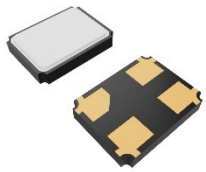
ABM12N series

IoT Optimized Ultra-Miniature Quartz Crystal

Description

The ABM12N series is an ultra-miniature AT-Cut MHz quartz crystal offered in a 1.6mm x 1.2mm x 0.4mm four-pad SMD package. Tight frequency accuracy of ±10ppm and stability of ±15ppm over operating temperature range of -40°C to +85°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	ºC	See options
Storage Temperature	-55		+125	ºC	
Frequency Tolerance @ +25°C	-10		+10	ppm	See options
Frequency Stability over the Operating Temperature (ref. to +25°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°C±3°C
Insulation Resistance	500			MΩ	@ 100Vdc±15V

Part Identification [Note 1]

ABM12N- [ ] MHz - [ ] - [ ] - [ ] [ ] [ ] - [ ]

Frequency in MHz
Please specify the Frequency in MHz out to **4 digit** accuracy after the decimal. (e.g. 32.0000MHz)

Load Capacitance (pF)
Please specify CL (min 4pF) in pF or S for series

Custom ESR if other than standard
R □: Specify a value in Ω (e.g.: R60)

Operating Temp.

I: 0°C ~ 50°C
E: 0°C ~ +70°C
B: -20°C ~ +70°C
C: -30°C ~ +70°C
N: -30°C ~ +85°C
D: -40°C ~ +85°C
J: -40°C ~ +105°C (*)
K: -40°C ~ +125°C (*)

(*) Only offered @ Freq. Stability options: Z & Q.

Contact ABRACON for tighter Frequency Stability.

Freq. Tolerance

1: ± 10 ppm
7: ± 15 ppm
2: ± 20 ppm
3: ± 25 ppm
4: ± 30 ppm
5: ± 50 ppm

Freq. Stability

U: ± 10 ppm (*)
G: ± 15 ppm (**)
X: ± 20 ppm (**)
W: ± 25 ppm (**)
Y: ± 30 ppm (**)
H: ± 35 ppm (**)
Z: ± 50 ppm
Q: ± 100 ppm

(*) Only offered @ Operating Temp. Range options: I, E, & B
(**) Only offered @ Operating Temp. Range options: I, E, B, C, N, & D

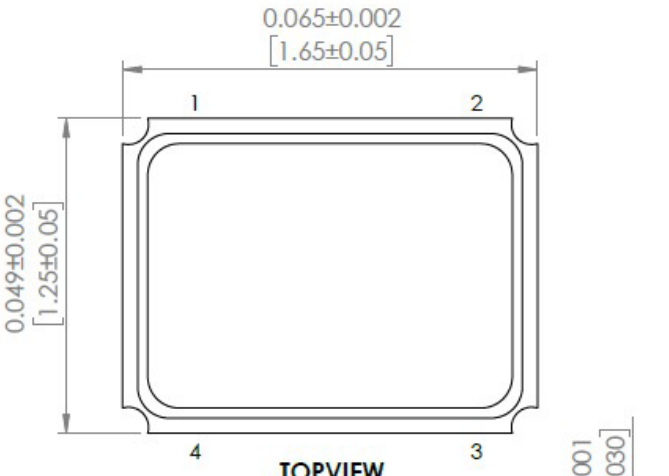
Contact ABRACON for wider Operating Temp. Range.

