DATA SHEET

SKY13314-374LF: 0.1 to 6.0 GHz GaAs SPDT Switch

Applications

- Dual-band WLAN systems

Features

- Positive low voltage control: 0 and 3.3 V
- Low insertion loss: 0.45 dB @ 2.5 GHz and 0.60 dB @ 6.0 GHz
- Excellent linearity performance: P1dB = +31 dBm
- Advanced pHEMT process
- Ultra-thin, miniature MLPD (6-pin, 1.5 x 1.5 x 0.45 mm) package (MSL1, 260 °C per JEDEC J-STD-020)

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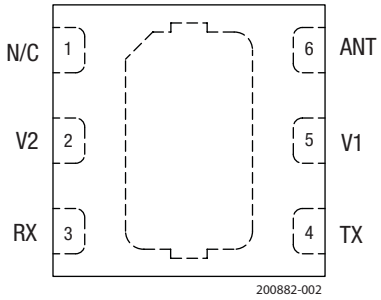


Figure 2. SKY13314-374LF Pinout (Top View)

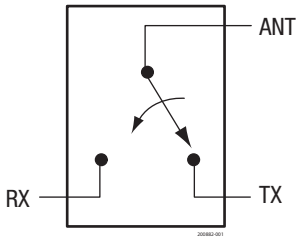


Figure 1. SKY13314-374LF Block Diagram

Description

The SKY13314-374LF is a pHEMT GaAs I/C antenna switch. Switching between the antenna and TX or RX ports is accomplished with two control voltages. The low-loss, high isolation, high linearity, small size and low cost make this switch ideal for all dual-band WLAN systems that operate at 2.4 to 2.5 GHz and 4.9 to 5.9 GHz.

The switch is manufactured in a compact, 1.5 x 1.5 mm, 6-pin exposed pad plastic Micro Leadframe Package Dual (MLPD) package.

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. SKY13314-374LF Signal Descriptions

Pin	Name	Description	Pin	Name	Description
1	N/C	No connection	4	TX	RF port (must be DC blocked)
2	V2	DC control voltage	5	V1	DC control voltage
3	RX	RF port (must be DC blocked)	6	ANT	RF common port (must be DC blocked)

Electrical and Mechanical Specifications

The absolute maximum ratings of the SKY13314-374LF are provided in Table 2. Electrical specifications are provided in Table 3.

Typical performance characteristics of the SKY13314-374LF are illustrated in Figures 3 through 9.

The state of the SKY13314-374LF is determined by the logic provided in Table 4.

Table 2. SKY13314-374LF Absolute Maximum Ratings[1]

Parameter	Symbol	Minimum	Maximum	Units
Input power @ 0 and 3 V	P_{IN}		+33	dBm
Input power @ 0 and 5 V	P_{IN}		+35	dBm
Operating voltage	V_{CTL}		6.0	V
Storage temperature	T_{STG}	–65	+150	°C
Operating temperature	T_{OP}	–40	+85	°C

