PRELIMINARY DATA SHEET

SKY14155: WCDMA DP4T Switch With Decoder

Applications

- WCDMA
- Broadband, high power switches

Features

- Broadband frequency range: 0.1-2.5 GHz
- Low insertion loss: 0.3 dB @ 1 GHz and 0.4 dB @ 2 GHz
- High isolation: >30 dB @ 1 GHz and 2 GHz
- Operating voltage range: 2.5 to 4.5 V
- Good 2nd and 3rd harmonic performance: <–50 dBm @ P_{IN} = +28 dBm
- Auxiliary control to easily expand operational bands
- Small, QFN (12-pin, 2 x 2 mm) package (MSL1, 260 °C per JEDEC J-STD-020)

NEW

Skyworks Green™ products are RoHS (Restriction of Hazardous Substances)-compliant, conform to the EIA/EICTA/JEITA Joint Industry Guide (JIG) Level A guidelines, are halogen free according to IEC-61249-2-21, and contain <1,000 ppm antimony trioxide in polymeric materials.

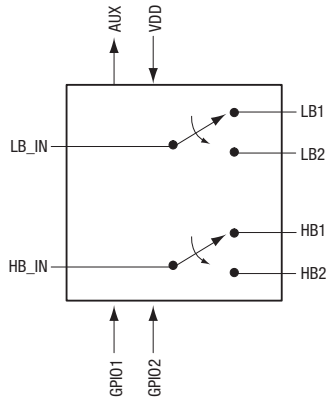


Figure 1. SKY14155 Block Diagram

Description

The SKY14155 is a double-pole, four-throw (DP4T) switch designed for broadband, high-power switching applications that demand low harmonics and low insertion loss. The switch is optimized for 3G WCDMA applications.

The SKY14155 features integrated logic that uses only two control lines for switch operation. The low current consumption of the device makes it very suitable for battery-operated applications.

The switch is manufactured using a state of the art Silicon on Insulator (SOI) process, and is provided in a compact Quad Flat No-Lead (QFN) 2 x 2 mm 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.

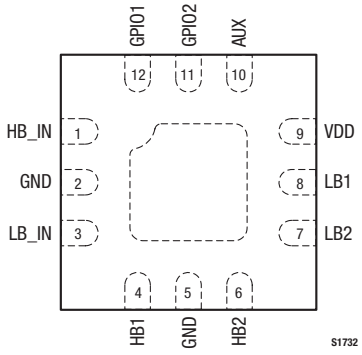


Figure 2. SKY14155 Pinout – 12-Pin QFN (Top View)

Table 1. SKY14155 Signal Descriptions

Pin #	Name	Description	Pin #	Name	Description
1	HB_IN	High band transmit. This pin connected to pin 4 or 6 depending on the control voltage applied to pins 11 and 12.	7	LB2	Low band RF output 2. This pin is either connected to or disconnected from pin 3 depending on the control voltage applied to pins 11 and 12.
2	GND	Ground	8	LB1	Low band RF output 1. This pin is either connected to or disconnected from pin 3 depending on the control voltage applied to pins 11 and 12.
3	LB_IN	Low band transmit. This pin connected to pin 7 or 8 depending on the control voltage applied to pins 11 and 12.	9	VDD	Supply voltage input.
4	HB1	High band RF output 1. This pin is either connected to or disconnected from pin 1 depending on the control voltage applied to pins 11 and 12.	10	AUX	Auxiliary control signal output. Logic level output by this pin depends on the control voltage applied to pins 11 and 12.
5	GND	Ground	11	GPIO2	Control signal 2. Logic level applied to this pin and to pin 12, controls the state of the switch.
6	HB2	High band RF output 2. This pin is either connected to or disconnected from pin 1 depending on the control voltage applied to pins 11 and 12.	12	GPIO1	Control signal 1. Logic level applied to this pin and to pin 11, controls the state of the switch.

Table 2. SKY14155 Absolute Maximum Ratings

Parameter	Symbol	Minimum	Typical	Maximum	Units
Supply voltage (no operation)	V_{DD}			6	V
Supply voltage (short operation)	V_{DD}			5.4	V
Input power	P_{IN}			+36	dBm
Storage temperature	T_{STG}	–50		+100	°C
Operating temperature	T_{OP}	–30		+85	°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.

***CAUTION**: 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. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times.*

Electrical and Mechanical Specifications

The absolute maximum ratings of the SKY14155 are provided in Table 2. Electrical specifications are provided in Table 3.

The SKY14155 may be used in one of three modes: standby, active, and isolation. These modes are controlled by the General Purpose I/O (GPIO) pins 11 and 12 with V_{DD} = high. When V_{DD} is high, the switch is active and its state is controlled as described in Table 4. When the switch is in isolation mode, all paths are in an isolation state (all ports are off). When the switch is in standby mode, all paths are not operating.

