

# ABS07-120-32.768kHz-T; TUNING FORK CRYSTAL



3.2 x 1.5 x 0.9 mm

32.768kHz SMD; ESR OPTIMIZED CRYSTAL



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

## FEATURES:

- Guaranteed ESR of 60kΩ Maximum for Low Power Designs
- 0.9mm height ideal for high density circuit boards
- Seam sealed ceramic package offers excellent environmental & heat resistance
- Extended Operating temperature of -40°C to +85°C for industrial applications

## APPLICATIONS:

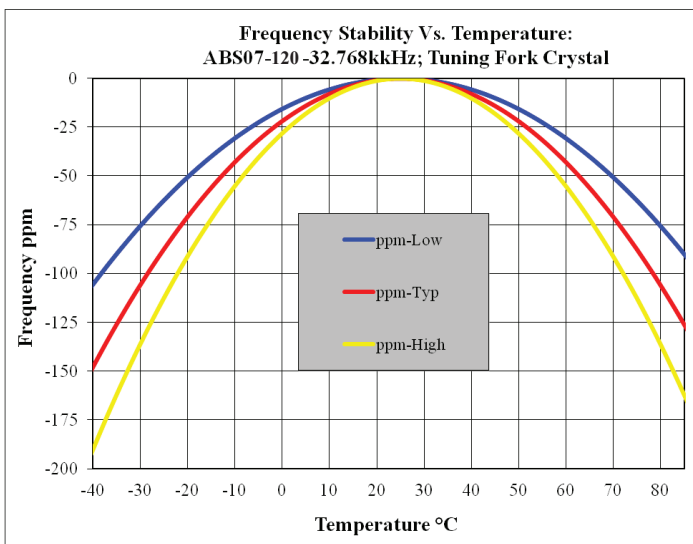
- Power sensitive designs requiring Low ESR Crystal, such as ST-Micro MCU STM32L based solutions
- Communication & measurement equipment
- Commercial, Consumer & Industrial applications
- Wireless communications
- PDA and Smartphone

## STANDARD SPECIFICATIONS

| Parameters                        | Minimum     | Typical   | Maximum | Units              | Notes           |
|-----------------------------------|-------------|-----------|---------|--------------------|-----------------|
| Frequency                         |             | 32.768    |         | kHz                |                 |
| Operation Mode                    | Tuning Fork |           |         |                    |                 |
| Operating Temperature             | -40         |           | +85     | °C                 |                 |
| Storage Temperature               | -55         |           | +125    | °C                 |                 |
| Frequency Tolerance @+25°C        | -20         |           | +20     | ppm                | Tested at 0.1uW |
| Temperature Coefficient:          | -0.045      | -0.035    |         | ppm/T <sup>2</sup> |                 |
| Turn-over temperature:            | +20         | +25       | +30     | °C                 |                 |
| Equivalent series resistance (R1) |             | 55        | 60      | kΩ                 |                 |
| Shunt capacitance (C0)            |             |           | 1.60    | pF                 |                 |
| Motional capacitance (Cm)         |             | 3.0 ~ 6.0 |         | fF                 |                 |
| Load capacitance (CL)             |             | 6.0       |         | pF                 |                 |
| Drive Level                       |             | 0.1       | 0.5     | μW                 |                 |
| Q value                           | 13000       |           |         |                    |                 |
| Aging@25°C±3°C                    | -3          |           | 3       | ppm                | First year      |
| Insulation Resistance             | 500         |           |         | MΩ                 | @ 100Vdc ± 15V  |

