

# SONY

## SPDT SOI Antenna Switch

# CXA4403GC

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### Description

The CXA4403GC is a SPDT antenna switch for 3G/LTE switching applications.  
The CXA4403GC has a 1.8 V CMOS compatible decoder.  
The Sony Silicon On Insulator (SOI) technology is used for low insertion loss.

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### Features

- ◆ Low Insertion loss : 0.23 dB(typ.) at 800 MHz  
0.30 dB(typ.) at 2 GHz  
0.36 dB(typ.) at 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 : 0.7 mm × 1.1 mm × 0.35 mm Typ.
- ◆ Lead-Free and RoHS compliant
- ◆ Applications: Diversity Switch, 3G/LTE Tx Switch

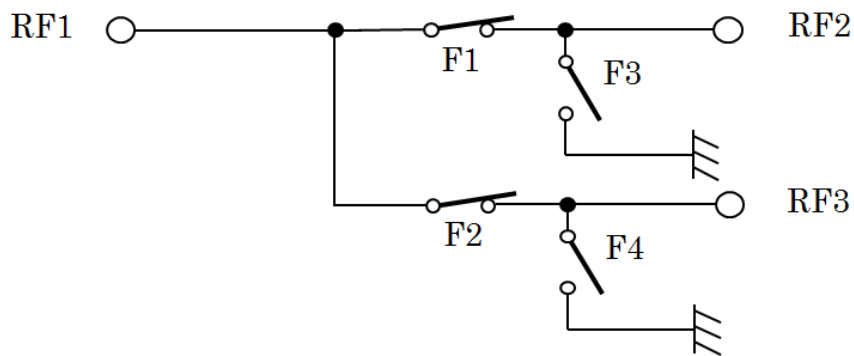
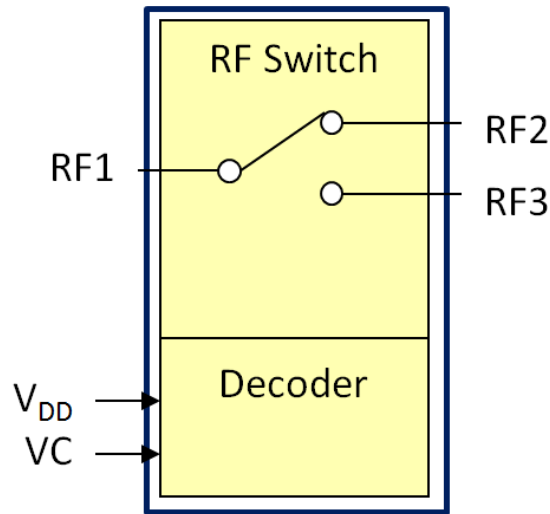
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### Structure

