

DATA SHEET

SKY13286-359LF: GaAs High Isolation SPDT Absorptive Switch 100 MHz–6 GHz

Features

- Single positive voltage control (0/3 to 0/5 V)
- High isolation 64 dB at 1 GHz and 2 GHz
- Integrated silicon CMOS driver
- Absorptive
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

Description

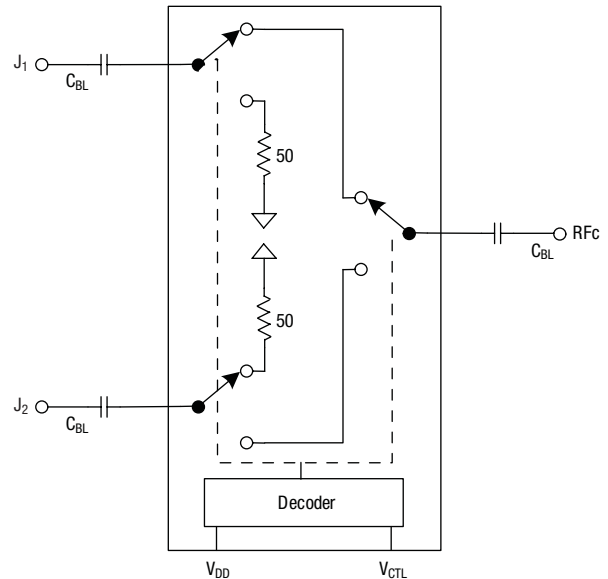
The SKY13286-359LF is a pHEMT GaAs FET IC high isolation absorptive switch packaged in a 16-lead exposed pad plastic package for low-cost commercial applications. It is an ideal building block for base station applications where synthesizer isolation is critical. Typical applications include GSM, PCS, WCDMA, 2.4 and 5.8 GHz ISM and wireless local loop.

An evaluation board is available upon request.

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



Functional Block Diagram



Electrical Specifications

$V_{CTL} = 0\text{ V}/3\text{ V}$, $V_{DD} = 5\text{ V}$, $T = 25\text{ °C}$, $P_{INPUT} = 0\text{ dBm}$, $Z_0 = 50\text{ }\Omega$, unless otherwise noted

Parameter	Frequency	Min.	Typ.	Max.	Unit
Insertion loss	0.1–2.0 GHz		0.8	1.10	dB
	2.0–3.0 GHz		0.8	1.25	dB
	3.0–4.0 GHz		1.0	1.35	dB
	4.0–6.0 GHz		1.5	1.80	dB
Isolation	0.1–2.0 GHz	60	62		dB
	2.0–3.0 GHz	58	62		dB
	3.0–4.0 GHz	55	58		dB
	4.0–6.0 GHz	40	42		dB
Return loss (insertion loss state) Lower frequency return loss is dependent on DC blocks	0.1–2.0 GHz	10	22		dB
	2.0–3.0 GHz	15	22		dB
	3.0–4.0 GHz	13	18		dB
	4.0–6.0 GHz	10	12		dB
Return loss (isolation state) Lower frequency return loss is dependent on DC blocks	0.5–2.0 GHz	10	12		dB
	2.0–3.0 GHz	12	15		dB
	3.0–4.0 GHz	12	15		dB
	4.0–6.0 GHz	11	13		dB

Operating Characteristics

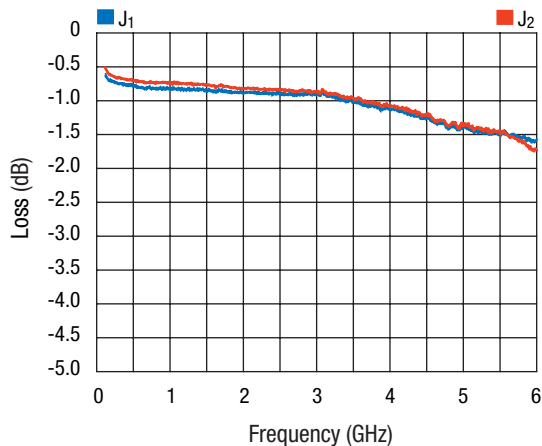
V_{CTL} = 0 V/3V, T = 25 °C, P_{INPUT} = 0 dBm, Z₀ = 50 Ω, unless otherwise noted

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics						
Rise, fall	10/90% or 90/10% RF			30		ns
On, off	50% CTL to 90/10% RF			50		ns
Video feedthru	T _{RISE} = 3 ns, Measurement BW = 500 MHz			25		mV
Input power for 1 dB compression	V _{DD} = 3 V V _{DD} = 5 V	0.7–2.0 GHz 0.7–2.0 GHz	26	23 30		dBm dBm
Intermodulation intercept point (IP3)	For two-tone input power 8 dBm/tone 1 MHz Spacing V _{DD} = 3.3 V V _{DD} = 5 V V _{DD} = 3.3 V V _{DD} = 5 V	0.7–1.0 GHz 0.7–1.0 GHz 1.0–2.0 GHz 1.0–2.0 GHz		49 47 43 46		dBm dBm dBm dBm
Control voltages ^(1,2)	V _{CTL} LOW V _{CTL} HIGH		0 2.7		0.5 V _{DD}	V V
Supply current	V _{DD} = 5 V				100	μA
Control current	V _{CTL} = LOW, V _{CTL} = HIGH			5		μA
Supply voltage			2.7		5	