Table 3. SKY14155 Electrical Specifications (Note 1)
(V_{DD} = 2.5 V to 4.5 V, T_{OP} = +25 °C, V_{HIGH} > 1.8 V, All Unused RF Ports Terminated in a 50 Ω Load, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
Insertion loss		f = 1.0 GHz f = 2.0 GHz f = 2.5 GHz		0.3 0.4 0.5	0.4 0.5 0.6	dB dB dB
Isolation		f = 1.0 GHz f = 2.0 GHz	30 30	32 32		dB dB
Return loss		f = 2.5 GHz	15			dB
2nd harmonic	2fo	$f_{FUNDAMENTAL}$ = 900 MHz, P_{IN} = +28 dBm $f_{FUNDAMENTAL}$ = 1800 MHz, P_{IN} = +28 dBm		–52 –51	–43 –43	dBm dBm
3rd harmonic	3fo	$f_{FUNDAMENTAL}$ = 900 MHz, P_{IN} = +28 dBm $f_{FUNDAMENTAL}$ = 1800 MHz, P_{IN} = +28 dBm		–61 –51	–46 –46	dBm dBm
Input 0.1 dB compression point	P0.1dB	f = 900 MHz f = 1800 MHz		+33 +33		dBm dBm
Switching speed				2.5	5	µs
Supply voltage	V_{DD}		2.5		4.5	V
Control voltage		V_{HIGH} V_{LOW} Control current in active & isolation Control current in standby @ V_{DD} = 2.5 V Control current in standby @ V_{DD} = 4.5 V Control current in standby @ V_{DD} = 5.4 V	1.8	2.0 0 27 0.8 4.7 6.0	2.8 0.3 5 	V V µA µA µA µA

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

Table 4. SKY14155 Truth Table

State	GPIO1	GPIO2	AUX (Output Only)	RF Path
1	0	0	0	Standby
2	0	1	1	High band 2 and Low band 2
3	1	0	1	High band 1 and Low band 1
4	1	1	0	Isolation

Note: "1" = +1.8 to +2.8 V (for GPIO1 and GPIO2 pins), or +2.0 V (for AUX pin). "0" = 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.

Package Dimensions

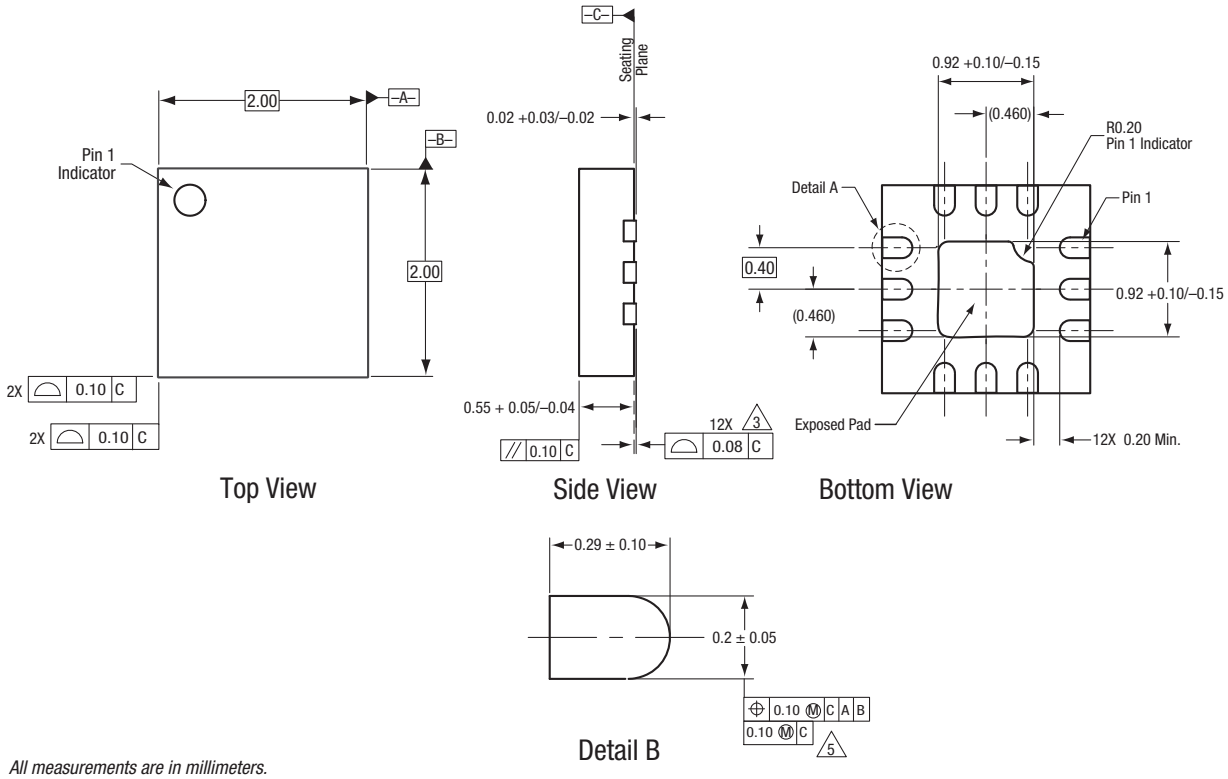
Package dimensions for the 10-pin QFN are shown in Figure 3, and tape and reel dimensions are provided in Figure 4.

