

# APPROVAL SHEET

Customer Name : \_\_\_\_\_  
Customer P/N : \_\_\_\_\_  
Frequency : 48.000000 MHz  
Aker Approved P/N: CXAF-048000-3-AL-05  
Aker MPN : CXAF-048000-3-AL-05  
Rev. : 1  
ISSUE DATE : Feb.10.2023

| APPROVED                                                                            | CHECKED | PREPARED                                                                              |
|-------------------------------------------------------------------------------------|---------|---------------------------------------------------------------------------------------|
|  |         |  |
| APPROVED BY CUSTOMER                                                                |         |                                                                                       |
|                                                                                     |         |                                                                                       |

**AKER TECHNOLOGY CO., LTD.**

ADDRESS : NO 11-3, Jianguo Rd., Tanzi Dist., Taichung City 427, Taiwan.

TEL : 886-4-25335978 FAX : 886-4-25336011

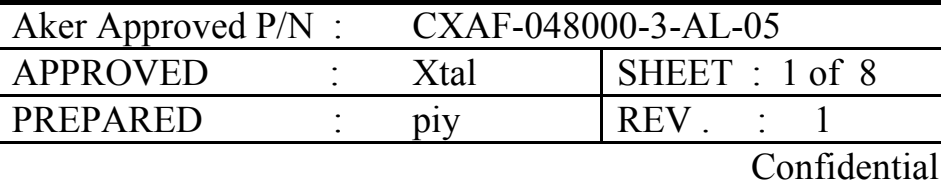
Web: [www.aker.com.tw](http://www.aker.com.tw)

**MSL:Level 1**

**RoHS compliant**

**IATF 16949 Certified**

**AEC-Q200 Qualified**

[illegible]

## SMD CRYSTAL SPECIFICATION

### 1 . ELECTRICAL CHARACTERISTICS

#### ■ Standard atmospheric conditions

Unless otherwise specified , the standard range of atmospheric conditions for making measurement and tests are as follow :

Ambient temperature :  $25 \pm 5^{\circ}\text{C}$

Relative humidity : 40%~70%

If there is any doubt about the results , measurement shall be made within the following limits :

Ambient temperature :  $25 \pm 3^{\circ}\text{C}$

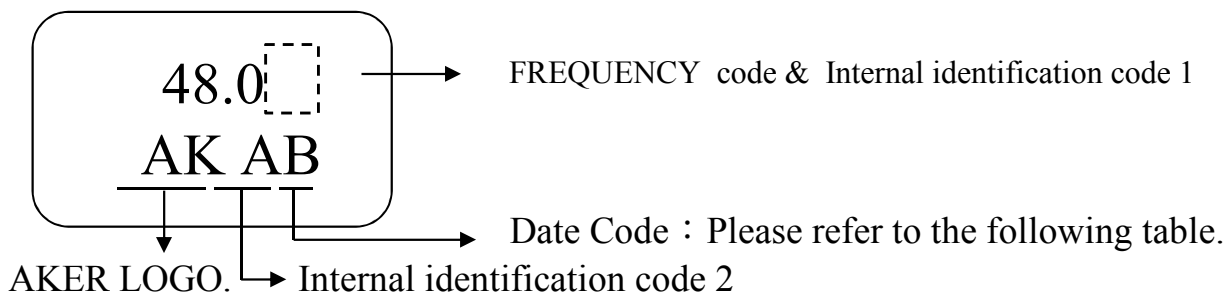
Relative humidity : 40%~70%

- AKER Model : CXAF-321
- Oscillation Mode : Fundamental
- Cutting Mode : AT CUT
- Measurement Equipment : 250B(Measured FL)
- Insulation Resistance : More than 500M ohms at DC 100V