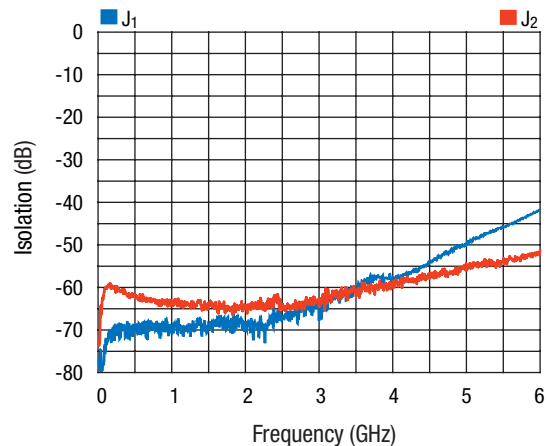
- V_{DD} must be powered on prior to a V_{CTL} high signal. A latch up condition may occur if a logic high signal is applied prior to the V_{DD} voltage.
- Control voltages switch the V_{DD} voltage to the GaAs switch.

Typical Performance Data

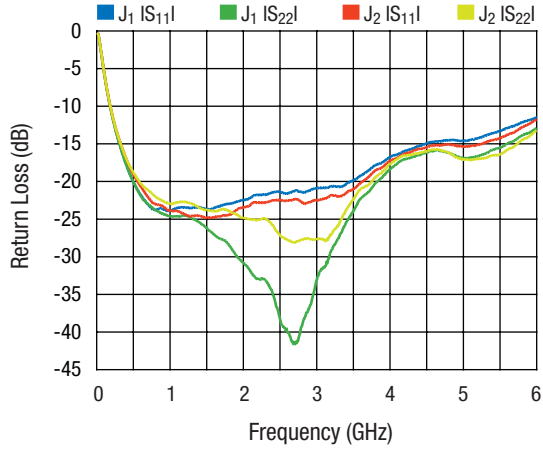
V_{CTL} = 0 V/3V, V_{DD} = 5 V, T = 25 °C, P_{INPUT} = 0 dBm, Z₀ = 50 Ω, unless otherwise noted



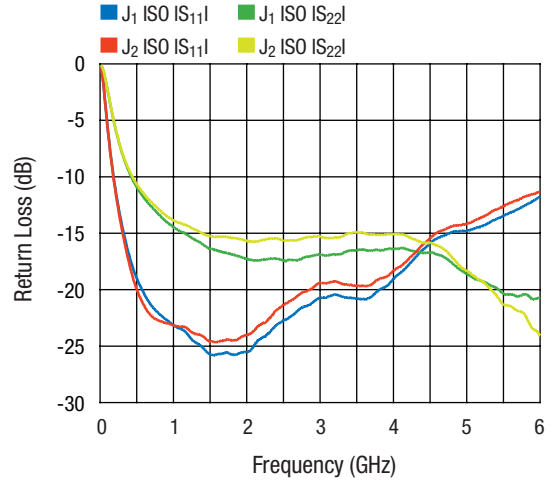
Insertion Loss vs. Frequency



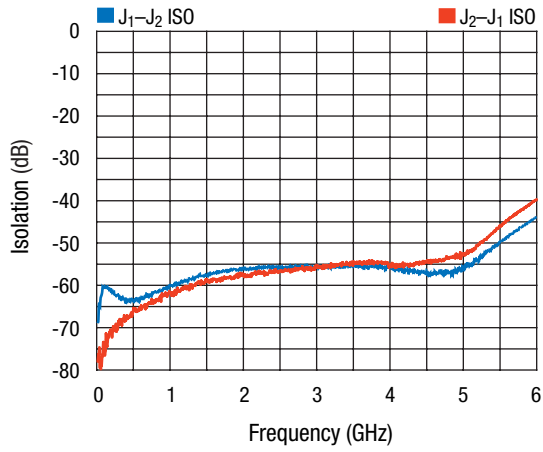
Isolation vs. Frequency



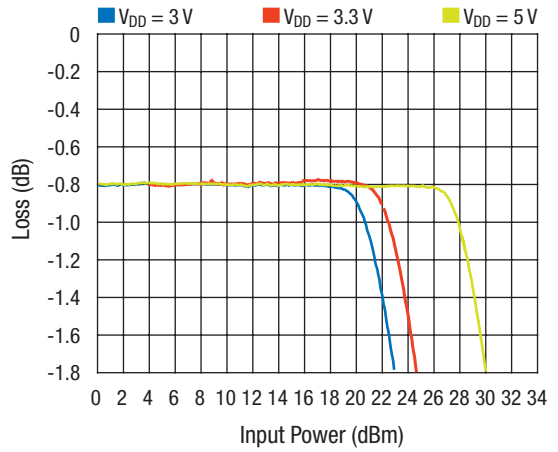
**Return Loss vs. Frequency
Insertion Loss State**



