

32.768kHz TCXO

ATXK-H11

Request Samples



Check Inventory



ESD Sensitive



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

Features

- Frequency Stability options: ± 5.0 ppm over -40 to $+85^{\circ}\text{C}$, & ± 8.0 ppm over -40 to $+105^{\circ}\text{C}$
- Output waveform CMOS
- Low power consumption
- Supply Voltage options: 3.3V, 2.5V, and 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 | | +105 | $^{\circ}\text{C}$ | See Options |
| Storage Temperature Range | -55 | | +105 | $^{\circ}\text{C}$ | |
| Frequency Stability $\Delta f/f_0$ vs: | | | | | |
| 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, two times |
| 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 | -1.5 | | +1.5 | ppm/V | +25 $^{\circ}\text{C}$ |
| Aging | -3.0 | | +3.0 | ppm | First year at $+25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ |
| Timing error over time (± 5 ppm over -40°C to $+85^{\circ}\text{C}$) | ± 0.432 sec/day; ± 12.960 sec/month; ± 2.628 minutes/year | | | | Reference to frequency tolerance reading (fo) at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ |
| Supply Voltage (V _{DD}) <small>[Note 4]</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 |
| Operating Voltage Range <small>[Note 3,5]</small> | 1.5 | | 3.63 | V | See notes below |
| Start-up Voltage <small>[Note 6]</small> | | | 1.5 | V | |
| Supply Current (I _{DD}) | | 1.0 | 2.0 | μA | V _{DD} = 1.8V, no load |
| Start-up Current <small>[Note 7]</small> | | | 3.3 | μA | V _{DD} = 1.8V, no load |
| Disable Current | | | 2.0 | μA | Pad 1 logic low |
| Start-up Time (T _{STA}) | | | 0.5 | s | |
| Rise and Fall Time (Tr/Tf) | | | 40 | ns | 20% to 80% of waveform, 15pF Load |
| Symmetry @ $\frac{1}{2}$ V _{DD} | 40 | | 60 | % | |
| Output Voltage | V _{OH} | 90%V _{DD} | | V | |
| | V _{OL} | | 10%V _{DD} | | |
| Output Load | | | 15 | pF | CMOS |
| Output Waveform | CMOS | | | | |
| Tri-state function <small>[Note 2]</small> | “1” (V _{IH} $\geq 0.8 \cdot V_{DD}$): Oscillation; “0” (V _{IL} $< 0.2 \cdot V_{DD}$): No Oscillation/Hi Z | | | V | |

Note 1: All measurements made over specified operating temperature range, at nominal V_{DD}, and 15pf load, unless otherwise specified.

Note 2: Do not leave pad 1 (tri-state) floating (no connect). Pad 1 must be tied to V_{DD} (logic 1) for proper oscillation on pad 3.

Note 3: Operational voltage range: 1.5V to 3.63V. Frequency accuracy is only guaranteed at the chosen supply voltage (V_{DD}).

Note 4: This oscillator is sensitive to power supply noise. Thus, the supply voltage should be stabilized to avoid a negative impact on the frequency accuracy and oscillation capability.

Note 5: Supply voltage (V_{DD}) must remain above 1.5V to maintain proper oscillation. If the supply voltage is reduced below 1.5V, it should be reset to ground (0V) for more than 10 seconds for a proper power-on reset. A power supply (V_{DD}) ramp up of 10 ms/V maximum is needed for proper power-on reset.

Note 6: Supply voltage (V_{DD}) at which the device begins oscillation.

Note 7: Maximum supply current (I_{DD}) during oscillator start-up (T_{STA} + 0.5 s).



