SONY

Dual-SP3T (SP3Tx2) SOI Antenna Switch

CXA2947GC

Description

The CXA2947 is Rx power SP3Tx2 antenna switch for balanced signal switching application.

The CXA2947 has a 1.8 V CMOS compatible decoder.
The SONY Silicon On Insulator (SOI) technology is used for low insertion loss.

Features

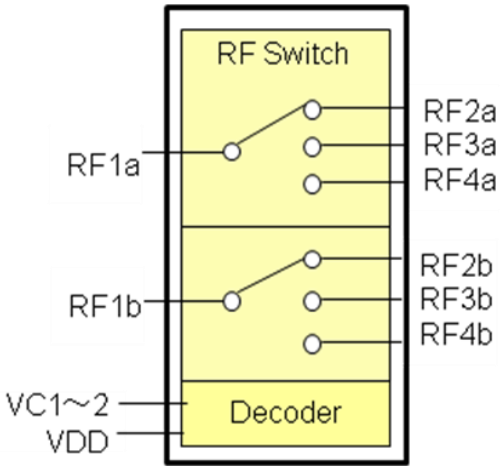
◆Low Insertion loss : 0.30 dB (typ.) @800 MHz
0.35 dB (typ.) @2 GHz
0.40 dB (typ.) @2.7 GHz
◆No DC Blocking Capacitors (except sourcing DC bias)
◆Solder Bump Bare Die(SBBD) : Bump Pitch = 0.4 mm
◆Small Flip-Chip Size : 1.5 mm x 1.5 mm x 0.35 mm Typ.
◆Lead-Free and RoHS compliant

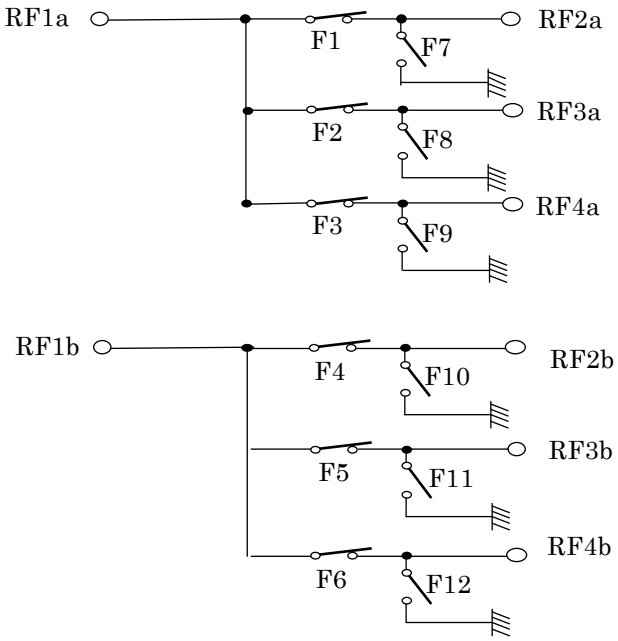
Structure

SOI CMOS MMIC

This IC is ESD sensitive device. Special handling precautions are required

Block Diagram of Dual-SP3T SOI Antenna Switch



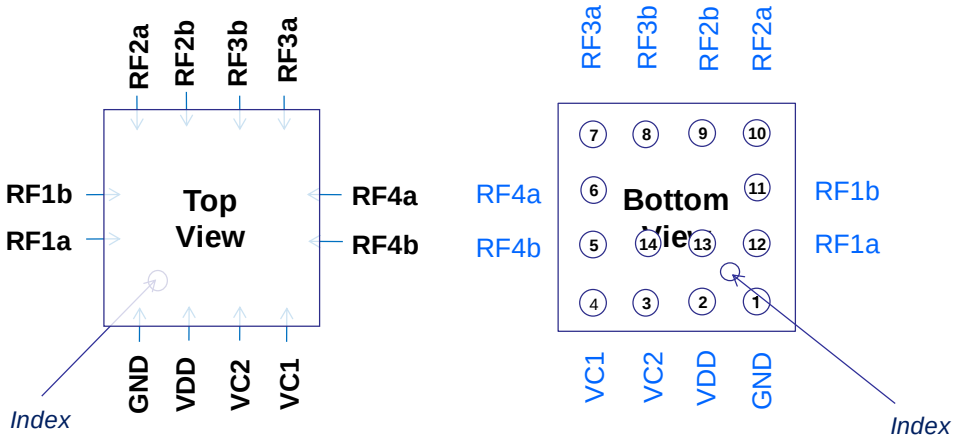


Truth Table

State	Active Path	VC State		Switch State											
		1	2	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
1	RF1a-RF2a、 RF1b-RF2b	H	L	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	ON	OFF	ON	ON
2	RF1a-RF3a、 RF1b-RF3b	L	L	OFF	ON	OFF	OFF	ON	OFF	ON	OFF	ON	ON	OFF	ON
3	RF1a-RF4a、 RF1b-RF4b	L	H	OFF	OFF	ON	OFF	OFF	ON	ON	ON	OFF	ON	ON	OFF

