.30	1.04	1.07	1.03
18	3.24	2.97	3.11	0.27	89.27	43.14	1.04	1.08	1.03
19	3.12	3.09	3.10	0.03	89.28	44.28	1.04	1.08	1.03
20	3.03	3.19	3.11	0.16	89.31	45.18	1.04	1.08	1.03
21	2.96	3.27	3.12	0.31	89.33	45.96	1.04	1.08	1.03
22	2.92	3.33	3.13	0.41	89.37	46.28	1.05	1.08	1.03
23	2.89	3.36	3.13	0.47	89.41	45.22	1.05	1.08	1.04
24	2.89	3.38	3.14	0.49	89.44	43.45	1.05	1.08	1.04
25	2.91	3.37	3.14	0.46	89.52	41.16	1.06	1.09	1.04
26	2.95	3.34	3.14	0.39	89.61	38.80	1.06	1.09	1.05
27	3.02	3.28	3.15	0.26	89.72	36.55	1.07	1.09	1.05
28	3.12	3.21	3.16	0.09	89.83	34.46	1.08	1.10	1.06
29	3.26	3.10	3.18	0.16	90.01	32.43	1.09	1.10	1.07
30	3.44	2.97	3.21	0.47	90.21	30.50	1.11	1.11	1.08
31	3.66	2.82	3.24	0.84	90.47	28.60	1.12	1.11	1.10
32	3.96	2.64	3.30	1.32	90.85	26.77	1.14	1.12	1.12
33	4.34	2.44	3.39	1.90	91.31	24.98	1.17	1.14	1.14
34	4.82	2.22	3.52	2.60	92.01	23.20	1.20	1.15	1.17
35	5.46	1.99	3.73	3.47	92.96	21.47	1.24	1.18	1.21

[1]Total Loss = Insertion Loss + 3dB Splitter Loss

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2 Way-90° Power Splitter/Combiner JYPQ-30

Typical Performance Data

TEST CONDITIONS: INPUT POWER = -10dBm @Temperature = -40°C

FREQ. (MHz)	TOTAL LOSS[1] (dB)			AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION (dB)	VSWR (:1)		
	S-1	S-2	AVG.			1-2	S	1	2
10	5.56	1.50	3.53	4.06	89.39	39.74	1.03	1.06	1.03
11	5.07	1.72	3.40	3.35	89.38	39.75	1.03	1.06	1.03
12	4.66	1.93	3.29	2.73	89.35	39.77	1.04	1.07	1.03
13	4.31	2.13	3.22	2.18	89.34	39.88	1.04	1.07	1.03
14	4.01	2.31	3.16	1.70	89.30	40.00	1.04	1.07	1.03
15	3.76	2.49	3.13	1.27	89.27	40.17	1.04	1.08	1.03
16	3.54	2.65	3.10	0.89	89.28	40.34	1.04	1.08	1.03
17	3.37	2.81	3.09	0.56	89.28	40.64	1.05	1.08	1.03
18	3.22	2.94	3.08	0.28	89.27	40.99	1.05	1.08	1.03
19	3.11	3.06	3.08	0.05	89.27	41.40	1.05	1.09	1.03
20	3.02	3.16	3.09	0.14	89.29	41.44	1.05	1.09	1.03
21	2.95	3.24	3.10	0.29	89.31	41.47	1.06	1.09	1.04
22	2.90	3.30	3.10	0.40	89.34	41.38	1.06	1.09	1.04
23	2.87	3.33	3.10	0.46	89.39	40.72	1.06	1.10	1.04
24	2.87	3.35	3.11	0.48	89.39	39.83	1.07	1.10	1.04
25	2.89	3.34	3.12	0.45	89.44	38.58	1.07	1.10	1.04
26	2.93	3.31	3.12	0.38	89.51	37.02	1.08	1.10	1.05
27	3.00	3.26	3.13	0.26	89.63	35.38	1.08	1.11	1.05
28	3.09	3.18	3.13	0.09	89.73	33.68	1.09	1.11	1.06
29	3.22	3.08	3.15	0.14	89.89	31.92	1.10	1.11	1.07
30	3.39	2.95	3.17	0.44	90.08	30.17	1.11	1.12	1.08
31	3.61	2.80	3.20	0.81	90.29	28.39	1.13	1.13	1.09
32	3.90	2.62	3.26	1.28	90.62	26.65	1.14	1.13	1.11
33	4.26	2.42	3.34	1.84	91.05	24.90	1.17	1.14	1.13
34	4.73	2.19	3.46	2.54	91.70	23.14	1.19	1.16	1.15
35	5.35	1.96	3.65	3.39	92.55	21.43	1.23	1.18	1.19

