

# Surface Mount Directional Coupler

50Ω 10 to 750 MHz

## TCD-10-1WX+

### Features

- wideband, 10 to 750 MHz
- low mainline loss, 1.2 dB typ.
- aqueous washable
- leads for excellent solderability
- protected by US Patent 6,140,887

### Applications

- VHF/UHF
- signal sampling
- communications



Generic photo used for illustration purposes only

CASE STYLE: DB1627

**+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                  | Frequency (MHz) | Min. | Typ.     | Max. | Unit |
|----------------------------|-----------------|------|----------|------|------|
| Frequency Range            |                 | 10   |          | 750  | MHz  |
| Mainline Loss <sup>1</sup> | 10 - 100        | —    | 1.3      | 2.1  | dB   |
|                            | 100 - 350       | —    | 1.2      | 1.6  |      |
|                            | 350 - 750       | —    | 1.4      | 2.0  |      |
| Nominal Coupling           |                 | —    | 10.3±0.5 | —    | dB   |
| Coupling Flatness(±)       |                 | —    | ±0.8     | —    | dB   |
| Directivity                | 10 - 100        | 17   | 22       | —    | dB   |
|                            | 100 - 350       | 14   | 18       | —    |      |
|                            | 350 - 750       | —    | 15       | —    |      |
| VSWR                       | 10 - 750        |      | 1.3      |      | :1   |
| Input Power                | 10 - 100        | —    | —        | 0.5  | W    |
|                            | 100 - 750       | —    | —        | 1.0  |      |

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 |

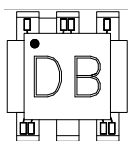
Permanent damage may occur if any of these limits are exceeded.

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

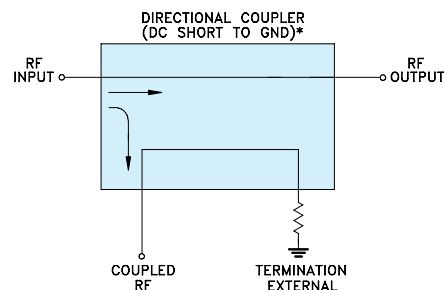
### Pin Connections

| Function          | Pin Number |
|-------------------|------------|
| INPUT             | 3          |
| OUTPUT            | 4          |
| COUPLED           | 1          |
| GROUND            | 2          |
| 50Ω TERM EXTERNAL | 6          |
| NOT USED          | 5          |

### Product Marking



### Electrical Schematic



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



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M151107  
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# Directional Coupler

