



Mini-Circuits®

SURFACE MOUNT

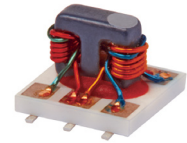
## Directional Coupler

DBTC-13-5-75L+

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: AT1030

**+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.

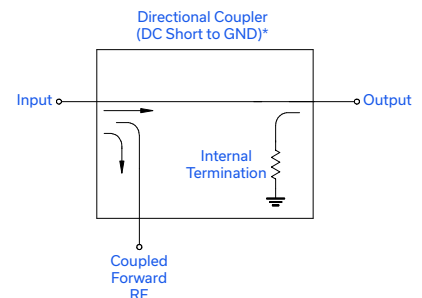
2. For coupled port VSWR above 500 MHz, 1.6:1 typ.

## 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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www.minicircuits.com P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com

REV. M  
ECO-027296  
DBTC-13-5-75L+  
MCL NY  
251010  
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## Directional Coupler

DBTC-13-5-75L+

75Ω

13 dB

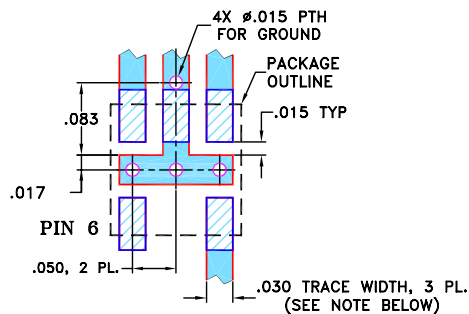
5 to 1500 MHz

## PIN CONNECTIONS

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

PRODUCT MARKING: N/A

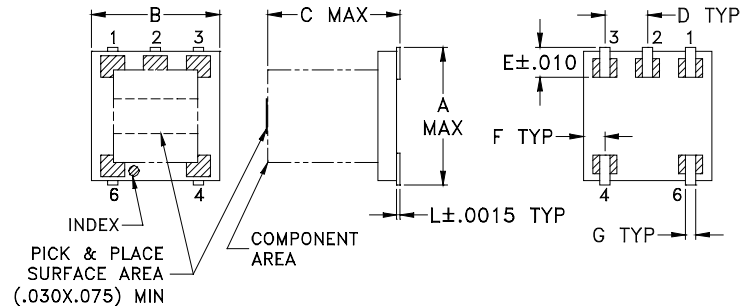
DEMO BOARD MCL P/N: TB-DBTC135-75L+  
SUGGESTED PCB LAYOUT (PL-151)



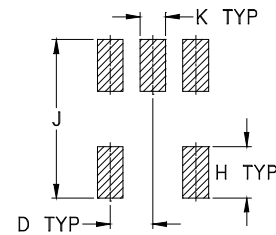
- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS  $0.030" \pm 0.002"$ ; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

-  DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
-  DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

## OUTLINE DRAWING



## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\square .002$

## OUTLINE DIMENSIONS (Inches/mm)

| A    | B    | C    | D    | E    | F    | G    | H    | J    | K    | L    | wt    |
|------|------|------|------|------|------|------|------|------|------|------|-------|
| .166 | .150 | .155 | .050 | .037 | .025 | .012 | .060 | .184 | .030 | .004 | grams |
| 4.22 | 3.81 | 3.94 | 1.27 | 0.94 | 0.64 | 0.30 | 1.52 | 4.67 | 0.76 | 0.10 | 0.10  |

## TAPE &amp; REEL INFORMATION: F76



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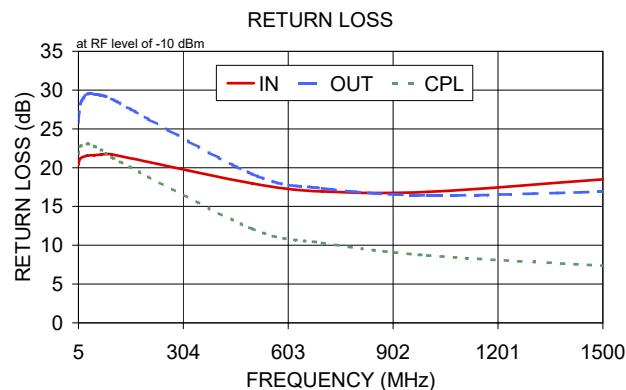
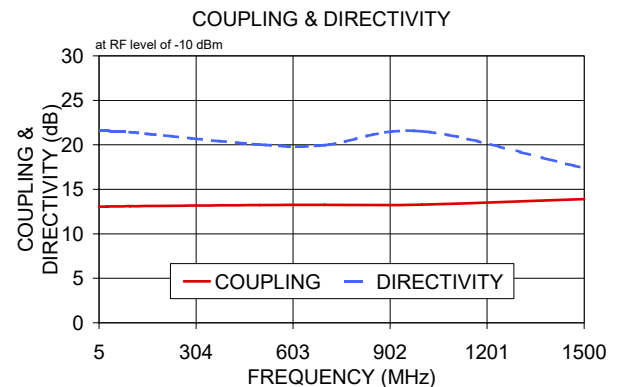
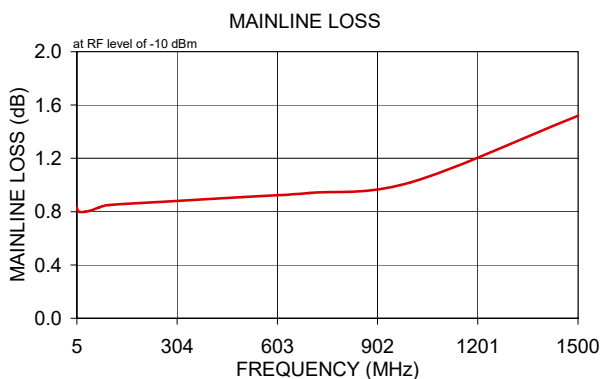
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75Ω 13 dB 5 to 1500 MHz

## TYPICAL PERFORMANCE DATA

| Frequency (MHz) | Mainline Loss (dB) | Coupling (dB) | Directivity (dB) | Return Loss (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

- 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.
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