



Mini-Circuits®

SURFACE MOUNT 

## Directional Coupler

DBTC-13-5-75X+

75Ω 13 dB 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



Generic photo used for illustration purposes only

CASE STYLE: AT1667-1

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

## APPLICATIONS

- VHF/UHF Receivers/Transmitters
- Cellular
- CATV

## ELECTRICAL SPECIFICATIONS AT +25°C

| Parameter                  | Condition (MHz) | Min. | Typ.     | Max. | Unit |
|----------------------------|-----------------|------|----------|------|------|
| Frequency Range            |                 | 5    |          | 1500 | MHz  |
| Mainline Loss <sup>1</sup> | 5-50            |      | 0.9      | 1.4  | dB   |
|                            | 50-500          |      | 1.0      | 1.5  |      |
|                            | 500-1000        |      | 1.1      | 1.6  |      |
|                            | 1000-1500       |      | 1.4      | 2.2  |      |
| Nominal Coupling           | 5-1000          |      | 13.5±0.5 |      | dB   |
|                            | 1000-1500       |      | 13.6±0.5 |      |      |
| Coupling Flatness          | 5-1000          |      |          | ±0.6 | dB   |
|                            | 1000-1500       |      |          | ±0.8 |      |
| Directivity                | 5-50            | 17   | 21       |      | dB   |
|                            | 50-500          | 14   | 19       |      |      |
|                            | 500-1000        |      | 18       |      |      |
|                            | 1000-1500       |      | 17       |      |      |
| VSWR <sup>2</sup>          | 5-1000          |      | 1.3      |      | :1   |
|                            | 1000-1500       |      | 1.3      |      |      |
| Input Power                | 5-50            |      |          | 0.5  | W    |
|                            | 50-500          |      |          | 1.0  |      |
|                            | 500-1000        |      |          | 1.0  |      |
|                            | 1000-1500       |      |          | 1.0  |      |

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

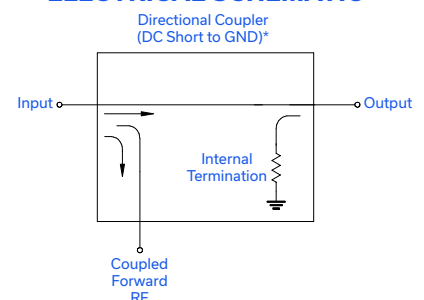
2. For coupled port VSWR above 500 MHz, 1.6:1 typ.

## ABSOLUTE 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.

## ELECTRICAL SCHEMATIC



\* Electrical schematic is for directional coupler with internal transformer(s) that routes DC from RF ports to ground.

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ECO-027378  
DBTC-13-5-75X+  
MCL NY  
251017  
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# Directional Coupler **DBTC-13-5-75X+**

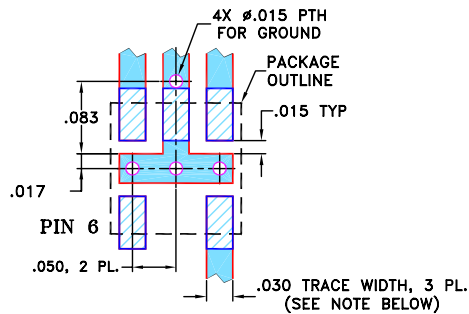
75Ω 13 dB 5 to 1500 MHz

## PIN CONNECTIONS

|                      |   |
|----------------------|---|
| INPUT                | 3 |
| OUTPUT               | 4 |
| COUPLED              | 1 |
| GROUND               | 2 |
| ISOLATE (DO NOT USE) | 6 |

**PRODUCT MARKING:** EY

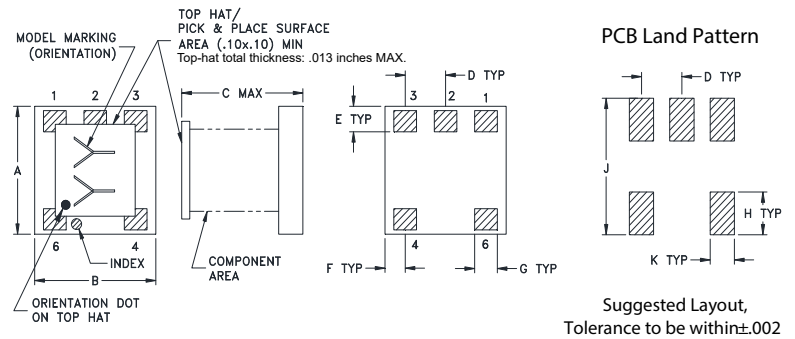
**DEMO BOARD MCL P/N:** TB-DBTC135-75X+  
**SUGGESTED PCB LAYOUT** (PL-151)