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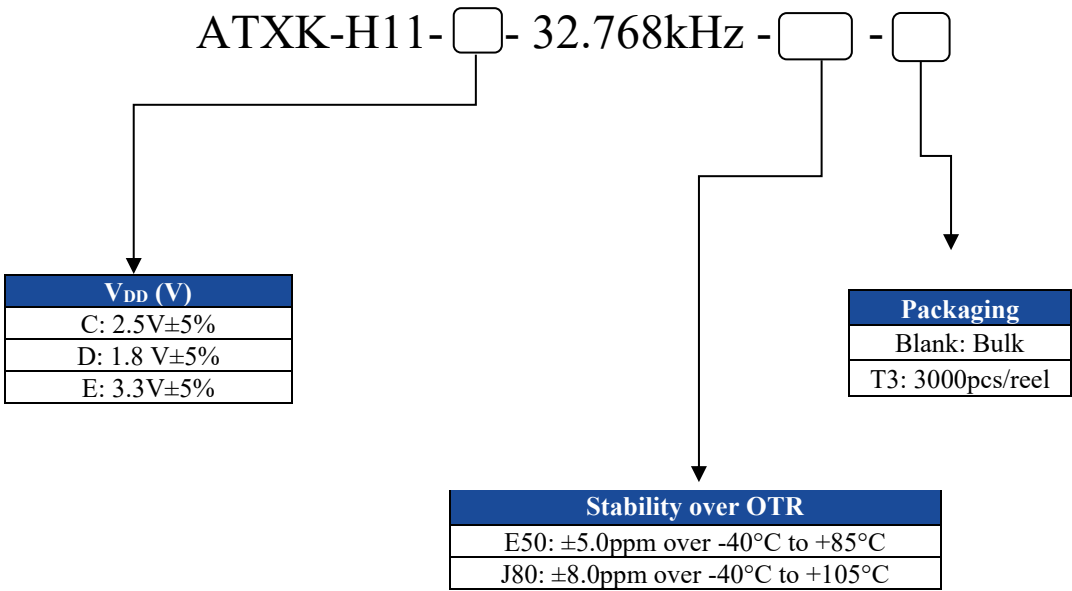
Absolute Maximum Ratings

| Parameters | Symbol | Conditions | Rating | Unit |
|---------------------------|------------------|---|----------------------------------|------|
| Supply voltage range (8) | V _{DD} | Between V _{DD} and V _{SS} | -0.3 to +4.5 | V |
| Input voltage range (8) | V _{IN} | Between INH and V _{SS} | -0.3 to V _{DD} +0.3 (9) | V |
| Output voltage range (8) | V _{OUT} | Output pad | -0.3 to V _{DD} +0.3 (9) | V |
| Junction temperature (8) | T _j | - | 150 | °C |
| Storage temperature range | STG | - | -55 to +105 | °C |

Note 8: 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 9: V_{DD} is a V_{DD} value of recommended operating conditions.

Part Identification



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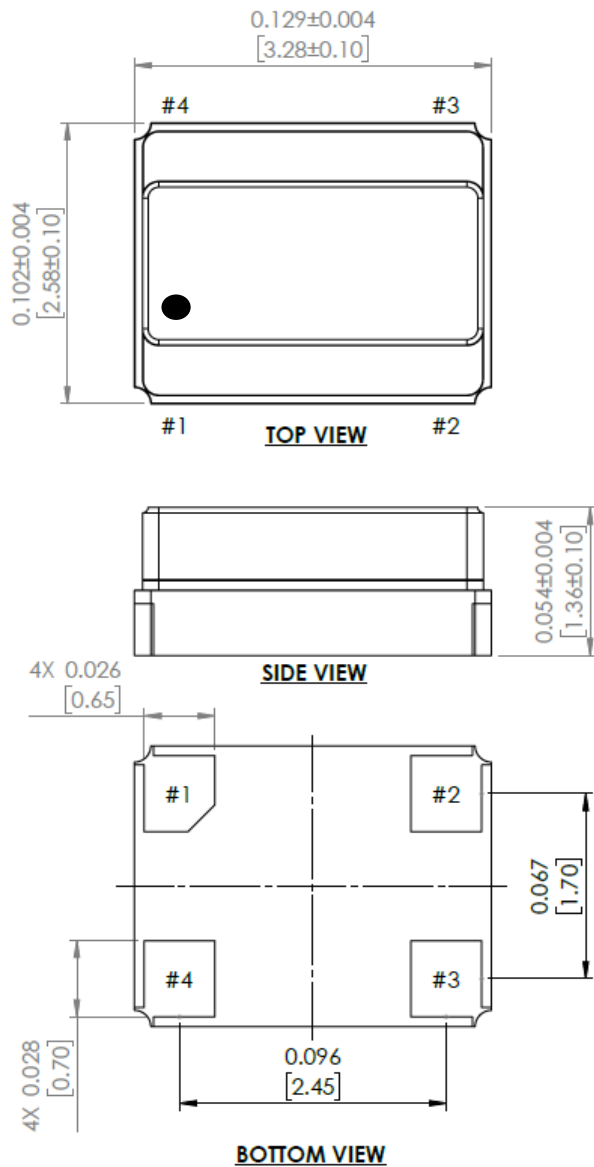


