

# Surface Mount <sup>top hat</sup> Directional Coupler

## TCD-10-122-75X+

75Ω 10 dB 5 to 1250 MHz



Generic photo used for illustration purposes only

CASE STYLE: AT1521

**+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

### Features

- wideband, 5 to 1250 MHz
- low mainline loss, 1.7 dB typ.
- aqueous washable
- leads for excellent solderability
- protected by US Patent 6,140,887

### Applications

- DOCSIS® 3.1 Systems
- VHF/UHF
- CATV
- cellular

### Electrical Specifications at 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		5		1250	MHz
Mainline Loss <sup>1</sup> (above theoretical 0.1 dB)	5-50	—	1.1	1.5	dB
	50-1000	—	1.5	1.9	
	1000-1250	—	1.7	2.0	
Nominal Coupling	5-1250	—	10.0±0.5	—	dB
Coupling Flatness(±)	5-1250	—	0.3	0.6	dB
Directivity	5-250	16	21	—	dB
	250-1000	10	15	—	
	1000-1250	8	12	—	
Return Loss (Input)	5-50	17	20	—	dB
	50-1000	16	22	—	
	1000-1250	16	20	—	
Return Loss (Output)	5-50	20	25	—	dB
	50-1000	18	22	—	
	1000-1250	18	20	—	
Return Loss (Coupling)	5-50	17	18	—	dB
	50-1000	16	22	—	
	1000-1250	16	20	—	

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

### Maximum Ratings

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

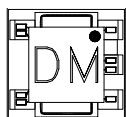
Permanent damage may occur if any of these limits are exceeded.

\* Case temperature is defined as temperature on ground leads.

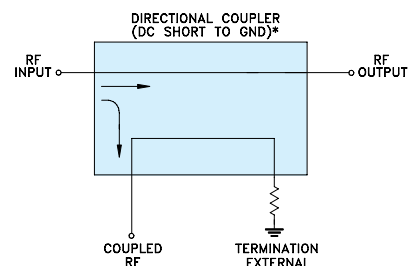
### Pin Connections

Function	Pin Number
INPUT	3
OUTPUT	4
COUPLED	1
GROUND	2
75Ω TERM EXTERNAL	6

### Product Marking

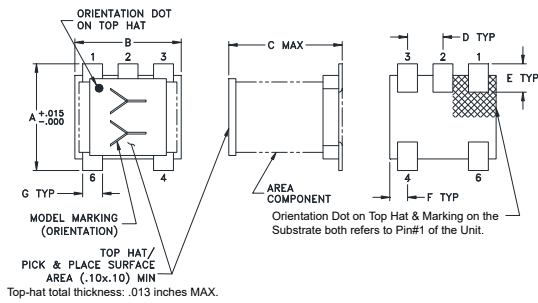


### Electrical Schematic

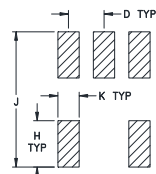


\* ELECTRICAL SCHEMATIC IS FOR DIRECTIONAL COUPLER WITH INTERNAL TRANSFORMER(S) AND EXTERNAL TERMINATION.

## Outline Drawing

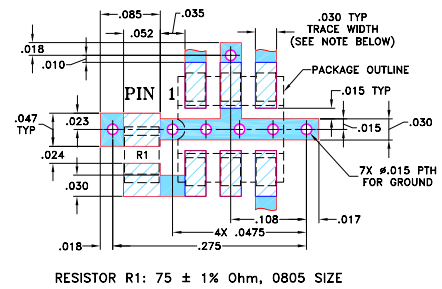


## PCB Land Pattern



Suggested Layout,  
Tolerance to be within ±0.02

## Demo Board MCL P/N: TB-72 Suggested PCB Layout (PL-010)



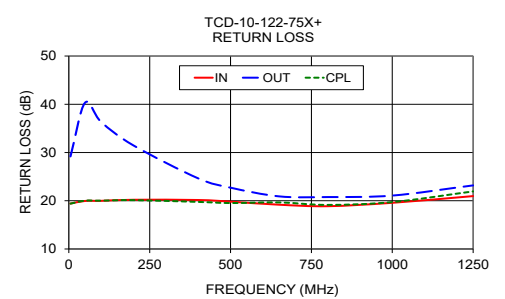
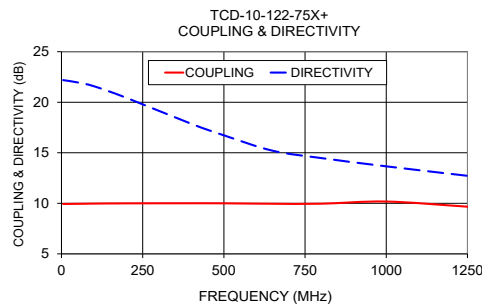
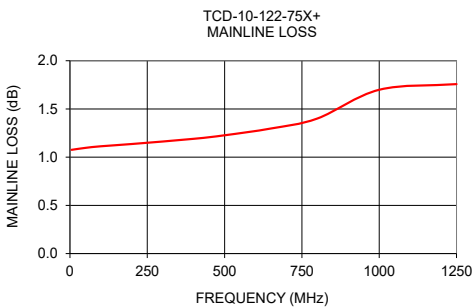
- NOTES:**
- TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS  $0.030" \pm 0.002"$ ; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
  - BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
  - DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

## Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	J	K	wt
.150	.150	.160	.050	.040	.025	.028	.065	.190	.030	grams
3.81	3.81	4.06	1.27	1.02	0.64	0.71	1.65	4.83	0.76	0.15

## Typical Performance Data

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	Return Loss (dB)		
				In	Out	Cpl
5	1.08	9.94	22.19	19.41	29.19	19.41
50	1.10	9.95	21.96	19.96	40.31	20.02
100	1.11	9.97	21.58	19.99	36.32	20.02
200	1.14	10.00	20.43	20.21	31.46	20.13
400	1.19	10.01	17.86	20.16	24.64	19.76
500	1.23	10.00	16.73	19.82	22.71	19.53
650	1.30	9.96	15.21	19.18	20.91	19.66
800	1.40	9.97	14.48	18.87	20.77	19.14
1000	1.70	10.18	13.66	19.58	21.07	19.72
1250	1.76	9.67	12.72	20.97	23.18	21.94



## Additional Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' applicable established test performance criteria and measurement instructions.
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