



Mini-Circuits

MICROWAVE PRECISION

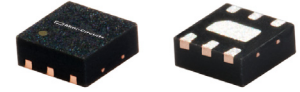
# Fixed Attenuator

YAT-20A+

50Ω 0.8 W 20 dB DC to 18 GHz

## THE BIG DEAL

- Exceptional Power Handling
- Wide Bandwidth, DC to 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-20A+ (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 (YAT-20A-DG+).

## 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 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 0.8 W	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. C  
ECO-024948  
YAT-20A+  
MCL NY  
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ELECTRICAL SPECIFICATIONS<sup>1</sup> AT +25°C, 50Ω (CPW)

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Unit
Frequency Range		DC		18	GHz
Attenuation	DC - 5	19.7	20.05	20.4	dB
	5 - 15	19.7	20.15	21.0	
	15 - 18	19.7	20.31	21.0	
VSWR	DC - 5		1.11	1.5	:1
	5 - 15		1.10	2.0	
	15 - 18		1.21	2.25	

1. Tested on Mini-Circuits test board TB-YAT-20A+ using coplanar wave guide (CPW) input and output traces (see suggested PCB layout on page 3 of this data sheet).

ABSOLUTE MAXIMUM RATINGS<sup>2</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>4</sup>	0.8 W

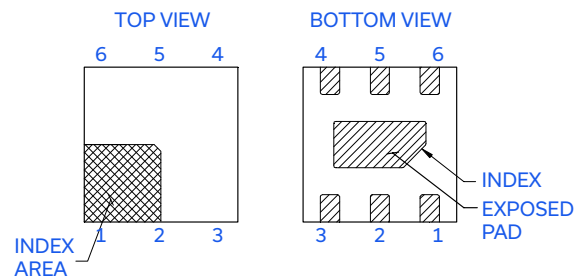
2. Permanent damage may occur if any of these limits are exceeded.

3. Case is defined as ground lead.

4. RF Power at +25°C case temperature: 0.8 Watt. Derate linearly to 0.6 W at +85°C.

## 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

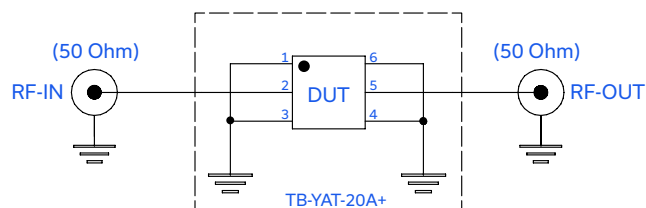


Fig 1. Block diagram of Test Circuit used for characterization, Test board TB-YAT-20A+  
Conditions: Attenuation, VSWR:  $P_{IN} = -10$  dBm





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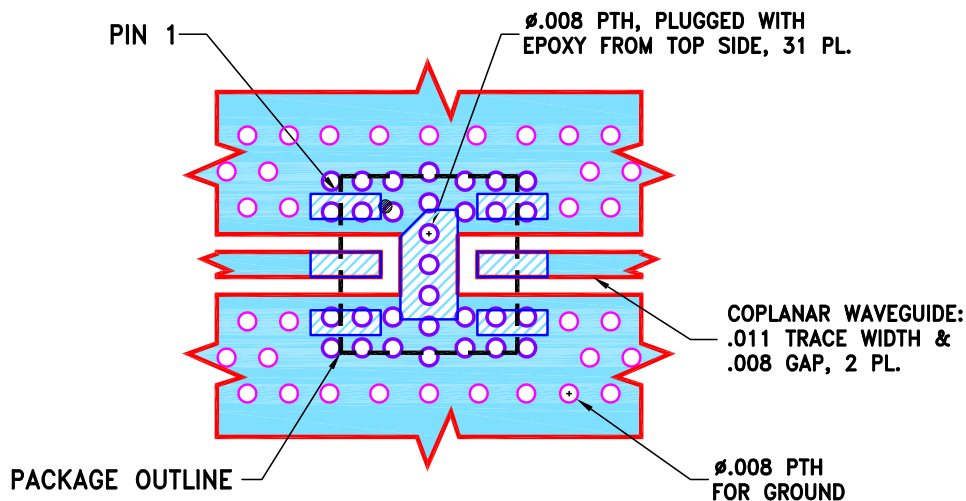
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## SUGGESTED PCB LAYOUT (PL-586)

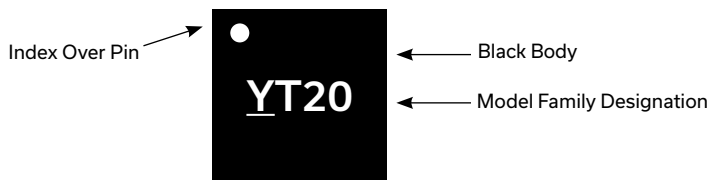


### NOTES:

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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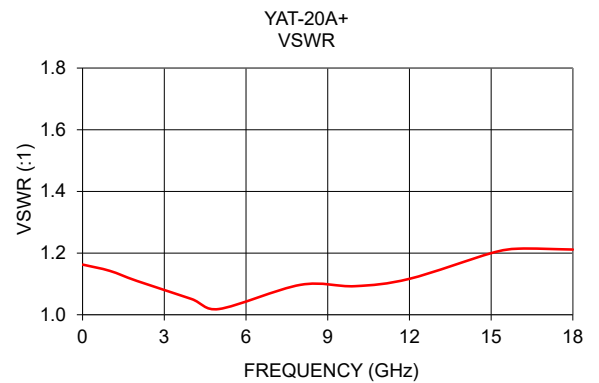
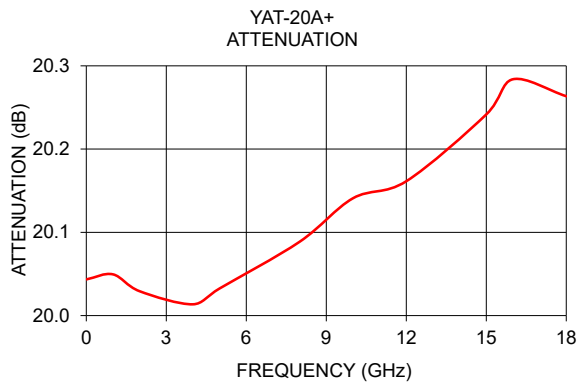
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## TYPICAL PERFORMANCE DATA AT +25°C

Frequency (GHz)	Attenuation (dB)	VSWR (:1)
0.01	20.04	1.16
1.0	20.05	1.14
2.0	20.03	1.11
4.0	20.01	1.05
5.0	20.03	1.02
8.0	20.09	1.10
10.0	20.14	1.09
12.0	20.16	1.12
15.0	20.24	1.20
16.0	20.28	1.21
18.0	20.26	1.21





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ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASHBOARD. 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, 2K, or 3K devices
Suggested Layout for PCB Design	PL-586
Evaluation Board	TB-YAT-20A+
Environmental Ratings	ENV08T1

## ESD RATING\*

	Class	Voltage Range	Reference Standard
HBM	Class 2	>2000 V	ANSI/ESD STM 5.1-2001
CDM	Class C3	>1000 V	ANSI/ESDA/JEDEC JS-002-2022

\* Tested in industry standard 2 x 2 mm, 6-lead MCLP package

## MSL RATING

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

### NOTES

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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/terms/viewterm.html](http://www.minicircuits.com/terms/viewterm.html)

