

# Surface Mount Directional Coupler

## ADC-17-122-75+

75Ω    17dB    5 to 1250 MHz

### The Big Deal

- Covers DOCSIS® 3.1 Bandwidth Requirements
- Low mainline loss, 0.8 dB
- Excellent coupling flatness,  $\pm 0.4$  dB up to 1000 MHz
- Good VSWR: 1.15:1



CASE STYLE: CD542

### Product Overview

Mini-Circuits' ADC-17-122-75+ is a 75Ω surface-mount directional coupler providing 17 dB coupling from 5 to 1250 MHz, supporting bandwidth requirements for DOCSIS 3.1 systems and equipment. This model, provides excellent coupling flatness, low mainline loss, good VSWR and RF input power handling up to 1W. The unit comes housed in a miniature 6-lead plastic package (0.27 x 0.31 x 0.11"), saving space in dense PCB layouts.

### Key Features

| Feature                                             | Advantages                                                                                         |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Wideband, 5 to 1250 MHz                             | The ADC-17-122-75+ supports a variety of 75Ω applications, including DOCSIS 3.1 compliant systems. |
| Good coupling flatness, $\pm 0.4$ dB up to 1000 MHz | Provides consistent coupling performance across frequency.                                         |
| High power handling, 1W                             | Usable in systems with a wide range of high-power requirements.                                    |
| Low mainline loss, 0.8 dB                           | Provides excellent through-path signal power transmission.                                         |
| Small size, 0.27 x 0.31 x 0.11"                     | Provides high power capability while saving space in systems with tight layouts.                   |

# Surface Mount Directional Coupler

75Ω 17dB 5 to 1250 MHz

## ADC-17-122-75+

### Features

- wideband, 5-1250 MHz
- low mainline loss, 0.8 dB typ.
- good VSWR, 1.15:1 typ.
- excellent coupling flatness,  $\pm 0.4$  dB typ. up to 1000 MHz
- aqueous washable
- protected by U.S. Patents 6,133,525 & 6,140,887

### Applications

- cable tv
- cellular
- DOCSIS 3.1 system
- VHF/UHF



Generic photo used for illustration purposes only  
CASE STYLE: CD542

### +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 |
| 13"       | 500, 1000        |

### Electrical Specifications at 25°C

| Parameter                   | Condition (MHz) | Min. | Typ.         | Max. | Unit |
|-----------------------------|-----------------|------|--------------|------|------|
| Frequency Range             |                 | 5    |              | 1250 | MHz  |
| Mainline Loss <sup>1</sup>  | 5 - 1000        | —    | 0.8          | 1.2  | dB   |
|                             | 1000 - 1250     | —    | 1.0          | 1.4  |      |
| Coupling                    | 5 - 1250        | —    | 17 $\pm$ 0.5 | —    | dB   |
| Coupling Flatness ( $\pm$ ) | 5 - 1000        | —    | 0.4          | 0.9  | dB   |
|                             | 5 - 1250        | —    | 0.6          | 1.0  |      |
| Isolation                   | 5 - 50          | 30   | 48           | —    | dB   |
|                             | 50 - 870        | 22   | 30           | —    |      |
|                             | 870 - 1250      | 20   | 25           | —    |      |
| Return Loss (Input)         | 5 - 1250        | 18   | 23           | —    | dB   |
| Return Loss (Output)        | 5 - 1250        | 19   | 25           | —    | dB   |
| Return Loss (Coupling)      | 5 - 1250        | 18   | 22           | —    | dB   |
| Input Power                 | 5 - 1250        | —    | —            | 1.0  | W    |

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

### Maximum Ratings

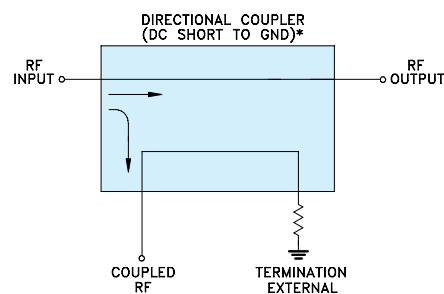
| Parameter             | Ratings        |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |

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

### Pin Connections

| Function             | Pin Number |
|----------------------|------------|
| INPUT                | 1          |
| OUTPUT               | 6          |
| COUPLED              | 3          |
| GROUND               | 2          |
| 75Ω TERM EXTERNAL    | 4          |
| ISOLATE (DO NOT USE) | 5          |

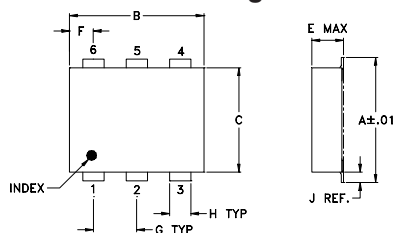
### Electrical Schematic



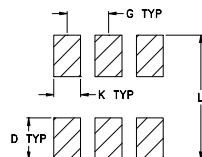
\* ELECTRICAL SCHEMATIC IS FOR DIRECTIONAL COUPLER WITH INTERNAL TRANSFORMER(S) AND EXTERNAL TERMINATION.



