

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](#)

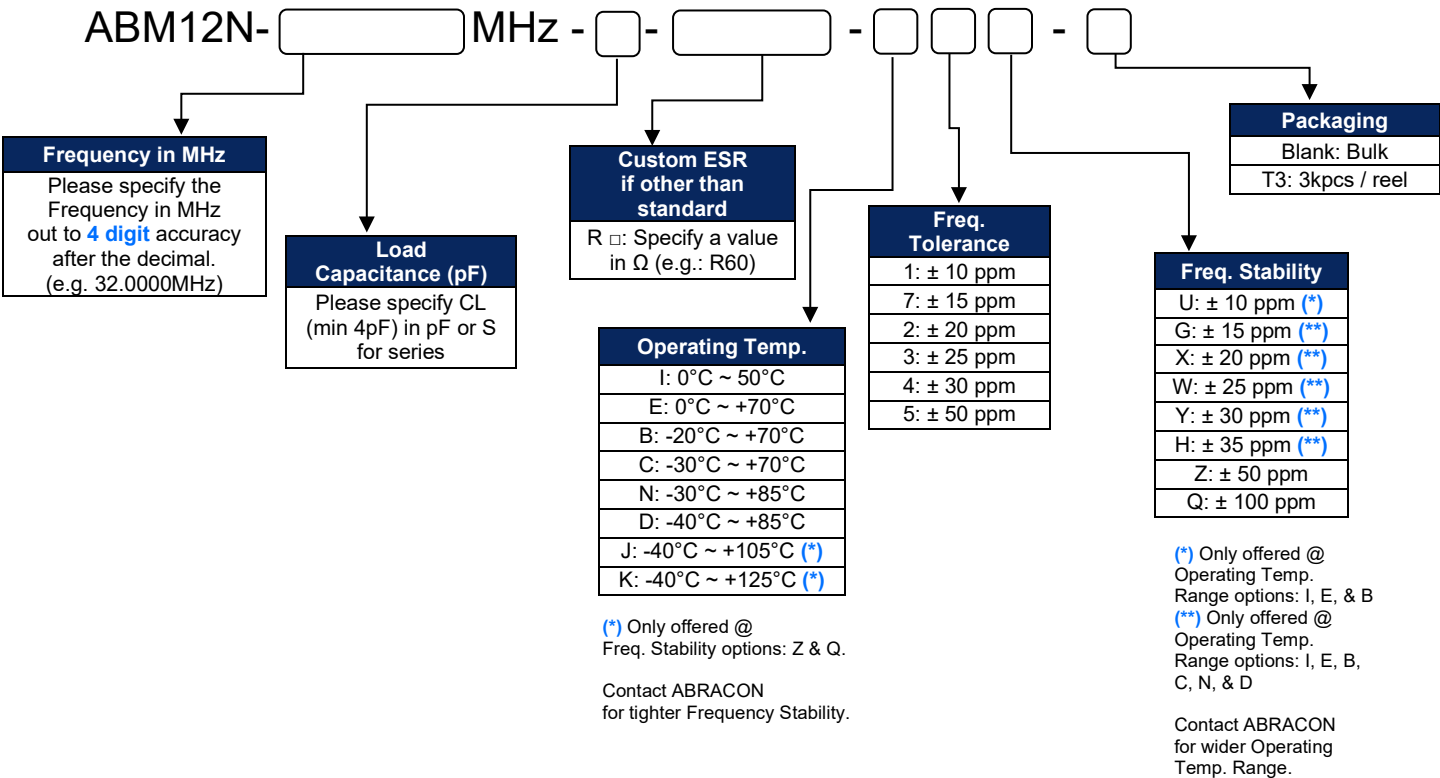
Typical Applications

- 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

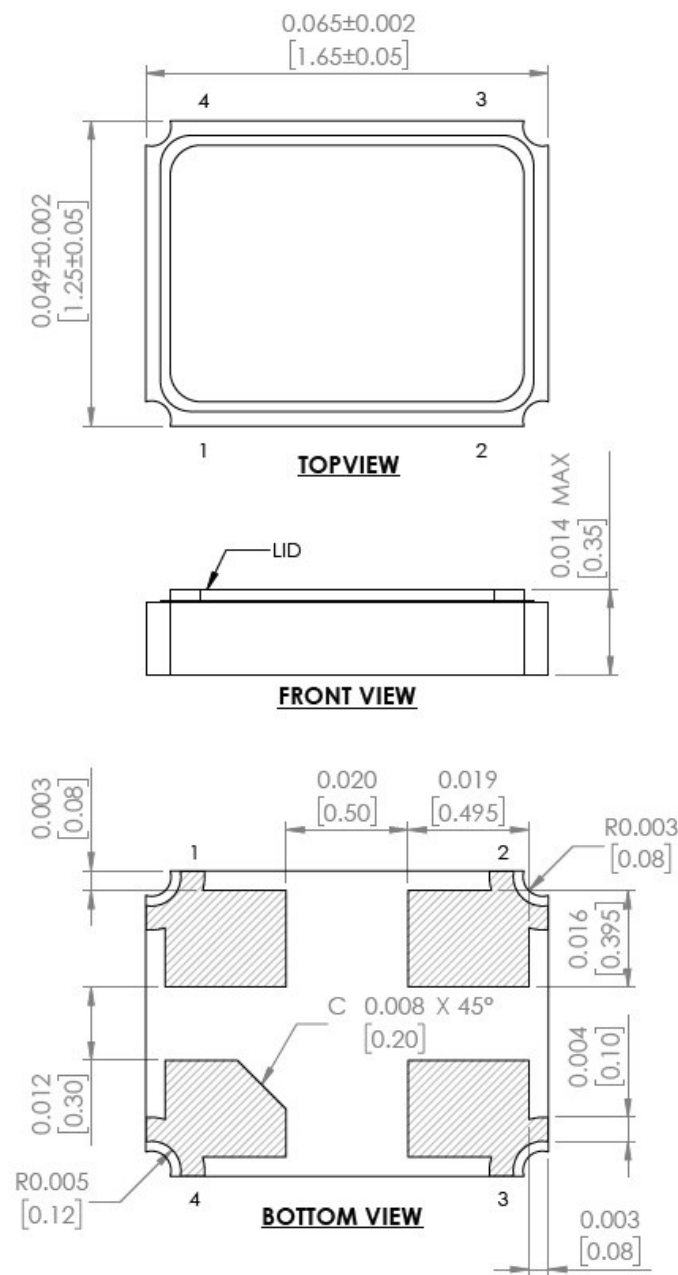
Parameters	Min.	Typ.	Max.	Units	Notes
Frequency Range	24.0000		52.0000	MHz	
Operation Mode	Fundamental				
Operating Temperature Range	-40		+125	$^{\circ}\text{C}$	See options
Storage Temperature	-55		+125	$^{\circ}\text{C}$	
Frequency Tolerance @ $+25^{\circ}\text{C}$	-10		+10	ppm	See options
Frequency 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			M Ω	@ 100Vdc $\pm 15\text{V}$

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

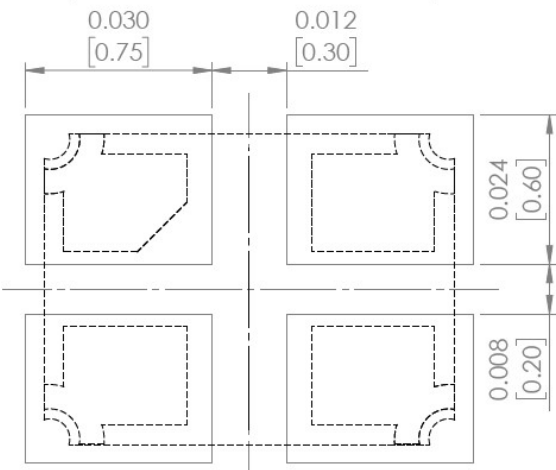


Note 1: Contact Abracon for part number requests with carrier frequency callouts up to 5 & 6 digit accuracy after the decimal.

