

DATA SHEET

SKY13282-334: GaAs Control FET

300 kHz–2.5 GHz

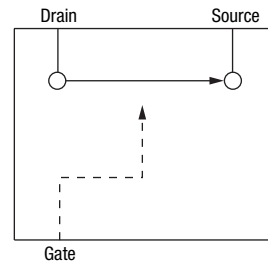
Applications

- Building block for series and shunt switches
- General purpose medium power switch in telecommunications applications

Features

- Low-cost LGA-6 package
- Series or shunt configuration
- Low DC current drain
- Pin to Pin diode replacement
- Available lead (Pb)-free and RoHS-compliant

Functional Block Diagram



Description

The SKY13282-334 is a GaAs control FET that can be used in both series and shunt configurations. It incorporates on chip circuitry that eliminates the need for extra bias components and minimizes power drain to typically 25 μ W. These features make the device an ideal replacement for PIN diodes, where low DC drain is critical.

An evaluation board is available upon request.

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



Electrical Specifications at 25 °C

$V_{CTL} = 0\text{ V/-7 V}$, $T = 25\text{ °C}$, $P_{INPUT} = 0\text{ dBm}$, $Z_0 = 50\ \Omega$, unless otherwise noted

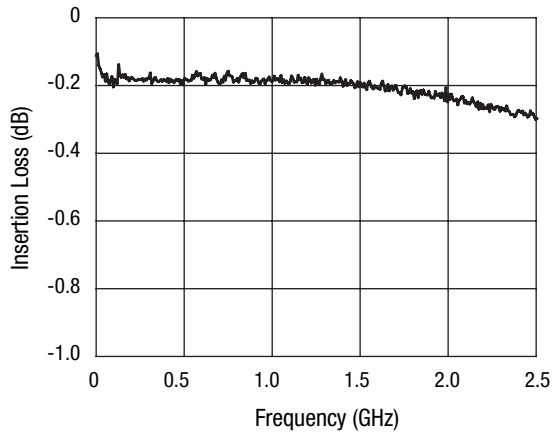
Parameter	Frequency	Min.	Typ.	Max.	Unit
Insertion loss series configuration	300 kHz–0.5 GHz		0.20	0.30	dB
	0.5–1.0 GHz		0.25	0.35	dB
	1.0–2.5 GHz		0.30	0.40	dB
Isolation series configuration	300 kHz–0.5 GHz	9	11		dB
	0.5–1.0 GHz	4	6		dB
	1.0–2.5 GHz		2		dB
Insertion loss shunt configuration	300 kHz–0.5 GHz		0.15	0.25	dB
	0.5–1.0 GHz		0.40	0.50	dB
	1.0–2.5 GHz		1.50		dB
Isolation shunt configuration	300 kHz–0.5 GHz	11	13		dB
	0.5–1.0 GHz	5	7		dB
	1.0–2.5 GHz		3		dB

Operating Characteristics at 25 °C

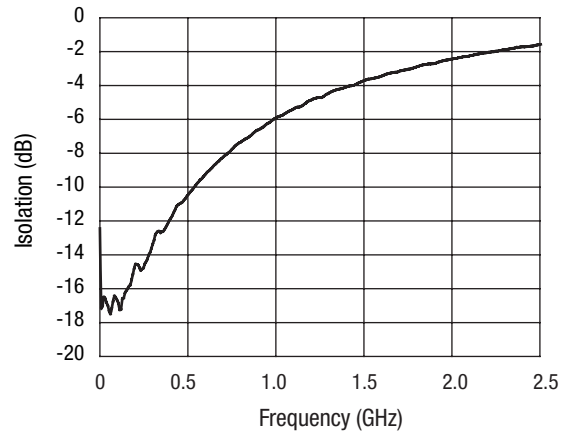
V_{CTL} = 0 V/5V, T = 25 °C, P_{INPUT} = 0 dBm, Z₀ = 50 Ω, unless otherwise noted

Parameter	Condition	Min.	Typ.	Max.	Unit
R _{ON} (Ω)	Gate voltage = 0 V for negative operation		0.5	1.1	Ω
	Gate voltage = 7 V for positive operation		0.5	1.1	Ω
C _{OFF} (pF)	Gate voltage = -7 V for negative operation		1.1		pF
	Gate voltage = 0 V for positive operation		1.1		pF
P ₁ dB	Series configuration, insertion loss state (0 V) 20 MHz		25		dBm
	Series configuration, insertion loss state (0 V) 380 MHz		>35		dBm
	Shunt configuration, insertion loss state (-7 V) 20 MHz		26		dBm
	Shunt configuration, insertion loss state (-7 V) 380 MHz		28		dBm
IP3	Series configuration Insertion loss state (0 V) t1 = 45 MHz, t2 = 46 MHz @ 10 dBm/tone		>43		dBm
	Shunt configuration Insertion loss state (-7 V) t1 = 45 MHz, t2 = 46 MHz @ 10 dBm/tone		>43		dBm
Switching speed	On/off time (50% CTL to 90/10% RF)		25		ns
	Rise/fall (10/90% RF, 90/10% RF)		15		ns
	Video feedthru		40		mv
Control voltage	Negative voltage operation V _{LOW}	-5		-9	V
	V _{HIGH}	0		0.2	V
	Positive voltage operation V _{LOW}	0		0.2	V
	V _{HIGH}	5		9	V
Control current	0 V		20		uA
	-5 V or +5 V		50		uA
	-9 V or +9 V		200		uA

