



# PRODUCT SPECIFICATION SHEET

CUSTOMER'S APPROVAL&DATE

[illegible]

|          |              |          |
|----------|--------------|----------|
| APPROVED | CHECKED      | DESIGNED |
| Liu Feng | Zhou Xueming | Li Xiang |

MSL1  
RoHS Compliant



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## ATTACHMENT ( optional )

- |                                    |   |                              |                                        |
|------------------------------------|---|------------------------------|----------------------------------------|
| • ELECTRICAL CHARACTERISTICS TEST  | A | <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO |
| • TEMPERATURE CHARACTERISTICS TEST | B | <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO |

## Attention

- If you intend to use products on the controlling equipment that relate to medical, aeronautical, aerospace, military science, space and etc, please make sure to let us know your intentions in advance.
- Ultrasonic related process may cause damage to crystal blank by resonance itself. If ultrasonic related process is used, we strongly recommend to assess the damage risk under related ultrasonic conditions before use in production.



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3SQ3270028

S1

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## SPECIFICATION REVISION RECORD SHEET

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## PRODUCT DESCRIPTION

### Standard atmospheric conditions

Unless otherwise specified. The standard range of atmospheric conditions for making measurement and tests are as follow:

Ambient temperature  $25\pm 2^{\circ}\text{C}$   
Relative humidity 40%~70%

If there is no doubt the results, measurement shall be made within the following limits:

Ambient temperature  $25\pm 2^{\circ}\text{C}$   
Relative humidity : 40%~70%

### Measure equipment

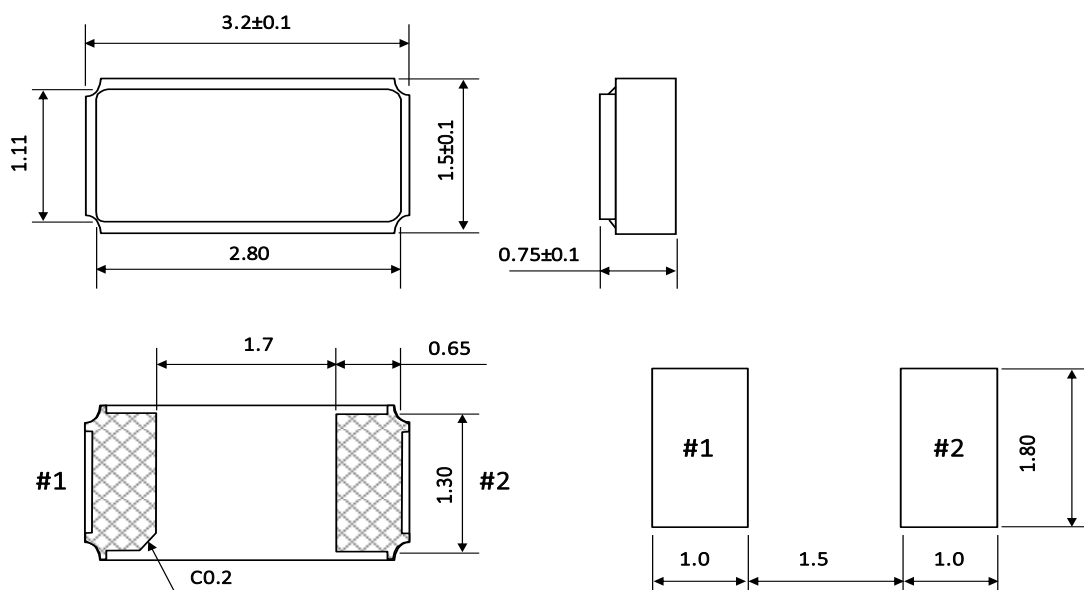
Electrical characteristics measured by S&A250B or equivalent.

