

# 32.768kHz TCXO

ATXK-H11

Request Samples



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ESD Sensitive



3.28 x 2.58 x 1.36 mm  
RoHS/RoHS II Compliant  
MSL Level = 1

## Features

- Frequency Stability options:  $\pm 3.8\text{ppm}$  over  $-10$  to  $+60^\circ\text{C}$ ,  $\pm 5.0\text{ppm}$  over  $-40$  to  $+85^\circ\text{C}$ , &  $\pm 8.0\text{ppm}$  over  $-40$  to  $+105^\circ\text{C}$
- Output waveform CMOS
- Low power consumption
- Supply Voltage options: 3.3V, 2.5V, 1.8V

## Applications

- Frequency reference for real time clocks (RTCs)
- Portable & wearable electronics
- Internet of Things (IoT)
- Consumer electronics
- Timing synchronization for networks, servers, hubs, routers & switches

## Electrical Specifications [Note 1]

Parameters	Min.	Typ.	Max.	Units	Notes
Frequency (fc)		32.768		kHz	
Operating Temperature Range	-40		+85	$^\circ\text{C}$	See Options
Storage Temperature Range	-55		+85	$^\circ\text{C}$	
<b>Frequency Stability <math>\Delta f/f_0</math> vs:</b>					
Tolerance	-2.5		+2.5	ppm	Reference to fc (at $25^\circ\text{C} \pm 2^\circ\text{C}$ ), Pre-reflow
Tolerance	-3.0		+3.0		Reference to fc (at $25^\circ\text{C} \pm 2^\circ\text{C}$ ), 24 hours after reflow, one time
Temperature	-5.0		+5.0		See Options Reference to frequency tolerance reading (fo) at $25^\circ\text{C} \pm 2^\circ\text{C}$
Load Change	-0.2		+0.2		Load $\pm 10\%$
Supply Voltage Change	-1.0		+1.0	ppm/V	
Aging	-3.0		+3.0	ppm	First year at $+25^\circ\text{C} \pm 2^\circ\text{C}$
Timing error over time ( $\pm 5\text{ ppm}$ over $-40^\circ\text{C}$ to $+85^\circ\text{C}$ )	$\pm 0.432\text{ sec/day}$ ; $\pm 12.960\text{ sec/month}$ ; $\pm 2.628\text{ minutes/year}$				Reference to frequency tolerance reading (fo) at $25^\circ\text{C} \pm 2^\circ\text{C}$
Supply Voltage (V <sub>DD</sub> ) <small>[Note 2]</small>	+3.135	+3.3	+3.465	V	Option E
	+2.375	+2.5	+2.625		Option C
	+1.71	+1.8	+1.89		Option D
Supply Current (I <sub>DD</sub> )		1.0	2.0	$\mu\text{A}$	Without load
Disable Current			1.0	$\mu\text{A}$	Pad 1 logic low
Start-up Time			0.5	sec	
Rise and Fall Time (Tr/Tf)			100	ns	20% to 80% of waveform, 15pF Load
Symmetry @ $\frac{1}{2} V_{DD}$	40		60	%	
Output Voltage	V <sub>OH</sub>	90%V <sub>DD</sub>		V	
	V <sub>OL</sub>		10%V <sub>DD</sub>		
Output Load			15	pF	CMOS
Output Waveform	CMOS				
Tri-state function <small>[Note 3]</small>	“1” (V <sub>IH</sub> $\geq 0.8 \cdot V_{DD}$ ): Oscillation; “0” (V <sub>IL</sub> $< 0.2 \cdot V_{DD}$ ): No Oscillation/Hi Z			V	

**Note 1:** All measurements made over specified operating temperature range, at nominal V<sub>DD</sub>, and 15pF load, unless otherwise specified.

**Note 2:** Operational voltage range: 1.5V to 3.63V

**Note 3:** Do not leave pad 1 (tri-state) floating (no connect). Pad 1 must be tied to V<sub>DD</sub> (logic 1) for proper oscillation on pad 3.



