Digital Attenuator, 15 dB, 4-Bit
DC - 2.0 GHz

MAATSS0015
V3

Features

- 1-dB Attenuation Steps to 15 dB
- High Accuracy
- Low Intermodulation Product: +50 dBm IP3
- Low DC Power Consumption: 50 µW
- Tape and Reel Packaging Available
- Temperature Stability +/-0.15 dB: -40°C to +85°C
- Lead-Free SOIC-16 Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- 260°C Re-flow Compatible
- RoHS* Compliant Version of AT-210

Description

M/A-COM's MAATSS0015 is a 4-bit, 1-dB step GaAs MMIC digital attenuator in a lead-free SOIC 16-lead surface mount plastic package. The MAATSS0015 is ideally suited for use where high accuracy, fast switching, very low power consumption and low intermodulation products are required. Typical applications include radio, cellular, and wireless LANs, GPS equipment and other gain/ level control circuits.

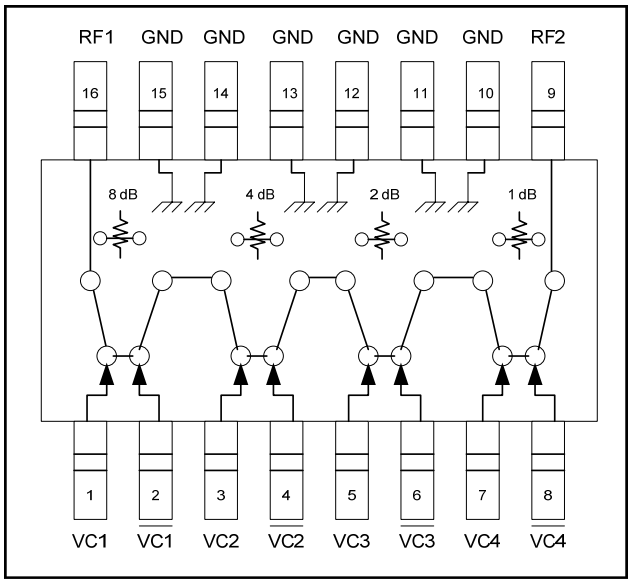
The MAATSS0015 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.

Ordering Information[1]

Part Number	Package
MAATSS0015	SOIC 16-Lead Plastic Package
MAATSS0015TR	Tape & Reel

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration

Pin No.	Function	Pin No.	Function
1	VC1	9	RF2
2	$\overline{VC1}$	10	GND
3	VC2	11	GND
4	$\overline{VC2}$	12	GND
5	VC3	13	GND
6	$\overline{VC3}$	14	GND
7	VC4	15	GND
8	$\overline{VC4}$	16	RF1

Absolute Maximum Ratings [2,3]

Parameter	Absolute Maximum
Input Power: 50 MHz 500-2000 MHz	 +27 dBm +34 dBm
Control Voltage	-8.5 V ≤ V_C ≤ 5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

2. Exceeding any one or combination of these limits may cause permanent damage to this device.
3. M/A-COM does not recommend sustained operation near these survivability limits.

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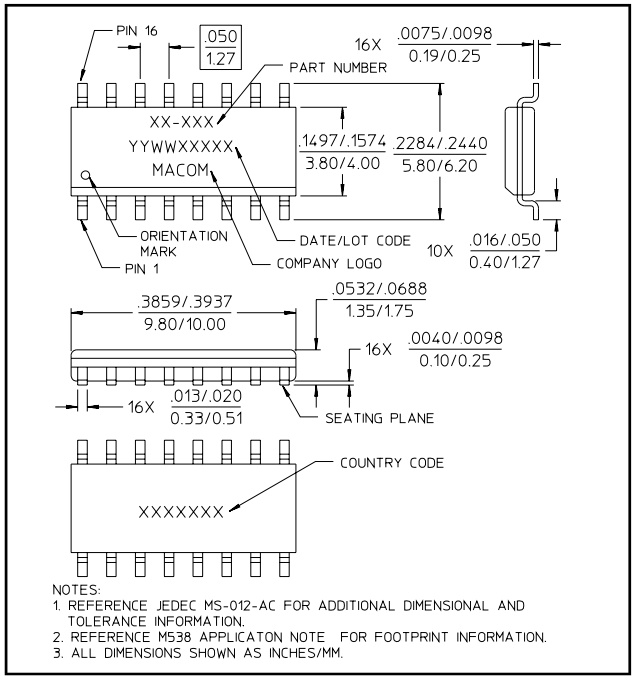
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Electrical Specifications: T_A = 25°C, V_C = 0 V / –5 V, Z_0 = 50 Ω

