

Description

The ABM12N series is an ultra-miniature AT-Cut MHz quartz crystal offered in a 1.6mm x 1.2mm x 0.35mm 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°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 ABM12N 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

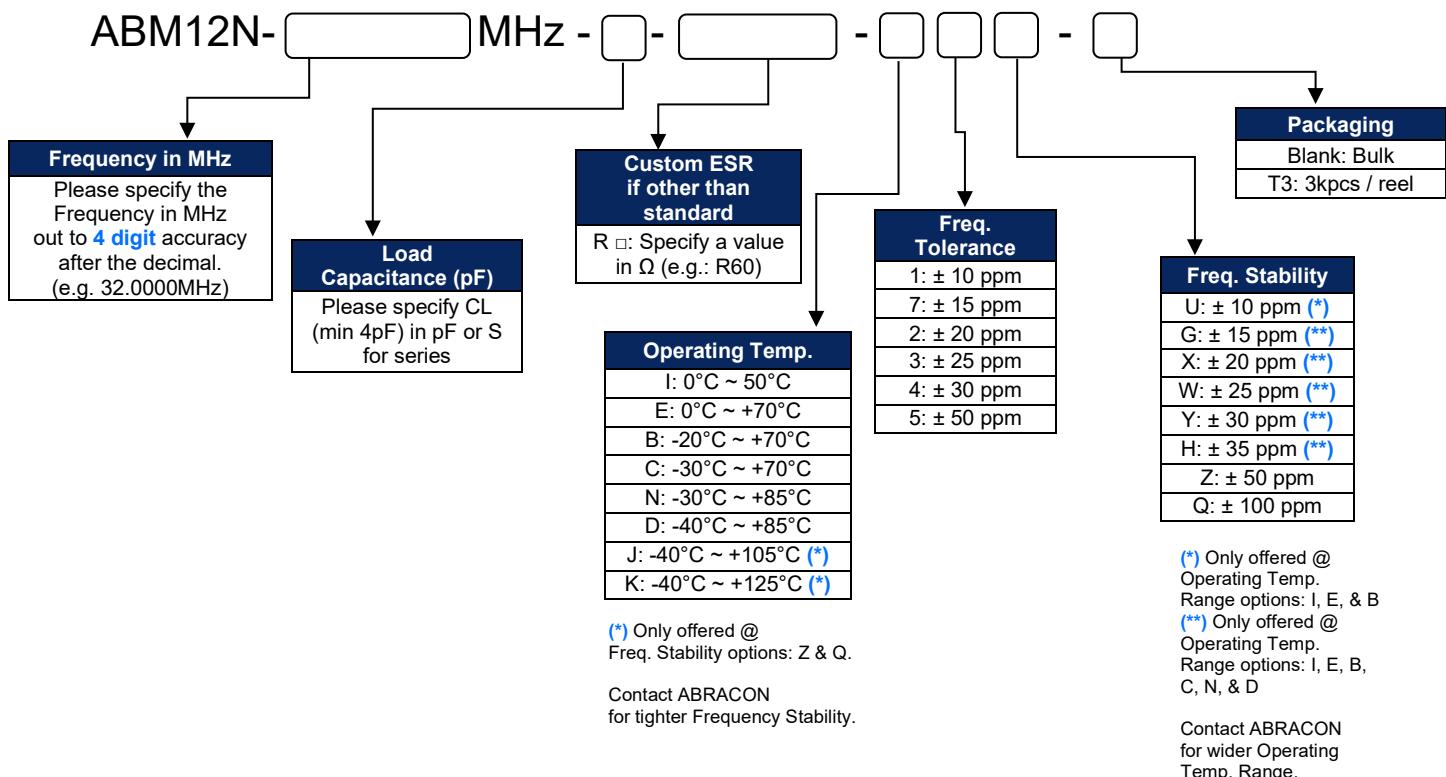
- Optimized for energy saving wearables and IoT applications
- Plated at exceptionally low plating capacitance, as low as 4pF , with optimized ESR
- 0.4 mm max height ideally suited for height constrained designs
- Seam sealed for long-term reliability
- [REACH/RoHS II Compliant | MSL Level N/A](#)

