

Description

The ABM13N series is an ultra-miniature AT-Cut MHz quartz crystal offered in a 1.2mm x 1.0mm x 0.33mm four-pad SMD package. Tight frequency accuracy and stability of ± 10 ppm over operating temperature range of -30°C to $+85^{\circ}\text{C}$, low plating load (CL) value of 5pF, and low Equivalent Series Resistance (ESR) is still achieved in the ultra-compact and thin package size. The ABM13N series offers industry standard frequencies (32MHz, 37.4MHz, 38.4MHz, 40MHz, 45MHz, 48MHz, 52MHz, 60MHz, 76.8MHz, 80MHz), common for wearables, IoT, Bluetooth / Bluetooth Low Energy (BLE), and Ultra-Low Power MCU's/SoC's/Transceivers end applications.



Features

- Ultra-miniature AT-Cut MHz Crystal (1.20 x 1.00 x 0.33 mm package)
- Ideally suited for space constraint IoT, Wearables & Wireless applications
- Simultaneously optimized for low plating load & ESR over extended temperature range
- Enhanced performance for start-up time and power savings with Low Energy SoC's
- Low profile ideal for height constraint designs
- Available with ± 10 ppm set-tolerance
- [REACH/RoHS II Compliant](#) | [MSL Level N/A](#)