# TCD-10-1WX+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER = 0 dBm @Temperature = +25°C

| FREQUENCY<br>(MHz) | INSERTION<br>LOSS<br>(dB) | COUPLING<br>LOSS<br>(dB) | DIRECTIVITY<br>(dB) | RETURN LOSS<br>(dB) |       |       |
|--------------------|---------------------------|--------------------------|---------------------|---------------------|-------|-------|
|                    |                           |                          |                     | IN                  | OUT   | CPL   |
| 10.0               | 1.14                      | 9.98                     | 21.77               | 18.91               | 30.69 | 18.75 |
| 20.0               | 1.14                      | 10.00                    | 21.89               | 19.11               | 32.82 | 18.88 |
| 30.0               | 1.15                      | 10.01                    | 21.87               | 19.16               | 33.20 | 18.90 |
| 40.0               | 1.15                      | 10.01                    | 21.85               | 19.20               | 33.12 | 18.91 |
| 50.0               | 1.16                      | 10.02                    | 21.81               | 19.22               | 33.18 | 18.93 |
| 100.0              | 1.17                      | 10.06                    | 21.59               | 19.35               | 32.16 | 19.02 |
| 150.0              | 1.18                      | 10.09                    | 21.27               | 19.39               | 30.87 | 19.04 |
| 200.0              | 1.19                      | 10.12                    | 20.82               | 19.37               | 29.52 | 19.00 |
| 250.0              | 1.20                      | 10.14                    | 20.34               | 19.31               | 28.33 | 18.91 |
| 300.0              | 1.21                      | 10.17                    | 19.78               | 19.21               | 27.27 | 18.78 |
| 350.0              | 1.22                      | 10.19                    | 19.20               | 19.06               | 26.43 | 18.62 |
| 375.0              | 1.23                      | 10.19                    | 18.91               | 19.00               | 26.04 | 18.54 |
| 400.0              | 1.23                      | 10.20                    | 18.60               | 18.93               | 25.62 | 18.46 |
| 450.0              | 1.25                      | 10.22                    | 17.98               | 18.79               | 24.93 | 18.28 |
| 500.0              | 1.26                      | 10.24                    | 17.35               | 18.67               | 24.32 | 18.10 |
| 550.0              | 1.28                      | 10.26                    | 16.72               | 18.49               | 23.83 | 17.92 |
| 600.0              | 1.29                      | 10.27                    | 16.10               | 18.33               | 23.38 | 17.76 |
| 650.0              | 1.31                      | 10.29                    | 15.47               | 18.21               | 22.89 | 17.59 |
| 700.0              | 1.33                      | 10.30                    | 14.88               | 18.10               | 22.48 | 17.45 |
| 750.0              | 1.35                      | 10.32                    | 14.32               | 17.94               | 22.12 | 17.32 |
| 800.0              | 1.37                      | 10.33                    | 13.73               | 17.84               | 21.88 | 17.20 |
| 900.0              | 1.42                      | 10.33                    | 12.69               | 17.61               | 21.34 | 17.02 |
| 1000.0             | 1.48                      | 10.34                    | 11.70               | 17.35               | 20.97 | 16.89 |
| 1100.0             | 1.54                      | 10.34                    | 10.78               | 17.16               | 20.70 | 16.79 |
| 1200.0             | 1.62                      | 10.33                    | 9.95                | 16.91               | 20.50 | 16.72 |
| 1300.0             | 1.70                      | 10.31                    | 9.17                | 16.70               | 20.46 | 16.65 |
| 1400.0             | 1.80                      | 10.29                    | 8.46                | 16.46               | 20.46 | 16.62 |
| 1500.0             | 1.91                      | 10.29                    | 7.78                | 16.22               | 20.48 | 16.59 |
| 1600.0             | 2.03                      | 10.28                    | 7.13                | 15.93               | 20.72 | 16.57 |
| 1700.0             | 2.16                      | 10.28                    | 6.55                | 15.58               | 20.98 | 16.49 |
| 1800.0             | 2.31                      | 10.29                    | 5.98                | 15.17               | 21.37 | 16.34 |
| 1900.0             | 2.48                      | 10.31                    | 5.49                | 14.75               | 21.79 | 16.14 |
| 2000.0             | 2.67                      | 10.36                    | 5.00                | 14.24               | 22.34 | 15.86 |
| 2100.0             | 2.87                      | 10.42                    | 4.57                | 13.73               | 22.92 | 15.48 |
| 2200.0             | 3.10                      | 10.51                    | 4.13                | 13.16               | 23.63 | 14.99 |
| 2300.0             | 3.33                      | 10.63                    | 3.67                | 12.57               | 24.72 | 14.41 |
| 2400.0             | 3.58                      | 10.78                    | 3.33                | 11.95               | 25.37 | 13.73 |
| 2500.0             | 3.85                      | 10.94                    | 2.97                | 11.38               | 26.18 | 13.07 |
| 2600.0             | 4.13                      | 11.12                    | 2.63                | 10.79               | 26.20 | 12.41 |
| 2700.0             | 4.42                      | 11.33                    | 2.33                | 10.21               | 25.17 | 11.76 |
| 2800.0             | 4.71                      | 11.57                    | 2.08                | 9.66                | 23.64 | 11.09 |
| 2900.0             | 5.01                      | 11.84                    | 1.88                | 9.14                | 21.80 | 10.40 |
| 3000.0             | 5.30                      | 12.10                    | 1.65                | 8.65                | 20.37 | 9.82  |
| 3100.0             | 5.58                      | 12.38                    | 1.50                | 8.18                | 18.96 | 9.26  |
| 3200.0             | 5.86                      | 12.64                    | 1.34                | 7.77                | 17.63 | 8.77  |
| 3300.0             | 6.13                      | 12.93                    | 1.26                | 7.37                | 16.46 | 8.31  |
| 3400.0             | 6.39                      | 13.19                    | 1.21                | 7.04                | 15.43 | 7.89  |
| 3500.0             | 6.64                      | 13.45                    | 1.19                | 6.70                | 14.51 | 7.51  |
| 3600.0             | 6.89                      | 13.71                    | 1.22                | 6.40                | 13.59 | 7.16  |
| 3700.0             | 7.11                      | 13.95                    | 1.26                | 6.12                | 12.94 | 6.88  |
| 3800.0             | 7.29                      | 14.15                    | 1.42                | 5.90                | 12.35 | 6.61  |
| 3900.0             | 7.52                      | 14.35                    | 1.59                | 5.68                | 11.80 | 6.40  |
| 4000.0             | 7.72                      | 14.53                    | 1.79                | 5.50                | 11.32 | 6.18  |