| Parameters                   | Symbol | Electrical Spec |      |      |                    | Notes                                         |
|------------------------------|--------|-----------------|------|------|--------------------|-----------------------------------------------|
|                              |        | Min.            | Typ. | Max. | Units.             |                                               |
| Nominal Frequency            | FL     | 48.000000       |      |      | MHz                |                                               |
| Frequency Tolerance          |        | $\pm 10$        |      |      | ppm                | at $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ |
| Frequency Stability          |        | $\pm 20$        |      |      | ppm                | Operating Temp (Refer $25^{\circ}\text{C}$ )  |
| Load Capacitance             | CL     | 10              |      |      | pF                 |                                               |
| Aging                        |        | $\pm 3$         |      |      | ppm                | First Year                                    |
| Operating Temperature        |        | -40             | ~    | 85   | $^{\circ}\text{C}$ |                                               |
| Storage Temperature Range    |        | -55             | ~    | 150  | $^{\circ}\text{C}$ |                                               |
| Drive Level                  | DL     |                 |      | 100  | uW                 |                                               |
| Equivalent Series Resistance | ESR    |                 |      | 40   | $\Omega$           | @Series                                       |
| Shunt Capacitance            | C0     |                 | 1.09 |      | pF                 |                                               |
| Motional Capacitance         | C1     |                 | 3.65 |      | fF                 |                                               |
| Motional Inductance          | L1     |                 | 3.01 |      | mH                 |                                               |

\*Please kindly be noted that AKER DO NOT guarantee parts quality which involves human security application.\*

## 2 . MARKING :



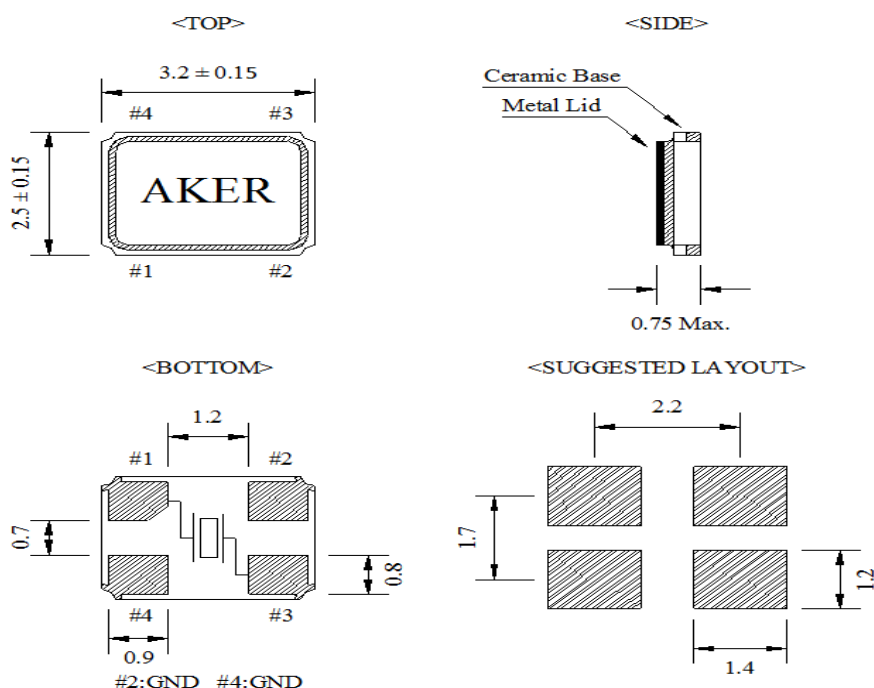
Date Code Table

| Month<br>Year |      |        | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------------|------|--------|---|---|---|---|---|---|---|---|---|----|----|----|
| 2019          | 2023 | (4N+3) | A | B | C | D | E | F | G | H | J | K  | L  | M  |
| 2020          | 2024 | (4N+0) | N | P | Q | R | S | T | U | V | W | X  | Y  | Z  |
| 2021          | 2025 | (4N+1) | a | b | c | d | e | f | g | h | j | k  | l  | m  |
| 2022          | 2026 | (4N+2) | n | p | q | r | s | t | u | v | w | x  | y  | z  |

