

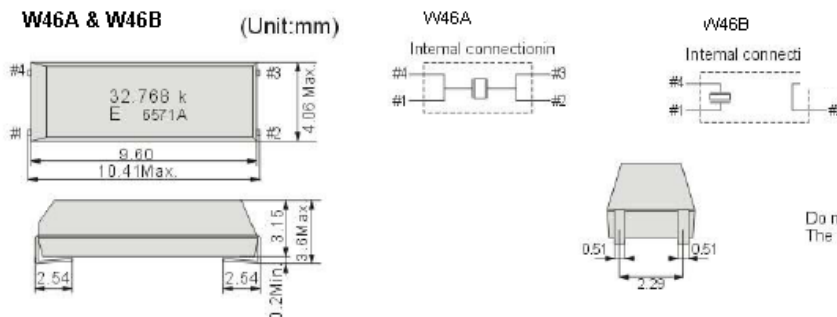
## 1.ELECTRICAL SPECIFICATIONS

Parameter	Symb	Value	Condition
Frequency Range	$F_0$	<b>32.768Khz</b>	
Frequency Tolerance	$\Delta f/f_0$	<b><math>\pm 20\text{PPM}</math></b>	REF TO 25°C
Temperature Coefficient	$\Delta f/f_0$	<b><math>-0.034 \pm 0.006 \text{ ppm}/(^{\circ}\text{C})^2</math></b>	
Turnover temperature	$T_m$	<b><math>25 \pm 5^{\circ}\text{C}</math></b>	
Operating Temperature Range	$T_{\text{OPR}}$	<b><math>-40^{\circ}\text{C}</math> to <math>85^{\circ}\text{C}</math></b>	
Storage Temperature Range	$T_{\text{STC}}$	<b><math>-55^{\circ}\text{C}</math> to <math>125^{\circ}\text{C}</math></b>	
Quality factor		<b>60,000TYP</b>	
Series resistance	$R_s$	<b>50 K<math>\Omega</math></b>	REF TO 25°C
Shunt Capacitance	$C_0$	<b>0.85PF TYP</b>	0.9~2.0PF
Motional Capacitance	$C_1$	<b>2.0 Ff TYP</b>	
Load Capacitance	$C_L$	<b>12.5PF</b>	
Insulator Resistance	IR	<b>500 M<math>\Omega</math></b>	DC100V $\pm 15\text{V}$
Drive Level	DL	<b>1 <math>\mu</math> W</b>	
Capacitance ratio	r	<b>450TYP</b>	
Aging	$\Delta f/f_0$	<b><math>\pm 5\text{PPM}</math></b>	at 25°C $\pm 3^{\circ}\text{C}$

## 1.2 DIMENSION Unit:mm

### External dimensions

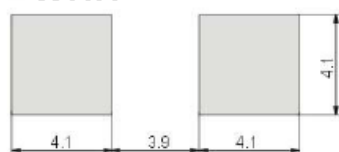
- W46A & W46B (Unit:mm)



Do not connect #2 and #3 to external device.  
The first digit of No. Means: 5xxxx W46A  
6xxxx W46B

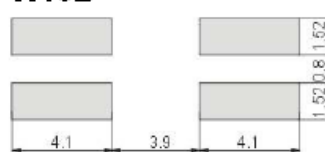
### Footprint(Recommended)