SOI CMOS MMIC

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

Block Diagram

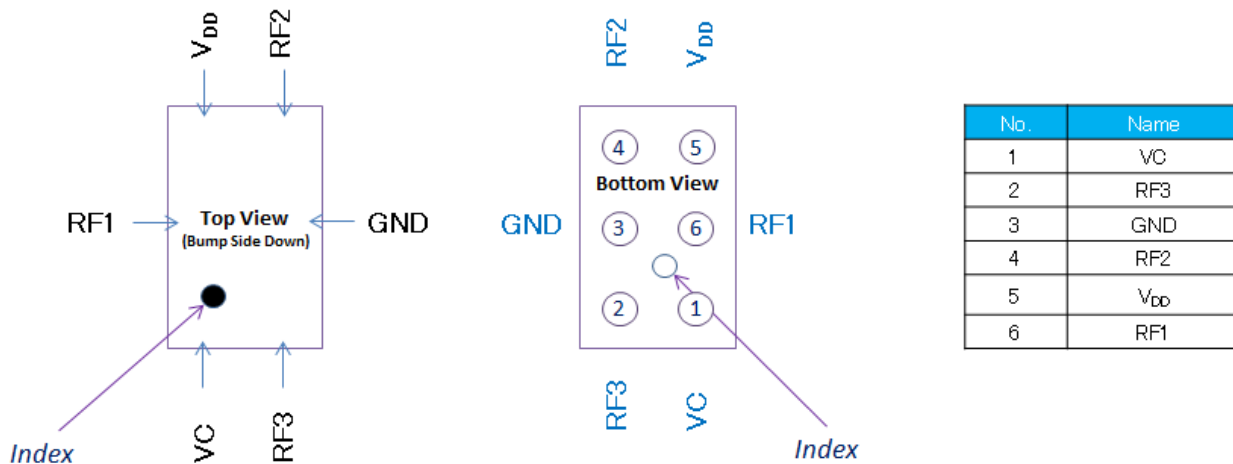


Truth Table

State	Active Path	State	SW State			
		VC	F1	F2	F3	F4
1	RF1-RF2	L	ON	OFF	OFF	ON
2	RF1-RF3	H	OFF	ON	ON	OFF

Pin Configuration

Chip Size: 0.7 × 1.1 mm (0.4 mm Pitch)



Absolute Maximum Ratings

◆ Supply voltage	V <sub>DD</sub>	4	V	(Ta = 25 °C)
◆ Control voltage	VC	4	V	(Ta = 25 °C)
◆ Maximum input		31	dBm	(Ta = 25 °C, V <sub>DD</sub> =2.4 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
V <sub>DD</sub>	2.5	2.8	3.3	V
VC(H)	1.35	1.8	3.3	V
VC(L)	0	-	0.45	V

**Electrical Characteristics 1**

(V<sub>DD</sub>=2.5 V, T<sub>a</sub>=25 °C)

Item	Symbol	Path	Condition	Min.	Typ.	Max.	Unit
Insertion Loss	IL	RF1 - RF2	*1	—	0.23	0.33	dB
			*2	—	0.29	0.44	
			*3	—	0.30	0.45	
			*4	—	0.38	0.53	
		RF1 - RF3	*1	—	0.23	0.33	
			*2	—	0.28	0.43	
			*3	—	0.30	0.45	
			*4	—	0.36	0.51	
Isolation	ISO	RF1 - RF2,3	*1	34	39	—	dB
			*2	26	29	—	
			*3	25	28	—	
			*4	22	25	—	
		RF2 - RF3	*1	30	35	—	
			*2	25	28	—	
			*3	23	26	—	
			*4	21	24	—	
VSWR	VSWR		704 to 2170 MHz	—	1.1	1.3	—
			2500 to 2690 MHz	—	1.15	1.4	
Harmonics	2fo	RF1 - RF2,3	*5	—	-60	-45	dBm
	3fo		*6	—	-70	-45	
	2fo		*7	—	-60	-45	
	3fo			—	-70	-45	
	2fo			—	-60	-45	
	3fo			—	-70	-45	
Inter Modulation Product Power in Rx Band	IMD2	RF1 - RF2,3	*8, *16	—	—	-105	dBm
			*9-11, *16	—	—	-105	
	IMD3		*12, *16	—	—	-105	
			*13-15, *16	—	—	-105	
Control Current	I <sub>ctl</sub>		V <sub>C</sub> =1.8 V per line	—	0.05	1	μ A
Supply Current	I <sub>dd</sub>		V <sub>DD</sub> = 2.5 V	—	13	30	μ A
Swiching Speed	T <sub>s</sub>		50 % V <sub>C</sub> to 90 % RF	—	2	5	μ S
Wake up time	T <sub>w</sub>		Wakeup time from V <sub>DD</sub> on to Active mode	—	10	30	μ S

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

- \* 1 freq = 704 to 960 MHz
- \* 2 freq = 1710 to 1990 MHz
- \* 3 freq = 2110 to 2170 MHz
- \* 4 freq = 2500 to 2690 MHz
- \* 5 Pin = 26 dBm, freq =704 to 915 MHz
- \* 6 Pin = 26 dBm, freq = 1920 to 1980 MHz
- \* 7 Pin = 26 dBm, freq = 2500 to 2570 MHz
- \* 8 Pin on RF: 20 dBm, 835 MHz, Pin on ANT: -15 dBm, 45 MHz
- \* 9 Pin on RF: 20 dBm, 1745 MHz, Pin on ANT: -15 dBm, 95 MHz
- \* 10 Pin on RF: 20 dBm, 1880 MHz, Pin on ANT: -15 dBm, 80 MHz
- \* 11 Pin on RF: 20 dBm, 1950 MHz, Pin on ANT: -15 dBm, 190 MHz
- \* 12 Pin on RF: 20 dBm, 835 MHz, Pin on ANT: -15 dBm, 790 MHz
- \* 13 Pin on RF: 20 dBm, 1745 MHz, Pin on ANT: -15 dBm, 1650 MHz
- \* 14 Pin on RF: 20 dBm, 1880 MHz, Pin on ANT: -15 dBm, 1800 MHz
- \* 15 Pin on RF: 20 dBm, 1950 MHz, Pin on ANT: -15 dBm, 1760 MHz
- \* 16 Measured with the recommended circuit

