WISOL / SFM11R2D
P/N: WSSFM11R2DAT

DATA SHEET Rev.05

WISOL

531-7, Gajang-ro,Osan-si,Gyeonggi-do
Rep. of   Korea

http://www.wisol.co.kr

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▶ CONTENTS

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1. Approval Revision Record

NO	REASON	RECORD OF REVISION	Date	Remark
1	REV00	WSSFM10R2DAT Approval Releases	2017-04-11	-
2	REV01	BOX Label design added	2017-07-09	
3	REV02	FCC completed.	2017-09-08	
4	REV03	Marking changed(ANATEL No. added.)	2018-05-08	
5	REV04	Marking changed(IFETEL No. added.)	2018-06-29	
6	REV05	'ESD Warning' added.	2018-07-02	

2. Scope

Description : Sigfox Module RC2&RC4

Type : SMD Type

PCBA Size : 13mm(W) x 20mm(L) x 2.21mm(H)

This module is SIGFOX verified and that the FCC,IC,ANATEL, IFETEL are completed.

3. Numbering of product

3-1. Product

3-2. Part No.

W	S	**S**	**F**	**M**	**1**	**1**	**R**	**2D**	A	T
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

No.	EXPLANATION
(1),(2)	WISOL
(3),(4)	Application (SF:Sigfox)
(5)	Type (M:Module)
(6),(7)	Group model numbering
(8), (9)	Region Code(R2D: US&AU)
(10),(11)	Application Type(Firm Ware Type) AT(AT command version) AP(API version)

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3-3. Lot. No.

S	A	C	J	A	1	1	0	1
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

①	Sigfox Module
②	Manufacture Area

② (Manufacture Area)

Packing Lot	A	B	C
Area	Korea	China	Vietnam

③ Year

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Mark	W	X	Y	Z	A	B	C	D	E	F

④ Month

Month	1	2	3	4	5	6	7	8	9	10	11	12
Mark	A	B	C	D	E	F	G	H	I	J	K	L

⑤ Day

Day	1	2	3	4	5	6	7	8	9	10	
Mark	1	2	3	4	5	6	7	8	9	A	
Day	11	12	13	14	15	16	17	18	19	20	
Mark	B	C	D	E	F	G	H	I	J	K	
Day	21	22	23	24	25	26	27	28	29	30	31
Mark	L	M	N	O	P	Q	R	S	T	U	V

⑥⑦	Model Serial Number (10,11,12,13…)
⑧⑨	A Serial Number (1serial: 900ea)

4. Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
VCC	Module input voltage	0 to 4.2	V
OT	Operating Temperature	-30 to +85	℃
ST	Storage Temperature	-40 to +125	℃

5. DC Characteristics

Symbol	Parameter	Min	Typ.	Max	Unit
VCC	Module input voltage	2.7	3.3	3.6	V
Current	Tx Current(@ +22.5dBm, MOD)	-	170	-	mA
	Rx Current	-	32	-	mA
	Sleep Current Deep Sleep Current		2.3 0.17		uA

6. I/O Specifications

Symbol	Parameter	Min	Typ.	Max	Unit
VIH	High level input voltage @VCC=3.3V	2.0			V
VIL	Low level input voltage @VCC=3.3V			0.8	V

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7. RF Specifications

Conditions: VCC=3.3V, Temp=25℃

Parameter			Min	Typ.	Max	Unit
RF Characteristics						
RF Frequency	RC2	Tx		902.2		MHz
		Rx		905.2		MHz
	RC4	Tx		920.8		MHz
		Rx		922.3		MHz
Tx output power(at "24" setting)			-	22.5	-	dBm
Frequency Error Tolerance(+25℃)			-2.5	-	+2.5	ppm
2nd Harmonics(conducted)			-	-44	-	dBm
3nd Harmonics(conducted)			-	-47	-	dBm
Rx Sensitivity(@600bps, GFSK)			-	-129	-	dBm
Rx Spurious Emission(30MHz~12.75GHz)					-54	dBm

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8. Pin Description

8-1. Interface PIN(SMD Type : 31 Pin)_Bottom view

< RC2/ RC4 Module >
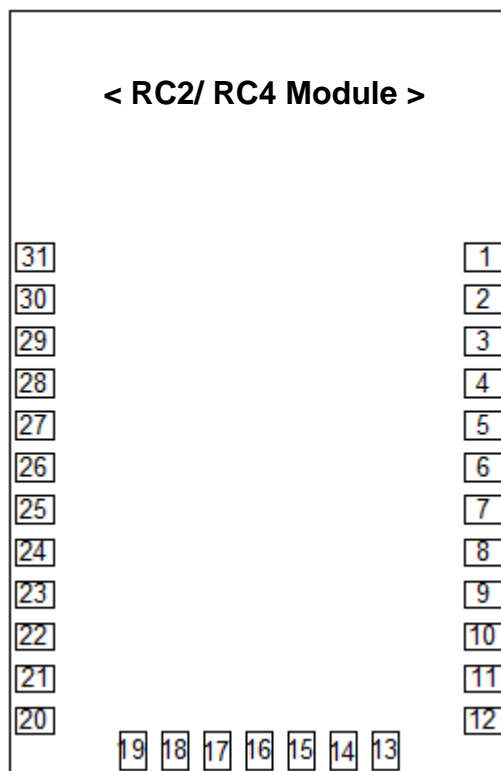
1	GND	9	GPIO5	17	TXLED/ DBG_CLK	25	GPIO2
2	GND	10	GPIO4	18	NC4/DBG_EN	26	GPIO3
3	GND	11	CPU_LED	19	RST_N	27	GND
4	GND	12	RADIO_LED	20	GND	28	GND
5	NC3/ SYSCLK	13	GPIO9	21	VDD_IO	29	GND
6	GPIO8	14	UARTTX	22	GND	30	RF_IO
7	GPIO7	15	UARTRX	23	GPIO0	31	GND
8	GPIO6	16	RXLED/ DBG_DATA	24	GPIO1		