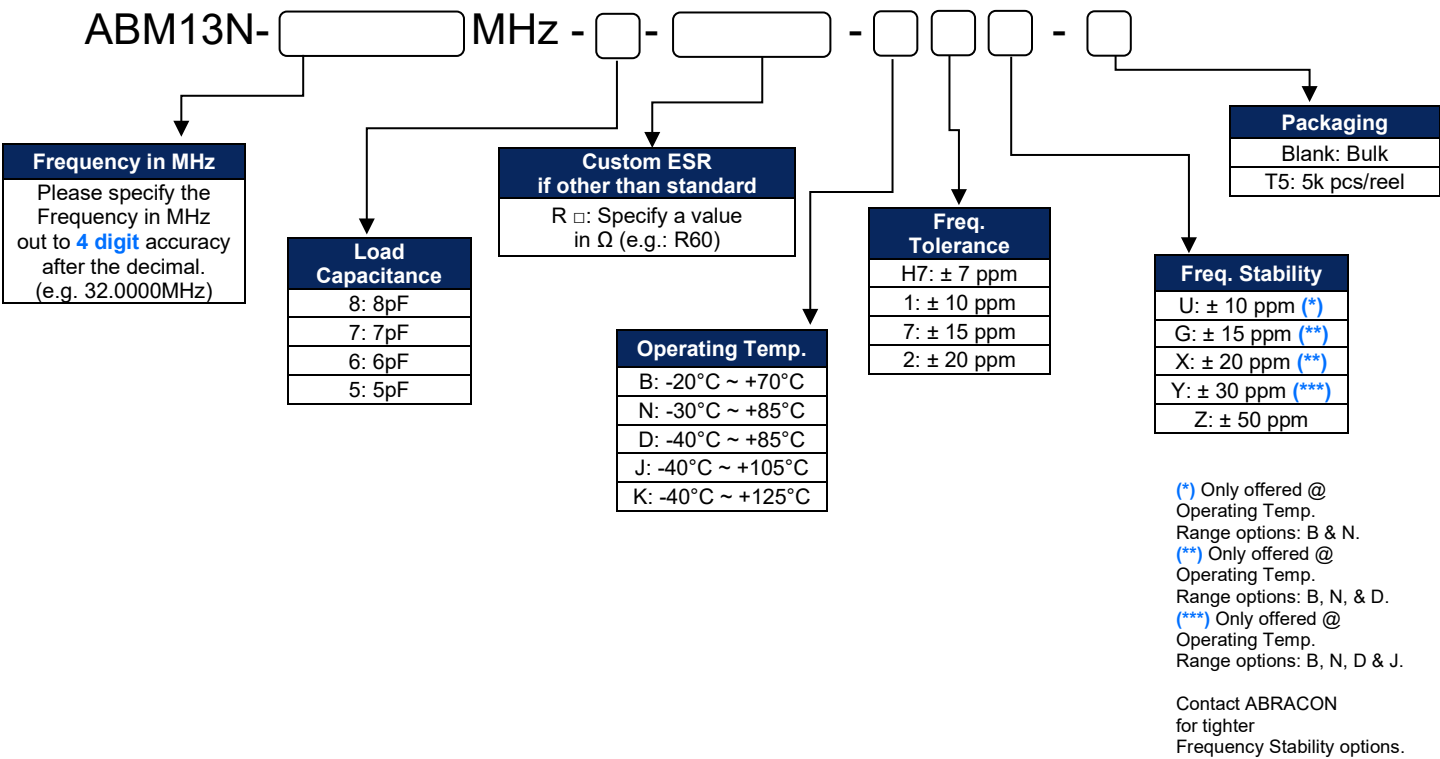
Typical Applications

- 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

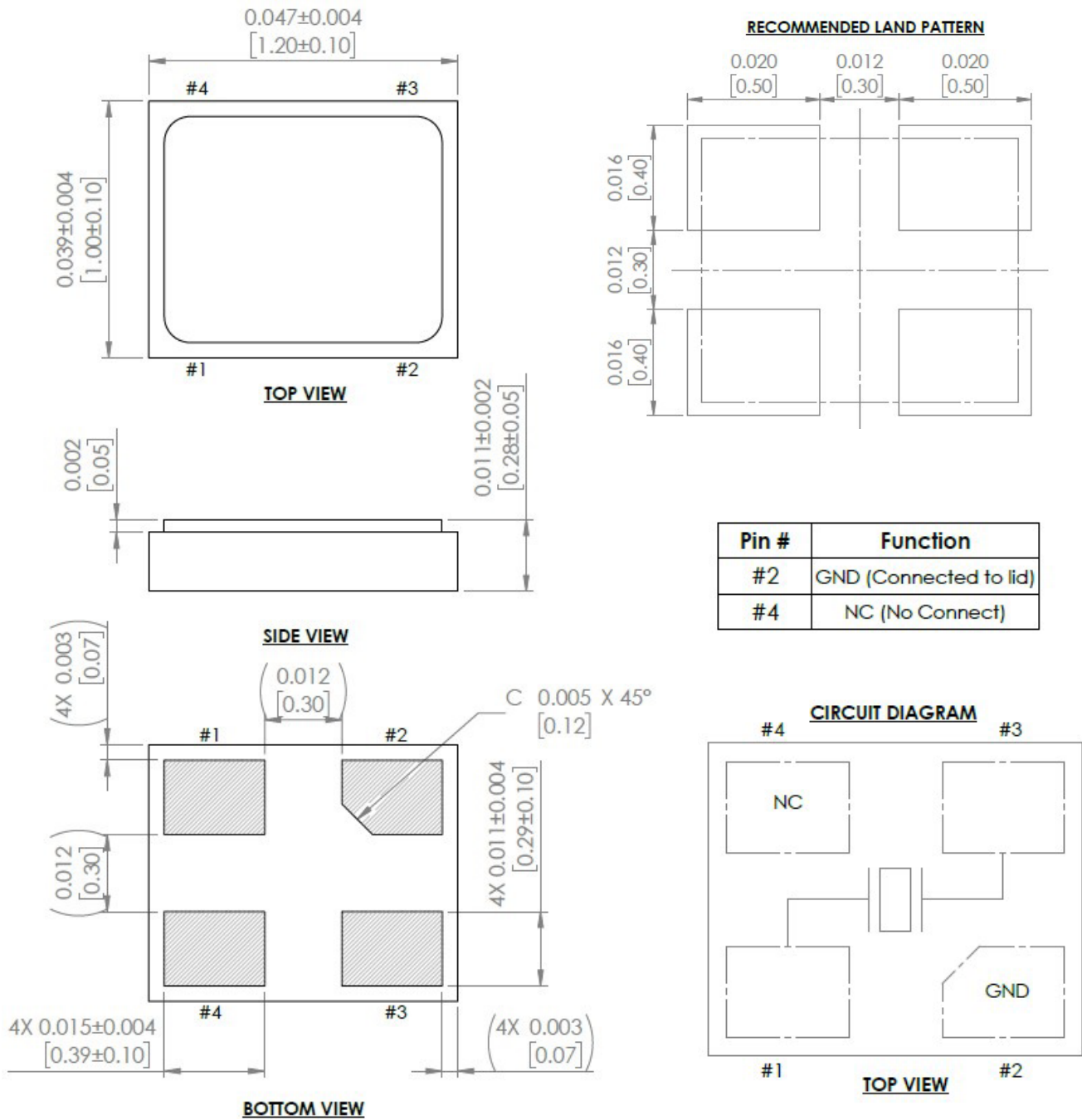
Parameters	Min.	Typ.	Max.	Units	Notes
Frequency Range	32.0000		80.0000	MHz	
Standard Available Frequencies	32.0000, 37.4000, 38.4000, 40.0000, 45.0000, 48.0000, 52.0000, 60.0000, 76.8000, 80.0000			MHz	Contact Abracon for Nonstandard Frequencies
Operation Mode	Fundamental				
Operating Temperature Range	-40		+85	$^{\circ}\text{C}$	See options
Storage Temperature	-40		+125	$^{\circ}\text{C}$	
Frequency Tolerance @ $+25^{\circ}\text{C}$	-10		+10	ppm	See options
Frequency Stability over the Operating Temperature (ref. to $+25^{\circ}\text{C}$)	-15		+15	ppm	See options
Equivalent Series Resistance (R1) (over -40°C to $+125^{\circ}\text{C}$)		< 45	100	Ω	32.0000-32.9999MHz
		< 35	80		33.0000-36.9999MHz
		< 25	50		37.0000-80.0000MHz
Shunt Capacitance (C0)			1.0	pF	
Load Capacitance (CL)		5.0		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



Dimensions: inches [mm]

Reflow Profile [JEDEC J-STD-020]