- W46A



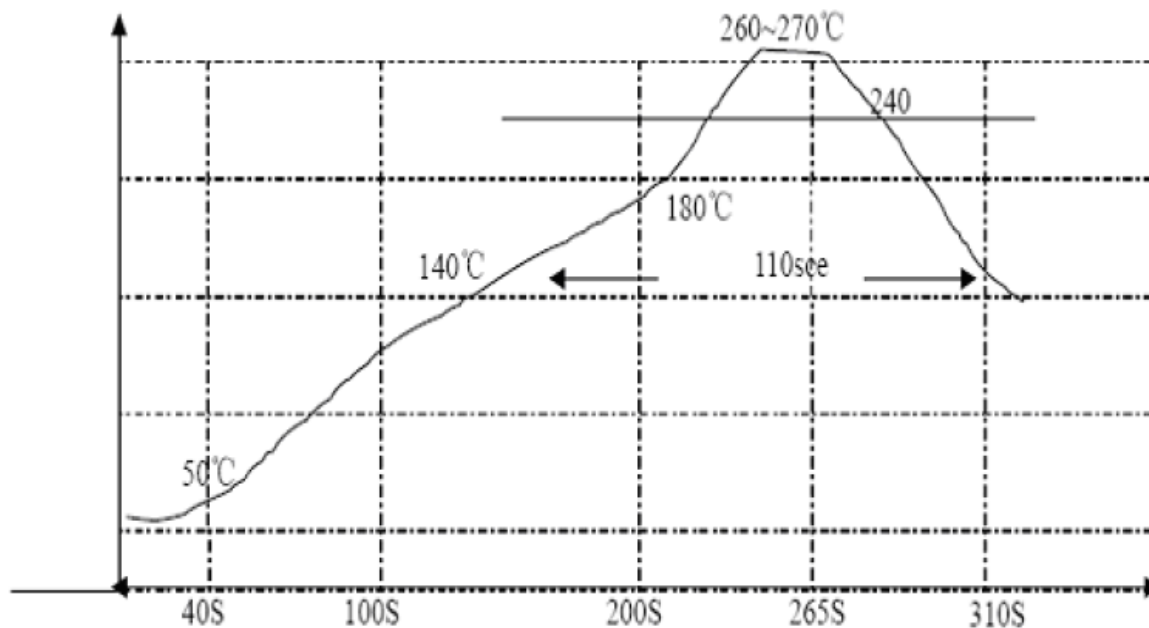
(Unit:mm)

- W46B



## 1.3 Reflow solder

温度 (0°C)



## 2. TEST STANDARD

### 2.1 GENERAL ELECTRICAL CHARACTERISTICS AND VISUAL TESTING

2.1.1 LOT CLASSIFICATION : If the quantity is 1,000 pcs or more, 1,000 pcs is one lot.

2.1.2 SAMPLING TEST METHOD : MIL-STD-105E G-II

2.1.3 TEST LEVEL

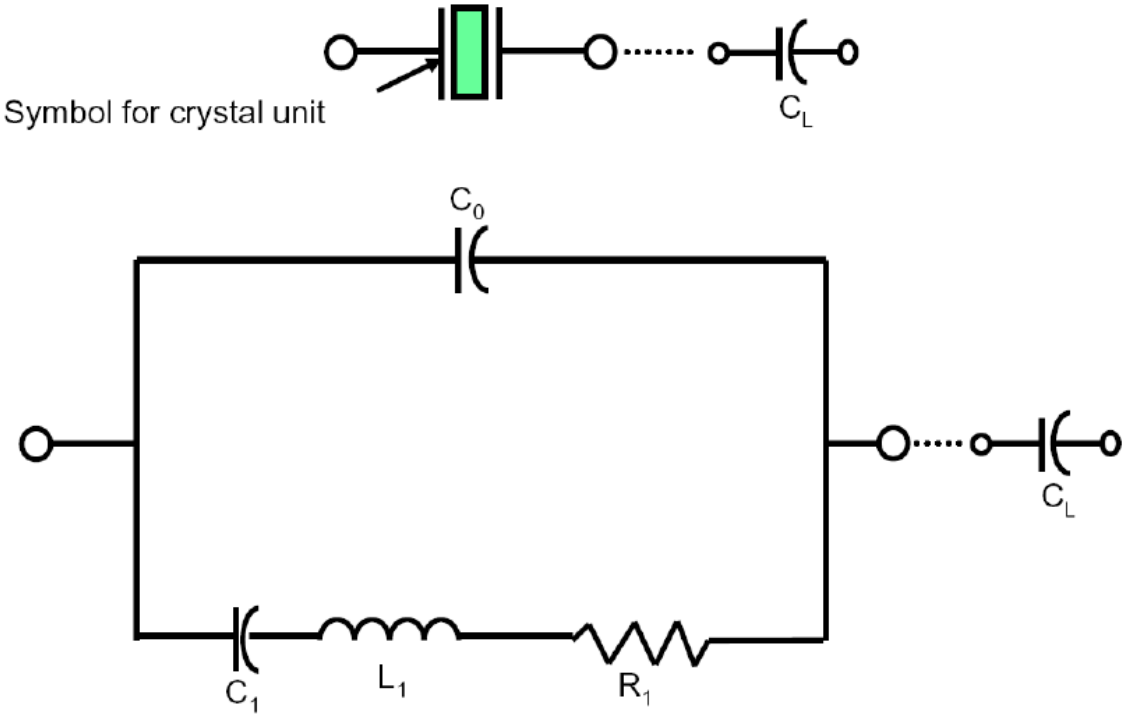
- A] HIGH LEVEL DEFECT : AQL 0.065% [200 PCS]
- B] MEDIUM LEVEL DEFECT : AQL 0.25% [50 PCS]
- C] LOW LEVEL DEFECT : AQL 0.4% [32 PCS]