[1]Total Loss = Insertion Loss + 3dB Splitter Loss

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2 Way-90° Power Splitter/Combiner JYPQ-30

Typical Performance Data

TEST CONDITIONS: INPUT POWER = -10dBm @Temperature = +85°C

FREQ. (MHz)	TOTAL LOSS[1] (dB)			AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION (dB)	VSWR (:1)		
	S-1	S-2	AVG.			1-2	S	1	2
10	5.56	1.52	3.54	4.04	89.45	38.56	1.03	1.07	1.03
11	5.08	1.75	3.41	3.33	89.44	38.66	1.03	1.07	1.03
12	4.66	1.96	3.31	2.70	89.43	38.85	1.03	1.07	1.03
13	4.31	2.15	3.23	2.16	89.43	39.24	1.03	1.07	1.03
14	4.02	2.34	3.18	1.68	89.43	39.64	1.03	1.07	1.03
15	3.77	2.52	3.14	1.25	89.41	40.15	1.03	1.07	1.03
16	3.56	2.68	3.12	0.88	89.42	40.86	1.03	1.07	1.03
17	3.39	2.84	3.12	0.55	89.45	41.86	1.03	1.07	1.02
18	3.25	2.97	3.11	0.28	89.45	42.93	1.03	1.07	1.03
19	3.13	3.08	3.11	0.05	89.46	44.77	1.03	1.07	1.03
20	3.04	3.18	3.11	0.14	89.50	46.89	1.03	1.07	1.03
21	2.98	3.26	3.12	0.28	89.54	49.74	1.03	1.07	1.03
22	2.93	3.32	3.13	0.39	89.55	53.44	1.03	1.07	1.03
23	2.91	3.36	3.13	0.45	89.64	51.70	1.04	1.07	1.03
24	2.91	3.37	3.14	0.46	89.65	47.10	1.04	1.07	1.04
25	2.93	3.36	3.14	0.43	89.73	43.04	1.05	1.08	1.04
26	2.98	3.33	3.15	0.35	89.83	39.81	1.06	1.08	1.05
27	3.06	3.28	3.17	0.22	89.97	37.06	1.06	1.08	1.06
28	3.16	3.19	3.18	0.03	90.11	34.68	1.07	1.08	1.07
29	3.30	3.09	3.19	0.21	90.30	32.48	1.09	1.08	1.08
30	3.48	2.96	3.22	0.52	90.54	30.44	1.10	1.09	1.09
31	3.73	2.80	3.26	0.93	90.82	28.48	1.12	1.10	1.11
32	4.03	2.62	3.33	1.41	91.24	26.61	1.15	1.11	1.13
33	4.42	2.42	3.42	2.00	91.77	24.79	1.18	1.13	1.16
34	4.93	2.20	3.56	2.73	92.56	23.01	1.21	1.15	1.19
35	5.60	1.98	3.79	3.62	93.62	21.28	1.26	1.17	1.23

