HMC346AMS8GE

v03.1119

GaAs MMIC SMT VOLTAGE-VARIABLE ATTENUATOR, DC - 8 GHz

Typical Applications

This attenuator is ideal for use as a VVA for DC - 8 GHz applications:

- Point-to-Point Radio
- VSAT Radio

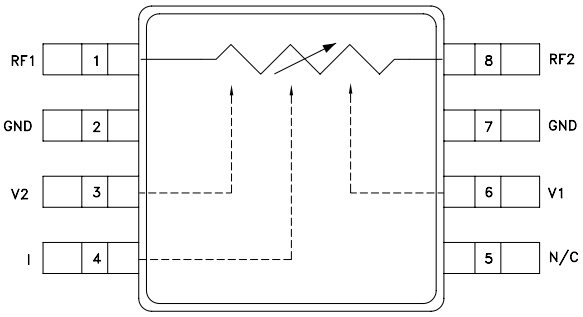
Features

Wide Bandwidth: DC - 8 GHz

Low Phase Shift vs. Attenuation

32 dB Attenuation Range

Functional Diagram



General Description

The HMC346AMS8GE is absorptive Voltage Variable Attenuators (VVA) in 8 lead surface-mount packages operating from DC - 8 GHz. It features an on-chip reference attenuator for use with an external op-amp to provide simple single voltage attenuation control, 0 to -5V. The device is ideal in designs where an analog DC control signal must control RF signal levels over a 30 dB amplitude range. Applications include AGC circuits and temperature compensation of multiple gain stages in microwave point-to-point and VSAT radios.

Electrical Specifications, T_A = +25° C, 50 Ohm system

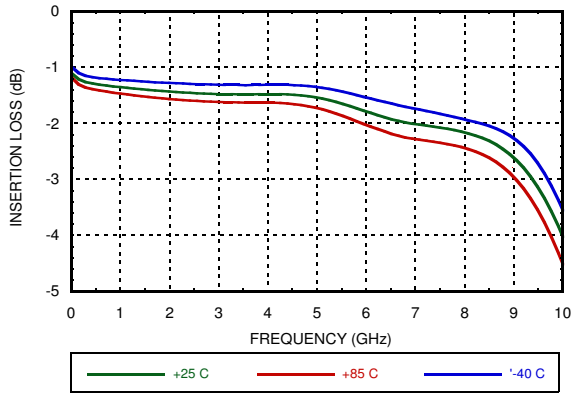
Parameter		Min	Typical	Max	Units
Insertion Loss	DC - 8 GHz		2.1	3.1	dB
Attenuation Range	DC - 8 GHz	23	28		dB
Return Loss	DC - 8 GHz	5	10		dB
Switching Characteristics	tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF)		8 16		ns ns
Input Power for 0.25 dB Compression (0.5 - 8 GHz)	Min. Atten. Atten. >2 dB		+8 +4		dBm dBm
Input Third Order Intercept (0.5 - 8 GHz) (Two-tone Input Power = -8 dBm Each Tone)	Min. Atten. Atten. >2 dB		+30 +10		dBm dBm

