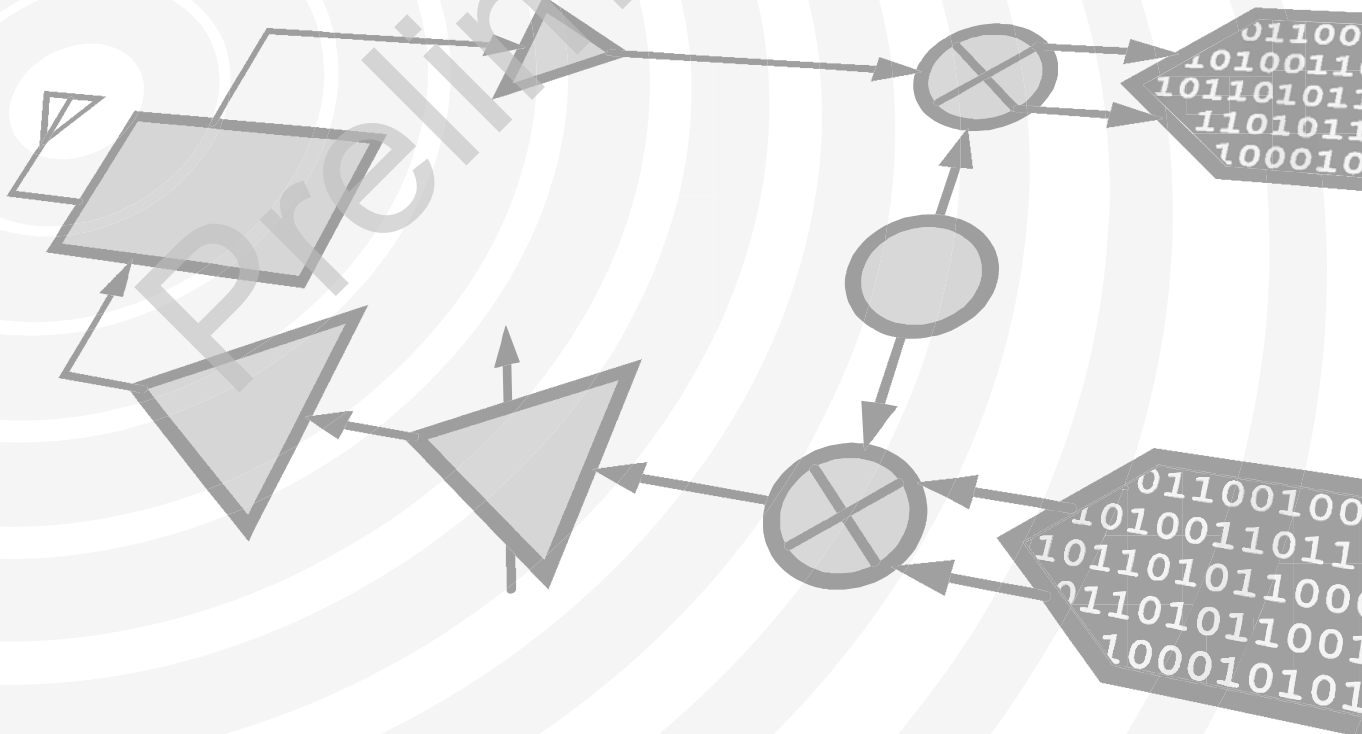


# Analog Devices Welcomes Hittite Microwave Corporation



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Preliminary

## GaAs MMIC VOLTAGE - VARIABLE ATTENUATOR, 20 - 50 GHz

1

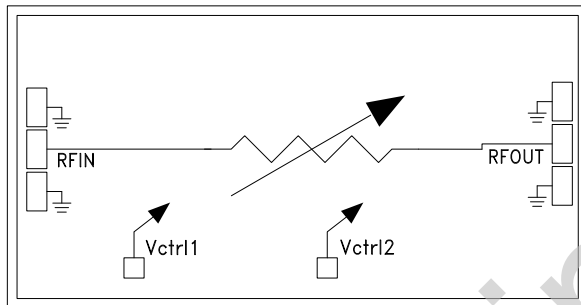
ATTENUATORS - ANALOG - CHIP

### Typical Applications

The HMC985A is ideal for:

- Point-to-Point Radio
- VSAT Radio
- Test Instrumentation
- Microwave Sensors
- Military, ECM & Radar

### Functional Diagram



### Features

Wide Bandwidth: 20 - 50 GHz

Excellent Linearity: +32 dB Input IP3

Wide Attenuation Range: 35 dB

Die Size: 2.78 x 1.37 x 0.1 mm

### General Description

The HMC985A is an absorptive voltage variable attenuator (VVA) which operates from 20 - 50 GHz and is ideal in designs where an analog DC control signal must be used to control RF signal levels over a 35 dB dynamic range. It features two shunt-type attenuators which are controlled by two analog voltages, Vctrl1 and Vctrl2. Optimum linearity performance of the attenuator is achieved by first varying Vctrl1 of the first attenuation stage from -3V to 0V with Vctrl2 fixed at -3V. The control voltage of the second attenuation stage, Vctrl2, should then be varied from -3V to 0V with Vctrl1 fixed at 0V.

