

SMD Low ESR Crystal

ABS06-107-32.768kHz-T



RoHS/RoHS II Compliant



2.0 x 1.2 x 0.6mm

Moisture Sensitivity Level (MSL) – This product is Hermetically Sealed and not Moisture Sensitive - MSL = N/A: Not Applicable

FEATURES:

- 0.6mm max. height ideal for high density circuit boards
- Ceramic package offers excellent environmental & heat resistance
- Extended temperature -40°C to +85°C for industrial applications

APPLICATIONS:

- Wide range in communication & measuring equipment
- Commercial & Industrial applications
- Wireless communications

Overview

ABRACON's **ABS06-107-32.768kHz-T** Tuning Fork Crystal is optimized for Power Sensitive Designs, requiring minimal plating load (4pF) and Ultra-Low ESR. With guaranteed maximum ESR of 80k Ω , this device is ideally suited for **Ultra-Low Power - Real Time Clocking** solutions, requiring exceptionally low power consumption (**Reference**; ST Micro STM32L1, F2 & F4 μ controllers).

Key Attributes

- 4pF plating load facilitates sustained oscillations with very low oscillator loop transconductance (g_m) $\leq 3\mu A/V$
- Guaranteed maximum ESR of 80k Ω ensures lower overall power consumption & higher Gain Margin
- Tight Frequency Set Tolerance $\leq \pm 20$ ppm into a 4pF Effective Oscillator Loop Load
- Wide Operating Temperature Range (-40°C to +85°C)
- $\leq \pm 175$ ppm typical stability over -40°C to +85°C; ± 250 ppm guaranteed; referenced to measured frequency at 25°C $\pm 3^\circ C$
- Developed in close-cooperation with ST Micro for STM32**L1**, **F2** & **F4** Reference Designs
- Space saving **2.0x1.2x0.6 mm**, RoHS Compliant SMT package
- Low cost, available through Abracon's Global Distributors

Reference Design Information

ABS06-107-32.768kHz-T device is Qualified on the following ST Micro's Reference Designs:

STM32F2 Series: <http://www.st.com/web/en/catalog/mmc/FM141/SC1169/SS1575>

STM32F4 Series: <http://www.st.com/web/en/catalog/mmc/FM141/SC1169/SS1577>

STM32L1 Series: <http://www.st.com/web/en/catalog/mmc/FM141/SC1169/SS1295>

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STANDARD SPECIFICATIONS:

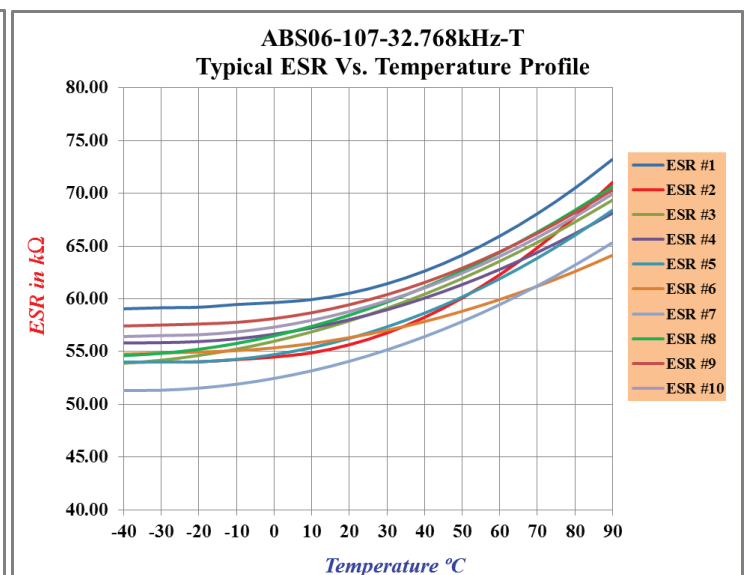
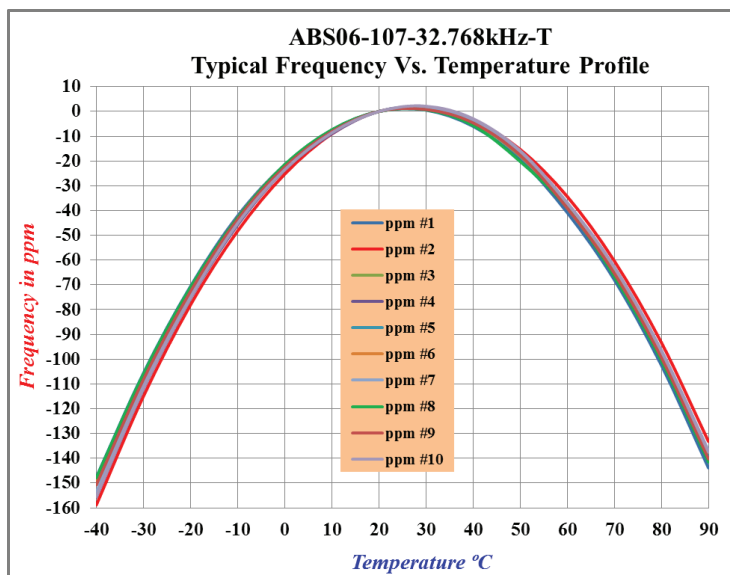
| Parameters | Minimum | Typical | Maximum | Units | otes |
|--------------------------------------|-----------------------------|---------|---------|--------------------|--|
| Frequency | | 32.768 | | kHz | |
| Operation Mode | Flexural Mode (Tuning Fork) | | | | |
| Operating Temperature | -40 | | +85 | °C | |
| Storage Temperature | -55 | | +125 | °C | |
| Temperature Coefficient: | -0.039 | -0.034 | -0.029 | ppm/T ² | |
| Turn-over temperature: | +20 | +25 | +30 | °C | |
| Frequency Stability over temperature | -250 | < ±175 | +250 | ppm | Relative to the measured frequency at 25°C ± 3°C |
| Equivalent series resistance (R1) | | < 60 | 80 | kΩ | |
| Shunt Capacitance (C0) | | < 1.50 | 1.70 | pF | |
| Load capacitance (CL) | 3.90 | 4.00 | 4.10 | pF | See Note#1 |
| Frequency Tolerance @+25°C | -20 | | +20 | ppm | See Note#2 Tested at 0.5μW |
| Drive Level | | 0.1 | 0.5 | μW | |
| Q value | 9000 | 20,000 | | | |
| Aging@25°C±3°C | -3 | | 3 | ppm | First year |
| Insulation Resistance | 500 | | | MΩ | @ 100Vdc ± 15V |

