

Miniature Ceramic Fixed Attenuator

PAT-30+

50Ω 1W 30dB DC to 7000 MHz



Generic photo used for illustration purposes only

CASE STYLE: AF320

+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" 1000

Maximum Ratings

| | |
|-----------------------|----------------|
| Operating Temperature | -55°C to 100°C |
| Storage Temperature | -55°C to 100°C |

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

Pin Connections

| | |
|--------|-----|
| INPUT | 1 |
| OUTPUT | 3 |
| GROUND | 2,4 |

Features

- wideband, DC to 7000 MHz
- excellent VSWR, through entire band
- miniature size
- aqueous washable

Applications

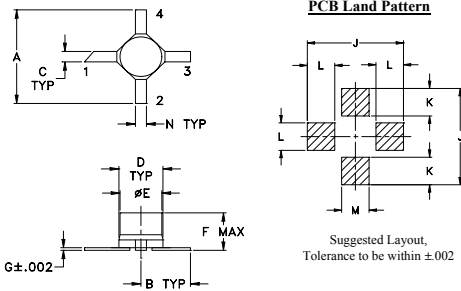
- power leveling
- impedance match improvement

Electrical Specifications at 25°C

| FREQ. RANGE (MHz) | ATTENUATION (dB) Flatness, Max. | VSWR (:1) Max. | | | MAX. INPUT POWER (W) | |
|--------------------------------|------------------------------------|----------------|------------|-----------------------|----------------------|---|
| | | DC-1 GHz | DC-2.5 GHz | DC-f _u GHz | | |
| f _L -f _u | Norm. | DC-1 GHz | DC-2.5 GHz | DC-f _u GHz | | |
| DC-7000 | 30±1.7 | 0.4 | 0.9 | 2.8 | 1.4 1.4 1.5 | 1 |

1. RF power at 25°C case temperature: 1 Watt. Derate linearly to 0.1 Watt at 100°C.

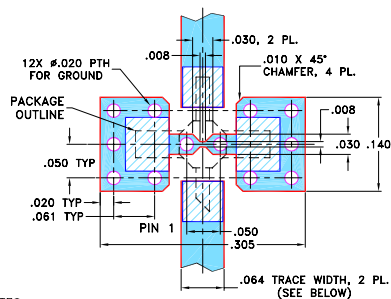
Outline Drawing



Outline Dimensions (inch/mm)

| A | B | C | D | E | F | G |
|------|------|------|------|------|------|-------|
| .200 | .100 | .020 | .070 | .068 | .057 | .005 |
| 5.08 | 2.54 | 0.51 | 1.78 | 1.73 | 1.45 | 0.13 |
| H | J | K | L | M | N | wt |
| -- | .230 | .065 | .060 | .080 | .040 | grams |
| -- | 5.84 | 1.65 | 1.52 | 2.03 | 1.02 | 0.04 |

Demo Board MCL P/N: TB-319 Suggested PCB Layout (PL-208)



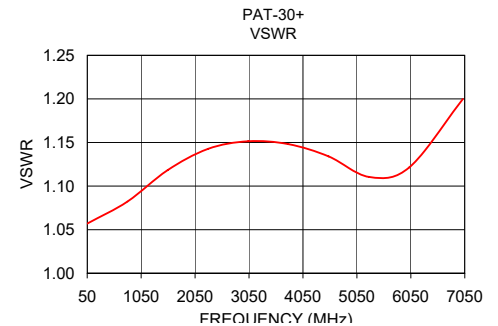
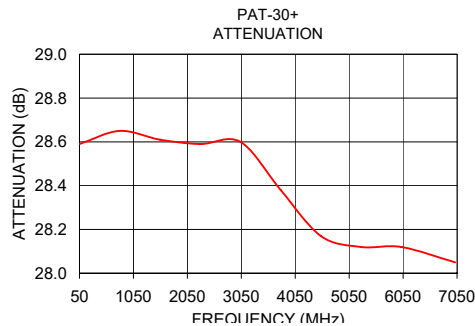
- NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