## ELECTRICAL SPECIFICATIONS

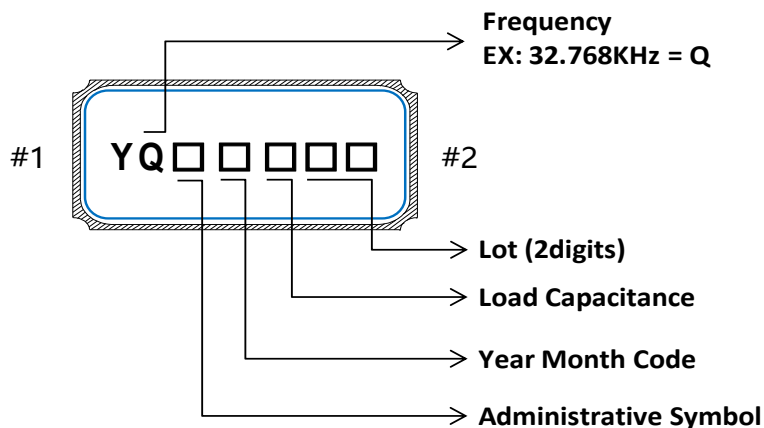
| No. | Items                        | Electrical Spec. |                 |     |     |                           | Remarks                                                                                                                                                                      |
|-----|------------------------------|------------------|-----------------|-----|-----|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |                              | Symbol           | Min             | Typ | Max | Units                     |                                                                                                                                                                              |
| 1   | Nominal Frequency            | f_nom            | 32.768000       |     |     | KHz                       | -                                                                                                                                                                            |
| 2   | Load Capacitance             | CL               | 9.0             |     |     | pF                        | -                                                                                                                                                                            |
| 3   | Frequency Tolerance          | f_tol            | $\pm 20$        |     |     | ppm                       | at $25\pm 3^{\circ}\text{C}$ , DL=0.5uW                                                                                                                                      |
| 4   | Turnover Temperature         | Ti               | 20              | 25  | 30  | $^{\circ}\text{C}$        | Measure this coefficient at 5 points of $-40^{\circ}\text{C}$ , $-20^{\circ}\text{C}$ , $25^{\circ}\text{C}$ , $60^{\circ}\text{C}$ , $85^{\circ}\text{C}$ . using S&A W2200 |
| 5   | Freq. vs Temp. Coefficient   | B                | $-0.03\pm 0.01$ |     |     | ppm/ $^{\circ}\text{C}^2$ |                                                                                                                                                                              |
| 6   | Shunt Capacitance            | C0               | -               | 1.2 | -   | pF                        | -                                                                                                                                                                            |
| 7   | Motional Capacitance         | C1               | -               | 4.7 | -   | fF                        | -                                                                                                                                                                            |
| 8   | Aging (1st year)             | f_age            | $\pm 3$         |     |     | ppm/year                  | at $25\pm 3^{\circ}\text{C}$ , DL=0.5uW                                                                                                                                      |
| 9   | Operating Temperature        | -                | -40             | -   | 85  | $^{\circ}\text{C}$        | -                                                                                                                                                                            |
| 10  | Storage Temperature          | -                | -40             | -   | 125 | $^{\circ}\text{C}$        | -                                                                                                                                                                            |
| 11  | Equivalent series resistance | ESR              | -               | -   | 70  | k $\Omega$                | -                                                                                                                                                                            |
| 12  | Insulation Resistance        | IR               | 500             | -   | -   | M-ohms                    | at DC 100V                                                                                                                                                                   |
| 13  | Drive Level                  | DL               | 0.1             | 0.5 | 1.0 | uW                        | -                                                                                                                                                                            |



