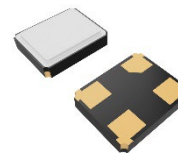


## Description

The ABM11N series is an AT-Cut MHz quartz crystal offered in a 2.0mm x 1.6mm x 0.5mm four-pad SMD package. Tight frequency accuracy of  $\pm 10\text{ppm}$  and stability of  $\pm 15\text{ppm}$  over operating temperature range of  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ , low plating load (CL) value of 4pF, and low Equivalent Series Resistance (ESR) is achieved in this compact package. The ABM11N series offers industry standard frequencies common for wearables, IoT, Bluetooth / Bluetooth Low Energy (BLE), and Ultra-Low Power MCU's/SoC's/Transceivers end applications.



## Features

- Optimized for energy saving wearables and IoT applications
- Plated at exceptionally low plating capacitance, as low as 4pF, with optimized ESR
- 0.5 mm max height ideally suited for height constrained designs
- Seam sealed for long-term reliability
- [REACH/RoHS II Compliant](#) | [MSL Level N/A](#)

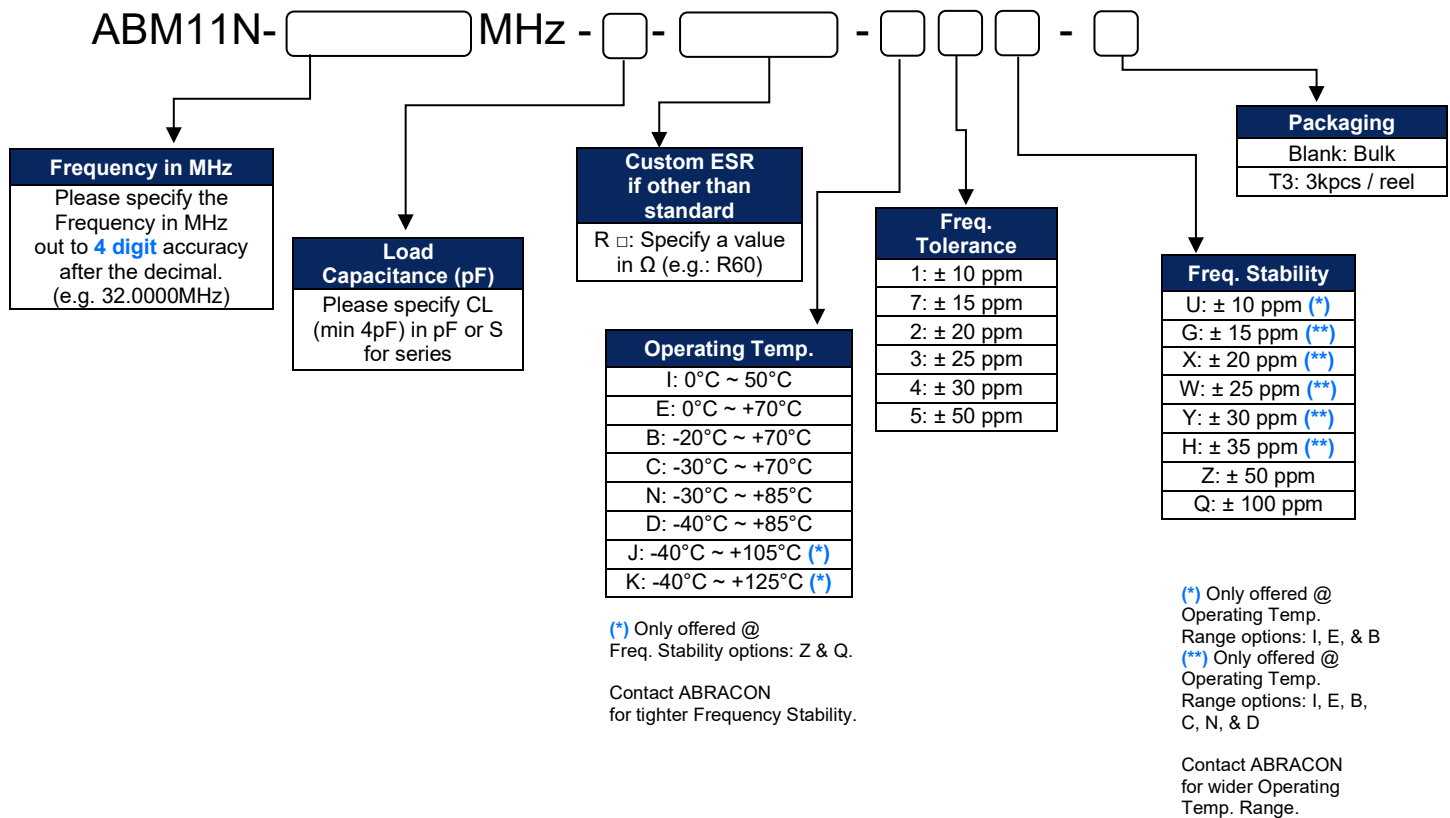
## Typical Applications

- Wearables
- Wireless Modules
- Internet of Things (IoT)
- Bluetooth / Bluetooth Low Energy (BLE)
- Machine-to-Machine (M2M) Connectivity
- Ultra-Low Power MCU's, SoC's, Transceivers
- Near Field Communication
- ISM Band Applications