[1]Total Loss = Insertion Loss + 3dB Splitter Loss

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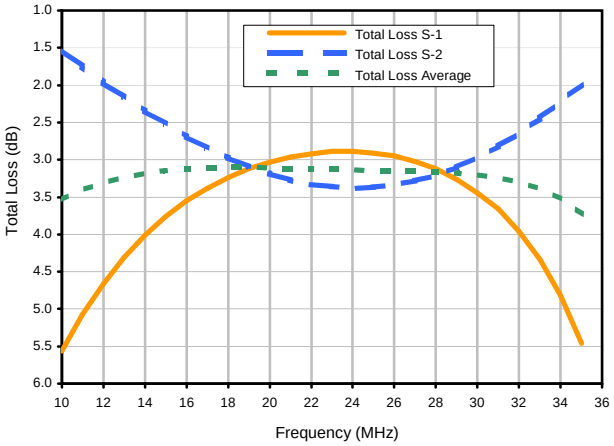
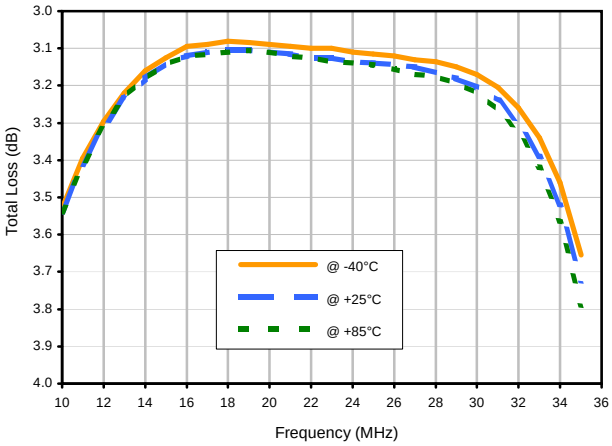
2 Way-90° Power Splitter/Combiner JYPQ-30