Pin-map of RCZ1, RCZ2, RCZ3 and RCZ4 module is compatible (Pin to Pin)

STELIAU TECHNOLOGY ••••

8-2. Interface PIN description

PIN(s)	NAME	TYPE	Description
1~4	GND	P	Ground
5	NC3/SYSCLK	N	Do not connect
6	GPIO8	I/O/PU	General purpose IO
7	GPIO7	I/O/PU	General purpose IO, selectable SPI functionality (MISO)
8	GPIO6	I/O/PU	General purpose IO, selectable SPI functionality (MOSI)
9	GPIO5	I/O/PU	General purpose IO, selectable SPI functionality (SCK)
10	GPIO4	I/O/PU	General purpose IO, selectable $\sum\Delta$ DAC functionality, selectable dock functionality
11	CPU_LED	O	CPU activity indicator
12	RADIO_LED	O	Radio activity indicator
13	GPIO9	I/O/PU	General purpose IO, wakeup from deep sleep
14	UARTTX	O	UART transmit
15	UARTRX	I/PU	UART receive
16	RXLED/DBG_DATA	O	Receive activity indicator
17	TXLED/DBG_CLK	O	Transmit activity indicator
18	NC4/DBG_EN	PD	Do not connect
19	RST_N	I/PU	Optional reset pin
20	GND	P	Ground
21	VDD_IO	P	Power supply
22	GND	P	Ground
23	GPIO0	I/O/A/PU	General purpose IO, selectable ADC functionality, selectable $\sum\Delta$ DAC functionality, selectable clock functionality
24	GPIO1	I/O/A/PU	General purpose IO, selectable ADC functionality
25	GPIO2*	I/O/A/PU	General purpose IO, selectable ADC functionality
26	GPIO3**	I/O/A/PU	General purpose IO, selectable ADC functionality
27	GND	P	Ground
28~29	GND	P	Ground
30	RF_IO	A	RF input/output
31	GND	P	Ground

* GPIO2 is TX_EN pin of FEM. This pin can not be used by the user.
** GPIO3 is RX_EN pin of FEM. This pin can not be used by the user.