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

Table 3. SKY13314-374LF Electrical Specification[1]
(V_{CTL} = 0 V and +3.3 V, T_{OP} = +25 °C, P_{IN} = 0 dBm, Characteristic Impedance [Z_0] = 50 Ω, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Insertion loss, ANT to TX and RX ports		2.4 to 2.5 GHz 0.1 to 3.0 GHz 3.0 to 6.0 GHz		0.45 0.50 0.60	0.65 0.70 0.85	dB dB dB
Isolation, ANT to TX and RX ports		2.4 to 2.5 GHz 0.1 to 3.0 GHz 3.0 to 6.0 GHz	19 18 18	22 21 21		dB dB dB
Return loss, ANT to TX and RX ports (insertion loss state) [2]		2.4 to 2.5 GHz 0.1 to 3.0 GHz 3.0 to 6.0 GHz	14 12 12	21 18 15		dB dB dB
Switching characteristics: Rise/fall time On/off time		 10/90% or 90/10% RF 50% V_{CTL} to 90/10% RF		 15 30		 ns ns
Video feedthrough		T_{RISE} = 1 ns @ 500 MHz		50		mV
Input power for 1 dB compression	P1dB	V_{CTL} = 0 and 3.3 V: 2.4 to 2.5 GHz 4.9 to 5.9 GHz V_{CTL} = 0 and 1.8 V: 2.4 to 2.5 GHz 4.9 to 5.9 GHz		 +31 +31 +27.5 +21.5		 dBm dBm dBm dBm
Input IP3	IIP3	For two-tone input power = +17 dBm/tone, 1 MHz spacing, V_{CTL} = 0 and 3.3 V, 2.4-2.5 GHz		+47		dBm
Error vector magnitude	EVM	802.11a, 54 Mbps, P_{IN} = <+20.5 dBm, V_{CTL} = 3 V 802.11g, 54 Mbps, P_{IN} = <+24.5 dBm, V_{CTL} = 3 V		2.5 2.5		% %
Control voltage: High Low	 V_{CTL_H} V_{CTL_L}		 1.80	 3.30 0	 5.00 0.25	 V V
Leakage current		V_{CTL_H} and V_{CTL_L}		5	50	µA

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

2 Low frequency return loss is limited by the value of DC blocking capacitors (15 pF).

Typical Performance Characteristics

(V_{CTL} = 0 V and +3.3 V, T_{OP} = +25 °C, P_{IN} = 0 dBm, Characteristic Impedance [Zo] = 50 Ω, Blocking Capacitors = 15 pF, Unless Otherwise Noted)