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# Directional Coupler

# TCD-10-1WX+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER =0 dBm @Temperature = -40°C

| FREQUENCY<br>(MHz) | INSERTION<br>LOSS<br>(dB) | COUPLING<br>LOSS<br>(dB) | DIRECTIVITY<br>(dB) | RETURN LOSS<br>(dB) |       |       |
|--------------------|---------------------------|--------------------------|---------------------|---------------------|-------|-------|
|                    |                           |                          |                     | IN                  | OUT   | CPL   |
| 10.0               | 1.19                      | 9.94                     | 20.65               | 17.64               | 22.95 | 17.51 |
| 20.0               | 1.07                      | 9.87                     | 21.22               | 19.22               | 27.61 | 19.02 |
| 30.0               | 1.04                      | 9.87                     | 21.52               | 19.77               | 29.96 | 19.52 |
| 40.0               | 1.03                      | 9.87                     | 21.74               | 20.09               | 31.20 | 19.81 |
| 50.0               | 1.02                      | 9.87                     | 21.87               | 20.29               | 32.01 | 20.01 |
| 100.0              | 1.02                      | 9.90                     | 21.66               | 20.29               | 31.97 | 20.07 |
| 150.0              | 1.02                      | 9.92                     | 21.35               | 20.21               | 31.09 | 20.05 |
| 200.0              | 1.04                      | 9.93                     | 21.11               | 20.22               | 29.12 | 20.04 |
| 250.0              | 1.05                      | 9.94                     | 20.52               | 19.95               | 27.82 | 19.70 |
| 300.0              | 1.06                      | 9.96                     | 20.05               | 19.86               | 27.00 | 19.49 |
| 350.0              | 1.08                      | 9.97                     | 19.49               | 19.55               | 26.05 | 19.16 |
| 375.0              | 1.08                      | 9.98                     | 19.19               | 19.43               | 25.63 | 19.03 |
| 400.0              | 1.09                      | 9.98                     | 18.92               | 19.33               | 25.22 | 18.92 |
| 450.0              | 1.11                      | 10.00                    | 18.35               | 19.05               | 24.35 | 18.62 |
| 500.0              | 1.12                      | 10.01                    | 17.71               | 18.83               | 23.66 | 18.35 |
| 550.0              | 1.14                      | 10.02                    | 17.13               | 18.60               | 23.12 | 18.12 |
| 600.0              | 1.15                      | 10.03                    | 16.51               | 18.36               | 22.65 | 17.82 |
| 650.0              | 1.17                      | 10.04                    | 15.91               | 18.22               | 22.18 | 17.62 |
| 700.0              | 1.19                      | 10.04                    | 15.35               | 18.02               | 21.70 | 17.39 |
| 750.0              | 1.21                      | 10.05                    | 14.81               | 17.84               | 21.34 | 17.18 |
| 800.0              | 1.23                      | 10.05                    | 14.27               | 17.68               | 21.03 | 17.00 |
| 900.0              | 1.28                      | 10.05                    | 13.20               | 17.31               | 20.40 | 16.78 |
| 1000.0             | 1.34                      | 10.05                    | 12.20               | 16.97               | 19.94 | 16.50 |
| 1100.0             | 1.40                      | 10.04                    | 11.22               | 16.64               | 19.49 | 16.31 |
| 1200.0             | 1.47                      | 10.02                    | 10.39               | 16.36               | 19.25 | 16.48 |
| 1300.0             | 1.54                      | 10.00                    | 9.56                | 16.09               | 19.14 | 16.09 |
| 1400.0             | 1.64                      | 9.98                     | 8.78                | 15.84               | 19.13 | 16.31 |
| 1500.0             | 1.74                      | 9.96                     | 8.09                | 15.60               | 19.12 | 16.00 |
| 1600.0             | 1.85                      | 9.95                     | 7.36                | 15.41               | 19.39 | 16.12 |
| 1700.0             | 1.98                      | 9.95                     | 6.75                | 15.02               | 19.61 | 15.94 |
| 1800.0             | 2.12                      | 9.96                     | 6.18                | 14.69               | 20.05 | 15.84 |
| 1900.0             | 2.29                      | 9.99                     | 5.62                | 14.21               | 20.34 | 15.49 |
| 2000.0             | 2.48                      | 10.03                    | 5.13                | 13.67               | 20.97 | 15.59 |
| 2100.0             | 2.70                      | 10.11                    | 4.58                | 13.04               | 21.48 | 15.17 |
| 2200.0             | 2.92                      | 10.22                    | 4.15                | 12.74               | 22.62 | 14.34 |
| 2300.0             | 3.16                      | 10.35                    | 3.65                | 12.03               | 23.68 | 14.00 |
| 2400.0             | 3.44                      | 10.53                    | 3.24                | 11.33               | 24.66 | 13.14 |
| 2500.0             | 3.71                      | 10.72                    | 2.85                | 10.81               | 26.16 | 12.48 |
| 2600.0             | 4.01                      | 10.94                    | 2.50                | 10.30               | 26.98 | 11.65 |
| 2700.0             | 4.31                      | 11.19                    | 2.16                | 9.74                | 26.37 | 11.08 |
| 2800.0             | 4.64                      | 11.49                    | 1.88                | 9.13                | 24.35 | 10.35 |
| 2900.0             | 4.97                      | 11.84                    | 1.65                | 8.53                | 21.89 | 9.52  |
| 3000.0             | 5.26                      | 12.13                    | 1.40                | 8.08                | 20.21 | 9.14  |
| 3100.0             | 5.56                      | 12.46                    | 1.24                | 7.59                | 18.65 | 8.67  |
| 3200.0             | 5.85                      | 12.81                    | 1.08                | 7.16                | 17.16 | 8.04  |
| 3300.0             | 6.11                      | 13.11                    | 0.99                | 6.80                | 15.99 | 7.80  |
| 3400.0             | 6.38                      | 13.44                    | 0.93                | 6.43                | 14.87 | 7.28  |
| 3500.0             | 6.62                      | 13.74                    | 0.96                | 6.11                | 13.89 | 6.97  |
| 3600.0             | 6.86                      | 14.04                    | 0.97                | 5.81                | 13.00 | 6.67  |
| 3700.0             | 7.07                      | 14.30                    | 1.09                | 5.56                | 12.35 | 6.40  |
| 3800.0             | 7.25                      | 14.52                    | 1.30                | 5.33                | 11.77 | 6.17  |
| 3900.0             | 7.44                      | 14.72                    | 1.57                | 5.14                | 11.23 | 6.02  |
| 4000.0             | 7.64                      | 14.93                    | 1.81                | 4.91                | 10.78 | 5.74  |