### DIMENSIONS unit:mm



### MARKING



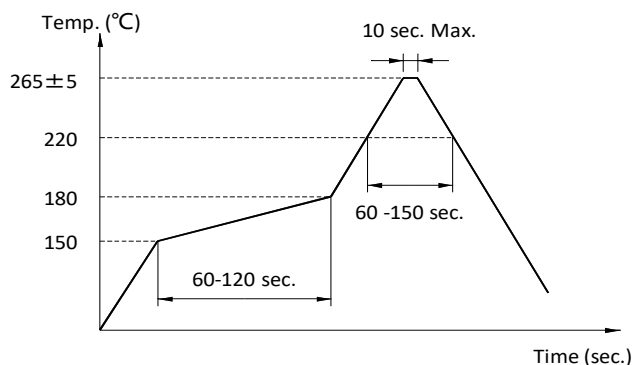
| month |      | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|-------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| year  |      |     |     |     |     |     |     |     |     |     |     |     |     |
| 2021  | 2025 | A   | B   | C   | D   | E   | F   | G   | H   | J   | K   | L   | M   |
| 2022  | 2026 | N   | P   | Q   | R   | S   | T   | U   | V   | W   | X   | Y   | Z   |
| 2023  | 2027 | a   | b   | c   | d   | e   | f   | g   | h   | j   | k   | l   | m   |
| 2024  | 2028 | n   | p   | q   | r   | s   | t   | u   | v   | w   | x   | y   | z   |

| Load Capacitance | 7.0pF | 9.0pF | 12.5pF | 6.0pF |
|------------------|-------|-------|--------|-------|
|                  | A     | B     | C      | D     |

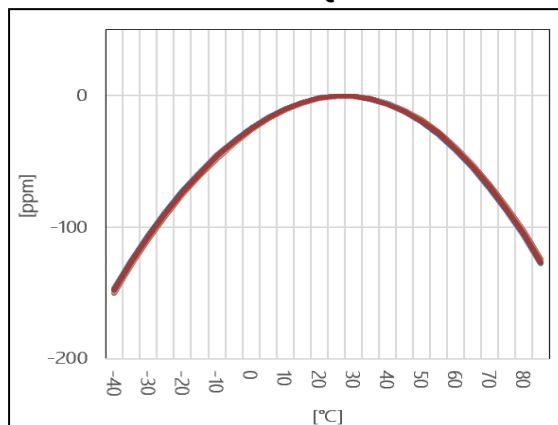
### SUGGESTED REFLOW PROFILE

Total time : 360 sec. Max.

Solder melting point :225 °C



### TEMPERATURE V.S FREQUENCY CURVE





## RELIABILITY SPECIFICATIONS

| No. | Item                                       | Specification                        | Conditions                                                                                                                                        | Note     |
|-----|--------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 1   | High temperature storage                   | $\Delta F/F = \pm 10 \times 10^{-6}$ | After storage under $125 \pm 3^\circ\text{C}$ for 1000 hours, measure at room temperature.<br>IEC60068-2                                          | *1<br>*3 |
| 2   | High temperature storage                   | $\Delta F/F = \pm 7 \times 10^{-6}$  | After storage under $85 \pm 3^\circ\text{C}$ for 1000 hours, measure at room temperature.<br>IEC60068-2                                           | *1<br>*3 |
| 3   | Low temperature storage                    | $\Delta F/F = \pm 10 \times 10^{-6}$ | After storage under $-55 \pm 3^\circ\text{C}$ for 1000 hours, measure at room temperature.<br>IEC60068-2                                          | *1<br>*3 |
| 4   | High temperature and high humidity storage | $\Delta F/F = \pm 10 \times 10^{-6}$ | After storage under $+85 \pm 3^\circ\text{C}$ , 85 % RH for 1000 hours, measure at room temperature.<br>IEC60068-2                                | *1<br>*3 |
| 5   | Temperature cycle                          | $\Delta F/F = \pm 10 \times 10^{-6}$ | Measure at room temperature after 100 cycles.<br>$-55 \pm 3^\circ\text{C} \leftrightarrow +125 \pm 3^\circ\text{C}$ for 30 minutes.<br>IEC60068-2 | *1<br>*3 |
| 6   | Mechanical shock resistance                | $\Delta F/F = \pm 8 \times 10^{-6}$  | Measure after 100g-dummy drop from 1500mm height on the concrete 3directions 10times.                                                             | *2       |
| 7   | Vibration resistance                       | $\Delta F/F = \pm 3 \times 10^{-6}$  | 10Hz~55Hz, 0.75mm<br>55Hz~500Hz, $98\text{m/s}^2$ , 3 direction (X, Y, and Z axis) each for 2 hours.<br>IEC60068-2                                | *2       |
| 8   | AIR Reflow                                 | $\Delta F/F = \pm 5 \times 10^{-6}$  | Measure after 3 time reflow under reflow profile specified in page 4<br>IEC60068-2                                                                | *1       |
| 9   | Shear strength                             | No peeling-off                       | Pressuring force $20\text{N} \times 10 \pm 1\text{sec}$ .<br>IEC60068-2                                                                           | *2       |
| 10  | Bending test                               | No peeling-off                       | Bending: $3\text{mm} \times 5 \pm 1\text{sec}$ .<br>Thickness of the testing board: 1mm<br>IEC60068-2                                             | *2       |
| 11  | Solderability test                         | $\geq 95\%$ Coated                   | $235^\circ\text{C} \pm 5^\circ\text{C}$ , $5\text{sec} \pm 1\text{sec}$ ,<br>Immersing depth $\geq 0.5\text{mm}$ .<br>IEC 60068-2                 | *2       |

