

# HIP3™ Variable Attenuator for UMTS Base Stations



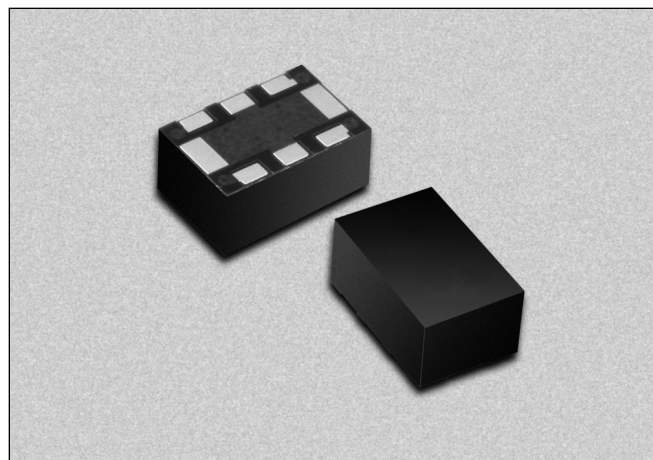
AV133-315

## Features

- 23 dB Attenuation Range
- 1.5 dB Insertion Loss, 1.5 SWR
- 0–12 V Control Voltage
- 43 dBm IP3
- Small Footprint LGA Package
- Designed for UMTS Base Stations

## Description

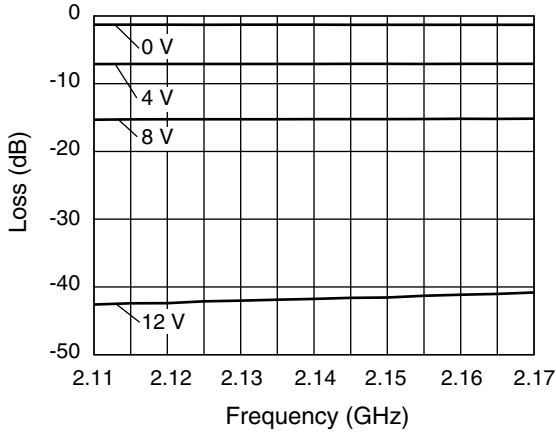
The AV133-315 is a voltage controlled variable attenuator from Alpha's series of HIP3™ components. It is specifically designed and specified for use as a wide dynamic range low distortion attenuator for UMTS base station applications centered at 2140 MHz. The AV133-315 employs a monolithic quadrature hybrid and a pair of silicon PIN diodes to achieve the specified low distortion performance. It operates from 0–12 V at 1.6 mA typical control current at maximum attenuation. The AV133-315 is packaged in a small outline LGA (Land Grid Array) surface mount package with the internal elements affixed to an organic BT substrate.



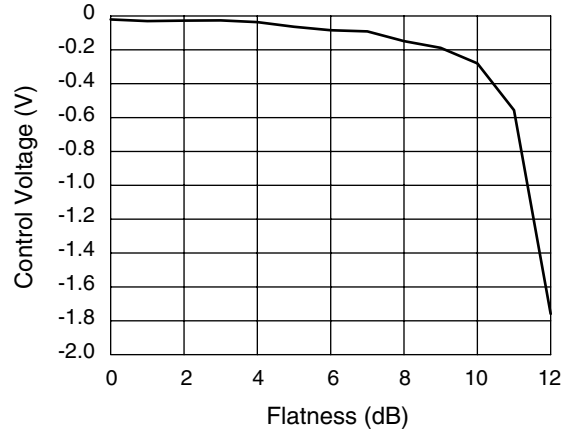
## Electrical Specifications at 25°C

| Parameter                       | Condition                  | Min. | Typ. | Max. | Unit |
|---------------------------------|----------------------------|------|------|------|------|
| UMTS Frequency Range (BW)       | $F_O \pm 12.5$ MHz         | 2110 |      | 2170 | MHz  |
| Control Voltage ( $C_V$ ) Range |                            | 0    |      | 12   | V    |
| Insertion Loss in BW            | $C_V = 0$ V                |      |      | 1.5  | dB   |
| Attenuation Range               | At $F_O$ , $C_V = 12$ V    | 23   |      |      | dB   |
| VSWR in BW                      |                            |      |      | 1.5  |      |
| IP3                             | 2140/2145 MHz, $C_V = 0$ V | 43   |      |      | dBm  |
| IM3                             | 8 dBm                      |      |      | -70  | dBc  |

