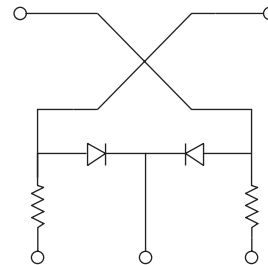


**DATA SHEET**

# AV133-315, 133-315LF: HIP3™ Variable Attenuator for UMTS Base Stations

## 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
- Available lead (Pb)-free MSL-1 @ 240 °C per JEDEC J-STD-020



## Description

The AV133-315 is a voltage controlled variable attenuator from Skyworks' 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.

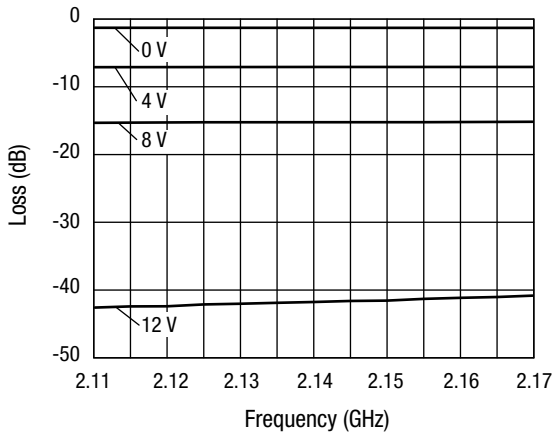
**NEW** Skyworks offers lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant packaging.



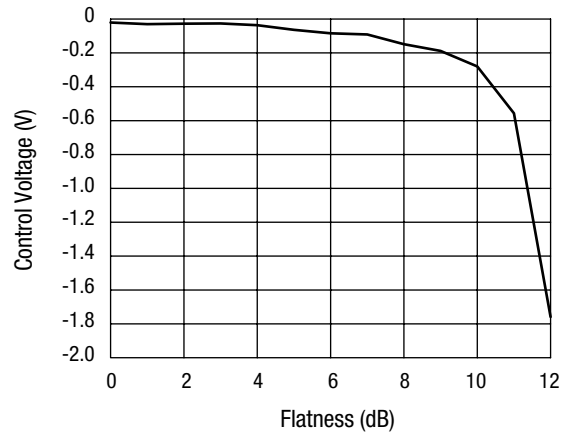
## Electrical Specifications at 25 °C

Parameter	Condition	Min.	Typ.	Max.	Unit
UMTS frequency range (BW)	$F_0 \pm 12.5$ 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 $F_0$ , $C_V = 10$ V	18		22	dB
	At $F_0$ , $C_V = 12$ V	23		–	dB
VSWR in BW				1.5	
IP3	2140/2145 MHz, $C_V = 0$ V	43			dBm
IM3	8 dBm			-70	dBc

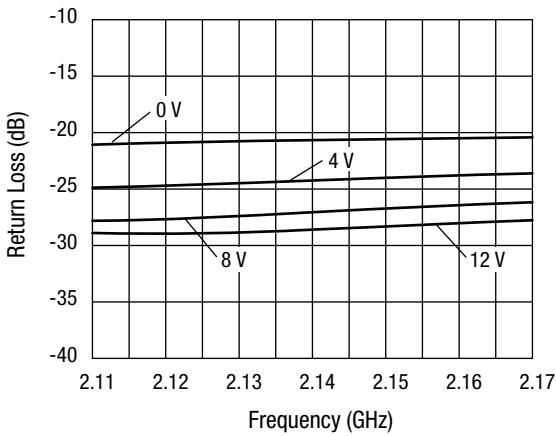
**Typical Performance Data**



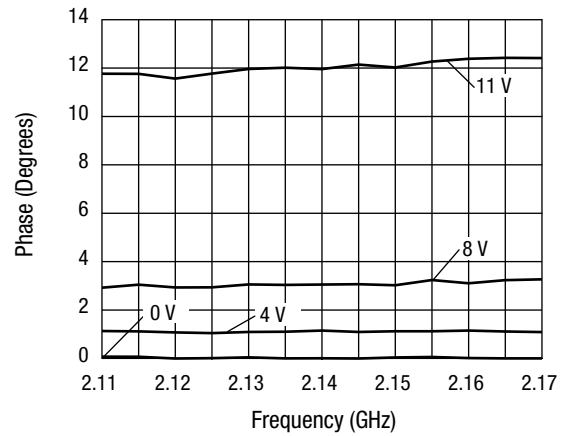
**Insertion Loss vs. Frequency and Control Voltage — UMTS Band**



