

DATA SHEET

AV113-12LF: HIP3™ Variable Attenuator 2.1 to 2.3 GHz

Features

- Low loss 1.4 dB typical
- Attenuation 18 dB typical
- Good VSWR < 1.5:1 typical
- Small SOIC-8 package
- For IMT-2000 applications
- MSL-1 @ 260 °C per JEDEC J-STD-020



Skyworks GreenTM products are compliant with all applicable legislation and are halogen-free. For additional information, refer to *Skyworks Definition of Green*TM, document number SQ04-0074.

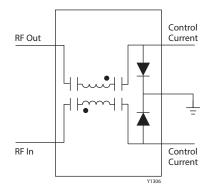


Figure 1. AV113-12LF Functional Block Diagram

Description

The AV113-12 is a current controlled, variable attenuator from Skyworks series of HIP3™ components. It is designed to meet the wide dynamic range required in IMT-2000 applications. A monolithic quadrature hybrid is teamed with a silicon PIN diode pair in a plastic surface mount package, reducing size and assuring consistency from part to part. AV113-12LF is packaged in a lead (Pb)-free, fully RoHS-compliant SOIC-8 package.

Figure 1 shows the functional block diagram of the AV113-12LF. The pinout is shown in Figure 2.

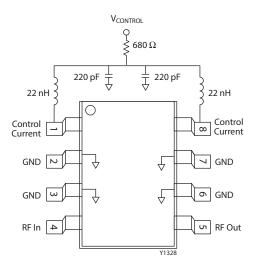


Figure 2. AV113-12LF Pinout Diagram

Electrical and Mechanical Specifications

The absolute maximum ratings for the AV113-12LF are shown in Table 1. Electrical specifications are provided in Table 2, and operating characteristics are shown in Table 3.

Typical performance characteristics are shown in Figures 3 through 6.

Table 1. AV113-12LF Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Minimum	Maximum	Units
RF input power			0.5 W CW, 4 W @ 12.5% duty cycle	
Control current			50 mA per diode	mA
Operating temperature	TA	-40	+85	°C
Storage temperature	T _{STG}	-65	+150	°C
Maximum reverse diode voltage			-10	V
Electrostatic discharge:	ESD			
Human Body Model (HBM), Class 0			125	V

Note 1: Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.

CAUTION: Although this device is designed to be as robust as possible, electrostatic discharge (ESD) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times.

Table 2. AV113-12LF Electrical Specifications (Note 1) (TOP = 25 °C, Unless Otherwise Noted)

Parameter	Minimum	Typical	Maximum	Units
Frequency	2.1		2.3	GHz
Insertion loss (0 mA control current)		1.4	1.6	dB
Attenuation @ 1.0 mA control current	16.5	18		dB
VSWR all ports		1.5		
Input 3rd order intercept point		+40		dBm
Group delay		0.4	0.8	ns

Note 1: Performance is guaranteed only under the conditions defined in this table.

Table 3. AV113-12LF Operating Characteristics (Note 1) (ToP = 25 °C, 0 V, 5 V,Unless Otherwise Noted)

Parameter	Condition	Minimum	Typical	Maximum	Units
Switching characteristics (Note 2):					
Rise, fall On, off Video feedthru (peak)	10/90% or 90/10% RF 50% CTL to 90/10% RF			5 8 2	μs μs mV
Maximum input power for <1 dB attenuation variation			+15		dBm

Note 1: All measurements made in a 50 Ω system, unless otherwise specified.

Note 2: 0 to 4 mA square wave total control current.

Typical Performance Characteristics

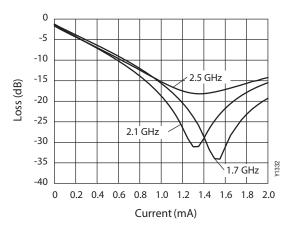


Figure 3. Attenuation vs Control Current

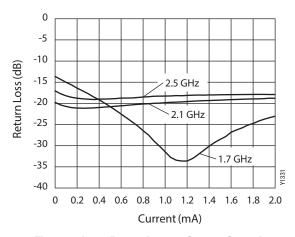


Figure 5. Input Return Loss vs Current Control

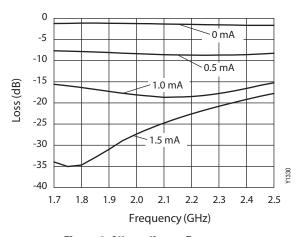


Figure 4. Attenuation vs Frequency

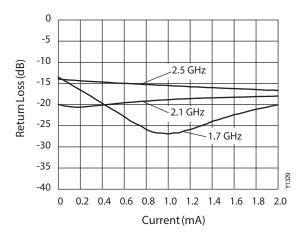


Figure 6. Output Return Loss vs Current Control

Package and Handling Information

The recommended board layout for the AV113-12LF is shown in Figure 7. Package dimensions for the device are shown in Figure 8.

