



Mini-Circuits

MICROWAVE PRECISION

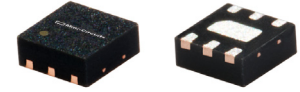
Fixed Attenuator

YAT-9A+

50Ω 1.1 W 9 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-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 MCLP™ package, it's ideal for tight spaces in crowded board layouts. Also available in die form (YAT-9A-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 1.1 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.

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

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Unit
Frequency Range		DC		18	GHz
Attenuation	DC - 5	8.5	8.92	9.3	dB
	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	

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 3 of this data sheet).

ABSOLUTE MAXIMUM RATINGS²

Parameter	Ratings
Operating Case Temperature ³	-40°C to +85°C
Storage Temperature	-65°C to +150°C
RF Input Power ⁴	1.1 W

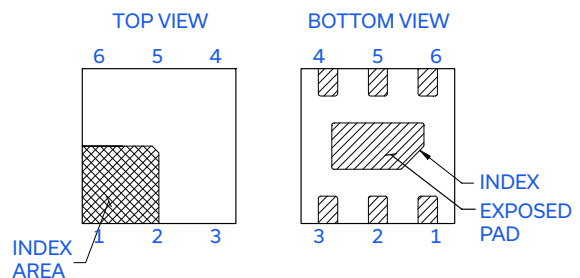
2. Permanent damage may occur if any of these limits are exceeded.

3. Case is defined as ground lead.

4. RF Power at +25°C case temperature: 1.1 Watt. Derate linearly to 0.8 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

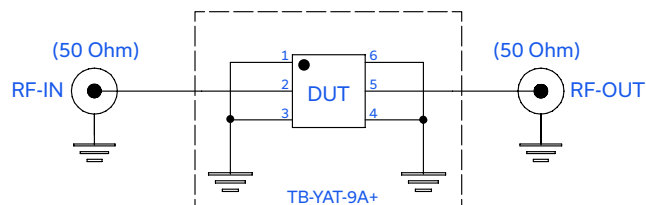


Fig 1. Block diagram of Test Circuit used for characterization, Test board TB-YAT-9A+
Conditions: Attenuation, VSWR: $P_{IN} = -10$ dBm





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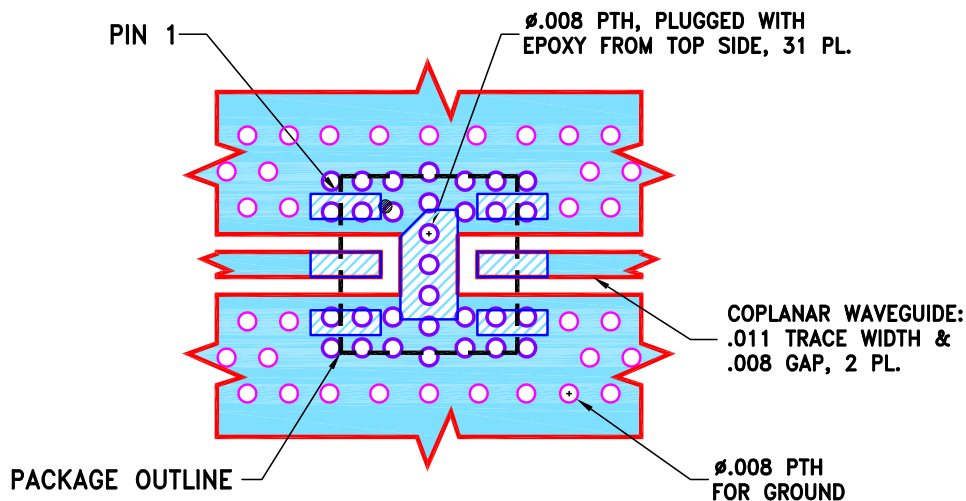
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SUGGESTED PCB LAYOUT (PL-586)

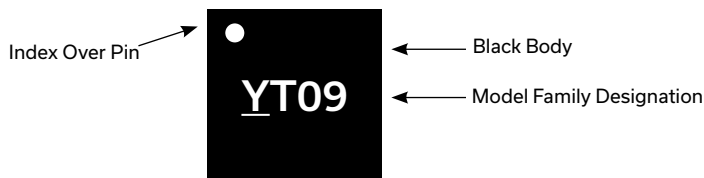


NOTES:

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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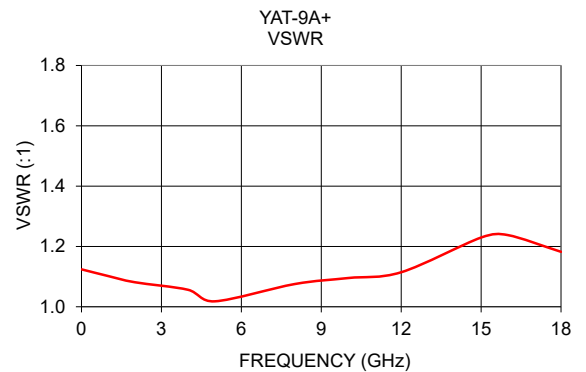
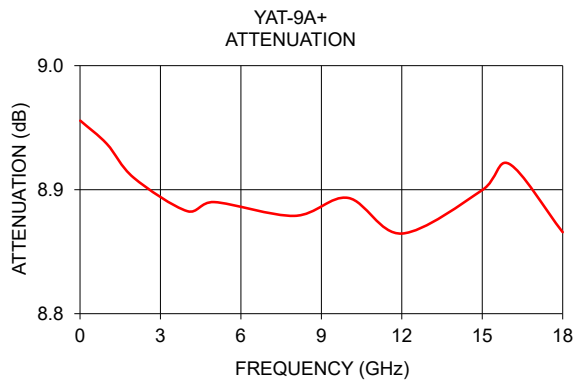
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TYPICAL PERFORMANCE DATA AT +25°C

Frequency (GHz)	Attenuation (dB)	VSWR (:1)
0.01	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





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ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASHBOARD. [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-9A+
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 2x2 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

