Surface Mount Directional Coupler

DBTC-13-5-75+

 75Ω . 13dB coupling, 5 to 1500 MHz

Features

- very flat coupling
- · very broadband, multi octave
- temperature stable, LTCC base
- all welded construction
- · leads attached for better solderability
- · micro miniature coupler
- aqueous washable
- protected by US Patents 6,140,887 & 6,784,521

Applications

- VHF/UHF receivers/transmitters
- cellular
- catv



Generic photo used for illustration purposes only CASE STYLE: AT790-1

+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
13"	1000, 2000

Electrical Specifications at 25°C

Parameter	Condition (MHz)	Min.	Тур.	Max.	Unit		
Frequency Range		5		1500	MHz		
	5-50		0.9	1.4			
Mainline Loss ¹	50-500		1.0	1.5	dB		
Mainline Loss	500-1000		1.1	1.6	ав		
	1000-1500		1.4	2.2			
Naminal Counting	5-1000		13.5±0.5		-ID		
Nominal Coupling	1000-1500		13.6±0.5		dB		
Counting Flatness(.)	5-1000			±0.6	-ID		
Coupling Flatness(±)	1000-1500			±0.8	dB		
	5-50	17	21				
Discontinuity	50-500	14	19		dB		
Directivity	500-1000	_	18				
	1000 -1500	_	17				
VOMB2	5-1000		1.3		-ID		
VSWR ²	1000-1500		1.3		dB		
	5-50			0.5			
Input Power	50-500 500-1000			1.0 1.0	W		
	1000-1500			1.0			

^{1.} Includes theoretical coupled power loss of 0.21 dB at 13 dB coupling.

Maximum Ratings

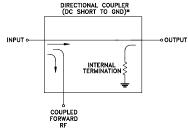
Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C

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

Pin Connections

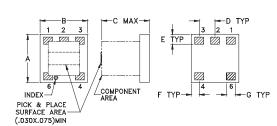
- III - C- IIII - C- III - C-							
Function	Pin Number						
INPUT	3						
OUTPUT	4						
COUPLED	1						
GROUND	2						
ISOLATE (DO NOT USE)	6						

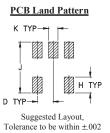
Electrical Schematic



^{2.} For coupled port VSWR above 500 MHz, 1.6:1 typ.

Outline Drawing

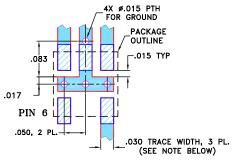




Outline Dimensions (inch)

В С Α Н Κ wt .150 .150 .150 .050 .030 .025 .028 .050 .160 .030 grams 3.81 3.81 0.76 0.64 0.76 0.10 3.81 1 27 0.711.27 4.06

Demo Board MCL P/N: TB-279 Suggested PCB Layout (PL-151)



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

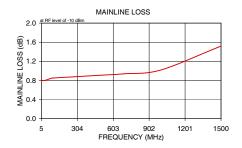
DENOTES PCB COPPER LAYOUT WITH SMO
(SOLDER MASK OVER BARE COPPER)

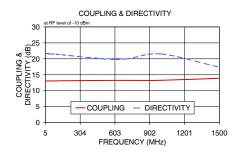
(SOLDER MASK OVER BARE

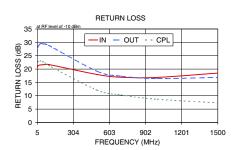
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Typical Performance Data

Frequency (MHz)	Mainline Loss (dB)	Coupling (dB)	Directivity (dB)	F	Return Loss (dB)	
, ,	In-Oút	In-Cpl	` ,	In	Òuť	Cpl
5.00	0.83	13.09	21.69	20.33	25.83	21.73
10.00	0.80	13.06	21.61	21.17	28.18	22.73
30.00	0.80	13.06	21.61	21.55	29.45	23.06
50.00	0.81	13.07	21.48	21.61	29.48	22.74
70.00	0.83	13.09	21.51	21.69	29.33	22.26
100.00	0.85	13.11	21.42	21.72	28.86	21.33
500.00	0.91	13.23	20.04	17.98	19.17	12.15
700.00	0.94	13.26	19.95	16.94	17.35	10.31
1000.00	1.02	13.29	21.53	16.89	16.41	8.68
1500.00	1.52	13.90	17.38	18.50	16.87	7.37