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

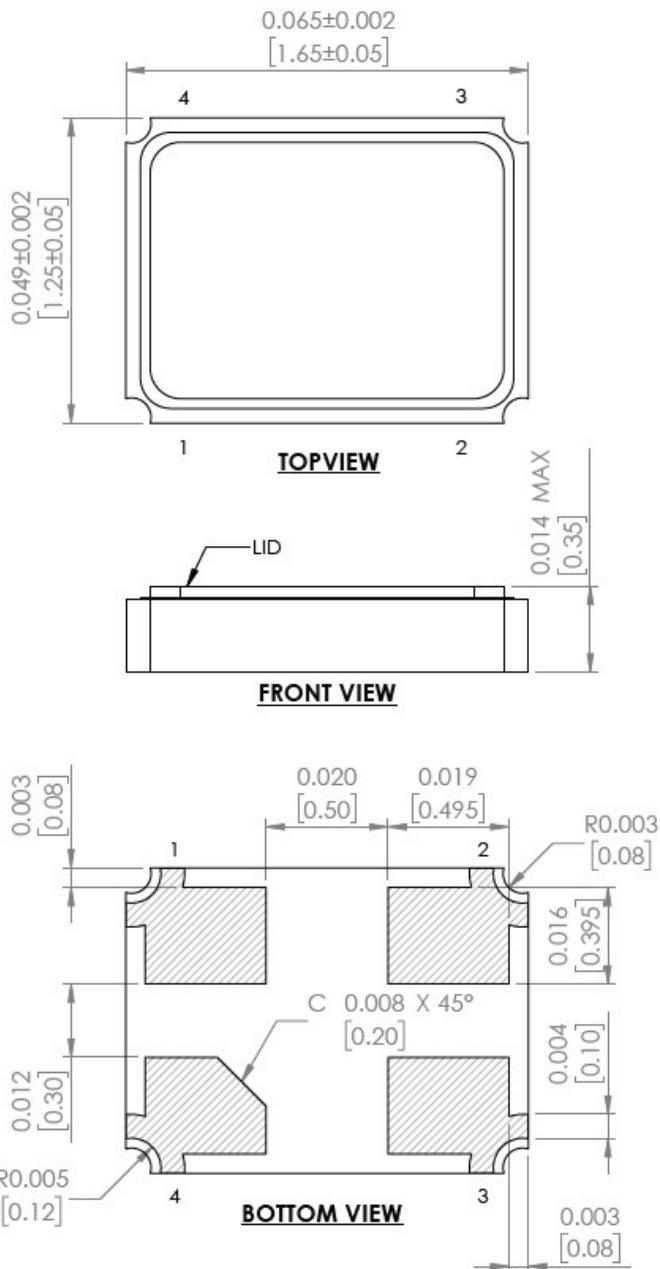
Electrical Specifications

Parameters	Min.	Typ.	Max.	Units	Notes
Frequency Range	24.0000		52.0000	MHz	
Operation Mode		Fundamental			
Operating Temperature Range	-40		+125	°C	See options
Storage Temperature	-55		+125	°C	
Frequency Tolerance @ $+25^\circ\text{C}$	-10		+10	ppm	See options
Frequency Stability over the Operating Temperature (ref. to $+25^\circ\text{C}$)	-10		+10	ppm	See options
Equivalent series resistance "R1" (over Operating Temperature Range) (CL=4pF)		< 90	150	Ω	24.0000 – 31.9999MHz
		< 80	100		32.0000 – 36.9999MHz
		< 60	80		37.0000 – 52.0000MHz
Equivalent series resistance "R1" (over Operating Temperature Range) (CL=6pF, 7pF, 8pF)		< 80	100	Ω	24.0000 – 31.9999MHz
		< 60	80		32.0000 – 36.9999MHz
		< 35	50		37.0000 – 52.0000MHz
Shunt Capacitance (C0)		< 1.0	2.0	pF	
Load Capacitance (CL)		4.0		pF	See options
Drive Level		10	100	μW	
Aging (1 year)	-2		+2	ppm	@ $25^\circ\text{C} \pm 3^\circ\text{C}$
Insulation Resistance	500			$\text{M}\Omega$	@ $100\text{Vdc} \pm 15\text{V}$

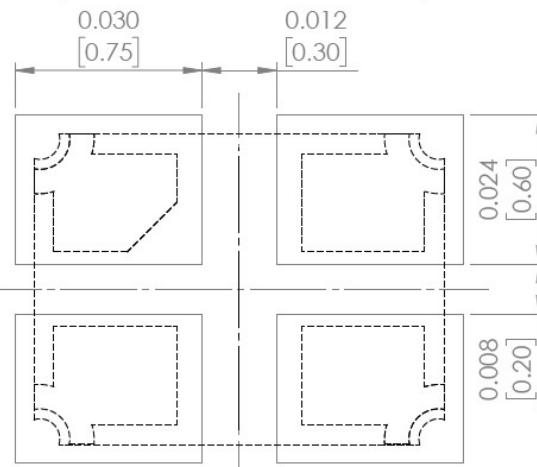
Part Identification [Note 1]

