

Rev. V1

Features

- Wide Bandwidth Fixed Attenuation up to 50 GHz
- 2, 3, 4, 6, 10, 15, and 20 dB Values
- Two 0 dB thru lines
- 50 Ω Impedance
- 27 dBm Power Handling
- Bare Die
- RoHS* Compliant

Applications

- Telecom Infrastructure
- Fiber Optics
- Sensors
- Test Instruments
- Microwave Radio
- General Purpose

Description

The MAAT-0110xx-DIE are broadband bidirectional, fixed attenuator values including 0, 2, 3, 4, 6, 10, 15, and 20 dB

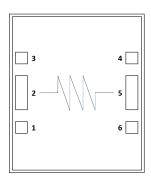
The MAAT-0110xx-DIE are suited for many applications that require a small attenuator die for chip-and-wire assemblies delivering flat attenuation and excellent return loss.

Ordering Information¹

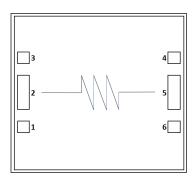
Part Number	Description	
MAAT-011022-DIE	Thru Line	
MAAT-011023-DIE	Thru Line	
MAAT-011024-DIE	2 dB Attenuator	
MAAT-011025-DIE	3 dB Attenuator	
MAAT-011026-DIE	4 dB Attenuator	
MAAT-011027-DIE	6 dB Attenuator	
MAAT-011028-DIE	10 dB Attenuator	
MAAT-011029-DIE	15 dB Attenuator	
MAAT-011030-DIE	20 dB Attenuator	

^{1.} Die supplied in gel pack.

Functional Schematic



MAAT-011022 / 024 / 025 / 026 / 027 / 028 / 029



MAAT-011023 / 030

Pin Configuration^{2,3}

Pin#	Name	Function	
1,3,4,6	GND	Ground	
2	RF _{IN}	RF Input	
5	RF _{out}	RF Output	

- The backside of the die must be connected to RF, DC and thermal ground.
- 3. Ground pins may be left open.

^{*} Restrictions on Hazardous Substances, compliant to current RoHS EU directive.



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Electrical Specifications: (measured with 150 μm G-S-G RF probes); T_A = 25°C, Z_0 = 50 Ω

Part Number	Attenuation 0.05 - 24 GHz 25 - 50 GHz		Return Loss In/Out 0.05 - 24 GHz 25 - 50 GHz	Input P1dB 0.05 - 30 GHz	Input IP3 0.05 - 30 GHz	
T dit Namboi		dB		dB	dBm	dBm
	Min.	Тур.	Max.	Тур.	Тур.	Тур.
MAAT-011022-DIE	_	0.1 0.2	0.15 0.25	21.0 17.5	_	_
MAAT-011023-DIE	_	0.2 0.3	0.3 0.4	21.0 17.5	_	_
MAAT-011024-DIE	1.7 1.6	1.9 2.0	2.1 2.4	21.0 17.5	27	40
MAAT-011025-DIE	2.8 2.75	3.0 3.1	3.2 3.5	21.0 17.5	27	40
MAAT-011026-DIE	3.9 3.75	4.1 4.2	4.3 4.65	21.0 17.5	27	40
MAAT-011027-DIE	6.0 6.0	6.2 6.3	6.4 6.6	21.0 17.5	27	40
MAAT-011028-DIE	10.0 9.85	10.2 10.3	10.4 10.75	21.0 17.5	27	40
MAAT-011029-DIE	15.0 15.1	15.3 15.4	15.5 15.7	21.0 17.5	27	40
MAAT-011030-DIE	20.1 19.9	20.5 20.4	21.0 20.8	21.0 17.5	27	40

Maximum Operating Conditions

Parameter	Maximum	
Input Power	29 dBm	
Operating Temperature	-40°C to +85°C	

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity (ESD Rating)

These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices. This device has a Class 1B HBM ESD rating

Absolute Maximum Ratings^{4,5}

Parameter	Absolute Maximum	
Input Power	30 dBm	
Storage Temperature	-65°C to +150°C	

^{4.} Exceeding any one or combination of these limits may cause permanent damage to this device.

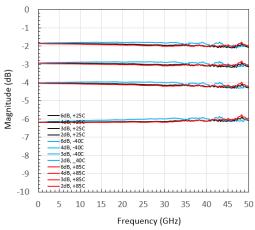
MACOM does not recommend sustained operation near these survivability limits.

