SURFACE MOUNT top hat

# Directional Coupler

# TCD-18-122-75X+

75Ω 17.5 dB 5 to 1250 MHz

## FEATURES

- Wideband, 5 to 1250 MHz
- Low Mainline Loss, 1.0 dB Typ.
- Aqueous Washable
- Leads for Excellent Solderability
- Protected by US Patent 6,140,887

## APPLICATIONS

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

*Generic photo used for illustration purposes only*

CASE STYLE: DB1627

**+RoHS Compliant**
The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

## ELECTRICAL SPECIFICATIONS AT +25°C

| Parameter | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Frequency Range | | 5 | | 1250 | MHz |
| Mainline Loss[1] (Above Theoretical 0.1 dB) | 5-50<br>50-1000<br>1000-1250 | | 1.2<br>1.0<br>1.1 | 1.5<br>1.4<br>1.5 | dB |
| Coupling | 5-1250 | | 17.5±0.8 | | dB |
| Coupling Flatness (±) | 5-1250 | | ±0.7 | ±1.1 | dB |
| Directivity | 5-50<br>50-1000<br>1000-1250 | 15<br>15<br>14 | 18<br>22<br>18 | | dB |
| Return Loss (Input) | 5-50<br>50-1000<br>1000-1250 | 14<br>18<br>17 | 17<br>22<br>24 | | dB |
| Return Loss (Output) | 5-50<br>50-1000<br>1000-1250 | 15<br>18<br>17 | 18<br>23<br>18 | | dB |
| Return Loss (Coupling) | 5-50<br>50-1000<br>1000-1250 | 15<br>18<br>17 | 17<br>23<br>25 | | dB |
| Input Power | 5-100<br>100-1250 | | | 0.5<br>1.0 | W |

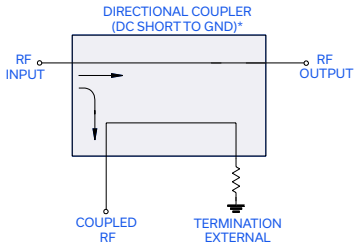
1. Mainline loss includes theoretical power loss at coupled port.

## ABSOLUTE MAXIMUM RATINGS

| Parameter | Ratings |
|---|---|
| Operating Temperature | -40°C to +85°C[2] |
| Storage Temperature | -55°C to +100°C |

2. Case temperature is defined as temperature on ground leads.
Permanent damage may occur if any of these limits are exceeded.

## ELECTRICAL SCHEMATIC




*Electrical schematic is for Directional coupler with internal transformer(s) and external termination

SURFACE MOUNT top hat

# Directional Coupler TCD-18-122-75X+

75Ω 17.5 dB 5 to 1250 MHz

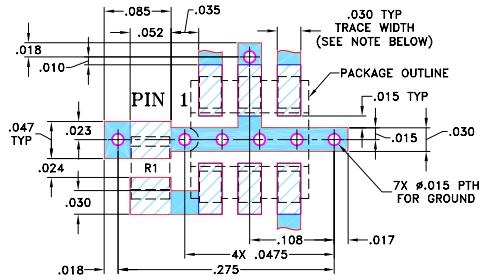
## PIN CONNECTIONS

| | |
|---|---|
| INPUT | 3 |
| OUTPUT | 4 |
| COUPLED | 1 |
| GROUND | 2 |
| 75Ω TERM EXTERNAL | 6 |
| NOT USED | 5 |

## PRODUCT MARKING: DG

## DEMO BOARD MCL P/N: TB-TCD1812275X+

## SUGGESTED PCB LAYOUT (PL-010)



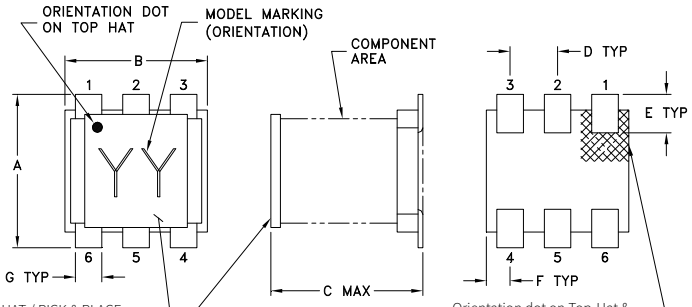

RESISTOR R1: 75 ± 1% Ohm, 0805 SIZE

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

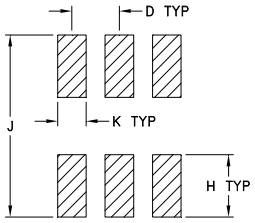
## OUTLINE DRAWING




TOP-HAT / PICK & PLACE SURFACE AREA (.10X.10) MIN
TOP-HAT TOTAL THICKNESS: .013 inches MAX.

