



Mini-Circuits

MICROWAVE PRECISION

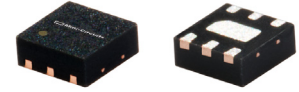
# Fixed Attenuator

YAT-9A+

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 web site for RoHS Compliance methodologies and qualifications

## APPLICATIONS

- Cellular
- PCS
- Communications
- Radar
- Defense

## PRODUCT OVERVIEW

YAT-A attenuators (ROHS compliant) are fixed value, absorptive attenuators fabricated using highly repetitive MMIC processing including thin film resistors on GaAs substrates. YAT-A attenuators contain through-wafer metallization vias to realize low thermal resistance and wideband operation. YAT-As are available with nominal attenuation values of 0 to 10 dB (in 1 dB steps), and 12, 15, 20, and 30 dB. Packaged in tiny 2 mm x 2 mm MCLP™ package fits into tiny spaces.

## 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.

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

Parameter	Condition (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	
	15 - 18	8.6	8.93	9.5	
VSWR	DC - 5	—	1.08	1.32	:1
	5 - 15	—	1.09	1.90	
	15 - 18	—	1.21	1.96	
Input Power <sup>2</sup>	DC - 18	—	—	1.1	W

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)

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

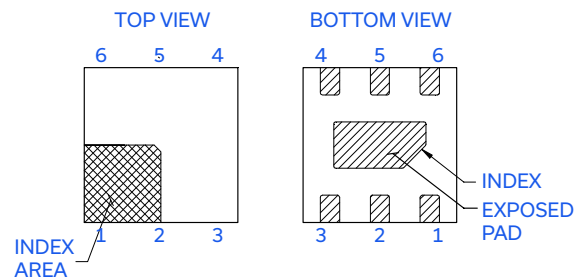
MAXIMUM RATINGS<sup>3</sup>

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>	1.1 W

3. Case is defined as ground lead. 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

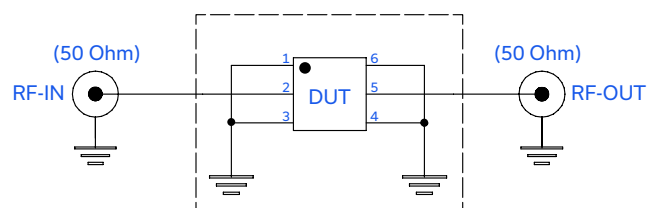


Fig 1. Block diagram of Test Circuit used for characterization, Test board TB-YAT-9A+  
Conditions: Attenuation, VSWR: Pin=-10 dBm



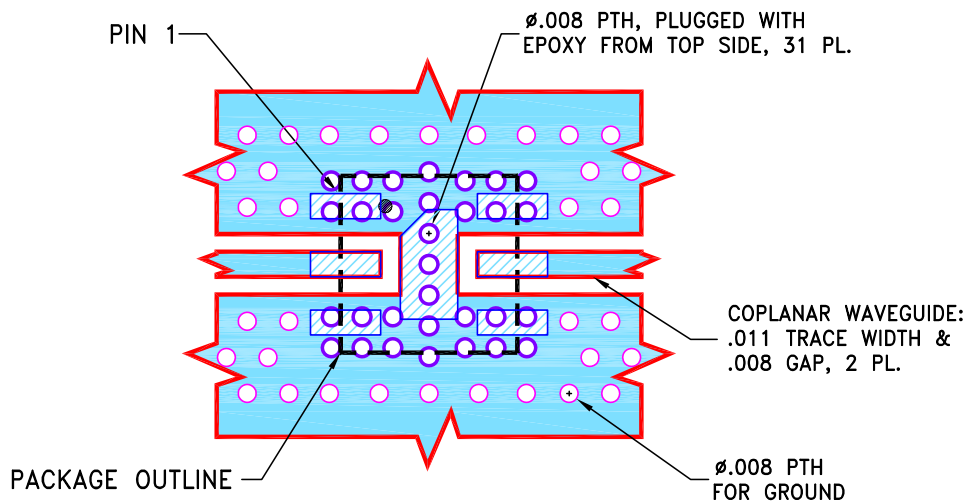
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

YAT-9A+

## SUGGESTED PCB LAYOUT (PL-586)

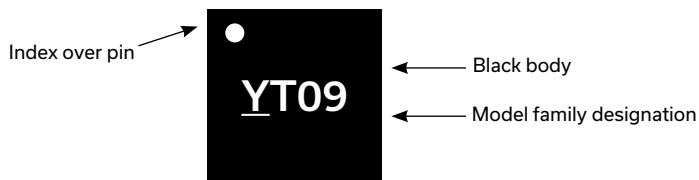


### NOTES:

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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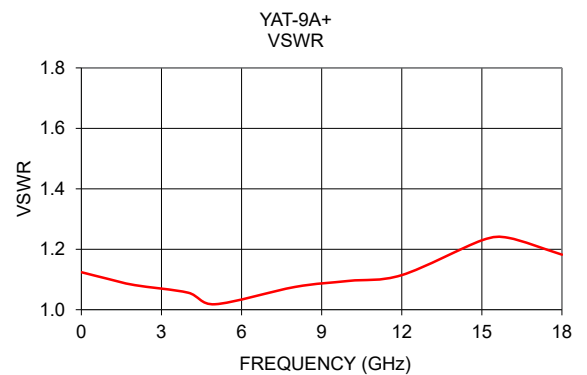
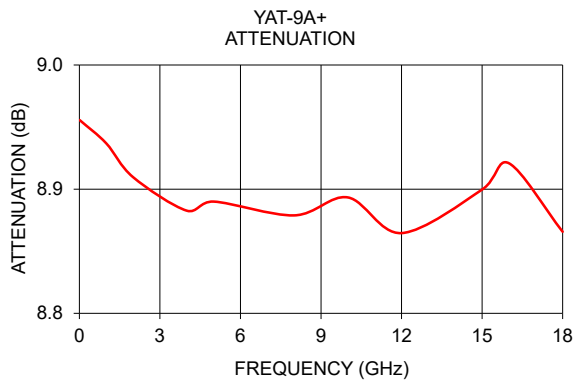
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## TYPICAL PERFORMANCE DATA AT 25°C

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](http://www.minicircuits.com/MCLStore/terms.jsp)