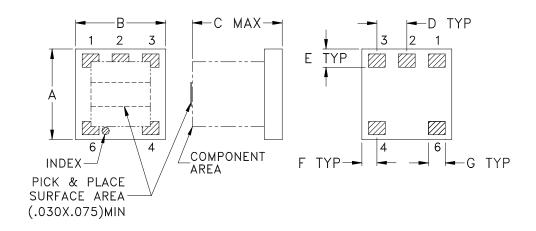
Additional Notes

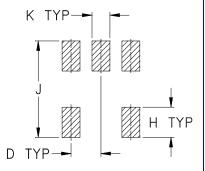
- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

Outline Dimensions

AT790-1

PCB Land Pattern





Suggested Layout, Tolerance to be within ±.002

CASE # A	В	C	D	E	F	G	Н	J	K	L	WT. GRAMS
AT790-1 .150 (3.81)	.150 (3.81)	.150 (3.81)	.050 (1.27)	.030 (0.76)	.025 (0.64)	.028 (0.71)	.050 (1.27)	.160 (4.06)	.030 (0.76)		.10

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

Notes:

- 1. Open style, Ceramic base.
- 2. Termination finish: Silver palladium or gold over nickel based on stock availability



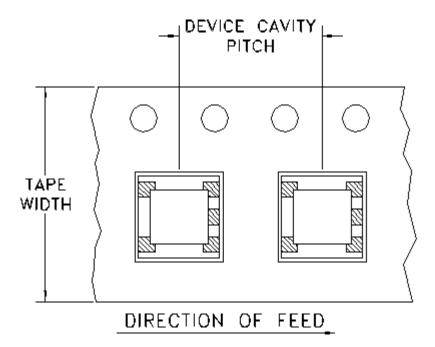


P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site

The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

Tape & Reel Packaging TR-F17

DEVICE ORIENTATION IN T&R



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

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





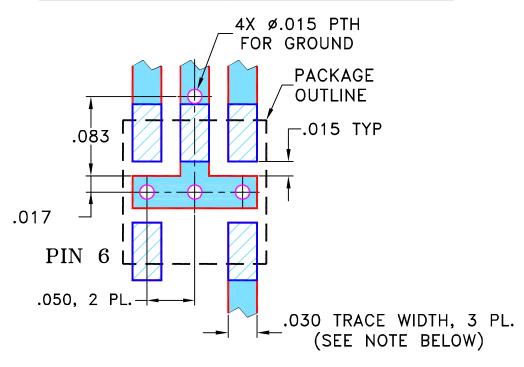
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

THIRD ANGLE	PROJECTION
(

		REVISIONS			
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M90455	NEW RELEASE	01/16/04	AV	WP
A	M102713	ADDED "WITH SMOBC"	01/17/06	MMG	IL

SUGGESTED MOUNTING CONFIGURATION FOR AT1029 CASE STYLE, "na" PIN CONNECTION



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.030" \pm 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.

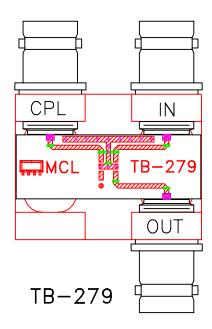
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

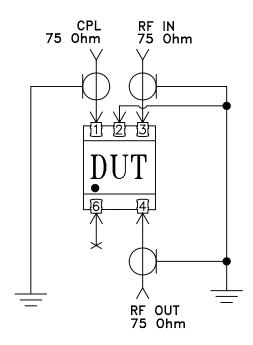


DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

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UNLESS OTHERWISE SPECIFIED		INITIALS	DATE	」 ┌──		. ~		• 4 ®		
DIMENSIONS ARE IN INCHES	DRAWN	AV	01/07/04		$\supseteq \operatorname{Min}_{1}$	ı — C	ircu	1ts :	Neptu	ne Avenue NY 11235
TOLERANCES ON: 2 PL DECIMALS ±	CHECKED	IL	01/16/04		Τ			BI	rookiyn	NI II235
3 PL DECIMALS ± .005	APPROVED	WP	01/16/04							
ANGLES ± FRACTIONS ±] PL.	na, 75	5. AT	1029.	DBTC	. TI	3-279
□ Mini−Circuits ®],	,,	,	· · · · ,		,		
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	ASHEETA1.D	WG REV:A DA	TE:01/12/95	6	30LT191		10:1		1	Or I

Evaluation Board and Circuit





Schematic Diagram

Notes:

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

☐ Mini-Circuits®



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

ENV02T1 Rev: B

02/25/11

M130240 File: ENV02T1.pdf

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