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Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

DC to 50 GHz MMIC Low Power Voltage Controlled Attenuator

Features

- Wideband operation: DC to 50 GHz
- Low Insertion Loss (<5 dB)
- Good Input/Output Match
- High Attenuation (max. 27 dB)
- Very flat Attenuation
- Size: 1640 x 920 mm

Description

The MMS004AA is a low-power high-attenuation DC-50 GHz PHEMT FET attenuator. The performance of the device is controlled by two bias voltages, Vseries and Vshunt. The bias voltages control the match and attenuation of the device when varied between -1V and +0.5V DC. Please refer to the tables of recommended bias settings optimized for flat insertion loss and flat attenuation for additional information.

Application

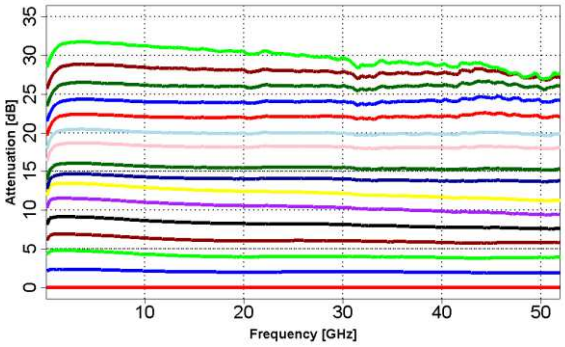
The MMS004AA MMIC voltage controlled attenuator is ideal for high frequency and broadband applications in test equipment, commercial and military systems. The attenuator is especially suited for applications needing a large amount of adjustable attenuation and fast attenuation control from DC to millimeter frequencies. The device is also useful as a general purpose building block in communications systems.

Key Characteristics: Zo=50Ω

Parameter	Description	Min	Typ	Max
Attenuation (dB)	DC to 50GHz	0	-	27
Flatness (±dB)	DC to 50GHz	-	1.0	-
Insertion Loss (dB)	DC to 50GHz	-	-	5
S11 (dB)	DC to 50GHz	-	-12	-10
S22 (dB)	DC to 50GHz	-	-12	-10
P1dB (dBm)	1dB Gain Compression 0 to 15dB	5	6	-

Optimized for Flat Attenuation (Typical)

MMS004AA Attenuation

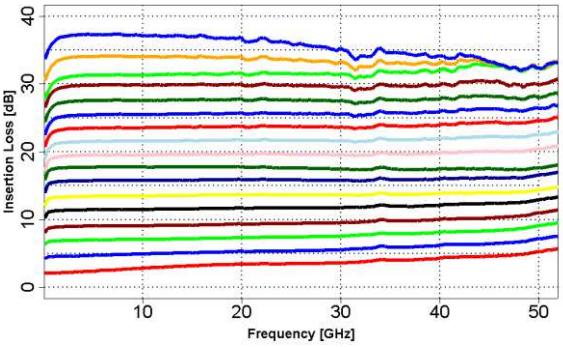


Typical on wafer measured performance

Vseries (V)	Vshunt (V)	Att. (dB)*
-0.637	0.5	30
-0.6	0.5	28
-0.575	0.062	26
-0.555	-0.142	24
-0.539	-0.252	22
-0.527	-0.334	20
-0.509	-0.375	18
-0.478	-0.425	15.5
-0.463	-0.45	14
-0.512	-0.506	12
-0.505	-0.534	10
-0.45	-0.55	8
-0.288	-0.562	6
0.25	-0.588	4
-0.25	-0.65	2
0.5	-1	0

Optimized for Flat Insertion Loss (Typical)

MMS004AA Insertion Loss

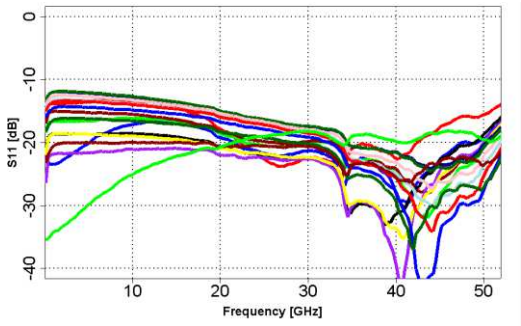


Typical on wafer measured performance

Vseries (V)	Vshunt (V)	Att. (dB)*
-0.688	0.5	35.5
-0.637	0.5	33.5
-0.6	0.45	31.6
-0.6	-0.15	29.8
-0.584	-0.255	27.7
-0.567	-0.315	25.7
-0.553	-0.364	23.7
-0.541	-0.408	21.7
-0.53	-0.446	19.7
-0.55	-0.5	17.6
-0.512	-0.506	15.7
-0.503	-0.539	13.7
-0.45	-0.55	11.8
-0.25	-0.562	9.6
-0.025	-0.592	7.6
0.387	-0.638	5.6
0.5	-1	3.6

