





1. Scope: This specification can cover the specification of crystal unit with Part No.: SM146-32.768K-12.5-20-E

2. ELECTRICAL SPECIFICATION

ITEM	SPECIFICATION
Package Type	SM146
Center frequency	32.768KHz
Load capacitance	12.5 PF
Frequency Tolerance (25°C±2°C)	±20PPM
E.S.R	40KΩ max
Drive Level	1.0μW
Operating Temperature Range	-40°C~+85°C
Storage Temperature	-55°C~+105°C
Aging	±5PPM/YEAR
Insultation Resistance	>500MΩ

3.MECHANICAL RELIABILITY

1) Terminal Strength

\* Lead pulling test

Conditions: Load 908. gram  
 Direction To the downward  
 Duration of applied force 5 seconds  
 Results: There should be no distortion in appearance.

\* Lead bending test

Conditions: Load 452.6 gram  
 Bending angle 90°to normal position  
 Rate of bending 3 seconds in each cycle  
 Number of bending 3  
 Results: There should be no distortion in appearance.

2) Lead solder ability test

Conditions: Dipping in solder(+230°C±5°C)for 5 seconds  
 Results: More than 95% of surface being tested should be coated uniformly with solder.

3) Vibration test

Conditions: Frequency 10 – 55Hz  
 Amplitude 0.76mm  
 Sweep 1.0 minute  
 Duration 2 hours  
 Results: Frequency and wave form of tested products must Remain within specifications.

4) Drop test

Conditions: Method of drop Natural drop  
 Dropping floor Hard wood board

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	Height	35cm
	Number of drops	3 times
Results:	Frequency and wave form of tested products must remain within specifications.	

#### 4.ENVIRONMENTAL RELIABILITY

##### 1) Temperature test

###### \* Temperature cycling test

Conditions:	Steps of cycle	1) At -55°C,30 minutes 2) At +25°C,10 - 15 minutes 3) At +85°C,30 minutes 4) At +25°C,10 - 15 minutes
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Number of cycles 3 times

Results: Frequency and wave form of tested products must remain within specifications.

###### \* Low Temperature test

Conditions:	Temperature	-20°C±2°C
	Length of test	96 hours

Results: There should be no stain on surface of products.  
Frequency and wave form of tested products must remain within specifications.

##### 2) Aging test

Conditions:	Temperature	+85°C±20°C
	Length of test	96 hours

Results: Deviation of frequency must be less than ±3ppm

##### 3) Salt spray test

Conditions:	Temperature	+35°C±2°C
	Length of test	48 hours
	NaCl %	5%

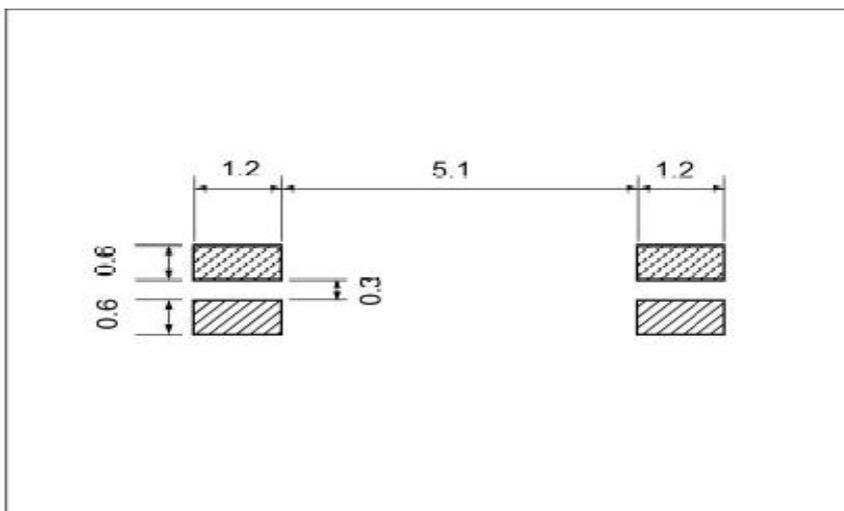
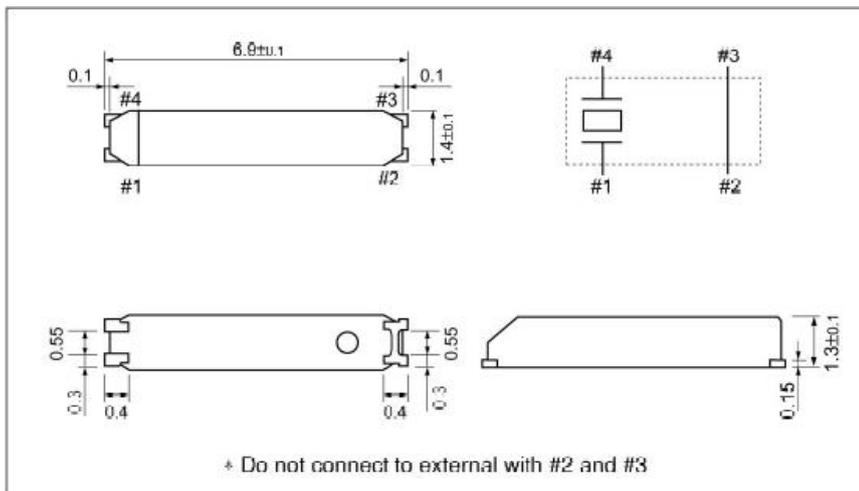
Results: There should be no stain on surface of products.

##### 4) Humidity test

Conditions:	Temperature	+40°C±2°C
	Relative humidity	90 - 95%
	Length of test	96 hours

Results: a. Insulation resistance must be 500 MΩ/100 Vac. minimum  
b. Resistance and wave form must remain within specifications.

5. DIMENSION (Unit: mm)



### 6. Reflow solder

