# Automotive & Industrial Grade 32.768kHz Ceramic Base SMD Crystal


## ABS07AIG

**3.2 x 1.5 x 0.9 mm**
**RoHS/RoHS II Compliant**
**MSL = N/A: Not Applicable**

## Features

- AEC-Q200 Qualified
- Automotive Grade 1: -40°C to +125°C
- TS16949 Production Line Certified
- PPAP Available Upon Request
- Hermetically Seam-sealed Ceramic Package
- RoHS/RoHS II Compliant and Pb free

## 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 | |
| Operation Mode | | Flexural Mode (Tuning Fork) | | | |
| Operating Temperature | -40 | | +125 | °C | Option “blank”; See options |
| Storage Temperature | -55 | | +125 | °C | |
| Frequency Tolerance @ +25°C | -10 | | +10 | ppm | Option “1”; See options |
| | -20 | | +20 | | Option “blank”; See options |
| Temperature Coefficient | -0.040 | -0.036 | | ppm/T² | |
| Turn-over Temperature | +20 | +25 | +30 | ºC | |
| Frequency stability over operating temperature, relative to in-circuit measured frequency post-reflow | -160 | | -100 | ppm | Over -40°C to +85°C |
| | -250 | | -100 | | Over -40°C to +105°C |
| | -450 | | -100 | | Over -40°C to +125°C |
| Equivalent series resistance (R1) | | | 45 | kΩ | @ +25±3°C |
| | | | 50 | | Over -40°C to +85°C |
| | | | 60 | | Over -40°C to +105°C |
| | | | 70 | | Over -40°C to +125°C |
| Shunt capacitance (C0) | | <1.4 | | pF | |
| Motional capacitance (C1) | | 4.7 | | fF | |
| Load capacitance (CL) | | 12.5 | | pF | Option “blank”; See options |
| Drive Level | | 0.1 | 0.5 | µW | |
| Q value | 10000 | 30000 | | | |
| Aging | -3 | | +3 | ppm | @25°C± 3°C First year |
| Insulation Resistance | 500 | | | MΩ | @100 Vdc |

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**Options and Part Identification (left blank if standard)**

**ABS07AIG-32.768 kHz - ○ - ○ - ○ - ○**

| Load Capacitance |
|---|
| Blank: 12.5pF |
| 9: 9pF |
| 7: 7pF |
| 6: 6pF |
| 5: 5pF |

| Operating Temp.Range |
|---|
| Blank: -40 ~ +125°C |
| D: -40 ~ +85°C |
| J: -40°C to +105°C |

| Freq. Tolerance |
|---|
| Blank: ±20ppm |
| 1: ±10ppm |
| 4: ±30ppm |

| Packaging |
|---|
| Blank: Bulk |
| T: 3k pcs / reel |
| T9: 9k pcs / reel |

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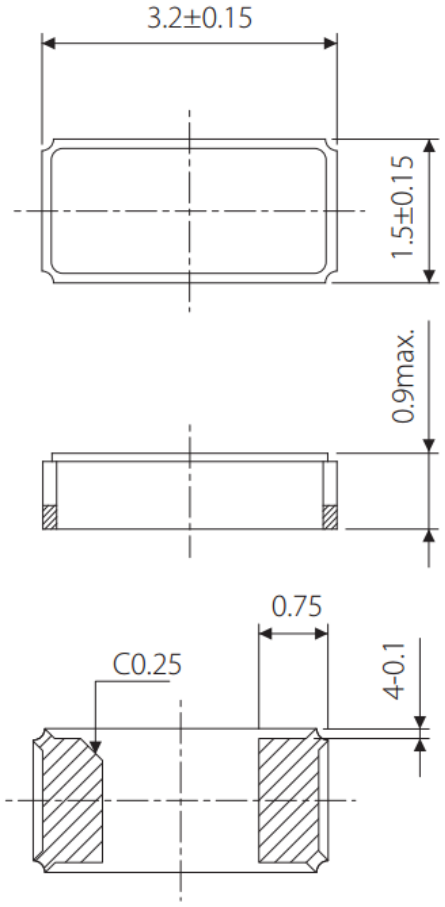
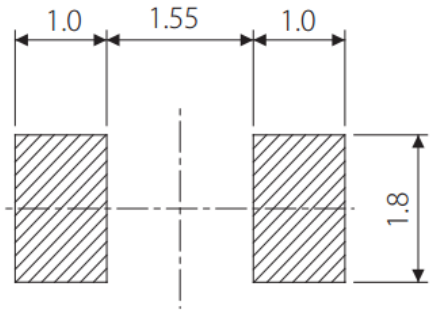
## Mechanical Dimensions




