

# Automotive & Industrial Grade 32.768kHz Continuous Voltage SMD Crystal X

ASAKDVAIG

Request Samples



Check Inventory



ESD Sensitive



2.0 x 1.6 x 0.8 mm

RoHS/RoHS II Compliant

MSL Level = 1

## Features

- Continuous  $V_{DD}$  operation from 1.62 V ~ 3.63 V
- Optimized for low current consumption
- Output Enable/Start & Disable/Stop function
- Output waveform CMOS/LVCMOS compatible
- Hermetically seam-sealed ceramic package
- AEC-Q200 Qualified
- Automotive Grade 1: -40°C to +125°C
- TS16949 Production Line Certified
- PPAP Available Upon Request

## Applications

- Infotainment Systems
- Keyless Entry & Startup
- GPS & Navigation
- Comfort control
- ADAS (Advanced Driver Assistance Systems)
- Vehicle to Vehicle Communication
- LiDAR (Light Detection and Ranging)
- In-vehicle Networking
- Powertrain & Drive Control
- Power Control & Conversion
- Industrial Control & Automation

## Electrical Specifications

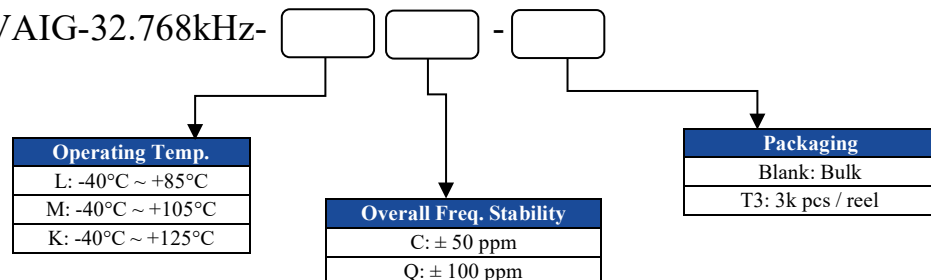
| Parameters                                                    |            | Min.                                                                                                                     | Typ. | Max.               | Units | Notes       |
|---------------------------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------|------|--------------------|-------|-------------|
| Frequency                                                     |            | 32.768                                                                                                                   |      |                    | kHz   |             |
| Operating Temperature Range                                   |            | -40.0                                                                                                                    |      | +125               | °C    | See options |
| Storage Temperature Range                                     |            | -55.0                                                                                                                    |      | +125               | °C    |             |
| Overall Frequency Stability [Note 1]                          |            | -100                                                                                                                     |      | +100               | ppm   | See options |
| Supply Voltage (Vdd)                                          |            | +1.62                                                                                                                    |      | +3.63              | V     |             |
| Tri-state function [Note 2]                                   |            | “1” ( $V_{IH} \geq 0.7 \cdot V_{DD}$ ) or Open: Oscillation;<br>“0” ( $V_{IL} < 0.3 \cdot V_{DD}$ ): No Oscillation/Hi Z |      |                    | V     |             |
| Output Load                                                   |            |                                                                                                                          |      | 15                 | pF    | CMOS        |
| Output Voltage                                                | $V_{OH}$   | $0.9 \cdot V_{DD}$                                                                                                       |      |                    | V     |             |
|                                                               | $V_{OL}$   |                                                                                                                          |      | $0.1 \cdot V_{DD}$ | V     |             |
| Aging 1 year @25°C ± 3°C                                      |            | -3.0                                                                                                                     |      | +3.0               | ppm   |             |
| Aging 5 years @25°C ± 3°C                                     |            | -5.0                                                                                                                     |      | +5.0               | ppm   |             |
| Symmetry @ $\frac{1}{2} V_{DD}$                               |            | 45                                                                                                                       | 50   | 55                 | %     |             |
| Start-up Time                                                 |            |                                                                                                                          |      | 10                 | ms    |             |
| Rise and Fall Time ( $T_r/T_f$ )<br>@10%Vdd-90%Vdd, 15pF load |            |                                                                                                                          |      | 50                 | ns    |             |
| Disable Current                                               |            |                                                                                                                          |      | 10                 | μA    |             |
| Supply Current ( $I_{DD}$ )<br>@25°C ± 3°C                    | Vdd = 3.3V |                                                                                                                          | 80   | 100                | μA    | No Load     |
|                                                               | Vdd = 2.5V |                                                                                                                          | 70   | 90                 | μA    | No Load     |
|                                                               | Vdd = 1.8V |                                                                                                                          | 60   | 80                 | μA    | No Load     |

**Note 1:** Overall frequency stability includes initial frequency tolerance @25°C ± 3°C and stability over the operating temperature range.

