Serial No. : 2013-0662
DATE : 2013/06/06

Shanghai STEP Electronic Corporation

ITEM : CRYSTAL RESONATOR

TYPE : DT-38

NOMINAL FREQUENCY : 32.768kHz

SPEC No. : 1TC080DFNS005

Please acknowledge receipt of this specification by signing and returning a copy to us.

RECEIPT	
DATE	
RECEIVED	(signature) (name)

General Manufacturer of Quartz Devices
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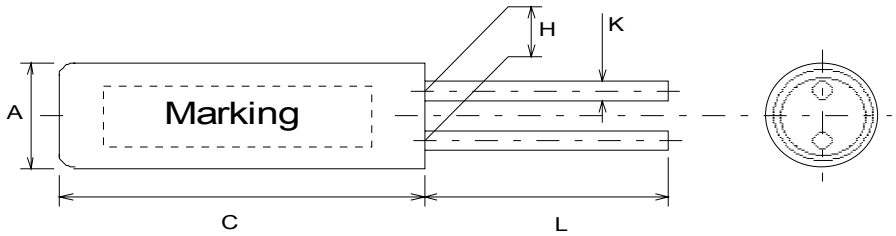
ENG. H. Nasu

1. ELECTRICAL CHARACTERISTICS
(This test shall be performed under the conditions of temp.at +25±2°C, relative humidity 60%max.)

1.1.	NOMINAL FREQUENCY	32.768 kHz
1.2.	OVERTONE ORDER	Fundamental
1.3.	LOADING CAPACITANCE(CL)	8.0 pF
1.4.	FREQUENCY TOLERANCE	±20 $\times 10^{-6}$ max.
1.5.	DRIVE LEVEL	1.0 ± 0.2 μW (2.0μW max.)
1.6.	SERIES RESISTANCE	30 kΩ max./Series
1.7.	TURNOVER TEMPERATURE	+25 ± 5°C
1.8.	PARABOLIC COEFFICIENT	-0.04 $\times 10^{-6}$ / $°C^2$ max.
1.9.	SHUNT CAPACITANCE	1.3 pF typ.
1.10.	OPERATING TEMPERATURE RANGE	-10 ~ +60 °C
1.11.	STORAGE TEMPERATURE RANGE	-20 ~ +70 °C
1.12.	INSULATION RESISTANCE	500 MΩ min./DC100±15V (Lead to lead, Lead to case)
1.13.	AGING	± 5 $\times 10^{-6}$ max./year

2. DIMENSIONS AND MARKING

2.1. DIMENSIONS



A	C	H	K	L
Φ3.1 max.	8.3 max.	1.1 ± 0.2	Φ0.35 ± 0.07	10.0 ± 1.0

unit : mm

Fig.-1

2.2. MARKING

Marking should be printed as follows:
Logo(*1), Lot No.(*2)

*1 Manufacturer's trademark shall be marked 'KDS' as Logo.

*2 Lot No. shall be marked by two figures.
(1)Year:The last digit of the year.
(2)Month:As shown in the table

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Symbol	A	B	C	D	E	F	G	H	J	K	L	M

ex. Manufactured day: 2013.06.06 → 3 F
Year Month

*3 Marking direction is not specified.

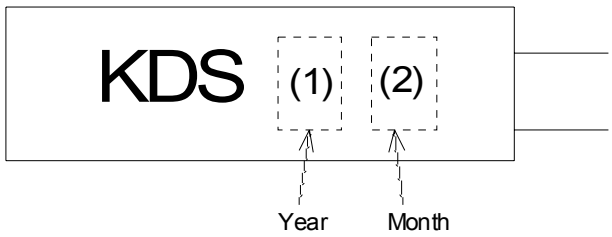


Fig.-2

Title	Remark		
DT-38 TYPE QUARTZ CRYSTAL SPECIFICATION			
Date	Spec No.	Rev.	Page
2013/06/06	1TC080DFNS005	-	2 / 9

