SKY13437-11: 0.4-2.7 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.
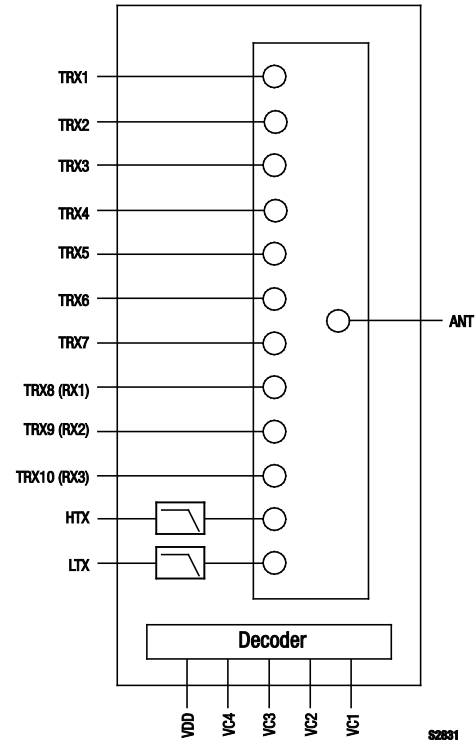

Figure 1. SKY13437-11 Block Diagram

Description

The SKY13437-11 is a Single Pole, Twelve Throw (SP12T) antenna switch with integrated GSM transmit harmonic filter. The SKY13437-11 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 2nd/3rd 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 SKY13437-11 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.
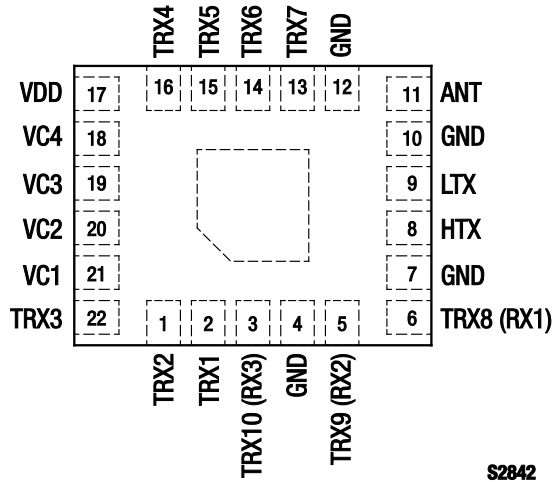
**Figure 2. SKY13437-11 Pinout – 22-Pin MCM
(Top View)**

Table 1. SKY13437-11 Signal Descriptions

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: Bottom ground paddles must be connected to ground.

Table 2. SKY13437-11 Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Power supply	V_{DD}	2.45	5.00	V
Digital control signals (VC1, VC2, VC3, VC4)	V_{CTRL}	−0.5	+3.0	V
RF input power: TX1 pin TX2 pin All TRXx pins	P_{IN}		+36 +34 +31	dBm dBm dBm
Storage temperature	T_{STG}	−55	+150	°C
Operating temperature	T_{OP}	−35	+90	°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 SKY13437-11 are provided in Table 2. Electrical specifications are provided in Table 3. Table 4 provides the control logic for the SKY13437-11.

The isolation matrices shown in Tables 5 and 6 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_{FUND}, is sequentially applied to the TRX1 through TRX10 ports, while a −15 dBm CW blocker signal, f_{BLK}, is applied to the ANT port.

The resulting 3rd Order Intermodulation Distortion (IMD3), f_{RX}, is measured over all phases of f_{FUND}. The SKY13437-11 exhibits exceptional performance for all TRXx ports.