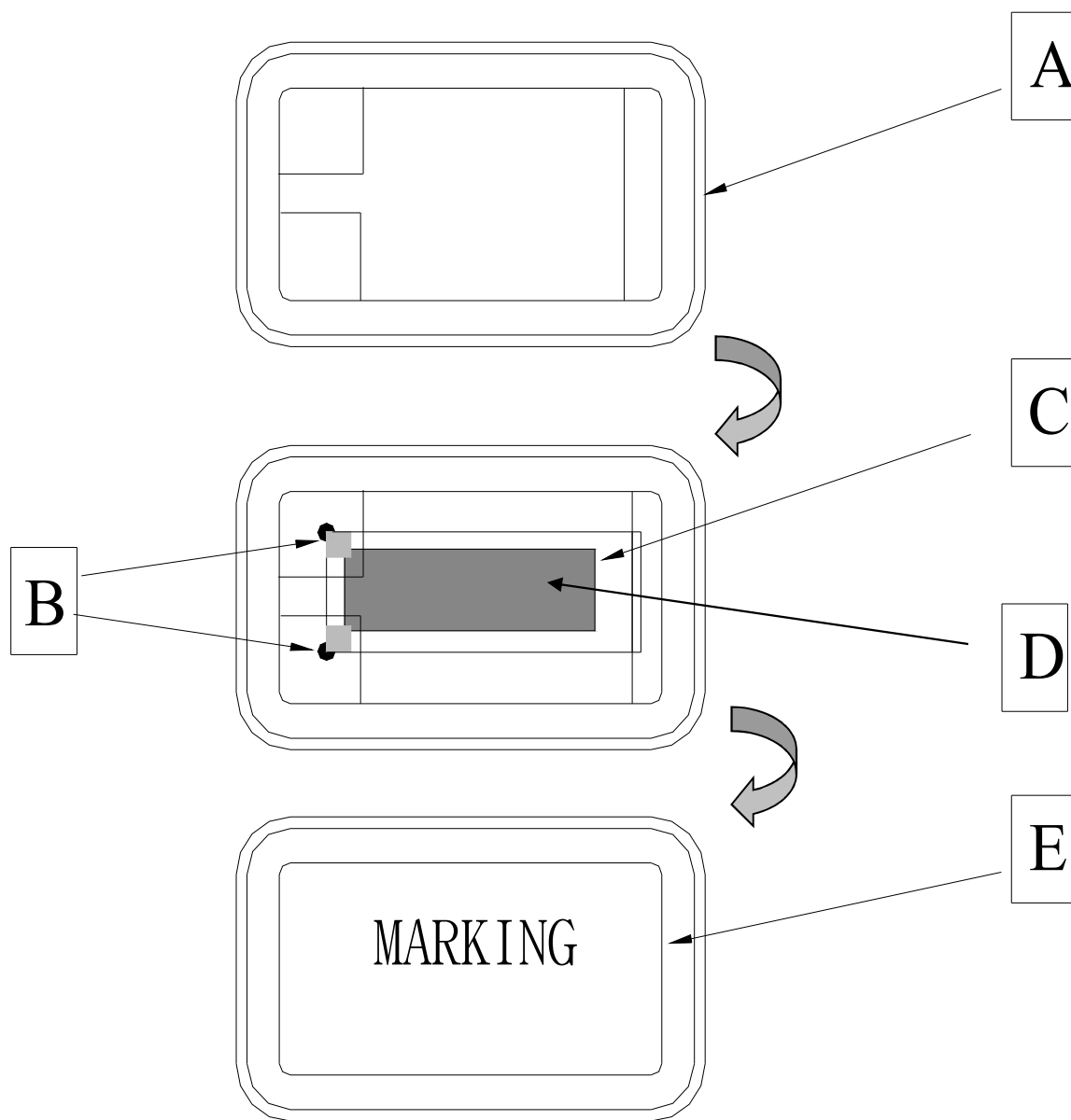
A cycle every four years

## 3 . DIMENSION :

( Unit : mm )