9. Block Diagram
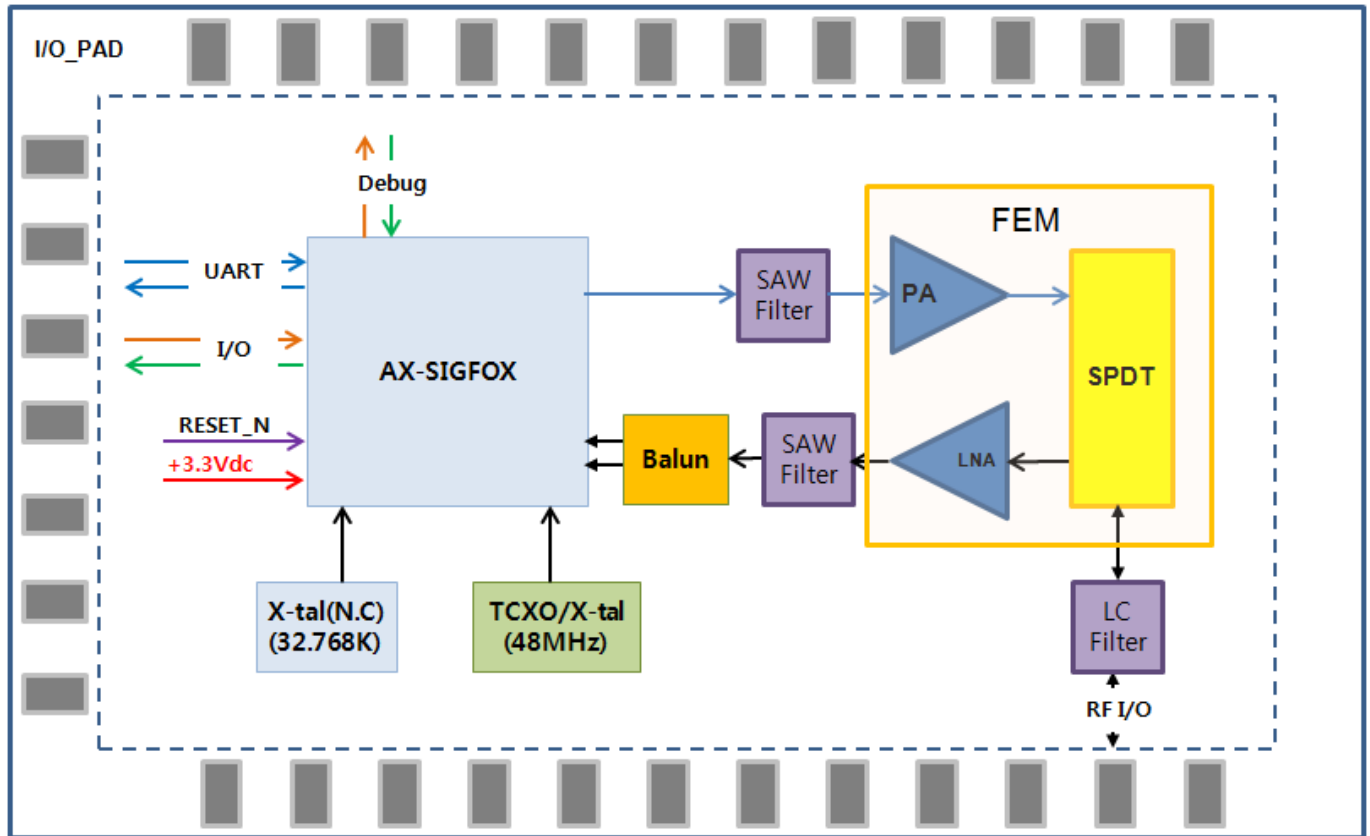
10. Dimensions & drawing

10-1. Design dimension
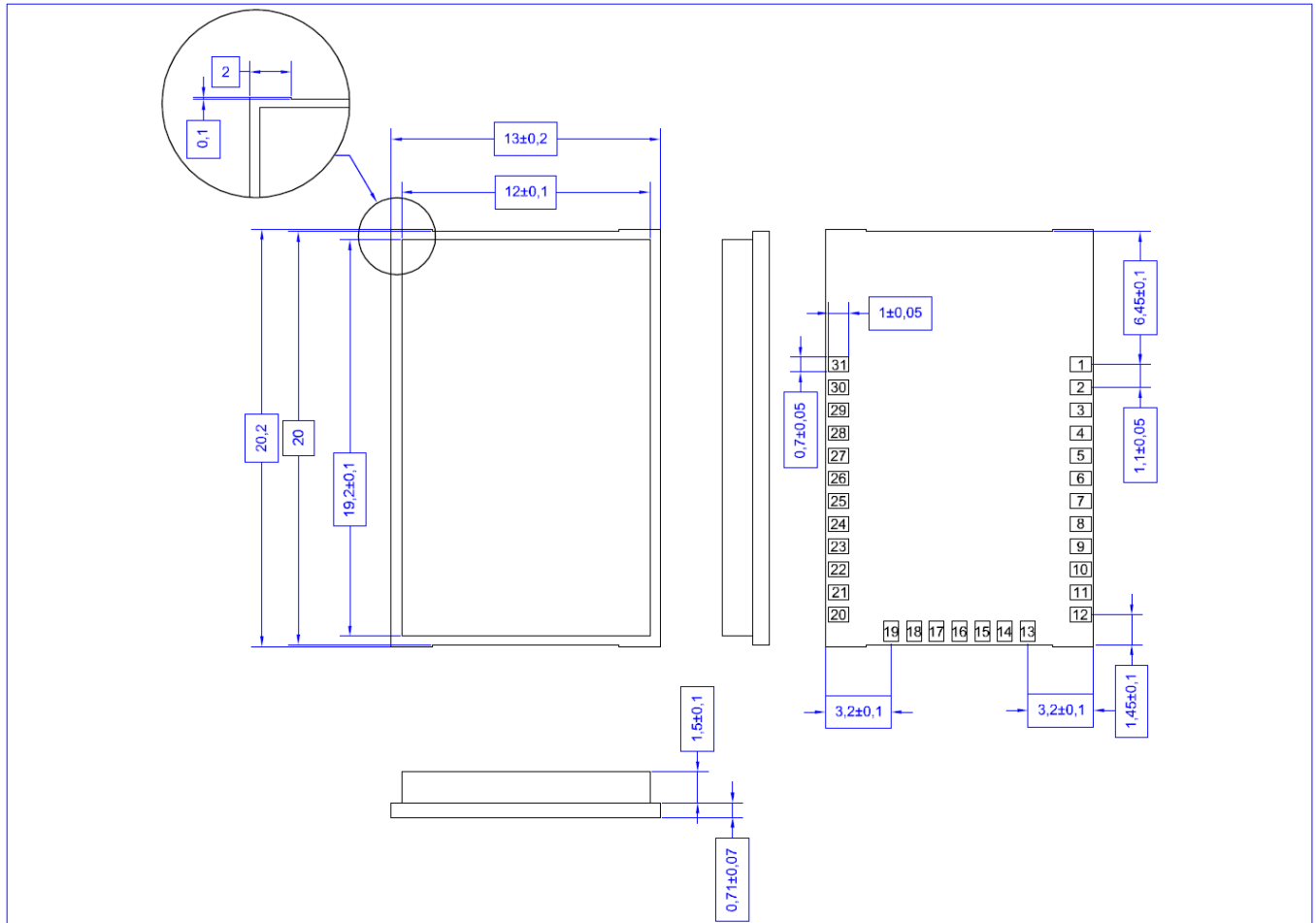
10-2. Soldering Footprint

[TOP View]