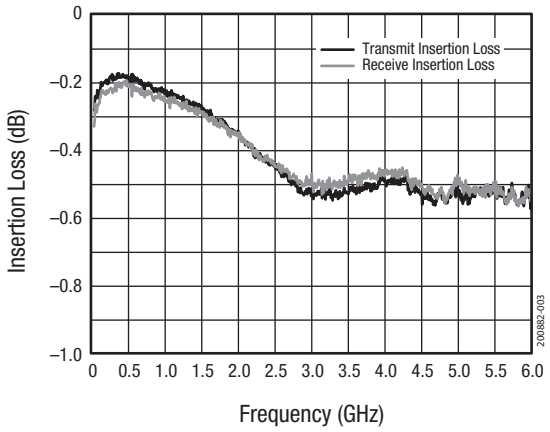


Figure 3. Typical Insertion Loss

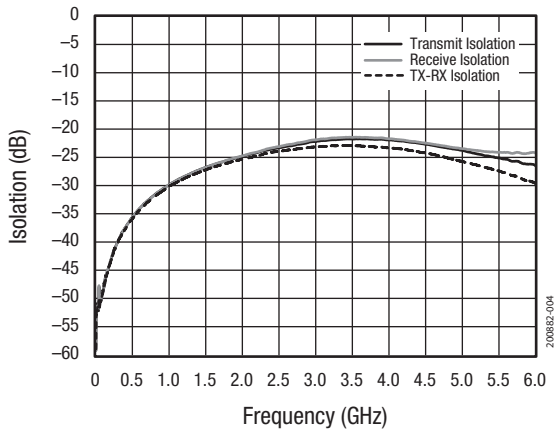


Figure 4. Typical Isolation

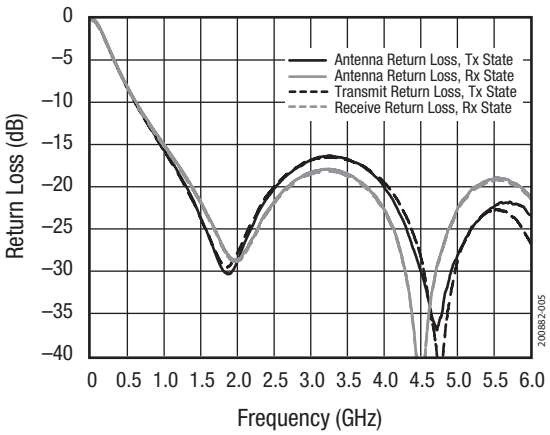


Figure 5. Typical Return Loss

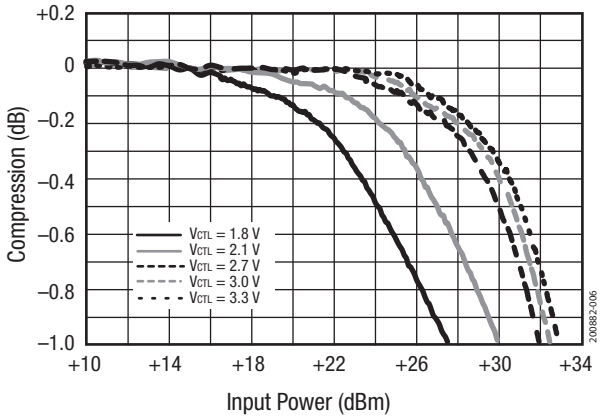


Figure 6. Typical Compression, 2.4-2.5 GHz

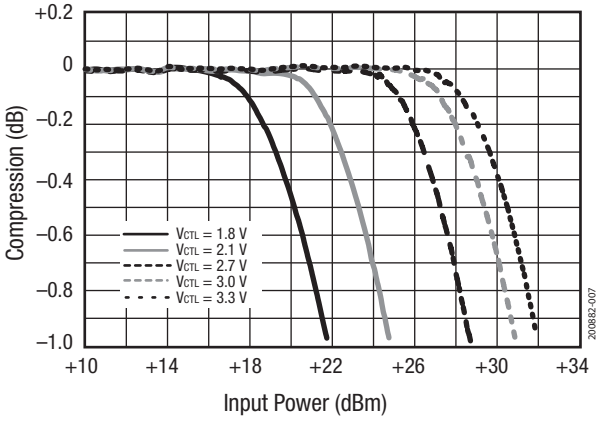


Figure 7. Typical Compression, 4.9-5.9 GHz

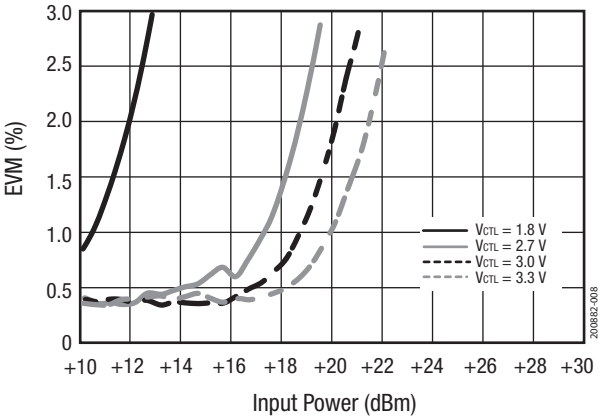


Figure 8. Typical 802.11a EVM, 4.9-5.9 GHz

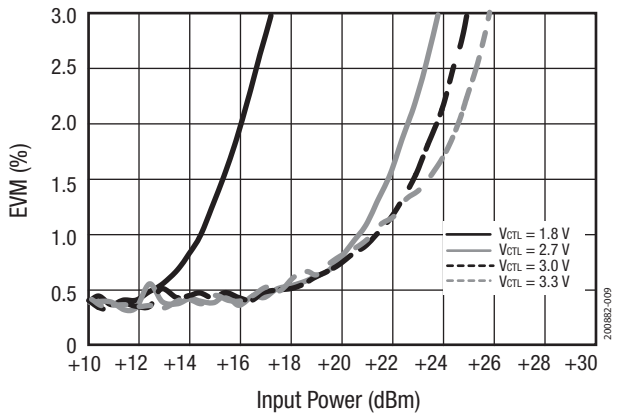


Figure 9. Typical 802.11g EVM, 2.4 to 2.5 GHz

Table 5. SKY13314-374LF Truth Table[1]

V1 (Pin 5)	V2 (Pin 2)	ANT to RX Path	ANT to TX Path
1	0	Insertion loss	Isolation
0	1	Isolation	Insertion loss

1 "1" = +1.8 V to +5.0 V. "0" = 0 V to +0.25 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 SKY13314-374LF Evaluation Board is used to test the performance of the SKY13314-374LF SPDT Switch. An Evaluation Board schematic diagram is provided in Figure 10. An assembly drawing for the Evaluation Board is shown in Figure 11.

