

**DATA SHEET**

# SKY13437: 0.4 to 2.7 GHz SP12T Switch with GPIO Interface

## Applications

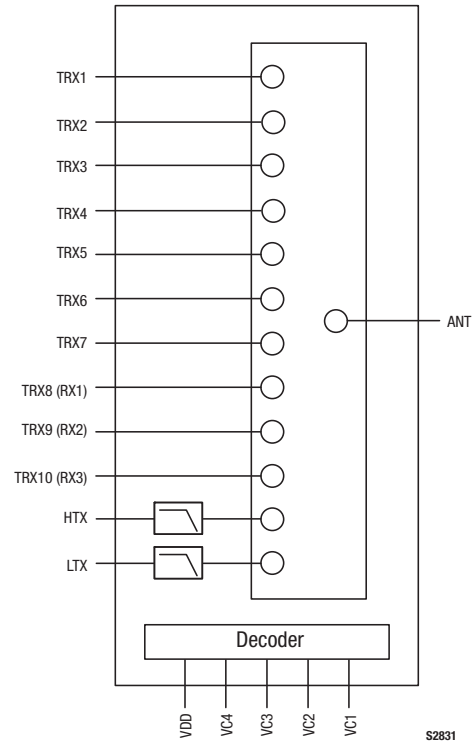
- 2G/3G/4G multimode cellular handsets (LTE, UMTS, CDMA2000, EDGE, GSM)
- Embedded data cards

## Features

- Broadband frequency range: 0.4 to 2.7 GHz
- Low insertion loss
- High isolation and linearity
- Integrated GSM harmonic filter
- Integrated GPIO interface
- Ten TRX ports, one GSM low band transmit port, and one GSM high band transmit port
- Small MCM (22-pin, 3.2 x 2.5 x 0.8 mm) package (MSL3, 260 °C per JEDEC J-STD-020)



Skyworks Green™ products are compliant with all applicable legislation and are halogen-free. For additional information, refer to *Skyworks Definition of Green™*, document number SQ04-0074.



**Figure 1. SKY13437 Block Diagram**

## Description

The SKY13437 is a single-pole, twelve-throw (SP12T) antenna switch with integrated GSM transmit harmonic filter. The SKY13437 maintains a high linearity, high isolation, and low insertion loss performance, which makes it an ideal choice for UMTS, CDMA2000, EDGE, GSM, and LTE applications.

The design features two dedicated GSM transmit ports. The remaining ten ports are suitable for WCDMA transmit/receive and GSM receive functions. Three transmit ports (TRX1, TRX2, and TRX4) have been specifically designed to provide optimal LTE Band 13 performance. The switch exhibits an excellent triple beat ratio and 2<sup>nd</sup>/3<sup>rd</sup> order modulation distortion performance.

Switching is controlled by an integrated GPIO interface. Depending on the logic applied to the decoder, the antenna pin is connected to one of 12 switched RF ports using a low insertion loss path, while the paths between the antenna pin and the other RF pins are in a high isolation state. No external DC blocking capacitors are required on the RF paths as long as no DC voltage is applied.

The SKY13437 is manufactured in a compact, 3.2 x 2.5 x 0.8 mm, 22-pin surface mount Multi-Chip Module (MCM) 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.

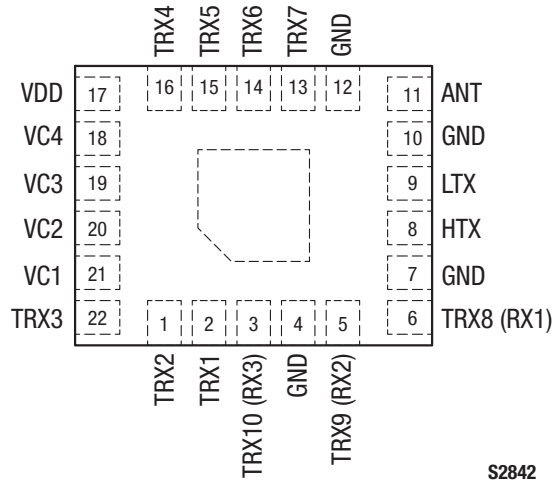


Figure 2. SKY13437 Pinout – 22-Pin MCM (Top View)

Table 1. SKY13437 Signal Descriptions (Note 1)

Pin	Name	Description	Pin	Name	Description
1	TRX2	RF input/output port 2 optimized for LTE Band 13 (704 to 787 MHz)	12	GND	Ground
2	TRX1	RF input/output port 1 optimized for LTE Band 13 (704 to 787 MHz)	13	TRX7	RF input/output port 7
3	TRX10 (RX3)	RF input/output port 10 (receive 3)	14	TRX6	RF input/output port 6
4	GND	Ground	15	TRX5	RF input/output port 5
5	TRX9 (RX2)	RF input/output port 9 (receive 2)	16	TRX4	RF input/output port 4 optimized for LTE Band 13 (704 to 787 MHz)
6	TRX8 (RX1)	RF input/output port 8 (receive 1)	17	VDD	DC power supply
7	GND	Ground	18	VC4	DC input control voltage 4
8	HTX	GSM high band transmit RF input port with integrated harmonic filter	19	VC3	DC input control voltage 3
9	LTX	GSM low band transmit RF input port with integrated harmonic filter	20	VC2	DC input control voltage 2
10	GND	Ground	21	VC1	DC input control voltage 1
11	ANT	Antenna RF port	22	TRX3	RF input/output port 3

Note 1: Bottom ground paddles must be connected to ground.

**Table 2. SKY13437 Absolute Maximum Ratings (Note 1)**

Parameter	Symbol	Minimum	Maximum	Units
Power supply	VDD	2.45	5.00	V
Digital control signals (VC1, VC2, VC3, VC4)	VCTRL	-0.5	+3.0	V
RF input power: LTX pin HTX pin All TRXx pins	PIN		+36 +34 +31	dBm dBm dBm
Storage temperature	TSTG	-55	+150	°C
Operating temperature	TOP	-40	+90	°C

**Note 1:** 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 SKY13437 are provided in Table 2. Electrical specifications are provided in Tables 3 through 6. Table 7 provides the control logic for the SKY13437.

Table 8 shows the insertion loss matrix. The isolation matrices shown in Tables 9 and 10 provide the port-to-port isolation and the antenna-to-port isolation for all available RF states at four different frequencies: 915 MHz, 1910 MHz, 2170 MHz, and 2690 MHz.