## Electrical Characteristics 2

( $V_{DD}=2.5\text{ V}$ ,  $T_a=25\text{ }^\circ\text{C}$ )

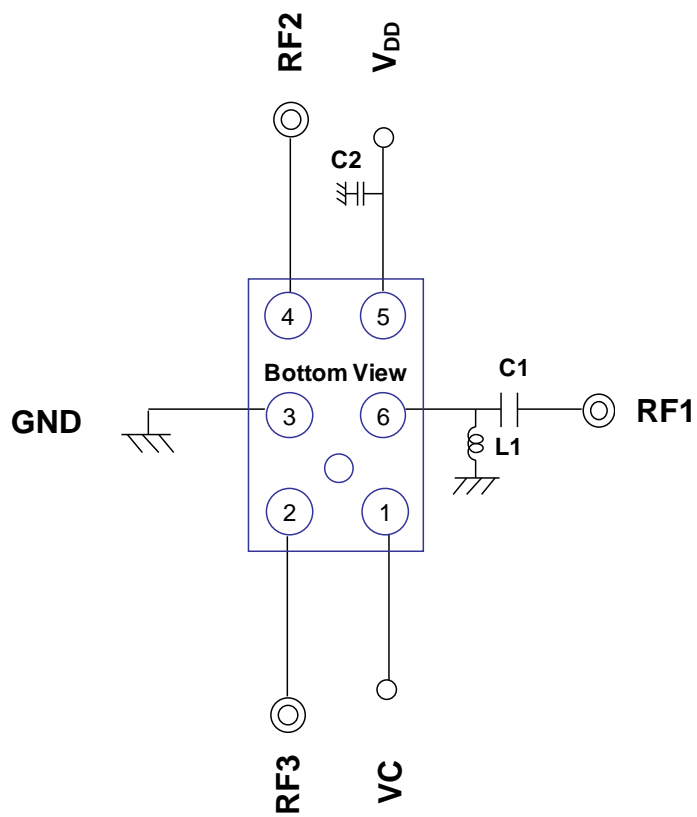
Item	Symbol	Path	Condition	Min.	Typ.	Max.	Unit
Insertion Loss	IL	RF1 - RF2	*17	—	0.19	0.29	dB
			*18	—	0.21	0.31	
		RF1 - RF3	*17	—	0.19	0.29	
			*18	—	0.21	0.31	
Isolation	ISO	RF1 - RF2,3	*17	50	55	—	dB
			*18	37	42	—	
		RF2 - RF3	*17	44	49	—	
			*18	33	38	—	

Electrical Characteristics are measured with all RF ports terminated in  $50\ \Omega$ .

\* 17 freq = 207.5 to 222 MHz

\* 18 freq = 470 to 770 MHz

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**Recommended Circuit**

\*1: No DC blocking capacitors are required on all RF ports.

\*2: DC levels of all RF ports are GND.

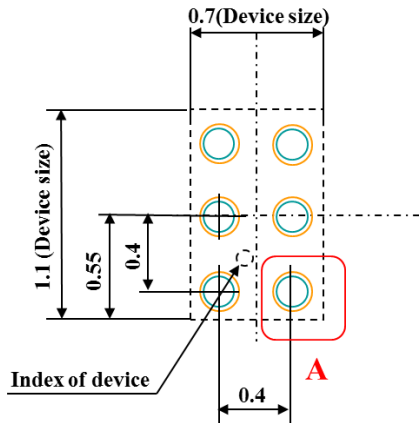
\*3: L1 (27 nH) and C1 (6.8 pF) are recommended on Ant port for ESD protection.