Typical Performance Curves

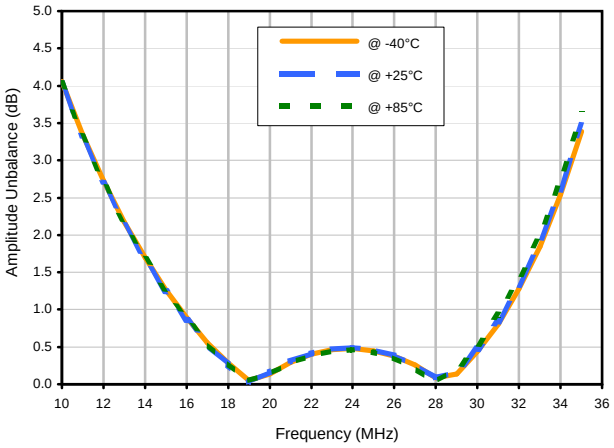
Total Loss



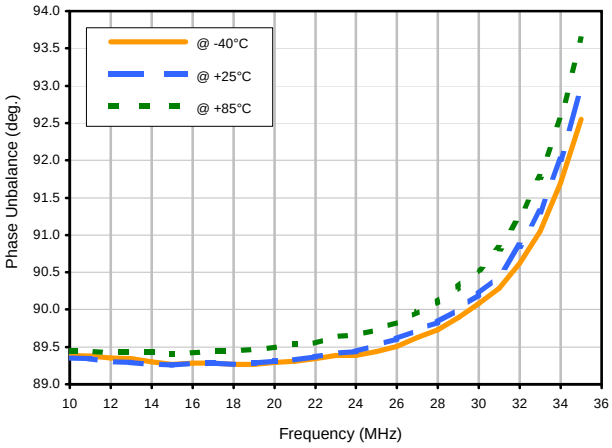
Average Total Loss vs. TEMPERATURE



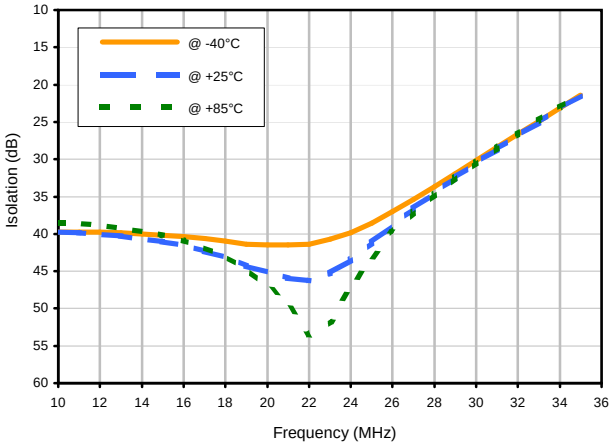
Amplitude Unbalance vs. TEMPERATURE



Phase Unbalance vs. TEMPERATURE



Isolation 1-2 vs. TEMPERATURE



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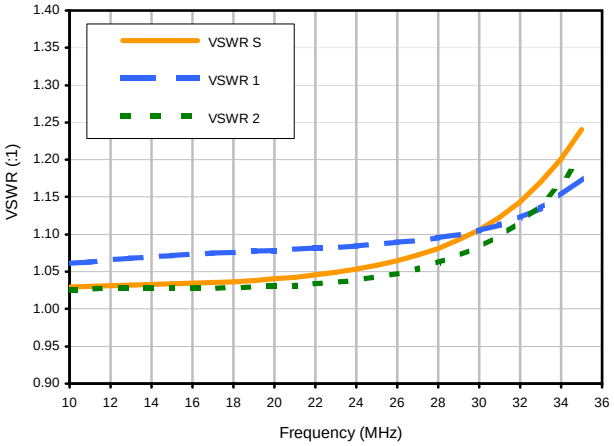
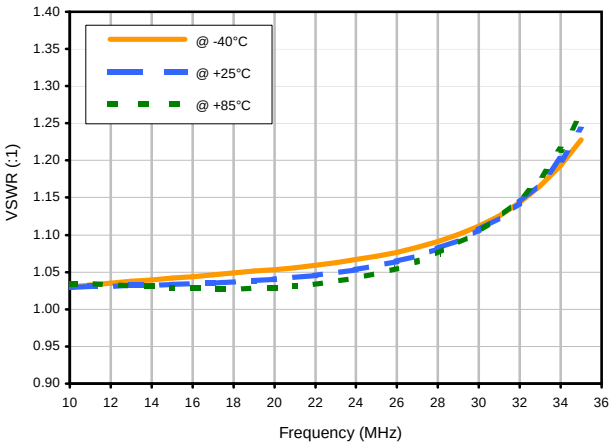
Typical Performance Curves

