

Product Specification

Abundance Enterprise Co.

Original Date

14/9/2006

PN:

ZM146



# AEC<sup>®</sup>

Abundance Enterprise Co.

## PRODUCT SPECIFICATION

### CRYSTAL RESONATOR

**AEC PART NUMBER / SPEC. NO:** ZM146-32.768K-20-12.5p

**CUSTOMER:** Schukat electronic Vertriebs GmbH



This model is ROHS/PB-free compliance according to the ROHS directive 2002/95/EC

<b>Production Name</b>	Crystal Resonator
<b>Frequency</b>	32.768KHz
<b>Model No</b>	ZM146-32.768K-20-12.5p
<b>Issue Date</b>	18 <sup>th</sup> Jan 2013

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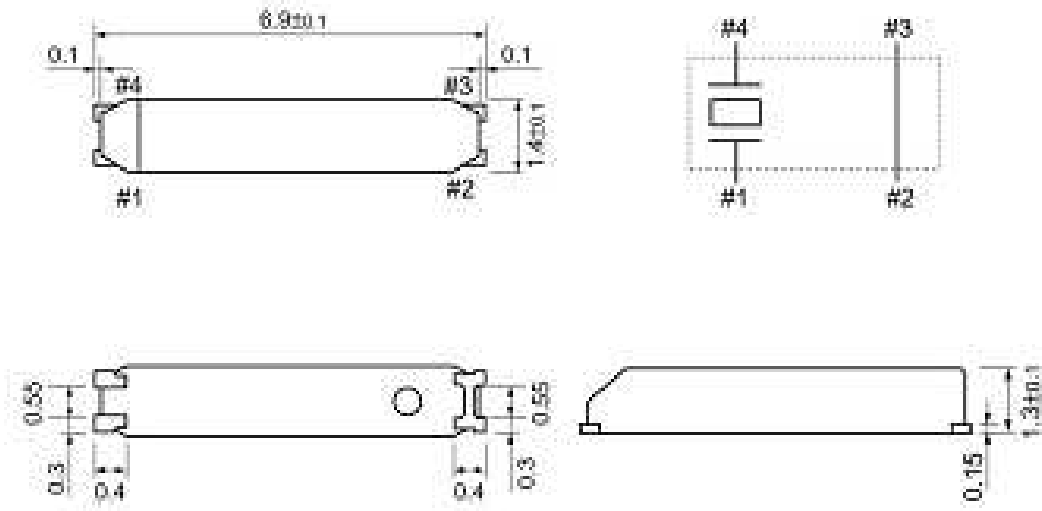
**1. GENERAL PROVISION**

- 1-1 Production Name: SMD Crystal Resonator
- 1-2 Holder Type: ZM146
- 1-3 This specification relates to the crystal resonator to be supplied by Abundance Enterprise Co. ( AEC ).

**2. ELECTRICAL DATA**

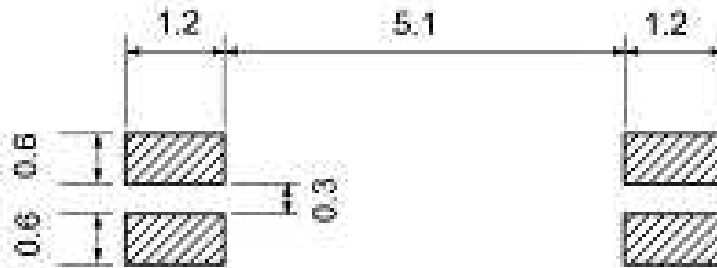
Items	Parameters		Condition
2-1	Frequency:		32.768KHz
2-2	Load Capacitance		12.5pF
2-3	Frequency Tolerance		+/- 20 ppm
2-4	Temperature Range	Operating	(-40°C to 85°C)
		Storage	(-55°C to 125°C)
2-5	Equivalent Series Resistance		65K ohm
2-6	Shunt Capacitance		0.8pF (typ.)
2-7	Motional Capacitance		1.9 fF (typ.)
2-8	Q-Factor		60K Typical
2-9	Parabolic Coefficient		-0.034ppm+/-0.006/(Δ°C) <sup>2</sup> (typ.)
2-10	Turnover Temperature		25°C +/-5°C
2-11	Shock Resistance		+/-3ppm max. Natural Drop 3 Times On Hard Wooden Board From Height of 75cm.
2-12	Insulation Resistance		500 Mega Ω Min./DC 100V
2-13	Drive Level		1u Watts max.
2-14	Aging (at 25°C)		+/-5 ppm/year max.
2-15	Capacitance Ratio		450 Typical