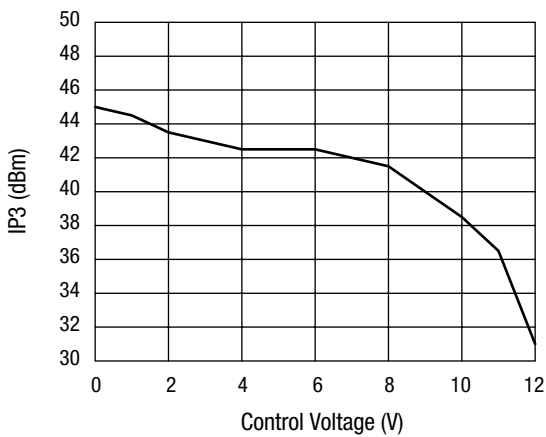
**Insertion Loss Flatness vs. Control Voltage — UMTS Band**



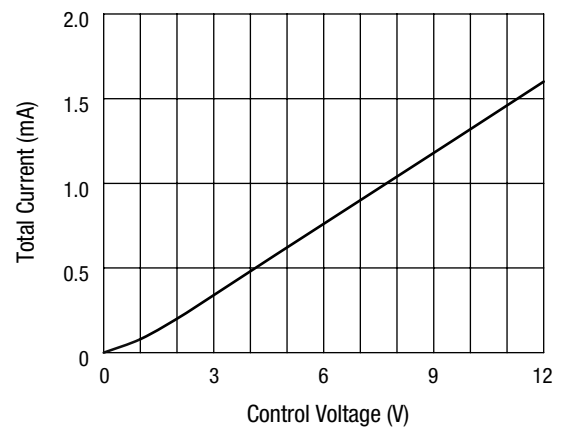
**Input/Output Return Loss vs. Frequency and Control Voltage — UMTS Band**



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

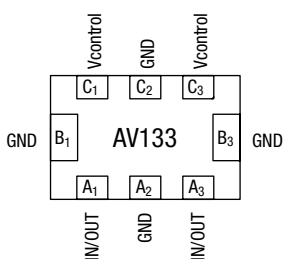


**3rd Order Intermod Intercept vs. Control Voltage**  
**RF<sub>1</sub> = 2.140 GHz, RF<sub>2</sub> = 2.145 GHz @ 8 dBm**



**Total Current vs. Control Voltage**

### Pin Out (Bottom View)



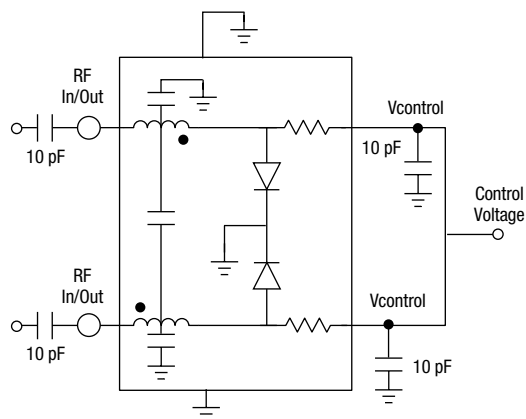
Terminal No.	Terminal Name
A <sub>1</sub> (Pin 1)	IN/OUT
A <sub>2</sub>	GND
A <sub>3</sub>	IN/OUT
B <sub>1</sub>	GND
B <sub>2</sub>	GND
B <sub>3</sub>	GND
C <sub>1</sub>	Vcontrol
C <sub>2</sub>	GND
C <sub>3</sub>	Vcontrol

### 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	+250V

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

### Connection Diagram



### -315