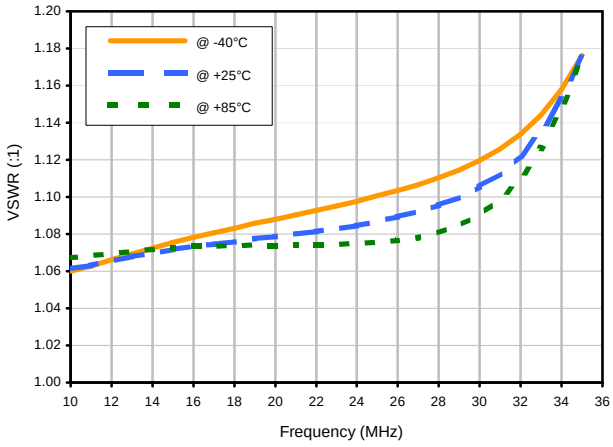
VSWR



VSWR SUM vs. TEMPERATURE



VSWR OUT1 vs. TEMPERATURE



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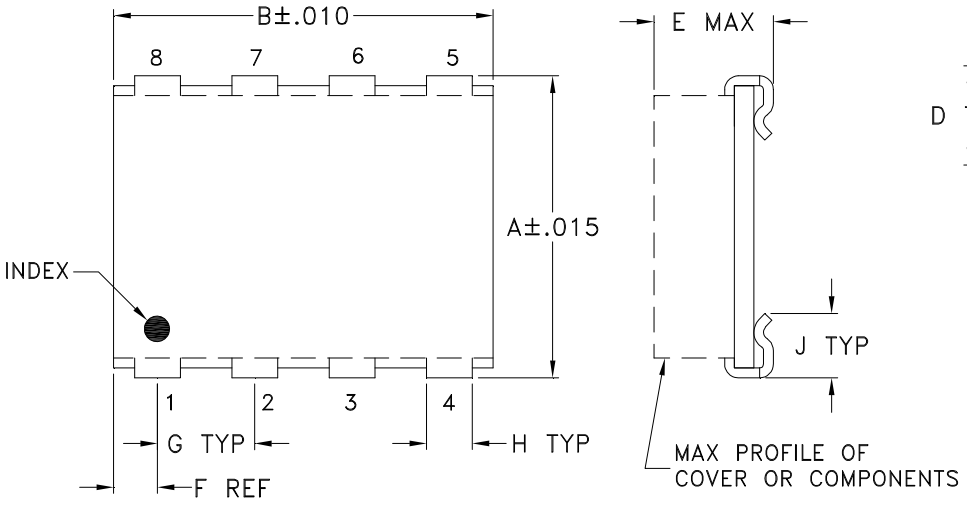
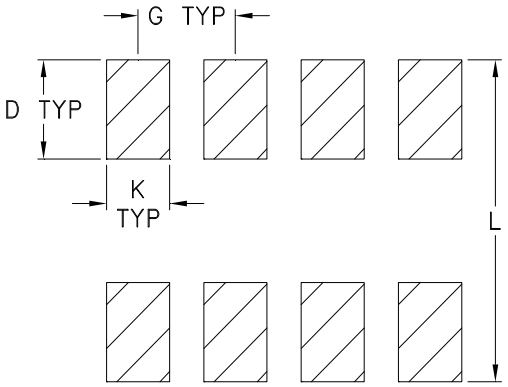
Case Style BJ

BJ293
BJ398

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE#	A	B	C	D	E	F	G	H	J	K	L	WT. GRAMS
BJ293	.395 (10.03)	.500 (12.70)	-- --	.100 (2.54)	.230 (5.84)	.100 (2.54)	.100 (2.54)	.047 (1.19)	.065 (1.65)	.065 (1.65)	.425 (10.80)	.80
BJ398	.305 (7.75)	.390 (9.91)	-- --	.100 (2.54)	.105 (2.67)	.045 (1.14)	.100 (2.54)	.047 (1.19)	.065 (1.65)	.065 (1.65)	.325 (8.26)	.20

Dimensions are in inches (mm). Tolerances: 2Pl. ± .01; 3Pl. ± .005

Notes:
1. Case material: Plastic.
2. Base material: Printed wiring laminate.
3. Termination finish:
   For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
   For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

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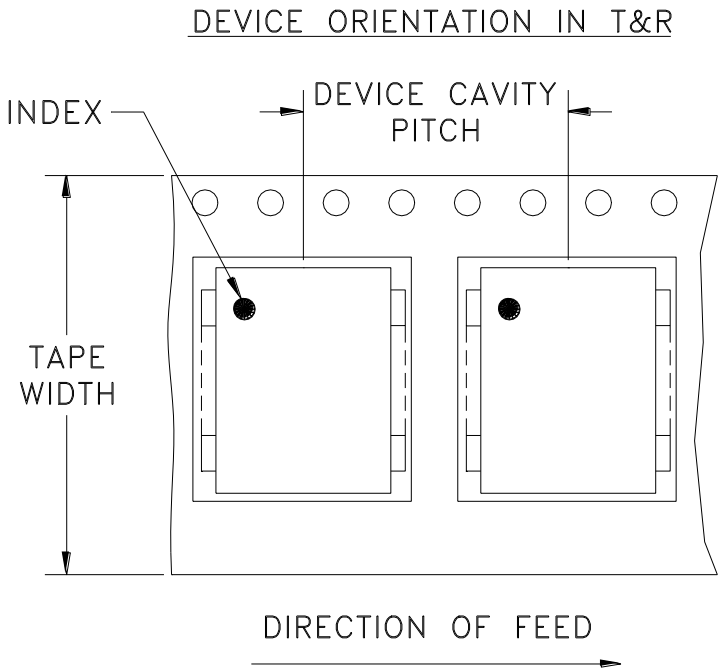
Tape & Reel Packaging TR-F10



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
24	16	7	10,20,50,100,200
		13	500

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

Note: Please consult individual model data sheet to determine device per reel availability.