2.1.4 DEFECT CLASSIFICATION

- A] HIGH LEVEL
  - @NO FREQUENCY
  - @MIXING
  - @LEAK DEFECT
- B] MEDIUM LEVEL – ELECTRICAL CHARACTERISTIC DEFECT
  - @FREQUENCY
  - @OSCILLATION
  - @ELECTRICAL CURRENT
  - @OTHER ELECTRICAL CHARACTERISTICS DEFECT
- C] VISUAL
  - @MARKING
  - @WELDING
  - @LEADS
  - @OTHER VISUAL DEFECT

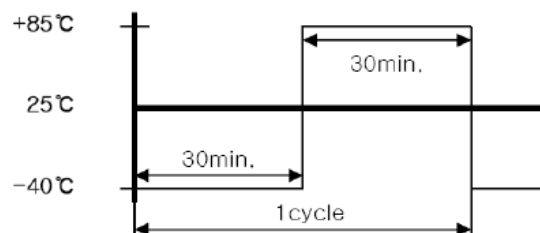
TESTING METHOD AND ITS STANDARD CAN BE MODIFIED DEPENDING ON THE CUSTOMER'S REQUEST.

2.2 EQUIVALENT CIRCUITS



### 3. RELIABILITY TEST STANDARD

#### 3.1 ENVIRONMENTAL

TEST ITEM	TESTING PROCEDURE & CONDITIONS	EVALUATION
1. THERMAL SHOCK TEST	<p>1. The test should be performed in accordance with the following condition for 10 cycle.</p>  <p>2. The crystal unit should be kept in room temperature for 1 hour then tested.</p>	The crystal unit should fulfill the specified requirements of the electrical characteristics and appearance.
2. HUMIDITY	<p>1.temperature : <math>+40^{\circ}\text{C} \pm 2^{\circ}\text{C}</math>            RELATIVE HUMIDITY : 90~95%            TEST PERIOD : 48 HOURS</p> <p>2. The crystal unit should be kept in room temperature for 1 hour then tested.</p>	The crystal unit should fulfill the specified requirements of the electrical characteristics and appearance.
3. COLD TEMPERATURE TEST	<p>1. TEMPERATURE : <math>-40^{\circ}\text{C} \pm 2^{\circ}\text{C}</math>            TEST PERIOD : 2 HOURS</p> <p>2. The crystal unit should be kept in room temperature for 1 hour then tested.</p>	The crystal unit should fulfill the specified requirements of the electrical characteristics and appearance.
4. THERMAL TEST	<p>1. TEMPERATURE : <math>+85^{\circ}\text{C} \pm 2^{\circ}\text{C}</math>            TEST PERIOD : 24 HOURS</p> <p>2. The crystal unit should be kept in room temperature for 1 hour then tested.</p>	The crystal unit should fulfill the specified requirements of the electrical characteristics and appearance.
5. RAPID CHANGE IN TEMPERATURE	<p>1. TEMPERATURE : <math>+85^{\circ}\text{C} \pm 2^{\circ}\text{C}</math>            TEST PERIOD : 120 HOURS</p> <p>2. The crystal unit should be kept in room temperature for 1 hour then tested.</p>	The crystal unit should fulfill the specified requirements of the electrical characteristics and appearance.