### Note:

1. Each test shall be done independently. (not in series tests)

2. \*1: Measure after 24 hours left at room temperature.

3. \*2: Measure after 2 hours left at room temperature.

4. \*3: Pre conditions

(1)AIR Reflow : 2 times

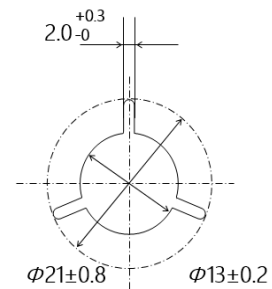
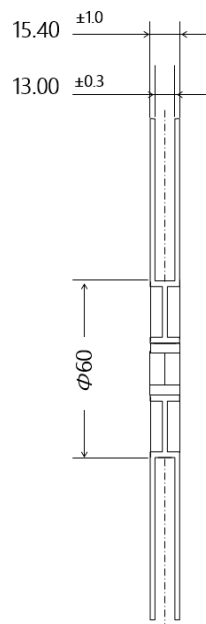
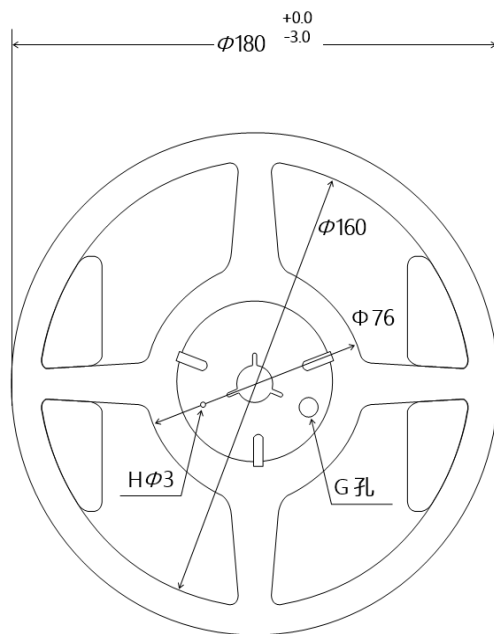
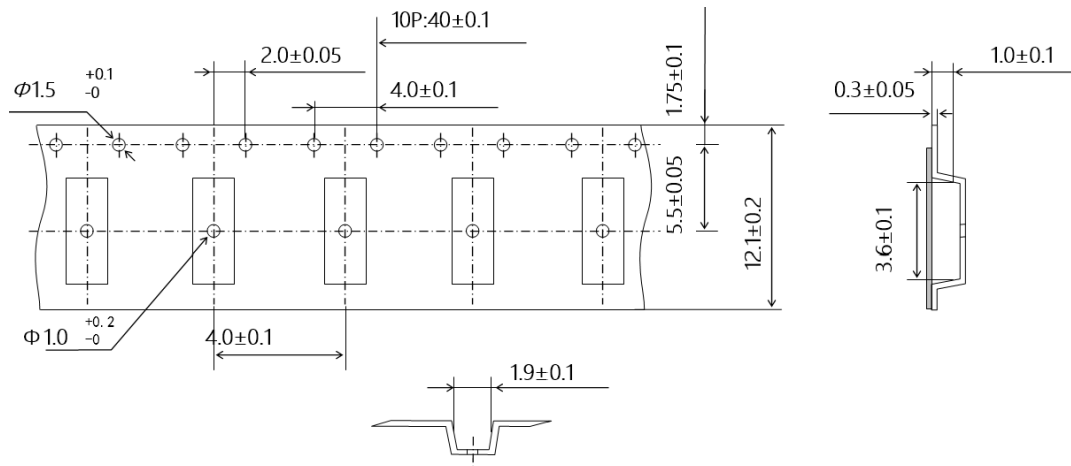
(2) Initial values shall be measured after 24 hours at room temperature.