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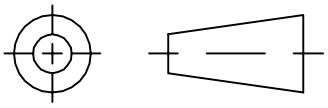
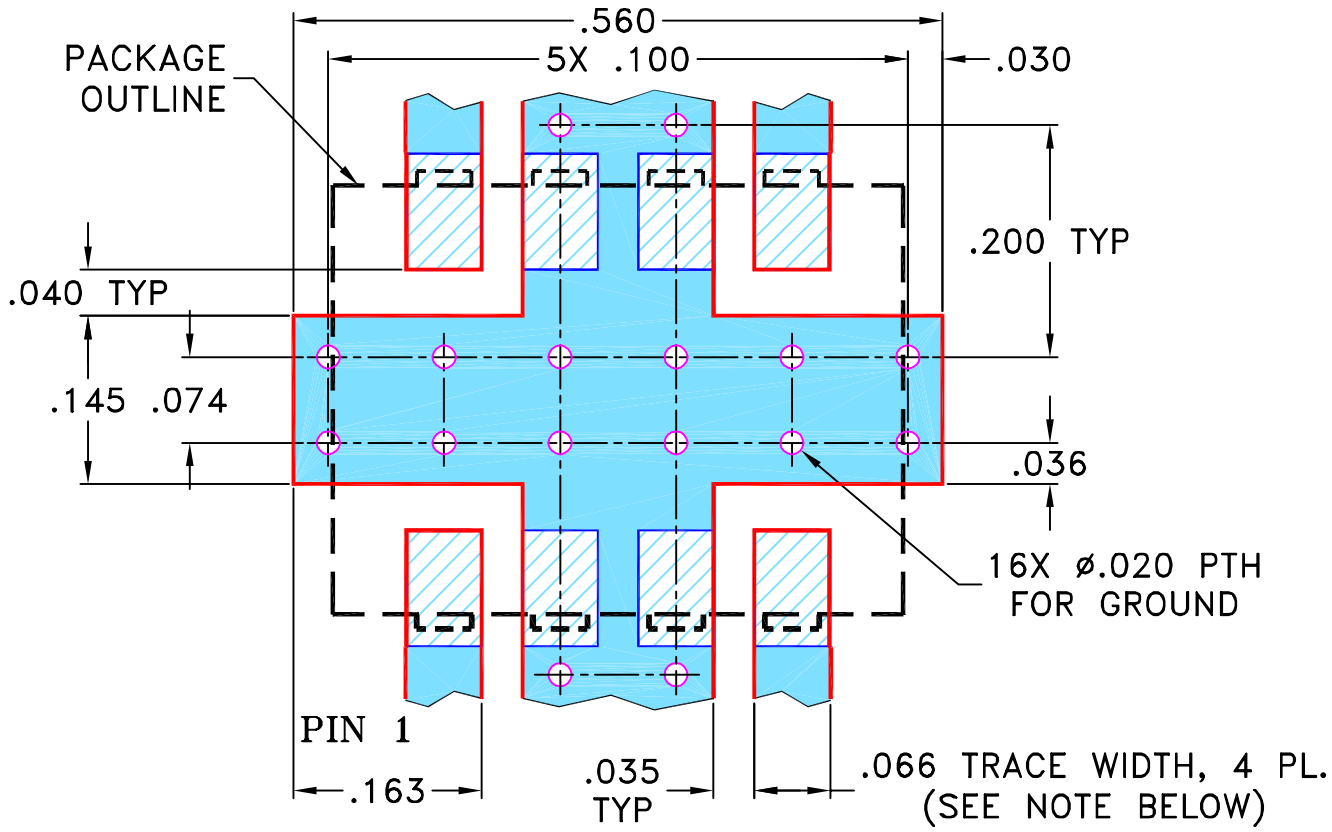
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82549	NEW RELEASE	11/15/02	MMG	HY
A	M102713	MODIFIED NOTES, ADDED "...WITH SMOBC"	01/16/06	GT	IL