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

Mechanical Dimensions



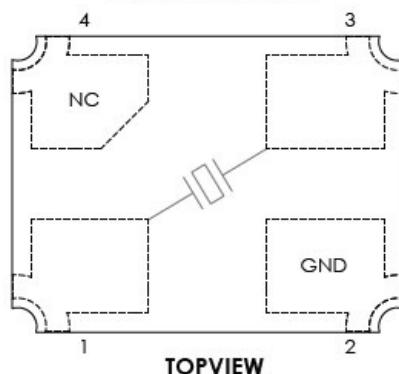
RECOMMENDED LAND PATTERN



Pin #	Function
1	Crystal
2	GND(*)
3	Crystal
4	NC

(*) Electrically connected to lid

CIRCUIT DIAGRAM



Dimensions: inches [mm]

Reflow Profile [JEDEC J-STD-020]

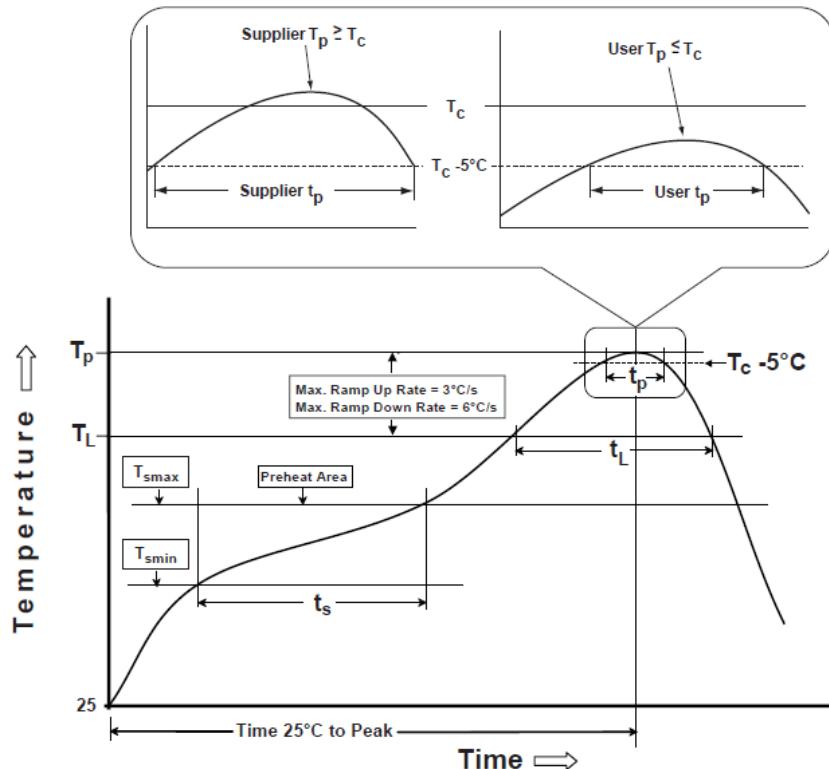


Table 1

**SnPb Eutectic Process
Classification Temperatures (T_c)**

Package Thickness	Volume mm ³ <350	Volume mm ³ \geq 350
<2.5 mm	235 °C	220 °C
\geq 2.5 mm	220 °C	220 °C

Table 2

**Pb-Free Process
Classification Temperatures (T_c)**

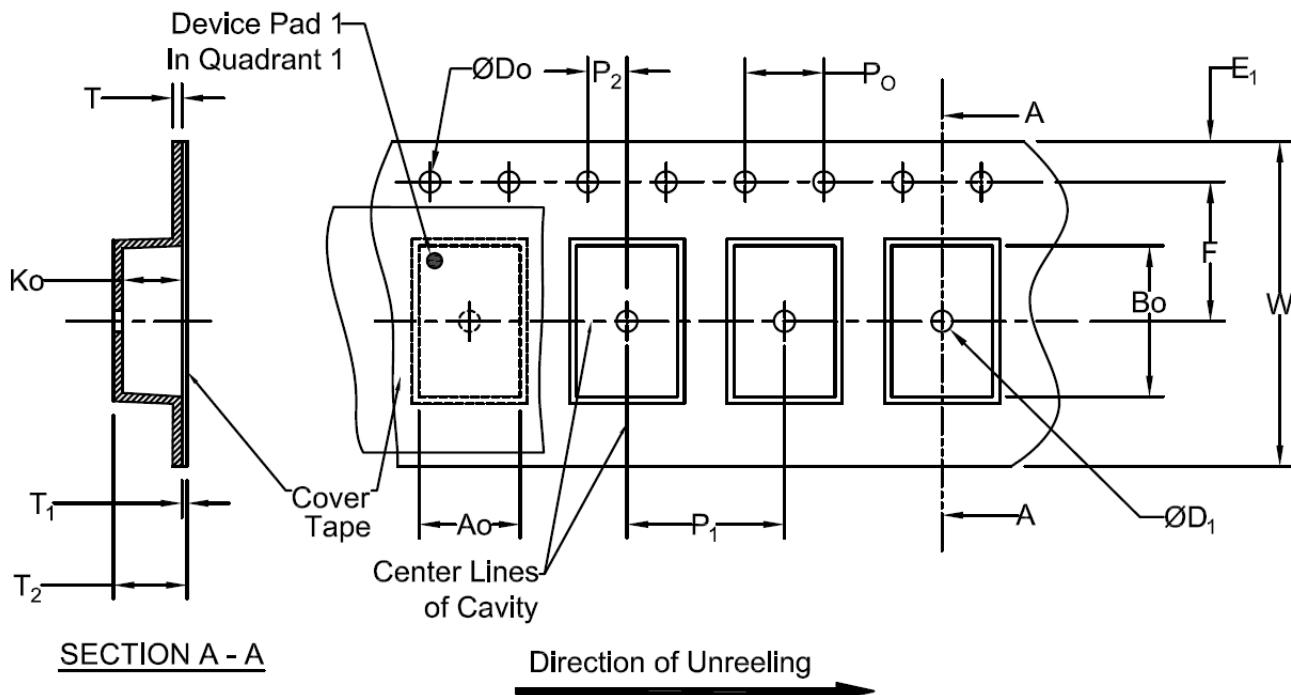
Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm - 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