# Series W46

## Tuning Fork Crystal Unit



### 3.2 MECHANICAL

TEST ITEM	TESTING PROCEDURE & CONDITIONS	EVALUATION
1. LEAD TENSILITY	<ol style="list-style-type: none"> <li>1. FIX THE UNIT.</li> <li>2. APPLY 2LB OF WEIGHT AXIS TO THE LEADS.</li> <li>3. TIME : 5 SECONDS</li> </ol>	SHOULD PASS SEALING AND VISUAL TEST
2. LEAD BENDING	<ol style="list-style-type: none"> <li>1. ATTACH 1 LB OF WEIGHT TO EACH OF THE LEADS.</li> <li>2. BENDING ANGLE : 90° (FROM THE NORMAL POSITION TO 45° OPPOSITE DIRECTION)</li> <li>3. BENDING TIME : 3 SECONDS(EACH DIRECTION)</li> <li>4. NUMBER OF BENDING : 2 TIMES</li> </ol>	SHOULD PASS SEALING AND VISUAL TEST
3. LEADS SOLDERABILITY	<ol style="list-style-type: none"> <li>1. DIP THE LEADS INTO FLUX(ROJIN METHANOL) FOR 5 SECONDS</li> <li>2. DIP THE LEADS INTO 250±5°C 99% Sn DIPPING SOLUTION FOR 5 SECONDS.</li> </ol>	THE DIPPED PART OF THE LEADS SHOULD HAVE 90~95% Sn COATING.
4. SOLDERING HEAT RESISTANCE TEST	<ol style="list-style-type: none"> <li>1. PERFORM ELECTRICAL CHARACTERISTICS TEST BEFORE STARTING THIS PROCEDURE.</li> <li>2. DIP THE LEADS INTO FLUX(ROJIN METHANOL) FOR 5 SECONDS.</li> <li>3. DIP THE LEADS INTO 260±5°C 99% Sn DIPPING SOLUTION FOR 5 SECONDS.</li> <li>4. TAKE THE UNIT OUT, STORE AT ROOM TEMPERATURE FOR 30 SECONDS THEN MEASURE THE ELCTRICAL CHARACTERISTICS.</li> </ol>	SHOULD PASS SEALING AND VISUAL TEST
5. VIBRATION	<ol style="list-style-type: none"> <li>1. PERFORM ELECTRICAL CHARACTERISTICS TEST BEFORE STARTING THIS PROCEDURE.</li> <li>2. THE UNIT SHOULD BE FIXED ONTO A VIBRATING MACHINE AND THEN SHAKEN X.Y.Z DIRECTIONS. VIBRATING FREQUENCY : 10 ~ 55 Hz AMPLITUDE : 0.03 Inch FACTOR TIME : 1 MINUTES TESTING TIME : 30 MINUTES EACH FOR X, Y, Z DIRECTIONS</li> </ol>	SHOULD PASS SEALING AND VISUAL TEST
6. DROP TEST	<ol style="list-style-type: none"> <li>1. PERFORM ELECTRICAL CHARACTERISTICS TEST BEFORE STARTING THIS PROCEDURE.</li> <li>2. FROM THE HEIGHT OF 500mm DROP THE UNIT 3 TIMES ONTO A HARD RUBBER SURFACE.</li> </ol>	SHOULD PASS SEALING AND VISUAL TEST
7. LEAK TEST	<p>USE Helium Leak Detector.</p> <p>Bombing PRESSURE : 5kg/cm<sup>2</sup></p> <p>Bombing TIME : 2 HOURS</p> <p>LEAK SHOULD BE LESS THAN 1E-8 atm.cc/sec.</p>	GAS OR AIR SHOULD NOT BE DETECTED.
8. MARKING ERASE	SUBMERGE THE UNIT INTO IPA[ISOPROPYL ALCOHOL] SOLUTION FOR 10 MINUTES AND BRUSH THE MARKING 10 TIMES WITH A TOOTH BRUSH.	MARKING SHOULD NOT BE ERASED.

### 4. Packing