Pin Configuration

Chip Size：1.5 x 1.5 mm （0.4 mm pitch, Φ200 um）



No.	Name
1	GND
2	VDD
3	VC2
4	VC1
5	RF4b
6	RF4a
7	RF3a
8	RF3b
9	RF2b
10	RF2a
11	RF1b
12	RF1a
13	GND
14	GND

Absolute Maximum Ratings

◆Supply voltage	V_{DD}	4	V	(Ta = 25 °C)
◆Control voltage	VC	4	V	(Ta = 25 °C)
◆Maximum input		25	dBm	(Ta = 25 °C, VDD = 2.5 to 3.3 V)
◆Operating temperature	Topr	–35 to +90	°C	
◆Storage temperature	Tstg	–65 to +150	°C	

DC Bias Condition

(Ta = 25 °C)

Parameter	Min.	Typ.	Max.	Unit
VDD	2.5	2.8	3.3	V
VC(H)	1.3	1.8	3.3	V
VC(L)	0	-	0.45	V

Electrical Characteristics

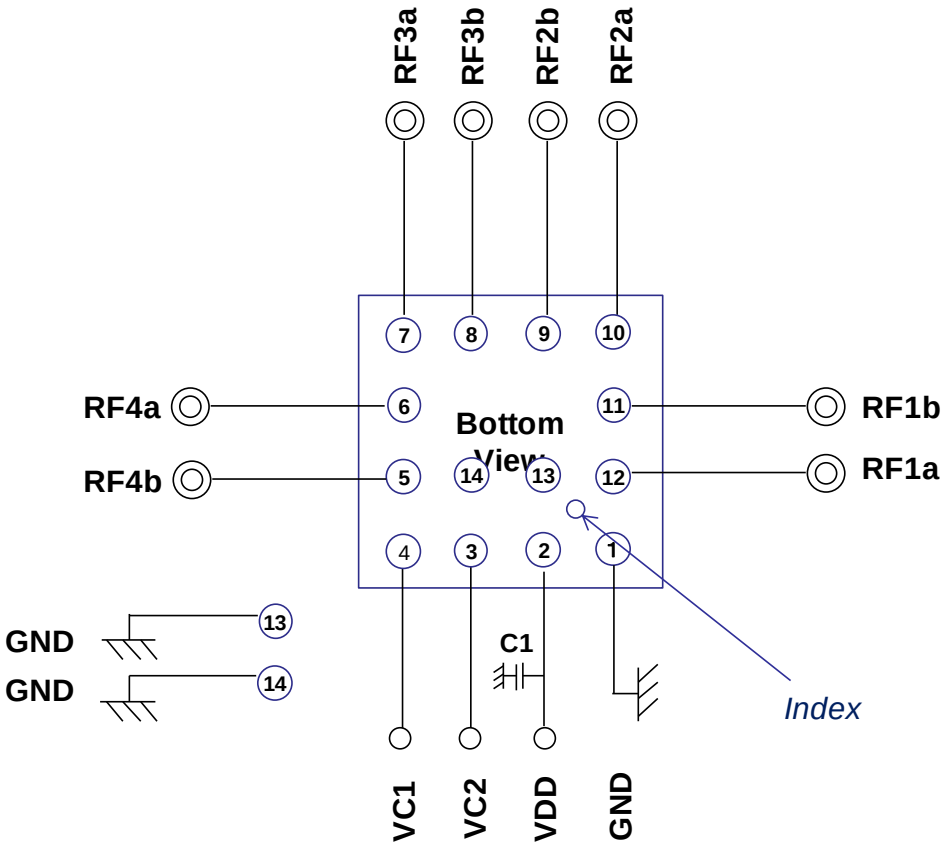
(V_{DD} = 2.5 V, Ta = 25 °C)