However, if the Vctrl1 and Vctrl2 pins are connected together it is possible to achieve the full analog attenuation range with only a small degradation in input IP3 performance. Applications include AGC circuits and temperature compensation of multiple gain stages in microwave point to point and VSAT radios.

### Electrical Specifications, $T_A = +25^\circ\text{C}$ , See Test Conditions

Parameter	Condition	Min.	Typ.	Max.	Units
Insertion Loss	20 - 27		3	3.5	dB
	27 - 35		3	4	dB
	35 - 50		3.5	4.5	dB
Attenuation Range	20 - 27	25	30		dB
	27 - 35	30	35		dB
	35 - 50	35	40		dB
Input Return Loss			13		dB
Output Return Loss			13		dB
Input Third Order Intercept (two-tone input Power = 10 dBm Each Tone) <sup>[1]</sup>			33		dBm

[1] VCTR2 = -3, VCTR1 = -2.0 worst case

**GaAs MMIC VOLTAGE - VARIABLE  
ATTENUATOR, 20 - 50 GHz**

2

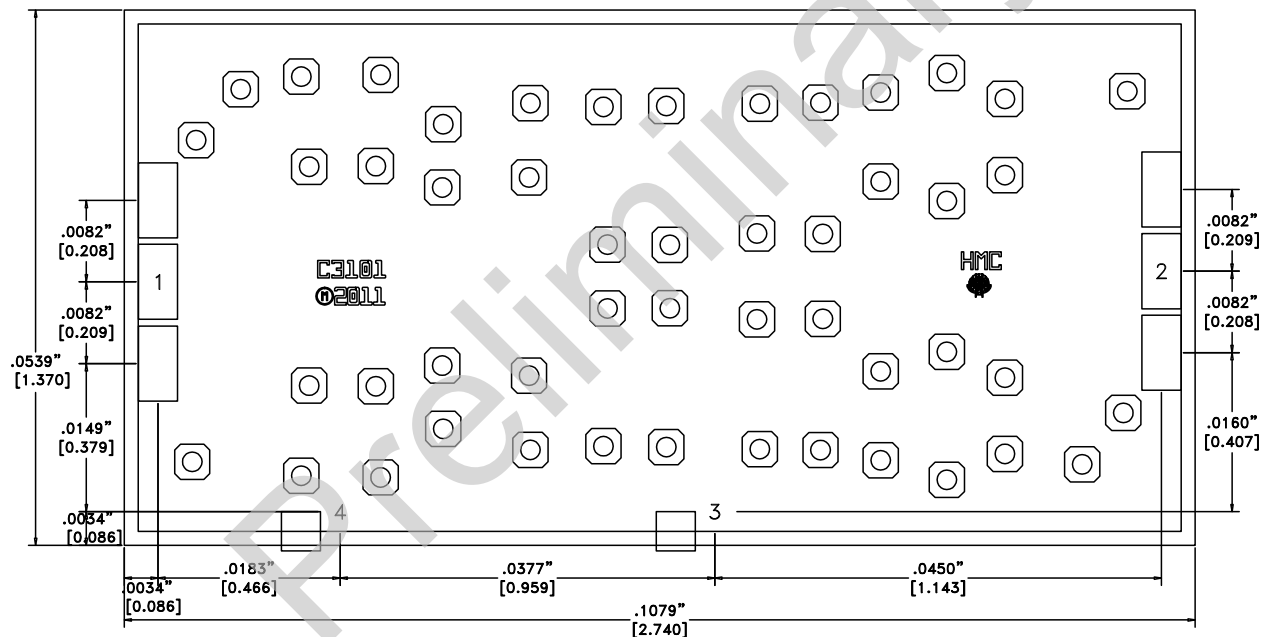
ATTENUATORS - ANALOG - CHIP

**Absolute Maximum Ratings**

Control Voltage	+1 to -5V
Input RF Power	30 dBm
Maximum Junction Temperature	165 °C
Thermal Resistance ( $R_{TH}$ ) (junction to ground paddle)	62 °C/W
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to 125°C



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

**Outline Drawing**

**NOTES:**

1. ALL DIMENSIONS ARE IN INCHES [MM]
2. DIE THICKNESS IS .004"
3. TYPICAL BOND PAD IS 0.0026" [0.066] SQUARE
4. BACKSIDE METALLIZATION: GOLD
5. BOND PAD METALLIZATION: GOLD
6. BACKSIDE METAL IS GROUND.
7. CONNECTION NOT REQUIRED FOR UNLABELED BOND PADS.
8. OVERALL DIE SIZE  $\pm .002$