Figure 3 illustrates the test setup used to measure intermodulation products. This industry standardized test is used to simulate the WCDMA Band 1 linearity of the antenna switch. A +20 dBm Continuous Wave (CW) signal,  $f_{\text{FUND}}$ , is sequentially applied to the TRX1 through TRX10 ports, while a -15 dBm CW blocker signal,  $f_{\text{BLK}}$ , is applied to the ANT port.

The resulting 3<sup>rd</sup> Order Intermodulation Distortion (IMD3),  $f_{\text{RX}}$ , is measured over all phases of  $f_{\text{FUND}}$ . The SKY13437 exhibits exceptional performance for all TRXx ports.

**Table 3. SKY13437 Electrical Specifications (Note 1) (1 of 3)**  
**(V<sub>DD</sub> = 2.85 V, T<sub>OP</sub> = +25 °C, Characteristic Impedance [Z<sub>0</sub>] = 50 Ω, Unless Otherwise Noted)**

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
<b>RF Specifications</b>						
Insertion loss, LTX (Note 2)	IL	824 to 915 MHz		1.35	1.5	dB
Insertion loss, HTX (Note 2)	IL	1710 to 1910 MHz		1.2	1.5	dB
Insertion loss, TRX1/2/4 (Note 2)	IL	704 to 787 MHz		0.55	0.65	dB
Insertion loss, TRX1/2/3 (Note 2)	IL	824 to 960 MHz		0.6	0.7	dB
		1710 to 1990 MHz		0.75	0.85	dB
		2110 to 2170 MHz		0.75	0.85	dB
		2300 to 2690 MHz		0.75	0.95	dB
Insertion loss, TRX4/5/6/7 (Note 2)	IL	824 to 960 MHz		0.65	0.75	dB
		1710 to 1990 MHz		0.8	0.95	dB
		2110 to 2170 MHz		0.8	1	dB
Insertion loss, TRX4/5/6 (Note 2)	IL	2300 to 2690 MHz		0.9	1.25	dB
Insertion loss, TRX8/9/10 (Note 2)	IL	824 to 960 MHz		0.6	0.7	dB
		1710 to 1990 MHz		0.75	0.9	dB
		2110 to 2170 MHz		0.75	0.95	dB
		2300 to 2690 MHz		0.8	1	dB
GSM harmonic attenuation	H2LB	LTX to ANT, 2fo 1648 to 1830 MHz	23	31		dB
	H3LB	LTX to ANT, 3fo 2472 to 2745 MHz	26	29		dB
	H4LB	LTX to ANT, 4fo 3296 to 3660 MHz		36		dB
	H2HB	HTX to ANT, 2fo 3420 to 3820 MHz	25	31		dB
	H3HB	HTX to ANT, 3fo 5130 to 5730 MHz	26	29		dB

**Table 3. SKY13437 Electrical Specifications (Note 1) (2 of 3)**  
**(V<sub>DD</sub> = 2.85 V, T<sub>OP</sub> = +25 °C, Characteristic Impedance [Z<sub>0</sub>] = 50 Ω, Unless Otherwise Noted)**

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
<b>RF Specifications (continued)</b>						
Isolation (Note 2)	Iso	LTX1 to TRx ports, 824 MHz to 915 MHz	40	44.5		dB
		HTX to TRx ports, 1710 to 1910 MHz	29	33		dB
		TRx1 to TRx3, TRx2 to TRx10, TRx4 to TRx6, TRx5 to TRx7, 824 to 1910 MHz (non-adjacent ports)	25	28		dB
		TRx1/2 to TRx3/4/5 824 to 1910 MHz (opposite ports)	35	41		dB
		TRx1 to TRx10, TRx2 to TRx3, TRx4 to TRx5, TRx6 to TRx7 824 MHz to 1910 MHz (adjacent ports)	20	22		dB
		ANT to TRX9 port when TRX10 is ON 1805 MHz to 1990 MHz	30	35		dB
		ANT to TRX10 port when TRX9 is ON 1805 MHz to 1990 MHz	30	35		dB
		LTX to HTX when LTX is ON, 1648 to 1830 MHz	25	27.5		dB
Large signal harmonics	LTX_HARM	Transmit GSM low band, PIN <+34.5 dBm, VSWR = 1:1		-57	-45	dBm
	LTX_HARM_VSWR	Transmit GSM low band, PIN <+34.5 dBm, VSWR = 5:1, all phases		-43	-36	dBm
	HTX_HARM	Transmit GSM high band, PIN <+32 dBm, VSWR = 1:1		-61	-48	dBm
	HTX_HARM_VSWR	Transmit GSM high band, PIN <+32 dBm, VSWR = 5:1, all phases		-42	-37	dBm
	B13_HARM	ANT to TRX1/2/4 ports @ 786.5 MHz, PIN <+25 dBm, VSWR = 1:1		-78		dBm
	TRXx_HARM	TRXx for f <sub>0</sub> up to 915 MHz, PIN <+27 dBm, VSWR = 1:1		-71	-66	dBm
	TRXx_HARM	TRXx for f <sub>0</sub> up to 1910 MHz, PIN <+27 dBm, VSWR = 1:1		-70	-66	dBm

**Table 3. SKY13437 Electrical Specifications (Note 1) (3 of 3)**  
**(V<sub>DD</sub> = 2.85 V, T<sub>OP</sub> = +25 °C, Characteristic Impedance [Z<sub>0</sub>] = 50 Ω, Unless Otherwise Noted)**

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
<b>RF Specifications (continued)</b>						
2nd Order Intermodulation Distortion	IMD2	CW carrier on TRXx ports with P <sub>OUT</sub> = +20 dBm, CW interferer on ANT port with P <sub>IN</sub> = -15 Bm, all blocker frequencies		-107	-100	dBm
3rd Order Intermodulation Distortion	IMD3	CW carrier on TRXx ports with P <sub>OUT</sub> = +20 dBm, CW interferer on ANT port with P <sub>IN</sub> = -15dBm, all blocker frequencies		-110	-107	dBm
Triple beat ratio	TBR	Band 5 (see Table 6)	+81	+92		dBc
		Band 2 (see Table 6)	+81	+86		dBc
<b>DC Specifications</b>						
Supply voltage	V <sub>DD</sub>		2.50	2.85	4.80	V
Supply current: GSM850/EGSM900/DCS1800/ PCS1900 transmit WCDMA/CDMA2000 transmit/receive	I <sub>DD</sub>			35	85	μA
				35	85	μA
Digital control signals: High Low Current	VC1, VC2, VC3, VC4		1.35	1.80	2.70	V
			0		0.45	V
				1	5	μA
DC supply turn-on/turn-off time				2	20	μs
RF path switching time		Between the ANT port and any LTX/HTX or TRXx ports		2	5	μs
Supply ripple					20	mVp-p