Parameter	Test Conditions	Frequency	Units	Min.	Typ.	Max.
Insertion Loss (Reference state)		DC - 0.1 GHz DC - 0.5 GHz DC - 1.0 GHz DC - 2.0 GHz	dB dB dB dB	— — — —	0.9 1.3 1.5 2.0	— 1.5 1.8 —
Attenuation Accuracy [4]		DC - 1.0 GHz DC - 2.0 GHz	± (0.15 dB + 3% of Atten Setting in dB) dB ± (0.30 dB + 3% of Atten Setting in dB) dB			
VSWR			Ratio	—	1.4	—
Trise, Tfall	10% to 90% RF, 90% to 10% RF	—	nS	—	10	—
Ton, Toff	50% Control to 90% RF, 50% Control to 10% RF	—	nS	—	15	—
Transients	In-Band	—	mV	—	18	—
1 dB Compression	Input Power Input Power	0.05 GHz 0.5 - 2.0 GHz	dBm dBm	— —	22 28	— —
IP_2	Measured Relative to Input Power (For two-tone input power up to +5 dBm)	0.05 GHz 0.5 - 2.0 GHz	dBm dBm	— —	49 72	— —
IP_3	Measured Relative to Input Power (For two-tone input power up to +5 dBm)	0.05 GHz 0.5 - 2.0 GHz	dBm dBm	— —	45 50	— —
Control Current	$\|V_C\|$ = 5 V		µA	—	10	20

4. Attenuation accuracy specifications apply with negative bias control and low inductance grounding.

Lead-Free SOIC-16†



† Reference Application Note M538 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements

Truth Table [5]

Control Inputs								
$\overline{VC4}$	VC4	$\overline{VC3}$	VC3	$\overline{VC2}$	VC2	$\overline{VC1}$	VC1	Attenuation (dB)
1	0	1	0	1	0	1	0	Reference state
0	1	1	0	1	0	1	0	1 dB
1	0	0	1	1	0	1	0	2 dB
1	0	1	0	0	1	1	0	4 dB
1	0	1	0	1	0	0	1	8 dB
0	1	0	1	0	1	0	1	15 dB

5. 0 = -0.2 V to 0 V, 1 = -8 V to -5 V.

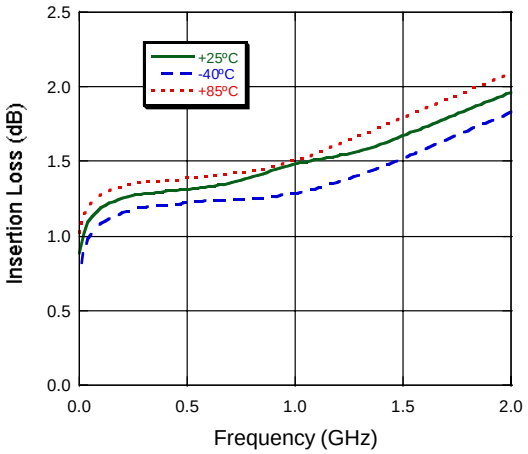
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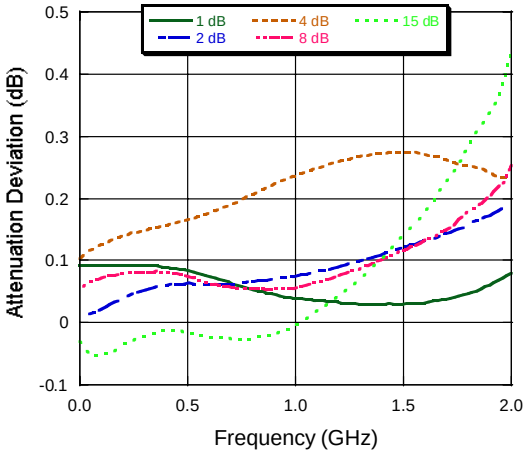
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Typical Performance Curves

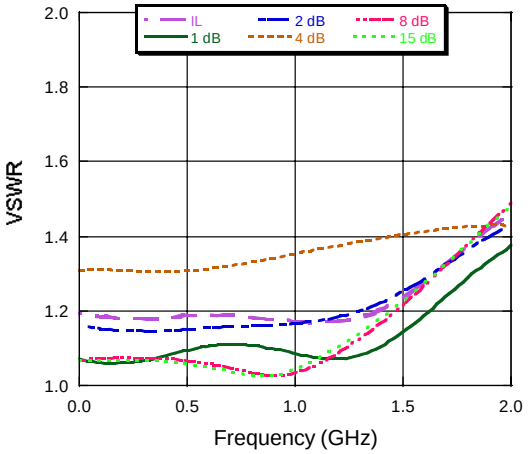
Insertion Loss



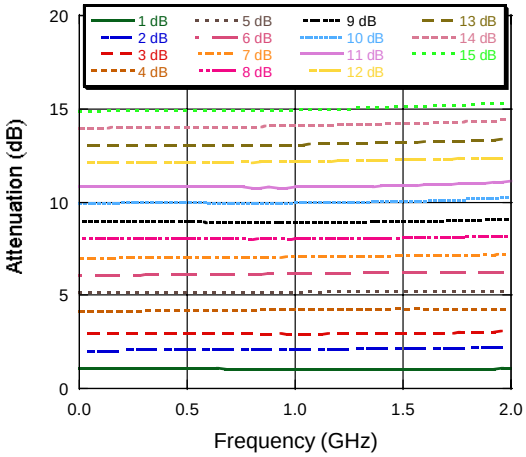
Attenuation Accuracy



VSWR



Attenuation



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