**Note 2:** Do not leave pin 1 (INH) floating. If pin 1 (INH) is not utilized for toggling, it must be tied to Vdd (logic 1).

## Part Identification

ASAKDVAIG-32.768kHz-



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REVISED: 06-30-22

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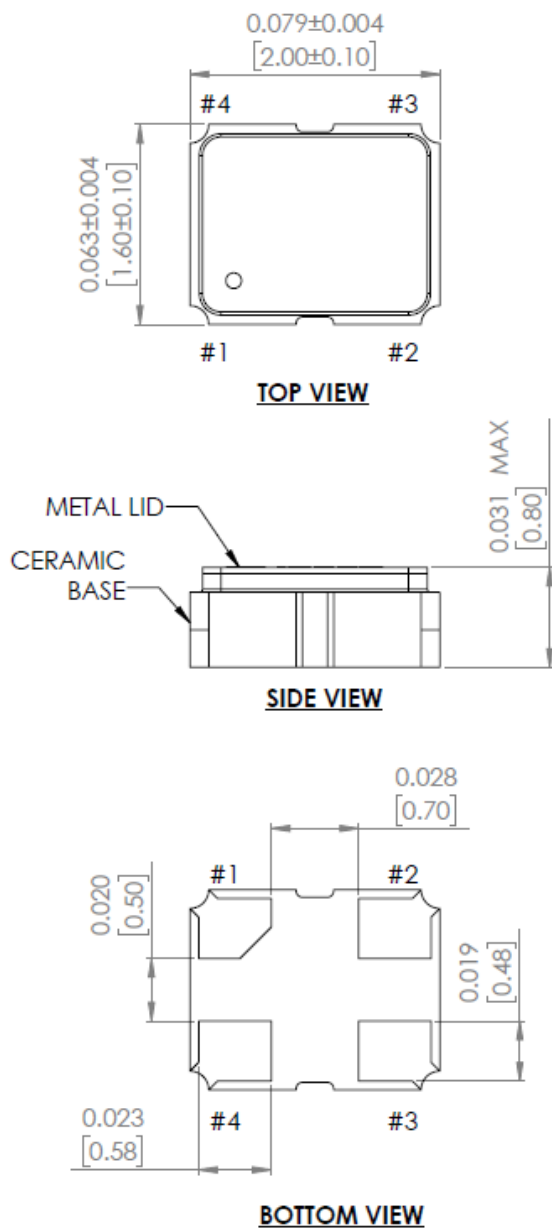


2.0 x 1.6 x 0.8 mm

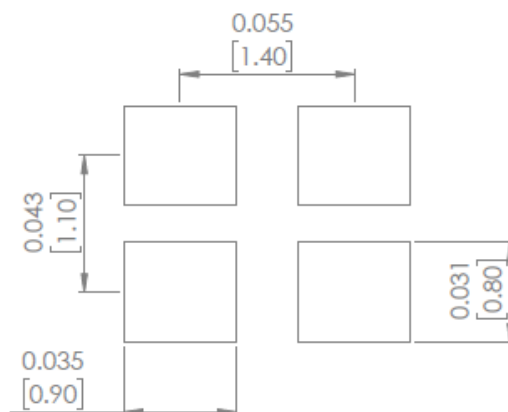
RoHS/RoHS II Compliant

MSL Level = 1

## Mechanical Dimensions



## Recommended Land Pattern



| Pin # | Function |
|-------|----------|
| 1     | INH      |
| 2     | GND      |
| 3     | Output   |
| 4     | Vdd      |

| INH Function |                         |
|--------------|-------------------------|
| #1           | #3 (Output)             |
| Open         | Active                  |
| "H" Level    | Active                  |
| "L" Level    | High Z (No Oscillation) |

### Note 3:

-Do not leave Pin 1 (INH) floating  
-If Pin 1 (INH) is not utilized for toggling, it must be tied to Vdd (logic 1)