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# Directional Coupler

# TCD-10-1WX+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER = 0 dBm @ Temperature = +85°C

| FREQUENCY<br>(MHz) | INSERTION<br>LOSS<br>(dB) | COUPLING<br>LOSS<br>(dB) | DIRECTIVITY<br>(dB) | RETURN LOSS<br>(dB) |       |       |
|--------------------|---------------------------|--------------------------|---------------------|---------------------|-------|-------|
|                    |                           |                          |                     | IN                  | OUT   | CPL   |
| 10.0               | 1.36                      | 10.19                    | 21.76               | 17.49               | 26.57 | 17.45 |
| 20.0               | 1.36                      | 10.19                    | 21.69               | 17.60               | 27.21 | 17.52 |
| 30.0               | 1.37                      | 10.20                    | 21.57               | 17.62               | 27.40 | 17.50 |
| 40.0               | 1.38                      | 10.21                    | 21.45               | 17.61               | 27.45 | 17.47 |
| 50.0               | 1.38                      | 10.23                    | 21.36               | 17.62               | 27.58 | 17.46 |
| 100.0              | 1.39                      | 10.26                    | 21.18               | 17.93               | 27.29 | 17.65 |
| 150.0              | 1.40                      | 10.30                    | 20.81               | 18.13               | 26.91 | 17.81 |
| 200.0              | 1.40                      | 10.34                    | 20.20               | 18.14               | 26.96 | 17.79 |
| 250.0              | 1.40                      | 10.37                    | 19.76               | 18.27               | 26.68 | 17.86 |
| 300.0              | 1.40                      | 10.40                    | 19.16               | 18.24               | 26.18 | 17.83 |
| 350.0              | 1.41                      | 10.44                    | 18.53               | 18.18               | 25.85 | 17.77 |
| 375.0              | 1.41                      | 10.46                    | 18.23               | 18.20               | 25.63 | 17.76 |
| 400.0              | 1.41                      | 10.47                    | 17.93               | 18.19               | 25.35 | 17.73 |
| 450.0              | 1.43                      | 10.51                    | 17.28               | 18.14               | 24.89 | 17.65 |
| 500.0              | 1.43                      | 10.55                    | 16.62               | 18.13               | 24.51 | 17.56 |
| 550.0              | 1.45                      | 10.58                    | 15.99               | 18.07               | 24.20 | 17.49 |
| 600.0              | 1.46                      | 10.61                    | 15.37               | 18.00               | 23.92 | 17.43 |
| 650.0              | 1.47                      | 10.64                    | 14.75               | 17.97               | 23.59 | 17.39 |
| 700.0              | 1.49                      | 10.67                    | 14.17               | 17.93               | 23.28 | 17.32 |
| 750.0              | 1.51                      | 10.69                    | 13.63               | 17.86               | 23.03 | 17.24 |
| 800.0              | 1.53                      | 10.71                    | 13.09               | 17.86               | 22.91 | 17.21 |
| 900.0              | 1.57                      | 10.73                    | 12.11               | 17.80               | 22.55 | 17.15 |
| 1000.0             | 1.63                      | 10.75                    | 11.21               | 17.64               | 22.29 | 17.12 |
| 1100.0             | 1.70                      | 10.76                    | 10.38               | 17.50               | 22.07 | 17.07 |
| 1200.0             | 1.78                      | 10.76                    | 9.60                | 17.28               | 21.89 | 16.98 |