Mechanical Dimensions



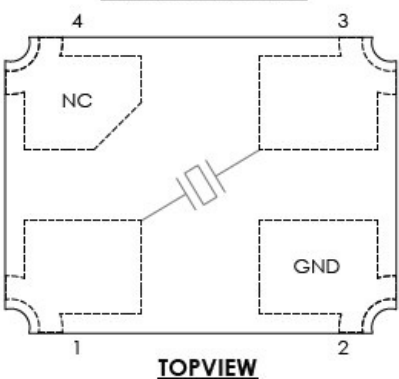
RECOMMENDED LAND PATTERN



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]

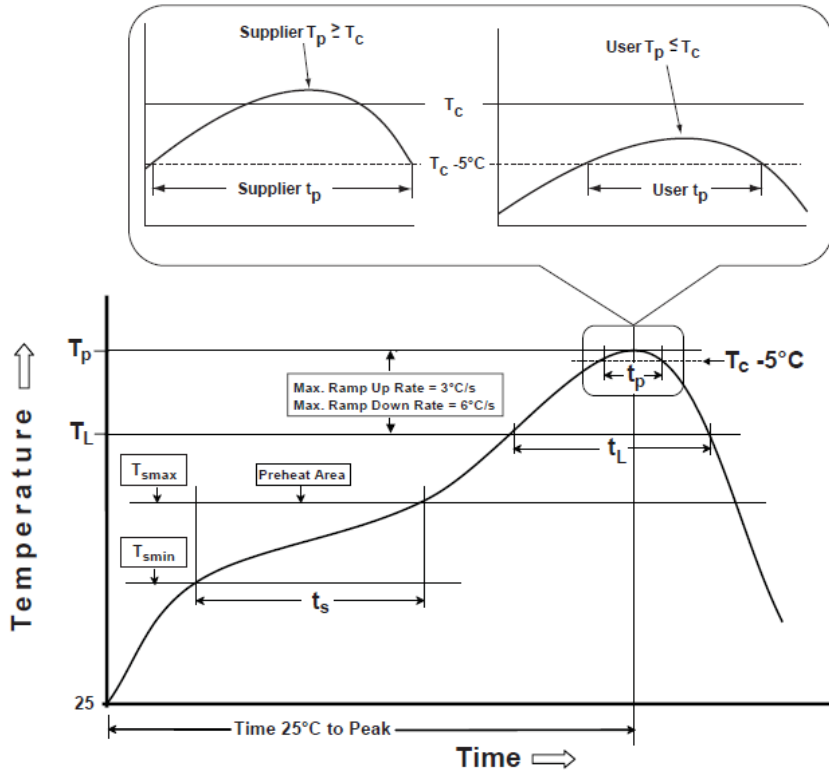


Table 1

SnPb Eutectic Process Classification Temperatures (T_c)		
Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2

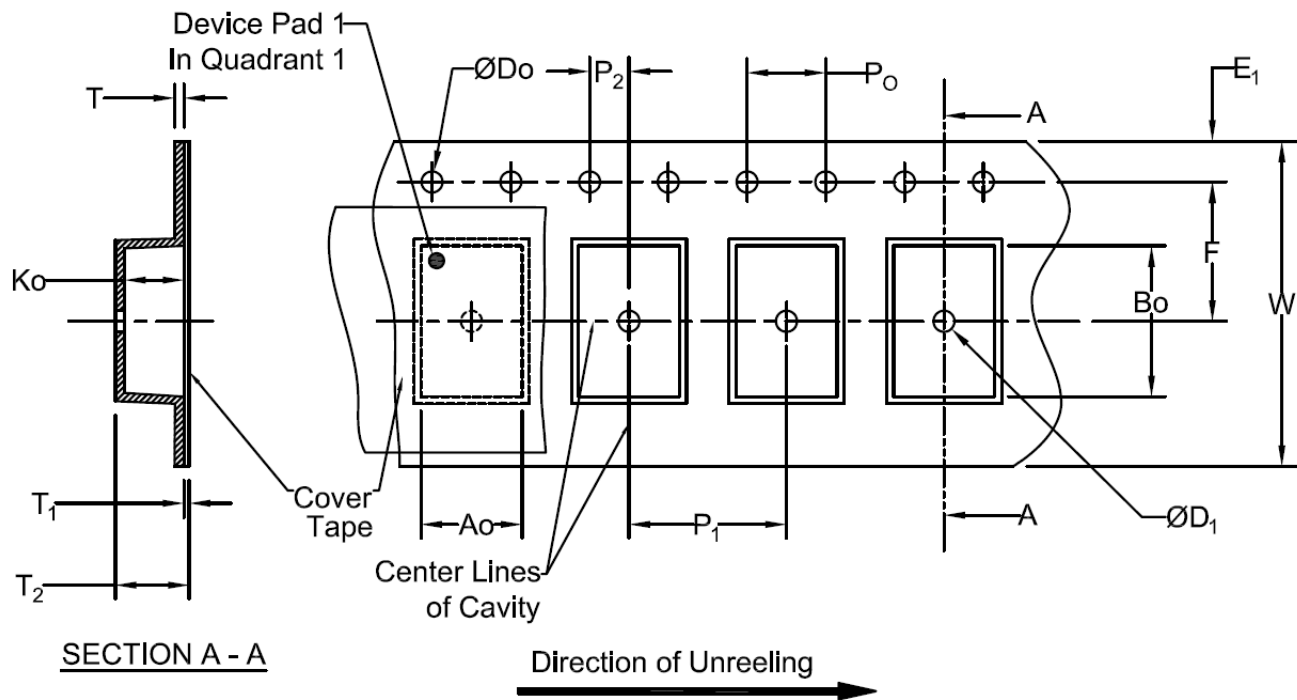
Pb-Free Process Classification Temperatures (T_c)			
Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm - 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