11. Reflow profile

<Reflow profile of Module>
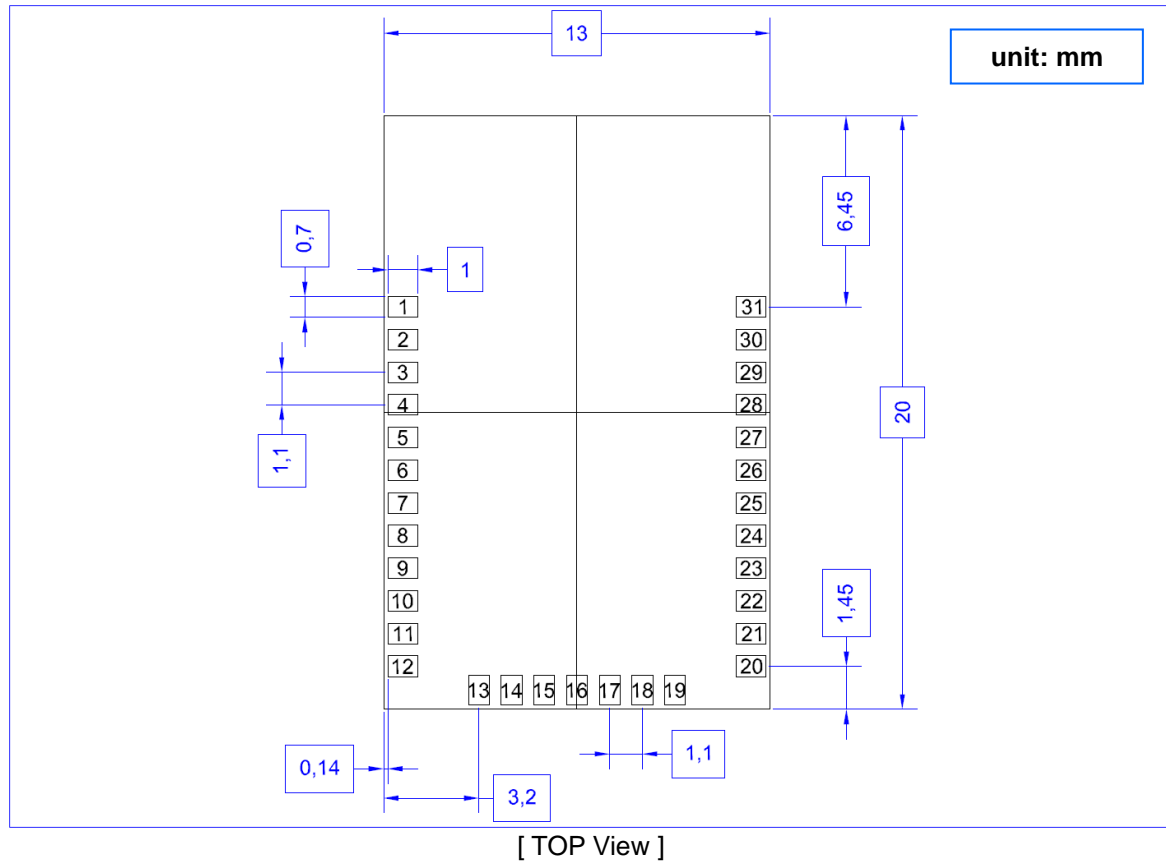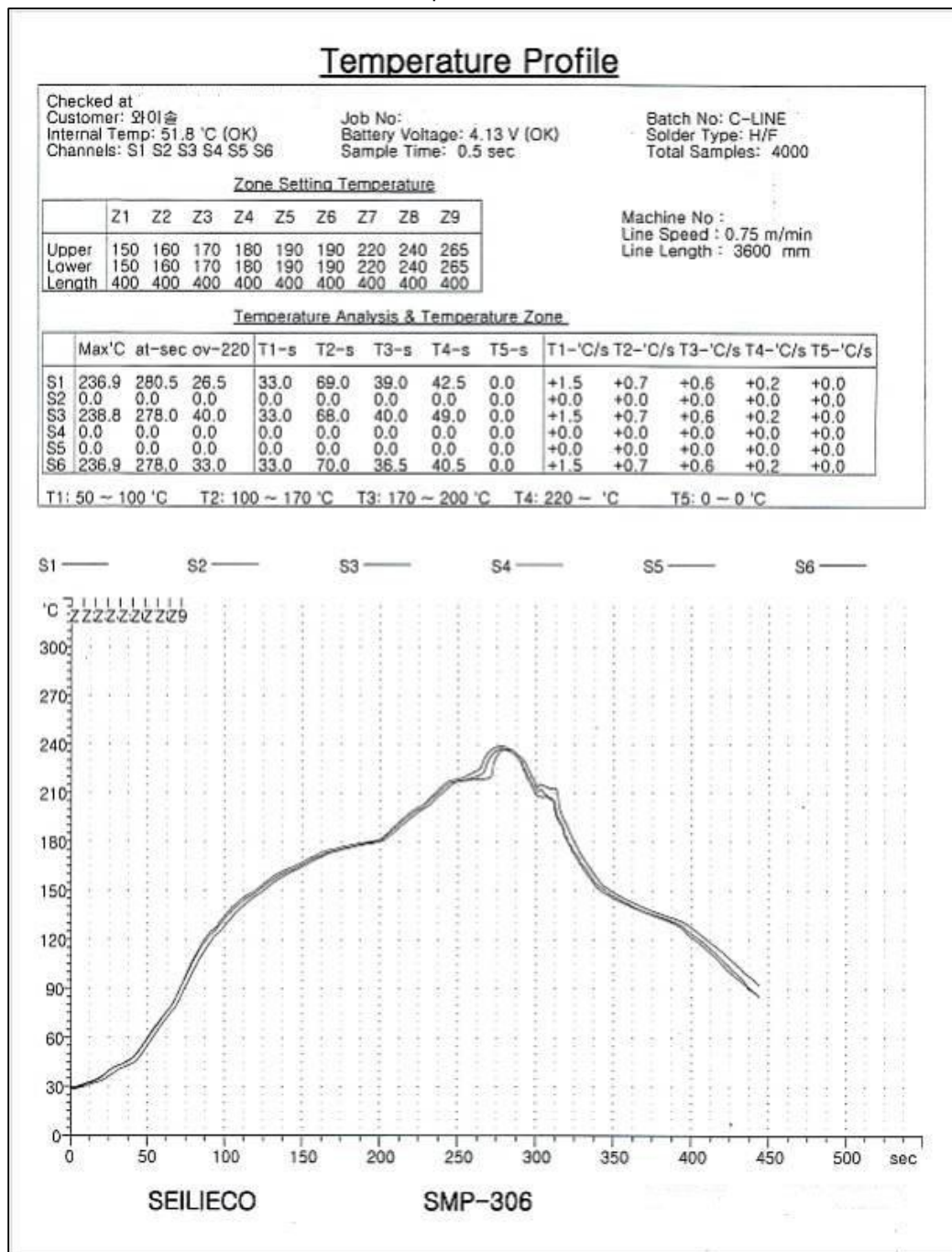
		Preheat	Soak	Ramp	PEAK
SPEC		50~100℃	100~170℃	220℃ ↑	240℃
		1~2℃/sec	60~100sec	30~50sec	±5℃
result of measurement		1.5	69	44	237.5
		OK	OK	OK	OK

12. Package

12-1. Dimension of Tape

12-2. Dimension of Reel

TAPING STYLE

Flip direction

900ea/1reel

12-3. IN BOX

Module Ass'y

MODEL	
Q'TY	EA
USER	
DATE	. .