Recommended Land Pattern




**Dimensions: mm**

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

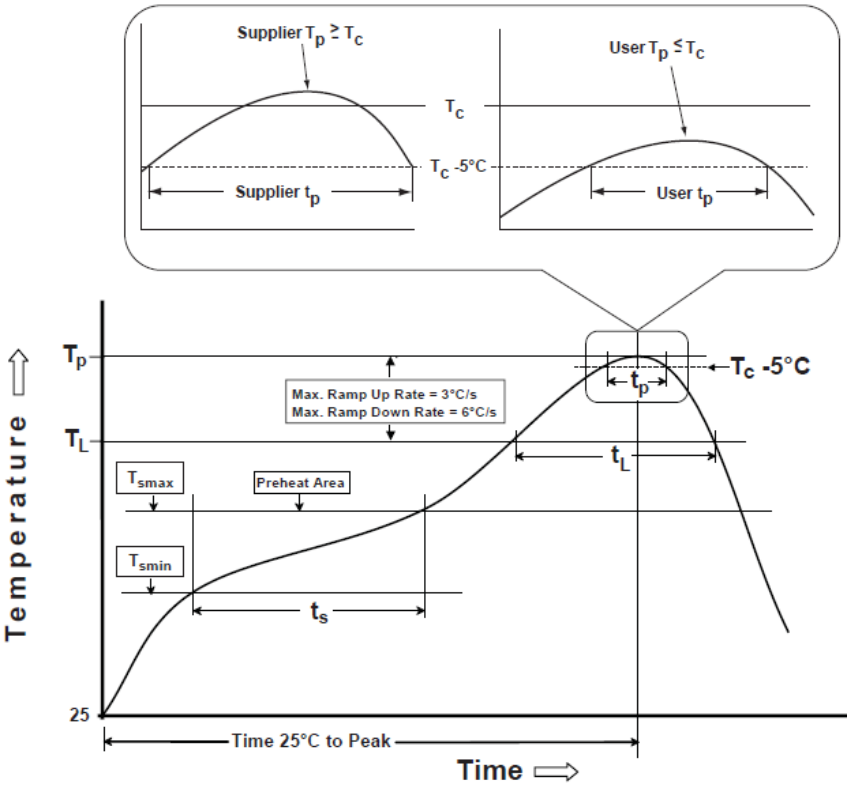


**Table 1**

| SnPb Eutectic Process Classification Temperatures ($T_c$) | | |
|---|---|---|
| Package Thickness | Volume mm³ <350 | Volume mm³ >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 mm³ <350 | Volume mm³ 350-2000 | Volume mm³ >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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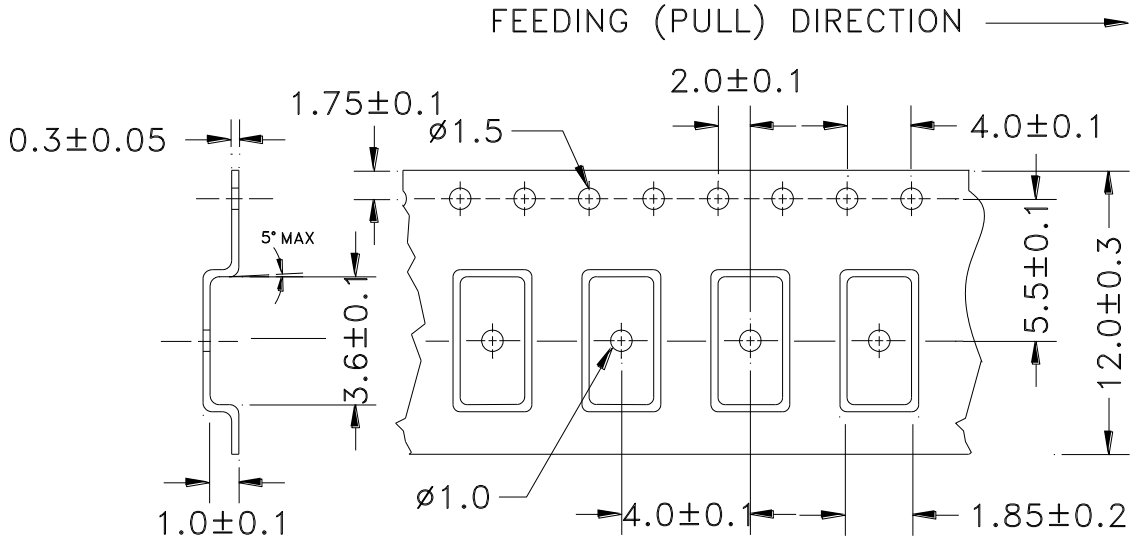
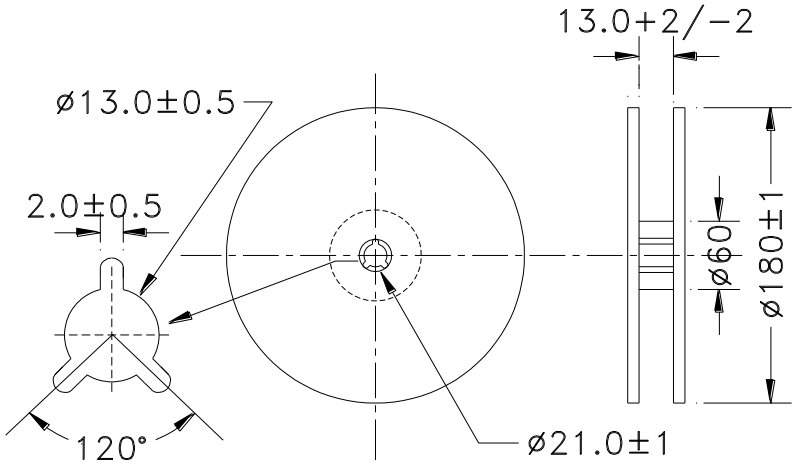
## Packaging

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




**Reel=3,000pcs**

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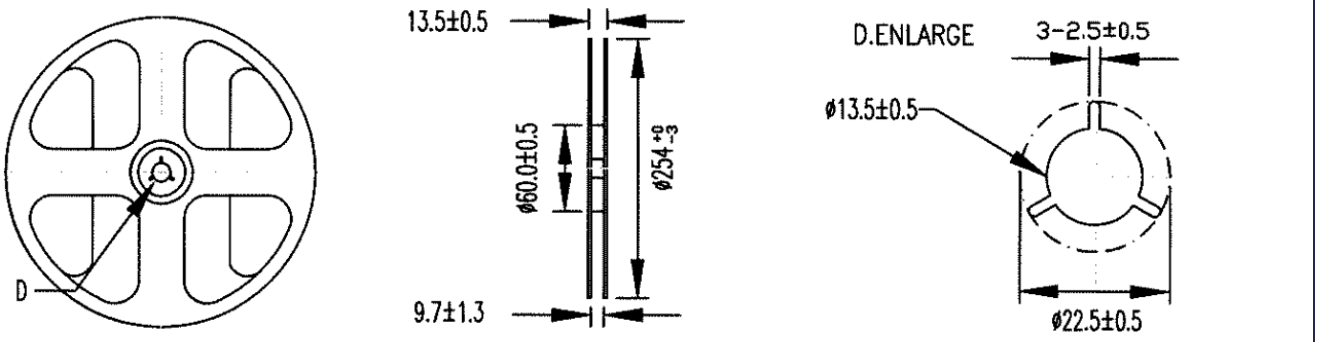
## Packaging

**Reel=9,000pcs**




**Dimensions: mm**



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