Package Dimensions

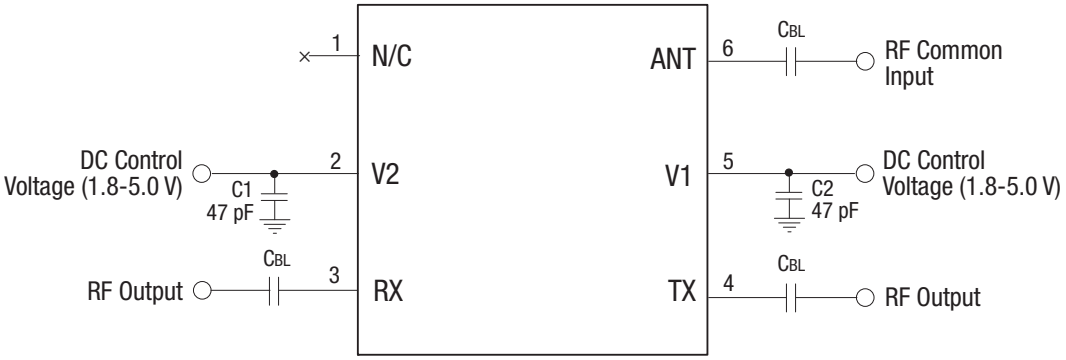
The PCB layout footprint for the SKY13314-374LF is provided in Figure 12. Typical part markings are shown in Figure 13. Package dimensions are shown in Figure 14, and tape and reel dimensions are provided in Figure 15.

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 SKY13314-374LF is rated to Moisture Sensitivity Level 1 (MSL1) at 260 °C. It can be used for lead or lead-free soldering.

Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. Production quantities of this product are shipped in a standard tape and reel format. For packaging details, refer to the Skyworks Application Note, *Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation*, document number 200083.



CBL = 22 pF for 2.4-6.0 GHz operation.
Exposed ground paddle should be grounded for best performance.

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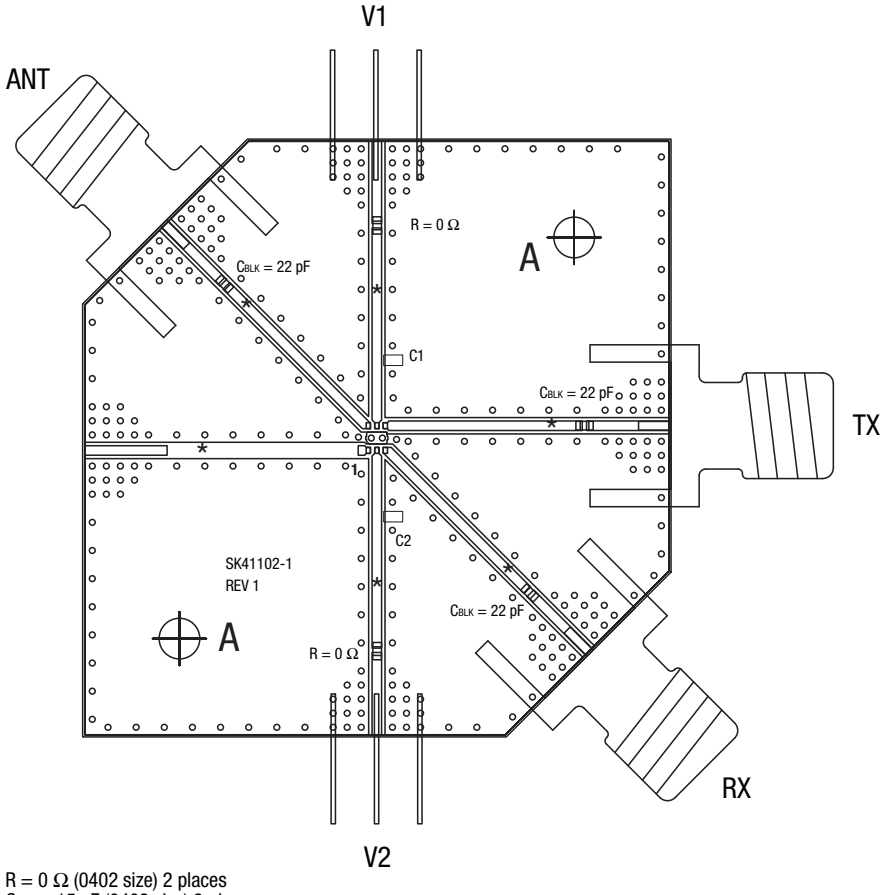
Figure 10. SKY13314-374LF Evaluation Board Schematic