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 SKY14155 is rated to Moisture Sensitivity Level 1 (MSL1) at 260 °C. It can be used for lead or lead-free soldering.

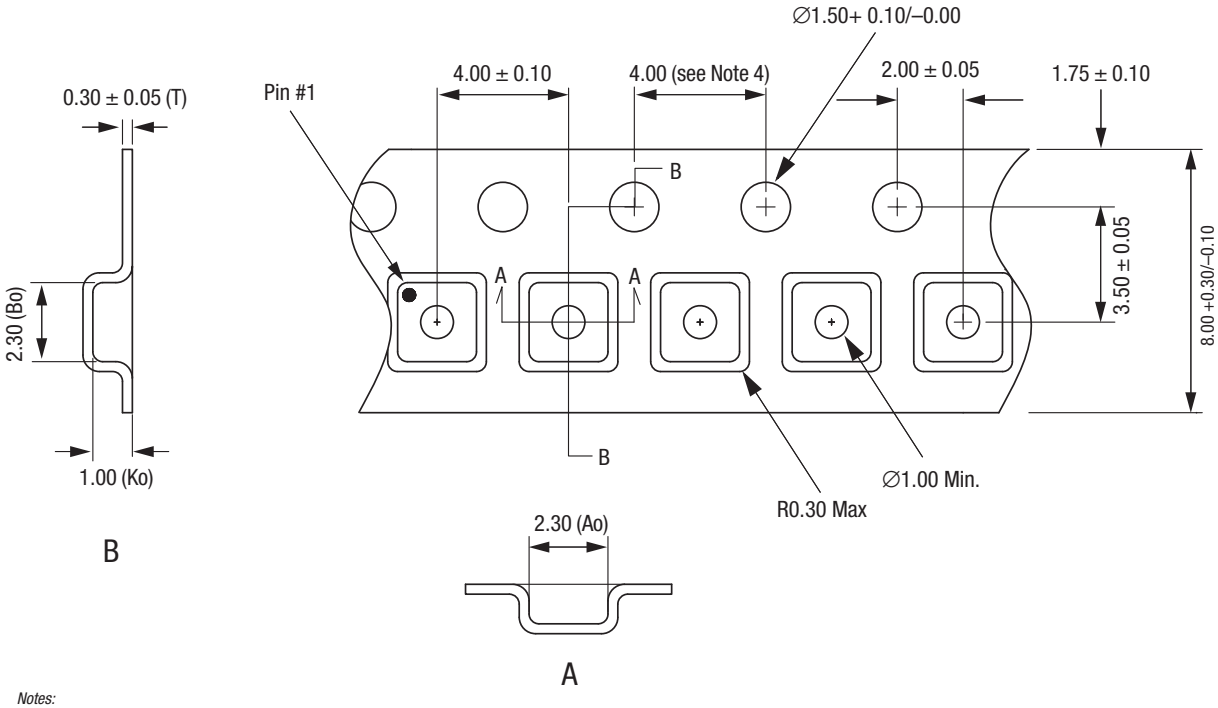
Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. Production quantities of this product are shipped in a standard tape and reel format. For packaging details, refer to the Skyworks Application Note, *Discrete Devices and IC Switch/Attenuators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



All measurements are in millimeters.
Dimensioning and tolerancing according to ASME Y14.5M-1994.
Coplanarity applies to the terminals and all other bottom surface metalization.
Plating requirement per source control drawing (SCD) 2504.
Dimension applies to metalized terminal and is measured between 0.15 and 0.30 mm from terminal tip.

S1731

Figure 3. SKY14155 12-Pin QFN Package Dimensions



Notes:
1. *Carrier tape: black conductive polystyrene.*
2. *Cover tape material: transparent conductive HSA.*
3. *Cover tape size: 5.40 mm width.*
4. *Ten sprocket hole pitch cumulative tolerance = ±0.20 mm.*
5. *All measurements are in millimeters.*

S1601

Figure 4. SKY14155 Tape and Reel Dimensions

Ordering Information

Model Name	Manufacturing Part Number	Evaluation Kit Part Number
SKY14155 DP4T Switch	SKY14155	***** TBD *****