1reel/ 1 In-BOX

12-4. OUT BOX

Module Ass'y

MODEL	
Q'TY	EA
USER	
DATE	. .

Module Ass'y

MADE IN KOREA
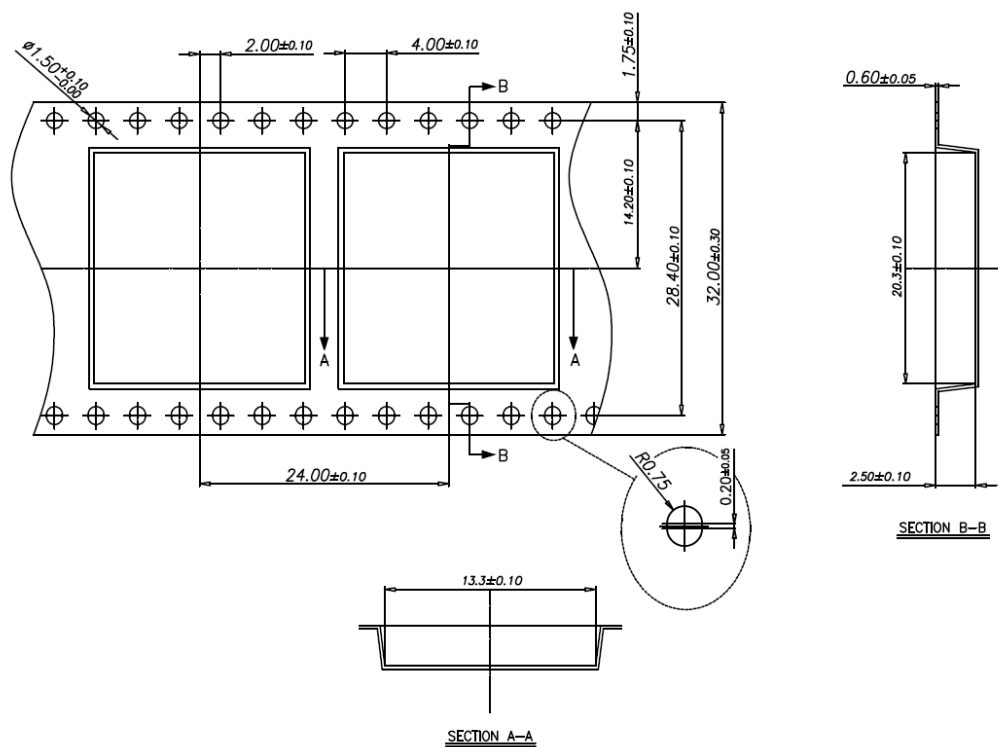