




**SPECIFICATION SHEET**

<b>SPECIFICATION SHEET NO.</b>	N0208-CD2M000000S001
<b>DATE</b>	Feb. 08, 2021
<b>REVISION</b>	A0
<b>DESCRIPTION</b>	<p>Thru-Hole Ceramic Resonator, L9.5*W4.0*H5.5mm, 3 Pins Lead: 13.5mm                  2.00000MHz, Built-in Capacitance, CRTWS Series</p> <p>Frequency Accuracy +/-0.5%, Operating Temp. Range -25°C ~+85°C</p> <p>RoHS/RoHS III compliant, 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: Feb. 08, 2021			

<b>CUSTOMER APPROVE</b>	
DATE:	

**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
- RoHS/RoHS III compliant



**APPLICATION**

- Measurement Instrument
- Communication Electronics

**PART CODE GUIDE**

**RFQ**  
Request For Quotation

<b>CD</b>	<b>2M000000</b>	<b>S</b>	<b>001</b>
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**

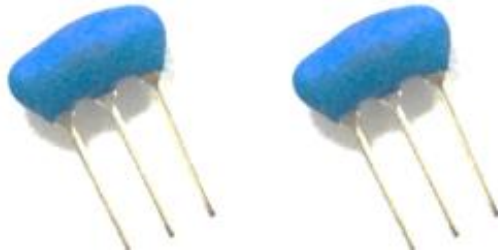
**MORE FREQUENCY RANGE AVAILABLE (MHz)**

2.000	4.000	6.00							

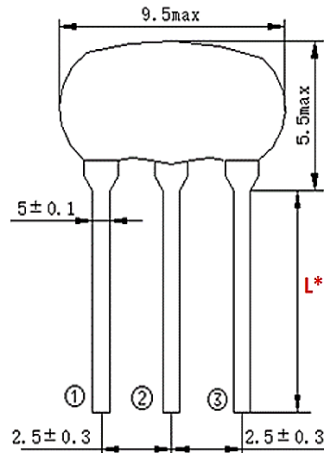
**MHZ THRU-HOLE CERAMIC RESONATOR CRTWS SERIES**

**DIMENSION (Unit: mm, Tol. +/-0.15mm)**

Image for reference



CRTWS



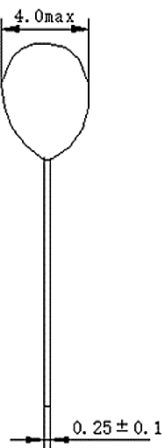
**Marking**

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 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	RoHS III compliant			
	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. Time: 30 min. @ -25 +/-3°C 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. 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..

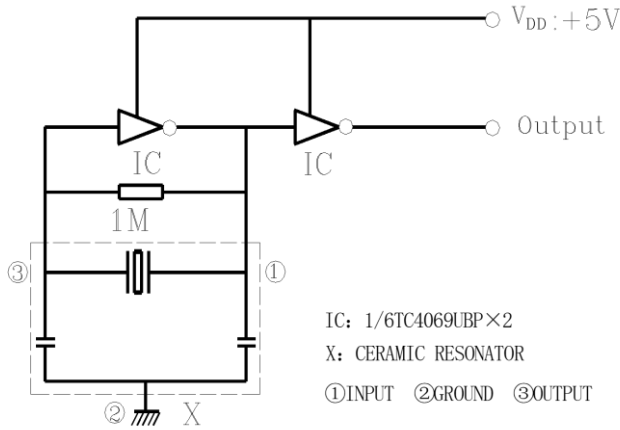
**Table 1**

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.

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

**TEST CIRCUIT (For Reference Only)**



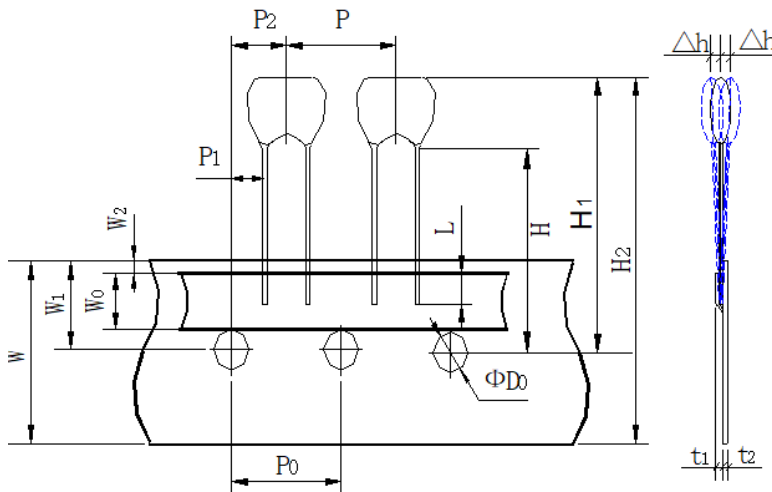
**Note:**

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.

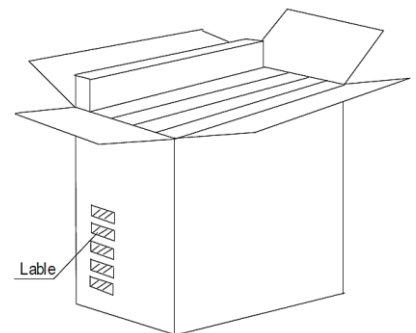
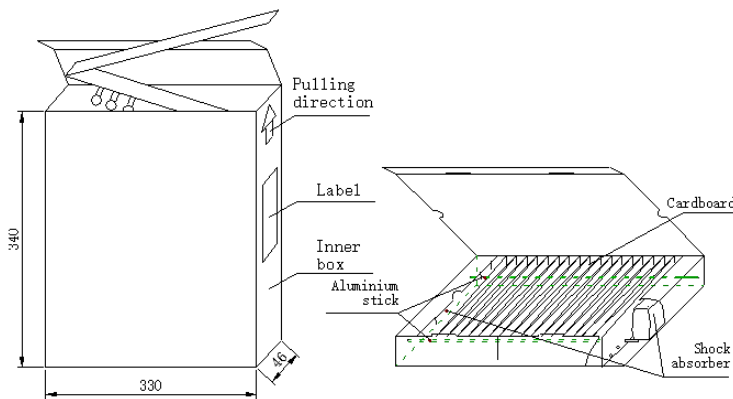
# MHZ THRU-HOLE CERAMIC RESONATOR CRTWS SERIES

## 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 (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. (Varies with P/N)
H2	36.0 max. (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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