\*4: C2(100 pF) is recommended on V<sub>DD</sub> pin for Decoupling Capacitor.

**Solder Bump Foot Print (Macro) Reference**

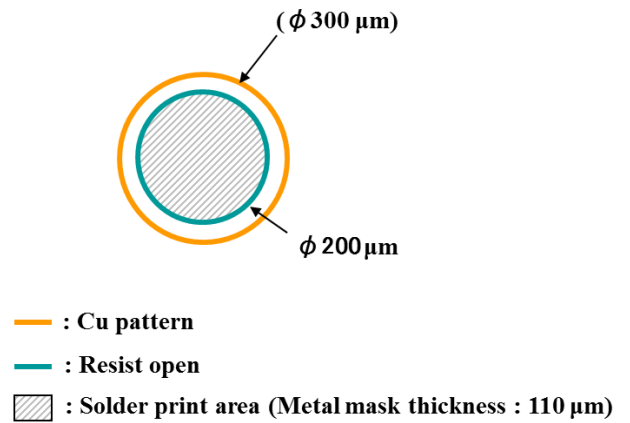
Device specification

- Device size : 0.7 mm × 1.1 mm × t 0.35 mm
- Pin counts : 6 Pin
- Solder Bump height : 0.15 mm
- Solder Bump ball size :  $\phi$  0.2 mm
- Solder Bump pitch : 0.4 mm

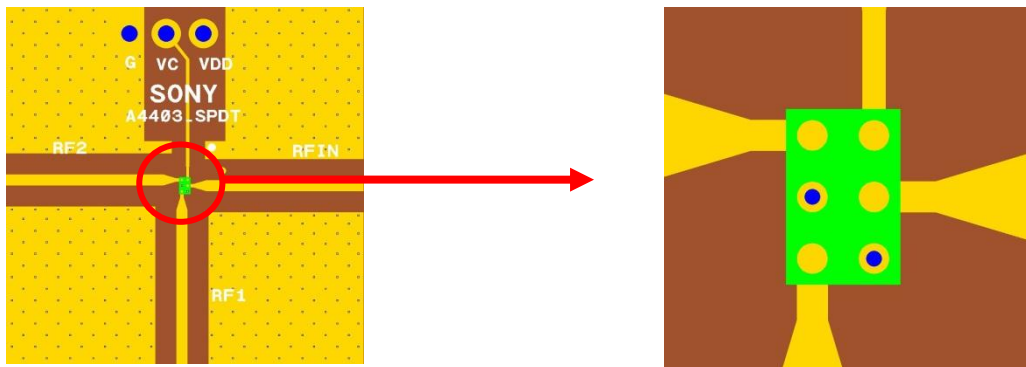


Detail - A

- Land size (Resist Open area) :  $\phi$  200  $\mu$ m
- Cu pattern size : ( $\phi$  300  $\mu$ m)