### 3. DIMENSION & LAND PATTERN




\* Do not connect to external with #2 and #3

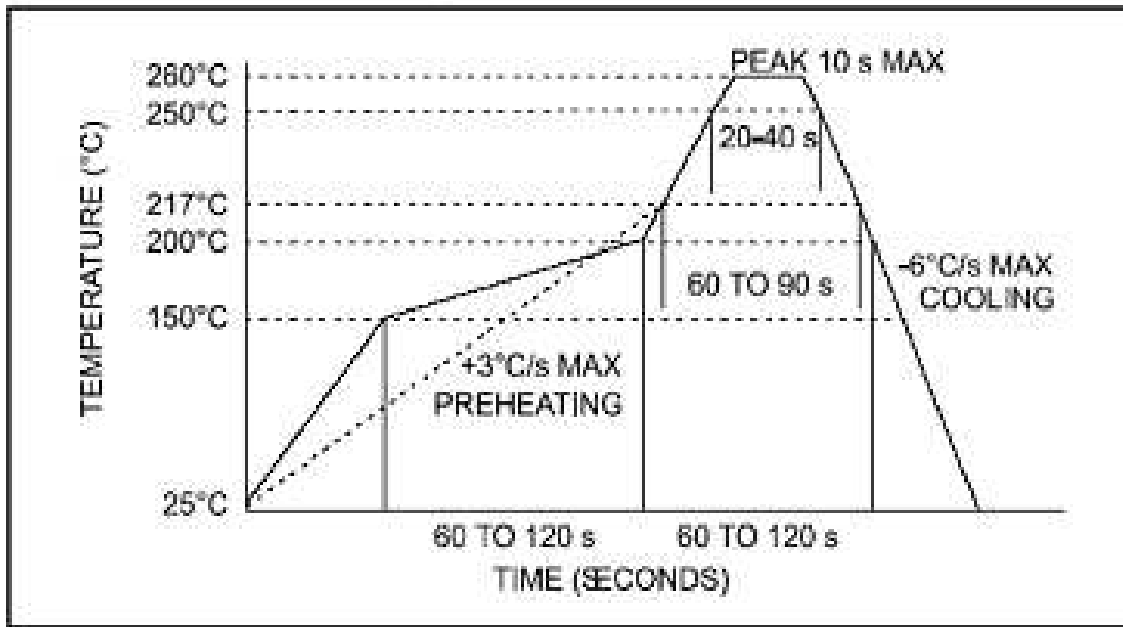
#### Recommended Soldering Pads



Unit: mm

 Abundance Enterprise Co.	NO.	REVISED DATE	MODIFY CONTENTS
	1	2006.10.4	ORIGINAL
DIMENTION	mm		
SCALE	/	MODEL	ZM-145 PAD AND PRODUCT DIMENTION
TOLERANCE	$\pm 0.2$	PART NAME	ZM-146

### 4. Soldering Condition



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## 5. Testing standard

5.1.1 Lot Classification: If the quantity is 1000pcs or more, 1000pcs is one lot

5.1.2 Sampling Test method: MIL-STD- 105E G-II

5.1.3 Test Level

- A) High Level Defect: AQL 0.065% [200pcs]
- B) Medium Level Defect: AQL 0.25% [50pcs]
- C) Low Level Defect: AQL 0.4%[32pcs]

5.1.4 Defect Classification

A) High Level

- i)NO Frequency
- ii)MIXING
- iii)Leak Defect

B) Medium Level- Electrical Characteristic Defect

- i) Frequency
- ii) Oscillation
- iii) Electrical Current
- iv) Other Electrical Characteristics Defect

C) Visual

- i) Marking
- ii) Welding
- iii) Leads
- iv) other visual defect

Testing method and its standard can be modified depending on the customer's request.

## 6. Reliability Test Standard- Environmental

Test Item	Testing procedure and Conditions	Evaluation
1. Thermal stock 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: +40 °C +/-2 °C 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: -40 °C +/-2 °C 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: +85 °C +/-2 °C 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: +85 °C +/-2 °C 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

**7. Reliability Test Standard- Mechanical.**

Test Item	Testing procedure and Conditions	Evaluation
1. Lead Tension	<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 Solder ability	<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>	Should pass sealing and visual test.
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 electrical 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. Vibration frequency: 10~55Hz 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. Bombing pressure: 5kg/cm<sup>2</sup> Leak should be less than 1E- 8atm.cc/sec.</p>	GAS or Air should not be detected.
8. Marking erase	<p>Submerge the unit into IPA [ISOPROPYL ALCOHOL] Solution for 10 Minutes and Brush the marking 10 times with a tooth brush.</p>	Marking should not be erased.

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## 8. Caution

In order to maintain quality, without change in characteristics of the crystal unit, please follow below recommendation

### 8.1 Shock

8.1.1 ALL crystal units have a thin crystal blanks within. If it is dropped above the recommended dropping height (500mm). The specific characteristics and appearance can be changed. Please pay special attention to external shock.

### 8.2 Environment.

8.2.1 Crystal units frequency can be changed due to surrounding temperature. If it is stored next to a high temperature heater (above +85°C) or below 40°C. And a strong light source for long period of time, the electrical characteristics can be changed. It is suggested that these environments can be avoided.

8.2.2 If the unit is placed in a humid environment, lead terminal can be damaged; therefore , do not store the crystal units in humid environment.

8.2.3 Crystal unit has vibrating characteristics. If it is placed where vibration exists, the operating characteristics can be altered; therefore, this environment should be avoided.

### 8.3 Lead

8.3.1 If the leads are bent 90° from its axis for more than 2 times the terminal could be disconnected; therefore, do not bent the leads excessively.

8.3.2 After soldering crystal units into a PCB, impacting the unit form the top, bottom, left or right side of the unit can shatter the glass portion of the base, rendering the unit useless.

### 8.4 Assembly method

8.4.1 Correct ultrasonic frequency for cleaning should be less than 20KHz.

8.4.2 Soldering should be done using IEC 61760-1 or PB- Free products.

### 8.5 Storage

8.5.1 If the crystal units are stored in humid or salty environment. Appearance can be changed and solder ability can be deteriorate; therefore, avoid storing in such environment, do not store the crystal unit more than 3 months.