| 1300.0             | 1.86                      | 10.74                    | 8.90                | 17.12               | 21.90 | 17.01 |
| 1400.0             | 1.97                      | 10.73                    | 8.25                | 16.90               | 21.92 | 16.92 |
| 1500.0             | 2.08                      | 10.72                    | 7.65                | 16.70               | 21.95 | 16.95 |
| 1600.0             | 2.20                      | 10.71                    | 7.06                | 16.39               | 22.18 | 16.88 |
| 1700.0             | 2.33                      | 10.70                    | 6.53                | 16.02               | 22.35 | 16.82 |
| 1800.0             | 2.47                      | 10.70                    | 6.00                | 15.61               | 22.71 | 16.73 |
| 1900.0             | 2.63                      | 10.70                    | 5.56                | 15.26               | 23.11 | 16.64 |
| 2000.0             | 2.80                      | 10.72                    | 5.12                | 14.85               | 23.66 | 16.24 |
| 2100.0             | 2.98                      | 10.74                    | 4.79                | 14.45               | 24.01 | 15.90 |
| 2200.0             | 3.18                      | 10.79                    | 4.39                | 13.79               | 24.17 | 15.61 |
| 2300.0             | 3.37                      | 10.84                    | 3.99                | 13.31               | 24.88 | 15.12 |
| 2400.0             | 3.59                      | 10.91                    | 3.71                | 12.78               | 24.86 | 14.62 |
| 2500.0             | 3.80                      | 10.98                    | 3.42                | 12.27               | 24.78 | 14.02 |
| 2600.0             | 4.04                      | 11.07                    | 3.15                | 11.70               | 24.06 | 13.46 |
| 2700.0             | 4.28                      | 11.18                    | 2.89                | 11.15               | 23.07 | 12.78 |
| 2800.0             | 4.52                      | 11.29                    | 2.67                | 10.63               | 21.84 | 12.28 |
| 2900.0             | 4.78                      | 11.43                    | 2.51                | 10.14               | 20.67 | 11.69 |
| 3000.0             | 5.03                      | 11.57                    | 2.30                | 9.59                | 19.66 | 11.07 |
| 3100.0             | 5.27                      | 11.72                    | 2.16                | 9.15                | 18.54 | 10.38 |
| 3200.0             | 5.53                      | 11.85                    | 1.99                | 8.71                | 17.52 | 9.93  |
| 3300.0             | 5.78                      | 12.03                    | 1.91                | 8.33                | 16.47 | 9.33  |
| 3400.0             | 6.04                      | 12.18                    | 1.82                | 7.94                | 15.51 | 8.88  |
| 3500.0             | 6.31                      | 12.35                    | 1.74                | 7.51                | 14.71 | 8.42  |
| 3600.0             | 6.58                      | 12.53                    | 1.67                | 7.16                | 13.88 | 8.01  |
| 3700.0             | 6.83                      | 12.71                    | 1.64                | 6.83                | 13.17 | 7.65  |
| 3800.0             | 7.05                      | 12.88                    | 1.69                | 6.57                | 12.56 | 7.22  |
| 3900.0             | 7.32                      | 13.04                    | 1.70                | 6.27                | 12.00 | 6.93  |
| 4000.0             | 7.54                      | 13.20                    | 1.76                | 6.07                | 11.44 | 6.70  |



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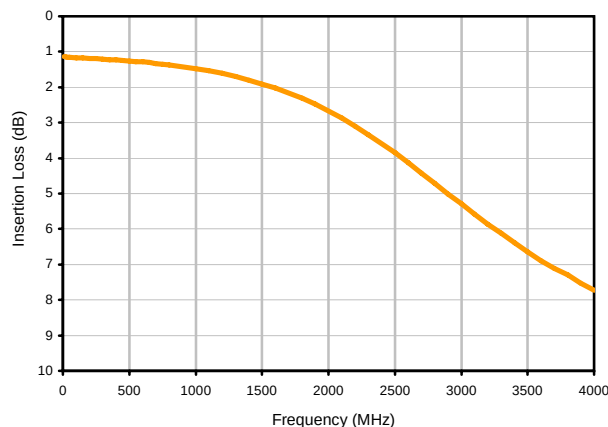
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# Directional Coupler