5. Shift in series resistance after the above tests shall be less than  $\pm 20\%$  or less than  $\pm 15\text{k}\Omega$ .

In case of resistance to AIR reflow and high temperature storage ( $\pm 125^\circ\text{C}$  for 1000 hours), shift in series resistance after the above tests shall be less than  $\pm 30\%$  or  $\pm 20\text{k}\Omega$ .



PACKING :



| Item                 | Specification    | Unit |
|----------------------|------------------|------|
| Materials            | PS(anti statics) | -    |
| inside reel wise W1  | $13.0 \pm 0.3$   | mm   |
| outside reel wise W2 | $15.4 \pm 1.0$   | mm   |

Unit = mm



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VER: S1

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| Range                                                                                                                | Products                            | Packing Material                                 |
|----------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------|
| Banned Substances                                                                                                    | Maximum concentration<br>ppm(mg/kg) | Maximum concentration<br>ppm(mg/kg)              |
| 1. 镉及镉化合物<br>Cadmium and cadmium compounds                                                                           | 100                                 | 100                                              |
| 2. 铅及铅化合物<br>Lead and lead compounds                                                                                 | 1000                                | 100                                              |
| 3. 汞及汞化合物<br>Mercury and mercury compounds                                                                           | 1000                                | 100                                              |
| 4. 六价铬化合物<br>Hexavalent-Chromium VI (Cr+6)                                                                           | 1000                                | 100                                              |
| 5. 聚溴联苯 PBB<br>Polybrominated biphenyls                                                                              | 1000                                | N/A                                              |
| 6. 聚溴二苯醚 PBDE<br>Polybrominated diphenyl ethers                                                                      | 1000                                | N/A                                              |
| 7. 邻苯二甲酸二(2-乙基己基)酯 DEHP<br>Di (2-ethylhexyl) phthalate                                                               | 1000                                | N/A                                              |
| 8. 邻苯二甲酸丁苄酯 BBP<br>Butyl Benzyl Phthalate                                                                            | 1000                                | N/A                                              |
| 9. 邻苯二甲酸二丁酯 DBP<br>Dibutyl Phthalate                                                                                 | 1000                                | N/A                                              |
| 10 邻苯二甲酸二异丁酯 DIBP<br>Diisobutyl Phthalate                                                                            | 1000                                | N/A                                              |
| 11. 氟 (F)、氯 (Cl)、溴 (Br)、碘 (I)<br>Fluorine、Chlorine、Bromine、Iodine                                                    | 900、900、900、900<br>注: Br+Cl<1000    | N/A                                              |
| 12. 包装材料中重金属(汞、镉、六价铬、铅、PBB、PBDE)之总量<br>Heavy metals (mercury, cadmium, lead, Cr+6,PBB and PBDE) in packing materials | N/A                                 | 100<br>铅(Pb) + 镉(Cd) + 汞(Hg) + 六价铬(Cr+6) <100ppm |
| 13. 高度关注物质<br>SVHC-Substances of Very High Concern                                                                   | 1000                                | N/A                                              |