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

**Note 2:** See Tables 8, 9, and 10 for complete insertion loss and isolation matrices.

**Table 4. SKY13437 Electrical Specifications: IP3 Frequencies and Power Levels (Note 1)**  
**(V<sub>DD</sub> = 2.85 V, T<sub>OP</sub> = +25 °C, Characteristic Impedance [Z<sub>0</sub>] = 50 Ω, Unless Otherwise Noted)**

Band	Transmit Frequency (MHz)	Transmit Power (dBm)	Frequency Blocker (MHz)	Power Blocker (dBm)	Receive Frequency (MHz)
1	1950.0	+20	1760.0	-15	2140.0
2	1880.0	+20	1800.0	-15	1960.0
4	1732.0	+20	1332.0	-15	2132.0
5	836.5	+20	791.5	-15	881.5
8	897.0	+20	852.0	-15	942.0

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

**Table 5. SKY13437 Electrical Specifications: IP2 Frequencies and Power Levels (Note 1)**  
**(V<sub>DD</sub> = 2.85 V, T<sub>OP</sub> = +25 °C, Characteristic Impedance [Z<sub>0</sub>] = 50 Ω, Unless Otherwise Noted)**

Band	Transmit Frequency (MHz)	Transmit Power (dBm)	Frequency Blocker 1 (MHz)	Frequency Blocker 2 (MHz)	Power Blocker (dBm)	Receive Frequency (MHz)
1	1950.0	+20	190	4090	-15	2140.0
2	1880.0	+20	80	3840	-15	1960.0
4	1732.0	+20	400	3864	-15	2132.0
5	836.5	+20	45	1718	-15	881.5
8	897.0	+20	45	1839	-15	942.0

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

**Table 6. SKY13437 Electrical Specifications: Triple Beat Ratio Frequencies and Power Levels (Note 1)**  
**(V<sub>DD</sub> = 2.85 V, T<sub>OP</sub> = +25 °C, Characteristic Impedance [Z<sub>0</sub>] = 50 Ω, Unless Otherwise Noted)**

Band	Transmit Frequency 1 (MHz)	Transmit Power 1 (dBm)	Transmit Frequency 2 (MHz)	Transmit Power 2 (dBm)	Frequency Blocker @ ANT (MHz)	Power Blocker (dBm)	Triple Beat Product Frequency (MHz)
2	1880.0	+21.5	1881.0	+21.5	1960.0	-30	1960 ± 1
5	836.5	+21.5	881.5	+21.5	881.5	-30	881.5 ± 1

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

**Table 7. SKY13437 Mode Control Logic**

Insertion Loss State	VC1 (Pin 21)	VC2 (Pin 20)	VC3 (Pin 19)	VC4 (Pin 18)
LTX	0	0	1	0
HTX	1	0	1	0
TRX10 (RX3)	1	0	0	0
TRX9 (RX2)	1	0	0	1
TRX8 (RX1)	1	1	0	1
TRX7	0	1	0	0
TRX6	0	1	1	0
TRX5	0	0	0	0
TRX4	1	1	1	0
TRX3	1	0	1	1
TRX2	1	1	0	0
TRX1	1	1	1	1
Sleep (all ports in isolation state)	0	0	0	1

**Note:** "1" = 1.8 V typical. "0" = 0 V to +0.4 V. Any state other than described in this table places the switch into an undefined state. An undefined state will not damage the device.

**Table 8. Insertion Loss Matrix**

Frequency (MHz)	Insertion Loss (dB)											
	LTX	HTX	TRx1	TRx2	TRx3	TRx4	TRx5	TRx6	TRx7	TRx8	TRx9	TRx10
915	-1.26	-0.94	-0.49	-0.50	-0.54	-0.51	-0.56	-0.58	-0.59	-0.55	-0.55	-0.53
1910	-30.89	-1.29	-0.65	-0.65	-0.69	-0.64	-0.69	-0.70	-0.73	-0.69	-0.66	-0.65
2170	-26.95	-1.71	-0.67	-0.68	-0.72	-0.69	-0.75	-0.77	-0.81	-0.71	-0.70	-0.69
2690	-31.13	-6.63	-0.75	-0.72	-0.75	-0.85	-0.94	-1.05	-1.19	-0.79	-0.82	-0.77