Item	Symbol	Path	Condition	Min.	Typ.	Max.	Unit
Insertion Loss	IL	RF1a - RF2a	*1	-	0.30	0.40	dB
			*2	-	0.35	0.50	
			*3	-	0.40	0.55	
		RF1a - RF3a	*1	-	0.30	0.40	
			*2	-	0.35	0.50	
			*3	-	0.40	0.55	
		RF1a - RF4a	*1	-	0.30	0.40	
			*2	-	0.35	0.50	
			*3	-	0.40	0.55	
		RF1b - RF2b	*1	-	0.30	0.40	
			*2	-	0.40	0.55	
			*3	-	0.45	0.60	
		RF1b - RF3b	*1	-	0.30	0.40	
			*2	-	0.40	0.55	
			*3	-	0.45	0.60	
		RF1b- RF4b	*1	-	0.30	0.40	
			*2	-	0.40	0.55	
			*3	-	0.50	0.65	
Isolation	ISO	RF1a/b - RF2a/b	*1	32	37	-	dB
			*2	24	29	-	
			*3	23	27	-	
		RF1a/b - RF3a/b	*1	35	44	-	
			*2	26	31	-	
			*3	23	28	-	
		RF1a/b - RF4a/b	*1	35	44	-	
			*2	28	33	-	
			*3	24	29	-	
VSWR	VSWR	All Ports in Active Paths	734 to 2170 MHz	-	1.20	1.40	-
			2500 to 2690 MHz	-	1.30	1.50	
Switching Time	Ts		50 % Ctl to 90 % RF	-	2	5	µs
Control Current	Ictl		Vctl = 1.80 V	-	0.01	1	µA
Supply Current	Idd		Vdd = 2.60 V	-	14	30	µA

Electrical Characteristics are measured with all RF ports terminated in 50 Ohms.

* 1 freq = 734 to 960 MHz
* 2 freq = 1805 to 2170 MHz
* 3 freq = 2620 to 2690 MHz
* 4 Measured with the recommended circuit

Recommended Circuit

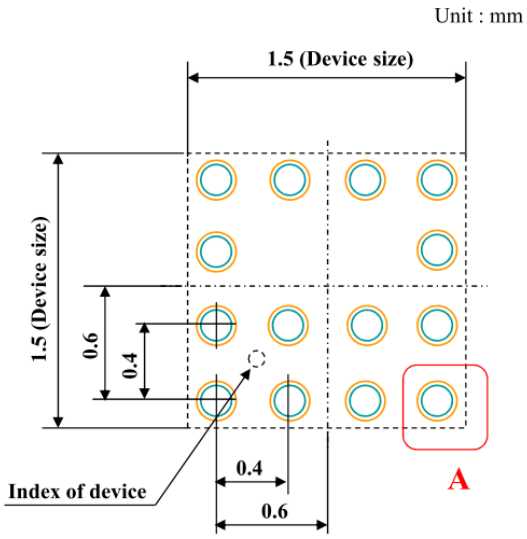


*1: No DC blocking capacitors are required on all RF ports.
*2: DC levels of all RF ports are GND.
*4: C1 (100 pF) is recommended on VDD pin for Decoupling Capacitor.

Solder Bump Foot Print (Macro) *Reference

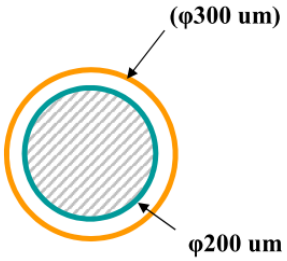
Device specification

- •Device size : 1.5 mm × 1.5 mm × t 0.35 mm
- •Pin counts : 14 Pin
- •Solder Bump height : 0.15 mm
- •Solder Bump ball size : φ0.2 mm
- •Solder Bump pitch : 0.4 mm



Detail - A

- •Land size (Resist Open area) : φ200 um
- •Cu pattern size : (φ300 um)