#### 4. STRUCTURE ILLUSTRATION

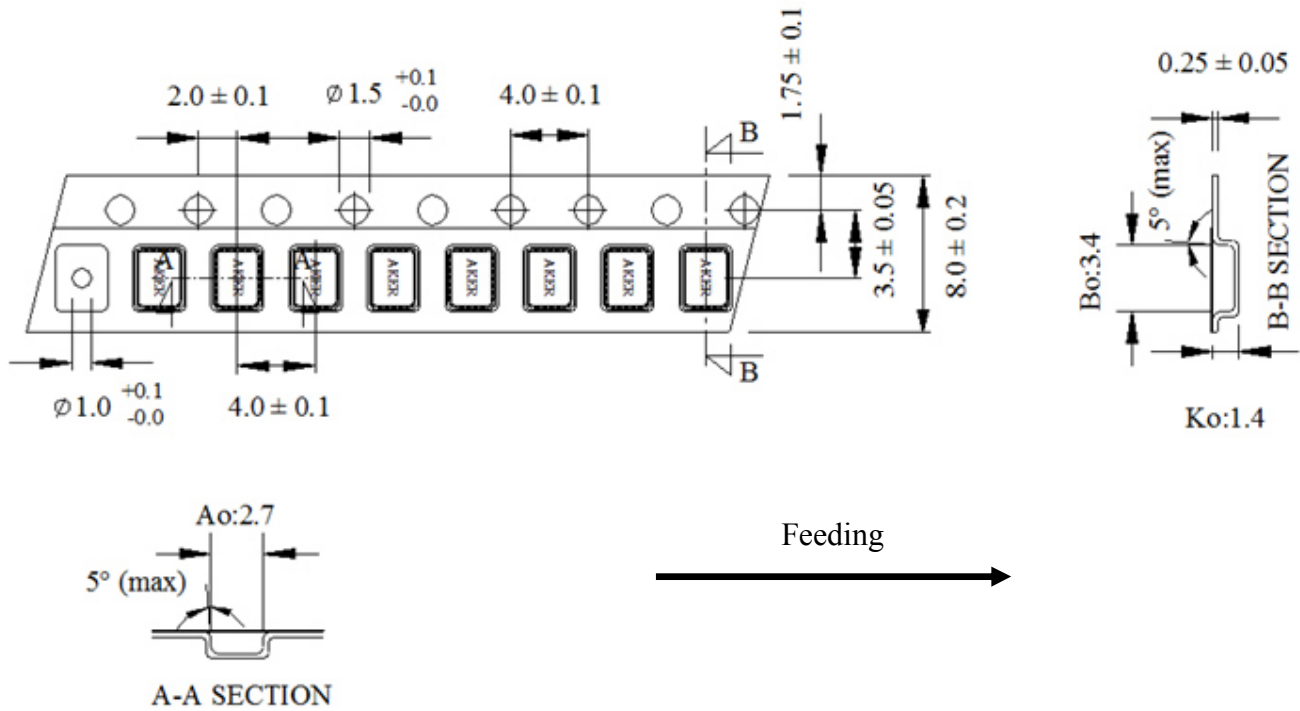


| COMPONENTS |                     | MATERIALS                                                                   | COMPONENTS |           | MATERIALS                       |
|------------|---------------------|-----------------------------------------------------------------------------|------------|-----------|---------------------------------|
| A          | Base (Package)      | Ceramic( $\text{Al}_2\text{O}_3$ )+Kovar( $\text{Fe}/\text{Co}/\text{Ni}$ ) | D          | Electrode | $\text{Cr} / \text{Ag}$         |
| B          | Conductive adhesive | $\text{Ag} / \text{Silicon resin}$                                          | E          | Lid       | $\text{Fe}/\text{Co}/\text{Ni}$ |
| C          | Crystal blank       | $\text{SiO}_2$                                                              |            |           |                                 |

## 5 . PACKING :

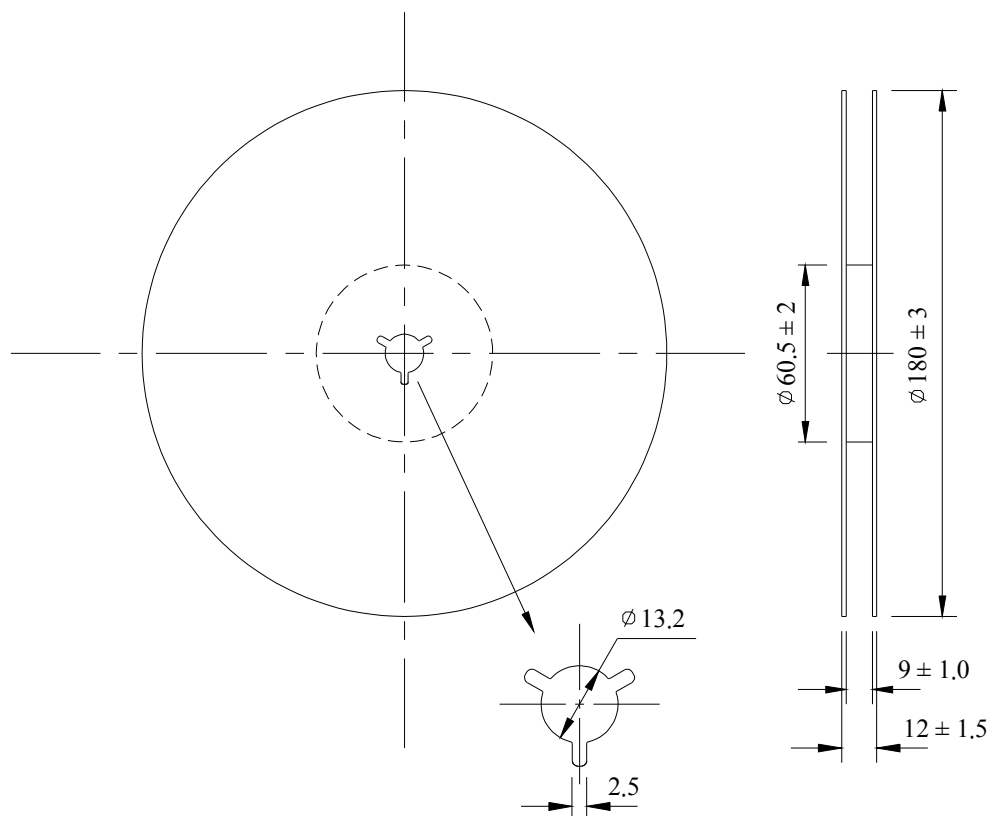
### TAPE SPECIFICATION

( Unit : mm )

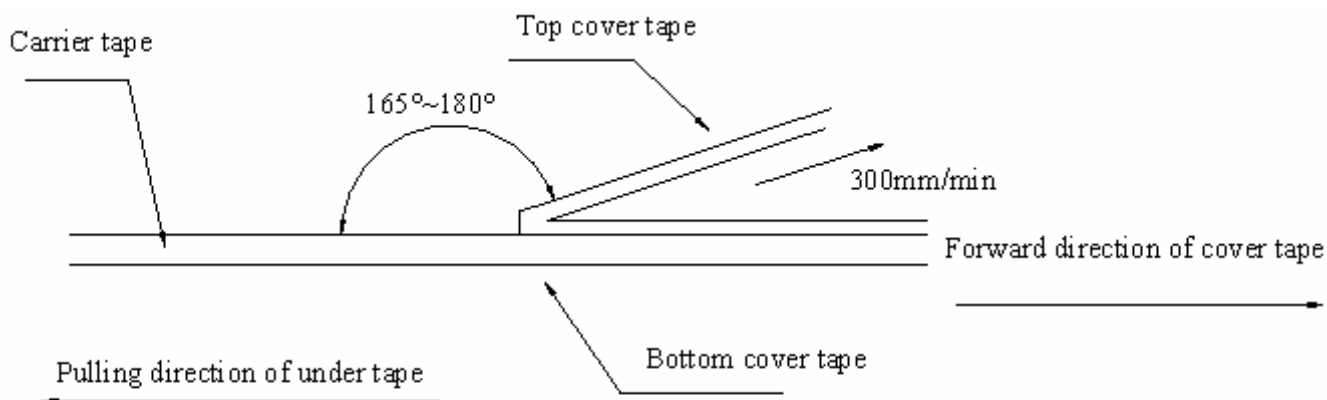


### OUTLINE DIMENSION

( Unit : mm )