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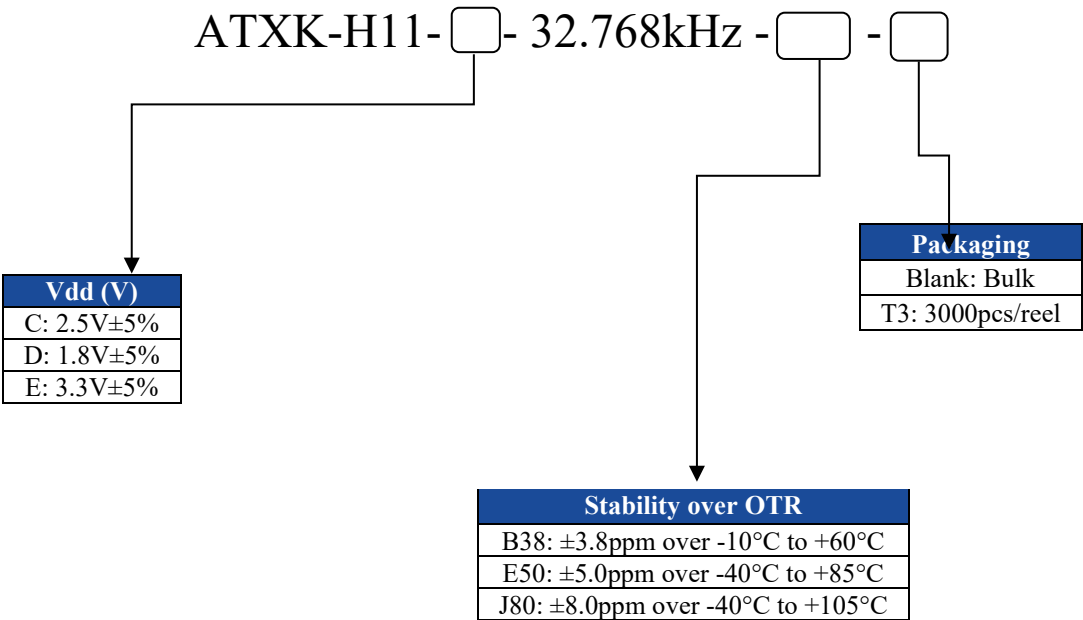
## Absolute Maximum Ratings

Parameters	Symbol	Conditions	Rating	Unit
Supply voltage range (4)	V <sub>DD</sub>	Between V <sub>DD</sub> and V <sub>SS</sub>	-0.3 to +4.5	V
Input voltage range (4)	V <sub>IN</sub>	Between INH and V <sub>SS</sub>	-0.3 to V <sub>DD</sub> +0.3 (5)	V
Output voltage range (4)	V <sub>OUT</sub>	Output pad	-0.3 to V <sub>DD</sub> +0.3 (5)	V
Junction temperature (4)	T <sub>j</sub>	-	150	°C
Storage temperature range	TSTG	-	-55 to +105	°C

Note 4: Absolute maximum ratings are the values that must not be exceeded. This product may suffer damage if any one of these parameter ratings is exceeded. Operation and characteristics are guaranteed only when the product is operated per the specification datasheet.

Note 5: V<sub>DD</sub> is a V<sub>DD</sub> value of recommended operating conditions.

## Part Identification



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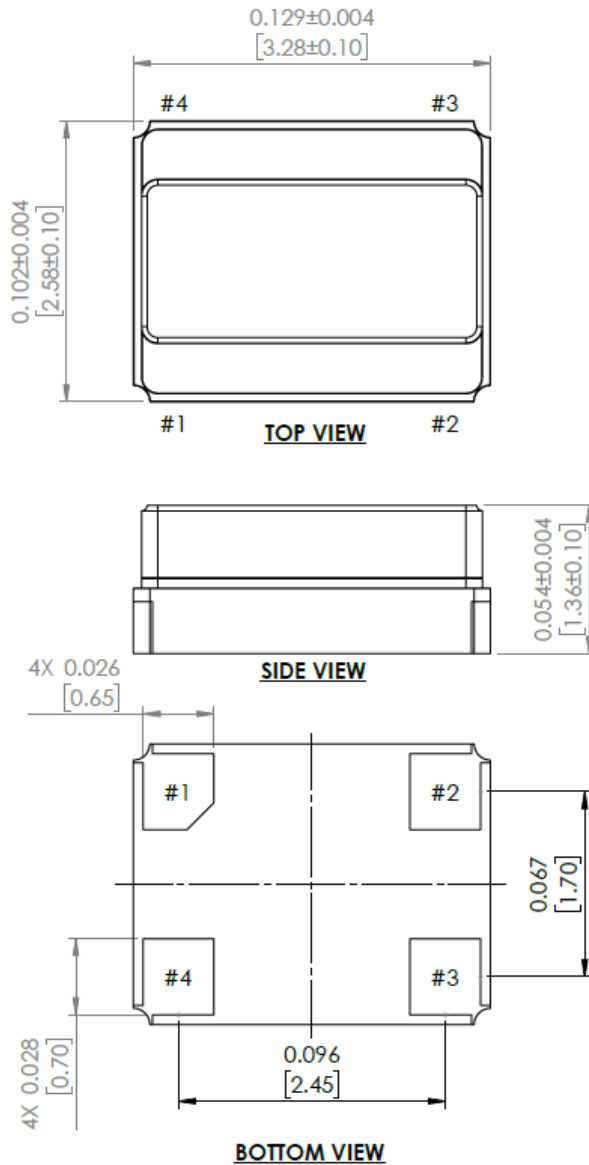


