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

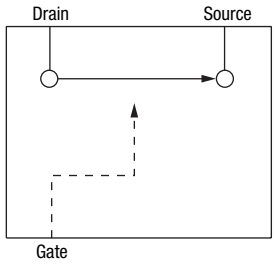
Description

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 µW. 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.

Functional Block Diagram



Electrical Specifications at 25 °C

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

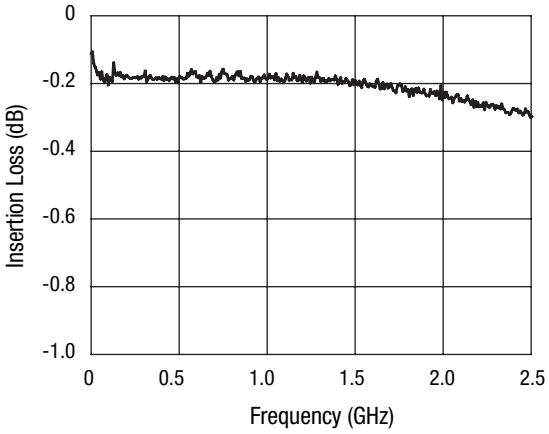
Parameter	Frequency	Min.	Typ.	Max.	Unit
Insertion loss series configuration	300 kHz–0.5 GHz		0.20	0.30	dB
	0.5–1.0 GHz		0.25	0.35	dB
	1.0–2.5 GHz		0.30	0.40	dB
Isolation series configuration	300 kHz–0.5 GHz	9	11		dB
	0.5–1.0 GHz	4	6		dB
	1.0–2.5 GHz		2		dB
Insertion loss shunt configuration	300 kHz–0.5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

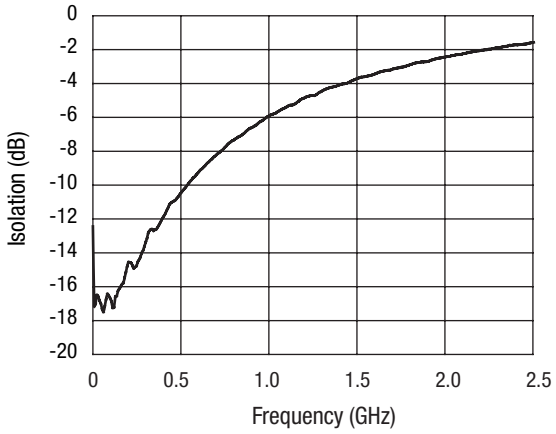
V_{CTL} = 0 V/5V, T = 25 °C, P_{INPUT} = 0 dBm, Z_0 = 50 Ω, unless otherwise noted

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

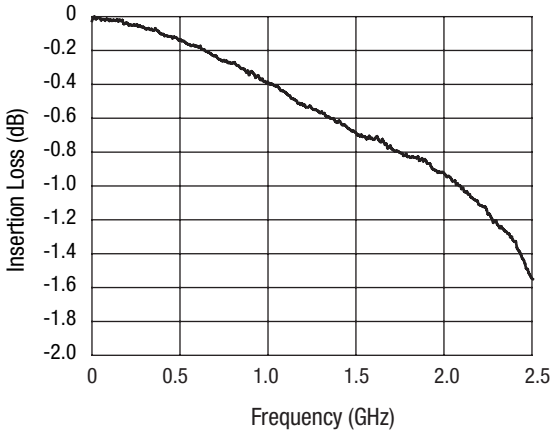
Typical Performance Data



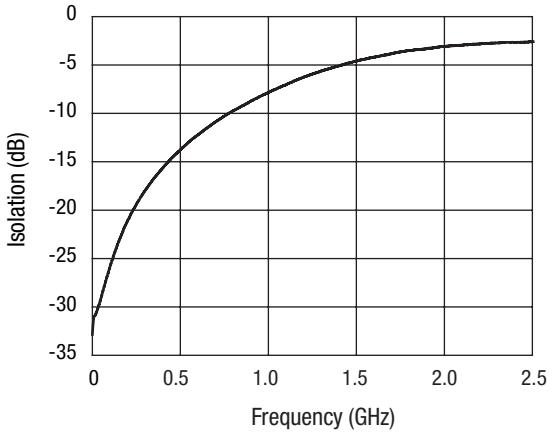
Insertion Loss vs. Frequency
Series Configuration



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 V, freq. = 380 MHz	37 dBm
RF input power, shunt configuration, insertion loss state, V_{CTL}= -7 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

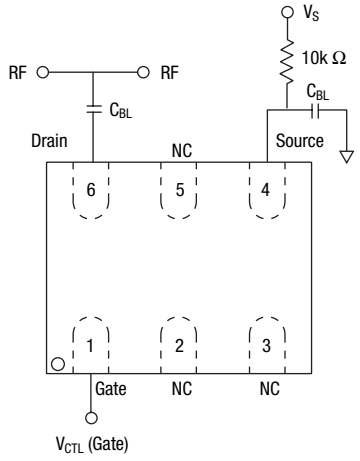
Positive Voltage Operation

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

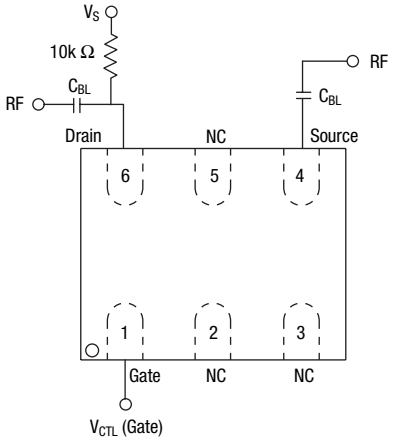
V_{HIGH} = 5 to 9 V (V_S = V_{HIGH} ± 0.2 V).

Positive Voltage Operation

Shunt Configuration

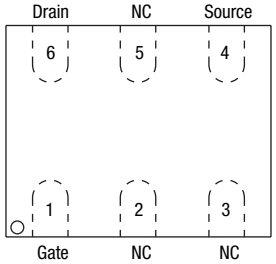


Series Configuration

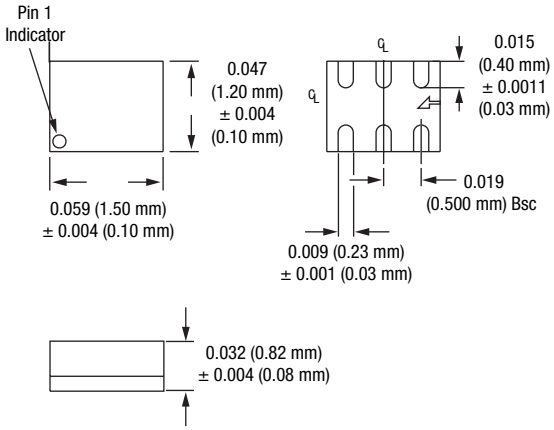


C_{BL} DC blocks are required on RF lines for positive voltage operation.

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.