

RoHS Compliant
Pb - Lead Free
AEC Q200

| Ltr | Revisions | Date | Appr |
|-----|-----------|------|------|
| | | | |
| | | | |
| | | | |

Electrical Specifications:

| | | | |
|------------------------------|----------|--|-----------|
| Nominal Frequency | | 32.768 | KHz |
| Frequency Tolerance at 25° C | Standard | ±20 | PPM |
| | Optional | ±10 | |
| Aging per year | | ±3 | |
| Turnover Temperature | | 25 ±5 | ° C |
| Temperature Coefficient | | -0.034 ± 0.008 PPM/Δ °C ² | |
| Temperature Range | | -40 to +85 | |
| Temperature Range (Extended) | | -40 to +125 | |
| Temperature Range (Storage) | | -55 to +140 | |
| Equivalent Series Resistance | | 70 | K Ohm Max |
| Load Capacitance | Standard | 12.5 | pF |
| | | 6.0 | |
| | Optional | 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 100 Vdc ± 15 Vdc | M Ohm Min |
| Quality Factor | | 70000 | Typ |
| Capacitance Ratio | | 450 | |
| Resistance to Shock | | ±5 PPM maximum offset from 75 cm drop test in all axes on to a hard surface. | |



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All dimensions are millimeters.

CAD: TCR

Review: EG

Appr: JL

Page: 1/4 Date: Oct. 21, 2018

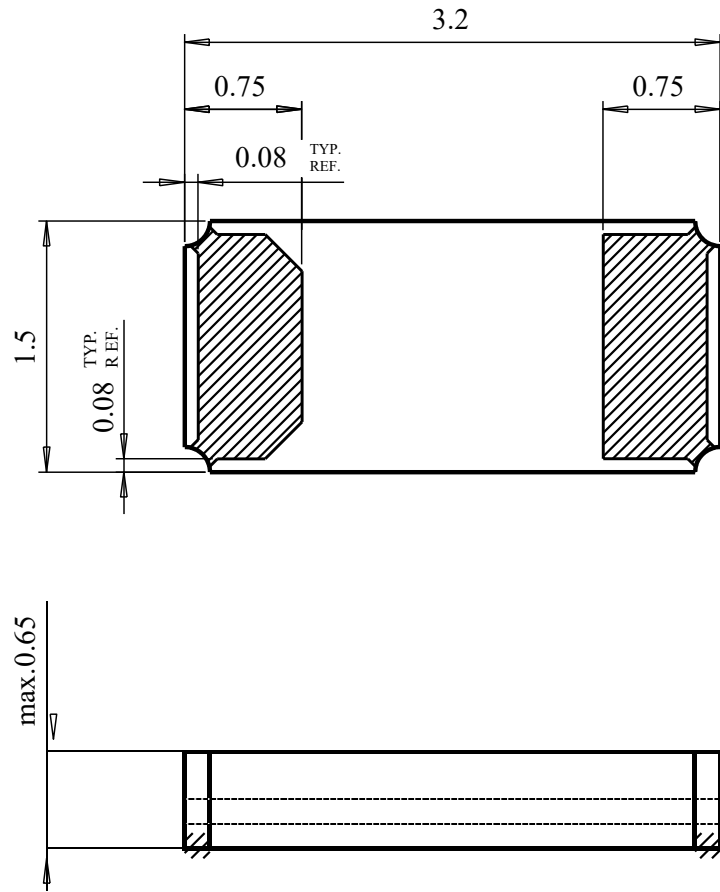
Specification Title:

**Microprocessor Crystal Unit
32.768 KHz (Time of Day)
3.2 x 1.5 millimeter Surface Mount
Ceramic Package
General Product Specification**