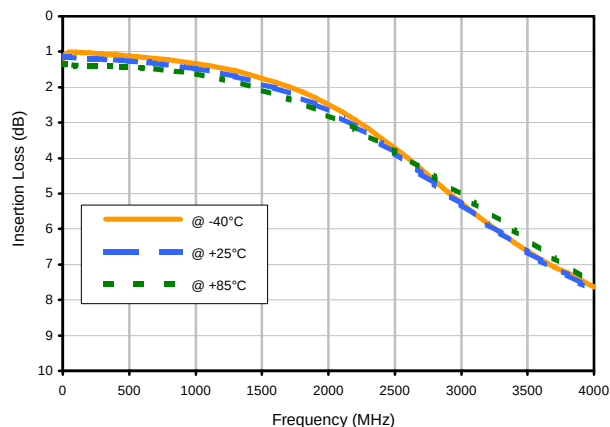
## Typical Performance Curves

**TCD-10-1WX+**

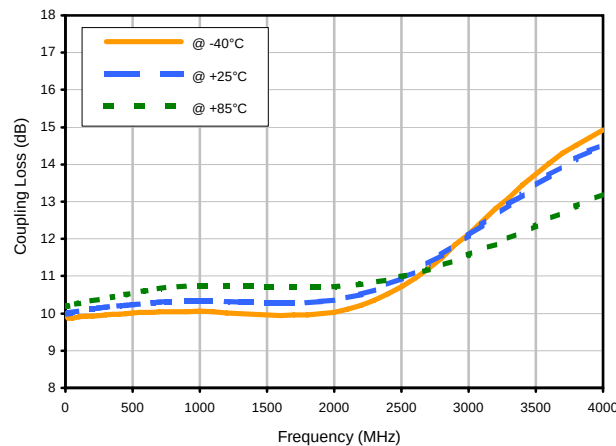
Insertion Loss



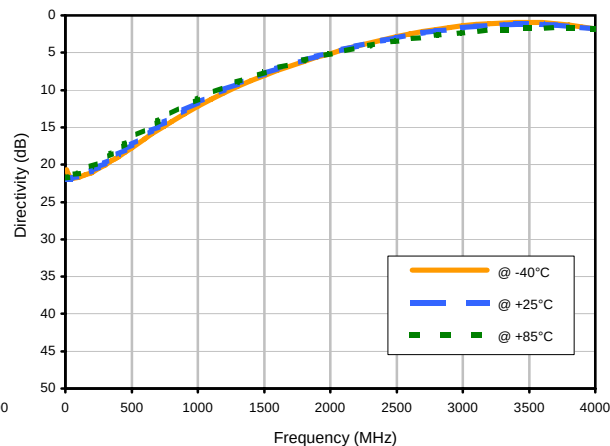
Insertion Loss vs. TEMPERATURE



Coupling Loss vs. TEMPERATURE



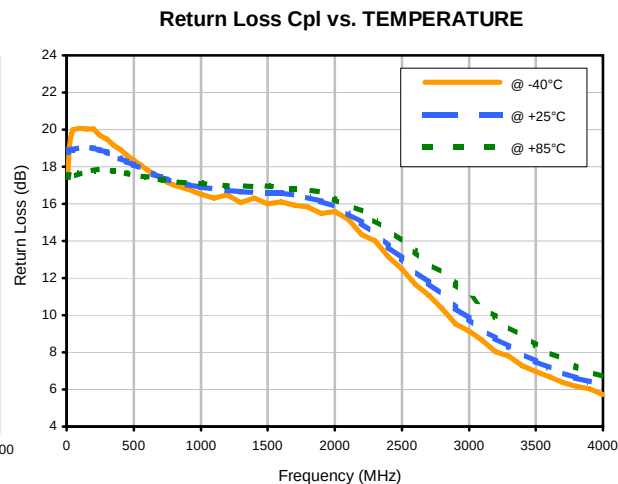
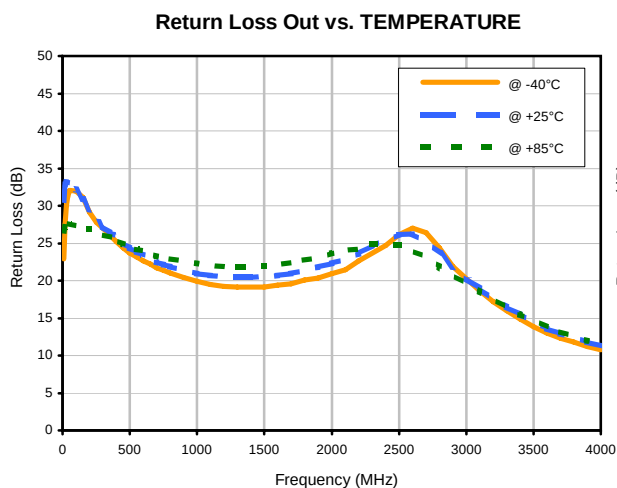
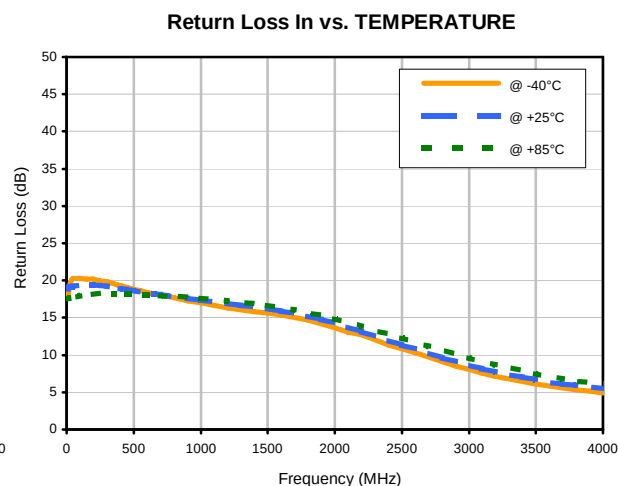
Directivity vs. TEMPERATURE