3. PACKING

3.1. INNER BOX

3.1.1. PACKING

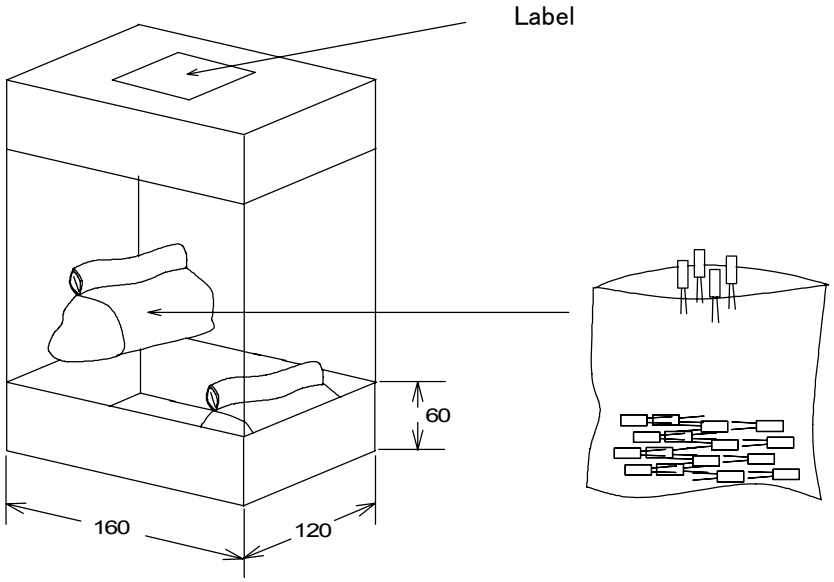
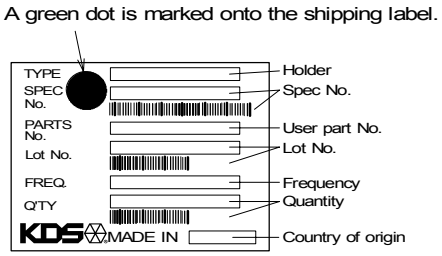


Fig.-3

2,000 pieces per plastic bag. 2 plastic bags as 4,000 pieces max. in an inner box.
A label is attached on an inner box.
(Even small quantity lot less than 2,000 pieces will be put into a plastic bag. Pieces will be packed with cushion material.)

3.1.2. LABEL CONTENTS



3.2. OUTER BOX

3.2.1.PAKING AND LABEL

Crystal units shall be packed in inner box by production lot.
Outer carton size would be changed depending on lot size.
A label shall be put on an outer carton.

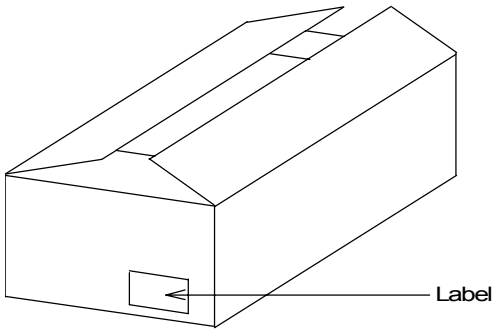


Fig.-4

3.2.2. SIZE OF A PACKING CARTON

There may be different size of packing carton used depending on the lot size
Also,the product packed inside shall be protected by air cushion.

3.2.3. LABEL CONTENTS

The type of product
Lot No.
Specification
Quantity
Shipment Day
Remark

4. MECHANICAL ENDURANCE

4.1. SHOCK

After the following test,parts shall conform specification Table-1-A.
3times free drop from 750mm heights to a hard wood board of minimum thickness 30mm.

4.2. VIBRATION

After the following test,parts shall conform specification Table-1-A.
and no abnormal appearance shall be observed.

(1)Frequency of Vibration : 30~120Hz
(2)Cycle : 1~2min
(3)Amplitude : 3G constant
(4)Vibration period : 20min for X,Y,Z axis

4.3. AIRTIGHTNESS

1.0×10^{-9} Pa-m^3/s max.
Testing by Helium leak detector.

4.4. TERMINAL STRENGTH

After the following test,parts shall show visual damage.
Bending terminals at +90°, then at –90°, then at +90°, and then finally unbending at 0°
1.0mm from the bottom of case.
One bend is counted as one time, it can be endured up to three times.

4.5. SOLDERING HEAT RESISTANCE

After the following test,parts shall conform specification Table-1-A.
Dipping terminals to 1mm from the bottom of product into the solder pot at +245±5°C for 3s.
Measuring 1h after the test at +25°C.

4.6. SOLDERABILITY

After the following test. More than 90% of leads shall be covered by new solder.
Dipping leads to 1mm from the bottom of product into the solder pot at +245±5°C for 3s.
(Use rosin type flux for solder.)

