

ITEM :

**CRYSTAL RESONATORS**

TYPE :

DT-38

NOMINAL FREQUENCY :

32.768kHz

SPEC No. :

1TC125AFNS027

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

| RECEIPT  |                           |
|----------|---------------------------|
| DATE     |                           |
| RECEIVED | (signature)<br><br>(name) |

General Manufacturer of Quartz Devices**DAISHINKU CORP.**

1389 Shinzaike, Hiraoka-cho, Kakogawa, Hyogo  
675-0194 Japan  
Phone (81)79-425-3141 Fax (81)79-425-1134  
[http://www.kds.info/index\\_en.htm](http://www.kds.info/index_en.htm)

C.ENG.

*T. Nakamura*

ENG.

*H. Nasu*

1. Electrical characteristics (measured at +25±2°C)

- |                                  |                                                          |
|----------------------------------|----------------------------------------------------------|
| (1) Nominal frequency            | 32.768 kHz                                               |
| (2) Frequency tolerance          | $\pm 5 \times 10^{-6}$ max.                              |
| (3) Loading capacitance          | 12.5 pF                                                  |
| (4) Equivalent resistance        | 30 kΩ max. / series                                      |
| (5) Measurement drive level      | $1.0 \pm 0.2 \mu\text{W}$                                |
| (6) Turnover temperature         | $25 \pm 5^\circ\text{C}$                                 |
| (7) Parabolic curvature constant | $-4.0 \times 10^{-8} / ^\circ\text{C}^2$ max.            |
| (8) Insulation resistance        | Lead to lead<br>500 MΩ min. at D.C. 100V<br>Lead to case |
| (9) Operating temperature range  | - 10 ~ + 60 °C                                           |
| (10) Storage temperature range   | - 20 ~ + 70 °C                                           |
| (11) Aging                       | $\pm 5 \times 10^{-6}$ max. / year                       |

|                        |               |
|------------------------|---------------|
| Manufacturing location | Spec No.      |
| Tianjin                | 1TC125AFNS044 |

2. Construction

- |                            |                           |
|----------------------------|---------------------------|
| (1) Holder                 | DT-38                     |
| (2) Dimensions and marking | Refer to Fig-1 and Fig-2. |

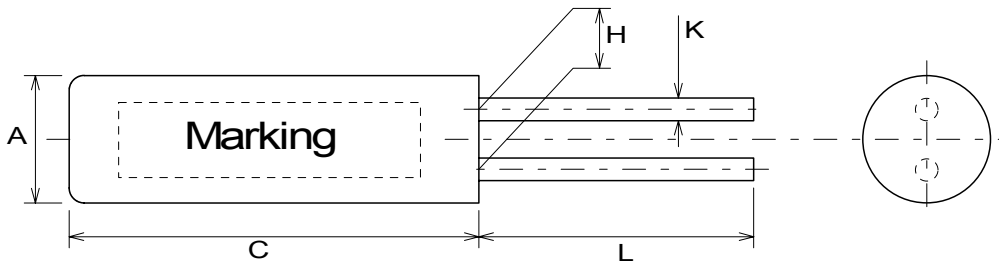
3. Other specifications

Use of Freon

This related product is not used with any ODC CLASS 1.

|                                                  |                            |        |             |
|--------------------------------------------------|----------------------------|--------|-------------|
| TITLE<br>DT-38 TYPE QUARTZ CRYSTAL SPECIFICATION |                            | Remark |             |
| Date<br>2009/02/09                               | Spec. No.<br>1TC125AFNS027 | Rev.   | Page<br>1/7 |

#### 4. Dimensions



| A            | C        | H         | K             | L        |
|--------------|----------|-----------|---------------|----------|
| dia.3.1 max. | 8.3 max. | 1.1 ± 0.2 | dia.0.35±0.07 | 10.0±1.0 |

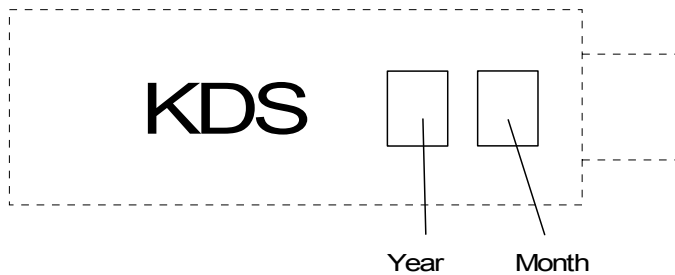
(Unit: mm)

Fig-1

#### 5. Marking

The manufacturer's code and manufacturing date should be marked on the surface of the holder as the following diagram shows.

\*Marking direction is not specified.