# Directional Coupler

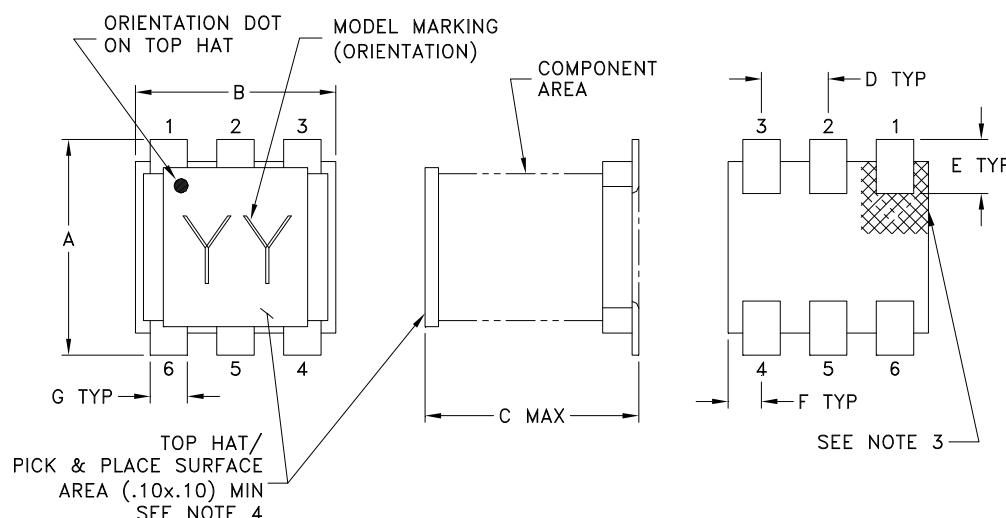
## Typical Performance Curves

**TCD-10-1WX+**

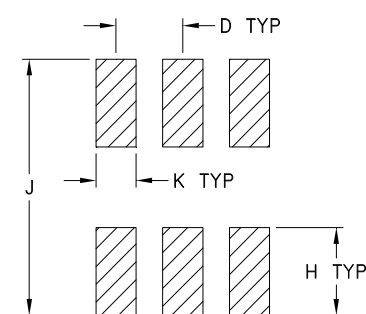


## Outline Dimensions

DB1627



## PCB Land Pattern



| CASE # | A              | B              | C              | D              | E              | F              | G              | H              | J              | K              | WT. GRAM |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------|
| DB1627 | .160<br>(4.06) | .150<br>(3.81) | .160<br>(4.06) | .050<br>(1.27) | .040<br>(1.02) | .025<br>(0.64) | .028<br>(0.71) | .065<br>(1.65) | .190<br>(4.83) | .030<br>(0.76) | .15      |

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

### Notes:

- Case material: Plastic.
- Termination finish:  
For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.  
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.
- Orientation dot on top hat & orientation feature on substrate correspondence to pin #1.
- Top-Hat total thickness: .013 inches MAX.