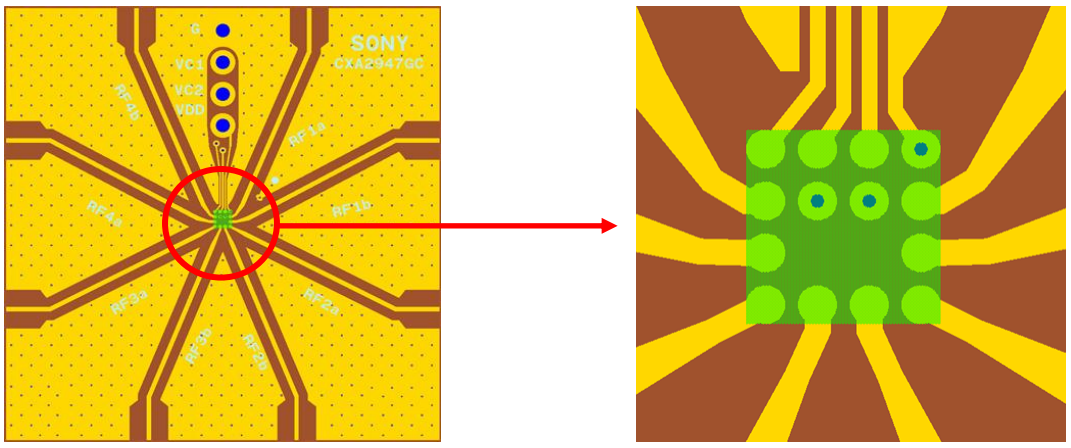


: Cu pattern

: Resist open

: Solder print area (Metal mask thickness : 110 um)