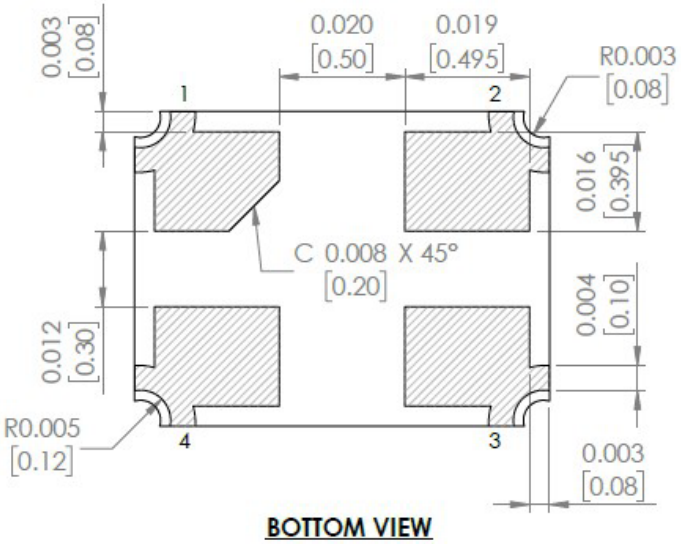
Packaging

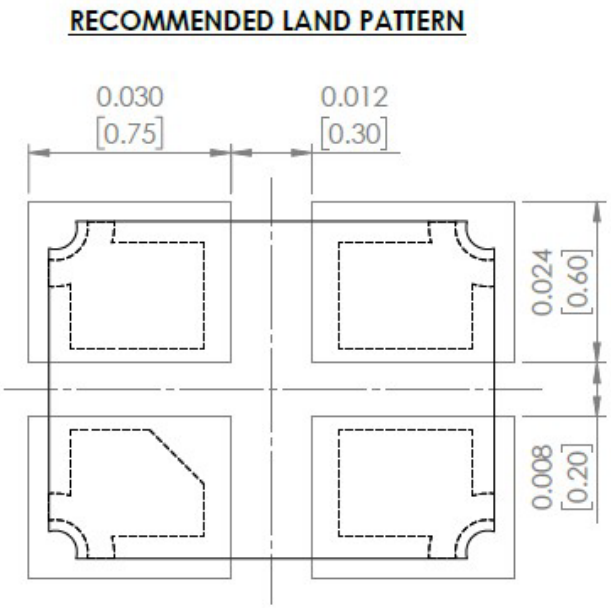
Blank: Bulk
T3: 3kpcs / reel

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

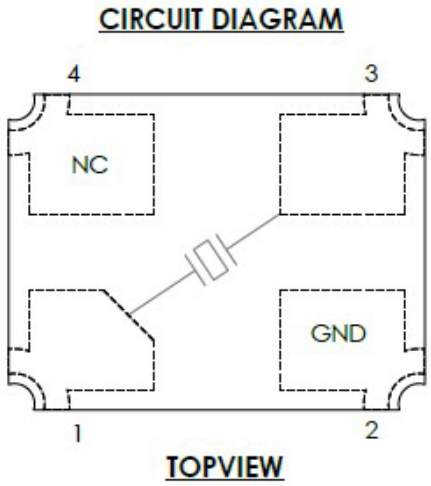
Mechanical Dimensions







Pin #	Function
2	GND
4	NC



Dimensions: inches [mm]

Reflow Profile [JEDEC J-STD-020]