Instructions on the shipping container label regarding exposure to moisture after the container seal is broken must be followed. Otherwise, problems related to moisture absorption may occur when the part is subjected to high temperature during solder assembly.

The AV113-12LF is rated to Moisture Sensitivity Level 1 (MSL1) at 260 °C for 5 seconds. They can be used for lead or lead-free soldering. For additional information, refer to the Skyworks Application Note, *Solder Reflow Information*, document number 200164.

Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. Production quantities of this product are shipped in a standard tape and reel format.

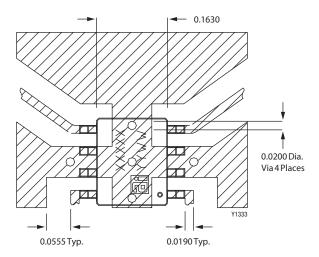


Figure 7. AV113-12LF Recommended Board Layout

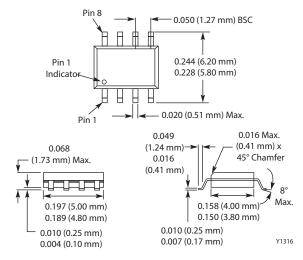


Figure 8. AV113-12LF Package Dimensions

Copyright © 2002-2007, 2014 Skyworks Solutions, Inc. All Rights Reserved.

Information in this document is provided in connection with Skyworks Solutions, Inc. ("Skyworks") products or services. These materials, including the information contained herein, are provided by Skyworks as a service to its customers and may be used for informational purposes only by the customer. Skyworks assumes no responsibility for errors or omissions in these materials or the information contained herein. Skyworks may change its documentation, products, services, specifications or product descriptions at any time, without notice. Skyworks makes no commitment to update the materials or information and shall have no responsibility whatsoever for conflicts, incompatibilities, or other difficulties arising from any future changes.

No license, whether express, implied, by estoppel or otherwise, is granted to any intellectual property rights by this document. Skyworks assumes no liability for any materials, products or information provided hereunder, including the sale, distribution, reproduction or use of Skyworks products, information or materials, except as may be provided in Skyworks Terms and Conditions of Sale.

THE MATERIALS, PRODUCTS AND INFORMATION ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, INCLUDING FITNESS FOR A PARTICULAR PURPOSE OR USE, MERCHANTABILITY, PERFORMANCE, QUALITY OR NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT; ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED. SKYWORKS DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. SKYWORKS SHALL NOT BE LIABLE FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO ANY SPECIAL, INDIRECT, INCIDENTAL, STATUTORY, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS THAT MAY RESULT FROM THE USE OF THE MATERIALS OR INFORMATION, WHETHER OR NOT THE RECIPIENT OF MATERIALS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Skyworks products are not intended for use in medical, lifesaving or life-sustaining applications, or other equipment in which the failure of the Skyworks products could lead to personal injury, death, physical or environmental damage. Skyworks customers using or selling Skyworks products for use in such applications do so at their own risk and agree to fully indemnify Skyworks for any damages resulting from such improper use or sale.

Customers are responsible for their products and applications using Skyworks products, which may deviate from published specifications as a result of design defects, errors, or operation of products outside of published parameters or design specifications. Customers should include design and operating safeguards to minimize these and other risks. Skyworks assumes no liability for applications assistance, customer product design, or damage to any equipment resulting from the use of Skyworks products outside of stated published specifications or parameters.

Skyworks and the Skyworks symbol are trademarks or registered trademarks of Skyworks Solutions, Inc., in the United States and other countries. Third-party brands and names are for identification purposes only, and are the property of their respective owners. Additional information, including relevant terms and conditions, posted at www.skyworksinc.com, are incorporated by reference.