## 6. COVER TAPE ADHESION STRENGTH :

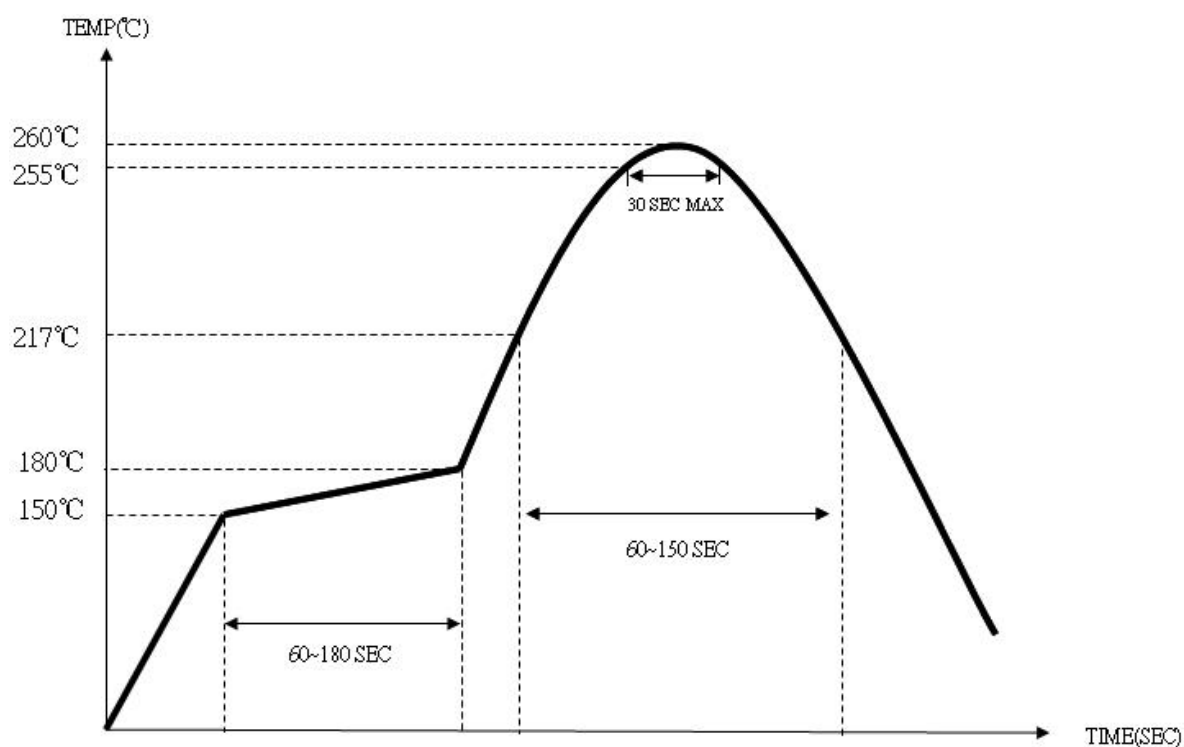


\*\*\* In the case, the cover tape is pulled off under the above conditions, the cover tape adhesion strength should be 10.2g~71.4g

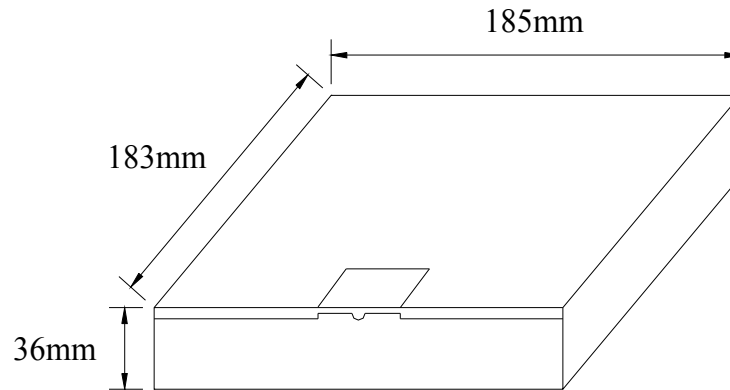
Plastic tape: 10.2g~71.4g

(Cover tape adhesion strength)