**Table 9. Port-To-Port Isolation Matrix (1 of 2)**

"On" Port	Frequency (GHz)	Isolation (dB)											
		LTX	HTX	TRX1	TRX2	TRX3	TRX4	TRX5	TRX6	TRX7	TRX8	TRX9	TRX10
LTX	915	-	-26	-52	-53	-55	-57	-54	-50	-50	-45	-50	-52
LTX	1910	-	-31	-51	-53	-53	-51	-48	-45	-42	-36	-42	-49
LTX	2170	-	-27	-51	-52	-53	-50	-48	-44	-41	-35	-41	-49
LTX	2690	-	-21	-51	-52	-53	-51	-48	-45	-41	-36	-41	-49
HTX	915	-27	-	-48	-50	-51	-58	-57	-52	-53	-37	-44	-48
HTX	1910	-27	-	-43	-44	-45	-45	-45	-42	-42	-34	-40	-43
HTX	2170	-26	-	-44	-44	-45	-44	-44	-41	-41	-37	-42	-44
HTX	2690	-21	-	-56	-53	-55	-52	-53	-48	-52	-34	-41	-56
TRX1	915	-34	-73	-	-28	-34	-56	-60	-54	-56	-49	-44	-32
TRX1	1910	-41	-46	-	-22	-28	-44	-46	-44	-43	-42	-38	-27
TRX1	2170	-40	-44	-	-22	-27	-42	-44	-42	-41	-40	-37	-26
TRX1	2690	-39	-41	-	-19	-25	-39	-42	-40	-38	-37	-35	-24
TRX2	915	-34	-68	-30	-	-28	-53	-60	-55	-56	-51	-46	-38
TRX2	1910	-41	-46	-25	-	-23	-43	-46	-44	-43	-43	-40	-33
TRX2	2170	-40	-43	-24	-	-22	-41	-44	-42	-41	-41	-39	-32
TRX2	2690	-39	-40	-21	-	-20	-38	-41	-40	-38	-38	-36	-30
TRX3	915	-34	-65	-34	-31	-	-49	-57	-56	-56	-53	-48	-41
TRX3	1910	-41	-45	-29	-26	-	-41	-45	-44	-43	-44	-42	-36
TRX3	2170	-40	-42	-28	-25	-	-39	-43	-42	-41	-42	-40	-35
TRX3	2690	-39	-39	-26	-23	-	-36	-40	-40	-38	-39	-38	-33
TRX4	915	-35	-59	-50	-48	-48	-	-28	-36	-40	-58	-55	-52
TRX4	1910	-41	-44	-43	-42	-41	-	-23	-30	-33	-46	-47	-45
TRX4	2170	-40	-41	-42	-40	-40	-	-22	-29	-31	-44	-45	-44
TRX4	2690	-39	-39	-40	-38	-39	-	-19	-26	-28	-41	-42	-42
TRX5	915	-35	-58	-51	-50	-50	-31	-	-29	-37	-57	-55	-53
TRX5	1910	-41	-44	-44	-43	-43	-25	-	-23	-30	-46	-47	-46
TRX5	2170	-40	-41	-42	-41	-41	-24	-	-22	-29	-44	-45	-44
TRX5	2690	-39	-39	-40	-39	-40	-22	-	-20	-26	-41	-42	-42
TRX6	915	-36	-56	-52	-51	-51	-36	-32	-	-30	-57	-55	-53
TRX6	1910	-41	-44	-44	-44	-44	-30	-26	-	-23	-46	-47	-46
TRX6	2170	-41	-41	-43	-42	-42	-29	-25	-	-22	-43	-45	-44
TRX6	2690	-39	-39	-40	-40	-40	-26	-22	-	-20	-40	-42	-42
TRX7	915	-37	-53	-52	-51	-52	-40	-38	-33	-	-55	-54	-53
TRX7	1910	-41	-43	-44	-44	-45	-33	-32	-26	-	-45	-46	-46
TRX7	2170	-40	-41	-43	-42	-43	-31	-30	-25	-	-43	-44	-44
TRX7	2690	-38	-39	-40	-40	-41	-28	-28	-22	-	-40	-42	-41

**Table 9. Port-To-Port Isolation Matrix (2 of 2)**

"On" Port	Frequency (GHz)	Isolation (dB)											
		LTX	HTX	TRX1	TRX2	TRX3	TRX4	TRX5	TRX6	TRX7	TRX8	TRX9	TRX10
TRX8	915	-34	-44	-42	-45	-47	-60	-58	-53	-56	-	-30	-38
TRX8	1910	-48	-34	-37	-39	-41	-46	-46	-44	-43	-	-24	-32
TRX8	2170	-47	-34	-36	-38	-40	-43	-45	-42	-41	-	-24	-31
TRX8	2690	-39	-31	-34	-36	-38	-40	-43	-40	-38	-	-21	-29
TRX9	915	-34	-56	-40	-43	-45	-60	-58	-53	-56	-38	-	-33
TRX9	1910	-44	-43	-34	-38	-40	-45	-46	-43	-43	-31	-	-27
TRX9	2170	-44	-47	-34	-37	-39	-43	-45	-42	-41	-29	-	-27
TRX9	2690	-40	-42	-32	-34	-36	-41	-43	-41	-38	-27	-	-24
TRX0	915	-34	-72	-29	-37	-40	-59	-59	-53	-56	-44	-40	-
TRX10	1910	-41	-46	-24	-32	-35	-45	-46	-44	-44	-37	-34	-
TRX10	2170	-41	-44	-23	-31	-34	-43	-45	-42	-42	-35	-33	-
TRX10	2690	-39	-42	-21	-29	-32	-40	-43	-41	-38	-32	-30	-

**Table 10. Antenna-To-Port Isolation Matrix (1 of 2)**

"On" Port	Frequency (GHz)	Isolation (dB)											
		LTX	HTX	TRX1	TRX2	TRX3	TRX4	TRX5	TRX6	TRX7	TRX8	TRX9	TRX10
LTX	915	-	-27	-49	-49	-50	-45	-44	-42	-40	-44	-47	-49
LTX	1910	-	-30	-48	-47	-47	-39	-37	-34	-35	-42	-46	-48
LTX	2170	-	-34	-50	-49	-49	-40	-37	-35	-36	-43	-47	-50
LTX	2690	-	-46	-51	-52	-51	-41	-38	-35	-37	-45	-48	-51
HTX	915	-29	-	-54	-53	-54	-46	-45	-43	-42	-44	-53	-56
HTX	1910	-27	-	-43	-43	-44	-38	-38	-35	-35	-36	-40	-44
HTX	2170	-25	-	-41	-41	-42	-37	-36	-34	-33	-35	-38	-42
HTX	2690	-28	-	-41	-41	-42	-35	-35	-32	-33	-36	-40	-42
TRX1	915	-41	-41	-	-34	-43	-48	-46	-43	-42	-50	-58	-38
TRX1	1910	-39	-38	-	-27	-34	-41	-40	-37	-36	-41	-44	-31
TRX1	2170	-38	-39	-	-26	-33	-39	-39	-36	-35	-40	-42	-30
TRX1	2690	-36	-46	-	-25	-32	-37	-37	-34	-33	-37	-39	-29
TRX2	915	-42	-41	-40	-	-34	-49	-47	-44	-42	-49	-58	-44
TRX2	1910	-39	-38	-31	-	-27	-41	-40	-37	-36	-41	-45	-37
TRX2	2170	-38	-39	-30	-	-26	-39	-39	-36	-35	-40	-43	-36
TRX2	2690	-36	-47	-28	-	-25	-37	-37	-34	-33	-37	-40	-35
TRX3	915	-42	-41	-48	-42	-	-51	-48	-44	-42	-49	-56	-51
TRX3	1910	-39	-38	-36	-32	-	-42	-41	-38	-36	-41	-45	-41
TRX3	2170	-38	-39	-34	-31	-	-40	-39	-37	-35	-40	-43	-40
TRX3	2690	-36	-48	-32	-29	-	-37	-37	-34	-33	-37	-40	-38