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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Typical Performance Data

| Frequency (MHz) | Attenuation (dB) | VSWR (:1) |
|-----------------|------------------|-----------|
| 50.00 | 28.59 | 1.06 |
| 796.25 | 28.65 | 1.08 |
| 1542.50 | 28.61 | 1.12 |
| 2288.75 | 28.59 | 1.14 |
| 3035.00 | 28.60 | 1.15 |
| 3781.25 | 28.38 | 1.15 |
| 4527.50 | 28.17 | 1.13 |
| 5273.75 | 28.12 | 1.11 |
| 6020.00 | 28.12 | 1.12 |
| 7015.00 | 28.05 | 1.20 |



Typical Performance Data

| FREQUENCY (MHz) | ATTENUATION (dB) | RETURN LOSS (dB) |
|--------------------|---------------------|---------------------|
| 50.00 | 28.59 | 31.15 |
| 796.25 | 28.65 | 28.07 |
| 1542.50 | 28.61 | 25.06 |
| 2288.75 | 28.59 | 23.53 |
| 3035.00 | 28.60 | 23.05 |
| 3781.25 | 28.38 | 23.23 |
| 4527.50 | 28.17 | 24.04 |
| 5273.75 | 28.12 | 25.62 |
| 6020.00 | 28.12 | 24.85 |
| 7015.00 | 28.05 | 20.83 |

REV. X1
PAT-30+
061108
Page 1 of 1



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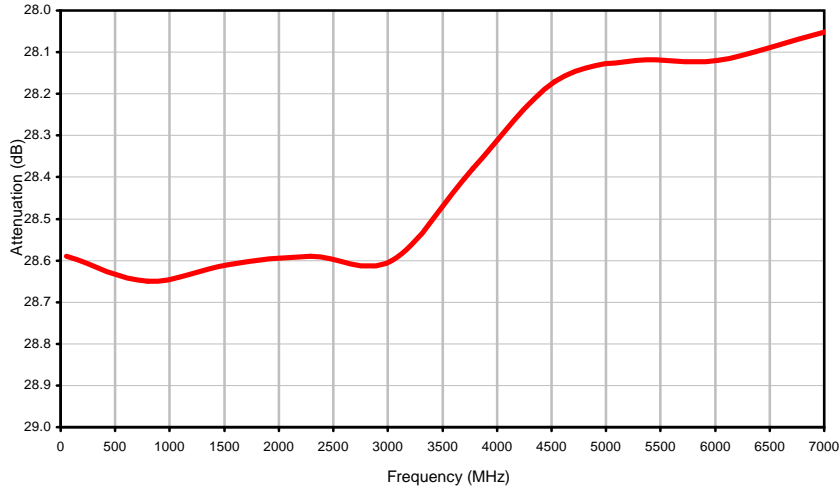