## PART IDENTIFICATION: ABS07-120-32.768 kHz-T

## FREQUENCY VARIATION OVER OPERATING TEMPERATURE; RELATIVE TO MEASURED FREQUENCY AT 25°C



| Temp °C | (ppm) Low | (ppm) Typ | (ppm) High |
|---------|-----------|-----------|------------|
| -40     | -105.63   | -147.88   | -190.13    |
| -35     | -90.00    | -126.00   | -162.00    |
| -30     | -75.63    | -105.88   | -136.13    |
| -25     | -62.50    | -87.50    | -112.50    |
| -20     | -50.63    | -70.88    | -91.13     |
| -15     | -40.00    | -56.00    | -72.00     |
| -10     | -30.63    | -42.88    | -55.13     |
| -5      | -22.50    | -31.50    | -40.50     |
| 0       | -15.63    | -21.88    | -28.13     |
| 5       | -10.00    | -14.00    | -18.00     |
| 10      | -5.63     | -7.88     | -10.13     |
| 15      | -2.50     | -3.50     | -4.50      |
| 20      | -0.63     | -0.88     | -1.13      |
| 25      | 0.00      | 0.00      | 0.00       |
| 30      | -0.63     | -0.88     | -1.13      |
| 35      | -2.50     | -3.50     | -4.50      |
| 40      | -5.63     | -7.88     | -10.13     |
| 45      | -10.00    | -14.00    | -18.00     |
| 50      | -15.63    | -21.88    | -28.13     |
| 55      | -22.50    | -31.50    | -40.50     |
| 60      | -30.63    | -42.88    | -55.13     |
| 65      | -40.00    | -56.00    | -72.00     |
| 70      | -50.63    | -70.88    | -91.13     |
| 75      | -62.50    | -87.50    | -112.50    |
| 80      | -75.63    | -105.88   | -136.13    |
| 85      | -90.00    | -126.00   | -162.00    |



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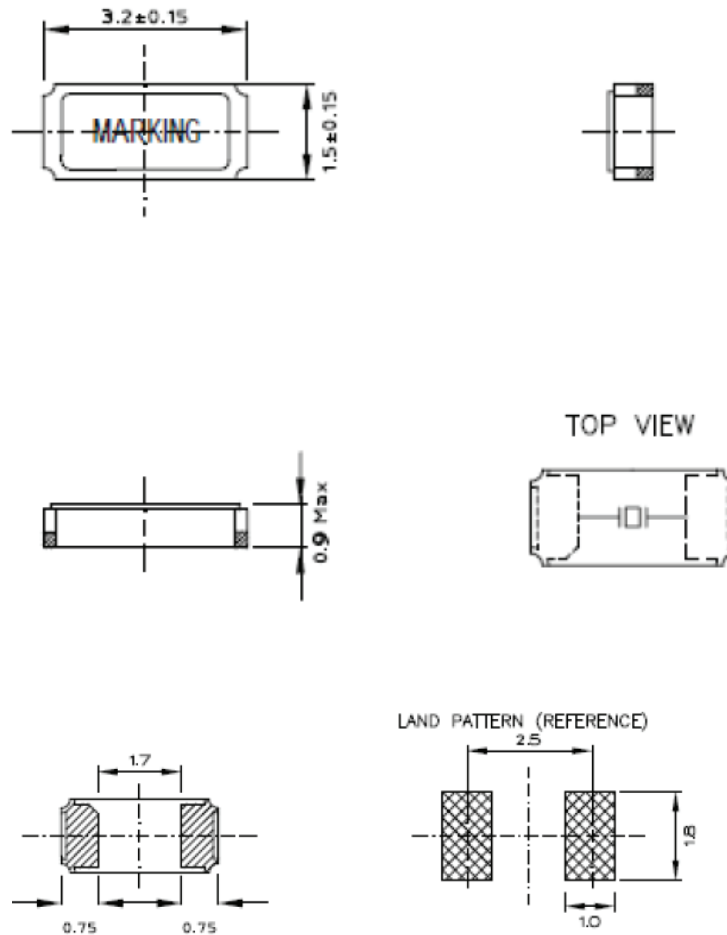
32.768kHz SMD; ESR OPTIMIZED CRYSTAL