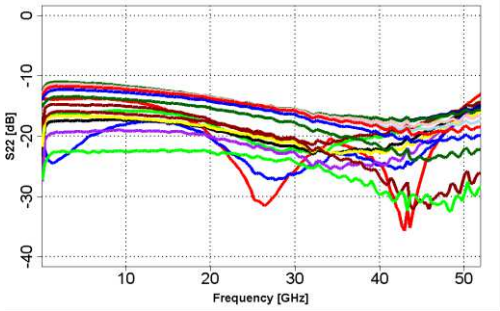
Note: (*) Midband

MMS004AA S11



Typical on wafer measured performance

MMS004AA S22

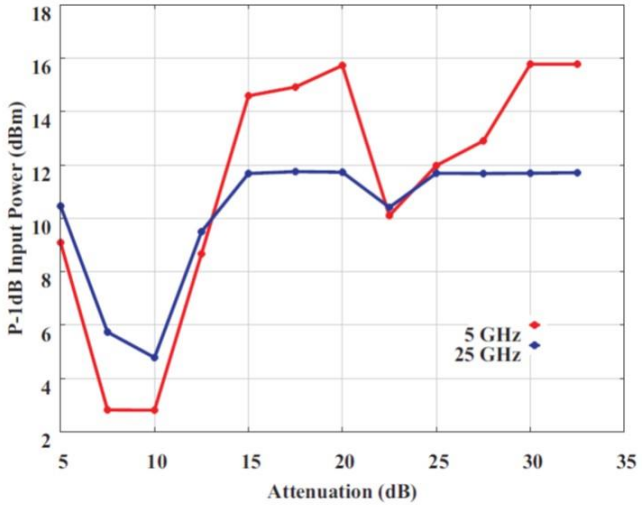


Typical on wafer measured performance

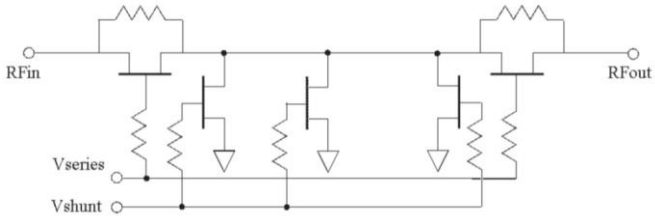
Table 1: Supplemental Specifications

Parameter	Description	Min	Typ	Max
Vseries	Attenuation Control Voltage	-2V	-	0.5V
Vshunt	Attenuation Control Voltage	-2V	-	0.5V
Dcin	DC feedback circuit input	0V	0.2V	1V
Dcout	DC feedback circuit output	0V	0.2V	1V
GND	Backside Ground Plane	-	-	-
Tch	Channel Temperature	-	-	150°C
Θch	Thermal Resistance (Tcase=85°C)	-	60˚ C/Watt	-

Typical Measured Performance on Evaluation Package



MMS004AA Simplified Schematic Diagram



Pick-up and Chip Handling:

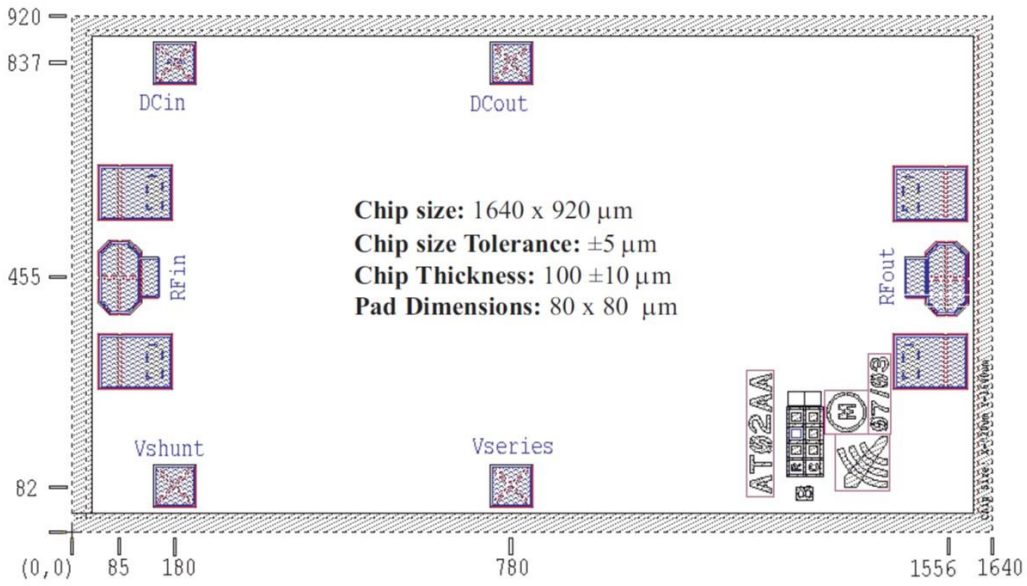
This MMIC has exposed air bridges on the top surface. **Do not pick up chip with vacuum on the die center;** handle from edges or use a collet.

ESD Handling and Bonding:

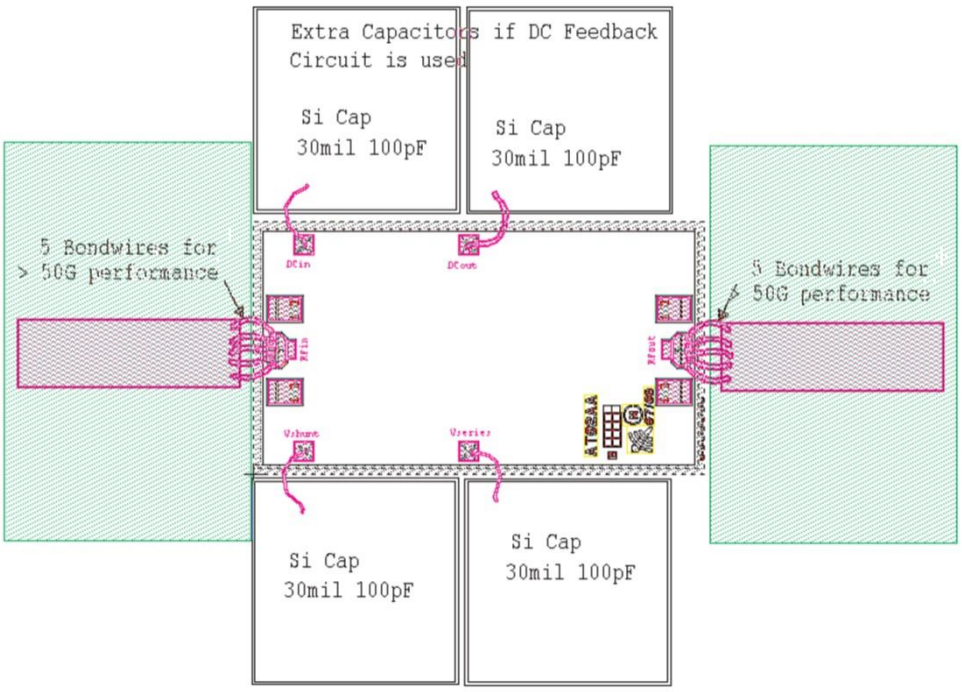
This MMIC is ESD sensitive; preventive measures should be taken during handling, die attach, and bonding.

Epoxy die attach is recommended. Please review our application note MM-APP-0001 handling and die attach recommendations, on our website for more handling, die attach and bonding information.

Physical Characteristics of MMS004AA



Assembly Diagram of MMS004AA



Microsemi Corporate Headquarters
One Enterprise, Aliso Viejo CA 92656 USA
Within the USA: +1 (949) 380-6100
Sales: +1 (949) 380-6136
Fax: +1 (949) 215-4996

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