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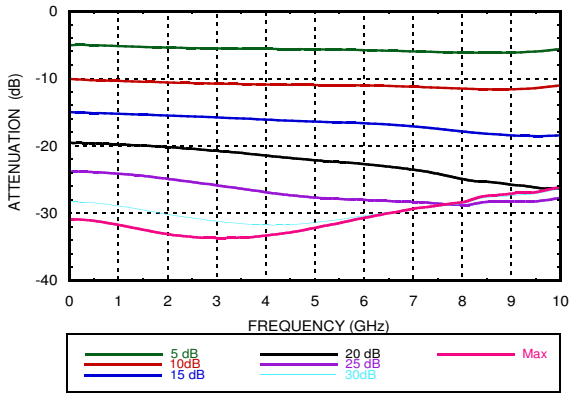
For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106
Phone: 781-329-4700 • Order online at www.analog.com
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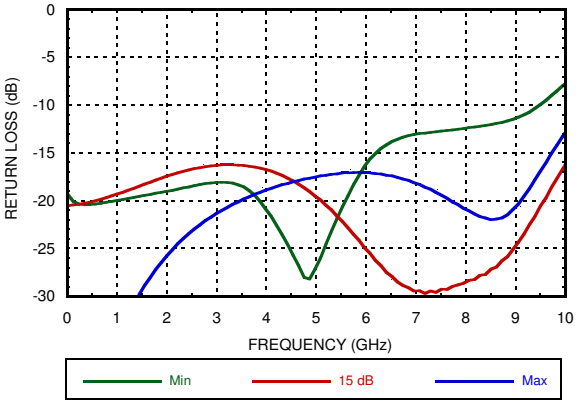
Insertion Loss vs. Temperature



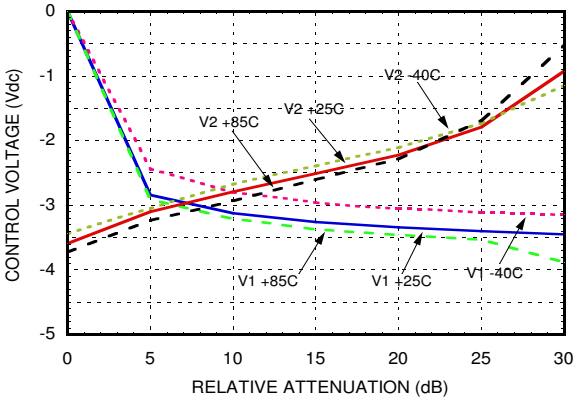
Relative Attenuation



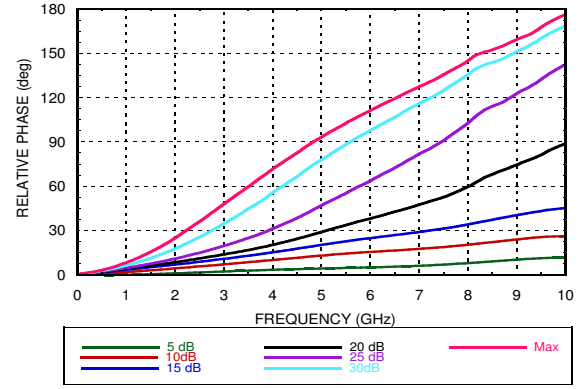
Return Loss vs. Attenuation



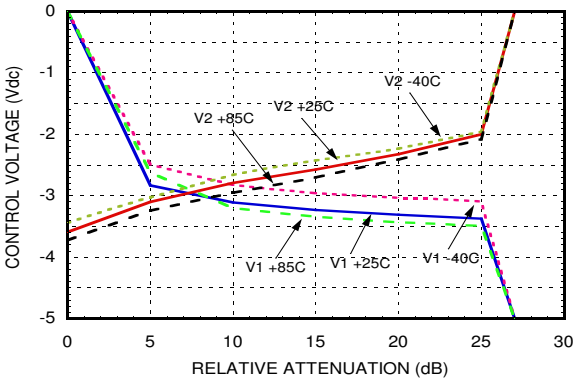
Relative Attenuation vs. Control Voltage @ 4 GHz