## Electrical Specifications

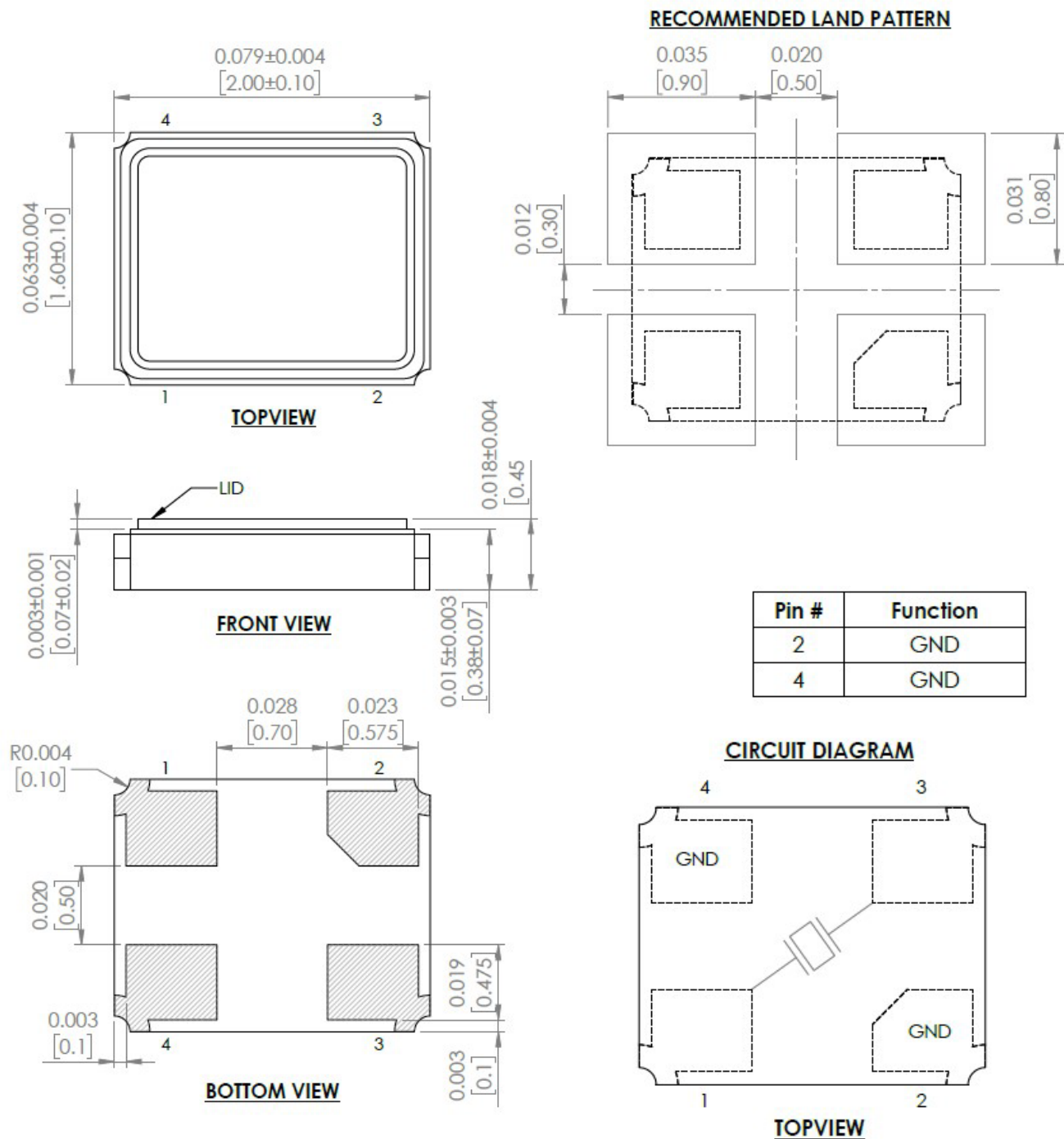
| Parameters                                                                                    | Min.        | Typ.  | Max.    | Units              | Notes                                        |
|-----------------------------------------------------------------------------------------------|-------------|-------|---------|--------------------|----------------------------------------------|
| Frequency Range                                                                               | 16.0000     |       | 50.0000 | MHz                |                                              |
| Operation Mode                                                                                | Fundamental |       |         |                    |                                              |
| Operating Temperature Range                                                                   | -40         |       | +125    | $^{\circ}\text{C}$ | <a href="#">See options</a>                  |
| Storage Temperature                                                                           | -55         |       | +125    | $^{\circ}\text{C}$ |                                              |
| Frequency Tolerance @ $+25^{\circ}\text{C}$                                                   | -10         |       | +10     | ppm                | <a href="#">See options</a>                  |
| Frequency Stability over the Operating Temperature (ref. to $+25^{\circ}\text{C}$ )           | -10         |       | +10     | ppm                | <a href="#">See options</a>                  |
| Equivalent series resistance "R1"<br>(over Operating Temperature Range)<br>(CL=4pF)           |             | < 150 | 200     | $\Omega$           | 16.0000 – 17.9999MHz                         |
|                                                                                               |             | < 80  | 120     |                    | 18.0000 – 20.9999MHz                         |
|                                                                                               |             | < 60  | 100     |                    | 21.0000 – 29.9999MHz                         |