Note #1: The oscillator loop needs to present an effective loop capacitance of 4.0 pF, not to exceed 4.50 pF. This loop capacitance is required to ensure Safety Factor of > 5.0 for the entire population of crystals.

Note #2: With an effective loop capacitance of 4.0 pF, the oscillator circuit will be with-in (32.768 kHz) ±20 ppm.

Depending on production equipment capability, these parts might be tested at a different load, with guaranteed projected performance at 4.0 pF.

FREQUENCY VS. TEMPERATURE CHARACTERISTICS



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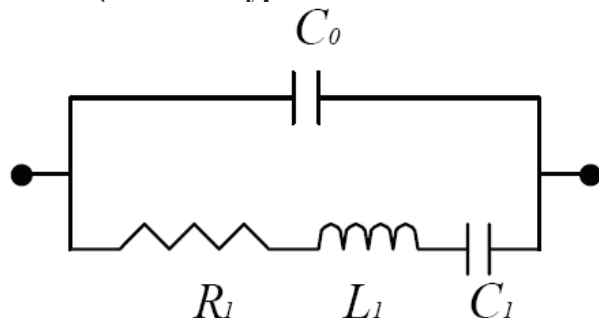
RoHS/RoHS II Compliant



2.0 x 1.2 x 0.6mm

SPICE MODEL:

SPICE Model (based on typical values at 25°C ± 3°C):

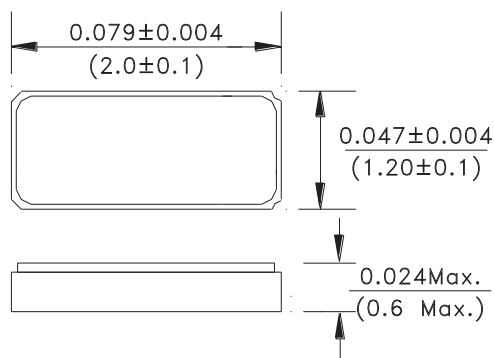


C0 = 1.30 pF
R1 = 57 kΩ
L1 = 4,625 H
C1 = 5.51 fF

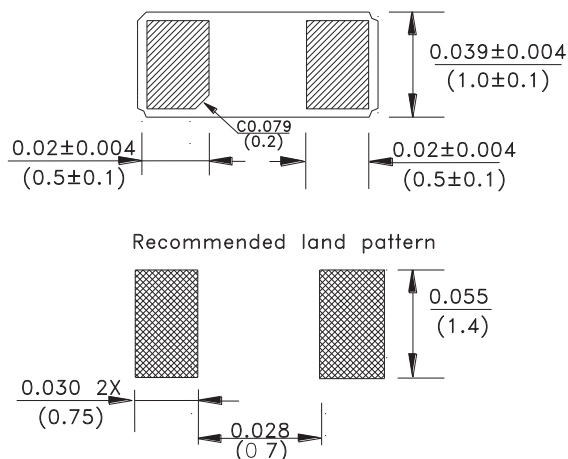
PART IDENTIFICATION

ABS06-107-32.768 kHz-T

OUTLINE DIMENSIONS:



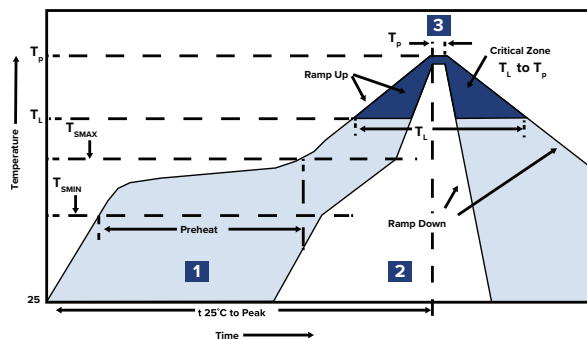
Internal Connection (Top View)



Note: Due to material availability, the outline and finish color of the component may vary. This variation in no way affects the electrical performance of the product.

Dimensions: inches (mm)

REFLOW PROFILE:



| Zone | Description | Temperature | Time |
|------|----------------|--|---------------|
| 1 | Preheat / Soak | T _{SMIN} ~ T _{SMAX} 150°C ~ 180°C | 60 ~ 120 sec. |
| 2 | Reflow | T _L 230°C | 30 ~ 40 sec. |
| 3 | Peak heat | T _p 260°C | 10 sec. MAX |

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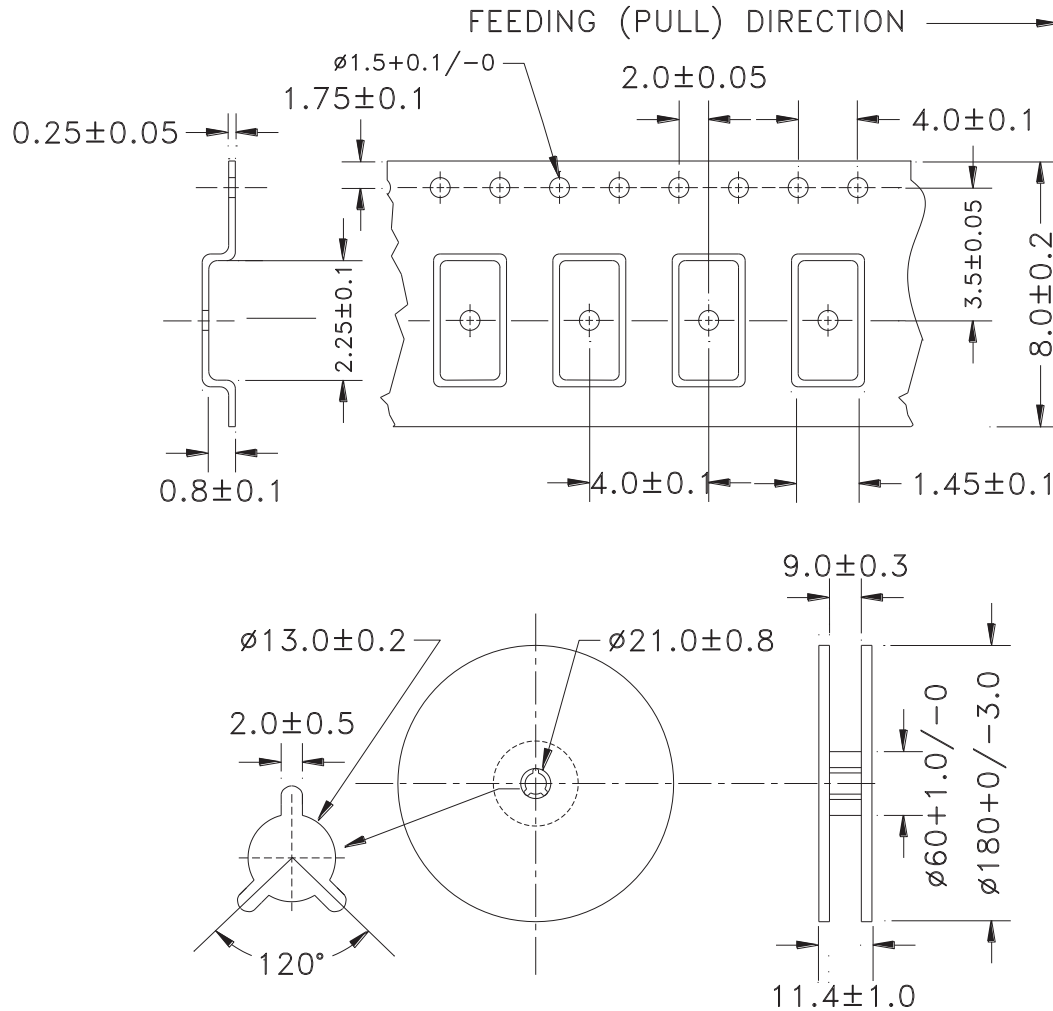
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2.0 x 1.2 x 0.6mm

TAPE & REEL:

T=Tape and reel (3,000pcs/reel)



Dimensions: mm

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