R = 0 Ω (0402 size) 2 places
CBLK = 15 pF (0402 size) 3 places
C1 and C2 = 47 pF (0402 size), 2 places

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Figure 11. SKY13314-374LF Evaluation Board Assembly Diagram

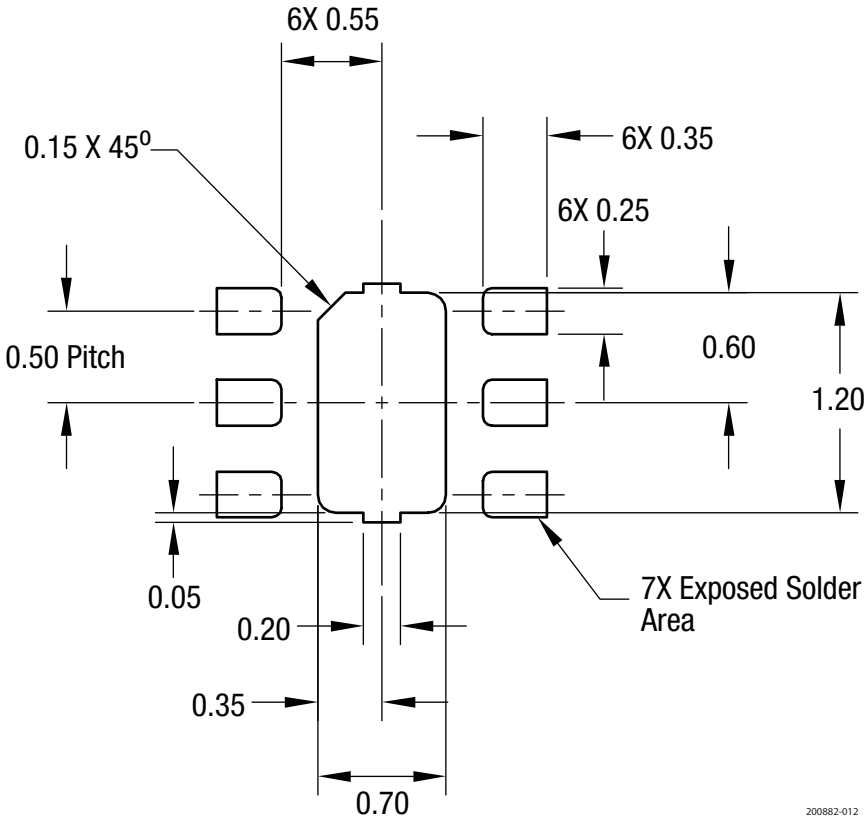


Figure 12. SKY13314-374LF PCB Layout Footprint (Top View)

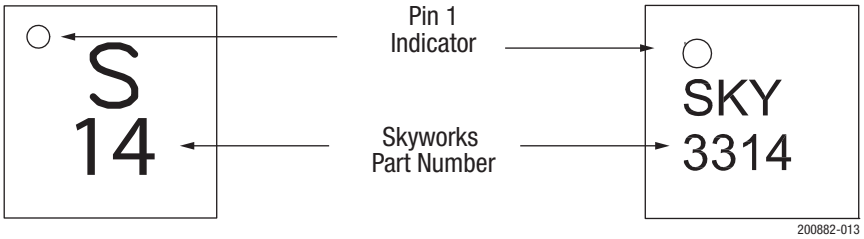
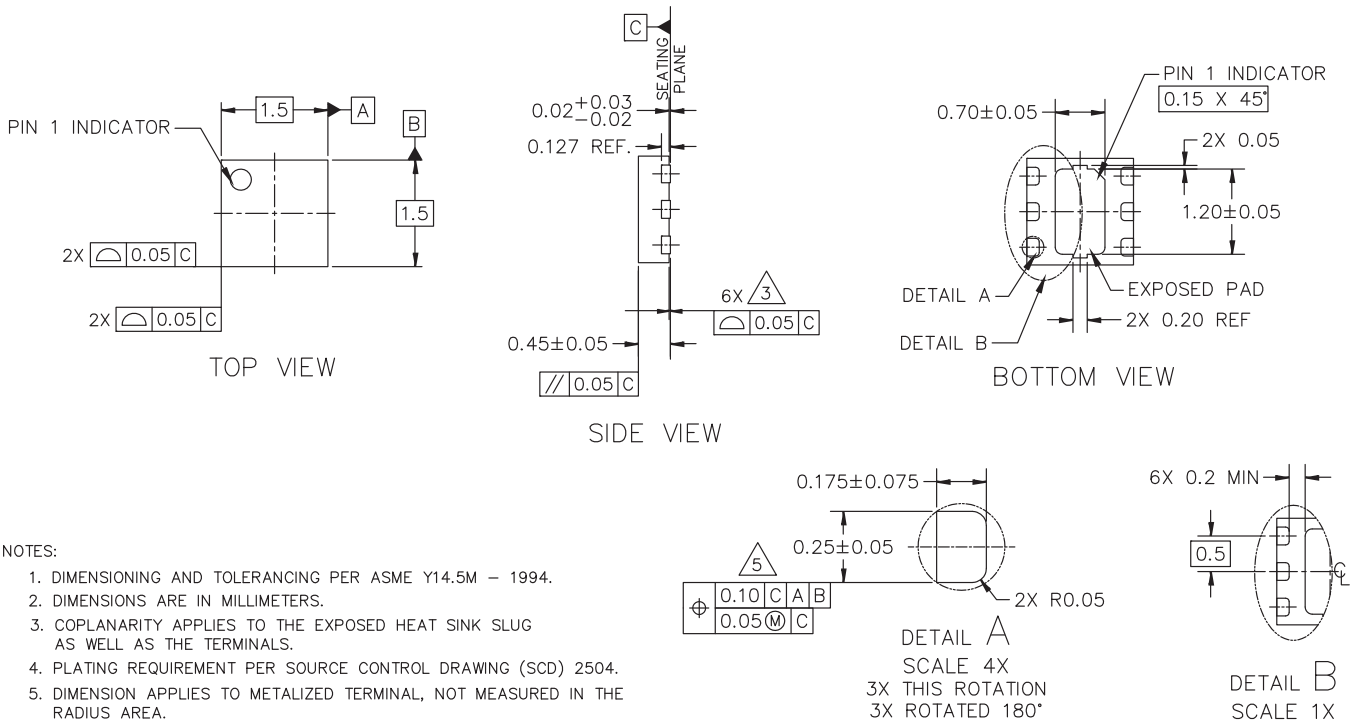


Figure 13. Typical Part Markings (Top View)



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M – 1994.
2. DIMENSIONS ARE IN MILLIMETERS.
3. COPLANARITY APPLIES TO THE EXPOSED HEAT SINK SLUG AS WELL AS THE TERMINALS.
4. PLATING REQUIREMENT PER SOURCE CONTROL DRAWING (SCD) 2504.
5. DIMENSION APPLIES TO METALIZED TERMINAL, NOT MEASURED IN THE RADIUS AREA.