|                                                                                               |             | < 50  | 80      |                    | 30.0000 – 37.9999MHz                         |
|                                                                                               |             | < 30  | 60      |                    | 38.0000 – 50.0000MHz                         |
| Equivalent series resistance "R1"<br>(over Operating Temperature Range)<br>(CL=6pF, 7pF, 8pF) |             | < 120 | 150     | $\Omega$           | 16.0000 – 17.9999MHz                         |
|                                                                                               |             | < 80  | 120     |                    | 18.0000 – 20.9999MHz                         |
|                                                                                               |             | < 60  | 100     |                    | 21.0000 – 29.9999MHz                         |
|                                                                                               |             | < 30  | 50      |                    | 30.0000 – 37.9999MHz                         |
|                                                                                               |             | < 30  | 50      |                    | 38.0000 – 50.0000MHz                         |
| Shunt Capacitance (C0)                                                                        |             | < 1.0 | 2.0     | pF                 |                                              |
| Load Capacitance (CL)                                                                         |             | 4.0   |         | pF                 | <a href="#">See options</a>                  |
| Drive Level                                                                                   |             | 10    |         | $\mu\text{W}$      |                                              |
| Aging (1 year)                                                                                | -2          |       | +2      | ppm                | @ $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ |
| Insulation Resistance                                                                         | 500         |       |         | M $\Omega$         | @ 100Vdc $\pm 15\text{V}$                    |