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

## OUTLINE DRAWING



## OUTLINE DIMENSIONS (Inches/mm)

| A    | B    | C    | D    | E    | F     |
|------|------|------|------|------|-------|
| .150 | .150 | .150 | .050 | .030 | .025  |
| 3.81 | 3.81 | 3.81 | 1.27 | 0.76 | 0.64  |
| G    | H    | J    | K    |      | wt    |
| .028 | .050 | .160 | .030 |      | grams |
| 0.71 | 1.27 | 4.06 | 0.76 |      | 0.10  |

**TAPE & REEL INFORMATION: F15**



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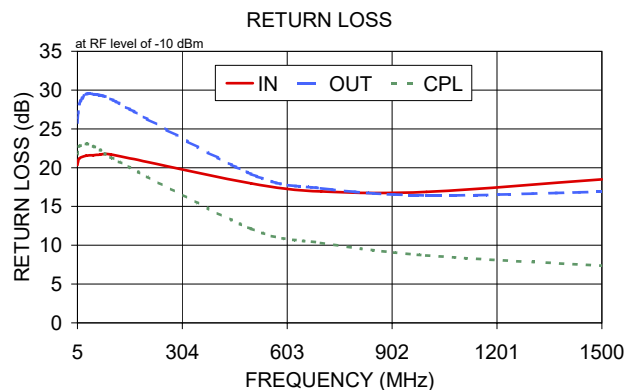
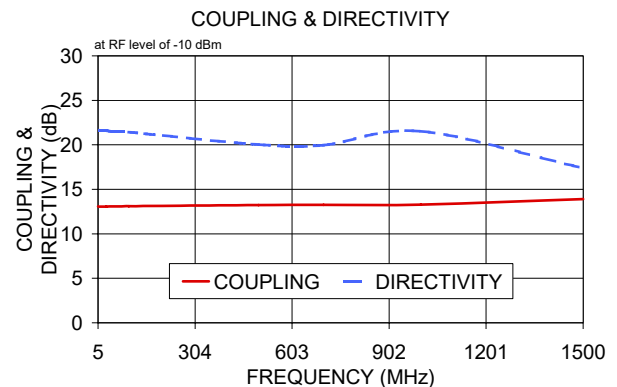
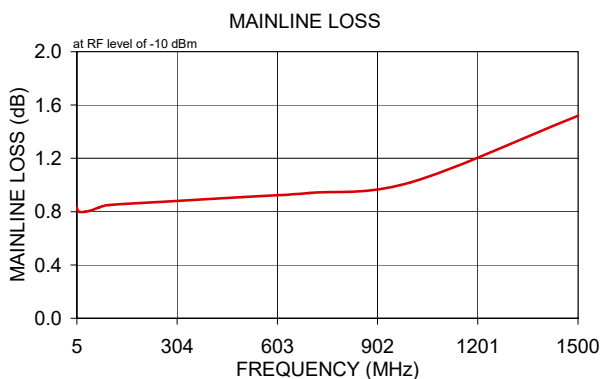
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75Ω 13 dB 5 to 1500 MHz

## TYPICAL PERFORMANCE DATA

| Frequency<br>(MHz) | Mainline Loss<br>(dB) | Coupling<br>(dB) | Directivity<br>(dB) | Return Loss<br>(dB) |       |       |
|--------------------|-----------------------|------------------|---------------------|---------------------|-------|-------|
|                    | In-Out                |                  |                     | In                  | Out   | Cpl   |
| 5                  | 0.83                  | 13.09            | 21.69               | 20.33               | 25.83 | 21.73 |
| 10                 | 0.80                  | 13.06            | 21.61               | 21.17               | 28.18 | 22.73 |
| 30                 | 0.80                  | 13.06            | 21.61               | 21.55               | 29.45 | 23.06 |
| 50                 | 0.81                  | 13.07            | 21.48               | 21.61               | 29.48 | 22.74 |
| 70                 | 0.83                  | 13.09            | 21.51               | 21.69               | 29.33 | 22.26 |
| 100                | 0.85                  | 13.11            | 21.42               | 21.72               | 28.86 | 21.33 |
| 500                | 0.91                  | 13.23            | 20.04               | 17.98               | 19.17 | 12.15 |
| 700                | 0.94                  | 13.26            | 19.95               | 16.94               | 17.35 | 10.31 |
| 1000               | 1.02                  | 13.29            | 21.53               | 16.89               | 16.41 | 8.68  |
| 1500               | 1.52                  | 13.90            | 17.38               | 18.50               | 16.87 | 7.37  |



### 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-Circuit's applicable established test performance criteria and measurement instructions.
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