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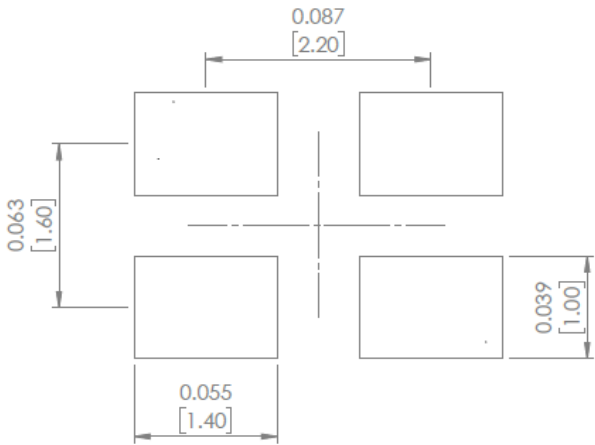


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Mechanical Dimensions



Recommended Land Pattern



| Pin # | Function |
|-------|-----------------|
| 1 | Output Enable |
| 2 | GND |
| 3 | Output |
| 4 | V _{DD} |

Dimensions: inches (mm)

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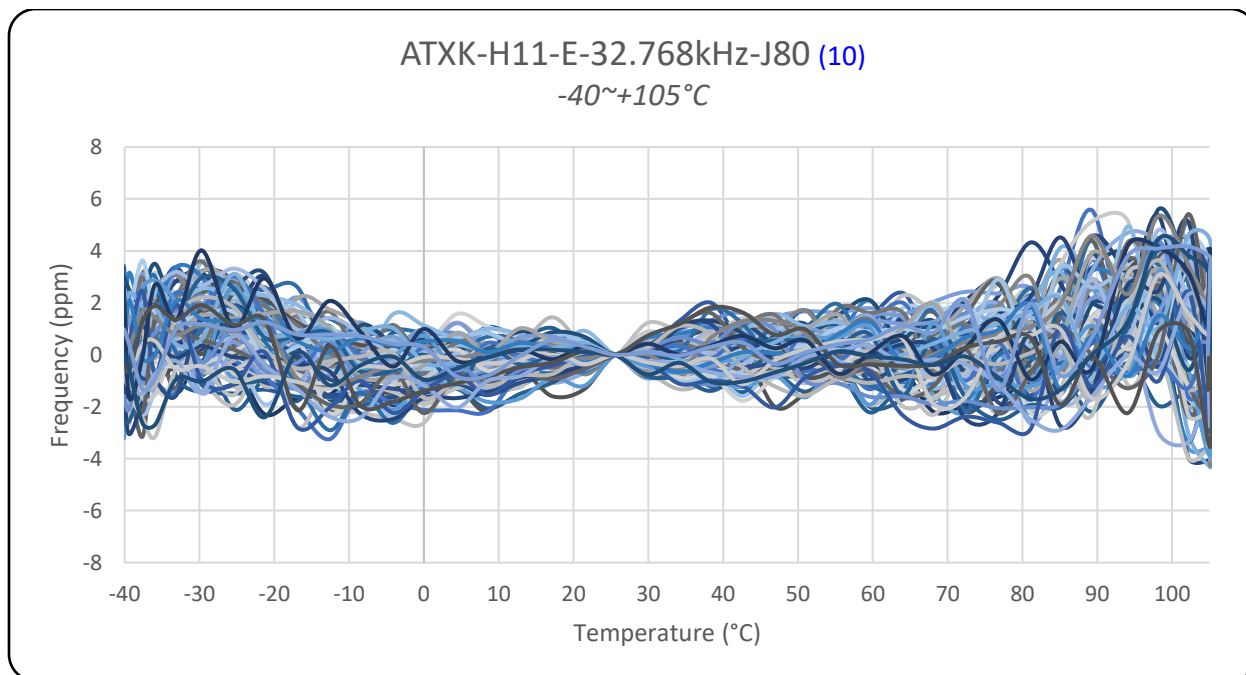
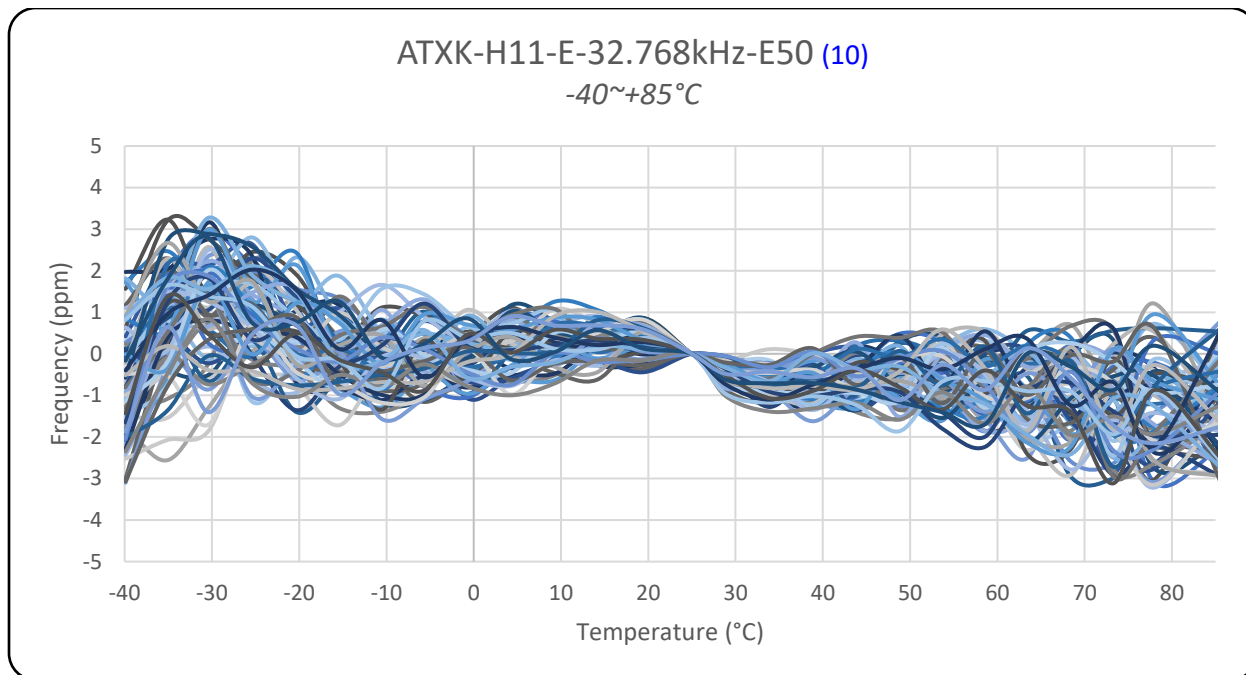


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Typical Frequency vs. Temperature Characteristics



Note 10: Frequency normalized to the frequency tolerance reading at +25°C

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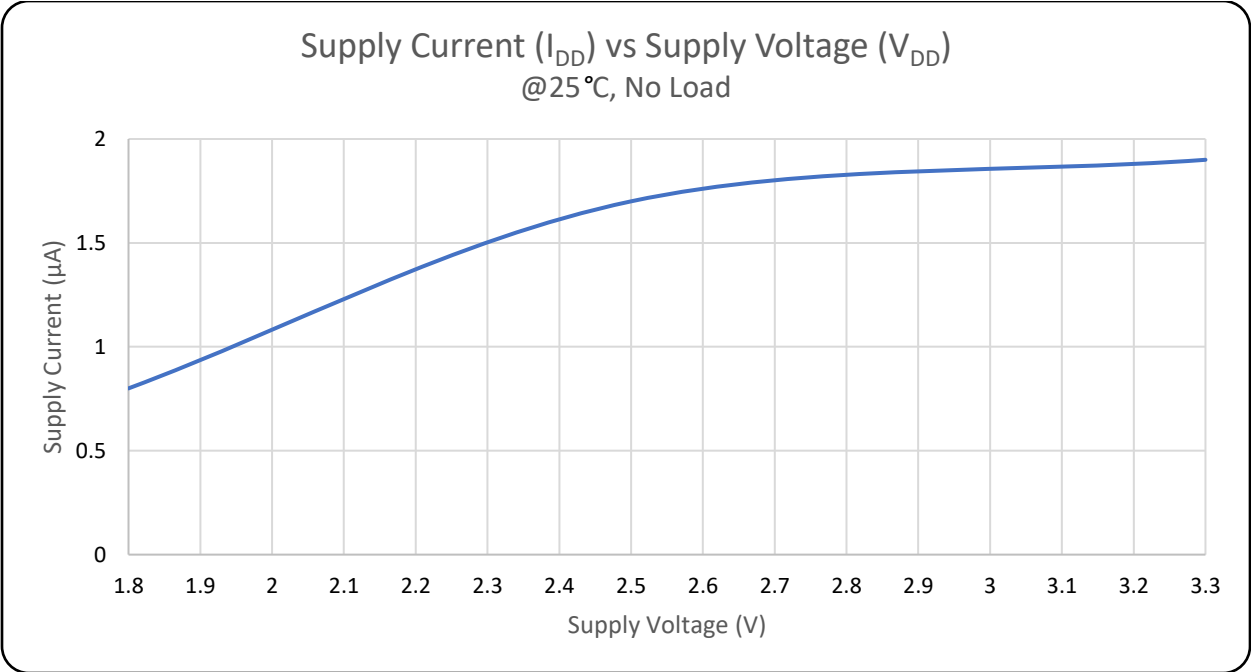


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Supply Current vs Supply Voltage Characteristics





Reflow Profile [JDEC J-STD-020]

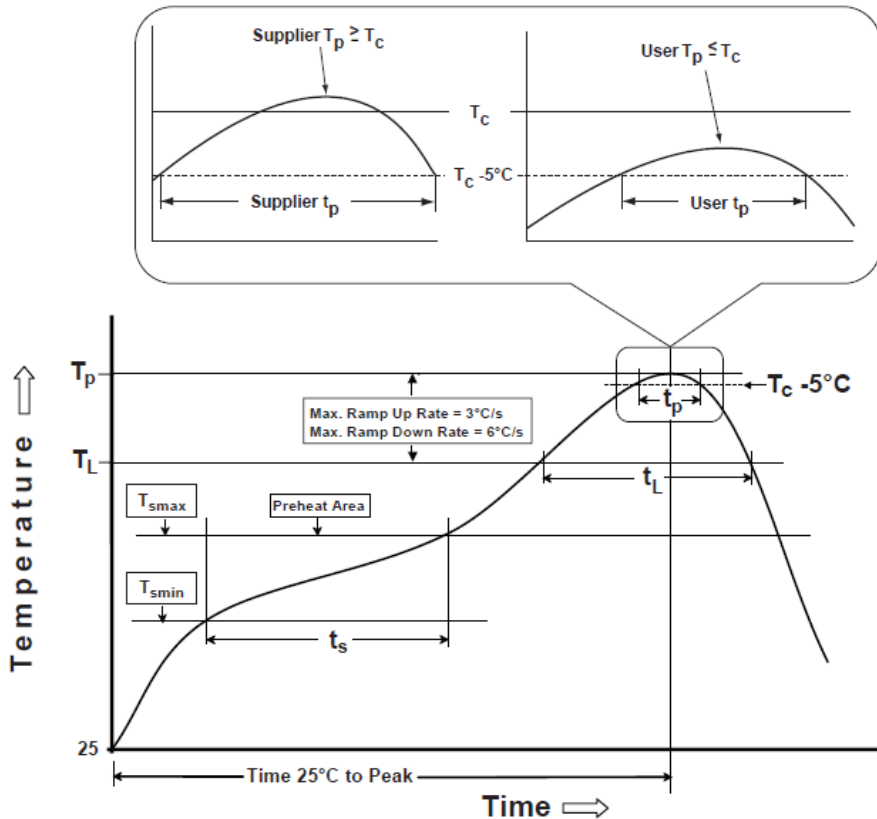


Table 1

SnPb Eutectic Process
Classification Temperatures (T_c)

