



MICROWAVE PRECISION

# Fixed Attenuator

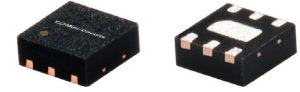
## YAT-2A+

Mini-Circuits

50Ω 2W 2dB DC to 18 GHz

### THE BIG DEAL

- Exceptional Power Handling
- Wide bandwidth, DC - 18 GHz
- Miniature package MCLP™ 2 x 2 mm
- Excellent attenuation accuracy & flatness



Generic photo used for illustration purposes only

CASE STYLE: MC1630

### +RoHS Compliant

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

### APPLICATIONS

- Cellular
- PCS
- Communications
- Radar
- Defense

### PRODUCT OVERVIEW

YAT-2A+ (RoHS compliant) is a fixed value, absorptive MMIC attenuator fabricated using highly repetitive IPD process technology with thin film resistors on GaAs substrates. This design incorporates through-wafer metallization vias to realize low thermal resistance and wideband operation with outstanding attenuation accuracy and flatness over its full operating bandwidth. **YAT-A** family attenuators are available with nominal attenuation values of 0 to 10 dB (in 1 dB steps), 12, 15, 20, and 30 dB. Packaged in a tiny 2 x 2 mm MCLP™ package, it's ideal for tight spaces in crowded board layouts. Also available in die form.

### KEY FEATURES

| Feature  | Advantages   |
|--|--|
| Wideband operation, DC to 18 GHz   | Supports a wide array of applications including wireless cellular, microwave Communications, satellite, Defense and aerospace, medical broadband and optic applications.   |
| Small Size and simple to use (2 mm x 2 mm)   | As a single chip solution, the YAT-A series occupies less board space than a "T" or "Pi" pad configuration, and ensures repeatable performance over wide frequency ranges. |
| High Power, Up to 2W   | High power handling in a small size package.   |
| Wide range of nominal attenuation values 0 to 10 dB (in 1 dB steps), and 12, 15, 20, and 30 dB | Small increment offering enables circuit designer to change attenuation values without motherboard redesign making the YAT-A series ideal for select at test application.  |
| MCLP™ Package  | Low Inductance, repeatable transitions, excellent thermal path make the YAT-A series an ideal solution as an alternative to "do it yourself" resistor based attenuators.   |

REV. A  
ECO-011434  
YAT-2A+  
MCL NY  
220930





### ELECTRICAL SPECIFICATIONS<sup>1</sup> AT 25°C, 50Ω (CPW)

| Parameter       | Frequency (GHz) | Min. | Typ. | Max. | Unit |
|-----------------|-----------------|------|------|------|------|
| Frequency Range |                 | DC   | —    | 18   | GHz  |
| Attenuation     | 0.01            | —    | 2    | —    | dB   |
|                 | DC - 5          | 1.5  | 1.92 | 2.3  |      |
|                 | 5 - 15          | 1.4  | 1.85 | 2.3  |      |
| VSWR            | DC - 5          | —    | 1.08 | 1.25 | :1   |
|                 | 5 - 15          | —    | 1.12 | 1.7  |      |
|                 | 15 - 18         | —    | 1.29 | 1.9  |      |

1. Tested on Mini-Circuits test board TB-YAT-2A+ using coplanar wave guide (CPW) input and output traces (see suggested PCB layout on page 4 of this data sheet)

### MAXIMUM RATINGS<sup>4</sup>

| Parameter                               | Ratings        |
|---|----------------|
| Operating Case Temperature <sup>3</sup> | -40°C to 85°C  |
| Storage Temperature                     | -65°C to 150°C |
| RF Input Power <sup>2</sup>             | 2W             |

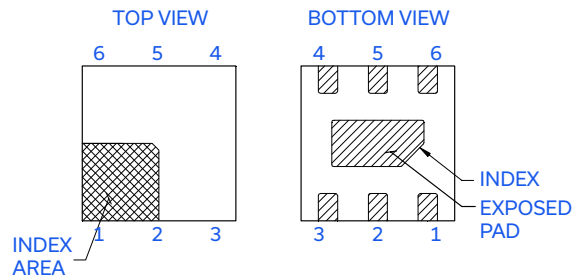
2. RF Power at 25°C case temperature: 2.0 Watt. Derate linearly to 1.0 W at 85°C.

3. Case is defined as ground lead.

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

### PAD DESCRIPTION

| Function | Pad Number                 | Description                    |
|----------|----------------------------|--------------------------------|
| RF-IN    | 2                          | RF input pad                   |
| RF-OUT   | 5                          | RF output pad                  |
| GND      | 1,3,4,6 Bottom Exposed pad | Connected to ground externally |



### CHARACTERIZATION TEST CIRCUIT

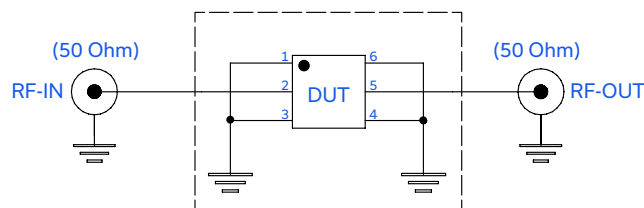


Fig 1. Block diagram of Test Circuit used for characterization, Test board TB-YAT-2A+ Conditions: Attenuation, VSWR: Pin=-10 dBm