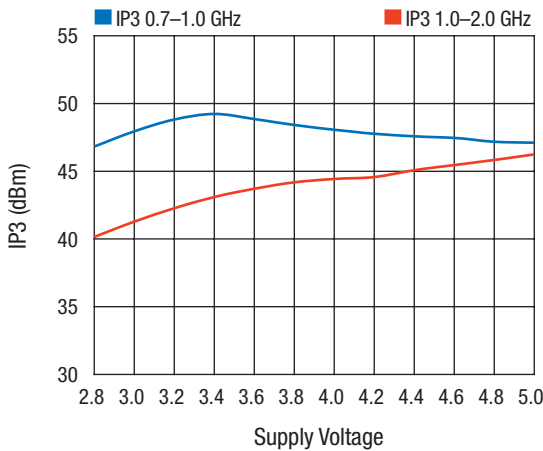
**Return Loss vs. Frequency
Isolation State**



Output to Output Isolation



**Insertion Loss vs. Input Power
vs. V_{DD} Voltage**



IP₃ vs. V_{DD} Supply Voltage

Truth Table

V _{CTL}	RFc-J ₁	RFc-J ₂
0	Insertion loss	Isolation
1	Isolation	Insertion loss

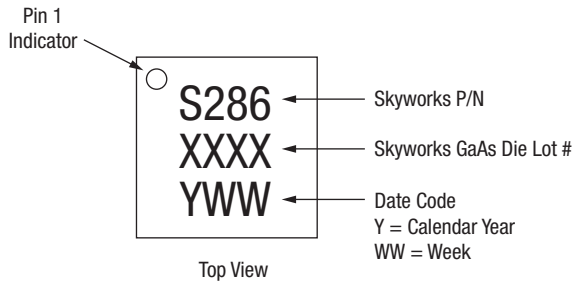
Absolute Maximum Ratings

Characteristic	Value
V _{DD} voltage range	2.7 ≤ V _{DD} ≤ 5.5 V
RF input power	1 W, f > 500 MHz
Operating temperature	-40 °C to +85 °C
Storage temperature	-65 °C to +150 °C

Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

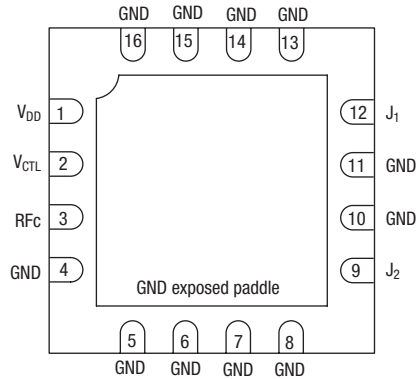
CAUTION: Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without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

Part Marking



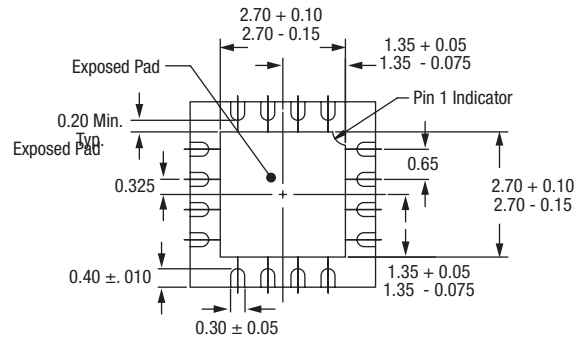
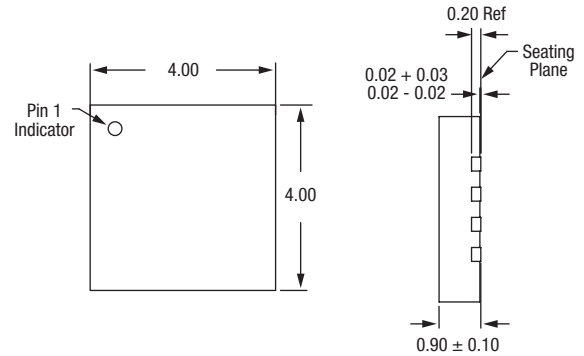
Pin Out (Top View)

“X-ray” of pads on bottom of package



DC blocking capacitors required on all RF lines (RFc, J₁, J₂).

Package Outline



Dimensions in mm.

Copyright © 2002, 2003, 2004, 2005, 2006, 2007, 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, the Skyworks symbol, and "Breakthrough Simplicity" 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.