Orientation dot on Top-Hat & orientation feature on substrate corresponds to pin #1.

### PCB Land Pattern




SUGGESTED LAYOUT
TOLERANCE TO BE WITHIN ±.002

## OUTLINE DIMENSIONS (Inches / mm)

| A | B | C | D | E | F |
|---|---|---|---|---|---|
| .160 | .150 | .160 | .050 | .040 | .025 |
| 4.06 | 3.81 | 4.06 | 1.27 | 1.02 | 0.64 |

| G | H | J | K | | wt |
|---|---|---|---|---|---|
| .028 | .065 | .190 | .030 | | grams |
| 0.71 | 1.65 | 4.83 | 0.76 | | 0.15 |

## TAPE & REEL INFORMATION: F47

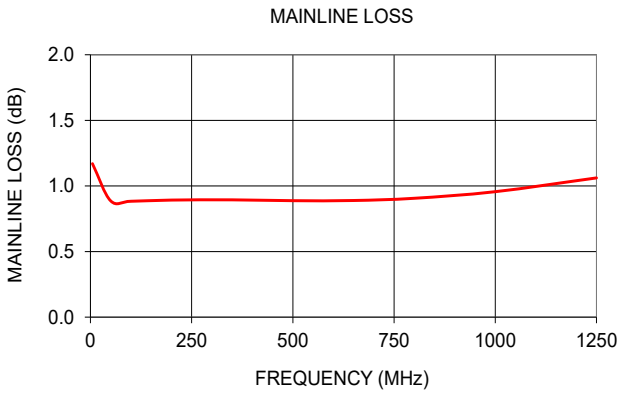
SURFACE MOUNT top hat

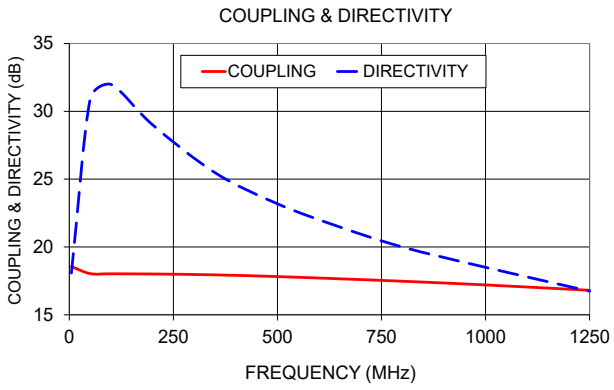
# Directional Coupler TCD-18-122-75X+

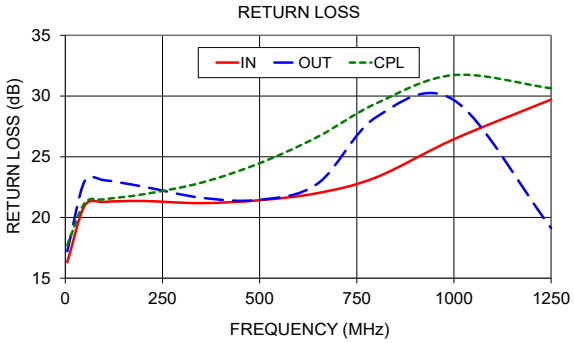
75Ω 17.5 dB 5 to 1250 MHz

## TYPICAL PERFORMANCE DATA

| Frequency (MHz) | Mainline Loss (dB) In-Out | Coupling (dB) In-Cpl | Directivity (dB) | Return Loss (dB) In | Out | Cpl |
|---|---|---|---|---|---|---|
| 5 | 1.17 | 18.56 | 18.08 | 16.32 | 17.22 | 17.73 |
| 50 | 0.89 | 18.04 | 30.89 | 20.97 | 23.02 | 21.18 |
| 100 | 0.88 | 18.02 | 31.98 | 21.28 | 23.07 | 21.50 |
| 200 | 0.89 | 18.01 | 29.01 | 21.36 | 22.54 | 21.91 |
| 350 | 0.89 | 17.95 | 25.48 | 21.18 | 21.63 | 22.86 |
| 500 | 0.89 | 17.82 | 23.18 | 21.42 | 21.46 | 24.47 |
| 650 | 0.89 | 17.65 | 21.47 | 22.01 | 22.80 | 26.65 |
| 800 | 0.91 | 17.48 | 20.00 | 23.30 | 28.26 | 29.39 |
| 1000 | 0.96 | 17.20 | 18.50 | 26.44 | 29.66 | 31.72 |
| 1250 | 1.06 | 16.81 | 16.74 | 29.71 | 19.14 | 30.64 |




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/terms/viewterm.html