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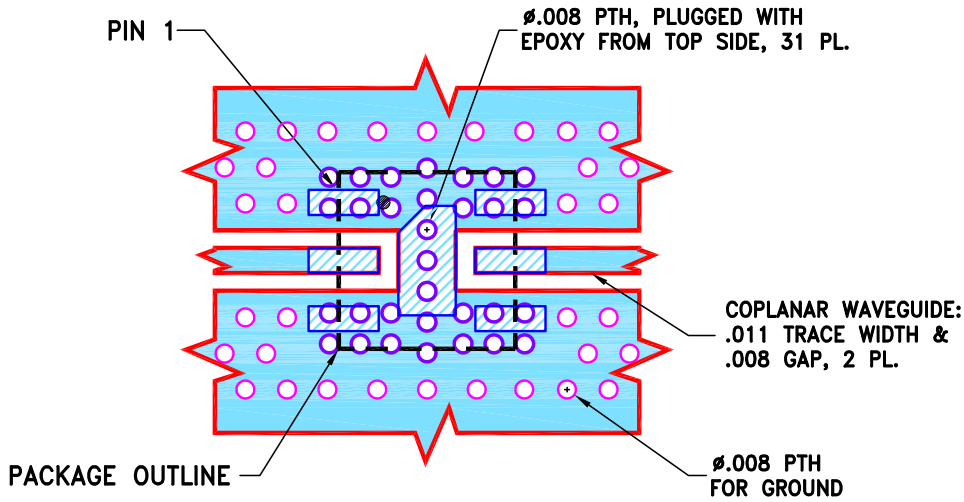
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### SUGGESTED PCB LAYOUT (PL-586)

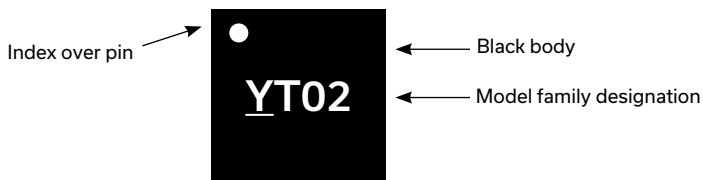


### NOTES:

1. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS  $.0066 \pm .0007$ . COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP 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.

### PRODUCT MARKING



Marking may contain other features or characters for internal lot control

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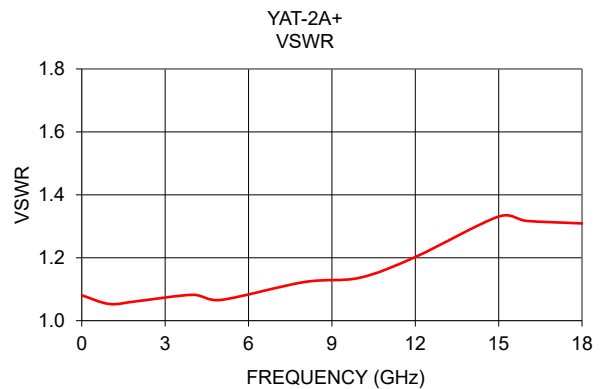
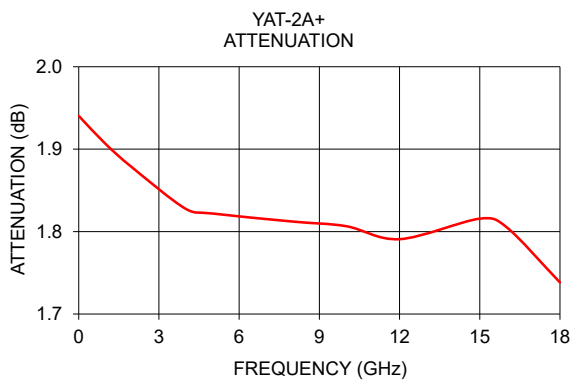
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## TYPICAL PERFORMANCE DATA AT 25°C

| Frequency (GHz) | Attenuation (dB) | VSWR (:1) |
|-----------------|------------------|-----------|
| 0.010           | 1.94             | 1.08      |
| 1.0             | 1.91             | 1.05      |
| 2.0             | 1.88             | 1.06      |
| 4.0             | 1.83             | 1.08      |
| 5.0             | 1.82             | 1.07      |
| 8.0             | 1.81             | 1.12      |
| 10.0            | 1.81             | 1.14      |
| 12.0            | 1.79             | 1.20      |
| 15.0            | 1.82             | 1.33      |
| 16.0            | 1.81             | 1.32      |
| 18.0            | 1.74             | 1.31      |





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ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS [CLICK HERE](#)

|  |  |
|--|--|
| Performance Data                                     | Data Table<br>Swept Graphs                                     |
| Case Style   | MC1630<br>Plastic package, Terminal finish: Matte Tin Plate    |
| Tape & Reel<br>Standard quantities available on reel | F108<br>7" reels with 20, 50, 100, 200, 500, 1K, or 2K devices |
| Suggested Layout for PCB Design                      | PL-586   |
| Evaluation Board                                     | TB-YAT-2A+   |
| Environmental Ratings                                | ENV08T1  |

### ESD RATING

Human Body Model (HBM): Class 2 (Pass 2000 V) per ANSI/ESD STM 5.1-2001

### MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020D

- 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.
  - C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard. Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)

