

High Power Directional Coupler

50Ω 30 to 500 MHz

JYDC-7-1HP+ JYDC-7-1HP



Generic photo used for illustration purposes only
CASE STYLE: BJ1051

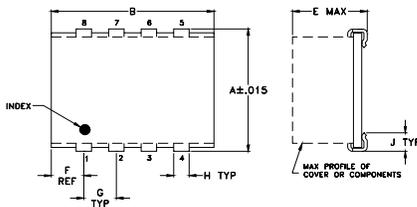
Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Permanent damage may occur if any of these limits are exceeded.	

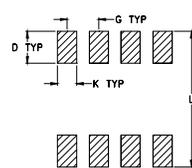
Pin Connections

INPUT	1
OUTPUT	8
COUPLED	3
GROUND	2,7
50Ω TERM EXTERNAL	6
ISOLATE (DO NOT USE)	4,5

Outline Drawing



PCB Land Pattern

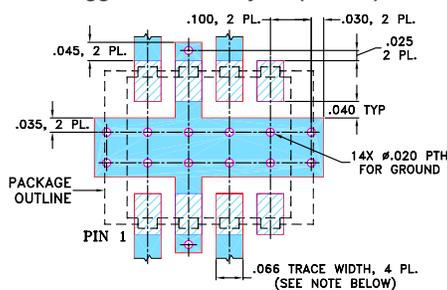


Suggested Layout,
Tolerance to be within ±0.02

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				0.71

Demo Board MCL P/N: TB-282 Suggested PCB Layout (PL-157)



- NOTE: 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

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Features

- high power handling, 5 watts
- low mainline loss, 1.3 dB typ.
- excellent VSWR, 1.25:1 typ.
- good flatness, ±0.1 dB typ.
- protected by US Patent 6,140,887

Applications

- VHF/UHF receivers
- cellular

Directional Coupler Electrical Specifications

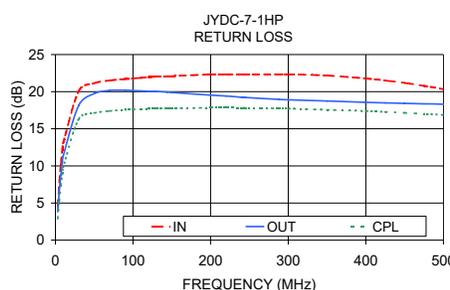
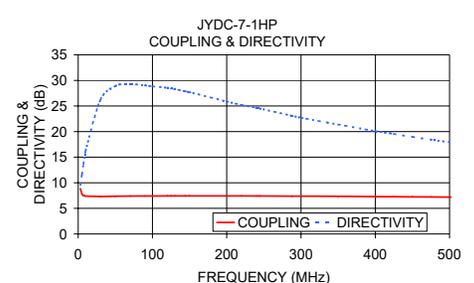
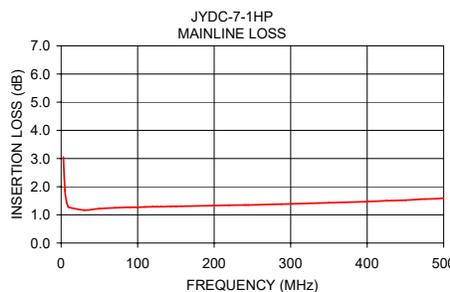
FREQ. (MHz)	COUPLING (dB)		MAINLINE LOSS ¹ (dB)				DIRECTIVITY (dB)				VSWR (:1)	POWER INPUT, W		
	Nom.	Max. Flatness	L		U		L		U			Typ.	Max.	Max.
			Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.				
30-500	7.3±0.4	±0.2	1.3	1.6	1.4	1.9	30	22	20	15	1.25	5.0	5.0	

L = 30-200 MHz U = 200-500 MHz

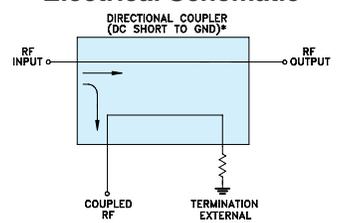
1. Mainline loss includes theoretical power loss at coupled port.

