



No.11-3 Jianguo Rd., T.E.P.Z. 42760 Taiwan, ROC

All dimensions are millimeters.

CAD:	TCR
Review:	EG
Appr:	JL
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Date:	August 01, 2022

**Specification Title:**

**Microprocessor Crystal Unit  
32.768 KHz  
2.0x 1.2 millimeter Surface Mount  
Thermoplastic Package  
General Product Specification**

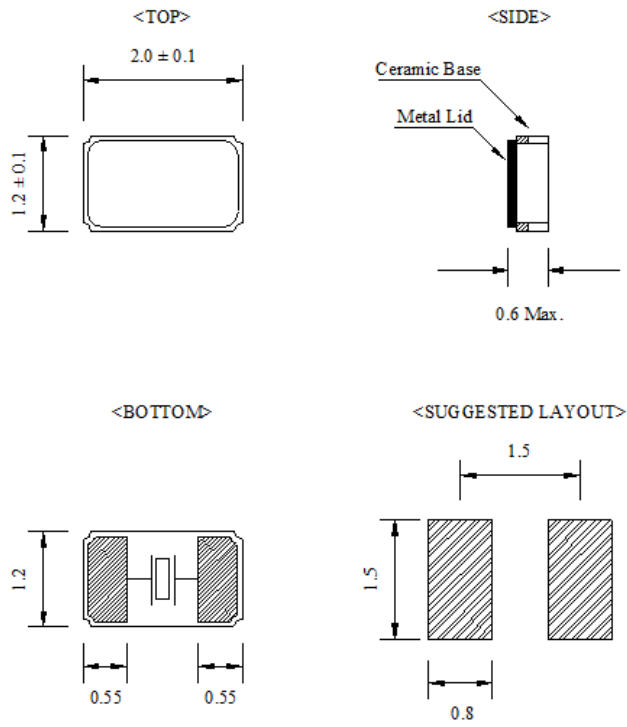
**Series Name: CTS2 Series**

**Electrical Specifications:**

Nominal Frequency		32.768	KHz
Frequency Tolerance at 25°C	Standard	±20	PPM
Aging		±3	PPM Max/Year
Turnover Temperature		25 ±5	°C
Temperature Coefficient		-0.035 Typ. PPM/°C <sup>2</sup>	
Temperature Range (Operating)	Standard	-40 to +85	
Storage Temperature Range		-55 to +125	
Equivalent Series Resistance(ESR)		90	K Ohm Max
Load Capacitance	Standard	12.5	pF
	Optional	7.0	
	Optional	9.0	
Shunt Capacitance		1.1	pF Typ
Motional Capacitance		3.5	fF Typ
Drive Level		0.5	uW Max
Insulation Resistance		500 at 100 Vdc ± 15 Vdc	M Ohm