**Table 10. Antenna-To-Port Isolation Matrix (2 of 2)**

"On" Port	Frequency (GHz)	Isolation (dB)											
		LTX	HTX	TRX1	TRX2	TRX3	TRX4	TRX5	TRX6	TRX7	TRX8	TRX9	TRX10
TRX4	915	-43	-41	-51	-54	-58	-	-35	-48	-43	-47	-49	-51
TRX4	1910	-38	-38	-44	-44	-45	-	-27	-34	-33	-41	-43	-44
TRX4	2170	-37	-39	-42	-42	-42	-	-26	-32	-32	-39	-42	-43
TRX4	2690	-36	-48	-40	-39	-40	-	-25	-29	-29	-37	-39	-40
TRX5	915	-43	-42	-51	-52	-56	-44	-	-37	-46	-47	-49	-50
TRX5	1910	-38	-39	-44	-44	-46	-32	-	-28	-33	-41	-43	-44
TRX5	2170	-37	-40	-42	-42	-43	-30	-	-27	-31	-39	-42	-43
TRX5	2690	-35	-48	-40	-40	-41	-27	-	-25	-29	-37	-39	-40
TRX6	915	-44	-42	-50	-51	-54	-51	-44	-	-39	-47	-49	-50
TRX6	1910	-38	-39	-44	-44	-46	-36	-33	-	-28	-41	-43	-44
TRX6	2170	-37	-40	-42	-42	-43	-33	-31	-	-27	-39	-42	-43
TRX6	2690	-35	-48	-40	-40	-41	-31	-29	-	-25	-37	-40	-40
TRX7	915	-50	-43	-50	-51	-53	-45	-51	-47	-	-48	-50	-50
TRX7	1910	-39	-39	-43	-43	-45	-35	-37	-33	-	-41	-43	-44
TRX7	2170	-38	-40	-42	-42	-43	-33	-35	-30	-	-39	-42	-42
TRX7	2690	-35	-46	-39	-39	-41	-30	-32	-28	-	-37	-39	-40
TRX8	915	-40	-35	-57	-59	-60	-46	-45	-43	-42	-	-38	-56
TRX8	1910	-38	-29	-45	-45	-47	-40	-39	-37	-36	-	-30	-40
TRX8	2170	-36	-28	-43	-43	-45	-39	-38	-36	-35	-	-29	-38
TRX8	2690	-33	-28	-41	-40	-42	-36	-36	-34	-33	-	-27	-35
TRX9	915	-41	-39	-49	-56	-60	-46	-45	-43	-42	-43	-	-44
TRX9	1910	-39	-35	-41	-44	-47	-40	-39	-37	-36	-33	-	-35
TRX9	2170	-37	-35	-40	-43	-45	-39	-38	-36	-35	-31	-	-34
TRX9	2690	-35	-36	-39	-41	-43	-36	-36	-34	-33	-28	-	-33
TRX0	915	-41	-40	-34	-42	-47	-47	-45	-43	-42	-43	-44	-
TRX10	1910	-39	-37	-27	-35	-39	-40	-39	-37	-36	-36	-36	-
TRX10	2170	-38	-37	-26	-34	-39	-39	-38	-36	-35	-34	-34	-
TRX10	2690	-36	-43	-26	-34	-38	-37	-36	-34	-33	-31	-31	-

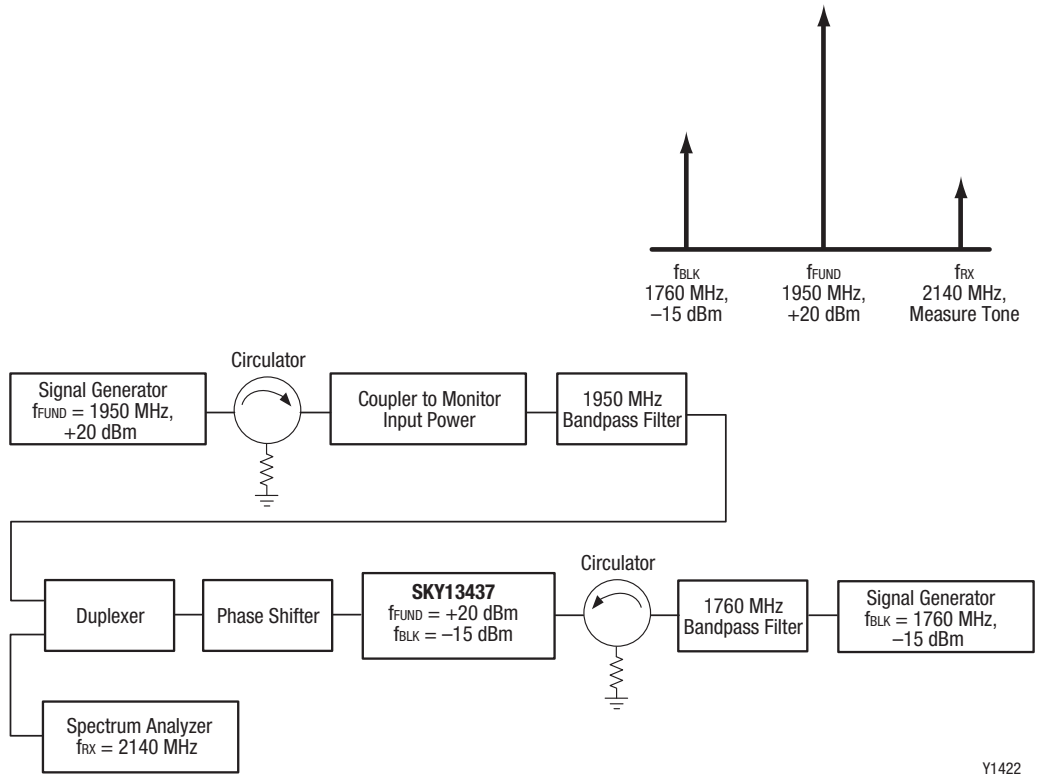


Figure 3. 3<sup>rd</sup> Order Intermodulation Test Setup

Y1422

### Evaluation Board Description

The SKY13437 Evaluation Board is used to test the performance of the SKY13437 SP12T Switch. An Evaluation Board schematic diagram is provided in Figure 4. A recommended ESD protection circuit diagram is provided in Figure 5. An assembly drawing for the Evaluation Board is shown in Figure 6.