Recommended PCB Layout

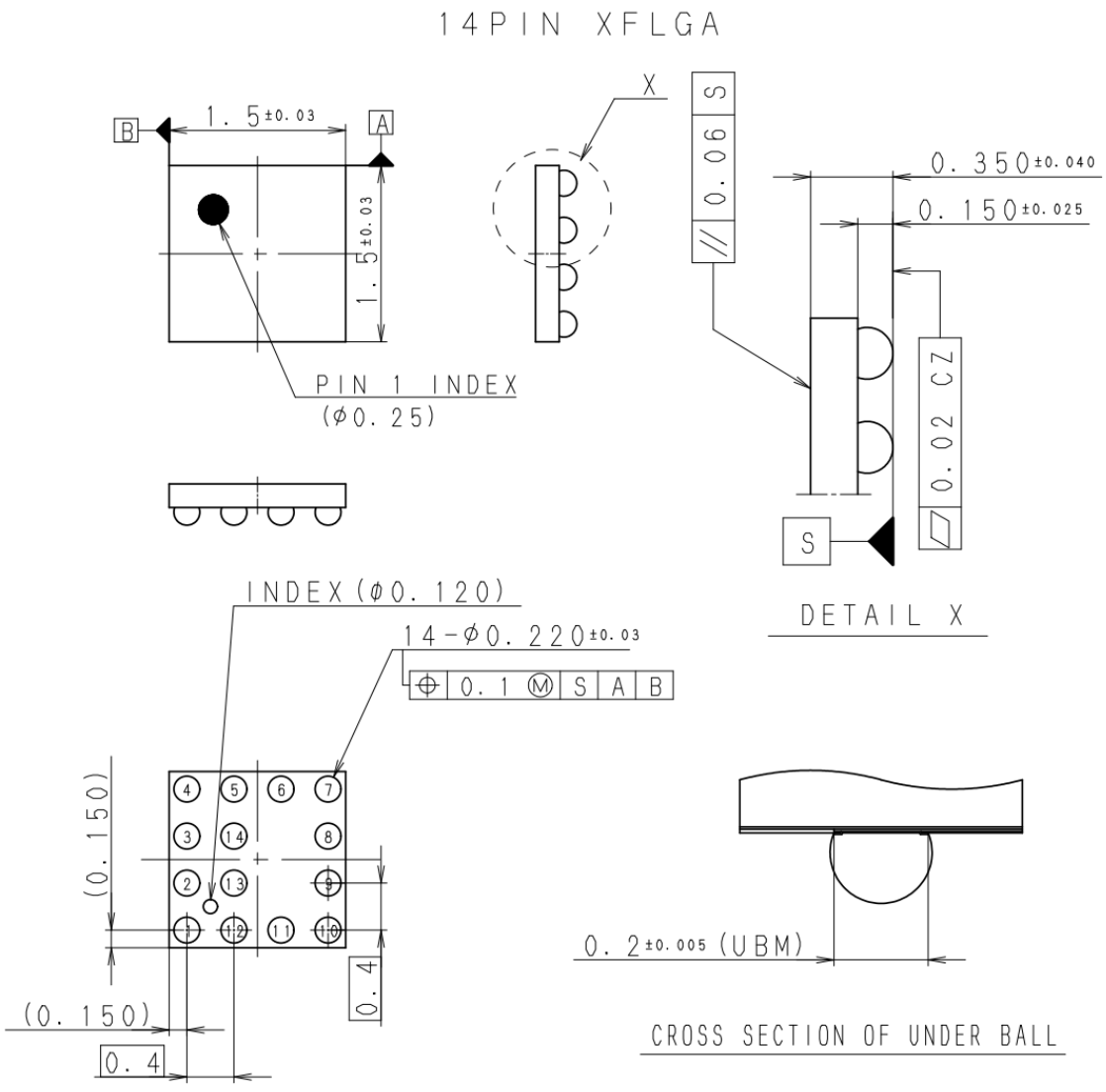


Device Area

Via

Metal Pattern

Package Outline



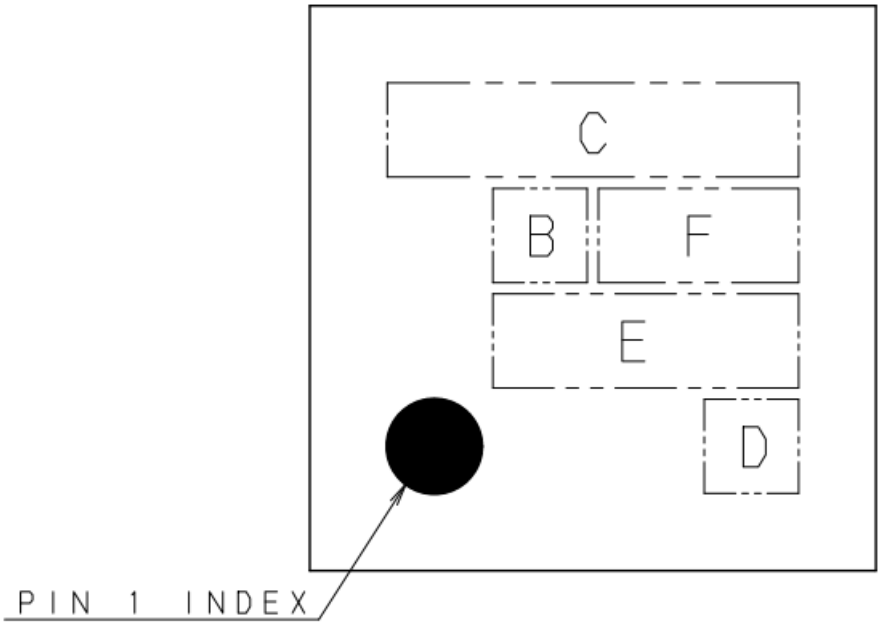
PACKAGE STRUCTURE

SONY CODE	XFLGA-14S-432
JEITA CODE	S-XFLGA14-1.5x1.5-0.4
JEDEC CODE	————

PACKAGE MATERIAL	Si SUBSTRATE
TERMINAL MATERIAL	Sn-3.0Ag-0.5Cu
PACKAGE MASS	0.0014g

PART No. AP-2000-14LGAS2	Rev. 0
ISSUED 12.12.18	REVISED
PRODUCTION LINE	COMPILING DIV. SONY SEMICONDUCTOR.
REMARKS PKG CORD:GX-14-CAS	

Marking



MARKING C: 2947

注1） C部は製品名（Ｍａｘ４文字）を配置する。
（４文字を超える場合は製品名省略標示規定に従う。）
2） B部は製造年（１文字）を配置する。
3） D部は組立場所記号（１文字）を配置する。
4） E部は通し記号（ＭＡＸ３文字）を配置する。
5） F部は製造週（ＭＡＸ２文字）を配置する。

< INSTRUCTIONS >
1) TYPE NO.(MAX 4 CHARACTERS) IN SECTION C.
(FOR MORE THAN 4 CHARACTERS FOLLOW RULES FOR ABBREVIATIONS.)
2) MANUFACTURING YEAR (1 CHARACTER) IN SECTION B.
3) ASSEMBLY LOCATION CODE (1 CHARACTER) IN SECTION D.
4) SERIAL CODE (MAX 3 CHARACTERS) IN SECTION E.
5) MANUFACTURING WEEK (MAX 2 CHARACTERS) IN SECTION F.

Moisture Sensitivity

Moisture Sensitivity Level for this part is MSL = 1

Note: The MSL of this product contains the following storage conditions (Taping).

Storage period

(With or without opening moisture-proof packing)

⇒The storage time limit shall be 1 year or less under storage environment conditions of temperature 30 ℃ or less and humidity 85 %RH or less.

*This device is unnecessary management of moisture sensitivity.

However, we will assume 1 year for the convenience of seal strength of the taping product.

Avoid storage in locations exposed to direct sunlight, locations where corrosive gases are generated, or dusty locations.

Note

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Application circuits shown, if any, are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits