




**SPECIFICATION SHEET**

|                                |   |
|--------------------------------|---|
| <b>SPECIFICATION SHEET NO.</b> | Q0503-CD2M000000S001  |
| <b>DATE</b>                    | May 03, 2023  |
| <b>REVISION</b>                | A1  |
| <b>DESCRIPTION</b>             | <p>Thru-Hole Ceramic Resonator, L9.5*W4.0*H5.5mm, 3 Pins Lead: 13.5mm<br/>           2.00000MHz, Built-in Capacitance, CRTWS Series<br/>           Frequency Accuracy +/-0.5%, Operating Temp. Range -25°C ~+85°C<br/>           RoHS3 EU Directive 2011/65/EU 2015/863<br/>           The 233 Substances of Very High Concern, as specified by Regulation (EC)<br/>           No.1907/2006 (REACH).<br/>           Packed in AMNO-Pack, 2000pcs/Tape, 1 Tape/Box</p> |
| <b>CUSTOMER</b>                |   |
| <b>CUSTOMER PART NUMBER</b>    |   |
| <b>CROSS REF. PART NUMBER</b>  |   |
| <b>ORIGINAL PART NUMBER</b>    | TGS CRTWS 2.0MG TLF   |
| <b>PART CODE</b>               | CD2M000000S001  |

|                         |   |  |   |
|-------------------------|---|--|---|
| <b>VENDOR APPROVE</b>   |   |  |   |
| Issued/Checked/Approved |  |  |  |
| DATE: May 03, 2023      |   |  |   |

|                         |  |
|-------------------------|--|
| <b>CUSTOMER APPROVE</b> |  |
|                         |  |
| DATE:                   |  |

5/3/2023

**MHZ THRU-HOLE CERAMIC RESONATOR CRTWS SERIES**

**MAIN FEATURE**



- MHz Thru-Hole Ceramic Resonator, L9.5\*W4.0\*H5.5mm, 3 pins
- Low cost, Built-in load capacitance type.
- Cross more competitors part
- RoHS3 EU Directive 2011/65/EU 2015/863
- The 233 Substances of Very High Concern, as specified by Regulation (EC) No.1907/2006 (REACH).

**APPLICATION**

- Measurement Instrument
- Communication Electronics

**PART CODE GUIDE**

**RFQ**  
Request For Quotation

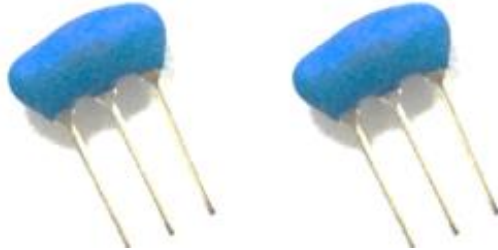
| CD | 2M000000 | S | 001 |
|----|----------|---|-----|
| 1  | 2        | 3 | 4   |

- 1) CD: Part family Code for MHz Thru-Hole Ceramic Resonator, L9.5\*W4.0\*H5.5mm, 3 Pins , CRTWS series
- 2) 2M000000: Frequency range code for 2.00000MHz
- 3) S: Packed in AMNO-Pack, 2000pcs/Tape, 1 Tape/Box
- 4) 001: Specification code for original Part No. **TGS CRTWS 2.0MG TLF**

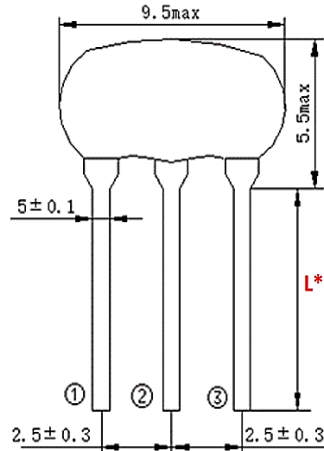
**MHZ THRU-HOLE CERAMIC RESONATOR CRTWS SERIES**

**DIMENSION (Unit: mm)**

Image for reference



CRTWS



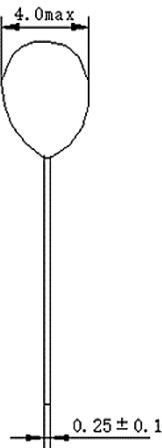
**Marking**

Line 1: Frequency Range + QC Code/stamp

**L:** 13.5 Max.

**Connection**

① Input ② Ground ③ Output



**MHZ THRU-HOLE CERAMIC RESONATOR CRTWS SERIES**
**ELECTRICAL PARAMETERS**

| Parameter  | Part No. Symbol         | Units   | Value   |         |        | Condition                                   |
|--|-------------------------|---|---|---------|--------|---|
|  |                         |   | Min.  | Typical | Max.   |   |
| Original Manufacturer                            | TGS                     | TGS Crystals  |   |         |        |   |
| Holder Type                                      | CRTWS                   | MHz Thru-Hole Ceramic Resonator<br>L9.5*W4.0*H5.5mm, 3 Pins |   |         |        |   |
| Frequency Range                                  | 2.0                     | MHz   | 2.0   |         |        |   |
| Withstanding Voltage                             |                         | V   | 50  |         |        | @DC, 1 min                                  |
| Insulation Resistance                            |                         | MΩ  | 500   |         |        | @AV, 1 min.                                 |
| Operation Temperature                            |                         | °C  | -25   |         | +85    |   |
| Storage Temperature                              |                         | °C  | -55   |         | +85    |   |
| Rating Voltage                                   |                         | V   | 6   |         |        | DC  |
|  |                         |   | 15  |         |        | p-p   |
| Frequency Accuracy                               |                         | %   | 0.5   |         |        |   |
| Resonant Impedance                               |                         | Ω   |   |         | 30     |   |
| Temperature Coefficient of Oscillation Frequency |                         | %   |   |         | +/-0.3 | Oscillation Frequency drift, -25°C ~ +85°C) |
| Oscillation Frequency Aging Rate (10 years)      |                         | %   |   |         | +/-0.3 | From initial value                          |
| IC Application                                   |                         | 1/6TC4069UBPx2  |   |         |        |   |
| Design Mode                                      | MG                      |   |   |         |        |   |
| Built-in Capacitance                             |                         | pF  | 30  |         |        |   |
| Other  | Package                 | T   | Packed in AMNO-Pack, 2000pcs/Tape, 1 Tape/Box |         |        |   |
|  | RoHS Status             | LF  | RoHS3 EU Directive 2011/65/EU 2015/863        |         |        |   |
|  | Add Value               |   | N/A   |         |        |   |
|  | Internal Control Code * |   | N/A   |         |        |   |

Note: 1) Original Part Number: **TGS CRTWS 2.0MG TLF**

2) \* Internal Control Code- 2 letter or digits; Blank: N/A

## MHZ THRU-HOLE CERAMIC RESONATOR CRTWS SERIES

**RELIABILITY**

| Test Items                          | Test Method And Conditions   | Performance Requirements  |
|-------------------------------------|--|---|
| <b>Humidity</b>                     | Subject the resonator at 40±2°C and 90%-95% R.H. for 500h, resonator shall be measured after being placed in natural conditions for 1h.  | It shall fulfill the specifications in Table 1.   |
| <b>High Temperature Exposure</b>    | Subject the resonator to 85±2°C for 500h, resonator shall be measured after being placed in natural conditions for 1h.   | It shall fulfill the specifications in Table 1.   |
| <b>Low Temperature Exposure</b>     | Subject the resonator to -55°C±2°C for 96h, then release the resonator into the room conditions for 1h prior to the measurement.   | It shall fulfill the specifications in Table 1.   |
| <b>Temperature Cycling</b>          | After temperature cycling of blow table was performed 5 times, resonator shall be measured after being placed in natural conditions for 1h.<br>Time: 30 min. @ -25 +/-3°C<br>Time: 30 min. @85 +/-3°C  | It shall fulfill the specifications in Table 1.   |
| <b>Vibration</b>                    | Subject the resonator to vibration for 2h each in x, y and z axis With the amplitude of 1.5mm, the frequency shall be varied uniformly between the limits of 10 Hz—55Hz.   | It shall fulfill the specifications in Table 1.   |
| <b>Mechanical Shock</b>             | Drop the resonator randomly onto a wooden floor from the height of 100cm 3 times.  | It shall fulfill the specifications in Table 1.   |
| <b>Resistance to Soldering Heat</b> | Lead terminals are immersed up to 2 mm from resonator's body in soldering bath of 260°C±5°C for 10s±1s and then resonator shall be measured after being placed in natural conditions for 1h.   | It shall fulfill the specifications in Table 1.   |
| <b>Solderability</b>                | Lead terminals are immersed up to 2mm from resonator's body in soldering bath of 250°C±5°C for 3s±0.5s.  | More than 95% of the terminal surface of the filter shall be covered with fresh solder. |
| <b>Terminal Strength</b>            | Pulling: Force of 5N is applied to each lead in axial direction for 10s±1s.<br>Bending: When force of 5N is applied to each lead in axial direction, the lead shall folded up 90°from the axial direction and folded back to the axial direction. The speed of folding shall be each 3s. | No visible damage and it shall fulfill Table 1..  |

**Table 1**

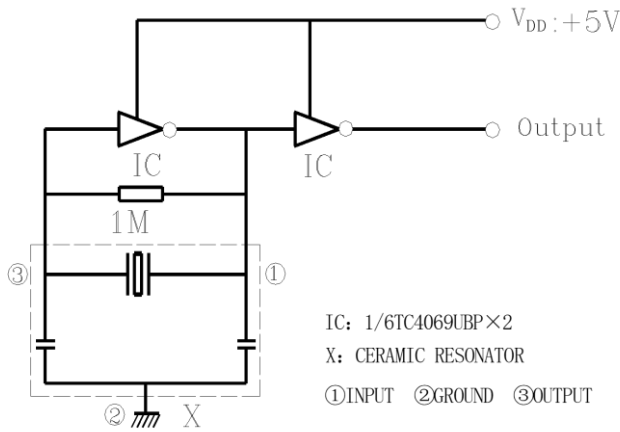
| Item  | Specification after test |
|---|--------------------------|
| Oscillation Frequency Change $\Delta F_{osc}/F_{osc}$ (%) max | ±0.3                     |
| Resonant Impedance ( $\Omega$ ) max                           | 30                       |

The limits in the above table are referenced to the initial measurements.