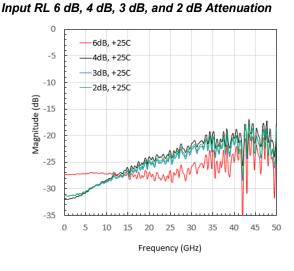


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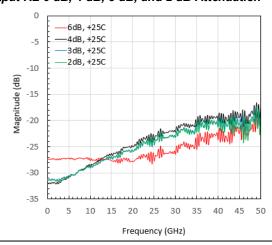
Typical Performance Curves

Attenuation 6 dB, 4 dB, 3 dB, and 2 dB over temp

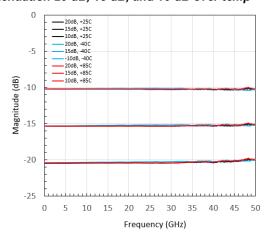




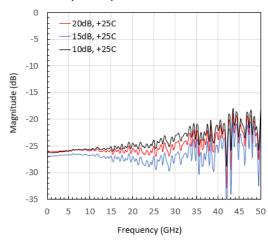
Output RL 6 dB, 4 dB, 3 dB, and 2 dB Attenuation



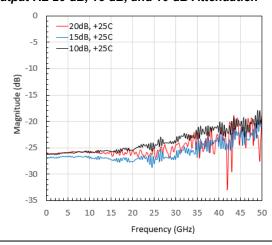
Attenuation 20 dB, 15 dB, and 10 dB over temp



Input RL 20 dB, 15 dB, and 10 dB Attenuation



Output RL 20 dB, 15 dB, and 10 dB Attenuation



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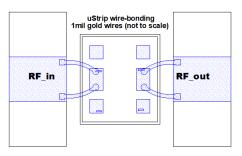
Visit www.macom.com for additional data sheets and product information.

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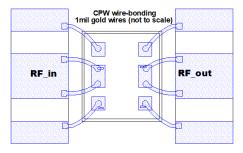


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Recommended Mounting & Wire-Bonding



(a) Recommended Microstrip wire bonding



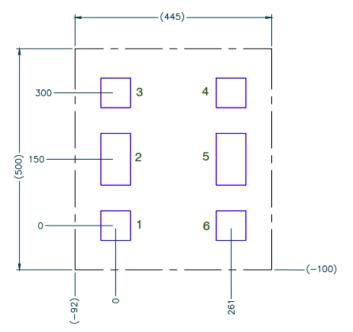
(b) Recommended CPW wire bonding

- The DIE should be directly attached to the RF/DC ground plane; either with solder (AuSn) or a thin application of conductive epoxy. Avoid overflows.
- 50 Ω microstrip, or 50 Ω CPW transmission lines should be brought up as close as possible to the die in order to minimize the connecting wire bonds inductances.
- Two bond wires are recommended for the RF ports as shown above. Do not exceed a substrate height of 10 mils for any connecting RF transmission line used.



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DIE Outlines

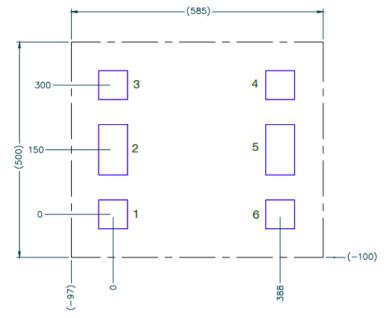


BOND PAD SIZE µm				
PAD	X(μm)	Υ(<i>μ</i> m)	PIN LABEL	
1,3,4,6	67	67	GND	
2	67	117	RFIN	
5	67	117	RFOUT	

NOTES:

- UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS SHOWN ARE μ m WITH A TOLERANCE OF $\pm 5 \mu$ m. DIE THICKNESS IS 100 $\pm 10 \mu$ m DIE SIZE REFLECTS CUT DIMENSIONS. DIE SIZE REDUCED BY 25 μ m EACH DIMENSION.

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BOND PAD SIZE µm			
PAD	X(μm)	Y(µm)	PIN LABEL
1,3,4,6	67	67	GND
2	67	117	RFIN
5	67	117	RFOUT

NOTES:

- UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS SHOWN ARE μm WITH A TOLERANCE OF $\pm 5 \mu m$. DIE THICKNESS IS 100 $\pm 10 \mu m$ DIE SIZE REFLECTS CUT DIMENSIONS. DIE SIZE REDUCED BY $25 \mu m$ EACH DIMENSION.

MAAT-011023 / 030