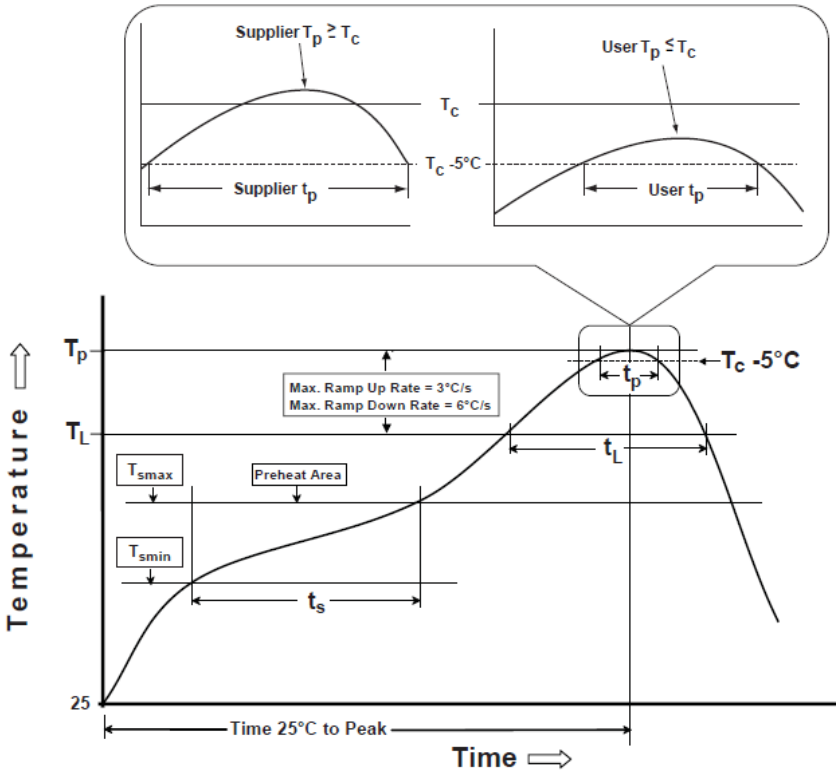


Table 1

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

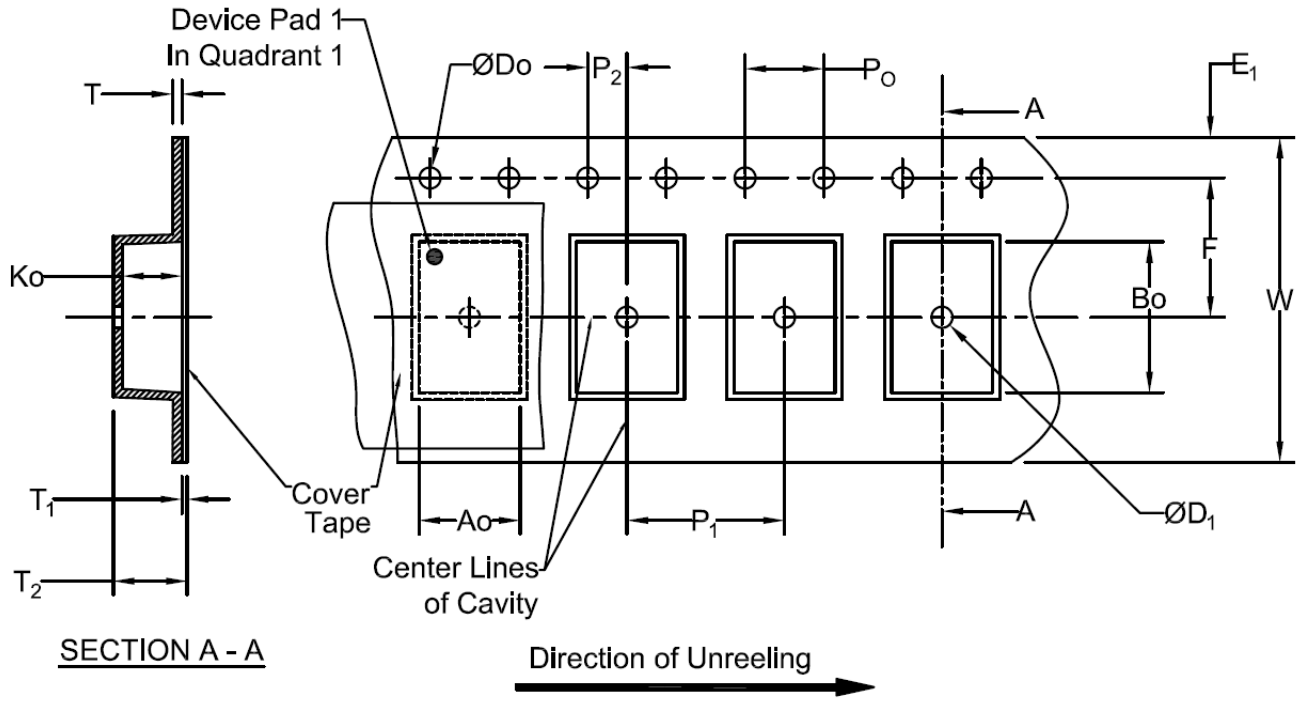
Pb-Free Process Classification Temperatures (T_c)			
Package Thickness	**Volume mm³ <350**	**Volume mm³ 350-2000**	**Volume mm³ >2000**
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm - 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

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.

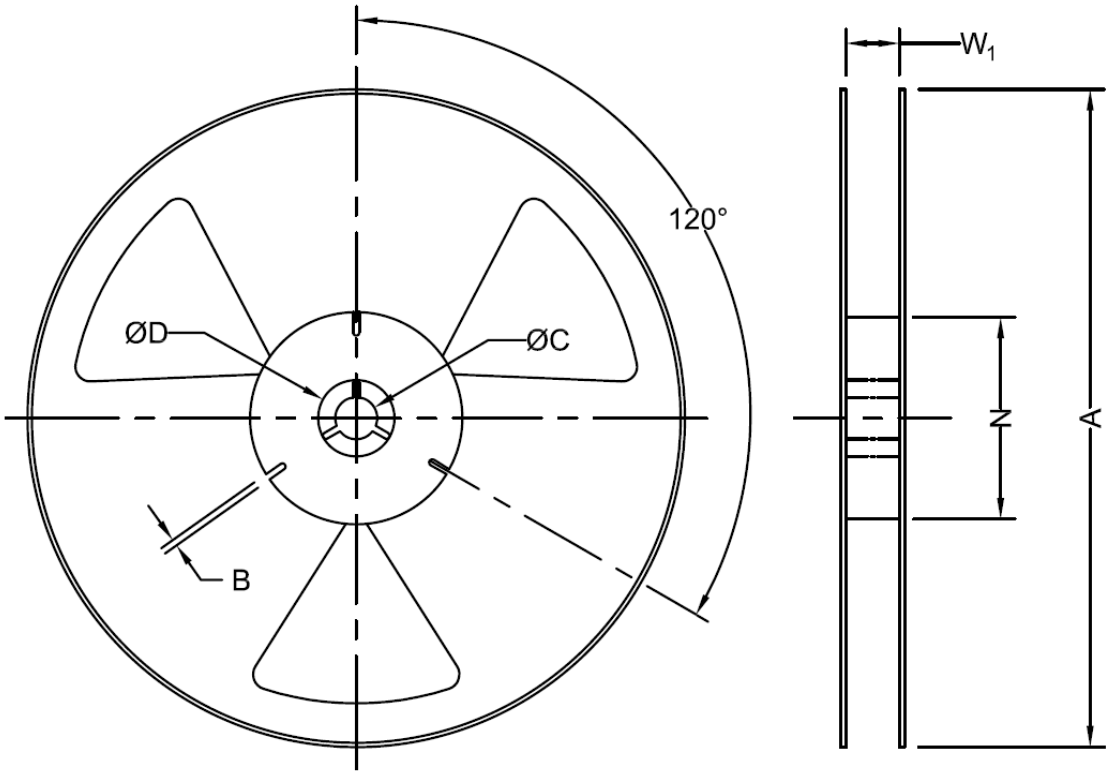
Packaging



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**