### Part Identification [\[Note 1\]](#)



Note 1: Contact Abracon for part number requests with carrier frequency callouts up to 5 & 6 digit accuracy after the decimal.

Mechanical Dimensions



Dimensions: inches [mm]

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

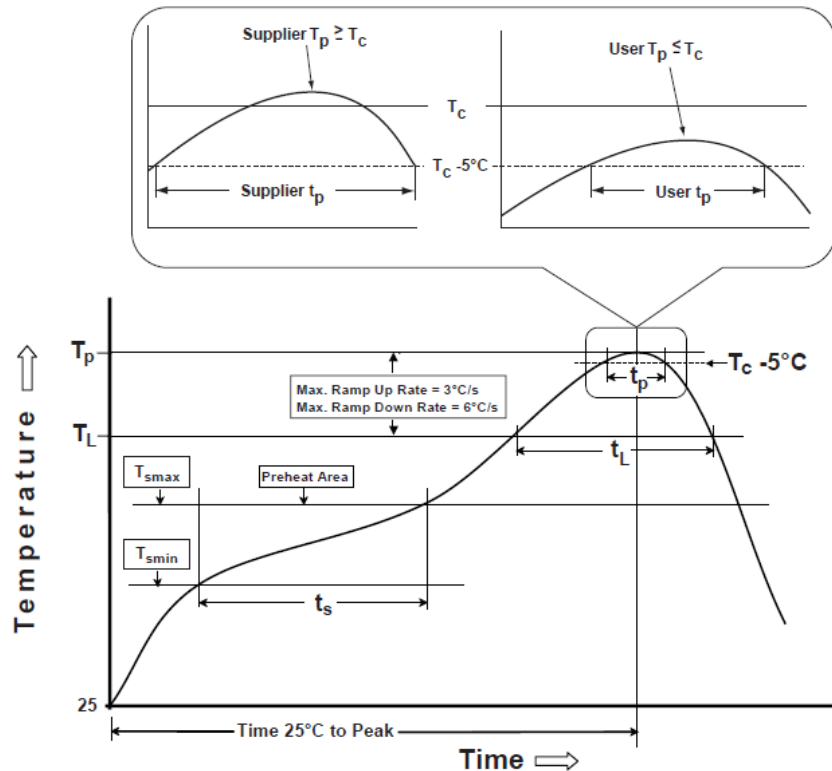


Table 1

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

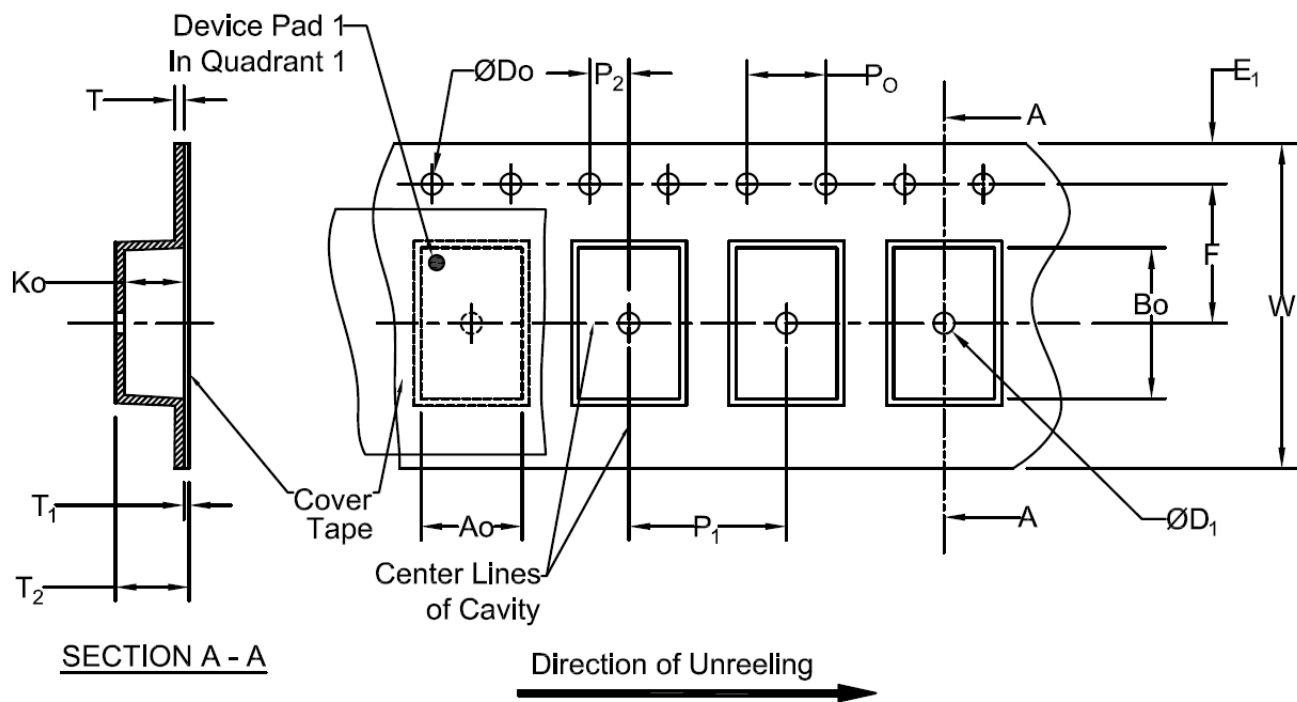
Pb-Free Process  
Classification Temperatures ( $T_C$ )

| 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       |
| 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 a supplier minimum and a user maximum.

Packaging



| Tape Specifications (mm) |         |          |              |         |          |          |         |
|--------------------------|---------|----------|--------------|---------|----------|----------|---------|
| Width                    | Ao      | Bo       | Do           | D1      | E1       | F        | Ko      |
| 8mm                      | *       | *        | 1.5+0.1/-0.0 | 1.0     | 1.75±0.1 | 3.5±0.05 | *       |
| Width                    | P1      | P2       | Po           | T (Max) | T1 (Max) | T2 (Max) | W (Max) |
| 8mm                      | 4.0±0.1 | 2.0±0.05 | 4.0±0.1      | 0.6     | 0.1      | 2.5      | 8.3     |

\*Note: Compliant to EIA-481

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[S6144000BBKB](#) [FC3BSHHEF32.0-T3](#) [ABM3C-25.000MHZ-E4Y-T](#) [49SMLB12.0000-18HJE-E\(T\)](#) [ABM8G-12.000MHZ-D4Y-T](#) [ABM8G-](#)  
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