(\*) Year : The last digit of the manufactured year

Ex) 2009 shall be marked as "9"

Month : As shown in the table

Ex) Feb. shall be marked as "B"

| 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    |

Fig-2

|                                                  |  |  |  |                            |  |      |             |
|--------------------------------------------------|--|--|--|----------------------------|--|------|-------------|
| TITLE<br>DT-38 TYPE QUARTZ CRYSTAL SPECIFICATION |  |  |  | Remark                     |  |      |             |
| Date<br>2009/02/09                               |  |  |  | Spec. No.<br>1TC125AFNS027 |  | Rev. | Page<br>2/7 |

## 6. Mechanical endurance

| Item                      | Standard                                        | Condition                                                                                                                                                                      |
|---------------------------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vibration resistance      | $f_0: \pm 3 \times 10^{-6}$<br>max.             | (1) Vibration 30 ~ 120Hz<br>(2) Cycle 2 min<br>(3) G force 3G<br>(4) Time 20 min<br>X,Y,Z Each direction.                                                                      |
| Shock resistance          | $f_0: \pm 3 \times 10^{-6}$<br>max.             | Free drops from 75cm high onto a wooden board (3 cm thickness) Repeat 3 times.<br>Measure 5 min after the test.                                                                |
| Hermetical sealing        | $1 \times 10^{-9}$ Pa·m <sup>3</sup> /s<br>max. | Testing by Helium leak detector.                                                                                                                                               |
| Terminal strength         | No visual damage                                | Bending terminals at +90°, at -90°, at +90°, and finally unbending at 0° 1mm from the bottom of case.<br>One bend is counted as one time, it can be endured up to three times. |
| Soldering heat resistance | $f_0: \pm 3 \times 10^{-6}$<br>max.             | Dipping terminals to 1mm from the bottom of product into the solder pot at +245±5°C for 3s.<br>Measuring 1h after the test at +25°C.                                           |
| Solder ability            | 90% min.                                        | Terminals solder ability is at a bath temperature of +245±5°C for 3s. (with flux)                                                                                              |