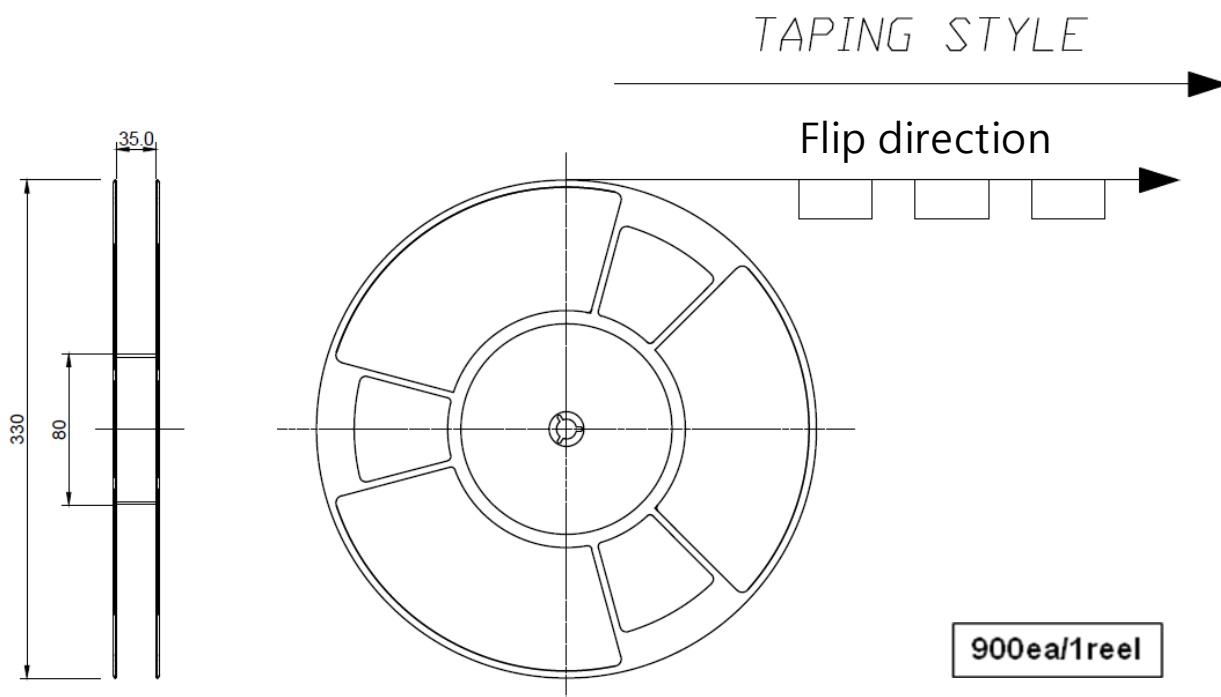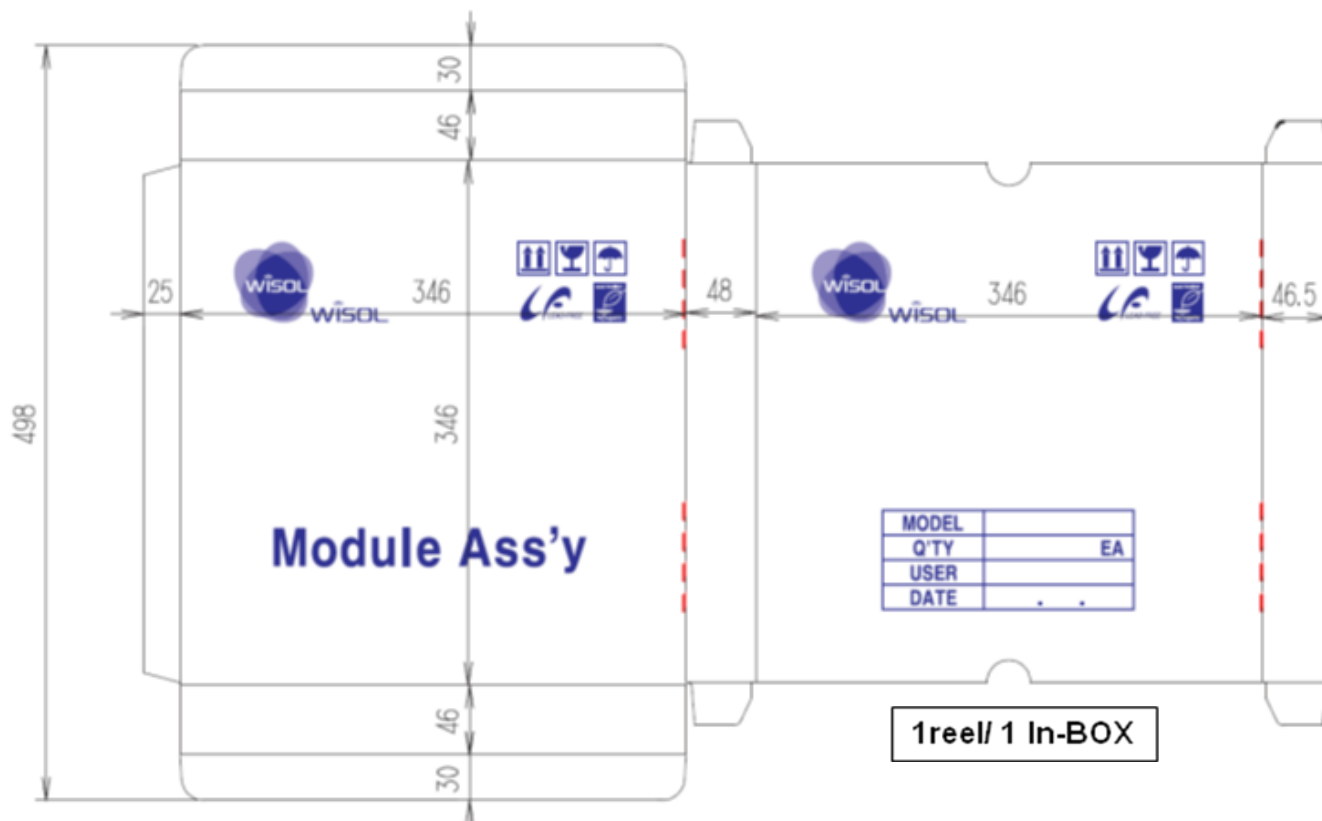
5 In-BOX/ 1 Out-BOX
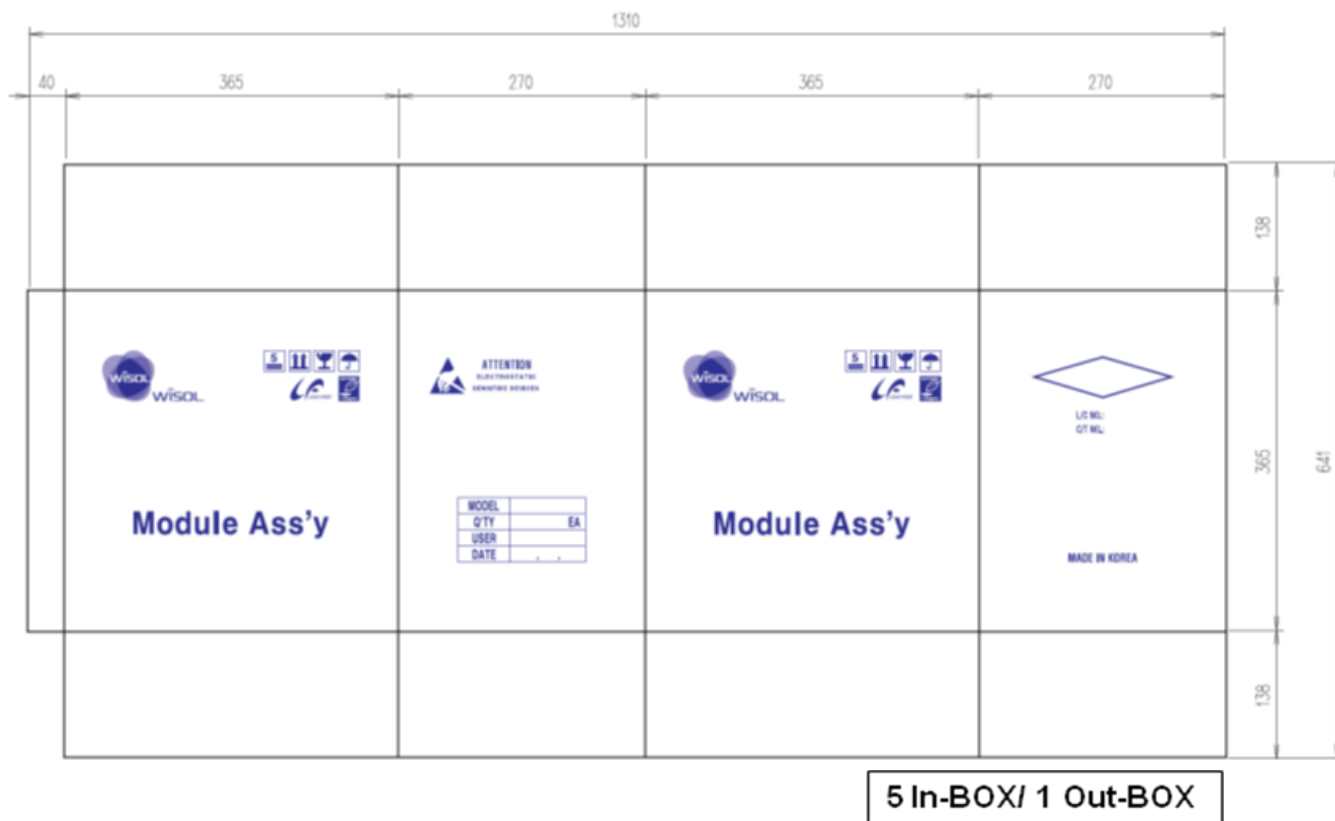
12-5. Reel Label & Inner BOX Label