Typical Performance Data

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	Return Loss (dB)		
				In	Out	Cpl
30.00	1.17	7.33	26.24	20.09	18.15	16.30
100.00	1.27	7.42	28.87	21.78	20.14	17.62
150.00	1.30	7.44	27.70	22.10	19.90	17.78
200.00	1.33	7.44	25.89	22.33	19.53	17.84
245.00	1.35	7.42	24.50	22.30	19.21	17.83
300.00	1.39	7.39	22.71	22.35	18.90	17.72
350.00	1.43	7.35	21.38	22.18	18.74	17.56
400.00	1.47	7.30	20.11	21.78	18.56	17.39
450.00	1.52	7.25	18.98	21.18	18.42	17.16
500.00	1.59	7.20	17.94	20.33	18.31	16.87



Electrical Schematic



* ELECTRICAL SCHEMATIC IS FOR DIRECTIONAL COUPLER WITH INTERNAL TRANSFORMER(S) AND EXTERNAL TERMINATION.



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REV. D
M157137
ED-11474
JYDC-7-1HP
WZ/TD/CP/AM
160715

Directional Coupler

JYDC-7-1HP

Typical Performance Data

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

FREQUENCY (MHz)	INSERTION LOSS (dB)	COUPLING LOSS (dB)	DIRECTIVITY (dB)	RETURN LOSS		
				IN	(dB) OUT	CPL
30	1.11	7.27	25.25	20.80	17.88	16.19
40	1.14	7.29	27.28	21.43	18.93	16.65
45	1.16	7.31	27.83	21.54	19.26	16.71
50	1.18	7.32	28.13	21.61	19.49	16.76
75	1.22	7.37	28.65	21.68	19.92	16.82
100	1.24	7.39	28.55	21.66	19.85	16.86
150	1.26	7.42	27.82	21.48	19.43	16.83
175	1.28	7.43	27.42	21.30	19.15	16.77
200	1.29	7.43	26.86	21.12	18.87	16.69
225	1.31	7.44	26.28	20.91	18.61	16.59
250	1.32	7.43	25.72	20.70	18.36	16.46
275	1.34	7.43	25.10	20.48	18.11	16.34
300	1.36	7.42	24.46	20.29	17.86	16.22
325	1.39	7.42	23.86	20.08	17.64	16.08
350	1.40	7.41	23.25	19.90	17.40	15.95
375	1.42	7.40	22.63	19.72	17.17	15.82
400	1.45	7.38	22.02	19.54	16.93	15.70
450	1.50	7.36	20.86	19.24	16.53	15.46
475	1.53	7.34	20.30	19.07	16.33	15.33
500	1.56	7.33	19.73	18.89	16.14	15.22
525	1.59	7.31	19.22	18.73	15.96	15.09
550	1.63	7.30	18.71	18.57	15.77	14.98
600	1.70	7.27	17.72	18.22	15.45	14.73
625	1.75	7.26	17.27	18.04	15.32	14.60
650	1.79	7.25	16.83	17.85	15.19	14.46
675	1.83	7.24	16.42	17.63	15.08	14.31
700	1.89	7.25	15.97	17.36	14.98	14.18
750	1.99	7.23	15.22	16.73	14.77	13.81
800	2.11	7.24	14.53	16.03	14.65	13.42
850	2.26	7.27	13.91	15.26	14.59	12.98
900	2.43	7.33	13.35	14.41	14.58	12.52
950	2.61	7.40	12.85	13.53	14.63	12.04
1000	2.84	7.51	12.44	12.66	14.76	11.56
1050	3.11	7.66	12.12	11.80	14.97	11.11
1100	3.40	7.83	11.85	11.00	15.24	10.72
1150	3.75	8.04	11.69	10.25	15.54	10.42
1200	4.14	8.30	11.63	9.58	15.87	10.22
1250	4.59	8.59	11.65	8.99	16.14	10.18
1300	5.11	8.93	11.71	8.50	16.22	10.33
1350	5.71	9.30	11.74	8.10	16.07	10.75
1400	6.42	9.72	11.52	7.81	15.62	11.54
1450	7.28	10.16	10.77	7.64	14.88	12.84
1500	8.35	10.59	9.34	7.61	13.94	14.91
1550	9.75	10.95	7.47	7.76	12.92	18.18
1600	11.59	11.14	5.66	8.13	11.91	22.75
1650	14.07	11.04	4.29	8.85	10.98	23.49
1700	17.00	10.98	3.23	9.83	10.21	19.02
1750	18.64	10.93	2.47	11.00	9.49	15.27
1800	16.89	11.29	1.71	11.69	8.84	12.15
1900	13.00	13.29	0.12	10.11	7.79	7.77
2000	11.95	16.86	2.87	7.61	7.10	5.36