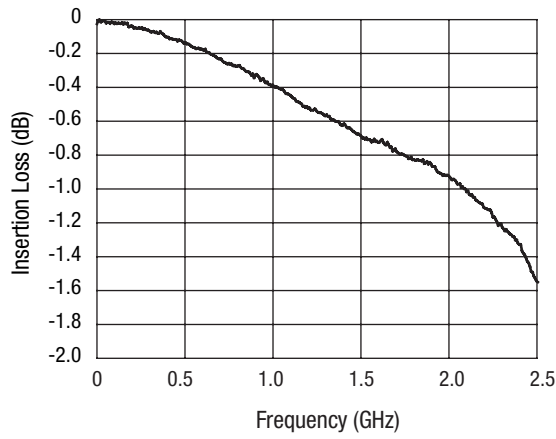
Typical Performance Data



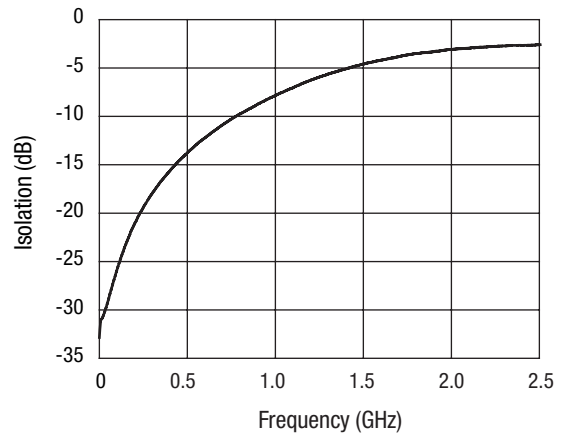
**Insertion Loss vs. Frequency
Series Configuration**



**Isolation vs. Frequency
Series Configuration**



**Insertion Loss vs. Frequency
Shunt Configuration**



**Isolation vs. Frequency
Shunt Configuration**

Absolute Maximum Ratings

Characteristic	Value
RF input power, series configuration, insertion loss state, $V_{CTL} = 0\text{ V}$, freq. = 380 MHz	37 dBm
RF input power, shunt configuration, insertion loss state, $V_{CTL} = -7\text{ V}$, freq. = 380 MHz	33 dBm
Control voltage range	12 V max. differential
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.

Truth Table

Negative Voltage Operation

S	D	G	RF Path
Shunt			
GND	RF	-5	Insertion loss
		0	Isolation
Series			
RF	RF	0	Insertion loss
		-5	Isolation

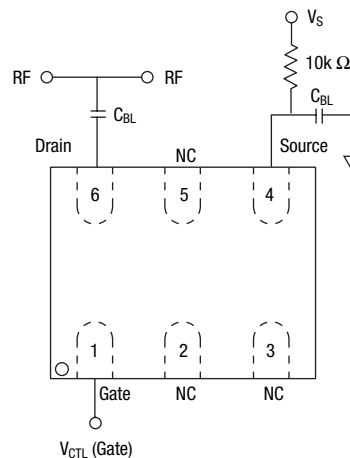
Positive Voltage Operation

S	D	G	RF Path
Shunt			
GND	RF	0	Insertion loss
		V_{HIGH}	Isolation
Series			
RF	RF	0	Isolation
		V_{HIGH}	Insertion loss

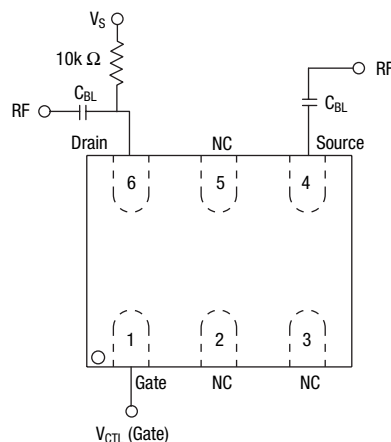
$V_{HIGH} = 5\text{ to }9\text{ V}$ ($V_S = V_{HIGH} \pm 0.2\text{ V}$).

Positive Voltage Operation

Shunt Configuration

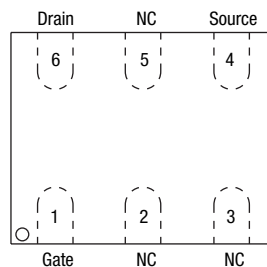


Series Configuration

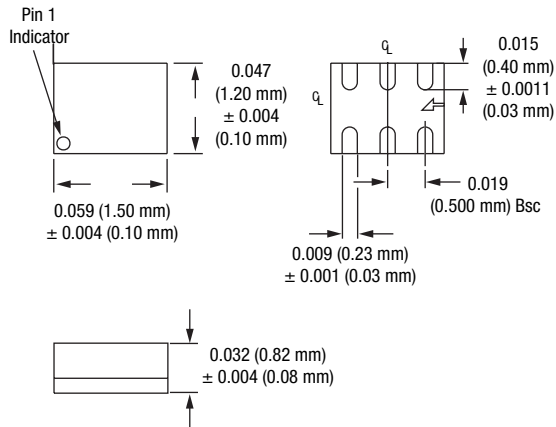


C_{BL} DC blocks are required on RF lines for positive voltage operation.

Pin Out (Top View)



LGA-6 (1.5 x 1.2 mm)



Recommended Solder Reflow Profiles

Refer to the [“Recommended Solder Reflow Profile”](#) Application Note.

Tape and Reel Information

Refer to the [“Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation”](#) Application Note.

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.