## Outline Drawing



## PCB Land Pattern



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

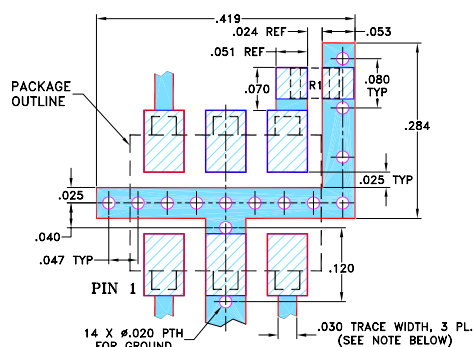
## Outline Dimensions (Inch mm)

| A    | B    | C    | D    | E    | F    | G    |
|------|------|------|------|------|------|------|
| .272 | .310 | .220 | .100 | .112 | .055 | .100 |
| 6.91 | 7.87 | 5.59 | 2.54 | 2.84 | 1.40 | 2.54 |

| H    | J    | K    | L    | wt    |
|------|------|------|------|-------|
| .030 | .026 | .065 | .300 | grams |
| 0.76 | 0.66 | 1.65 | 7.62 | 0.20  |

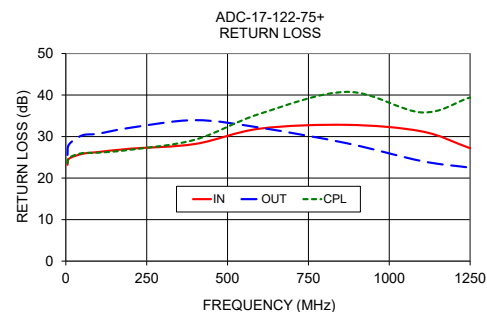
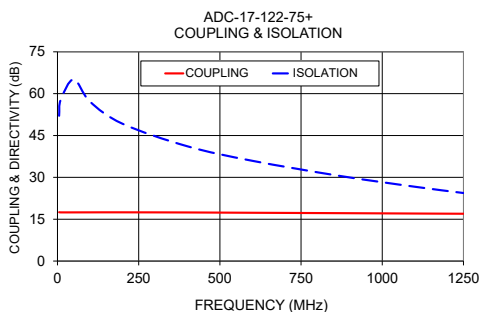
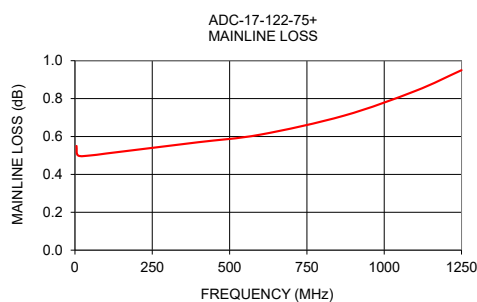
## Demo Board MCL P/N: TB-08 Suggested PCB Layout (PL-042)



RESISTOR R1: 75 Ohm, 0805 SIZE.  
NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030"  $\pm$  .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.  
[Blue shaded area] DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)  
[Hatched area] DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

## Typical Performance Data

| Frequency (MHz) | Mainline Loss (dB) In-Out | Coupling (dB) In-Cpl | Isolation (dB) | In    | Return Loss (dB) Out | Cpl   |
|-----------------|---------------------------|----------------------|----------------|-------|----------------------|-------|
| 5               | 0.55                      | 17.51                | 52.07          | 23.18 | 25.57                | 23.52 |
| 10              | 0.50                      | 17.45                | 57.83          | 24.67 | 28.11                | 24.90 |
| 50              | 0.50                      | 17.45                | 65.11          | 25.82 | 30.27                | 26.00 |
| 100             | 0.51                      | 17.46                | 57.14          | 26.27 | 30.69                | 26.12 |
| 200             | 0.53                      | 17.47                | 49.22          | 27.08 | 32.13                | 26.83 |
| 400             | 0.57                      | 17.42                | 41.13          | 28.22 | 33.95                | 29.26 |
| 600             | 0.61                      | 17.31                | 35.93          | 31.91 | 32.14                | 35.49 |
| 870             | 0.71                      | 17.17                | 30.50          | 32.82 | 28.37                | 40.77 |
| 1100            | 0.84                      | 17.04                | 26.64          | 31.25 | 24.10                | 35.81 |
| 1250            | 0.95                      | 16.96                | 24.39          | 27.19 | 22.51                | 39.42 |



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