

DATA SHEET

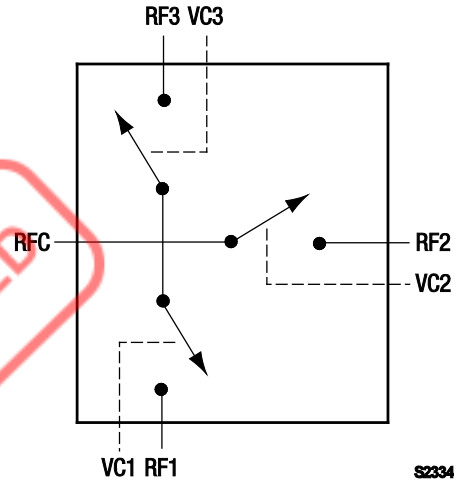
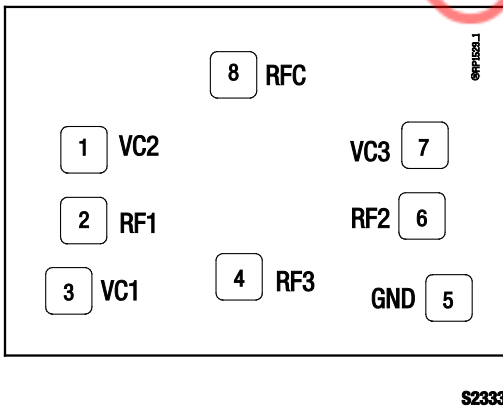
SKY13398-000: 0.02 – 6.0 GHz pHEMT GaAs SP3T Switch

Applications

- 802.11 a/b/g/n WLAN networks
- For devices that support Bluetooth® signals

Features

- Positive low voltage control: 0/1.8 to 5.0 V
- Low insertion loss: 0.8 dB @ 2.5 GHz
- Excellent linearity performance: P1dB = +33 dBm
- Advanced pHEMT process
- Bare pHEMT die: 650 x 450 x 127 μ m
- For RoHS and other product compliance information, see the [Skyworks Certificate of Conformance](#)


Figure 1. SKY13398-000 Block Diagram

Figure 2. SKY13398-000 Pinout (Top View)
Description

The SKY13398-000 is a GaAs pHEMT Single-Pole, Triple-Throw (SP3T) antenna switch that operates in the 0.1 to 6.0 GHz frequency range. Switching between the antenna (RFC signal) and the RF1, RF2, and RF3 ports is accomplished with three control voltages (VC1, VC2, and VC3). This switch is a reflective short when in the isolation state.

The low loss, high isolation, high linearity, small size, and low cost make this switch ideal for all WLANs and devices that support Bluetooth® signals operating in the 2.4 to 2.5 and 4.9 to 5.9 GHz bands.

The SKY13398-000 is provided as a bare die in an ultra-compact 650 x 450 x 127 μ m design. A functional block diagram is shown in Figure 1. The pin configuration and package are shown in Figure 2. Signal pin assignments and functional pin descriptions are provided in Table 1.

Table 1. SKY13398-000 Signal Descriptions

Pin #	Name	Description	Pin #	Name	Description
1	VC2	Switch logic control (see Table 4)	5	GND	Ground
2	RF1	RF port 1. DC blocking capacitor required.	6	RF2	RF port 2. DC blocking capacitor required.
3	VC1	Switch logic control (see Table 4)	7	VC3	Switch logic control (see Table 4)
4	RF3	RF port 3. DC blocking capacitor required.	8	RFC	Antenna. DC blocking capacitor required.

Table 2. SKY13398-000 Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Control voltage (VC1, VC2, VC3)	V _{CC}		+6	V
RF input power	P _{IN}		+33	dBm
Operating temperature	T _{OP}	−40	+85	°C
Storage temperature	T _{STG}	−65	+150	°C

Note: Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.

ESD HANDLING: Industry-standard ESD handling precautions must be adhered to at all times to avoid damage to this device.

Electrical and Mechanical Specifications

The absolute maximum ratings of the SKY13398-000 are provided in Table 2. Electrical specifications are provided in Table 3.

Typical performance characteristics of the SKY13398-000 are illustrated in Figures 3 through 6.

The state of the SKY13398-000 is determined by the logic provided in Table 4.