### Package Dimensions

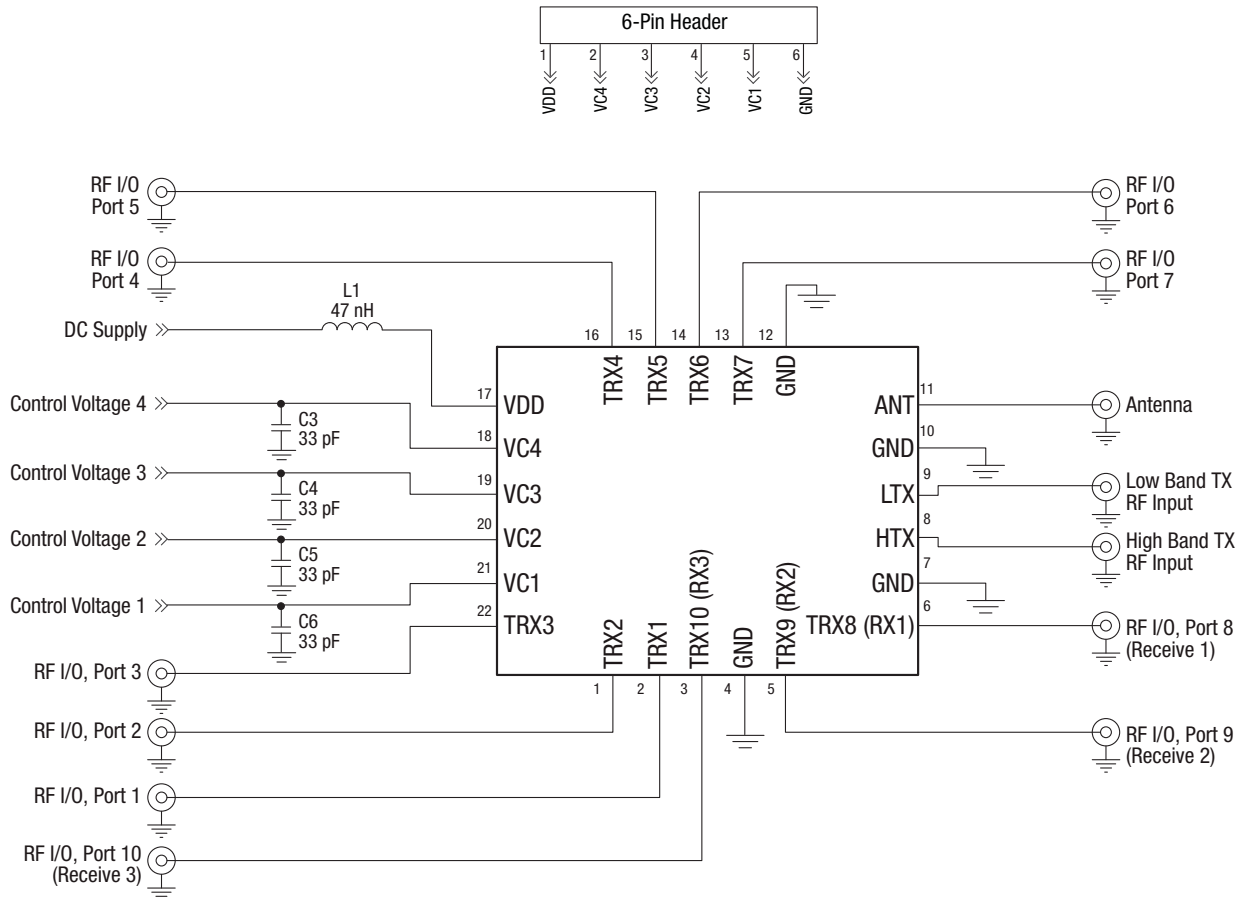
The PCB layout footprint for the SKY13437 is provided in Figure 7. Typical case markings are shown in Figure 8. Package dimensions for the 22-pin MCM are shown in Figure 9, and tape and reel dimensions are provided in Figure 10.

### 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 SKY13437 is rated to Moisture Sensitivity Level 3 (MSL3) at 260 °C. It can be used for lead or lead-free soldering. For additional information, refer to the Skyworks Application Note, *PCB Design and SMT Assembly/Rework Guidelines for MCM-L Packages*, document number 101752.

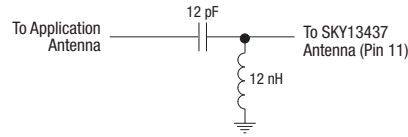
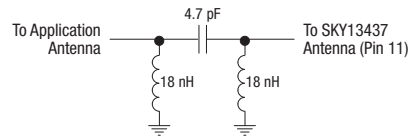
Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. Production quantities of this product are shipped in a standard tape and reel format.



NOTE: Bypass capacitor on the VDD is not recommended.