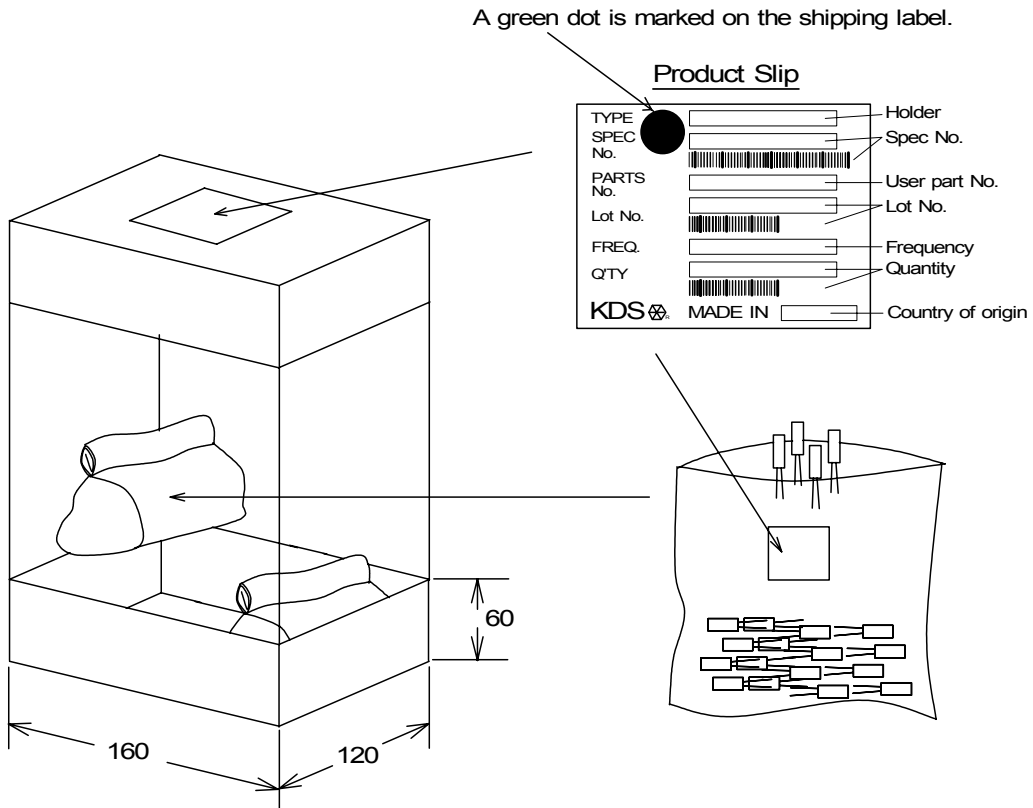
## 7. Environmental endurance

| Item                     | Standard                            | Condition                                                                       |
|--------------------------|-------------------------------------|---------------------------------------------------------------------------------|
| High temperature storage | $f_0: \pm 3 \times 10^{-6}$<br>max. | +70°C × 24h<br>Measuring 2h after the test at +25°C.                            |
| Low temperature storage  | $f_0: \pm 3 \times 10^{-6}$<br>max. | -30°C × 24h<br>Measuring 2h after the test at +25°C.                            |
| Moisture storage         | $f_0: \pm 3 \times 10^{-6}$<br>max. | +40°C × 24h in 90 % relative humidity.<br>Measuring 2h after the test at +25°C. |

|                                                  |                            |        |             |
|--------------------------------------------------|----------------------------|--------|-------------|
| TITLE<br>DT-38 TYPE QUARTZ CRYSTAL SPECIFICATION |                            | Remark |             |
| Date<br>2009/02/09                               | Spec. No.<br>1TC125AFNS027 | Rev.   | Page<br>3/7 |

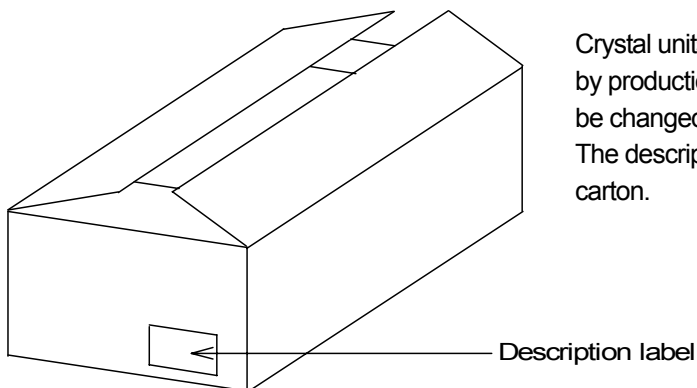
## 8. Packing

### 8.1. Inner box



1000 units per plastic bag. 5 plastic bags in an inner box. A product slip is attached on the inner box. (As for odd unit, shall be packed in a plastic bag.)

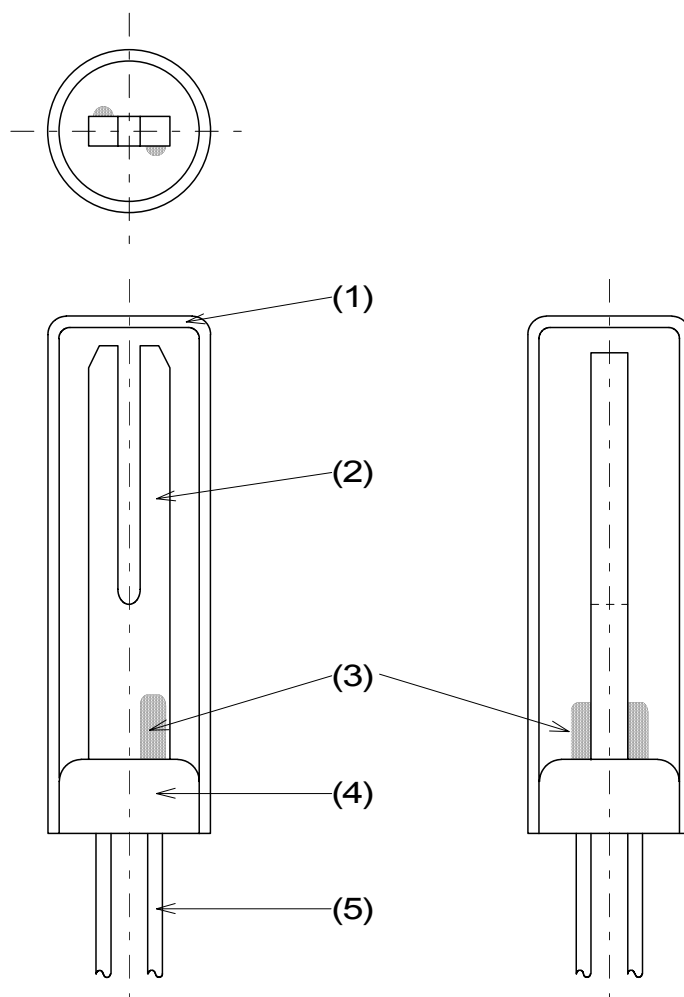
### 8.2. Outer box



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

|                                                  |                            |      |             |
|--------------------------------------------------|----------------------------|------|-------------|
| TITLE<br>DT-38 TYPE QUARTZ CRYSTAL SPECIFICATION | Remark                     |      |             |
| Date<br>2009/02/09                               | Spec. No.<br>1TC125AFNS027 | Rev. | Page<br>4/7 |