Part Number: **CTS3 Series**

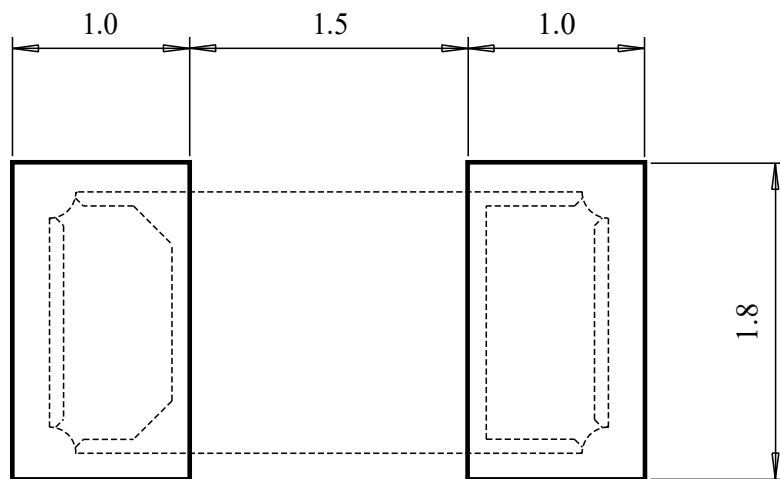
Mechanical Outline:

Tolerances: unless otherwise specified $\pm 0.1\text{mm}$

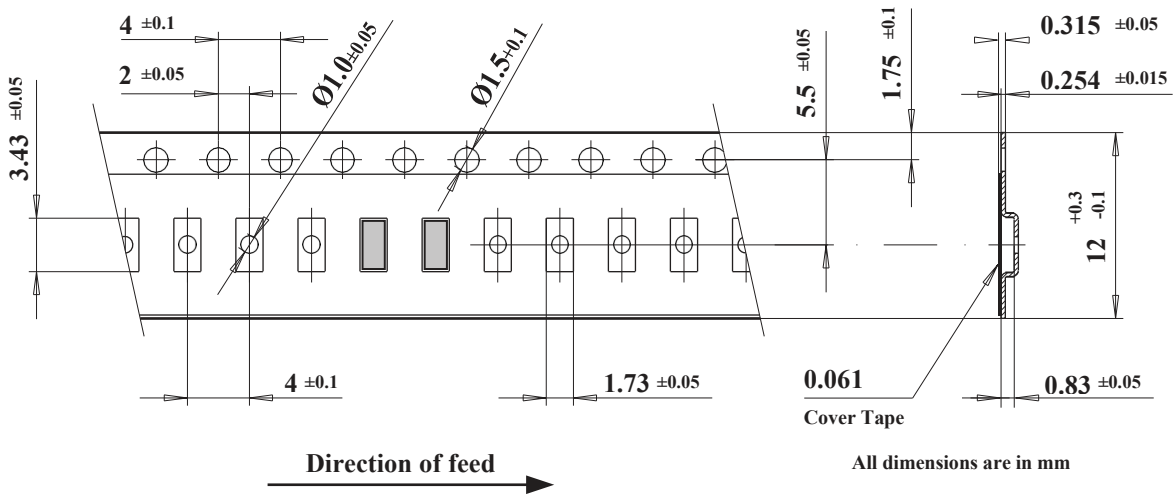


**Package is Ceramic-Metal.
Dimensions are millimeters.**

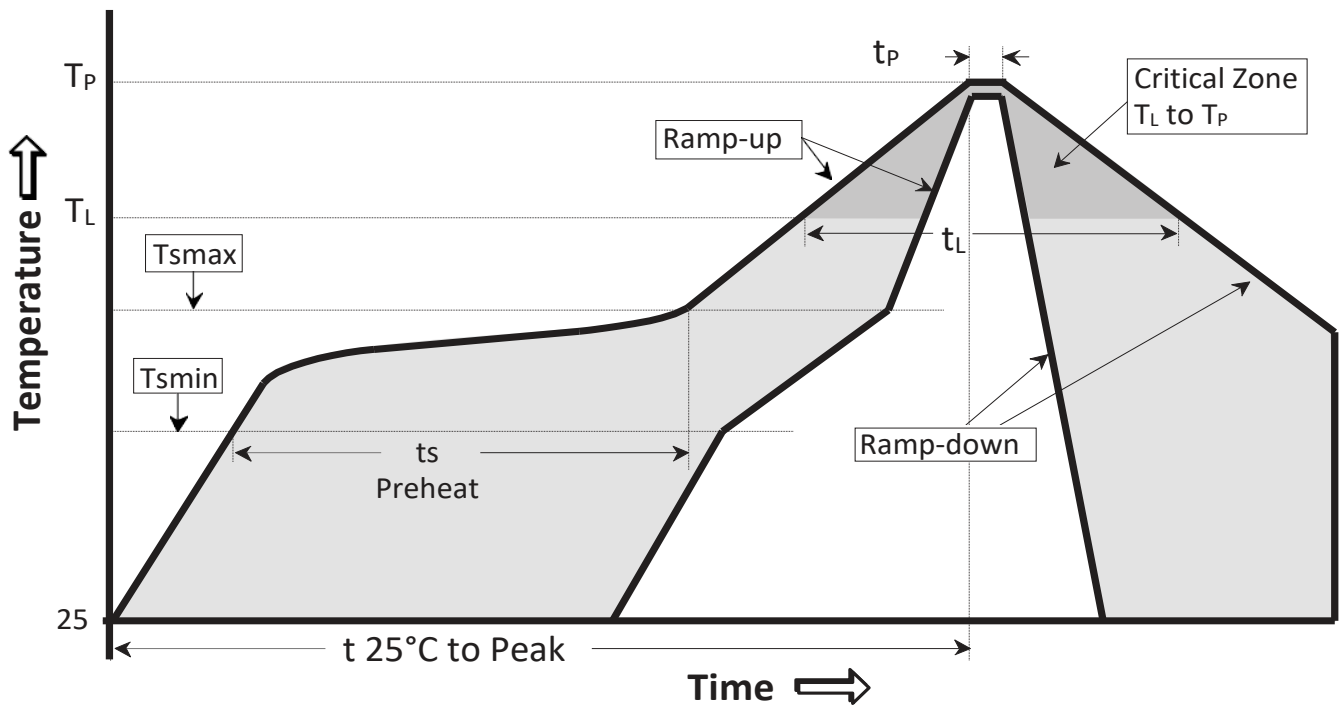
PCB Solder Pad Layout:



Carrier Tape Dimensions:



Solder Reflow Characteristics:



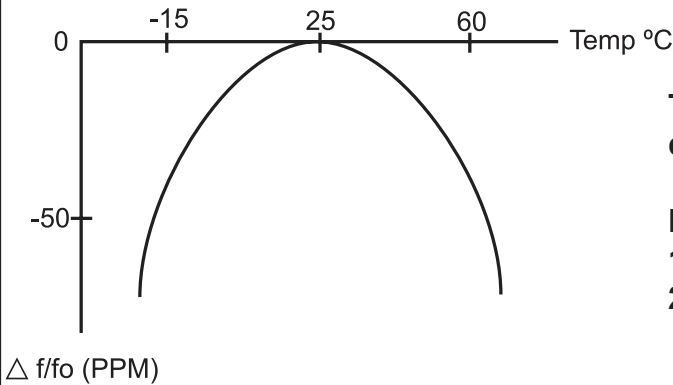
How to build a Part Number:

| | | |
|-------------------------------------|------------------|-------------------------|
| Series | CTS | Parameter |
| Package | 3 | 3.2 x 1.5 mm SMD |
| | - | |
| Frequency | 32.768 | KHz |
| | - | |
| Load Capacitance | Standard | 12.5 |
| | Option | 6 |
| | | 7 |
| | | 9 |
| | - | |
| Frequency Tolerance | 20 | ±20 PPM |
| | - | |
| Temperature Range | See Notes | -40 to +85 °C |
| Temperature Range (Extended) | X | -40 to +125 °C |
| | - | |
| Packaging | R | Tape and Reel |

Part Number Example:

CTS3-32.768-9-20-R
CTS3- 3.2 x 1.5 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 (ΔT) is $(45-25) = +20 \text{ }^\circ\text{C}$
- 2- Change in frequency is $(-0.034 \times (\Delta \text{ }^\circ\text{C})^2) = (-0.035 \times (20)^2) = -13.6 \text{ PPM}$

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.