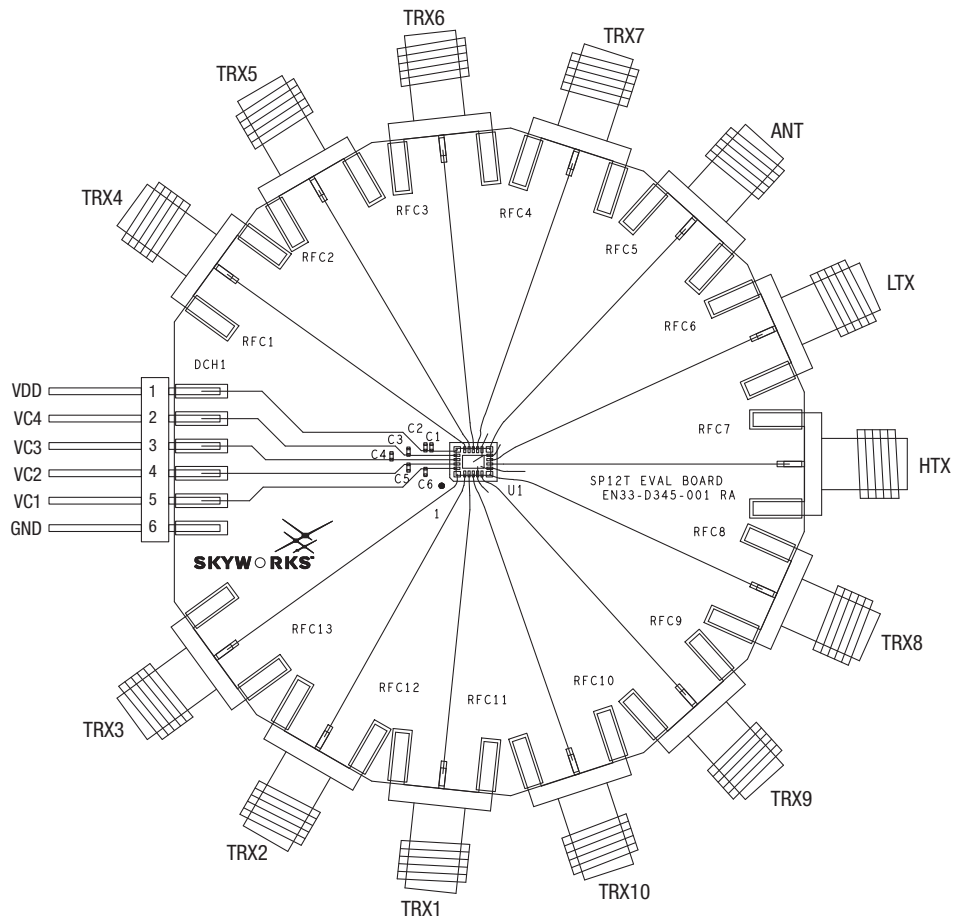
Y1423

Figure 4. SKY13437 Evaluation Board Schematic



Y1424

Figure 5. SKY13437 Recommended ESD Protection Circuits

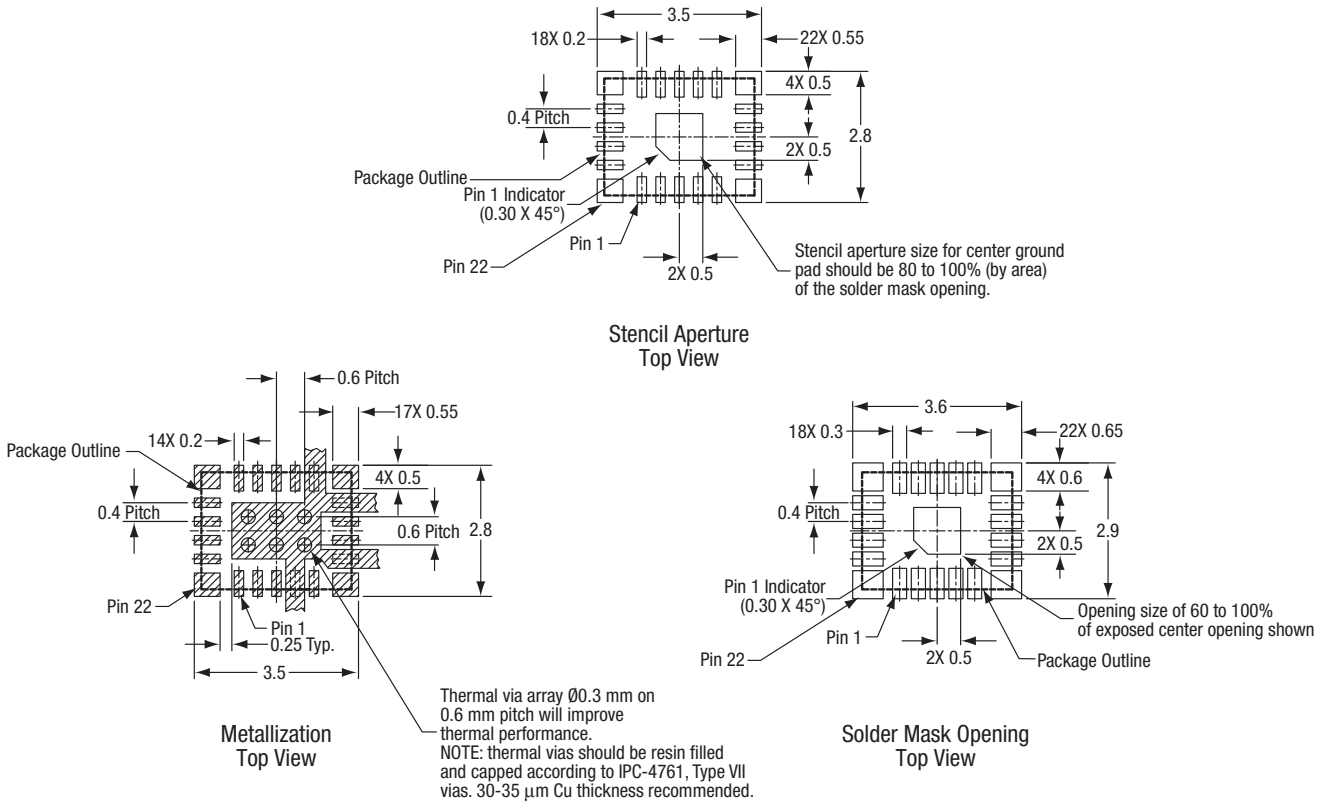


Notes:

Inductor L1 (pin 17 trace) is not shown in this drawing, but is included in the schematic and on the actual Evaluation Board. Capacitors C1 and C2 are designated as DNP (Do Not Place).

Y1425

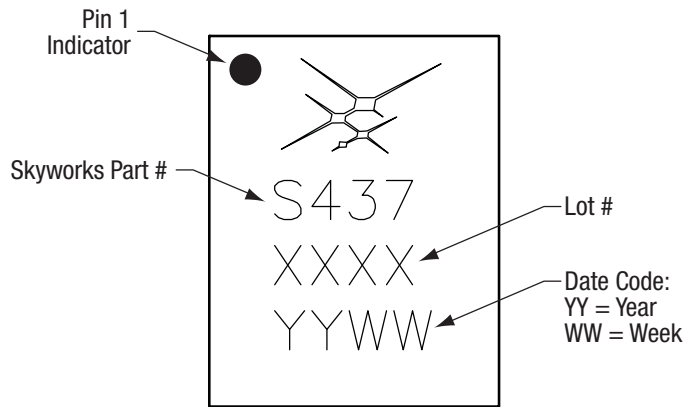
Figure 6. SKY13437 Evaluation Board Assembly Diagram



