

Product Specification

Abundance Enterprise Co.

Original Date

14/9/2006

PN:

ZM146



AEC[®]

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

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

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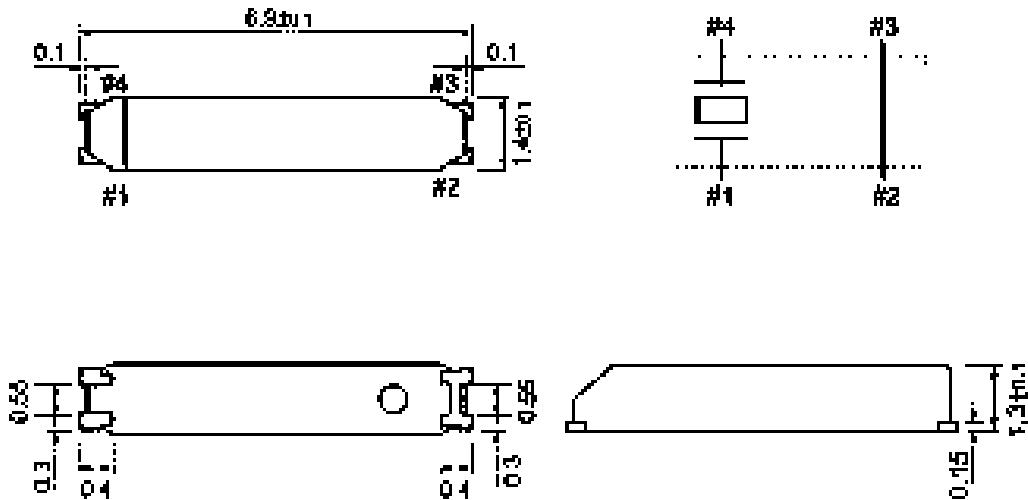
1. GENERAL PROVISION

- 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

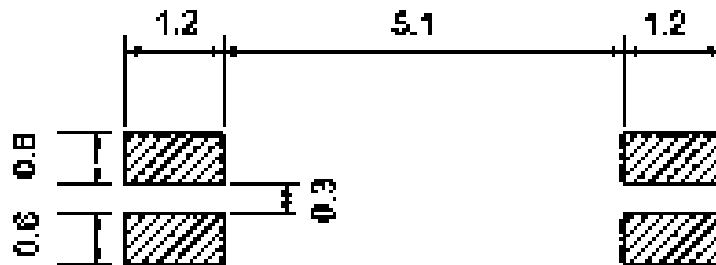
Items	Parameters		Condition
2-1	Frequency:		32.768KHz
2-2	Load Capacitance		12.5pF
2-3	Frequency Tolerance		+/- 20 ppm
2-4	Temperature Range	Operating	(-40°C to 85°C)
		Storage	(-55°C to 125°C)
2-5	Equivalent Series Resistance		65K ohm
2-6	Shunt Capacitance		0.8pF (typ.)
2-7	Motional Capacitance		1.9 fF (typ.)
2-8	Q-Factor		60K Typical
2-9	Parabolic Coefficient		-0.034ppm+/-0.006/(Δ°C) ² (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

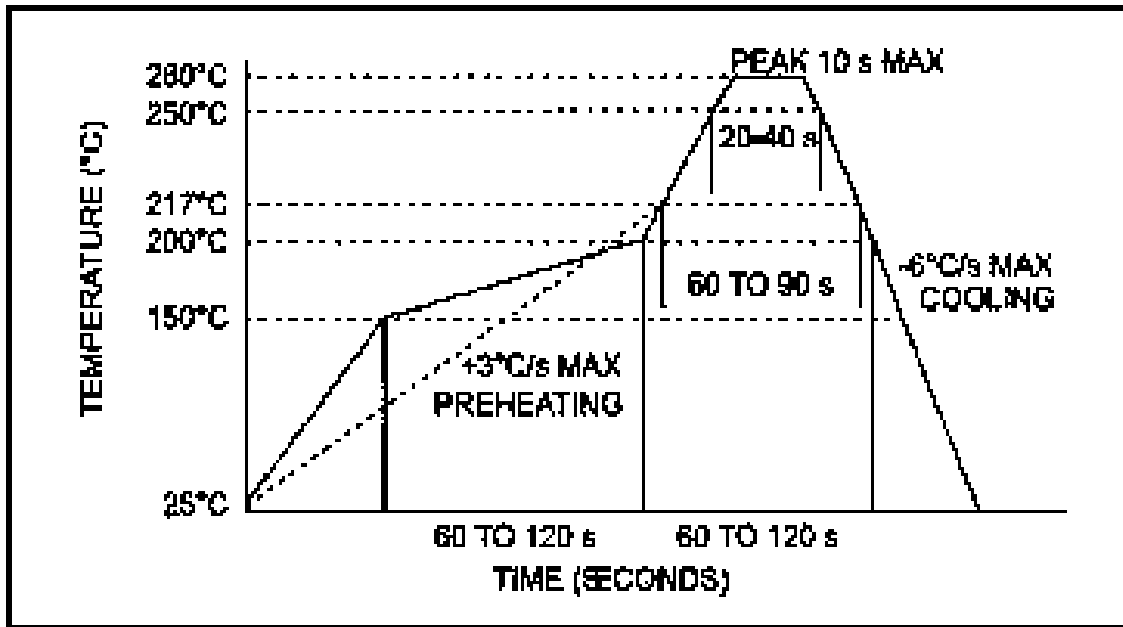
Recommended Soldering Pads



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	±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"> 1. Fix the unit 2. Apply 2LB of Weight Axis to the leads 3. Time: 5 Seconds. 	Should pass sealing and visual test.
2. Lead bending	<ol style="list-style-type: none"> 1. Attach 1 LB of Weight to each of the leads 2. Bending Angle 90° (From the normal position to 45° opposite direction) 3. Bending Time: 3 Seconds(Each direction) 4. Number of bending: 2 Times 	Should pass sealing and visual test.
3. Leads Solder ability	<ol style="list-style-type: none"> 1. Dip the leads into flux (Rojin Methanol) for 5 seconds. 2. Dip the leads into 250 +/- 5°C 99% Sn Dipping solution for 5 seconds. 	Should pass sealing and visual test.
4. Soldering heat resistance test	<ol style="list-style-type: none"> 1. Perform Electrical Characteristics Test before starting this procedure. 2. Dip the leads into flux (Rojin methanol) for 5 seconds. 3. Dip the leads into 260 +/- 5°C 99% Sn Dipping solution for 5 seconds. 4. Take the unit out, store at room temperature for 30 seconds then measure the electrical characteristics. 	Should pass sealing and visual test.
5 Vibration	<ol style="list-style-type: none"> 1. Perform electrical characteristics test before starting this procedure. 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 	Should pass sealing and visual test.
6. Drop Test	<ol style="list-style-type: none"> 1. Perform Electrical characteristics test before starting this procedure. 2. From the height of 500mm drop the unit 3 times onto a hard rubber surface. 	Should pass sealing and visual test.
7 Leak test	<p>USE helium Leak detector. Bombing pressure: 5kg/cm² 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 from 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.