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Directional Coupler

JYDC-7-1HP

Typical Performance Data

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

FREQUENCY (MHz)	INSERTION LOSS (dB)	COUPLING LOSS (dB)	DIRECTIVITY (dB)	RETURN LOSS		
				IN	(dB) OUT	CPL
30	1.08	7.22	25.31	21.02	17.83	16.36
40	1.11	7.24	27.88	21.80	18.82	16.95
45	1.12	7.25	28.81	21.96	19.15	17.05
50	1.14	7.26	29.42	22.05	19.38	17.11
75	1.18	7.31	30.50	21.87	19.74	17.05
100	1.20	7.33	29.84	21.52	19.49	16.92
150	1.22	7.34	28.80	21.21	19.04	16.91
175	1.23	7.35	28.55	20.97	18.76	16.83
200	1.25	7.35	27.82	20.62	18.41	16.63
225	1.26	7.35	26.89	20.29	18.09	16.44
250	1.27	7.34	26.17	20.08	17.85	16.31
275	1.29	7.34	25.54	19.91	17.65	16.20
300	1.30	7.33	24.91	19.72	17.44	16.04
325	1.32	7.32	24.22	19.47	17.20	15.85
350	1.33	7.31	23.49	19.26	16.95	15.70
375	1.35	7.30	22.82	19.09	16.73	15.59
400	1.38	7.28	22.22	18.91	16.49	15.44
450	1.42	7.25	20.94	18.54	16.05	15.11
475	1.45	7.23	20.33	18.38	15.84	14.96
500	1.47	7.22	19.75	18.26	15.67	14.85
525	1.50	7.20	19.25	18.14	15.51	14.73
550	1.53	7.18	18.74	18.00	15.34	14.62
600	1.59	7.14	17.72	17.72	15.04	14.41
625	1.63	7.13	17.27	17.60	14.93	14.28
650	1.66	7.12	16.86	17.46	14.81	14.13
675	1.70	7.10	16.43	17.26	14.69	13.98
700	1.75	7.10	15.96	17.01	14.58	13.90
750	1.84	7.08	15.20	16.44	14.36	13.57
800	1.95	7.08	14.51	15.85	14.23	13.16
850	2.08	7.09	13.87	15.14	14.17	12.75
900	2.23	7.12	13.30	14.32	14.17	12.35
950	2.40	7.18	12.79	13.49	14.23	11.93
1000	2.61	7.27	12.36	12.62	14.34	11.45
1050	2.85	7.39	12.00	11.73	14.51	11.01
1100	3.13	7.55	11.74	10.94	14.76	10.56
1150	3.45	7.74	11.52	10.14	15.01	10.27
1200	3.83	7.99	11.36	9.39	15.25	9.98
1250	4.27	8.27	11.31	8.74	15.51	9.75
1300	4.75	8.58	11.33	8.22	15.63	9.96
1350	5.33	8.95	11.28	7.73	15.51	10.22
1400	6.02	9.38	11.05	7.34	15.15	10.79
1450	6.83	9.82	10.43	7.08	14.54	11.88
1500	7.85	10.29	9.18	6.88	13.69	13.58
1550	9.14	10.70	7.43	6.84	12.76	16.65
1600	10.84	10.96	5.65	6.99	11.82	21.12
1650	13.12	10.88	4.22	7.37	10.93	24.06
1700	15.97	10.75	3.19	7.97	10.25	20.09
1750	18.59	10.47	2.53	8.91	9.57	16.44
1800	17.71	10.54	1.95	9.79	8.95	13.13
1900	12.96	11.94	0.51	9.67	7.81	8.31
2000	11.34	15.24	1.94	7.63	7.05	5.40

