

**DATA SHEET**

# **SKY13282-334: GaAs Control FET**

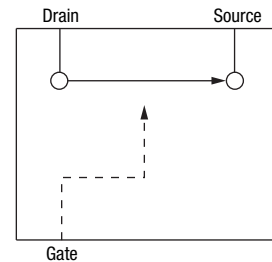
## **300 kHz–2.5 GHz**

**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
- Lead (Pb)-free, RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

**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  $\mu$ 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.

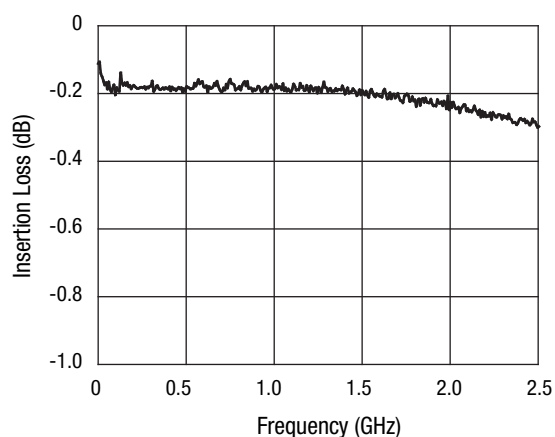

**Electrical Specifications at 25 °C**

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

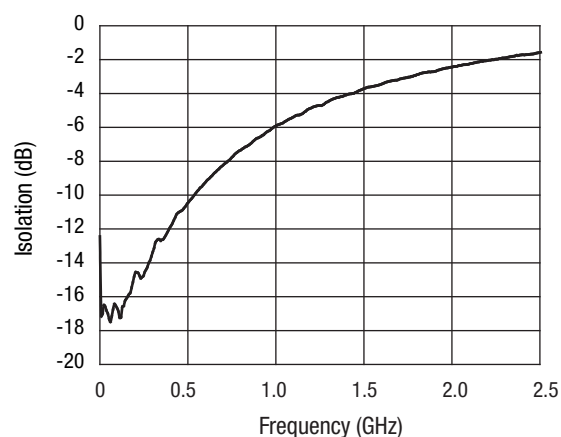
Parameter	Frequency	Min.	Typ.	Max.	Unit
Insertion loss series configuration	300 kHz–0.5 GHz		0.20	0.30	dB
	0.5–1.0 GHz		0.25	0.35	dB
	1.0–2.5 GHz		0.30	0.40	dB
Isolation series configuration	300 kHz–0.5 GHz	9	11		dB
	0.5–1.0 GHz	4	6		dB
	1.0–2.5 GHz		2		dB
Insertion loss shunt configuration	300 kHz–0.5 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** **$V_{CTL} = 0\text{ V}/5\text{ V}$ ,  $T = 25\text{ °C}$ ,  $P_{INPUT} = 0\text{ dBm}$ ,  $Z_0 = 50\text{ }\Omega$ , unless otherwise noted**

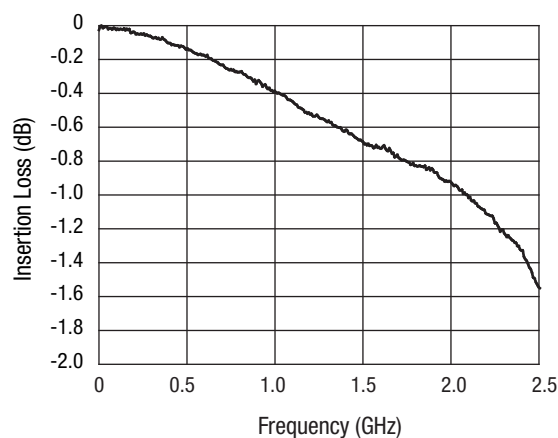
Parameter	Condition	Min.	Typ.	Max.	Unit
$R_{ON}$ ( $\Omega$ )	Gate voltage = 0 V for negative operation		0.5	1.1	$\Omega$
	Gate voltage = 7 V for positive operation		0.5	1.1	$\Omega$
$C_{OFF}$ (pF)	Gate voltage = -7 V for negative operation		1.1		pF
	Gate voltage = 0 V for positive operation		1.1		pF
$P_1$ 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) $t_1 = 45\text{ MHz}$ , $t_2 = 46\text{ MHz}$ @ 10 dBm/tone		>43		dBm
	Shunt configuration				
	Insertion loss state (-7 V) $t_1 = 45\text{ MHz}$ , $t_2 = 46\text{ MHz}$ @ 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		$\mu\text{A}$
	-5 V or +5 V		50		$\mu\text{A}$
	-9 V or +9 V		200		$\mu\text{A}$

**Typical Performance Data**

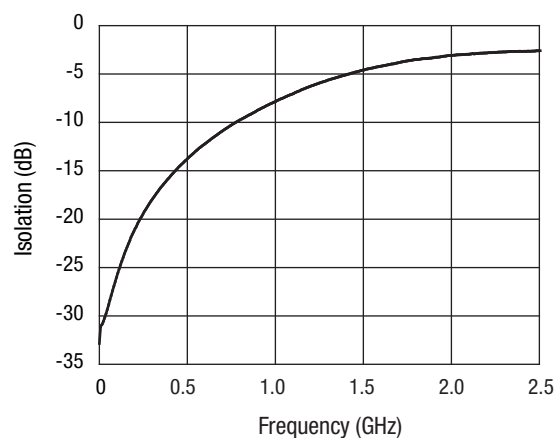
**Insertion Loss vs. Frequency  
Series Configuration**



**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

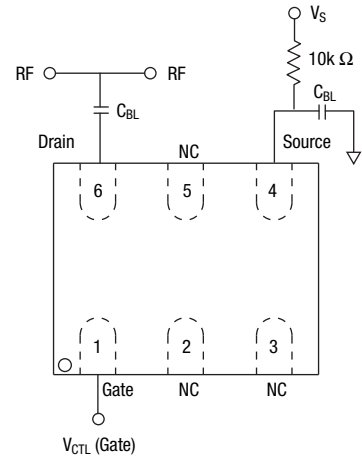
Positive Voltage Operation

S	D	G	RF Path
Shunt			
GND	RF	0	Insertion loss
		V <sub>HIGH</sub>	Isolation
Series			
RF	RF	0	Isolation
		V <sub>HIGH</sub>	Insertion loss

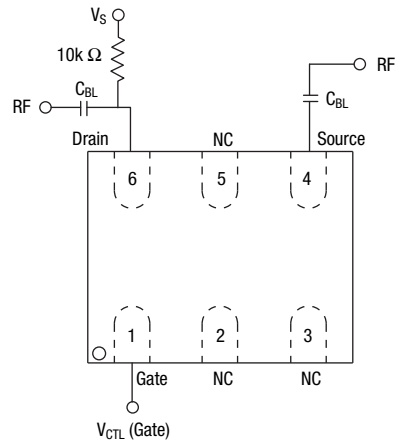
$V_{HIGH} = 5\text{ to }9\text{ V}$  ( $V_S = V_{HIGH} \pm 0.2\text{ V}$ ).

Positive Voltage Operation

Shunt Configuration

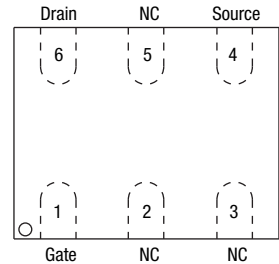


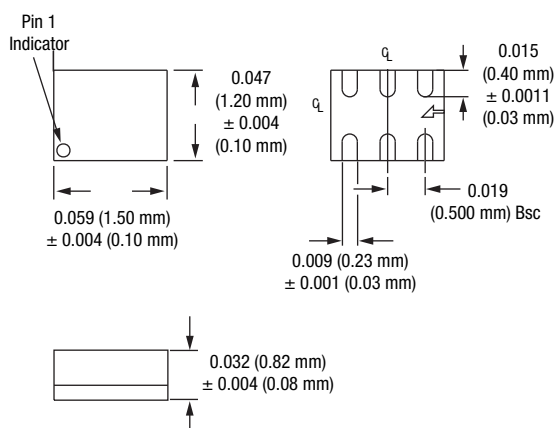
Series Configuration



$C_{BL}$  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.

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