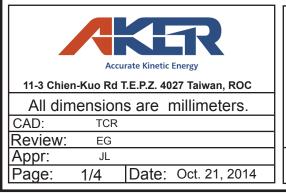
## RoHS Compliant Pb - Lead Free

Ltr	Revisions	Date	Appr

## **Electrical Specifications:**

Nominal Frequency		32.768	KHz	
Frequency Tolerance at 25° C	Standard	±20		
rrequency Tolerance at 25° C	Optional	±10	PPM	
Aging per year		±3	1	
Turnover Temperature		25 ±5		
Temperature Coefficient		-0.034 ± 0.008 PPM/△ °C²	7	
Temperature Range		-40 to +85	°C	
Temperature Range (Extended)		-40 to +125		
Temperature Range (Storage)		-55 to +140	1	
Equivalent Series Resistance		65	K Ohm Max	
	Standard	12.5		
Load Canacitanas	Optional	6.0	pF	
Load Capacitance		7.0		
		9.0		
Shunt Capacitance	·	1.7	pF Typ	
Motional Capacitance		3.0	fF Typ	
Drive Level		1.0	uW Max	
Insulation Resistance		500 at at 100 Vdc ± 15 Vdc	M Ohm Min	
Quality Factor		70000		
Capacitance Ratio		450	Тур	
Resistance to Shock		±5 PPM maximum offset from 75 cm drop	_	
Tresistance to onock		test in all axes on to a hard surface.	-	



# Specification Title:

Microprocessor Crystal Unit 32.768 KHz (Time of Day) 2.0 x 1.2 millimeter Surface Mount Ceramic Package General Product Specification

Part Number: CTS2 Series

# **Mechanical Outline:** 2.0 8.0 0.7 8.0 Marking $1.2 \pm 0.1$ $10.5 \pm 0.1$ Package is Ceramic-Metal. Dimensions are millimeters. **PCB Solder Pad Layout:** 8.0 1.5 1.5

P/N:

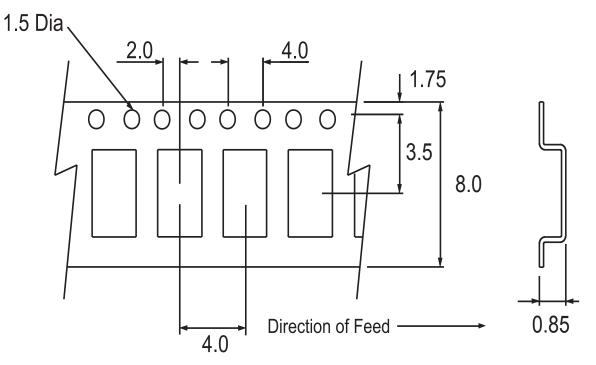
**CTS2 Series** 

Date: Oct. 21, 2014

Page:

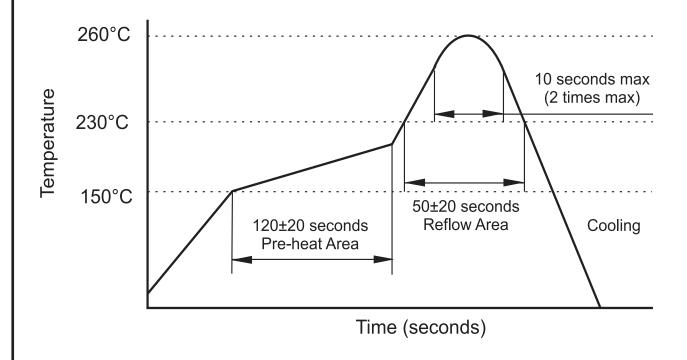
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# **Carrier Tape Dimensions:**



Dimensions are millimeters.

### **Solder Reflow Characteristics:**



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#### How to build a Part Number:

Series	CTS	Parameter
Package	2	2.0 x 1.2 mm SMD
		-
Frequency	32.768	KHz
		-
Standard	12.5	12.5 pF
Option _	6	6 pF
	7	7 pF
	9	9 pF
		-
Standard	20	±20 PPM
Optional	10	±10 PPM
		-
Temperature Range		-40 to +85 °C
(Extended)		-40 to +125 °C
		-
	Frequency Standard Option Standard Optional	Package         2           Frequency         32.768           Standard         12.5           6         0           Option         7           9           Standard         20           Optional         10           ture Range         See Notes

Part Number Example:

CTS2-32.768-9-20-R

CTS2: 2.0 x 1.2 mm SMD Crystal Unit

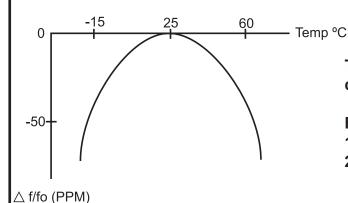
32.768 KHz Nominal Frequency

9 pF Load Capacitance

20: ±20 PPM Frequency Tolerance -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 ( $\triangle$ T) is (45-25) = +20 ° C
- 2- Change in frequency is  $(-0.034 \text{ x } (\triangle^{\circ} \text{ C})^{2}) = (-0.035 \text{ x } (20)^{2} = -13.6 \text{ PPM}$

### 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- Specification subject to change without notice.

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