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Directional Coupler

JYDC-7-1HP

Typical Performance Data

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

FREQUENCY (MHz)	INSERTION LOSS (dB)	COUPLING LOSS (dB)	DIRECTIVITY (dB)	RETURN LOSS		
				IN	(dB) OUT	CPL
30	1.14	7.30	25.40	20.61	18.07	16.05
40	1.19	7.34	26.81	21.05	19.08	16.36
45	1.20	7.35	27.08	21.13	19.37	16.40
50	1.22	7.37	27.21	21.20	19.57	16.44
75	1.26	7.41	27.48	21.47	20.00	16.60
100	1.27	7.44	27.73	21.73	20.04	16.79
150	1.30	7.48	27.22	21.60	19.60	16.75
175	1.32	7.49	26.68	21.43	19.31	16.68
200	1.34	7.49	26.19	21.37	19.09	16.65
225	1.35	7.50	25.83	21.27	18.88	16.61
250	1.37	7.50	25.42	21.06	18.62	16.49
275	1.39	7.50	24.82	20.77	18.33	16.34
300	1.41	7.50	24.19	20.56	18.06	16.21
325	1.44	7.49	23.65	20.38	17.84	16.10
350	1.45	7.49	23.13	20.22	17.62	15.98
375	1.48	7.48	22.58	20.02	17.38	15.86
400	1.51	7.47	21.99	19.81	17.12	15.72
450	1.57	7.45	20.89	19.50	16.72	15.50
475	1.60	7.44	20.35	19.33	16.52	15.39
500	1.63	7.43	19.80	19.13	16.33	15.28
525	1.67	7.42	19.29	18.93	16.13	15.16
550	1.71	7.41	18.77	18.75	15.94	15.04
600	1.79	7.39	17.77	18.37	15.59	14.77
625	1.83	7.38	17.32	18.19	15.44	14.63
650	1.88	7.38	16.90	17.98	15.30	14.47
675	1.93	7.37	16.46	17.75	15.18	14.33
700	1.98	7.38	16.02	17.48	15.07	14.19
750	2.09	7.38	15.28	16.87	14.87	13.82
800	2.23	7.40	14.59	16.20	14.75	13.42
850	2.38	7.44	13.97	15.44	14.70	12.98
900	2.55	7.51	13.43	14.58	14.70	12.50
950	2.75	7.59	12.93	13.71	14.78	12.02
1000	2.98	7.71	12.54	12.85	14.94	11.54
1050	3.26	7.87	12.21	11.97	15.16	11.10
1100	3.56	8.06	11.99	11.18	15.52	10.72
1150	3.91	8.27	11.88	10.48	15.92	10.44
1200	4.30	8.53	11.92	9.86	16.36	10.26
1250	4.75	8.82	12.05	9.32	16.72	10.21
1300	5.26	9.14	12.27	8.86	16.88	10.33
1350	5.84	9.49	12.52	8.52	16.74	10.71
1400	6.52	9.88	12.55	8.29	16.27	11.45
1450	7.34	10.27	11.99	8.20	15.45	12.57
1500	8.37	10.65	10.60	8.27	14.43	14.33
1550	9.69	10.97	8.64	8.55	13.35	16.91
1600	11.44	11.14	6.70	9.10	12.26	20.38
1650	13.77	11.13	5.13	10.05	11.25	22.80
1700	16.61	11.12	3.89	11.35	10.41	20.27
1750	18.53	11.18	2.97	12.79	9.65	16.33
1800	17.36	11.63	2.05	13.26	9.01	12.91
1900	13.67	13.74	0.00	10.67	8.02	8.29
2000	12.54	17.28	2.82	7.95	7.38	5.83

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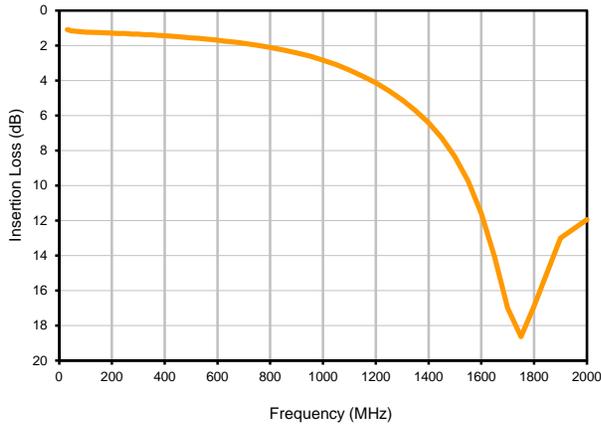