The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see

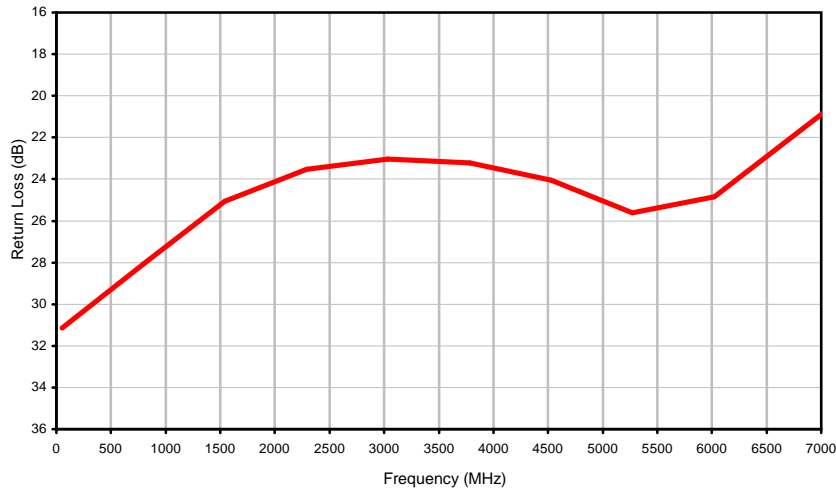


Typical Performance Curves

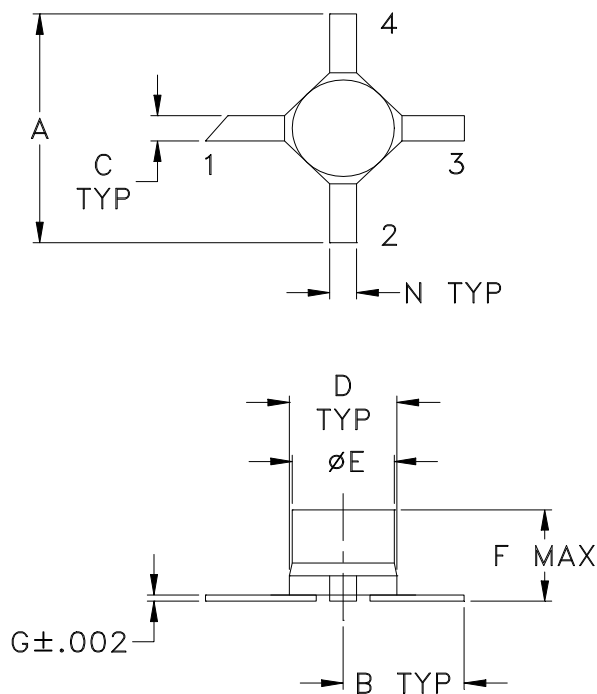
Attenuation



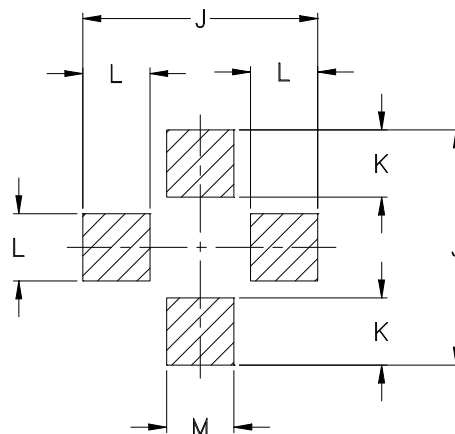
Return Loss



Outline Dimensions



PCB Land Pattern



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

| CASE # | A | B | C | D | E | F | G | H | J | K | L | M | N | WT. GRAM |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---|----------------|----------------|----------------|----------------|----------------|----------|
| AF320 | .200 (5.08) | .100 (2.54) | .020 (0.51) | .070 (1.78) | .068 (1.73) | .057 (1.45) | .005 (0.13) | - | .230 (5.84) | .065 (1.65) | .060 (1.52) | .080 (2.03) | .040 (1.02) | .04 |

Dimensions are in inches (mm). Tolerances: 2Pl. $\pm .03$; 3Pl. $\pm .015$

Notes:

- Case material: Ceramic.
- Termination material:
Nickel-Iron alloy 42.
- Termination finish:
For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier or Matte-Tin. (See Data Sheet)
For RoHS-5 Case Styles: Tin-Lead plate.
- Termination (1):
May have diagonal cut. Input and output interchangeable for PAT models only.
- Special Tolerances: Termination width $\pm .005$ inch, termination thickness $\pm .002$ inch, cap diameter $\pm .005$ inch.