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



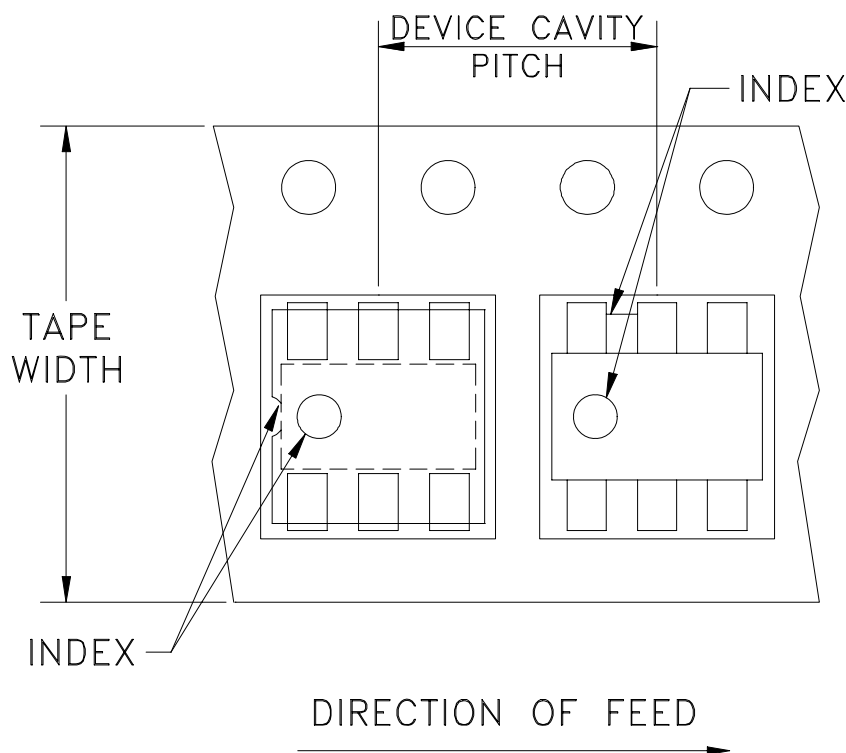
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS



# Tape & Reel Packaging TR-F47

## DEVICE ORIENTATION IN T&R



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel<br>see note |
|-------------------|----------------------------|----------------------|------------------------------|
| 12                | 8                          | 13                   | 1000, 2000                   |
|                   |                            | 7                    | 20, 50, 100, 200, 500        |

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](http://www.minicircuits.com/pages/pdfs/tape.pdf)



INTERNET <http://www.minicircuits.com>

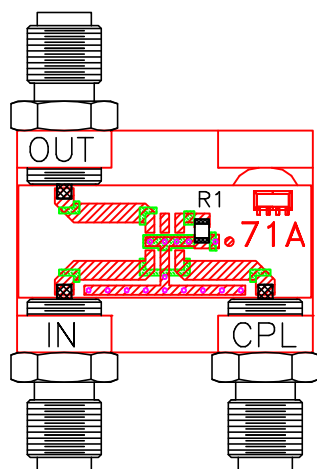
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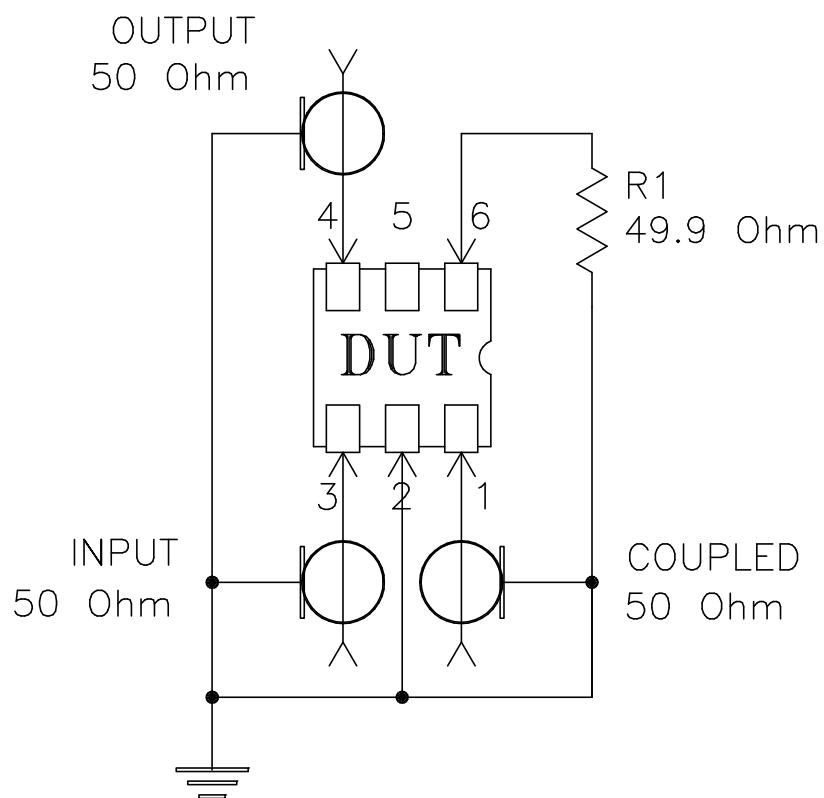
Mini-Circuits ISO 9001 & ISO 14001 Certified



# Evaluation Board and Circuit



TB-71



Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**



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<br>Ambient Environment                                                                                                                             | Individual Model Data Sheet                                                                          |
| Storage Temperature            | -55° to 100° C<br>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<br>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;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215                                                                              |