

**DATA SHEET**

# SKY13268-344LF: 300 kHz–3 GHz Medium Power GaAs SPDT Switch

## Applications

- Transceiver transmit-receive switching in GSM, CDMA, WCDMA, WLAN, Bluetooth®, Zigbee®, land mobile radio base stations or terminal equipment
- General-purpose medium power switch in telecommunications applications

## Features

- Broadband: 300 kHz–3 GHz
- Low insertion loss: 0.3 dB @ 900 MHz
- $P_{1\text{ dB}}$ : 30 dBm typical @ 3 V
- Low distortion: IP3 43 dBm @ 3 V
- Low current consumption: < 100  $\mu\text{A}$  @ 3 V
- Ultraminiature SOT-666 6-lead package
- Available lead (Pb)-free, RoHS-compliant, and Green MSL-1 @ 260 °C per JEDEC J-STD-020

## Description

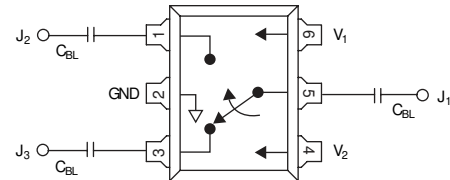
The SKY13268-344LF is a monolithic SPDT switch, fabricated using Skyworks proprietary GaAs pHEMTs as the switching elements. This wideband switch operates with RF signals from 300 kHz to 3 GHz. The RF signal paths within the SKY13268-344LF are fully bilateral. Ports  $J_2$  and  $J_3$ , RF input/output terminals are reflective.

Switching is controlled via two control voltage inputs, which are compatible with CMOS logic levels. Depending upon the logic voltage level applied to the control voltage pin, the common RF pin,  $J_1$ , is connected to one of two switched RF pins ( $J_2$  or  $J_3$ ) via a low insertion loss path, while the path between the RF common and the other RF pin is in its high-isolation state.

DC power consumption is very low, 100  $\mu\text{A}$  maximum with control voltage of 3 V. The switch can operate over the temperature range of -40 °C to +95 °C.

An evaluation board is available upon request.

## Pin Out



DC blocking capacitors ( $C_{BL}$ ) must be supplied externally for positive voltage operation.  $C_{BL} = 100$  pF for operation >500 MHz.



Skyworks Green products are lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant, conform to the EIA/EICTA/JEITA Joint Industry Guide (JIG) Level A guidelines, and are free from antimony trioxide and brominated flame retardants.

## Electrical Specifications

**V<sub>CTL</sub> = 0 V/3 V, T = 25 °C, P<sub>INPUT</sub> = 0 dBm, Z<sub>0</sub> = 50 Ω, unless otherwise noted**

Parameter	Frequency	Min.	Typ.	Max.	Unit
Insertion loss	300 kHz–1 GHz		0.3	0.4	dB
	1–2 GHz		0.4	0.5	dB
	2–3 GHz		0.4	0.6	dB
Isolation	300 kHz–1 GHz	20	25		dB
	1–2 GHz	20	25		dB
	2–3 GHz	20	23		dB
VSWR	300 kHz–1 GHz		1.3:1	1.4:1	
	1–2 GHz		1.3:1	1.4:1	
	2–3 GHz		1.3:1	1.4:1	

## Operating Characteristics

**V<sub>CTL</sub> = 0 V/3 V, T = 25 °C, P<sub>INPUT</sub> = 0 dBm, Z<sub>0</sub> = 50 Ω, unless otherwise noted**

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics						
Rise, fall	10/90% or 90/10% RF			36		ns
On, off	50% CTL to 90/10% RF			58		ns
Video feedthru	T <sub>RISE</sub> = 1 ns, BW = 500 MHz			25		mV
Input power for 1 dB compression	V <sub>LOW</sub> = 0 V, V <sub>HIGH</sub> = 3 V	0.5–3 GHz		30		dBm
	V <sub>LOW</sub> = 0 V, V <sub>HIGH</sub> = 5 V	0.5–3 GHz		34		dBm
Intermodulation intercept point (IP3)	For two-tone input power 5 dBm					
	V <sub>LOW</sub> = 0 V, V <sub>HIGH</sub> = 3 V V <sub>LOW</sub> = 0 V, V <sub>HIGH</sub> = 5 V	0.5–3 GHz 0.5–3 GHz		43 50		dBm dBm
Thermal resistance				25		°C/W
Control voltages	V <sub>LOW</sub> = 0 V @ 20 μA max. V <sub>HIGH</sub> = 3 V @ 100 μA max. to 5 V @ 200 μA max.					

## Absolute Maximum Ratings

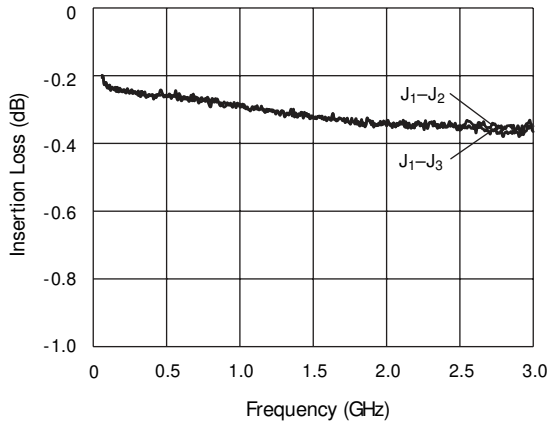
Characteristic	Value
Control voltage range	-0.2 V <sub>C</sub> to 8 V
RF input power	1 W for f < 500 MHz, 6 W for f > 500 MHz, V <sub>CTL</sub> = 0/7 V
Storage temperature range	-65 °C to +150 °C
Operating temperature range	-40 °C to +95 °C

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.

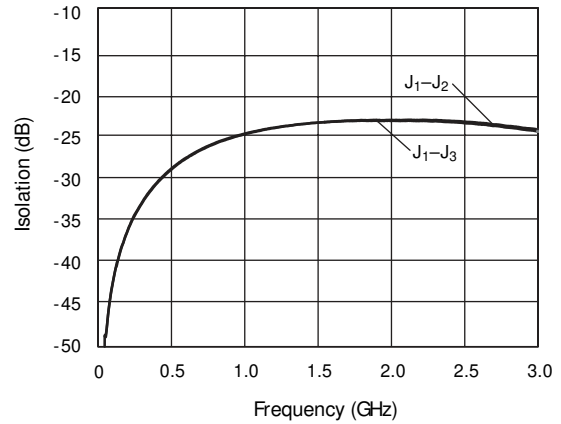
**CAUTION:** *Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge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

### Typical Performance Data

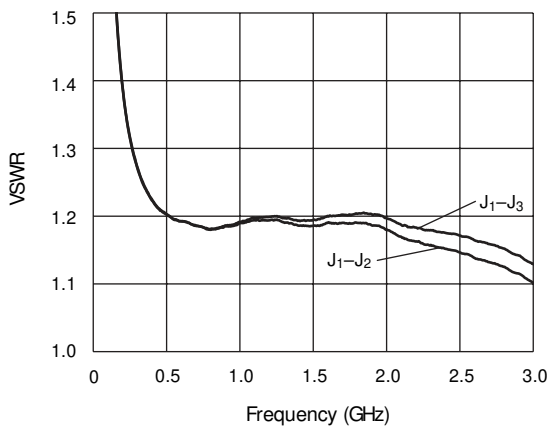
$V_{CTL} = 0$  V/3 V,  $T = 25$  °C,  $Z_0 = 50$   $\Omega$ , unless otherwise noted



Insertion Loss vs. Frequency



Isolation vs. Frequency



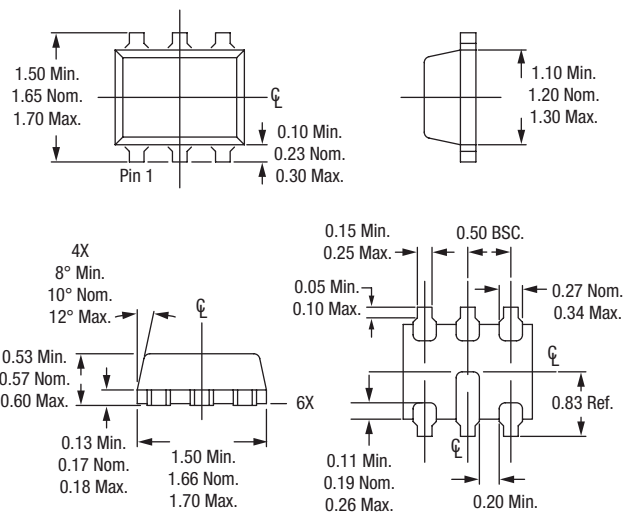
VSWR vs. Frequency

### Truth Table

$V_1$	$V_2$	J <sub>1</sub> -J <sub>2</sub>	J <sub>1</sub> -J <sub>3</sub>
$V_{HIGH}$	0	Isolation	Insertion loss
0	$V_{HIGH}$	Insertion loss	Isolation
0	0	Not recommended	Not recommended
$V_{HIGH}$	$V_{HIGH}$	Not recommended	Not recommended

3 V  $\square$   $V_{HIGH}$   $\square$  5 V.

### SOT-666 Package Outline



All dimensions are in mm.  
 Package outline exclusive of mold flash and metal burr.  
 Package outline inclusive of plating.  
 Maximum webbing flash remain 0.075 mm.  
 Plating requirement per Source Control Drawing (SCD) 2504.

### 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.

### Pin Descriptions

Pin Number	Pin Name	Description
1	J <sub>2</sub>	RF input/output – RF input or output port which is either connected via a low insertion loss path to RF common (J <sub>1</sub> ) or isolated from RF common, according to the logic levels applied to V <sub>1</sub> and V <sub>2</sub>
2	GND	Equipotential point – Equipotential point for control voltage and RF circuits. Must be connected to PCB ground via lowest possible impedance
3	J <sub>3</sub>	RF input/output – RF input or output port which is either connected via a low insertion loss path to RF common (J <sub>1</sub> ) or isolated from RF common, according to the logic levels applied to V <sub>1</sub> and V <sub>2</sub>
4	V <sub>2</sub>	Control voltage – Control voltage input #2
5	J <sub>1</sub>	RF common input/output – RF input/output port that is connected via low insertion loss path to either RF1 or RF2, depending upon the voltage applied to control voltage pin
6	V <sub>1</sub>	Control voltage – Control voltage input #1

### Evaluation Board

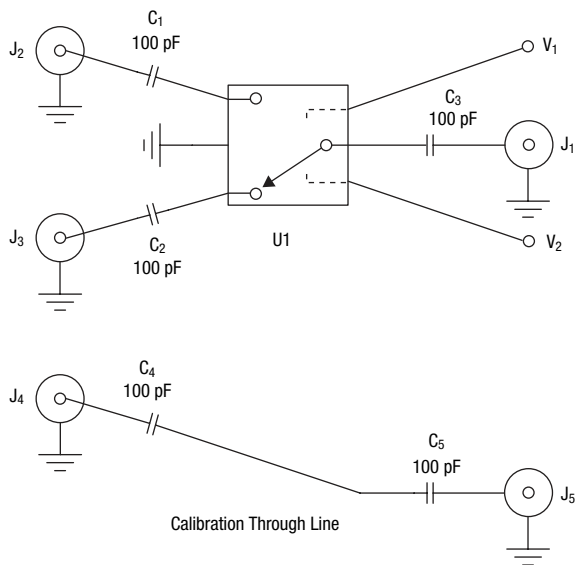
The evaluation board for SKY13268-344LF allows the part to be fully exercised. The insertion loss of the transmission lines between J<sub>1</sub>- U1 and U1 - J<sub>2</sub>/J<sub>3</sub> can be determined by measuring the performance of the calibration through-line, which contains two DC block capacitors in identical positions to the DC blocks present in the main circuit.

The state of the SKY13268-344LF is controlled by applying the appropriate logic level voltages to ports V<sub>1</sub> and V<sub>2</sub>, per the Truth Table.

### Evaluation Board Components

Component	Description	Default
C <sub>1</sub> -C <sub>5</sub>	DC blocking capacitor	100 pF, size 0402
U1	SKY13268-344 GaAs SPDT	
J <sub>1</sub> , J <sub>2</sub> , J <sub>3</sub> , J <sub>4</sub> , J <sub>5</sub>	SMA connectors	

### SKY13268-344LF Evaluation Circuit



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