



MICROWAVE PRECISION

Fixed Attenuator

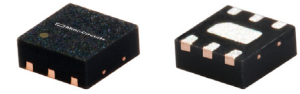
YAT-9A+

Mini-Circuits

50Ω 1.1W 9 dB 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-9A+ (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 MCLPTM 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 1.1W | 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-8A+
MCL NY
220930





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ELECTRICAL SPECIFICATIONS¹ AT 25°C, 50Ω (CPW)

| Parameter | Frequency (GHz) | Min. | Typ. | Max. | Unit |
|-----------------|-----------------|------|------|------|------|
| Frequency Range | | DC | — | 18 | GHz |
| Attenuation | 0.01 | — | 9 | — | dB |
| | DC - 5 | 8.5 | 8.92 | 9.3 | |
| | 5 - 15 | 8.5 | 8.90 | 9.5 | |
| VSWR | 15 - 18 | 8.6 | 8.93 | 9.5 | :1 |
| | DC - 5 | — | 1.08 | 1.32 | |
| | 5 - 15 | — | 1.09 | 1.90 | |
| VSWR | 15 - 18 | — | 1.21 | 1.96 | |

1. Tested on Mini-Circuits test board TB-YAT-9A+ using coplanar wave guide (CPW) input and output traces (see suggested PCB layout on page 4 of this data sheet)

MAXIMUM RATINGS⁴

| Parameter | Ratings |
|---|----------------|
| Operating Case Temperature ³ | -40°C to 85°C |
| Storage Temperature | -65°C to 150°C |
| RF Input Power ² | 1.1 W |

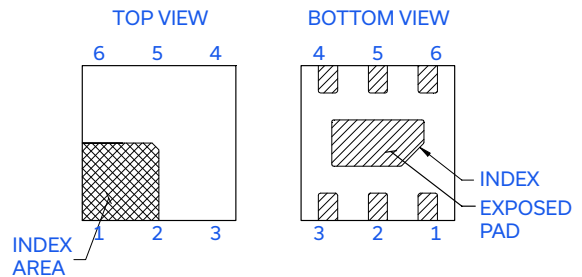
2. RF Power at 25°C case temperature: 1.1 Watt. Derate linearly to 0.8 W at 85°C.

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

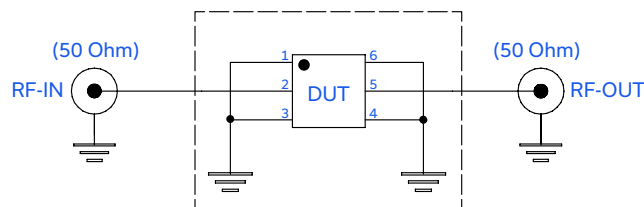


Fig 1. Block diagram of Test Circuit used for characterization, Test board TB-YAT-9A+ Conditions: Attenuation, VSWR: Pin=-10 dBm





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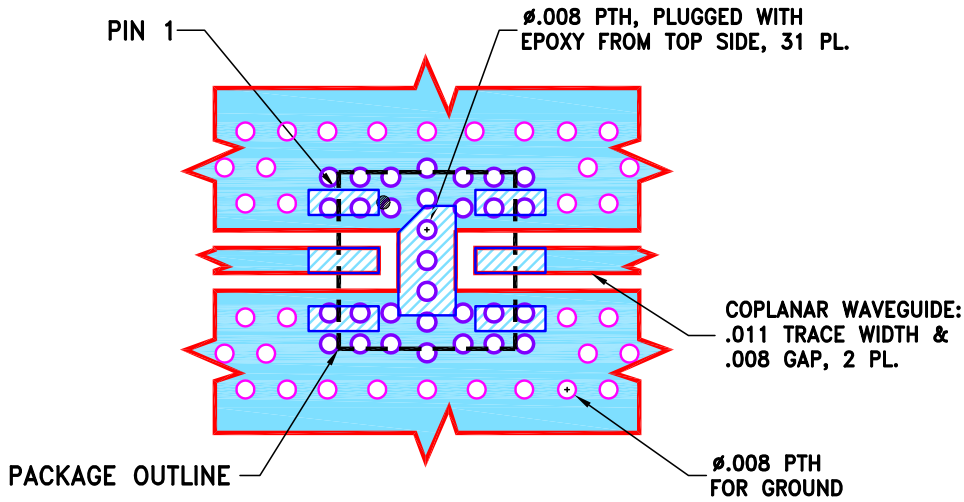
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SUGGESTED PCB LAYOUT (PL-586)

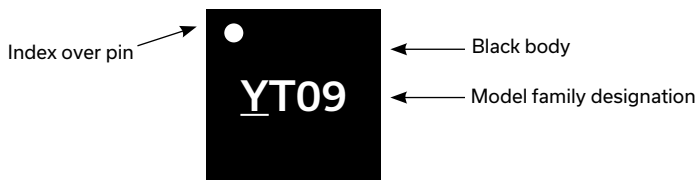


NOTES:

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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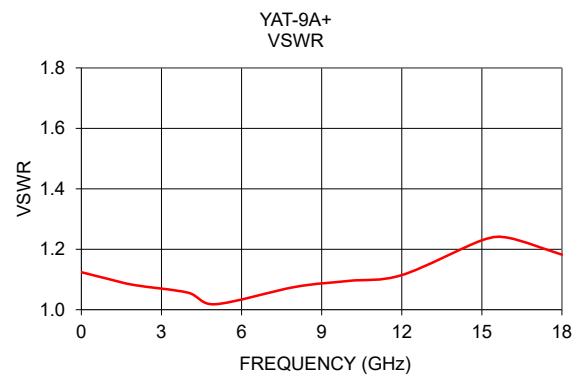
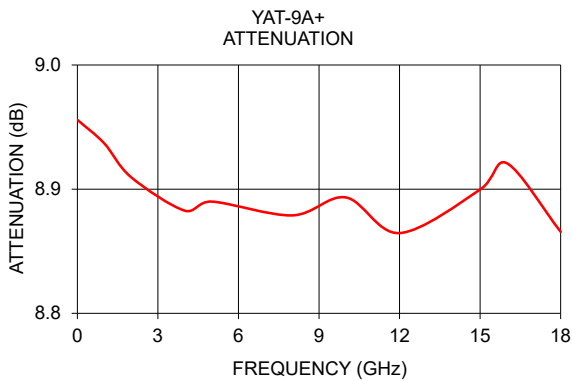
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TYPICAL PERFORMANCE DATA AT 25°C

| Frequency (GHz) | Attenuation (dB) | VSWR (:1) |
|-----------------|------------------|-----------|
| 0.01 | 8.96 | 1.12 |
| 1.0 | 8.94 | 1.10 |
| 2.0 | 8.91 | 1.08 |
| 4.0 | 8.88 | 1.06 |
| 5.0 | 8.89 | 1.02 |
| 8.0 | 8.88 | 1.08 |
| 10.0 | 8.89 | 1.10 |
| 12.0 | 8.86 | 1.11 |
| 15.0 | 8.90 | 1.23 |
| 16.0 | 8.92 | 1.24 |
| 18.0 | 8.87 | 1.18 |





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

| | |
|--|--|
| Performance Data | Data Table Swept Graphs |
| Case Style | MC1630 Plastic package, Terminal finish: Matte Tin Plate |
| Tape & Reel Standard quantities available on reel | F108 7" reels with 20, 50, 100, 200, 500, 1K, or 2K devices |
| Suggested Layout for PCB Design | PL-586 |
| Evaluation Board | TB-YAT-9A+ |
| 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