### Note 4:

Recommended to use approximately 0.01µF bypass capacitor between PIN 2 and PIN 4

Dimensions: inches (mm)



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## Reflow Profile [JDEC J-STD-020]

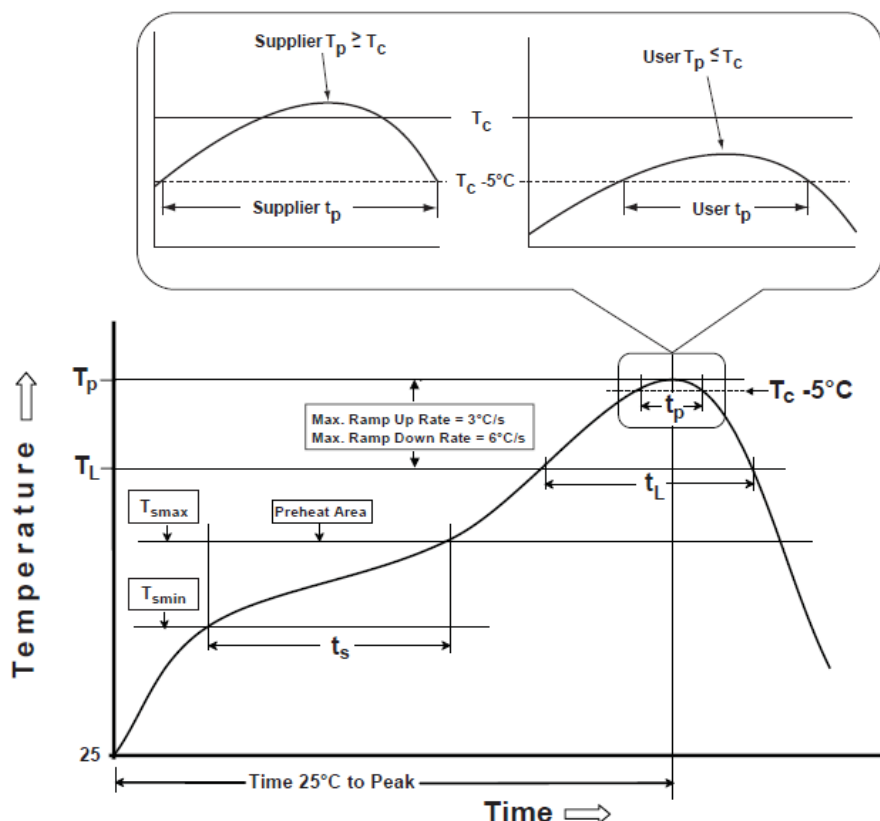


Table 1

### SnPb Eutectic Process Classification Temperatures ( $T_c$ )

| Package Thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> ≥350 |
|-------------------|-----------------------------|-----------------------------|
| <2.5 mm           | 235 °C                      | 220 °C                      |
| ≥2.5 mm           | 220 °C                      | 220 °C                      |

Table 2

### Pb-Free Process Classification Temperatures ( $T_c$ )

| Package Thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> 350-2000 | Volume mm <sup>3</sup> >2000 |
|-------------------|-----------------------------|---------------------------------|------------------------------|
| <1.6 mm           | 260 °C                      | 260 °C                          | 260 °C                       |
| 1.6 mm - 2.5 mm   | 260 °C                      | 250 °C                          | 245 °C                       |
| >2.5 mm           | 250 °C                      | 245 °C                          | 245 °C                       |

| Profile Feature                                                                   | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|-----------------------------------------------------------------------------------|-------------------------|------------------|
| Preheat / soak                                                                    |                         |                  |
| Temperature minimum ( $T_{smin}$ )                                                | 100°C                   | 150°C            |
| Temperature maximum ( $T_{smax}$ )                                                | 150°C                   | 200°C            |
| Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )                                       | 60 - 120 sec.           | 60 - 120 sec.    |
| Average ramp-up rate ( $T_{smax}$ to $T_p$ )                                      | 3°C/sec. max            | 3°C/sec. max     |
| Liquidous temperature ( $T_L$ )                                                   | 183°C                   | 217°C            |
| Time at liquidous ( $t_L$ )                                                       | 60 - 150 sec.           | 60 - 150 sec.    |
| Peak package body temperature ( $T_p$ )*                                          | see Table 1             | see Table 2      |
| Time ( $t_p$ )** within 5°C of the specified classification temperature ( $T_c$ ) | 20 sec.                 | 30 sec.          |
| Ramp-down rate ( $T_p$ to $T_{smax}$ )                                            | 6°C/sec. max            | 6°C/sec. max     |
| Time 25°C to peak temperature                                                     | 6 min. max              | 8 min. max       |

\*Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.