Table 3. SKY13398-000 Electrical Specifications (Note 1)
($V_{HIGH} = 3.3\text{ V}$, $T_{OP} = +25\text{ }^{\circ}\text{C}$, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
Insertion loss	IL	RFC to RF1, RF2, RF3 0.02 to 1.0 GHz 1.0 to 2.5 GHz 2.5 to 6.0 GHz		0.55 0.80 1.50	0.70 0.90 1.80	dB dB dB
Isolation	ISO	RFC to RF1, RF2, RF3 0.02 to 1.0 GHz 1.0 to 2.5 GHz 2.5 to 6.0 GHz	25 18 12	27 20 15		dB dB dB
Return loss (insertion loss state)	RL	RFC to RF1, RF2, RF3 0.02 to 1.0 GHz 1.0 to 2.5 GHz 2.5 to 6.0 GHz	20 15 13	22 18 15		dB dB dB
Switching speed		50% control to 90/10% RF		50		ns
Harmonics, 2 nd , 3 rd , 4 th	2fo, 3fo, 4fo	$P_{IN} = +20\text{ dBm}$		-70		dBc
1 dB Input Compression Point	IP1dB	@ 2450 MHz		+33		dBm
3 rd Order Input Intercept Point	IIP3	@ 2450 MHz, $\Delta f = 1\text{ MHz}$, $P_{IN} = +17\text{ dBm/ tone}$, $V_{LOW} = 0\text{ V}$, $V_{HIGH} = 3.3\text{ V}$		+50		dBm
Current leakage		$V_{CTL} = 3.3\text{ V}$		50		μA
Control voltage: Low High	V_{CTL}		0 1.8		0.2 5.0	V V

Note 1: Performance is guaranteed only under the conditions listed in this table.

Typical Performance Characteristics

(RFC to RF1/RF2/RF3 [0, 3.3 V], $T_{OP} = +25\text{ }^{\circ}\text{C}$, Characteristic Impedance [Z_0] = 50 Ω , Performance Includes Wirebond Inductance, Unless Otherwise Noted)

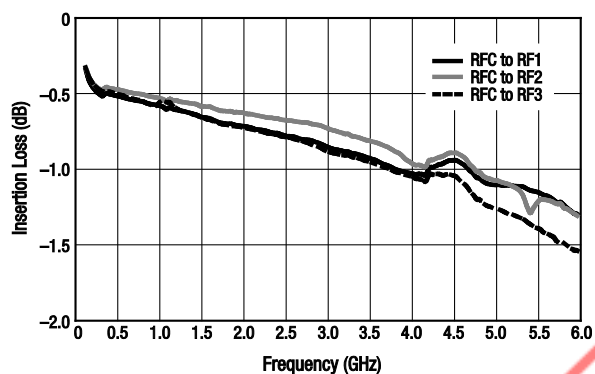
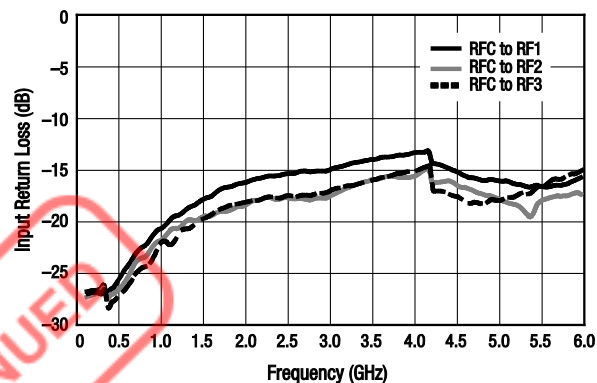
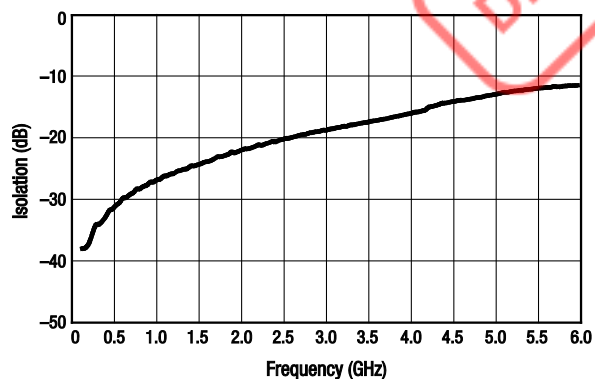
**Figure 3. Insertion Loss vs Frequency****Figure 4. Input Return Loss vs Frequency
(Insertion Loss State, $V_{CTL} = 3.0\text{ V}$)****Figure 5. Isolation vs Frequency****Figure 6. Normalized Insertion Loss vs Input Power**