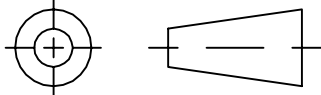
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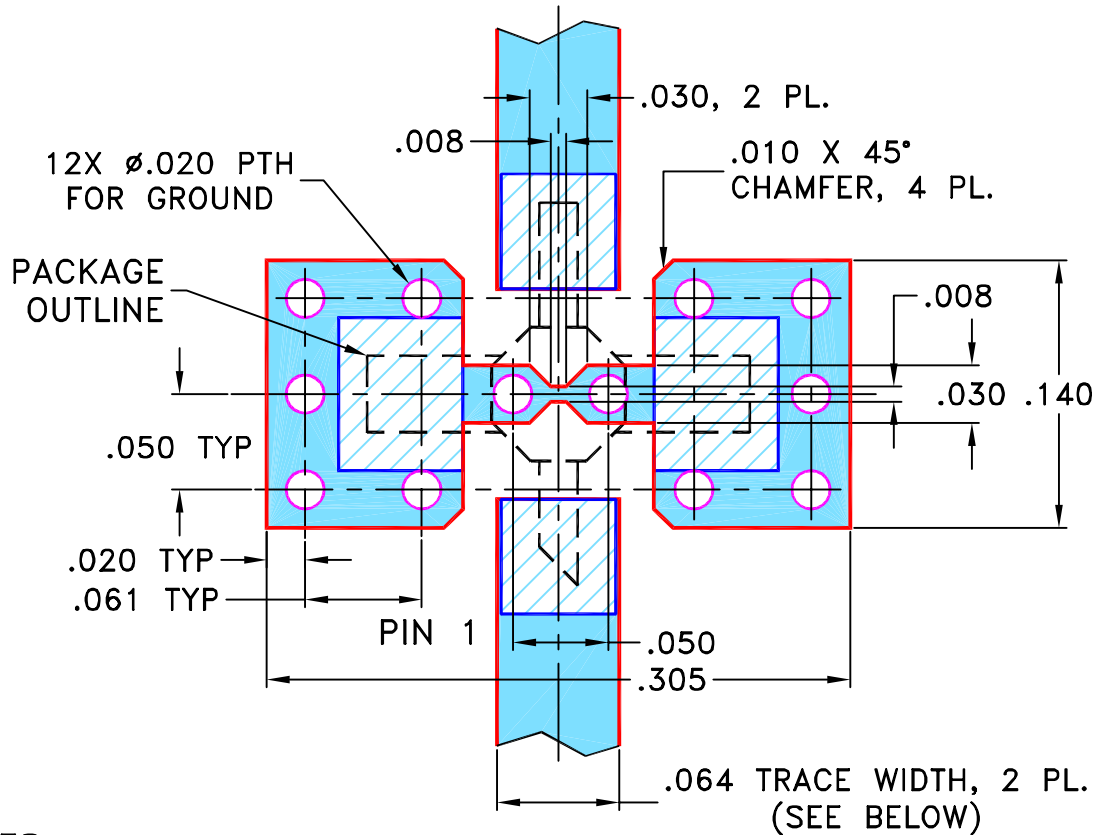
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|-----|---------|-----------------------|----------|-----|------|
| OR | M100749 | NEW RELEASE | 09/19/05 | MMG | MM |
| A | M102713 | ADDED "...WITH SMOBC" | 01/12/06 | GT | IL |
| | | | | | |

SUGGESTED MOUNTING CONFIGURATION FOR
AF320 CASE STYLES, "h1" PIN CONNECTION



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030" ± .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

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

DRAWN

MMG

09/12/05

TOLERANCES ON:

CHECKED

AV

09/16/05

2 PL DECIMALS ± .005

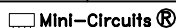
APPROVED

MM

09/19/05

ANGLES ± 1°

FRACTIONS ±



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ASHEETA1.DWG REV:A DATE:01/12/95