Relative Phase



Relative Attenuation vs. Control Voltage @ 8 GHz

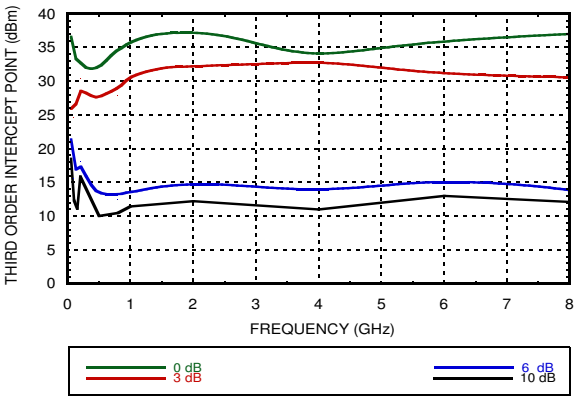


HMC346AMS8GE

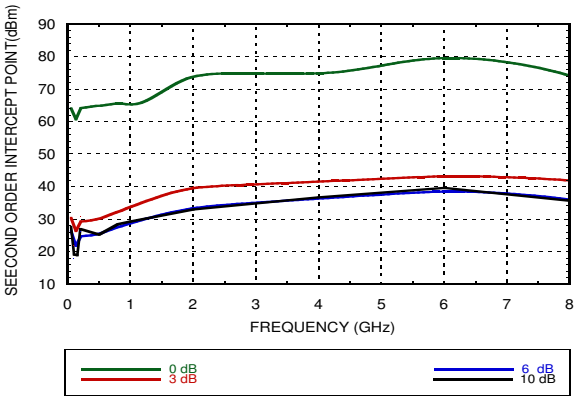
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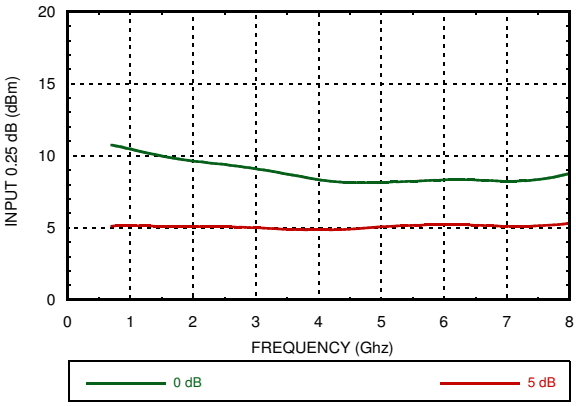
Input Third Order Intercept vs Attenuation*



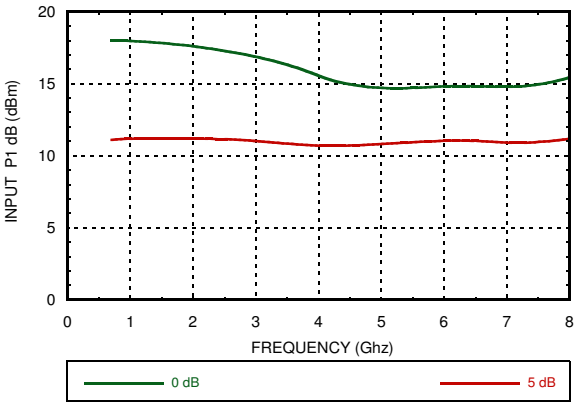
Input Second Order Intercept vs. Attenuation*



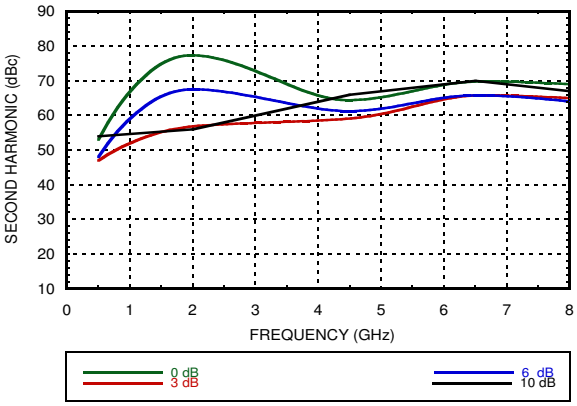
0.25 dB Compression vs. Attenuation



1 dB Compression vs. Attenuation



Second Harmonic vs. Attenuation



*Two-tone input power = -8 dBm each tone, 1 MHz spacing.