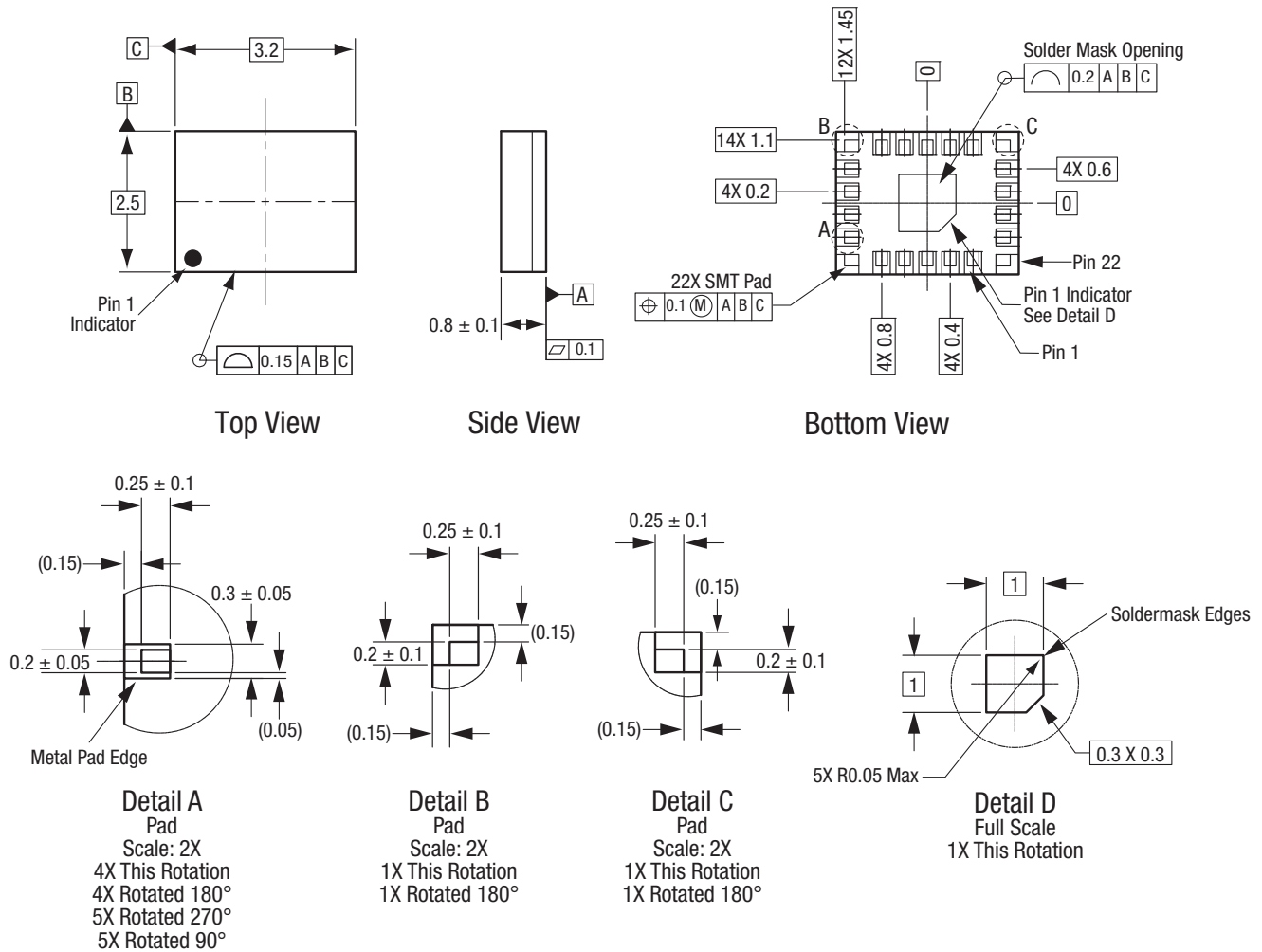
All dimensions are in millimeters

S3226

**Figure 7. SKY13437 PCB Layout Footprint (Top View)**



**Figure 8. Typical Part Markings (Top View)**



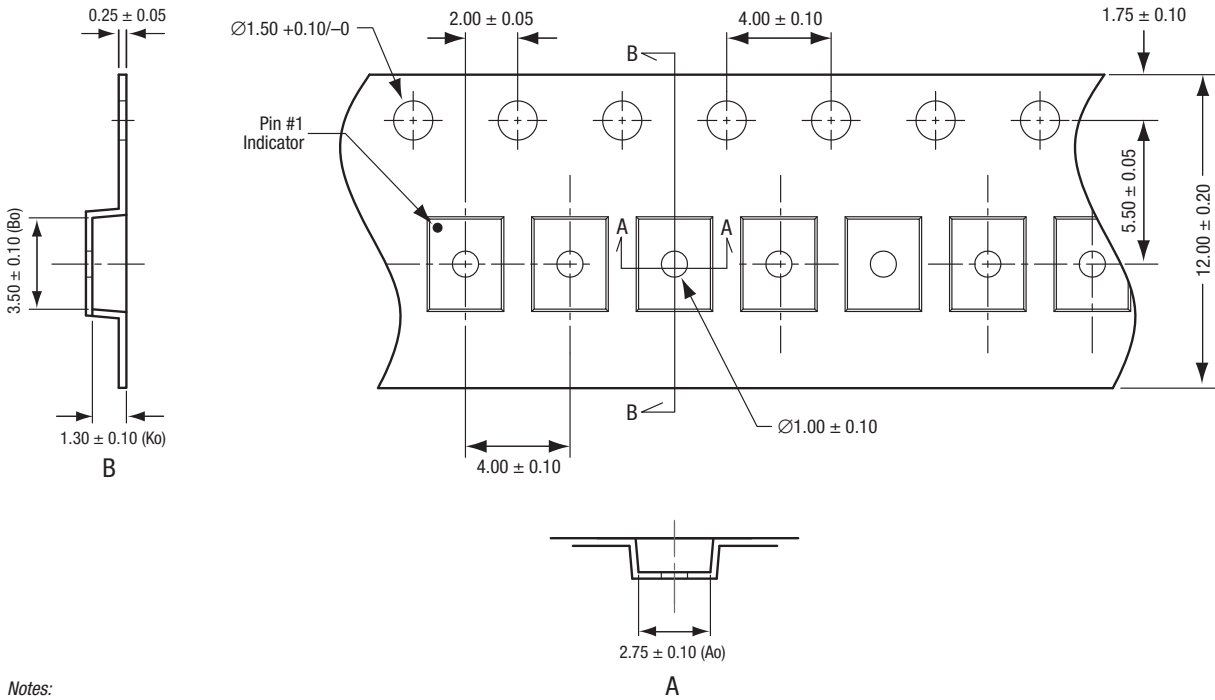
All measurements are in millimeters

Dimensioning and tolerancing according to ASME Y14.5M-1994

S3225

Figure 9. SKY13437 22-Pin MCM Package Dimensions





Notes:

1. Carrier tape: black conductive polycarbonate.
2. Cover tape material: transparent conductive material.
3. ESD-surface resistivity is  $\leq 1 \times 10^{10}$  Ohms/square per EIA, JEDEC TNR Specification.
4. 10 sprocket hole pitch cumulative tolerance:  $\pm 0.20$  mm
5. Ao and Bo measured on plane 0.30 mm above the bottom of the pocket.
6. All measurements are in millimeters.

S2686

Figure 10. SKY13437 Tape and Reel Dimensions

## Ordering Information

Model Name	Manufacturing Part Number	Evaluation Board Part Number
SKY13437: 0.4 to 2.7 GHz SP12T Switch	SKY13437	SKY13437-EVB

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