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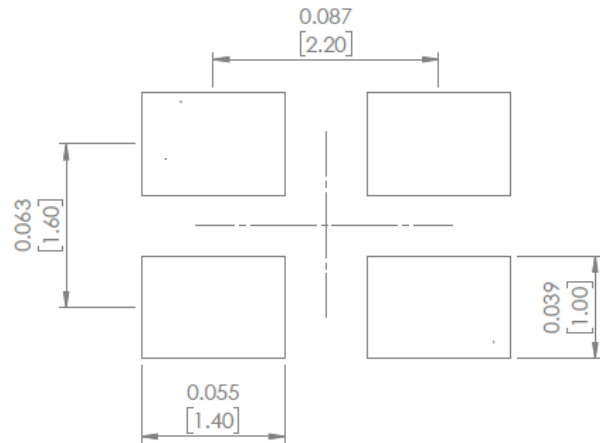


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## Mechanical Dimensions



### Recommended Land Pattern



Pin #	Function
1	Output Enable
2	GND
3	Output
4	V <sub>DD</sub>

Dimensions: inches (mm)



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

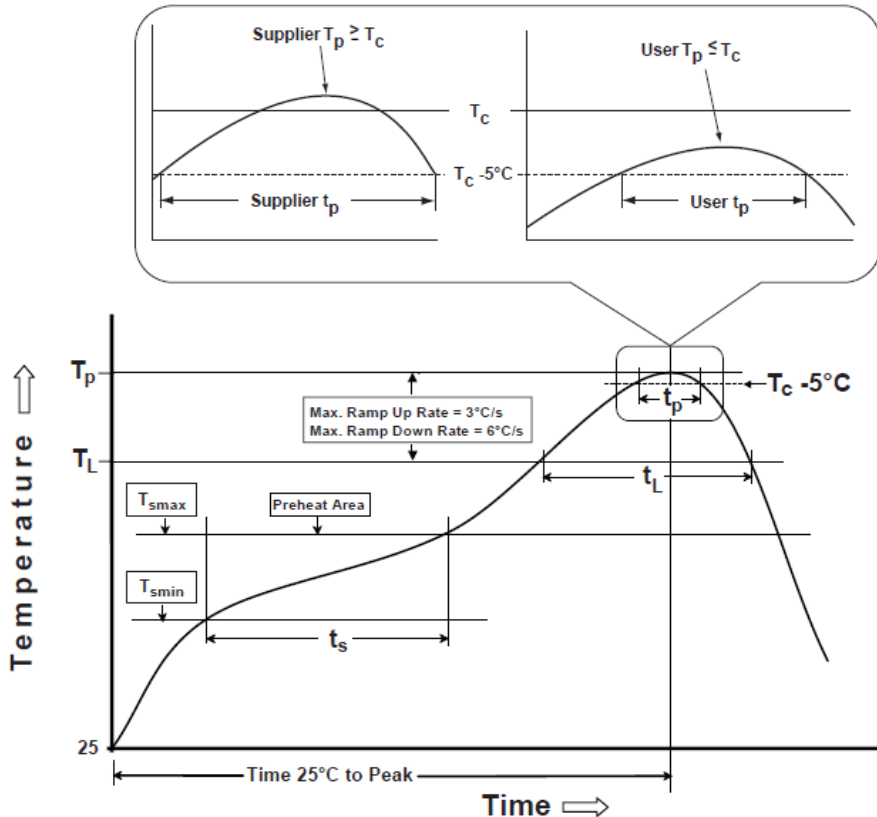


Table 1

**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.

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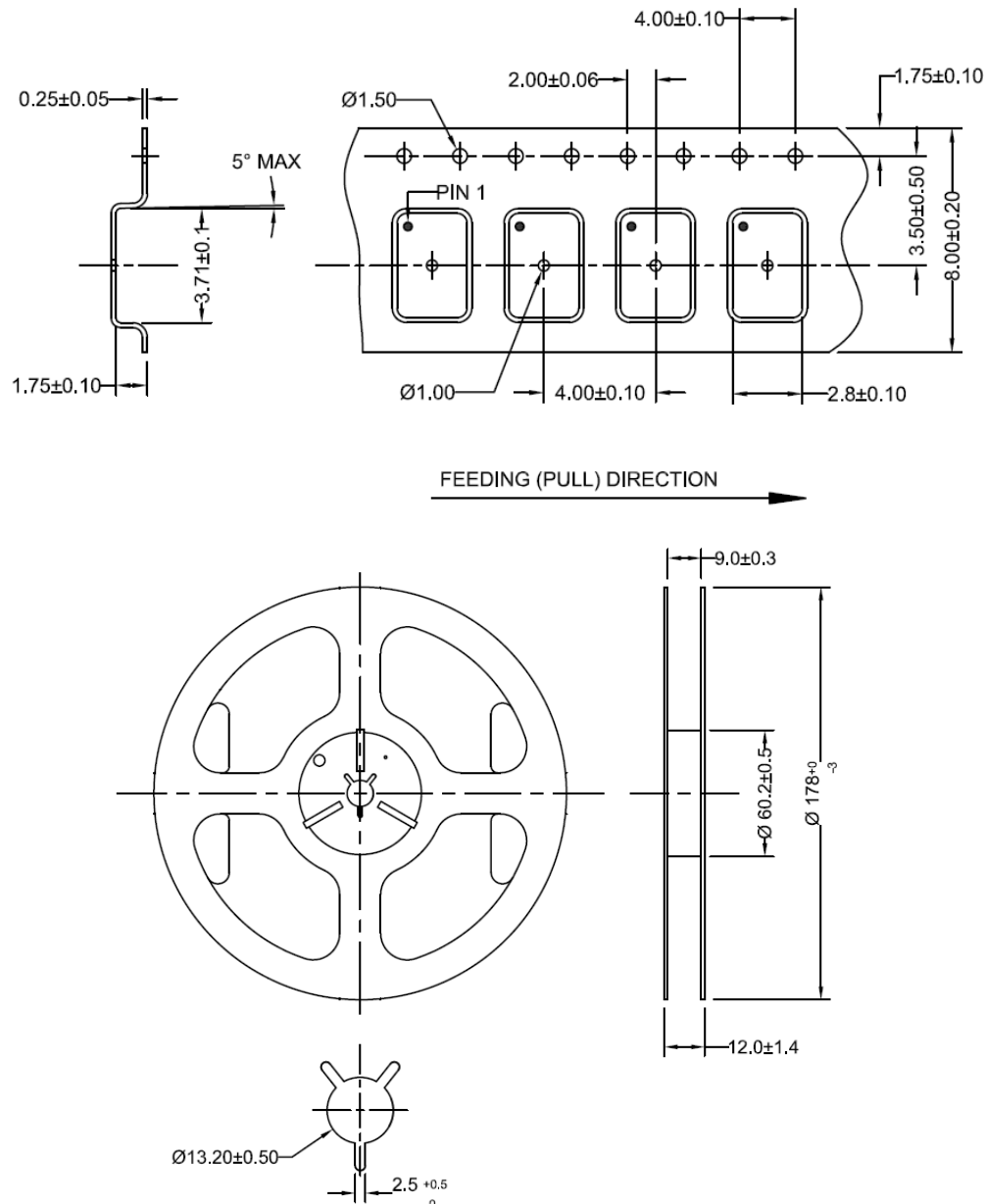
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## Packaging

T3: 3,000pcs/reel



Dimensions: mm

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