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, h1, AF320, PAT, TB-319

SIZE
A

CODE IDENT
15542

DRAWING NO:
98-PL-208

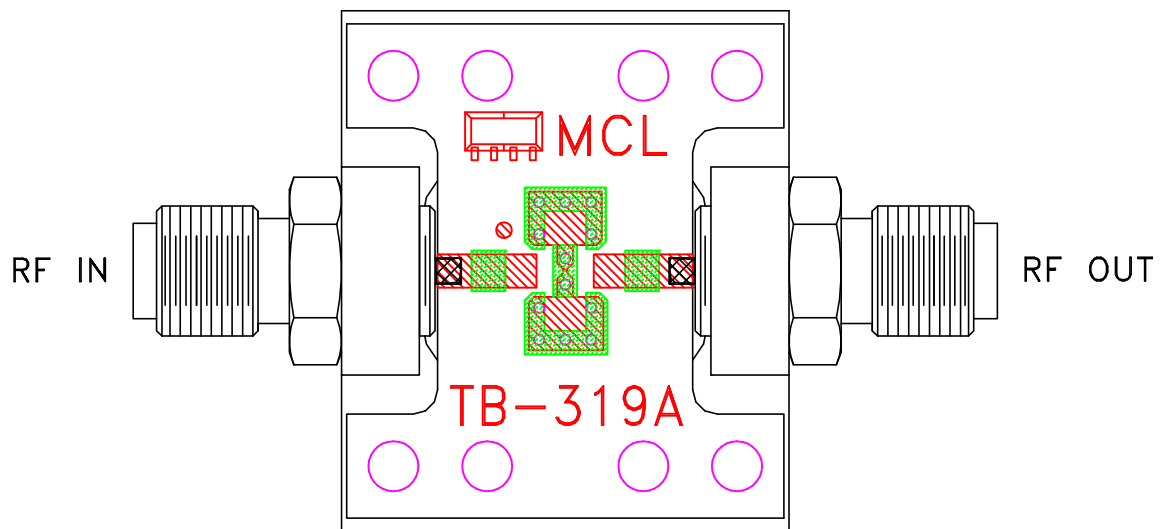
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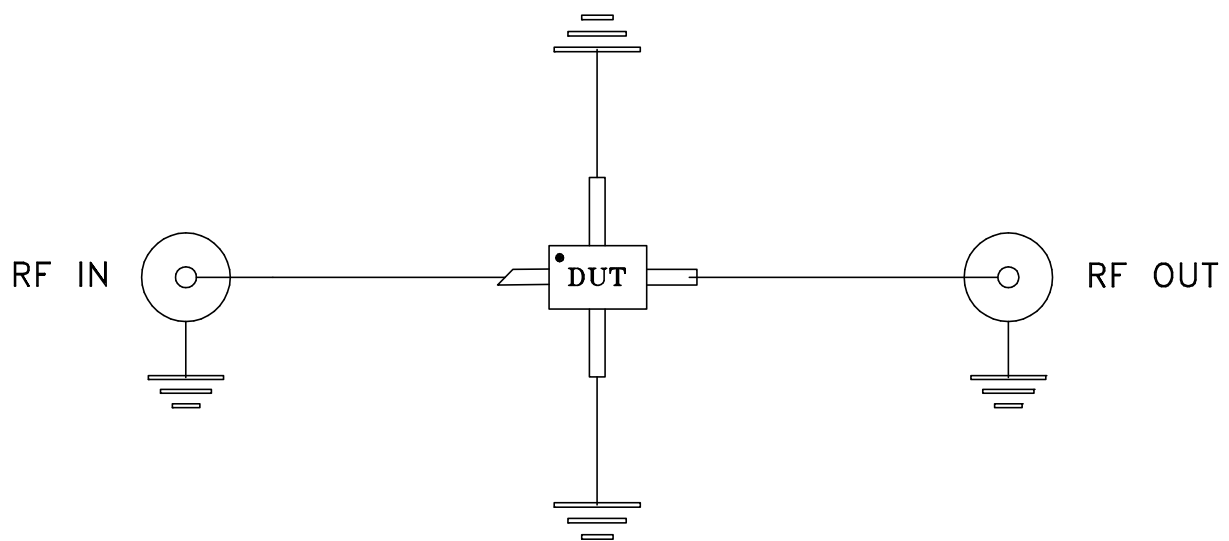
SCALE: 10:1

SHEET: 1 OF 1

Evaluation Board and Circuit




TB-319



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 | -54° to 100°C Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -65° to 150° C Ambient Environment | Individual Model Data Sheet |
| Autoclave | 15 psig, 100% RH, 121°C, 96 hours | JESD22-A102-C, Condition C |
| Thermal Shock | -55° to 100°C, 100 cycles | MIL-STD-202, Method 107, Condition A-3, except +100°C |
| Mechanical Shock | 1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only | MIL-STD-883, Method 2002, Condition B, except Y1 direction only |
| Vibration (Variable Frequency) | 50g peak | MIL-STD-883, Method 2007, Condition B |
| Constant Acceleration | Y1 plane only, 5 Kg | MIL-STD-883, Method 2001, Condition A, except Y1 plane only |
| Seal | Perfluorocarbon gross leak | MIL-STD-883, Method 1014, Condition C |
| HAST | 130°C, 85% RH, 96 hours | JESD22-A110 |
| Solderability | 10X Magnification | J-STD-002, Para 4.2.5, Test S, 95% Coverage |
| Solder Reflow Heat | Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak | J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1 |

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 |
|--------------------------------|---|-------------------------|
| Moisture Sensitivity: Level 1 | Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak | J-STD-020 |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215 |