HMC346ALP3E

v01.0117

GaAs MMIC VOLTAGE-VARIABLE ATTENUATOR, DC - 14 GHz

Typical Applications

The HMC346ALP3E is ideal for:

- Basestation Infrastructure
- Fiber Optics & Broadband Telecom
- Microwave Radio & VSAT
- Military Radios, Radar, & ECM
- Test Instrumentation

Features

Wide Bandwidth: DC - 14 GHz

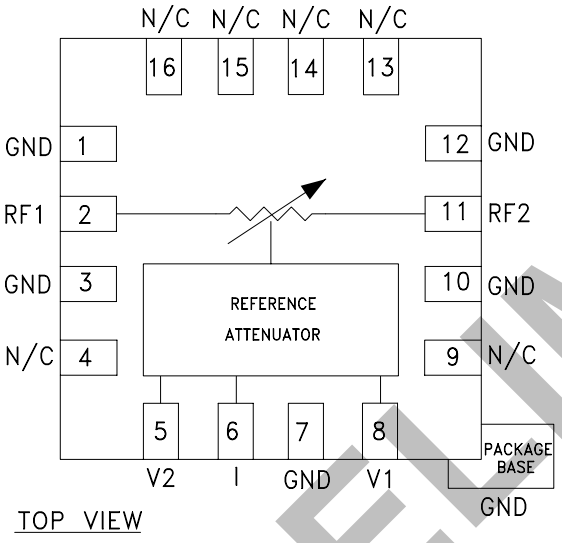
Low Phase Shift vs. Attenuation

30 dB Attenuation Range

Simplified Voltage Control

3 x 3 x 1 mm SMT Package

Functional Diagram



General Description

The HMC346ALP3E is an absorptive Voltage Variable Attenuator (VVA) in low cost leadless surface mount plastic package operating from DC - 14 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. This VVA is an excellent alternative to the HMC121C8.

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

Parameter		Min	Typical	Max	Units
Insertion Loss	DC - 14 GHz		2.7	TBD	dB dB
Attenuation Range	DC - 10 GHz DC - 14 GHz	TBD TBD	30 27		dB dB
Return Loss	DC - 14 GHz	TBD	10		dB
Switching Characteristics	tRISE, tFALL (10/90% RF): tON, tOFF (50% CTL to 10/90% RF):		2 8		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:		+25 +10		dBm dBm

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
Application Support: Phone: 1-800-ANALOG-D

HMC346ALP3E* PRODUCT PAGE QUICK LINKS

Last Content Update: 02/23/2017

COMPARABLE PARTS

View a parametric search of comparable parts.

EVALUATION KITS

- HMC346ALP3 Evaluation Board

DOCUMENTATION

Data Sheet

- HMC346ALP3E: GaAs MMIC Voltage-Variable Attenuator, DC - 14 GHz Preliminary Data Sheet

DESIGN RESOURCES

- HMC346ALP3E Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

DISCUSSIONS

View all HMC346ALP3E EngineerZone Discussions.

SAMPLE AND BUY

Visit the product page to see pricing options.

TECHNICAL SUPPORT

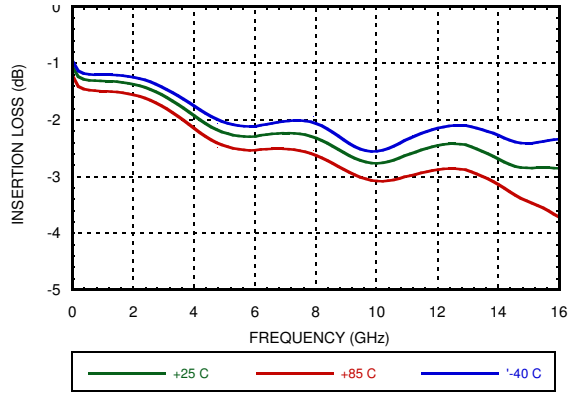
Submit a technical question or find your regional support number.