Table 3. SKY13437-11 Electrical Specifications (Note 1) (1 of 3)
(V_{DD} = 2.85 V, T_{OP} = +25 °C, Characteristic Impedance [Z_0] = 50 Ω, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
RF Specifications						
Insertion loss	IL	Transmit low band, 915 MHz		1.35	1.50	dB
		Transmit high band, 1910 MHz		1.20	1.50	dB
		TRX1/2/4 ports, 704 to 787 MHz		0.55	0.65	dB
		TRX1/2/3 ports, 960 MHz		0.60	0.70	dB
		TRX1/2/3 ports, 2170 MHz		0.75	0.85	dB
		TRX1/2/3 ports, 2690 MHz		0.75	0.95	dB
		TRX4/5/6 ports, 960 MHz		0.65	0.75	dB
		TRX4/5/6 ports, 2170 MHz		0.70	0.90	dB
		TRX4/5/6 ports, 2690 MHz		0.90	1.10	dB
		TRX7 port, 960 MHz		0.65	0.75	dB
		TRX7 port, 2170 MHz		0.70	0.90	dB
		TRX7 port, 2690 MHz		1.00	1.20	dB
		TRX8/9/10 ports, 960 MHz		0.60	0.70	dB
		TRX8/9/10 ports, 2170 MHz		0.75	0.95	dB
		TRX8/9/10 ports, 2690 MHz		0.75	0.95	dB
GSM harmonic attenuation	H2LB	Transmit low band to ANT, 2fo 1648 to 1830 MHz		30		dB
	H3LB	Transmit low band to ANT, 3fo 2472 to 2745 MHz		29		dB
	H4LB	Transmit low band to ANT, 4fo 3296 to 3660 MHz		36		dB
	H2HB	Transmit high band to ANT, 2fo 3420 to 3820 MHz		27		dB
	H3HB	Transmit high band to ANT, 3fo 5130 to 5730 MHz		30		dB

Table 3. SKY13437-11 Electrical Specifications (Note 1) (2 of 3)
(V$_{DD}$ = 2.85 V, T$_{OP}$ = +25 °C, Characteristic Impedance [Z$_0$] = 50 Ω, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
RF Specifications (continued)						
Large signal harmonics	TXLB_HARM, 2fo/3fo	Transmit GSM low band, P$_{IN}$ <+34.5 dBm, VSWR = 1:1		−55	−45	dBm
	TXLB_HARM_VSWR, 2fo/3fo	Transmit GSM low band, P$_{IN}$ <+34.5 dBm, VSWR = 5:1, all phases		−42	−36	dBm
	TXHB_HARM, 2fo/3fo	Transmit GSM high band, P$_{IN}$ <+32 dBm, VSWR = 1:1		−61	−45	dBm
	TXHB_HARM_VSWR, 2fo/3fo	Transmit GSM high band, P$_{IN}$ <+32 dBm, VSWR = 5:1, all phases		−42	−36	dBm
	B13_HARM, 2fo	ANT to TRX1/2/4 ports @786.5 MHz, P$_{IN}$ <+25 dBm, VSWR = 1:1			−80	dBm
	TRXLB_HARM, 2fo/3fo	Transmit WCDMA low band, P$_{IN}$ <+26 dBm, VSWR = 1:1		−70	−60	dBm
	TRXLB_HARM_VSWR, 2fo/3fo	Transmit WCDMA low band, P$_{IN}$ <+26 dBm, VSWR = 5:1		−62	−45	dBm
	TRXHB_HARM, 2fo/3fo	Transmit WCDMA high band, P$_{IN}$ <+26 dBm, VSWR = 1:1, all phases		−66	−60	dBm
	TRXHB_HARM_VSWR, 2fo/3fo	Transmit WCDMA high band, P$_{IN}$ <+26 dBm, VSWR = 5:1, all phases		−55	−45	dBm
Isolation	Iso_TX1/2_1800	TX1 to TX2, @ 1648 to 1830 MHz	25.0	27.5		dB
	Iso_TX1/TRX_900	TX1 to TRXx pins, @ 824 to 915 MHz	35.0	40.0		dB
	Iso_TX1/RX_900	TX1 to receive ports (Note 2), @ 869 to 960 MHz	40.0	44.5		dB
	Iso_TX2/TRX_1800	TX2 to TRXx pins, @ 1710 to 1910 MHz	29.0	32.0		dB
	Iso_TX2/RX_1800	TX2 to receive ports (Note 2) @ 1805 to 1930 MHz	29.0	32.5		dB
	Iso_RX2/RX3_1990	TRX9 (RX2) to ANT when TRX10 (RX3) active, @ 1805 to 1990 MHz	30.0	35.0		dB

Table 3. SKY13437-11 Electrical Specifications (Note 1) (3 of 3)
(V_{DD} = 2.85 V, T_{OP} = +25 °C, Characteristic Impedance [Z_0] = 50 Ω, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
RF Specifications (continued)						
Isolation (continued)	Iso_$_{RX3/RX2}$_1990	TRX10 (RX3) to ANT when TRX9 (RX2) active, @ 1805 to 1990 MHz	33.0	35.0		dB
	Iso_$_{TRX/RX}$_1990	TRXx to receive ports (Note 2), @ 1710 to 2170 MHz	24.0	26.0		dB
	Iso_$_{TRX/TRX}$_2170	TRXx to TRXx, @ 1710 to 2170 MHz, non-adjacent pins	25.0	27.0		dB
	Iso_$_{TRX/TRX}$_2170	TRXx to TRXx, @ 1710 to 2170 MHz, adjacent pins	20.0	22.0		dB
2nd Order Intermodulation Distortion	IMD2	CW carrier on TRXx ports with P_{OUT} = +20 dBm, CW interferer on ANT port with P_{IN} = −15dBm, all blocker frequencies		−107	−105	dBm
3rd Order Intermodulation Distortion	IMD3	CW carrier on TRXx ports with P_{OUT} = +20 dBm, CW interferer on ANT port with P_{IN} = −15dBm, all blocker frequencies		−110	−105	dBm
DC Specifications						
Supply voltage	V_{DD}		2.50	2.85	4.80	V
Supply current: GSM850/EGSM900/DCS1800/ PCS1900 transmit WCDMA/CDMA2000 transmit/receive	I_{DD}			35 35	85 85	µA µA
Digital control signals: High Low Current	VC1, VC2, VC3, VC4		1.35 0	1.80	2.70 0.40 5	V V µA
DC supply turn-on/turn-off time				2	20	µs
RF path switching time		Between the ANT port and any TX1/2 or TRXx ports			3	µs
Supply ripple					20	mVp-p

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

Note 2: Dedicated receive ports are TRX8 (RX1), TRX9 (RX2), or TRX10 (RX3).

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Table 4. SKY13437-11 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 5. 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

Table 5. 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
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
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	−

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Table 6. 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
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

Table 6. 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
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	–
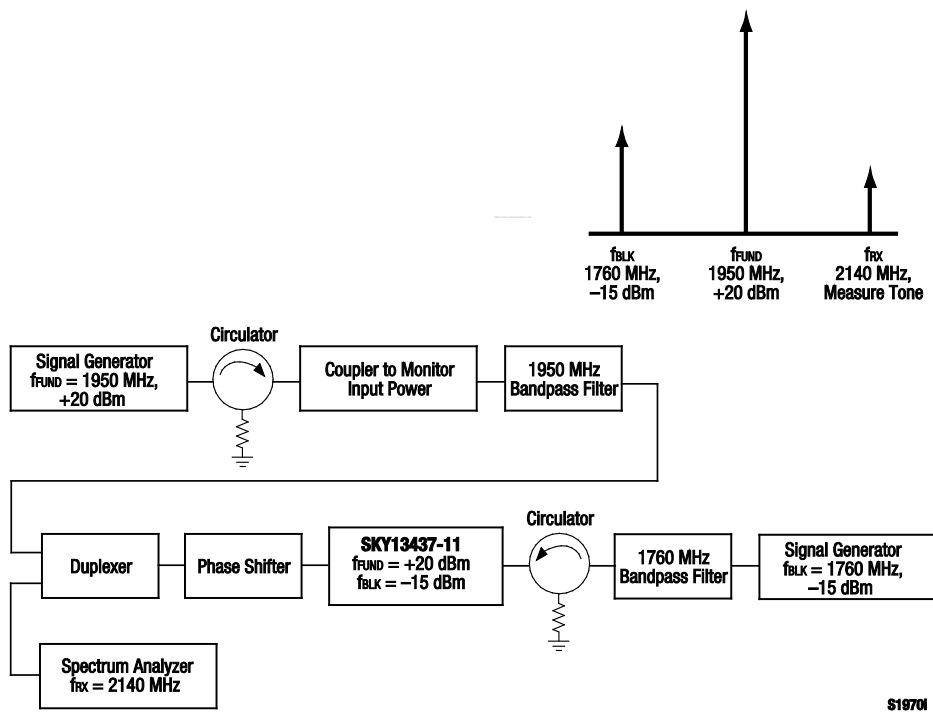
Figure 3. 3rd Order Intermodulation Test Setup

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Evaluation Board Description

The SKY13437-11 Evaluation Board is used to test the performance of the SKY13437-11 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 SKY13437-11 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 SKY13437-11 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.
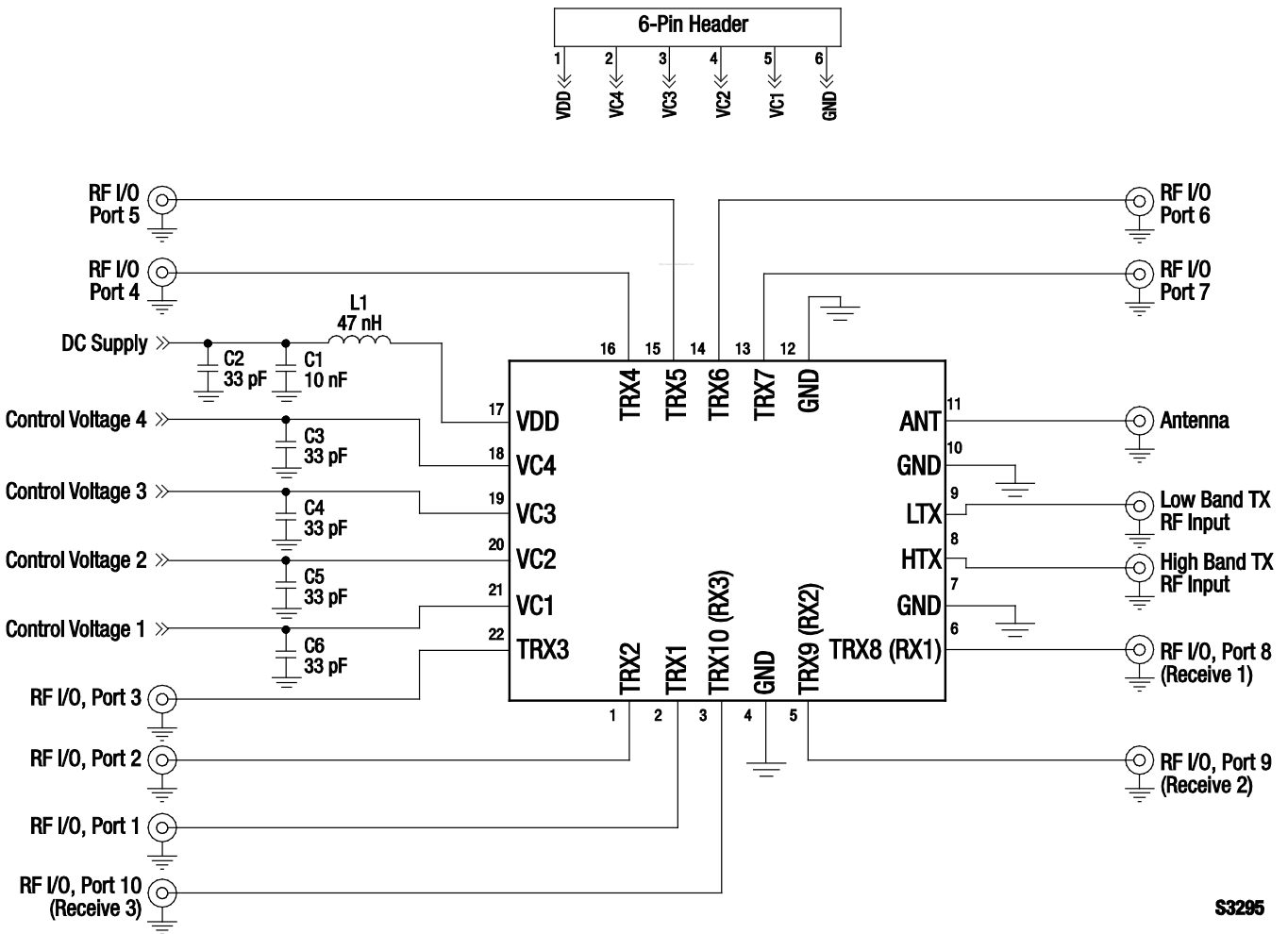
Figure 4. SKY13437-11 Evaluation Board Schematic
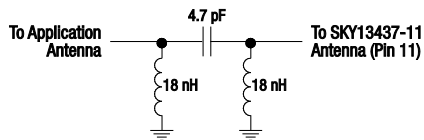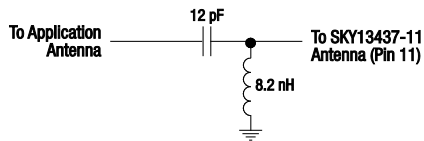
Figure 5. SKY13437-11 Recommended ESD Protection Circuits
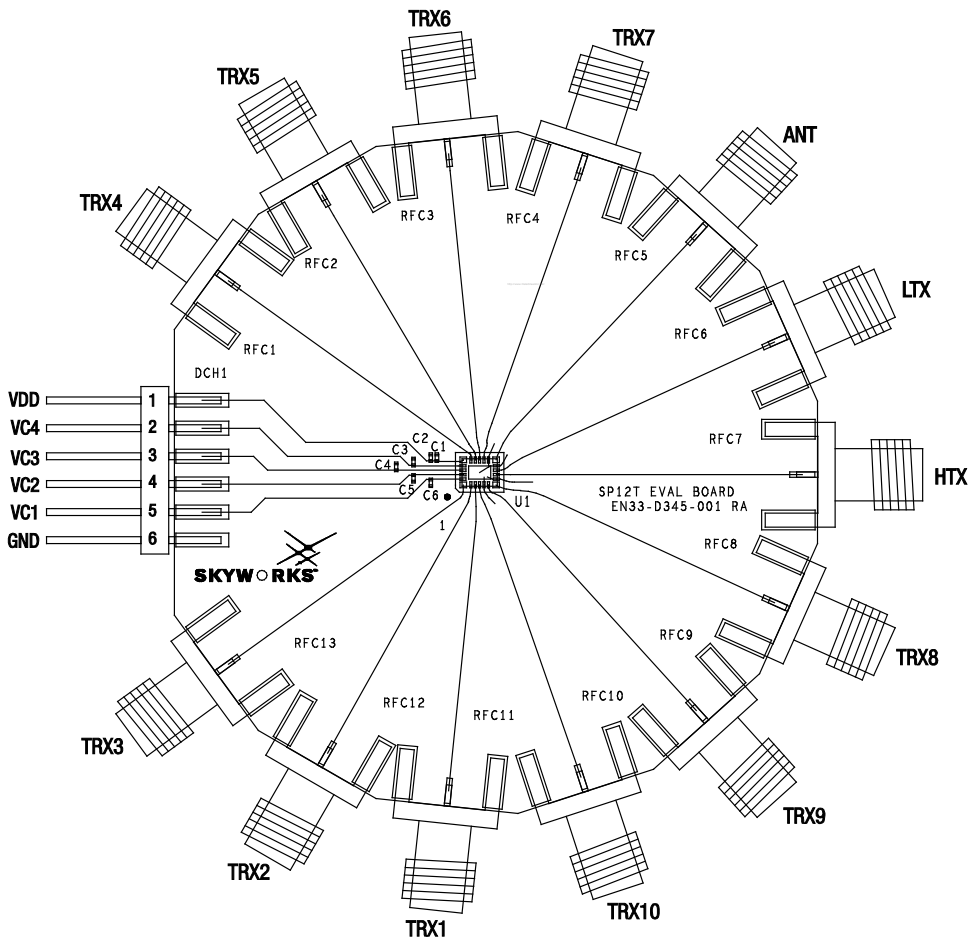
Note: Inductor L1 (pin 17 trace) not shown in this drawing, but is included in schematic and on actual Evaluation Board

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Figure 6. SKY13437-11 Evaluation Board Assembly Diagram

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Stencil Aperture
Top View

Metallization
Top View

Thermal via array Ø0.3 mm on
0.6 mm pitch will improve
thermal performance.
NOTE: thermal vias should be resin filled
and capped according to IPC-4761, Type VII
vias. 30-35 µm Cu thickness recommended.

Solder Mask Opening
Top View

All dimensions are in millimeters

S3226

**Figure 7. SKY13437-11 PCB Layout Footprint
(Top View)**
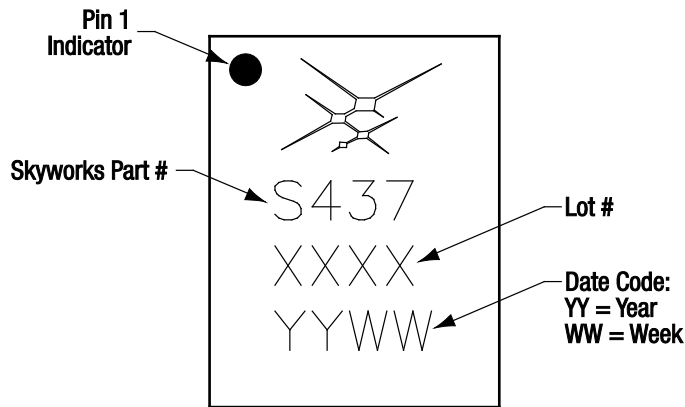
**Figure 8. Typical Part Markings
(Top View)**

Top View

Side View

Bottom View

Detail A
Pad
Scale: 2X
4X This Rotation
4X Rotated 180°
5X Rotated 270°
5X Rotated 90°

Detail B
Pad
Scale: 2X
1X This Rotation
1X Rotated 180°

Detail C
Pad
Scale: 2X
1X This Rotation
1X Rotated 180°

Detail D
Full Scale
1X This Rotation
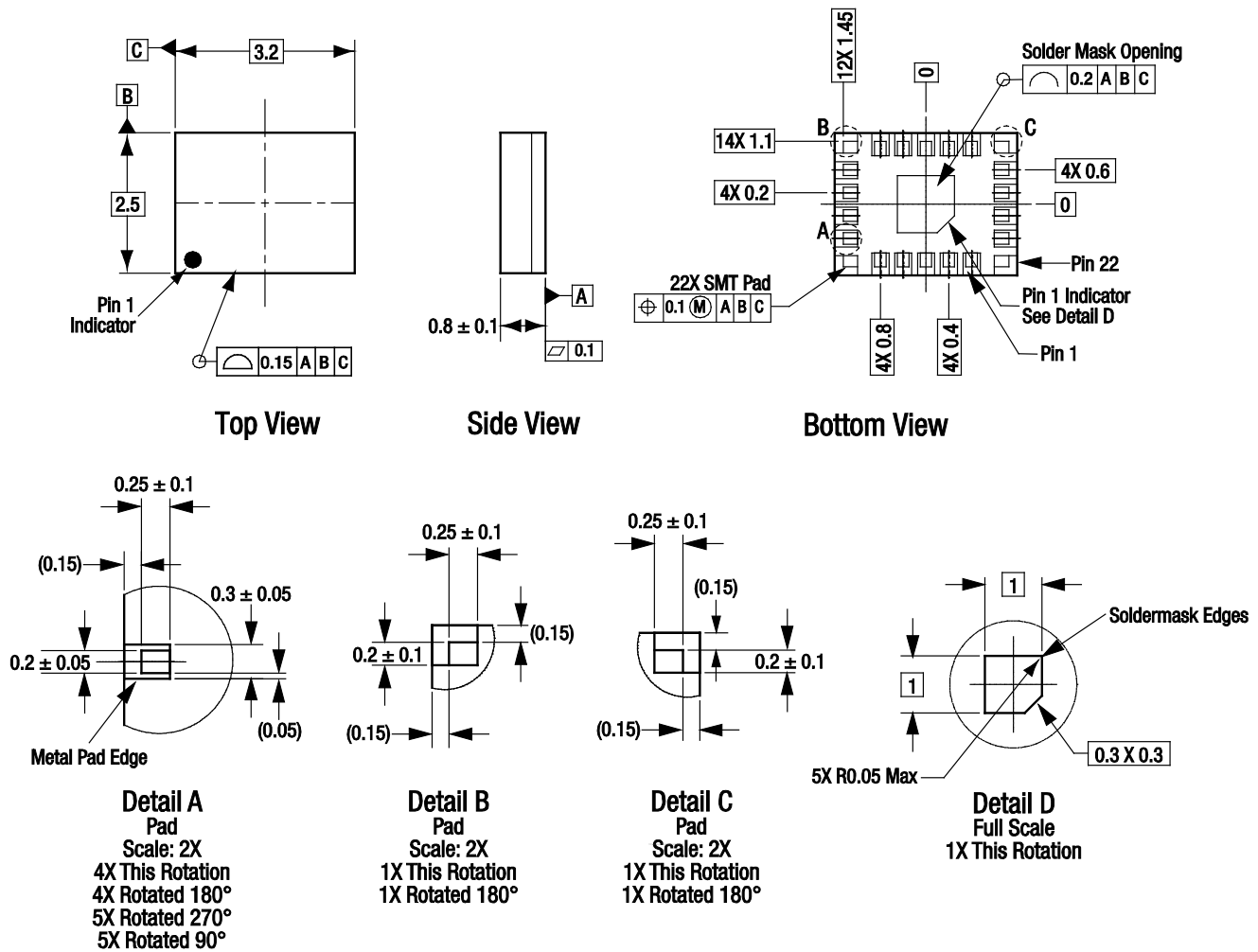
All measurements are in millimeters

Dimensioning and tolerancing according to ASME Y14.5M-1994   **S3225**

Figure 9. SKY13437-11 22-Pin MCM Package Dimensions

Figure 10. SKY13437-11 Tape and Reel Dimensions
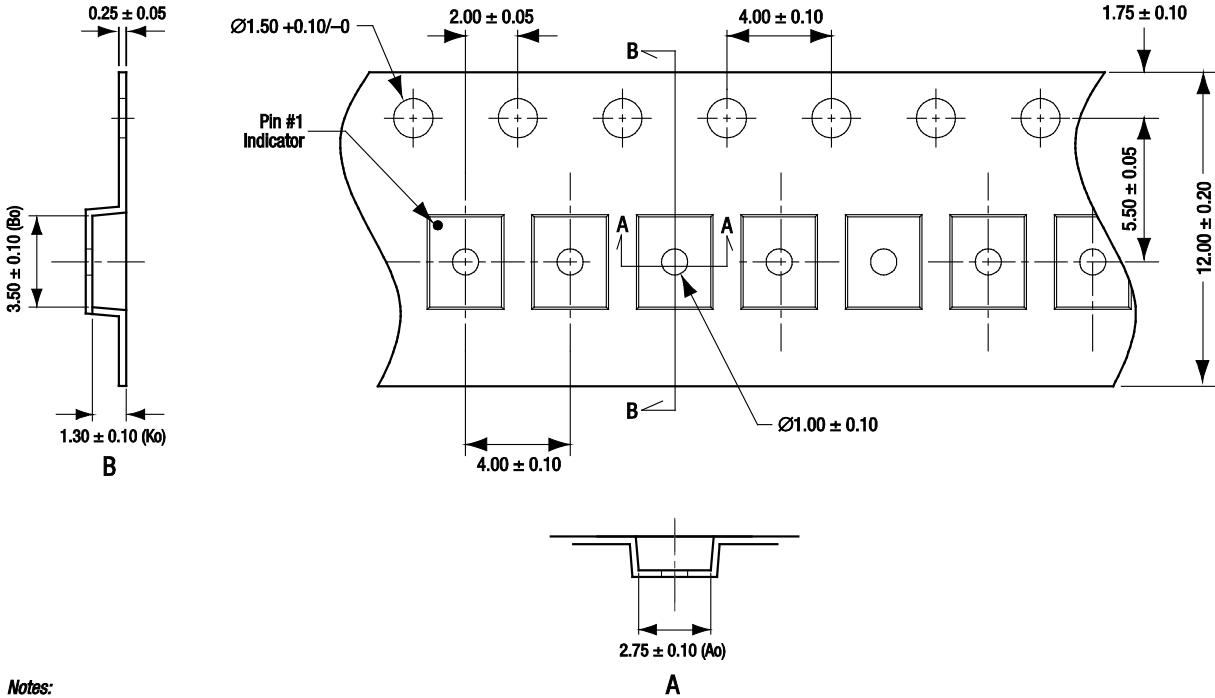
Notes:
1. *Carrier tape: black conductive polycarbonate.*
2. *Cover tape material: transparent conductive material.*
3. *ESD-surface resistivity is ≤1 x 10^{10} Ohms/square per EIA, JEDEC TNR Specification.*
4. *10 sprocket hole pitch cumulative tolerance: ±0.20 mm*
5. *Ao and Bo measusred on plane 0.30 mm above the bottom of the pocket.*
6. *All measurements are in millimeters.*

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Ordering Information

Model Name	Manufacturing Part Number	Evaluation Board Part Number
SKY13437-11 0.4-2.7 GHz SP12T Switch	SKY13437-11	SKY13437-11-EVB

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