Directional Coupler

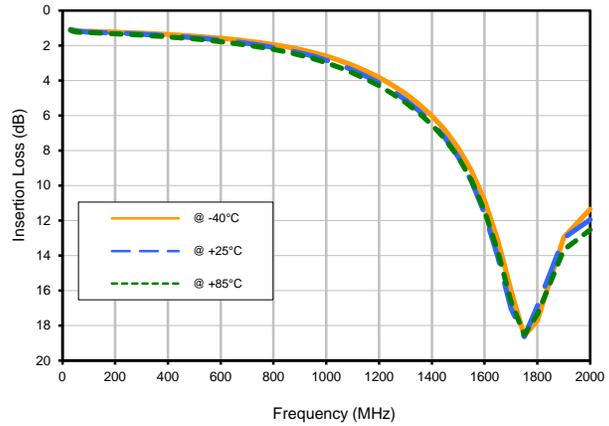
Typical Performance Curves

JYDC-7-1HP

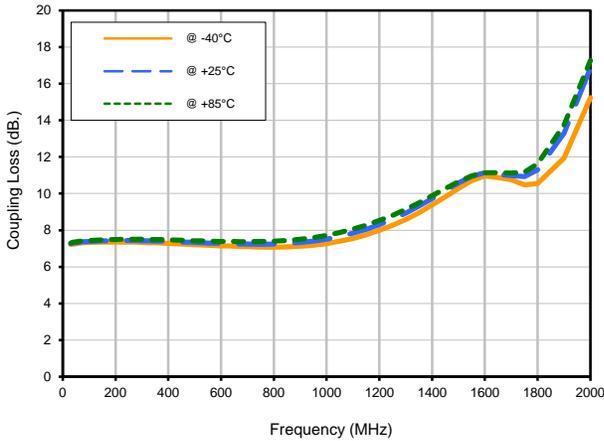
Insertion Loss



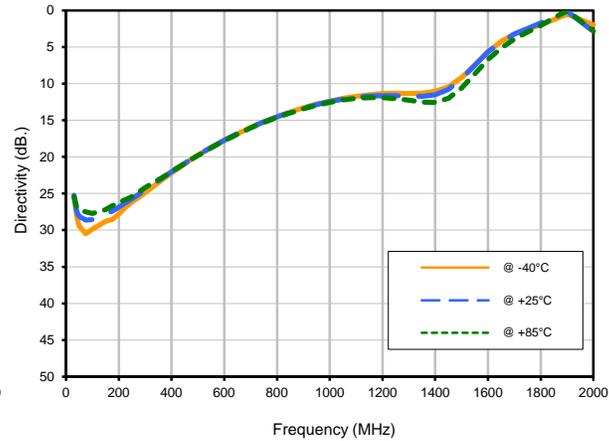
Insertion Loss vs. TEMPERATURE



Coupling Loss vs. TEMPERATURE



Directivity vs. TEMPERATURE



Notes

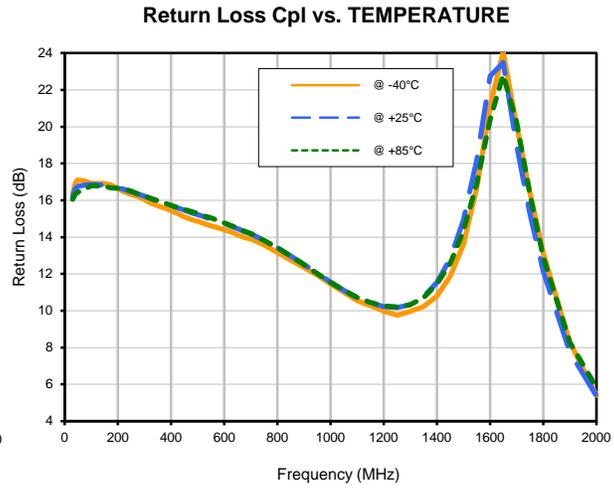
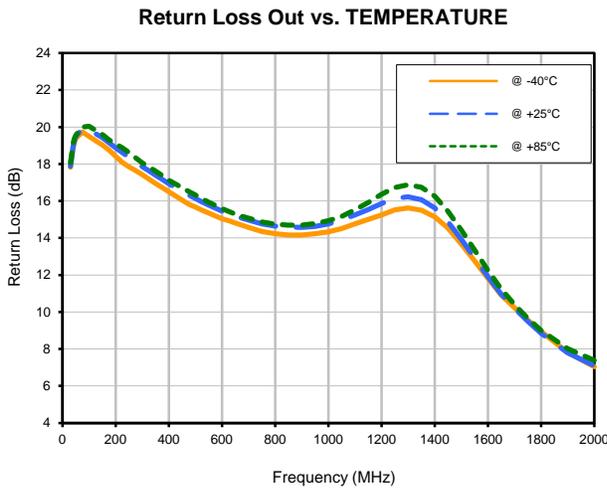
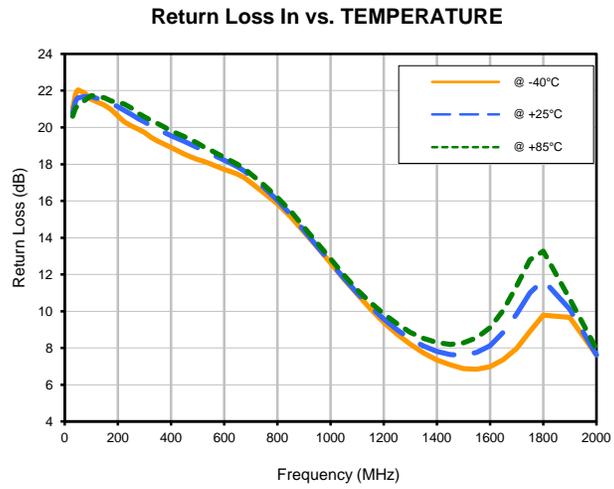
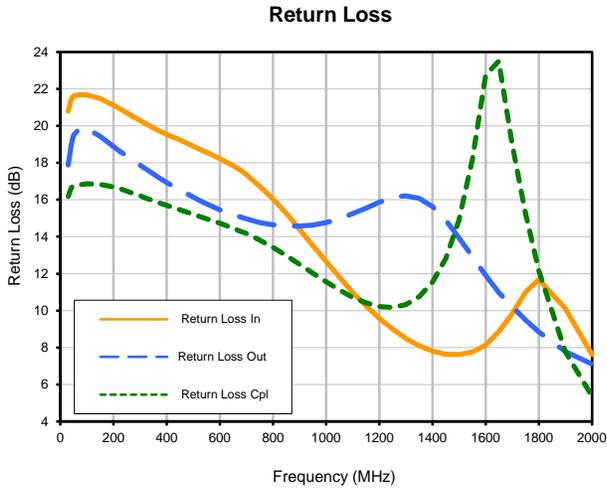
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Directional Coupler