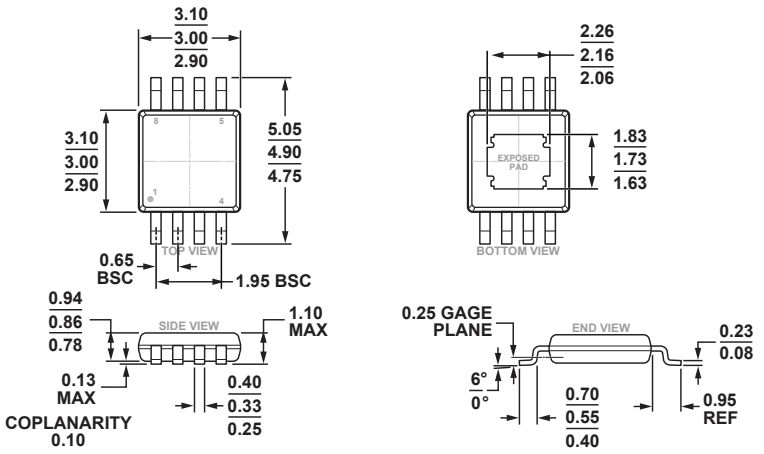
Absolute Maximum Ratings

RF Input Power	+18 dBm
DC Voltage on I Pin	+/- 0.8V
Control Voltage Range	+0.3 to -6 V
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
Junction Temperature	+175 °C
Junction to Case Thermal Resistance	10 °C/W
ESD Sensitivity	Class 1 A

State	Bias Condition
V1	-5 to 0V @ 9mA typical
V2	-5 to 0V @ 9mA typical

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



COMPLIANT TO JEDEC STANDARDS MO-187-AA-T

8-Lead Mini Small Outline Package with Exposed Pad [MINI_SO_EP]
(RH-8-1)
Dimensions shown in millimeters

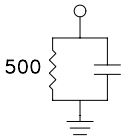
Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [2]
HMC346AMS8GE	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL3 [1]	H346A XXXX
HMC346AMS8GETR	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL3 [1]	H346A XXXX
EV1HMC346AMS8G	Eval Board			

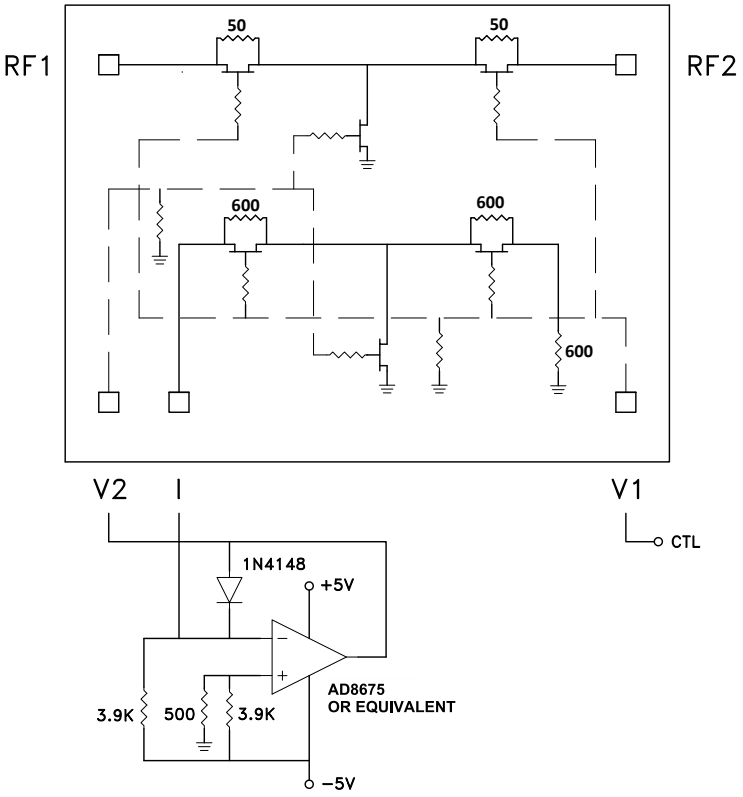
[1] Max peak reflow temperature of 260 °C
[2] 4-Digit lot number XXXX