<b>RoHS Compliant Pb - Lead Free</b>	Ltr	Revisions	Date	Appr

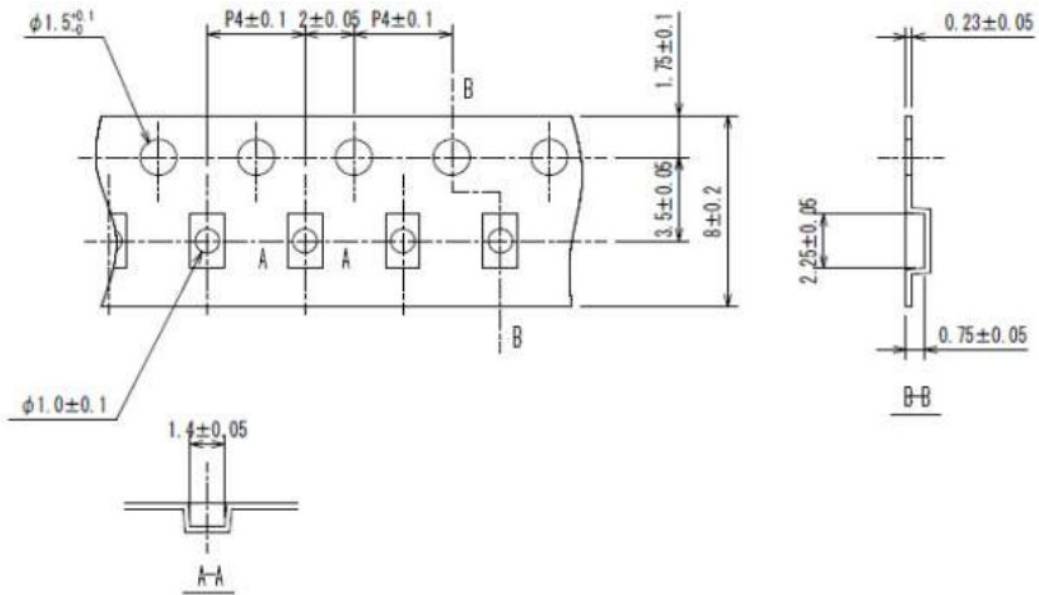
**Mechanical Outline:**



**Dimensions are millimeters.**

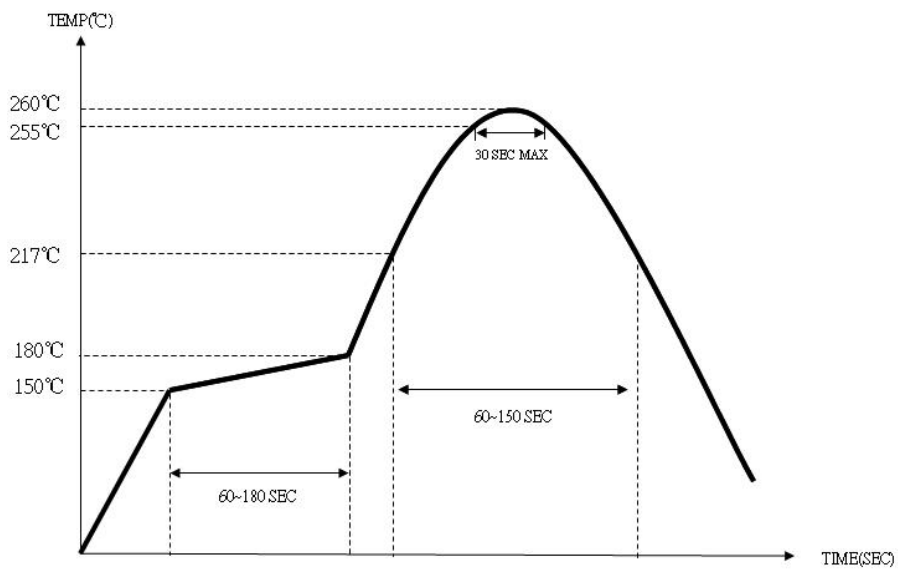
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**Carrier Tape Dimensions:**



**Dimensions are millimeters.**

**Solder Reflow Characteristics:**



**How to build a Part Number:**

Series		CTS	Parameter
Package		2	2.0x 1.2 mm Thermoplastic SMD
Frequency		32.768	KHz
Load Capacitance	Standard	12.5	12.5pF
	Option	7	7pF
	Option	9	9pF
Frequency Tolerance	Standard	20	±20PPM
Temperature Range	Standard	X	-40 to +85 °C
Packaging		R	Tape and Reel

**Part Number Example:**

CTS2-32.768-12.5-20-X-R

CTS2- 2.0 x 1.2 mm Thermoplastic SMD Package

32.768 KHz Nominal Frequency

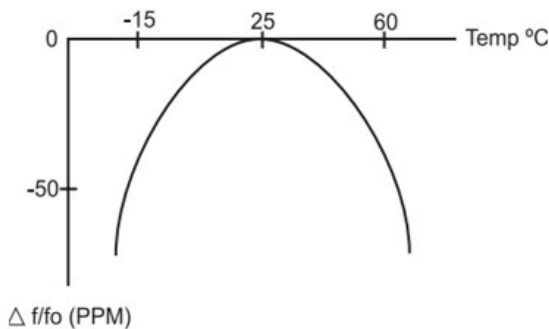
12.5 pF Load Capacitance

20: ±20 PPM Frequency Tolerance

X:-40 to +85° C Temperature Range

R: Tape and Reel Packaging

**Frequency vs. Temperature Characteristics:**



To calculate the frequency stability the parabolic curvature constant (K) is needed.

For calculating the stability at 45 ° C?

1- Change in temperature ( Δ T) is (45-25) = +20 °C

2- Change in frequency is  $(-0.035 \times (\Delta ^\circ\text{C})^2) = (-0.035 \times (20)^2) = -14 \text{ PPM}$

**Notes:**

- 1- Standard Temperature Range does not need to be included in Part Number description.
- 2- Product is shipped in Tape and Reel configuration. Each reel contains 3000 pieces.
- 3- Quantities less than 3000 are shipped bulk in ESD pouches.
- 4- Specification subject to change without notice.

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