5. ENVIRONMENTAL ENDURANCE

5.1. HIGH TEMPERATURE

2h past at room temperature after following test,
parts shall conform specification Table-1-A.
24h +70±2°C

5.2. LOW TEMPERATURE

2h past at room temperature after following test,
parts shall conform specification Table-1-A.
24h -30±3°C

5.3. HUMIDITY

2h past at room temperature after following test,
parts shall conform specification Table-1-A.
24h +40±2°C,relative humidity 85±5%.

6 SPECIFICATION

Table-1

	Frequency Variation	Resistance Variation
A	$\pm 3\times10^{-6}$	±15 % or ±5kΩ max. (Use larger specification)

7. HANDLING GUIDE TO DT-38 TYPE

7.1. HANDLING

Do not add excessive shocks to units, otherwise characteristic deterioration or no-oscillation may be caused.
Please be careful not to drop, and operate them on the shock free condition.
Please also confirm the condition before applying automatic mounting or changing the condition of use.
In the process where the boad is warped,such as board separation process,
be careful that the warping does not influence the characteristics and soldering of crystal products.

7.2. DRIVE LEVEL

Oscillation in excessive drive level may cause characteristic deterioration or no-oscillation.
For this product, drive level as less than 1.0μW is recommended.
And original characteristics cannot be guaranteed when more than 2.0μW is supplied.

7.3. SOLDERING

Solder which shall be melt at +217°C is used inside of a unit.,
Therefore characteristic deterioration or no-oscillation may be caused if the temperature of the package comes +150°C or over.
Please use SMD or heat-resistant type units when applying the above temperature.
And please deeply concern about temperature condition or consult with us when applying wave soldering.
Also please remind to solder with dipping at +280°C max. for 5s max., or at +260°C max. for 10s max. at the leads.
With regard to hand soldering, we recommend to solder at +350°C max. for 3s max.
And please take care so that a soldering iron should not touch the sealing area.
Please do not apply solder to the package directly, as it may cause characteristic deterioration.

7.4. MOUNTING

Fix the units firmly if laid condition on circuit board is required.
Especially under the vibrating condition, insert shock absorber between the unit and circuit board, or fix the unit with elastic glue (silicone applied) onto the board.
If soldering the unit at standing condition is required, it is suggested to keep it away from a circuit board more than 3mm.

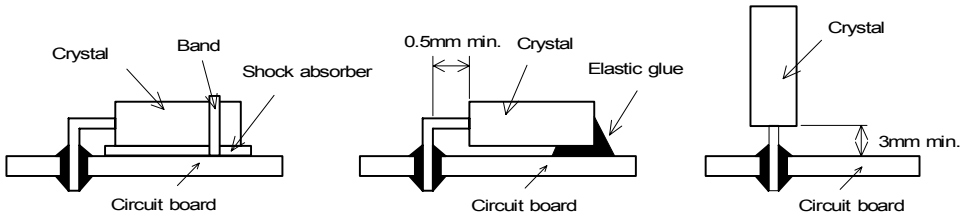


Fig.-5

7.5. LEAD CUTTINNG AND LEAD FORMING

Please keep your lead cutter in good condition, when applying the leads cutting.
If forming or reforming the leads, do not add excessive power to the roots of leads or sealing areas, otherwise the crack of glass or the leak may be caused.
Please do not cut or bend the leads within 0.5 mm from the base of the cylinder body.

7.6. CLEANING

Though use of aqueous solvent, alcohole or alternative freon is available, please consult with us if you use other solvent.
Tuning fork crystals resonate at frequency bands that are close to the washing frequency of ultrasonic cleaning machines and this may cause resonance deterioration in the crystal.
Therefore the use of ultrasonic cleaning machines to clean tuning fork crystals should be avoided.
After applying ultrasonic cleaning, the functionality of crystals should be verified by testing the performance of the end product.

7.7. ULTRASONIC WELDING

Original characteristics cannot be guaranteed when ultrasonic welding is applied, due to the damage of inside crystal blank by sympathetic vibration, and this may cause no-oscillation of units.

7.8. STORAGE

Please keep the crystal units in the temperature range of +40°C max. and the humidity range of 80% max. for storing, because the solderability of the crystal units may deteriorate if it is stored under high temperature or high humidity environment.
The crystal units must not be subjected to direct sunlight, and please store in a non-condensing place.
Solderability of the crystal units may deteriorate in long-term storage, so it is recommended crystal units be used within 6 months after shipped from KDS.

2013-0662 REVISION RECORD

Rev.No	Date	Reason	Contents	Approved	Checked	Drawn
-	2013/06/06		The first edition.	T.Okishio	T.Kusai	H.Nasu