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
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.

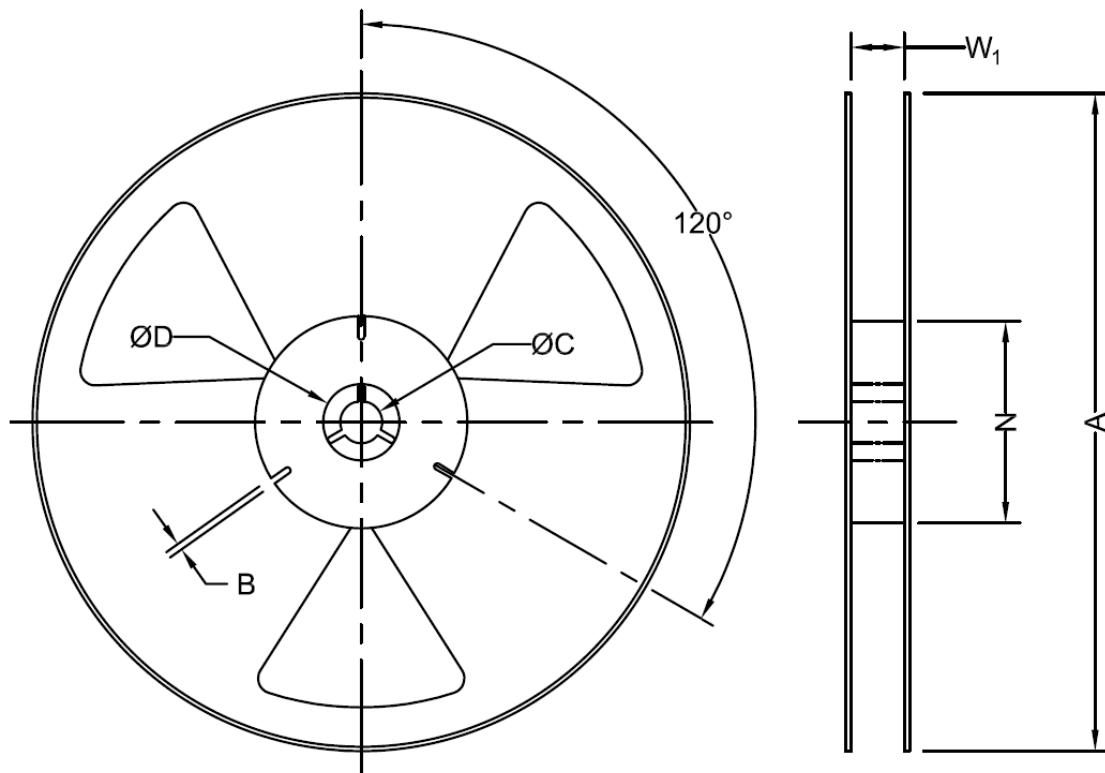
Packaging



Tape Specifications (mm)							
Width	Ao	Bo	Do	D ₁	E ₁	F	Ko
8mm	*	*	1.5+0.1/-0.0	1.0	1.75±0.1	3.5±0.05	*
Width	P ₁	P ₂	P ₀	T (Max)	T ₁ (Max)	T ₂ (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

Packaging continued



Reel Specifications (mm)							
Width	Qty/Reel	A (Nom)	B (Min)	C (Min)	D (Min)	N (Min)	*W ₁
8mm	3000	178	1.5	13.0+0.5/-0.2	20.2	50	8.4+1.5/-0.0

*Note: Measured at Hub