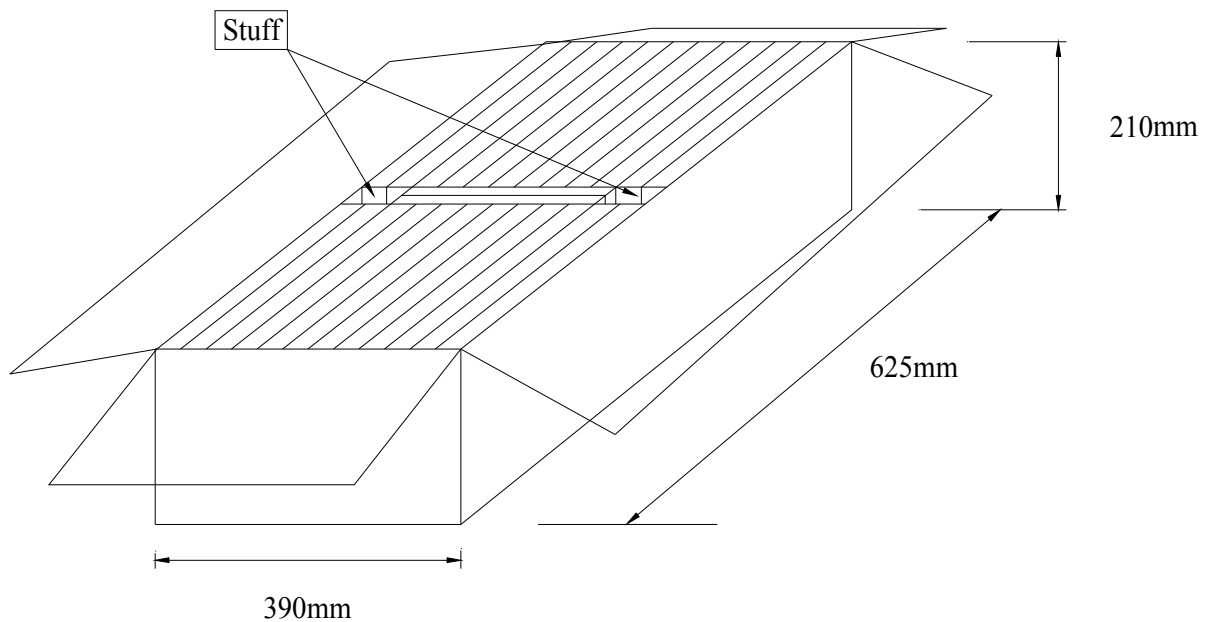
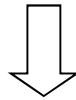
## 7. SOLDERING REFLOW PROFILE



## 8. PACKING :



BOX = 3000 PCS / REEL(MAX)



SMD product packs 32 BOX=The outside box packs (3000 PCS \*32 BOX = 96000 PCS)(MAX)

## 9 . MECHANICAL PERFORMANCE

| TEST ITEMS                            | TEST METHODS AND TEST CONDITION                                                                                                                                    | PERFORMANCE                             |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| 9.1 Temperature Cycling               | -55±3℃/30min maximum~+125±3℃/30min maximum , 1000cycles                                                                                                            | To satisfy the electrical performance . |
| 9.2 Operational Life                  | 125℃±3℃ , 1000hrs±12hrs                                                                                                                                            |                                         |
| 9.3 Biased Humidity                   | 85℃±5℃&85%±5%R.H. , 1000±12hrs                                                                                                                                     |                                         |
| 9.4 Resistance To Soldering Heat Test | Reflow test 2 times.                                                                                                                                               |                                         |
| 9.5 High Temperature Exposure         | 150℃±3℃ , 1000hrs±12hrs                                                                                                                                            |                                         |
| 9.6 Vibration Test                    | Freq.range: 10~2000Hz , Peak to peak amplitude:1.52mm<br>Peak acceleration:5G (49m/s <sup>2</sup> ) , 3 direction(X, Y,Z) , 20min 12cycles each of 3 orientations. |                                         |
| 9.7 Mechanical Shock                  | 100G , 6mS , 3 times for each direction(X, Y, Z ) , 3 cycles                                                                                                       |                                         |
| 9.8 Physical Dimension                | Verify physical dimensions to the applicable device detail specification.                                                                                          |                                         |
| 9.9 Solderability                     | 260℃ , Coated > 95%                                                                                                                                                |                                         |
| 9.10 Board Flex                       | PCB=100*40(mm) , Bending=2 mm (min) , Duration=60+5/-0 sec                                                                                                         |                                         |
| 9.11 External Visual                  | Inspect device construction and marking.                                                                                                                           |                                         |
| 9.12 Terminal Strength                | A force of 17.7N for 60 seconds.                                                                                                                                   |                                         |