DOCUMENT FEEDBACK

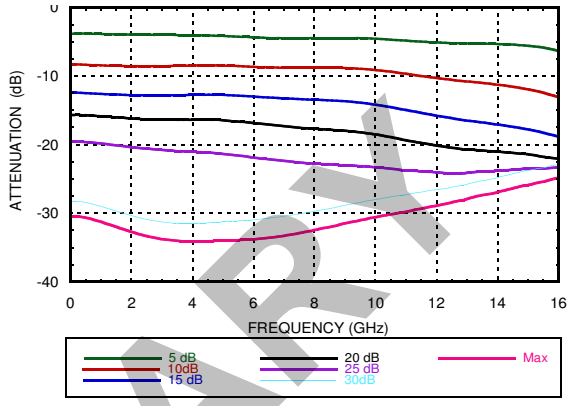
Submit feedback for this data sheet.

GaAs MMIC VOLTAGE-VARIABLE ATTENUATOR, DC - 14 GHz

Insertion Loss vs. Temperature



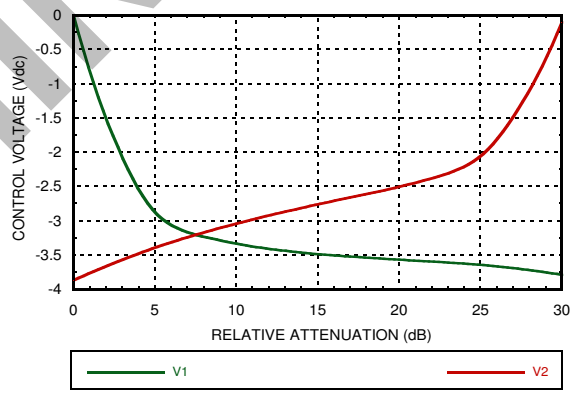
Relative Attenuation



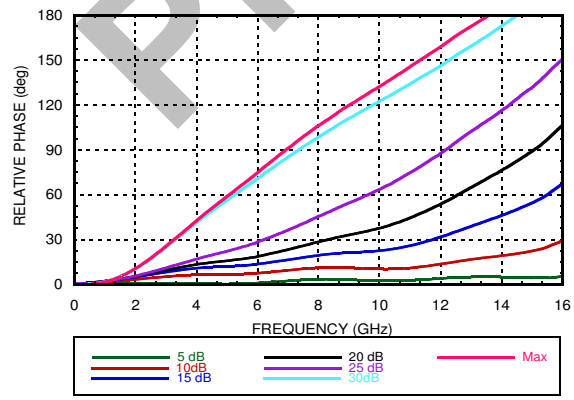
Return Loss vs. Attenuation

TBD

Relative Attenuation vs. Control Voltage @ 10 GHz



Relative Phase



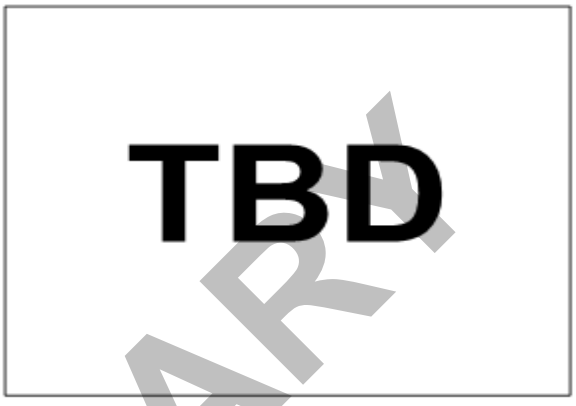
Input IP3 vs. Attenuation*

TBD

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

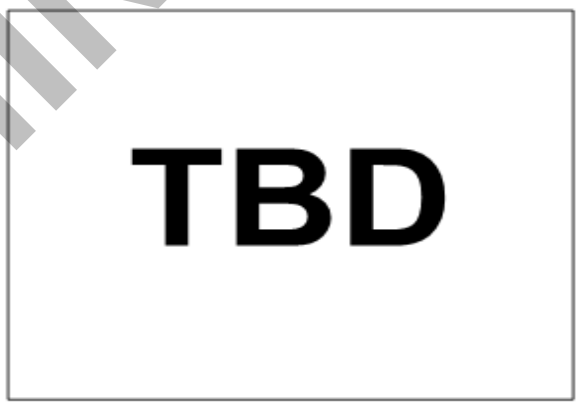
*Input IP2 vs. Attenuation**

Second Harmonic vs. Attenuation, Pin = -8 dBm



0.25 dB Compression vs. Attenuation

1 dB Compression vs. Attenuation



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

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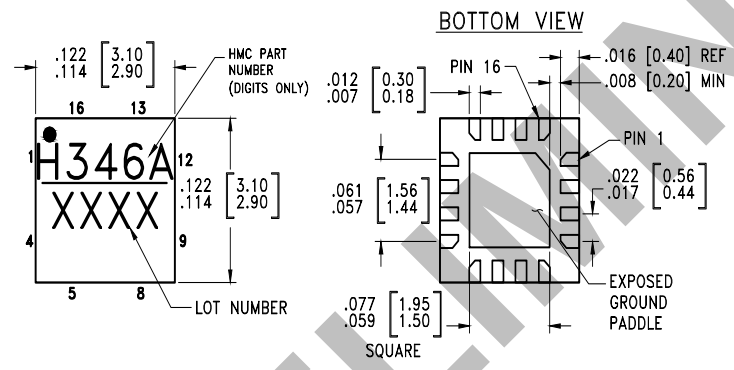
Absolute Maximum Ratings

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

State	Bias Condition
Vctrl1	-5 to 0V @ 9 mA typical.
Vctrl2	-5 to 0V @ 9 mA typical.

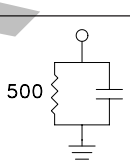
ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing

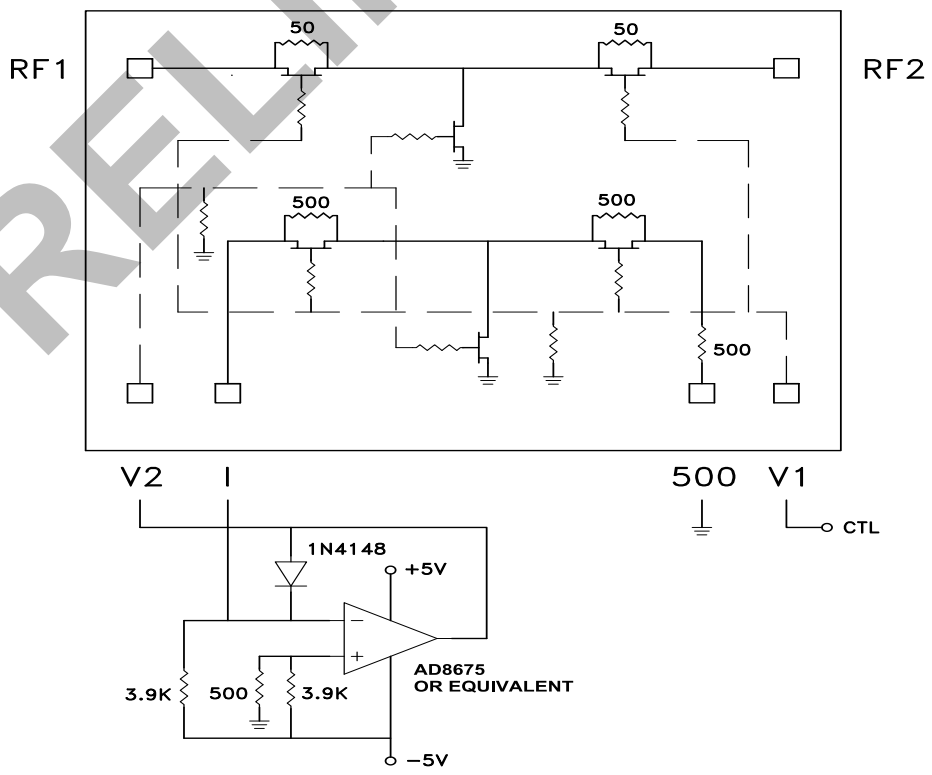


NOTES:
1. PACKAGE BODY MATERIAL: LOW STRESS INJECTION MOLDED PLASTIC SILICA AND SILICON IMPREGNATED.
2. LEAD AND GROUND PADDLE MATERIAL: COPPER ALLOY.
3. LEAD AND GROUND PADDLE PLATING: 100% MATTE TIN.
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
6. CHARACTERS TO BE HELVETICA MEDIUM, .025 HIGH, WHITE INK, OR LASER MARK LOCATED APPROX. AS SHOWN.
7. PAD BURR LENGTH SHALL BE 0.15mm MAX. PAD BURR HEIGHT SHALL BE 0.05mm MAX.
8. PACKAGE WARP SHALL NOT EXCEED 0.05mm
9. ALL NC LEADS, GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
10. REFER TO HITTITE APPLICATION NOTE FOR SUGGESTED PCB LAND PATTERN.

Pin Descriptions

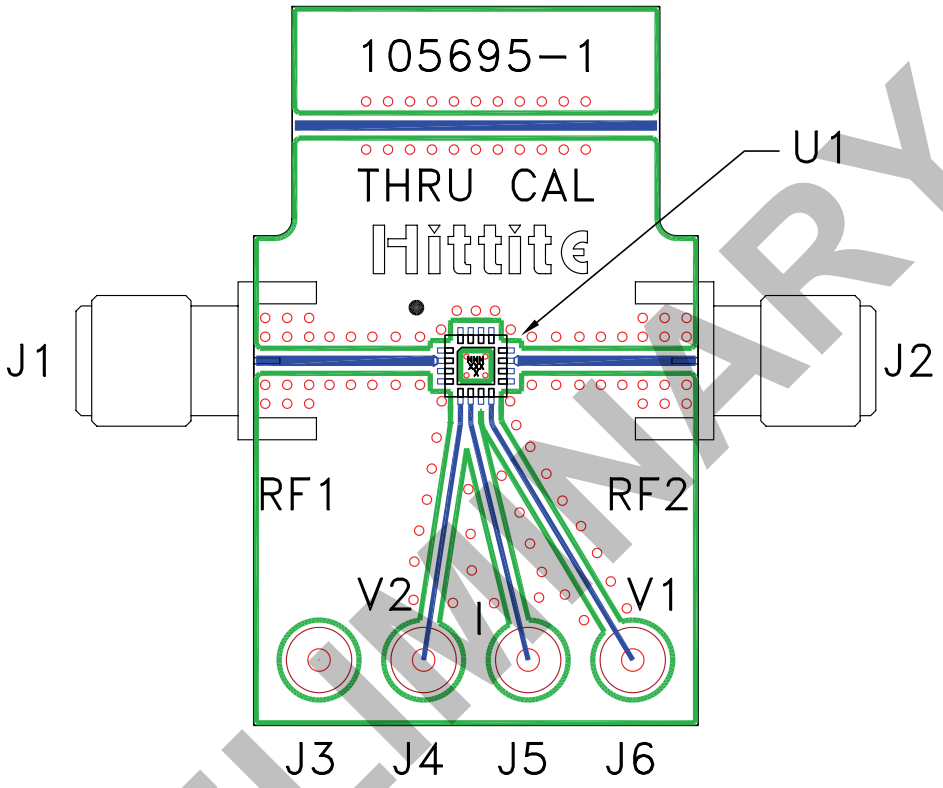
Pin Number	Function	Description	Interface Schematic
1, 3, 7, 10, 12	GND	Package bottom has exposed metal paddle that must also be connected to PCB RF ground.	
2, 11	RF1 RF2	This pin is DC coupled and matched to 50 Ohm. Blocking capacitors are required if the RF line potential is not equal to 0V.	
4, 9, 13, 14, 15, 16	N/C	This pin should be connected to PCB RF ground.	
5, 8	V2, V1	Control input (master).	
6	I	Control input (slave).	

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 -5.0 Volts (max. attenuation.)

Evaluation PCB



List of Materials for Evaluation EV1HMC346ALP3 [1]

Item	Description
J1 - J2	PCB Mount SMA RF Connector
J3 - J6	DC Pin
U1	HMC346ALP3E VVA
PCB [2]	105695 Evaluation PCB

[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 Inc. upon request.