| Package Thickness | Volume mm ³ <350 | Volume mm ³ ≥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 ³ <350 | Volume mm ³ 350-2000 | Volume mm ³ >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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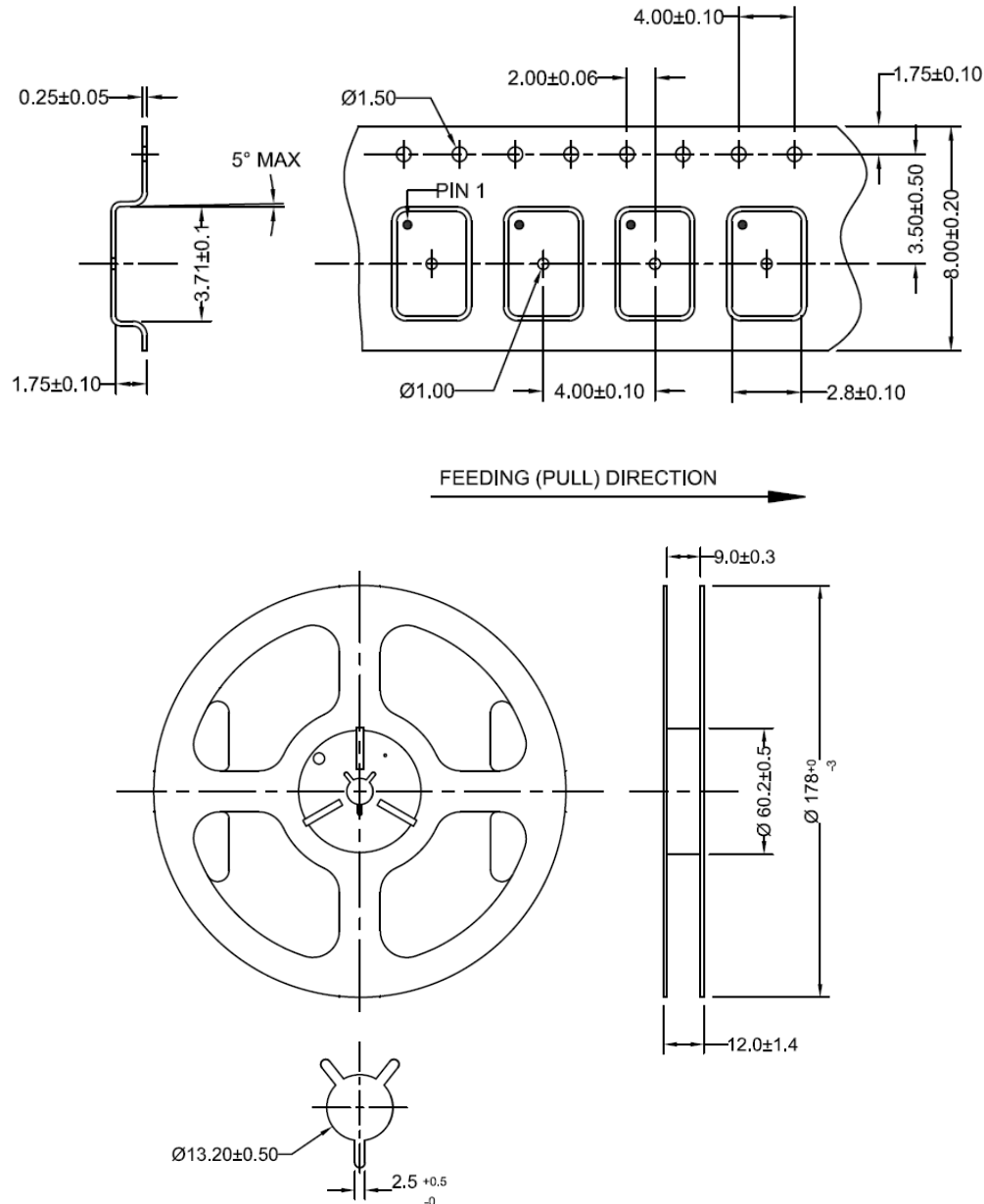
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Packaging

T3: 3,000pcs/reel



Dimensions: mm

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