Typical Performance Curves

JYDC-7-1HP



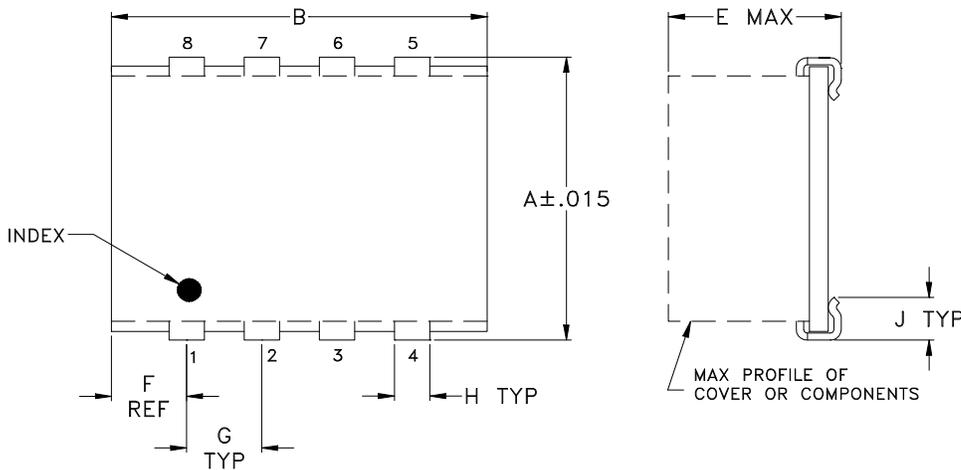
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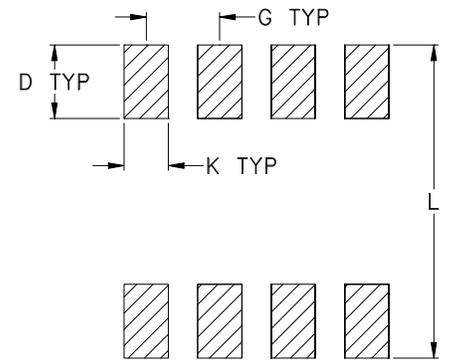


BJ1051

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	WT. GRAMS
BJ1051	.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)	.71

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

Notes:

- Open style, ceramic base.
- 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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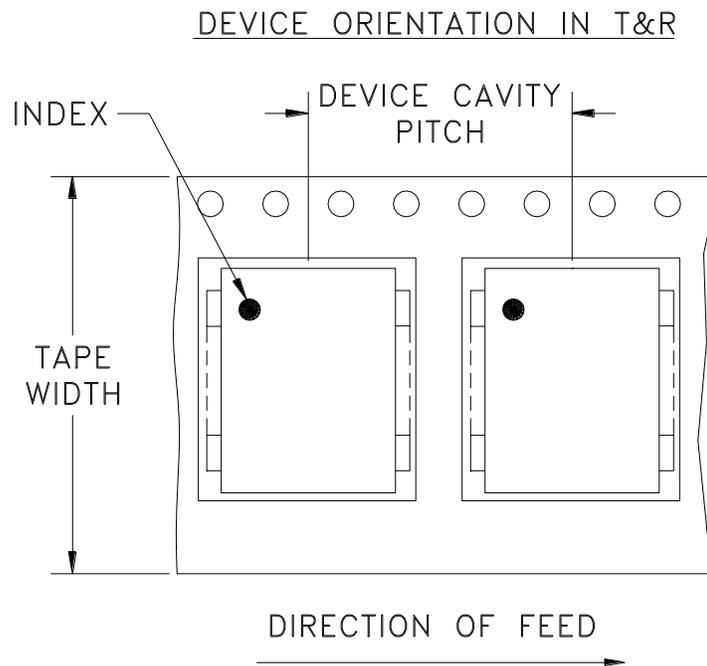
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Tape & Reel Packaging TR-F10



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

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.



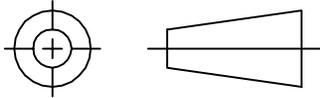
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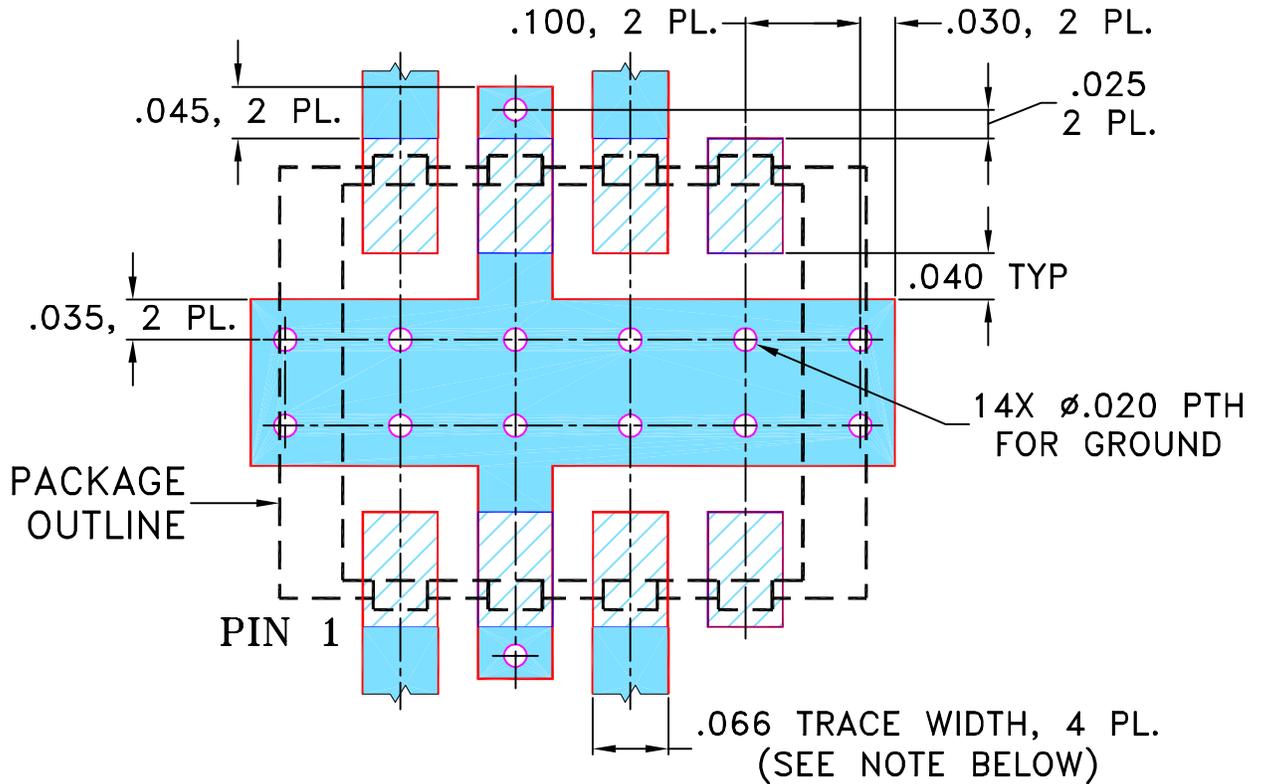
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M91979	NEW RELEASE	04/30/04	MMG	WP
A	M102713	ADDED "...WITH SMOBC"	01/12/06	GF	IL

**SUGGESTED MOUNTING CONFIGURATION
FOR BJ1051 CASE STYLE, "ph" PIN CONNECTION.**



- NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B 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