Table 4. SKY13398-000 Truth Table

VC1 (Pin 3)	VC2 (Pin 1)	VC3 (Pin 7)	Low Insertion Loss Path
High	Low	Low	RFC to RF1
Low	High	Low	RFC to RF2
Low	Low	High	RFC to RF3

Note: High = 1.8 V to 5.0 V. Low = 0 V to 0.2 V. Any state other than described in this table places the switch into an undefined state. An undefined state will not damage the device.

Evaluation Board Description

The SKY13398-000 Evaluation Board is used to test the performance of the SKY13398-000 SP3T Switch. An Evaluation Board schematic diagram is provided in Figure 7. An assembly drawing for the Evaluation Board is shown in Figure 8.

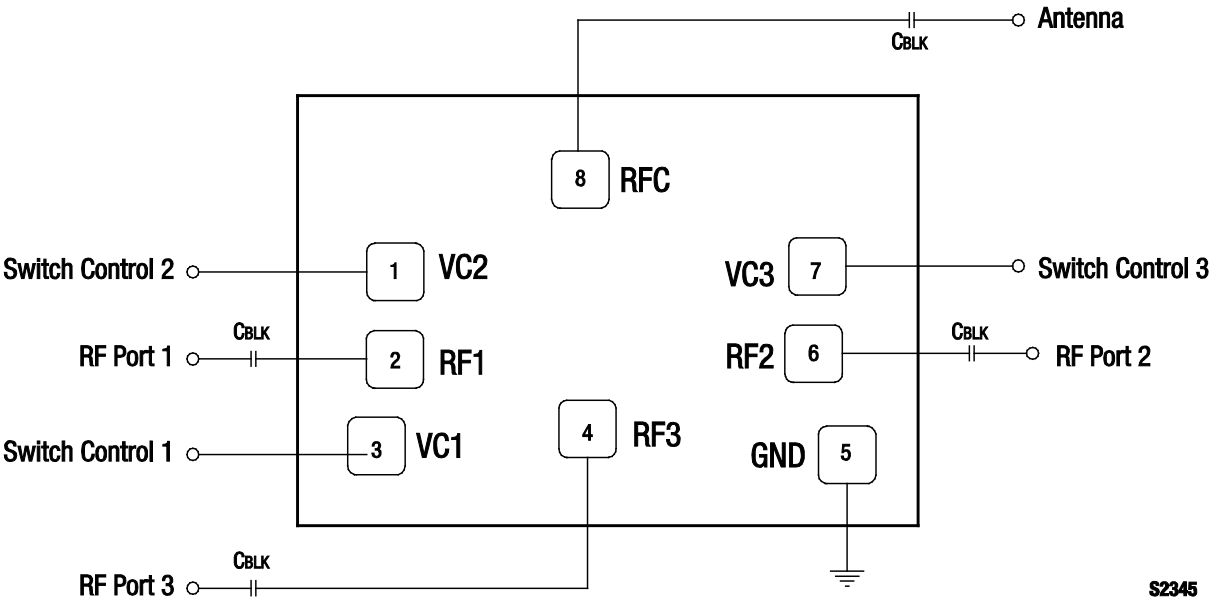
Package Dimensions

Package dimensions for the SKY13398-000 die are shown in Figure 9. The SKY13398-000 is shipped on a grip ring as illustrated in Figure 10.