**Recommended PCB Layout**

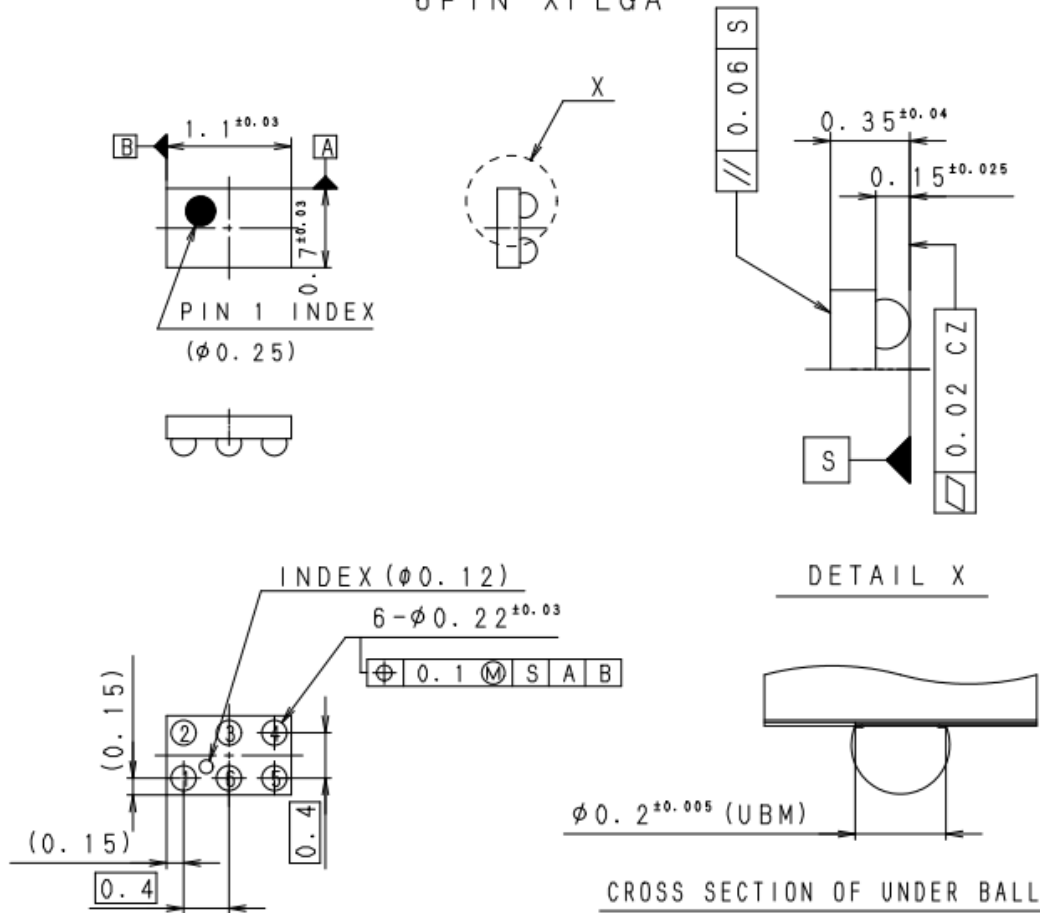


- Device Area
- Via
- Metal Pattern

Package Outline

Unit : mm

6PIN XFLGA



PACKAGE STRUCTURE

SONY CODE	XFLGA-6S-431
JEITA CODE	S-XFLGA6-0.7X1.1-0.4
JEDEC CODE	_____

PACKAGE MATERIAL	Si SUBSTRATE
TERMINAL MATERIAL	Sn-3.0Ag-0.5Cu
PACKAGE MASS	0.0005g

PART No.	AP-2000-6LGAS1	Rev. 0
ISSUED	13.02.05	REVISED
PRODUCTION LINE	COMPILING DIV. SONY SEMICONDUCTOR.	
REMARKS	PKG CORD:GX-6-EAS	