UNLESS OTHERWISE SPECIFIED

INITIALS DATE

DIMENSIONS ARE IN INCHES

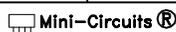
DRAWN MMG 04/19/04

TOLERANCES ON:
2 PL DECIMALS ±
3 PL DECIMALS ± .005

CHECKED AV 04/30/04

ANGLES ±
FRACTIONS ±

APPROVED WP 04/30/04



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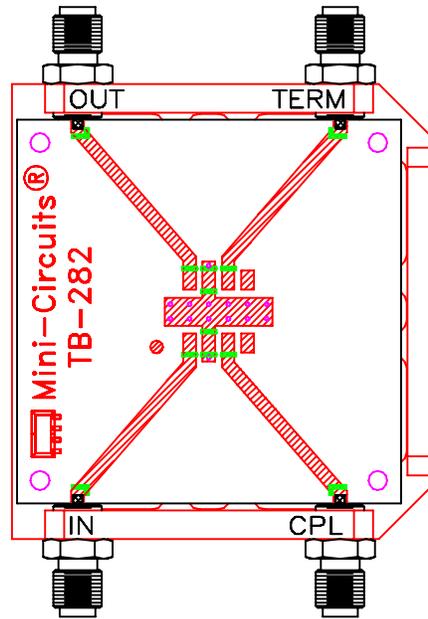
PL, ph, BJ1051, JYDC-7-1HP, TB-282

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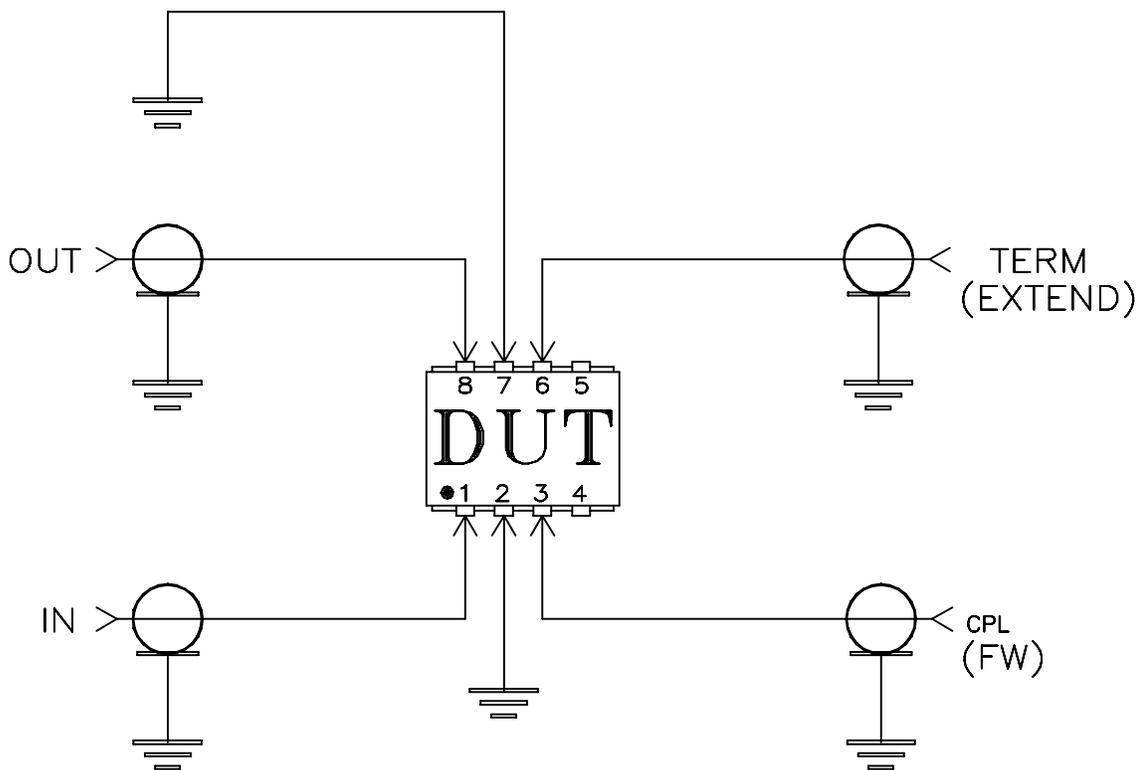
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ASHEET1.DWG REV:A DATE:01/12/95

Evaluation Board and Circuit



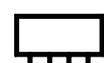
TB-282



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**

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