



MICROWAVE PRECISION

# Fixed Attenuator

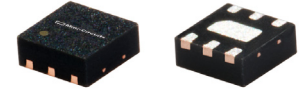
## YAT-5A+

Mini-Circuits

50Ω 1.4W 5 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-5A+ (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 1.4W	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-5A+  
 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	—	5	—	dB
	DC - 5	4.6	4.89	5.2	
	5 - 15	4.6	4.96	5.4	
	15 - 18	4.7	5.03	5.5	
VSWR	DC - 5	—	1.09	1.38	:1
	5 - 15	—	1.14	1.90	
	15 - 18	—	1.25	1.95	

1. Tested on Mini-Circuits test board TB-YAT-5A+ 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>	1.4W

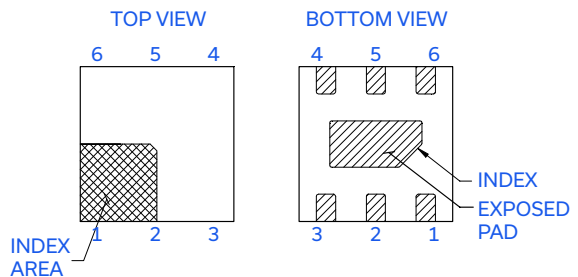
2. RF Power at 25°C case temperature: 1.4 Watt. Derate linearly to 1.0 W at 85°C.

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

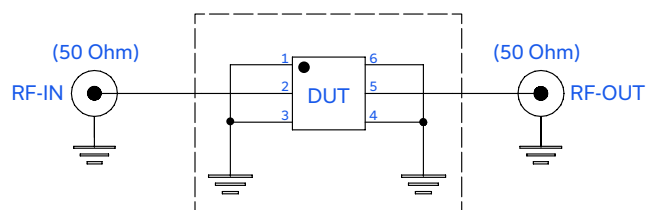


Fig 1. Block diagram of Test Circuit used for characterization, Test board TB-YAT-4A+ Conditions: Attenuation, VSWR: Pin=-10 dBm



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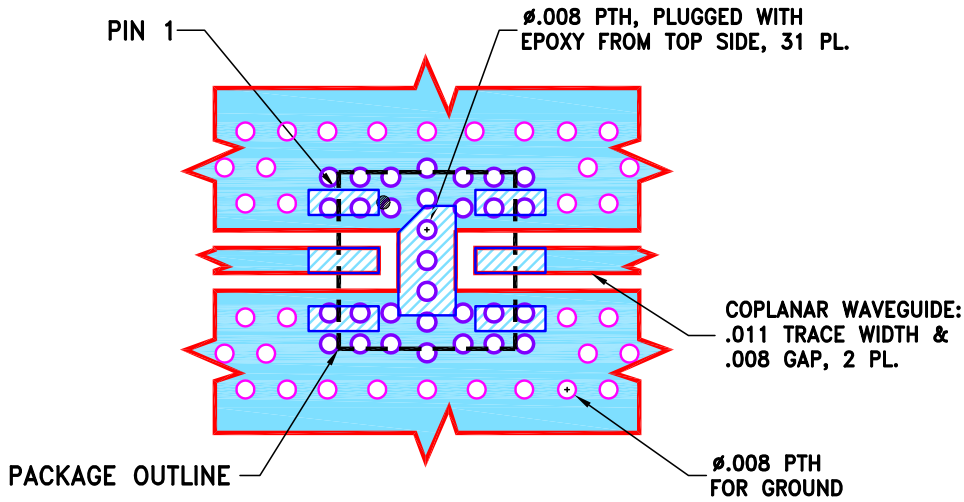
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### SUGGESTED PCB LAYOUT (PL-586)

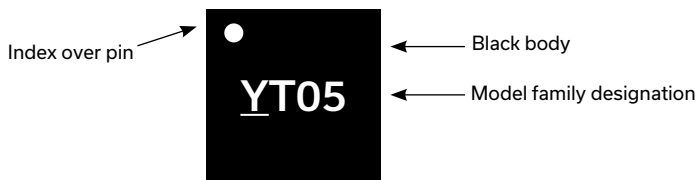


### NOTES:

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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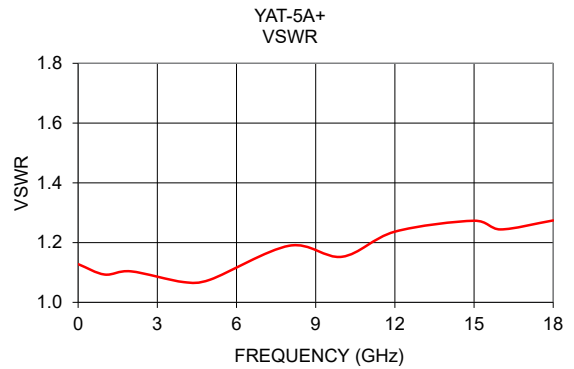
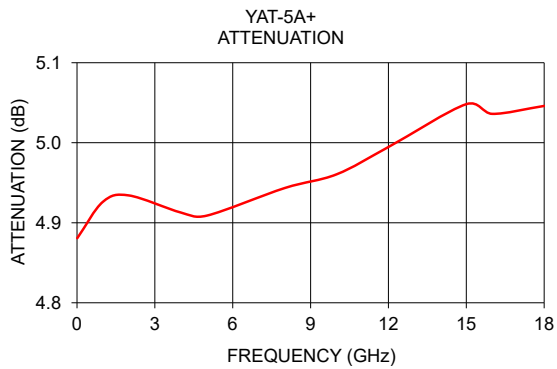
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### TYPICAL PERFORMANCE DATA AT 25°C

Frequency (GHz)	Attenuation (dB)	VSWR (:1)
0.01	4.88	1.13
1.0	4.93	1.09
2.0	4.93	1.10
4.0	4.91	1.07
5.0	4.91	1.08
8.0	4.94	1.19
10.0	4.96	1.15
12.0	4.99	1.24
15.0	5.05	1.27
16.0	5.04	1.24
18.0	5.05	1.27





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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-5A+
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)