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Pin Descriptions

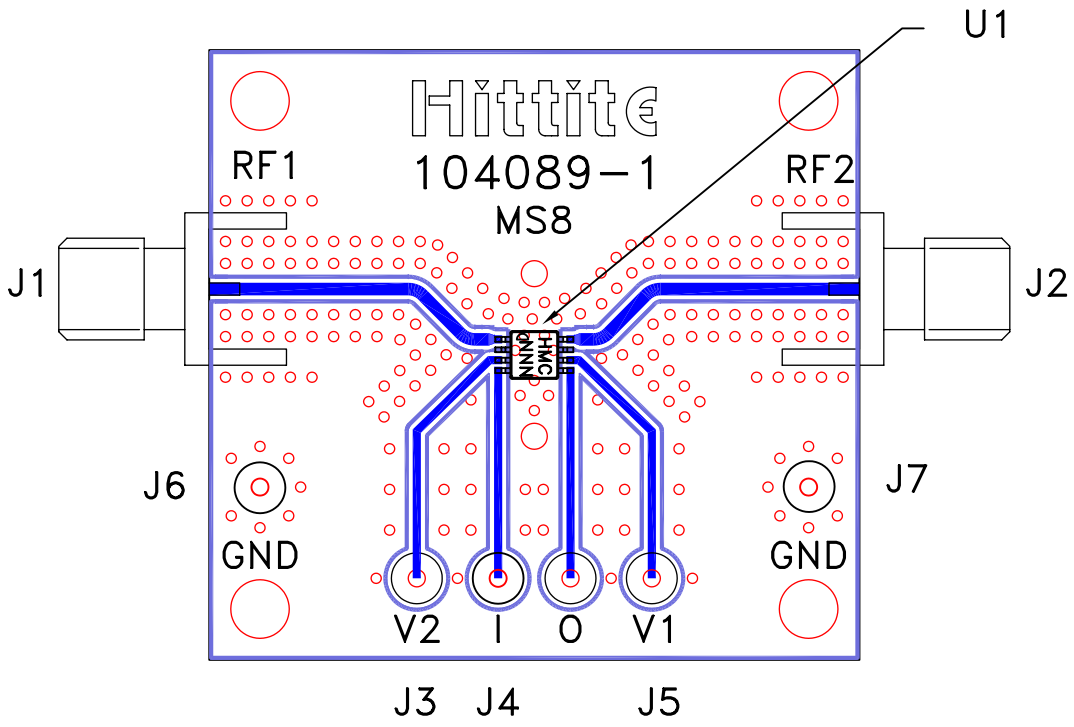
Pin Number	Function	Description	Interface Schematic
1, 8	RF1 RF2	This pin is DC coupled and matched to 50 Ohm. Blocking capacitors are required if RF line potential is not equal to 0V.	
2, 7	GND	This pin must be DC grounded.	
3, 6	V2, V1	Control Input (Master).	
4	I	Control Input (Slave).	
5	N/C	Not Connected.	

Single-Line Control Driver



External op-amp control circuit maintains impedance match while attenuation is varied. Input control ranges from 0 Volts (min. attenuation) to -5 Volts (max. attenuation.)

Evaluation PCB



List of Materials for Evaluation EV1HMC346AMS8G [1]

Item	Description
J1 - J2	PCB Mount SMA RF Connector
J3 - J7	DC PIN
U1	HMC346AMS8GE
PCB [2]	104089 Eval Board

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350

The circuit board used in the application should be generated with proper RF circuit design techniques. Signal lines at the RF ports should be 50 Ohm impedance and the package ground leads and package bottom should be connected directly to the PCB RF ground plane, similar to that shown above. The evaluation circuit board shown above is available from Analog Devices, upon request.