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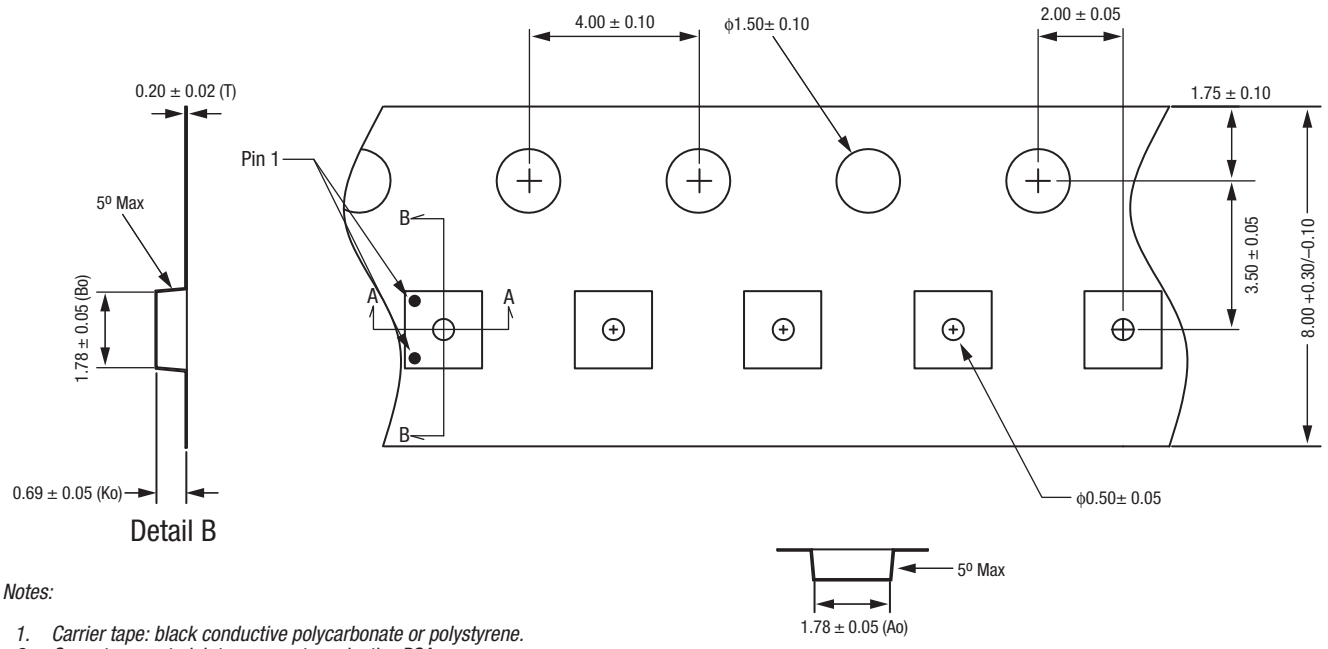
Figure 14. SKY13314-374LF Package Dimensions



Notes:

1. *Carrier tape: black conductive polycarbonate or polystyrene.*
2. *Cover tape material: transparent conductive PSA.*
3. *Cover tape size: 5.4 mm width.*
4. *All measurements are in millimeters.*
5. *Pin 1 orientation is in lower left corner for SOT-666 packages. Pin 1 orientation is in upper left corner for 1.5 x 1.5 mm MLPD, QFN, and DFN packages.*

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Figure 15. SKY13314-374LF Tape and Reel Dimensions

Ordering Information

Product Description	Product Part Number	Evaluation Board Part Number
SKY13314-374LF SPDT Switch	SKY13314-374LF	SKY13314-374-EVB

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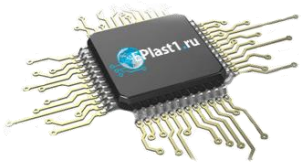
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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