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**MHZ THRU-HOLE CERAMIC RESONATOR CRTWS SERIES**

**TEST CIRCUIT (For Reference Only)**



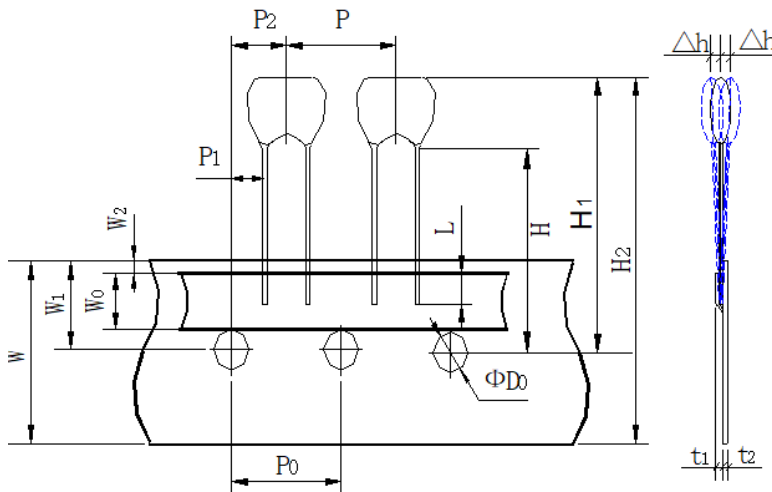
**Note:**

Parts shall be tested under the condition  
(Temp.: 20±15°C, Humidity 65±20% R.H.)  
unless the standard condition (Temp.: 25±3 °C,  
Humidity :65±10% R.H.) is regulated to  
measure.

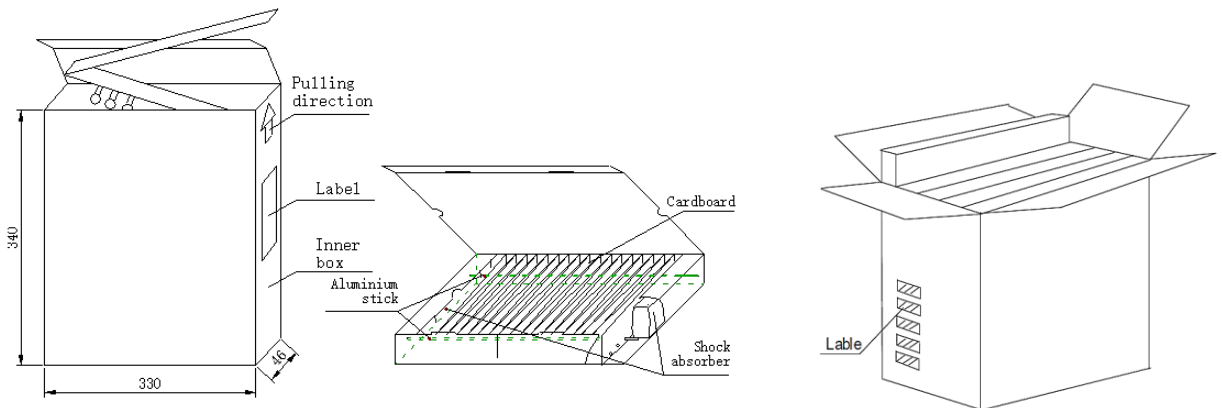
# MHZ THRU-HOLE CERAMIC RESONATOR CRTWS SERIES

## TAPE AND AMNO-Pack (Unit: mm)

All Devices are packed in accordance with EIA standard RS-481-2 and Packed in AMNO-Pack  
2000pcs/Tape, 1 Tape/Box



| MARK    | SIZE(mm)                                    |
|---------|---|
| P       | 12.7±0.5                                    |
| Po      | 12.7±0.2                                    |
| P1      | 3.85±0.5                                    |
| P2      | 6.35±1.30<br>(include the slant of product) |
| F1      | 2.5±0.3                                     |
| F2      | 2.5±0.3                                     |
| Wo      | 5.5±0.5                                     |
| W1      | 9.0±0.5                                     |
| W2 max. | 1   |
| W       | 18.0±0.5                                    |
| H       | 18  |
| H1      | 27.0 max.<br>(Varies with P/N)              |
| H2      | 36.0 max.<br>(Varies with P/N)              |
| L min.  | 3   |
| ΦDo     | 4.0±0.2                                     |
| t1      | 0.6±0.2                                     |
| t2 max  | 1.5.  |
| Δh max. | 1   |



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