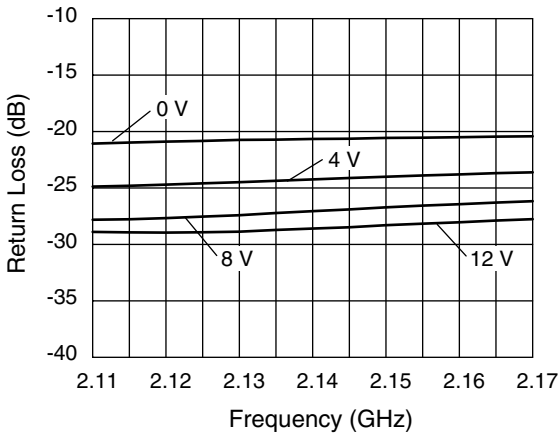
**Typical Performance Data**



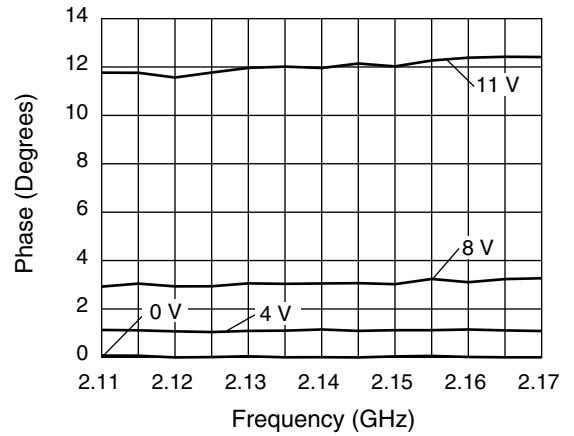
**Insertion Loss vs. Frequency and Control Voltage — UMTS Band**



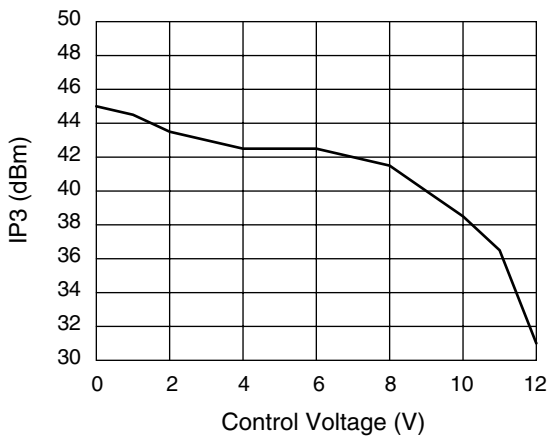
**Insertion Loss Flatness vs. Control Voltage — UMTS Band**



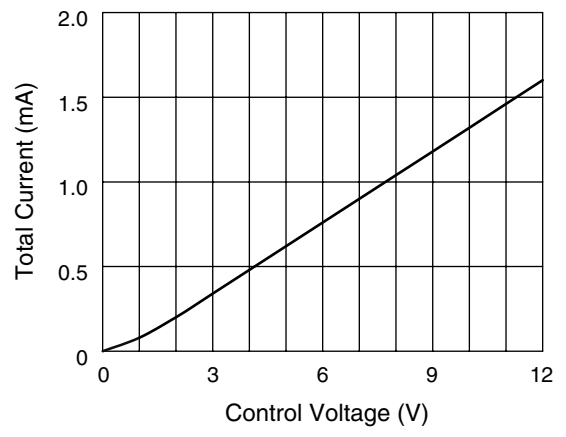
**Input/Output Return Loss vs. Frequency and Control Voltage — UMTS Band**



**Phase vs. Frequency and Control Voltage — UMTS Band**

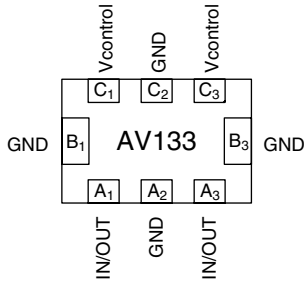


**3rd Order Intermod Intercept vs. Control Voltage**  
**RF<sub>1</sub> = 2.140 GHz, RF<sub>2</sub> = 2.145 GHz @ 8 dBm**



**Total Current vs. Control Voltage**

**Pin Out (Bottom View)**



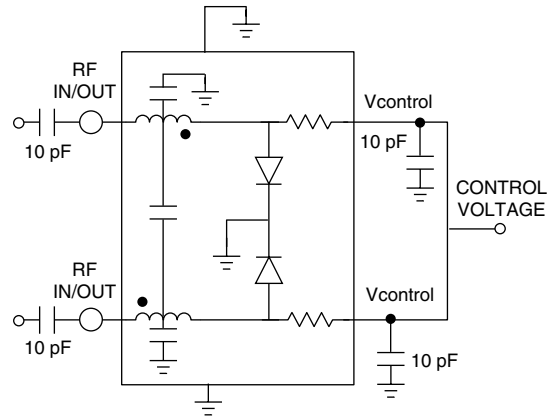
| Terminal No.   | Terminal Name |
|----------------|---------------|
| A <sub>1</sub> | IN/OUT        |
| A <sub>2</sub> | GND           |
| A <sub>3</sub> | IN/OUT        |
| B <sub>1</sub> | GND           |
| B <sub>3</sub> | GND           |
| C <sub>1</sub> | Vcontrol      |
| C <sub>2</sub> | GND           |
| C <sub>3</sub> | Vcontrol      |

**Absolute Maximum Ratings**

| Characteristic                | Value                            |
|-------------------------------|----------------------------------|
| RF Input Power                | 0.5 W CW, 4 W @ 12.5% Duty Cycle |
| Control Voltage               | 15 V                             |
| Control Current               | 50 mA Each Diode                 |
| Operating Temperature         | -40 to +85°C                     |
| Storage Temperature           | -40 to +85°C                     |
| Maximum Reverse Diode Voltage | -10 V                            |
| Electrostatic Discharge       | +125 V                           |

Note: Operating this device above any of these parameters may cause irreversible damage.

**Connection Diagram**



**-315**