9. Inside structure



| No  | Components    | Materials        | Finish/Specifications |
|-----|---------------|------------------|-----------------------|
| (1) | Can           | Nickel silver    | Ni plating            |
| (2) | Crystal blank | SiO <sub>2</sub> | -                     |
| (3) | Solder        | Sn-Ag-Cu         | -                     |
| (4) | Shell         | 42 alloy         | Sn plating            |
| (5) | Lead terminal | Kovar            | Sn plating            |

This is a sketch of inside construction.  
So the size of this drawing may not match with actual size.

|                                                  |                            |        |             |
|--------------------------------------------------|----------------------------|--------|-------------|
| TITLE<br>DT-38 TYPE QUARTZ CRYSTAL SPECIFICATION |                            | Remark |             |
| Date<br>2009/02/09                               | Spec. No.<br>1TC125AFNS027 | Rev.   | Page<br>5/7 |

## 10. User manual for tuning fork type crystal units (cylinder type)

### 10.1. Shock

Do not add excessive shocks to units, otherwise deterioration or non-oscillation may be caused.  
Please be careful not to drop the units and operate them in a shock free condition.  
Please also confirm conditions before applying automatic mounting or changing the condition of use.

### 10.2. Temperature and humidity

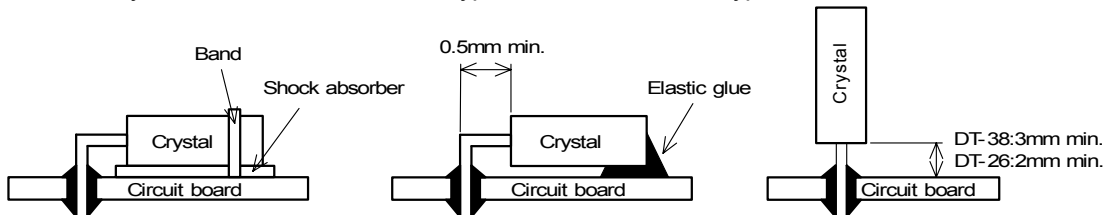
Operation or storage in high-temperature, low-temperature or high-humidity may cause deterioration of the units.  
Please operate or store them under condition of normal temperature and normal humidity.

### 10.3. Solder heat

Solder which shall be melted at +217°C is used inside of these units, and therefore deterioration or non-oscillation may be caused if the units' body temperature reaches +150°C or over.  
Please use SMD or heat-resistant type units when applying the above temperature.  
Please be aware of temperature conditions or consult with us when applying flow-soldering.  
May we also remind you to solder at +280°C max. with 5s max., or at +260°C max. with 10s max. at the leads.  
Please do not apply solder to the body of units directly, as it may cause deterioration.

### 10.4. Mounting

If a horizontal laying position on the circuit board is required, fix the units firmly.  
Especially under the vibrating conditions, insert shock absorber between the unit and circuit board or fix the unit with elastic glue (silicon applied) onto the board.  
Please do not put the glue on glass part of units.  
If a vertical standing position on a circuit board is required it is suggested to keep the unit at least 3mm away from circuit board for DT-38 type and 2mm for DT-26 type.



### 10.5. Lead cutting and Lead forming

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

### 10.6. Ultrasonic washing and ultrasonic welding

Since mounting by Ultrasonic welding and processing have a possibility of an excessive vibration spreading inside a crystal resonator and becoming the cause of characteristic deterioration and not oscillating, it does not recommend.  
Please consult with us if ultrasonic washing is required.

### 10.7. Drive level

Oscillation in excessive drive level may cause deterioration or non-oscillation.  
For this product, drive level less than 1.0μW is recommended.  
And original characteristics cannot be guaranteed when more than 2.0μW is supplied.

Thank you very much.

Please do contact us to below if you have any question.

Daishinku Corporation  
R&D Engineering Dept.  
179-15 Mizuashi, Noguchi-cho,  
Kakogawa-city, Hyogo-pref.,  
675-0194 Japan  
Tel : +81 (79) 421-7200  
Fax : +81 (79) 421-7240

|                                                  |                            |      |             |
|--------------------------------------------------|----------------------------|------|-------------|
| TITLE<br>DT-38 TYPE QUARTZ CRYSTAL SPECIFICATION | Remark                     |      |             |
| Date<br>2009/02/09                               | Spec. No.<br>1TC125AFNS027 | Rev. | Page<br>6/7 |