SUGGESTED MOUNTING CONFIGURATION FOR BJ293 CASE STYLE, "kx" PIN CONNECTION.



NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .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

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	MMG	11/05/02
TOLERANCES ON:	CHECKED	AV	11/14/02
2 PL DECIMALS ±	APPROVED	HY	11/15/02
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

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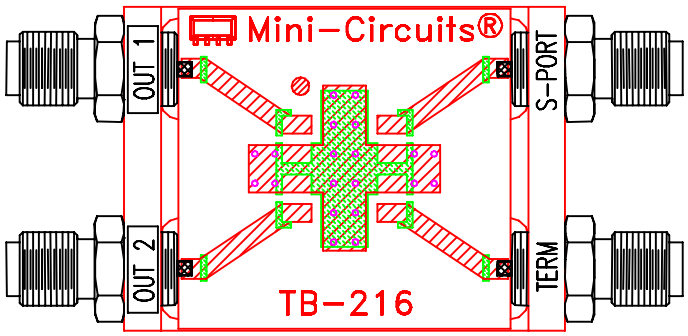
PL, kx, BJ293, JYPQ, TB-216

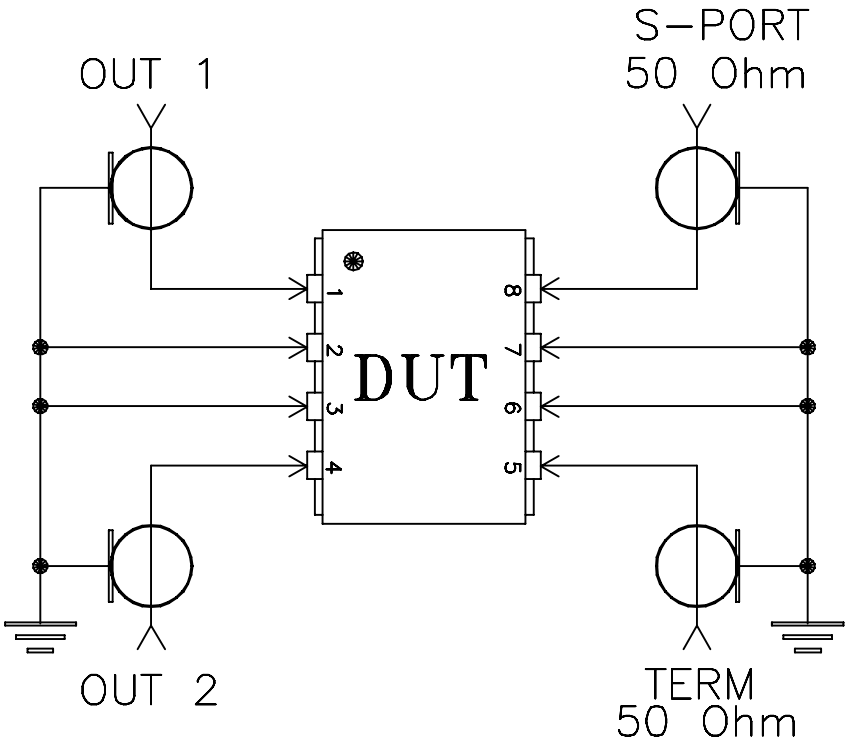
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-100	A

FILE:	SCALE:	SHEET:
98PL100	6:1	1 OF 1

Evaluation Board and Circuit



TB-216



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.

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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

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