- HQ -

SFM11R2DAT 000900

Model   Name : Sigfox Sigle Module

Assy Code :   SFM11R2DAT

Vendor :   WISOL(OSAN)

Quantity :   900

Vendor P/N : WSSFM11R2DAT

Vendor Lot : SACK311I01

75mm

100mm

→ (1) Vendor Barcode

→ (2) Model Name
→ (3) Assy Code
→ (4) Vendor
→ (5) Quantity

→ (6) Vendor P/N
→ (7) Vendor Lot

- WHC -

SFM11R2DAT 000900

Model   Name : Sigfox Sigle Module

Assy Code :   SFM11R2DAT

Vendor :   WISOL(HANOI)

Quantity :   900

Vendor P/N : WSSFM11R2DAT

Vendor Lot : SCCK311I01

75mm

100mm

→ (1) Vendor Barcode

→ (2) Model Name
→ (3) Assy Code
→ (4) Vendor
→ (5) Quantity

→ (6) Vendor P/N
→ (7) Vendor Lot

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12-6. OUT BOX Label

- HQ -

```
                              SFM11R2DAT 004500

Model   Name : Sigfox Sigle Module       ────→ (1) Vendor Barcode

Assy Code :    SFM11R2DAT                 ────→ (2) Model Name
                                          ────→ (3) Assy Code
Vendor :       WISOL(OSAN)                ────→ (4) Vendor

Quantity :     4,500                      ────→ (5) Quantity

Vendor  P/N :  WSSFM11R2DAT               ────→ (6) Vendor P/N

Vendor  Lot : SACK311P01                  ────→ (7) Vendor Lot
```

75mm × 100mm

- WHC -

```
                              SFM11R2DAT 004500

Model   Name : Sigfox Sigle Module       ────→ (1) Vendor Barcode

Assy Code :    SFM11R2DAT                 ────→ (2) Model Name
                                          ────→ (3) Assy Code
Vendor :       WISOL(HANOI)               ────→ (4) Vendor

Quantity :     4,500                      ────→ (5) Quantity

Vendor  P/N :  WSSFM11R2DAT               ────→ (6) Vendor P/N

Vendor  Lot : SCCK311P01                  ────→ (7) Vendor Lot
```

75mm × 100mm

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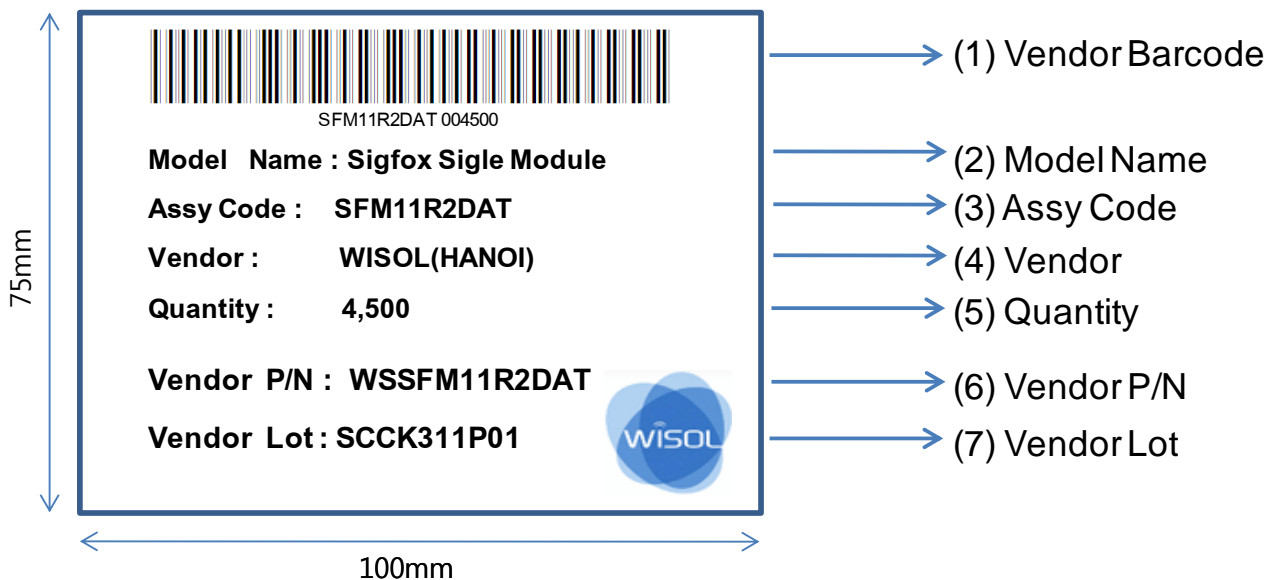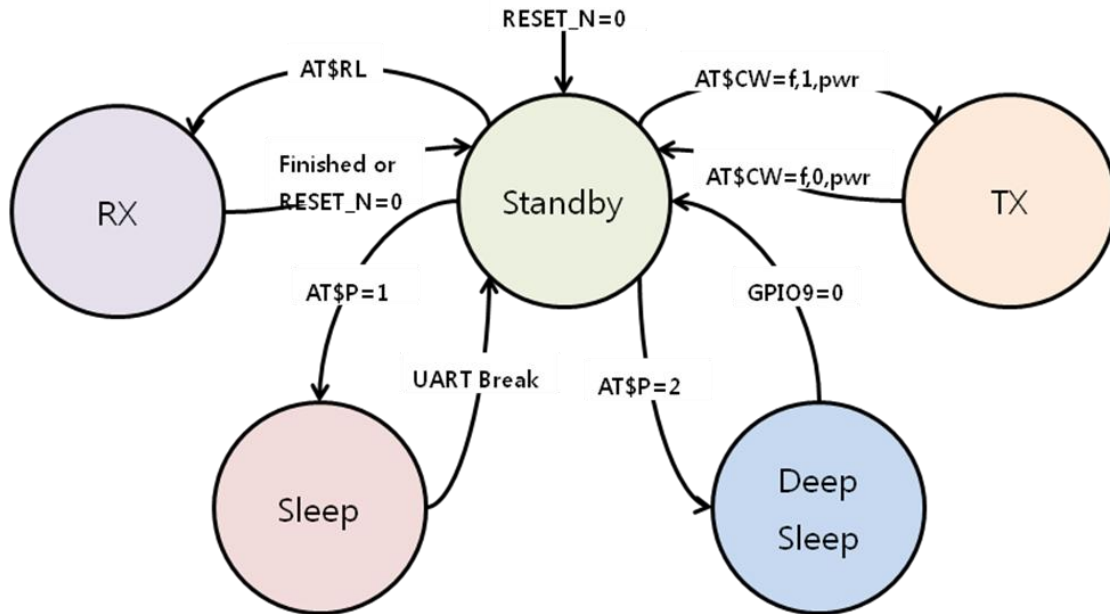
13. Power Modes