Package and Handling Information

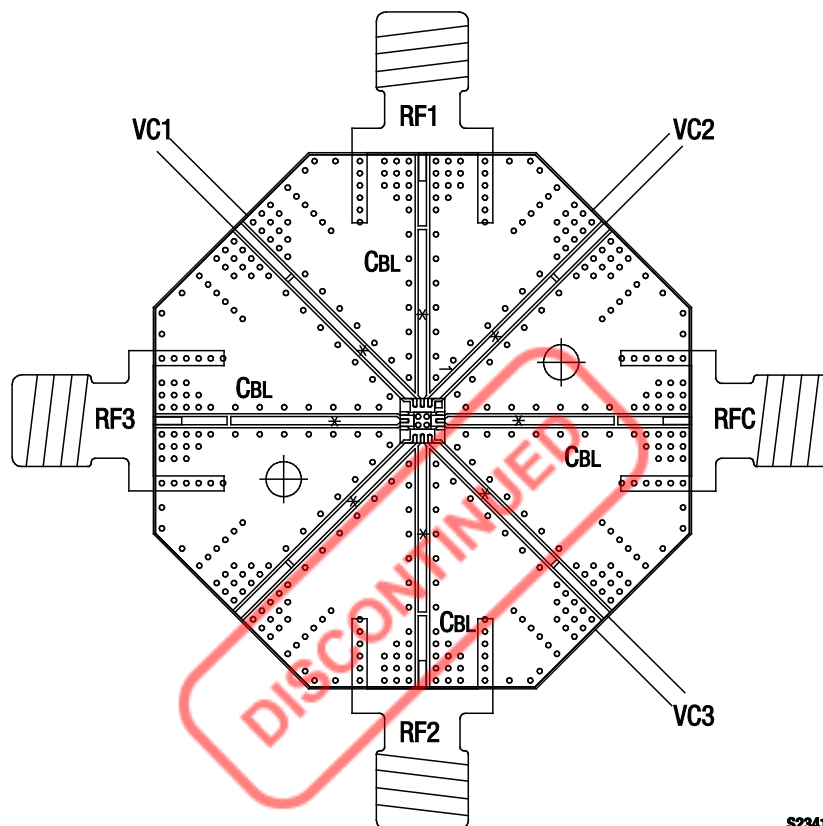
Instructions on the shipping container label regarding exposure to moisture after the container seal is broken must be followed. Otherwise, problems related to moisture absorption may occur when the part is subjected to high temperature during solder assembly.

The SKY13398-000 has no backside metal and must be attached using conductive or non-conductive epoxy.



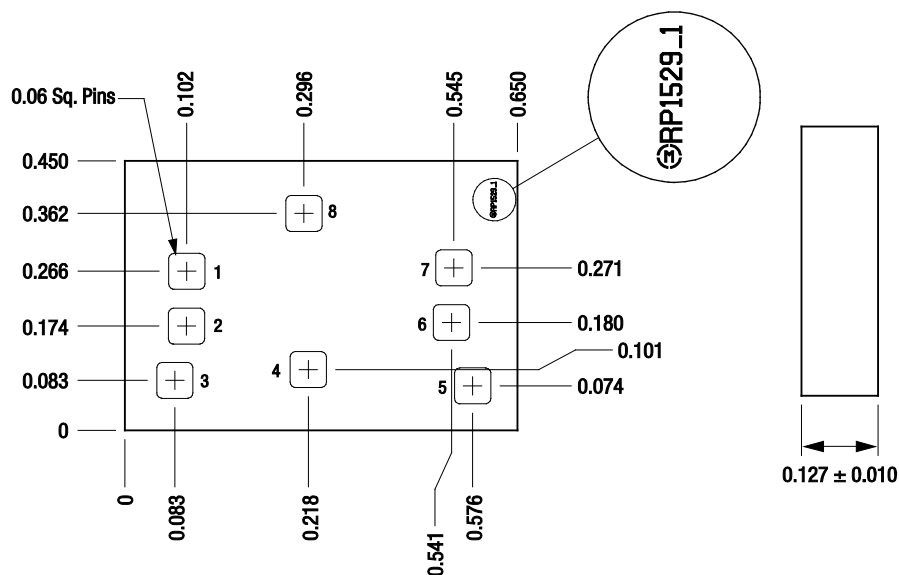
S2345

Figure 7. SKY13398-000 Evaluation Board Schematic



S2341

Figure 8. SKY13398-000 Evaluation Board Assembly Diagram



Notes:
1. Bond pad metallization: Gold
2. Backside metallization: None
3. All measurements are in millimeters