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 a supplier minimum and a user maximum.

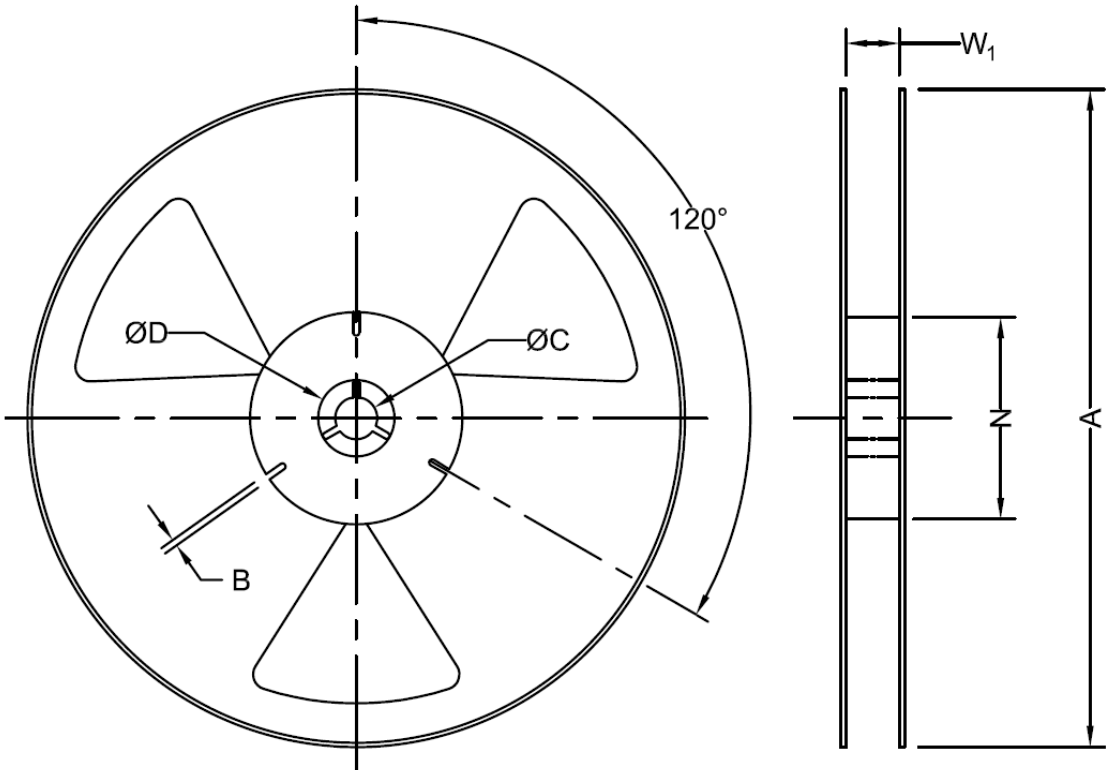
Packaging



Tape Specifications (mm)							
Width	A_o	B_o	D_o	D_1	E_1	F	K_o
8mm	*	*	$1.5+0.1/-0.0$	1.0	1.75 ± 0.1	3.5 ± 0.05	*
Width	P_1	P_2	P_o	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