\*\*Tolerance for time at peak profile temperature ( $t_p$ ) is defined as supplier minimum and a user maximum.

# Automotive & Industrial Grade 32.768kHz Continuous Voltage SMD Crystal XOs

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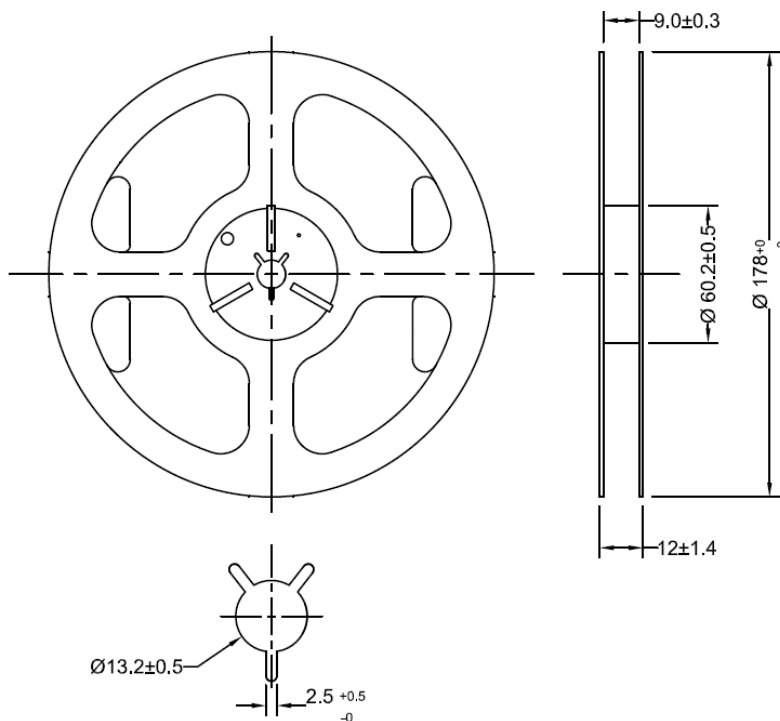
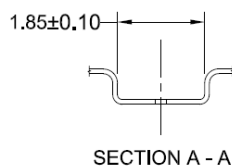
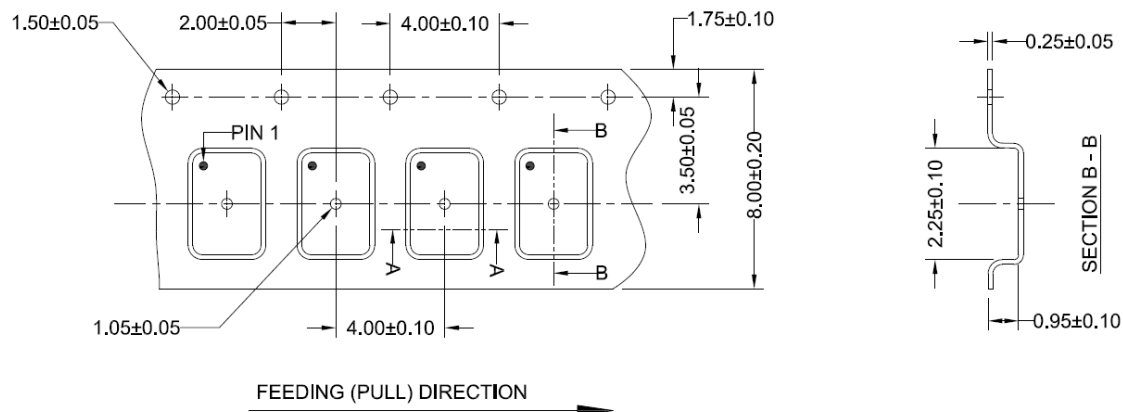


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## Packaging

**T3: 3,000pcs/reel**



**Dimensions: mm**

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