 RoHS/RoHS II



3.2 x 1.5 x 0.9 mm

## OUTLINE DRAWING:



Dimensions: mm

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

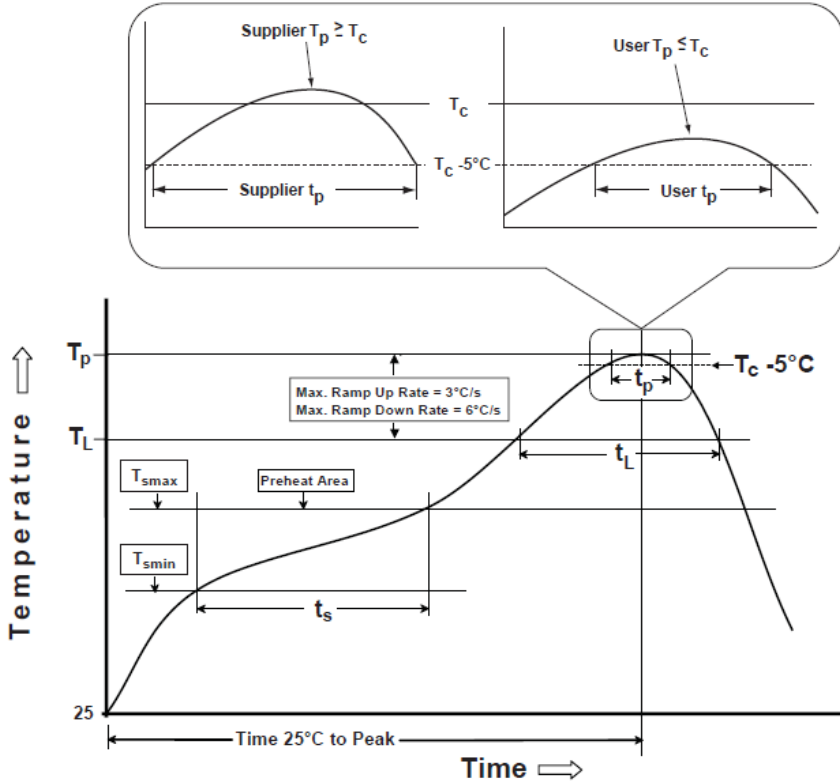


Table 1

| SnPb Eutectic Process<br>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<br>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       |
| Reflow cycles   | 2 max                   | 2 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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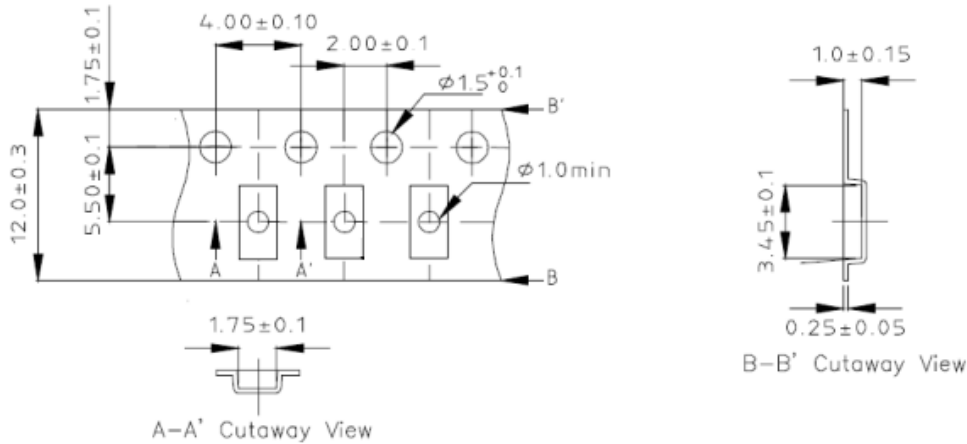
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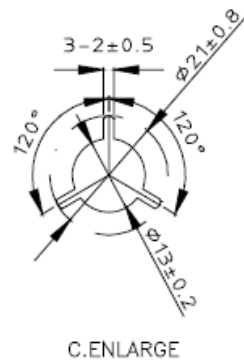
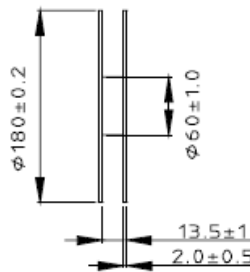
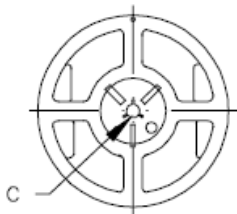
## TAPE & REEL:

T=Tape and reel (3,000pcs/reel)  
T9=Tape and reel (9,000pcs/reel)

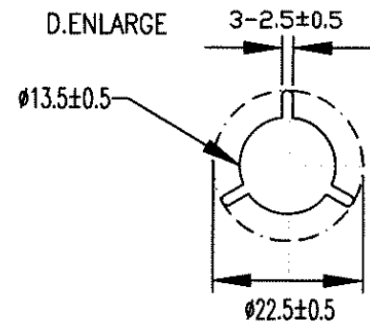
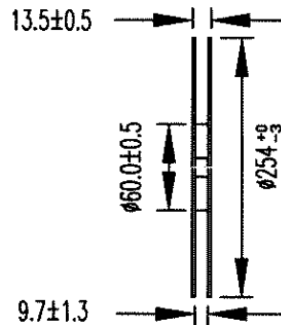
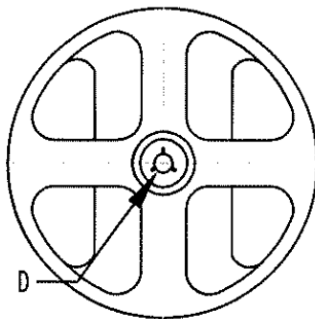


Reel=3,000pcs

REEL : 3000PCS



Reel=9,000pcs



Dimensions: mm

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