13-1. RC2 Power Mode

TX current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. TX current test method
   1) Input AT command 'AT' (UART condition checking)
   2) Click the Quick command (　MOD US ON　 : default power table '24') or
      Input AT command 'AT$CW=902200000,1,24' and then click 'Send' icon.
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check TX current

RX current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. RX current test method
   1) Input AT command 'AT' (UART condition checking)
   2) Input AT command 'AT$RL' and then click 'Send' icon.
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check RX current.

Sleep current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. Sleep current test method
   1) Input AT command ʻATʼ (UART condition checking)
   2) Input AT command ʻAT$P=1ʼ (sleep mode command)
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check Sleep current
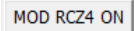
Deep sleep current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. Deep sleep current test method
   1) Input AT command ʻATʼ (UART condition checking)
   2) Input AT command ʻAT$P=2ʼ (Deep sleep mode command)
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check Deep sleep current
   5) If the module wakes up, Push the tact switch(SW2: wakeup PIN)

13-2. RC4 Power Mode

TX current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. TX current test method
   1) Input AT command ʻATʼ (UART condition checking)
   2) Click the Quick command (`MOD RCZ4 ON` : default power table ʻ24ʼ) or
    Input AT command ʻAT$IF=920800000ʼ click ʻSendʼ icon and then input AT command ʻAT$CB=-1,1ʼ
    click ʻSendʼ icon.
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check TX current

RX current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. RX current test method
   1) Input AT command ʻATʼ (UART condition checking)
   2) Input AT command ʻAT$RLʼ and then click ʻSendʼ icon.
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check RX current.

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Sleep current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. Sleep current test method
   1) Input AT command ´AT´ (UART condition checking)
   2) Input AT command ´AT$P=1´ (sleep mode command)
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check Sleep current

Deep sleep current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. Deep sleep current test method
   1) Input AT command ´AT´ (UART condition checking)
   2) Input AT command ´AT$P=2´ (Deep sleep mode command)
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check Deep sleep current
   5) If the module wakes up, Push the tact switch(SW2: wakeup PIN)

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14. AT command for Region change

14-1. RC2 -> RC4

1. AT$DR=922300000
2. ATS400=<00000000><F0000000><0000001F>,63
3. AT$WR
4. AT$RC

14-2. RC4 -> RC2

1. AT$DR=905200000
2. ATS400=<000001FF><00000000><00000000>,1
3. AT$WR
4. AT$RC

ESD Warning

This modules are ESD sensitive devices, appropriate precautions should be taken during the module assembly in the final product.
Mechanical impact and harsh tools must be avoided during the module assembly in the final product.

Product ESD specification:
• HBM   ±2kV

The following precautions must be taken:

• Do not open the protective conductive packaging until you have use the following, and are at an approved anti-static work station.
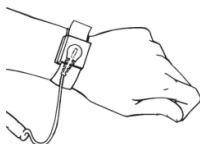
• Use a conductive wrist strap attached to a good earth ground.

• If working on a prototyping board, use a soldering iron or station that is marked as ESD-safe.
• If possible, use SMT equipment(reflow) when making prototype boards.
• Use an approved anti-static mat to cover your work surface.
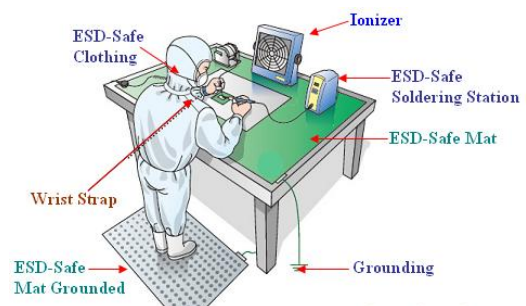
• Always discharge yourself by touching a grounded bare metal surface or approved anti-static mat before picking up an ESD - sensitive electronic component.