**Tape and Reel Size**

CXA4403GC-T9

Unit : mm

8 mm WIDTH EMBOSSED TAPING

PACKAGE CODE	EMBOSSSED TAPING CODE
XFLGA-6S-431	R006XLN4-08-N-1

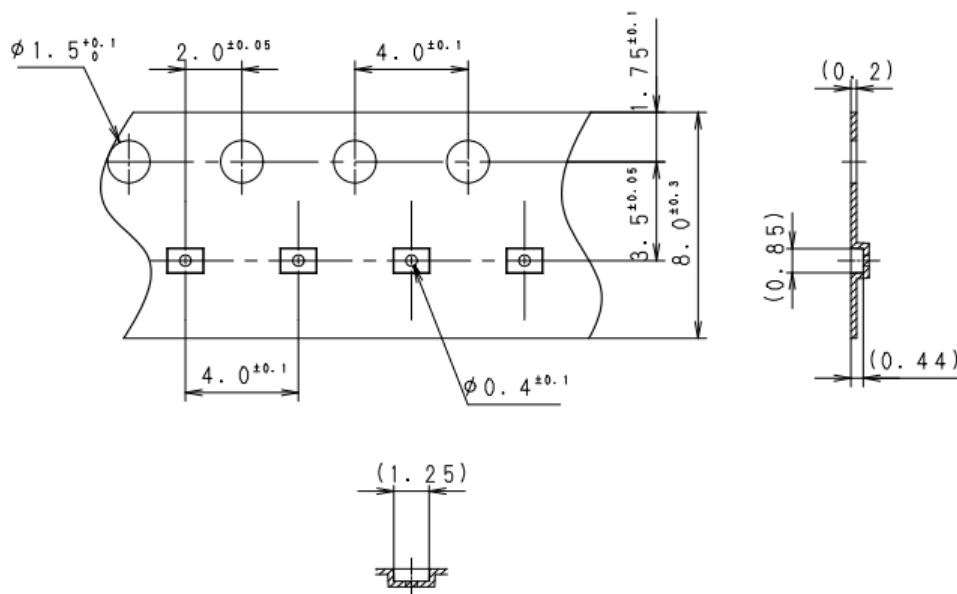
1. SCOPE

THIS SPECIFICATION DESCRIBES THE EMBOSSED TAPING FOR SMD (SURFACE MOUNTED DEVICE) IC'S, FOR SHIPMENT. THIS SPECIFICATION IS BASED ON THE STIPULATIONS OF JAPAN ELECTRONICS AND INFORMATION TECHNOLOGY INDUSTRIES ASSOCIATION (JEITA), JIS C0806-3, AND ELECTRONIC INDUSTRIES ASSOCIATION EIA-481.

2. PRODUCT INDICATION



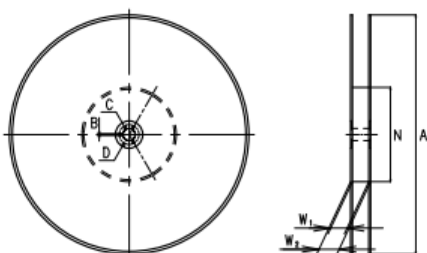
3. TAPING SPECIFICATIONS



NOTE) 1. THE R MEASUREMENT WITHOUT INDICATION IS ASSUMED TO BE 0.3mm MAX. GENERAL TOLERANCE:  $\pm 0.2$   
 2. THE FEED HOLE CUMULATIVE PITCH ERROR IS ASSUMED AT  $\pm 0.2$ mm/10 PITCH. UNIT: mm

4. REEL DIMENSIONS

$\phi 180$ mm PLASTIC REEL

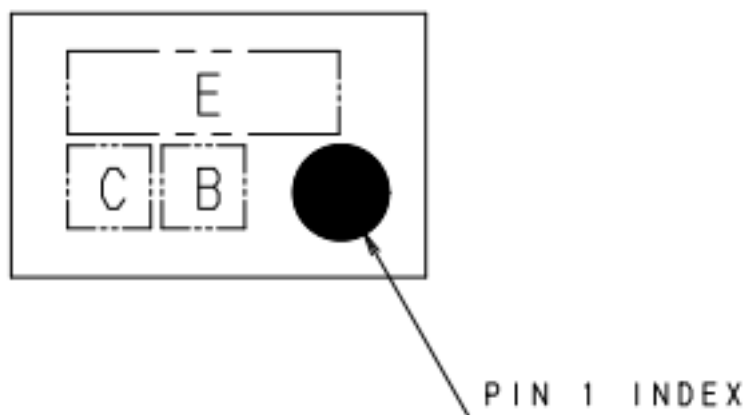


UNIT : mm

SYMBOL	A	N	C	D
DIMENSION	$\phi 180 \pm 2$	$\phi 54^{+2}$	$\phi 13^{+2}$	$\phi 20.2^{+0.1}$
SYMBOL	B	W <sub>1</sub>	W <sub>2</sub>	
DIMENSION	$1.5^{+0.1}$	$8.4^{+2.5}$	$12.4 \pm 2$	

MATERIAL: POLYSTYRENE CONTAINING CARBON (ANTISTATIC)

## Marking



MARKING C: 0 (zero)

- 注1) C部は製品名 (Max 1文字) を配置する。
- 注2) B部は製造年 (1文字) を配置する。
- 注3) E部は通し記号 (MAX 3文字) を配置する。

## &lt; INSTRUCTIONS &gt;

- 1) TYPE NO. ( MAX 1 CHARACTER ) IN SECTION C.
- 2) MANUFACTURING YEAR ( 1 CHARACTER ) IN SECTION B.
- 3) SERIAL CODE ( MAX 3 CHARACTERS ) IN SECTION E.

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## 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 °C 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