S2332

Figure 9. SKY13398-000 8-Pin Package Dimensions

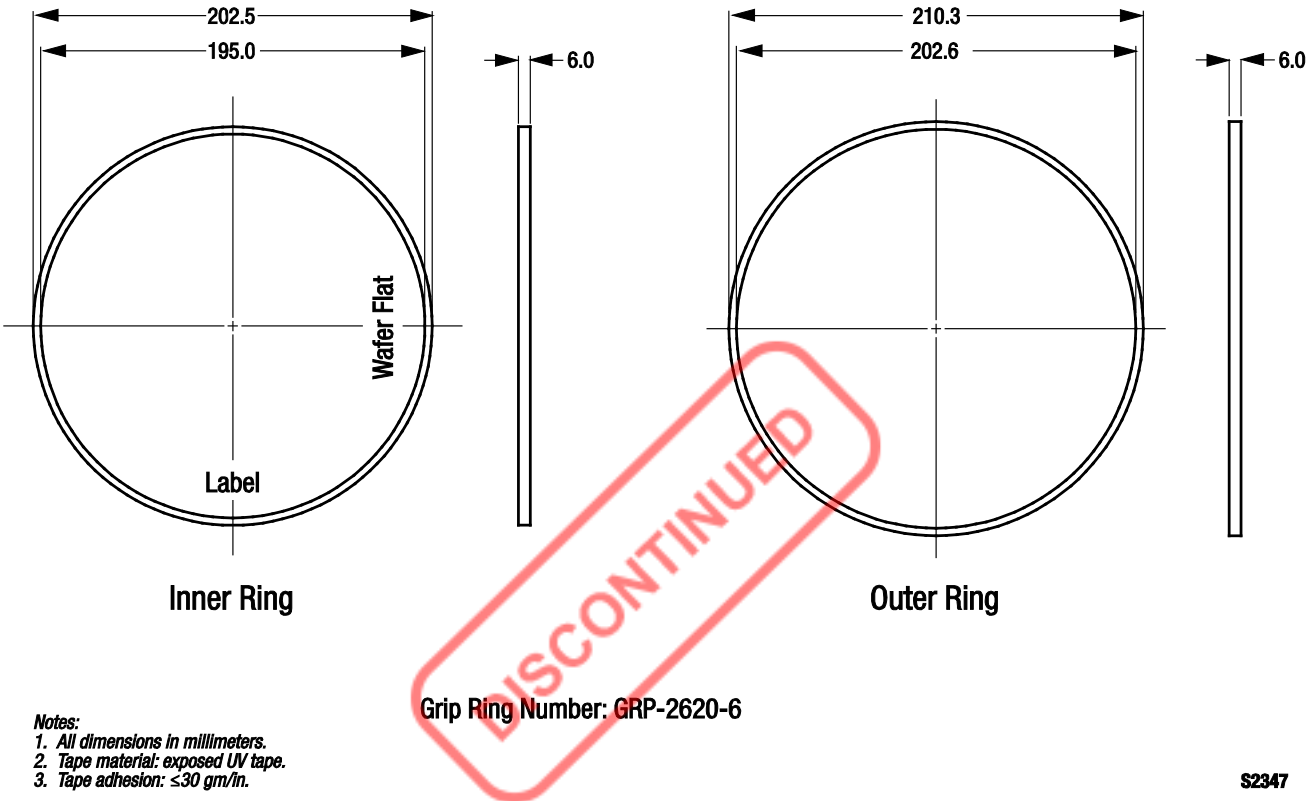


Figure 10. SKY13398-000 Grip Ring Dimensions

Ordering Information

Model Name	Manufacturing Part Number	Evaluation Board Part Number
SKY13398-000 0.1-6.0 GHz SP3T Switch	SKY13398-000	SKY13398-000-EVB



Copyright © 2022, 2026, Skyworks Solutions, Inc. All Rights Reserved.

Information in this document is provided in connection with Skyworks Solutions, Inc., and its subsidiaries (“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 INFORMATION IN THIS DOCUMENT AND THE MATERIALS AND PRODUCTS DESCRIBED THEREIN 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 designed, intended, authorized, or warranted for use or inclusion in life support or life endangering applications, devices, or systems where failure or inaccuracy might cause death or personal injury. Skyworks customers agree not to use or sell the Skyworks products for such applications, and further agree to, without limitation, fully defend, indemnify, and hold harmless Skyworks and its agents from and against any and all actions, suits, proceedings, costs, expenses, damages, and liabilities including attorneys’ fees arising out of or in connection with such improper use or sale.

Skyworks assumes no liability for applications assistance, customer product design, or damage to any equipment resulting from the use of Skyworks products outside of Skyworks’ published specifications or parameters. Customers are solely responsible for their products and applications using the Skyworks products.

“Skyworks” and the Skyworks Starburst logo are 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.