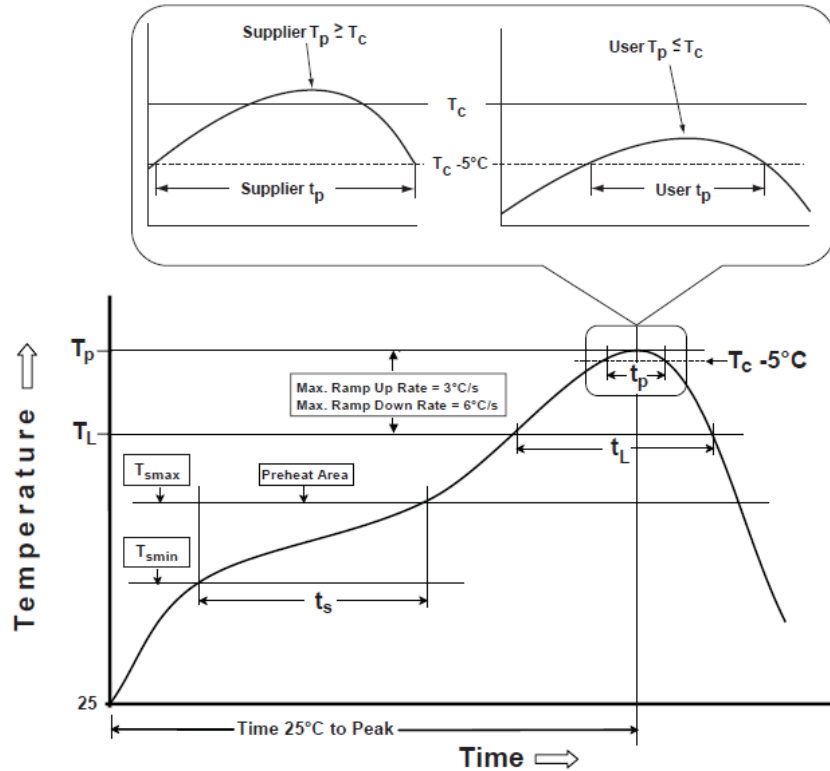


Table 1

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

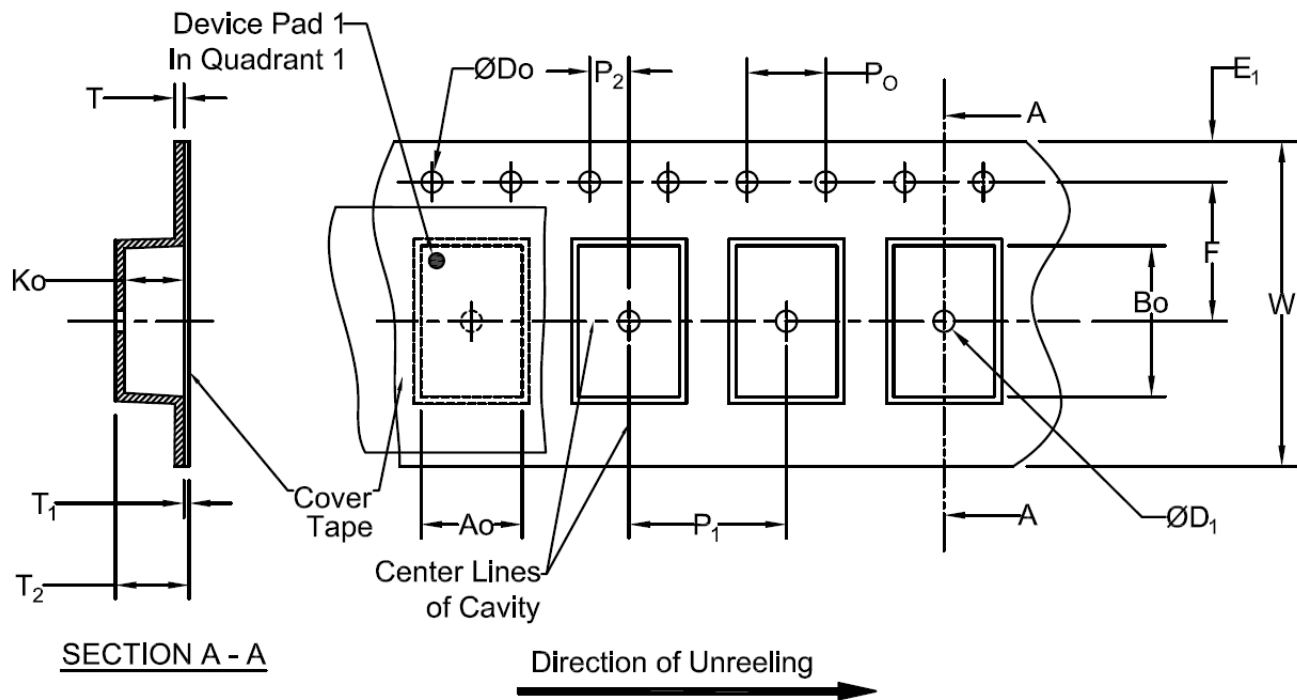
Pb-Free Process Classification Temperatures (T_c)			
Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm - 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

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 a supplier minimum and a user maximum.

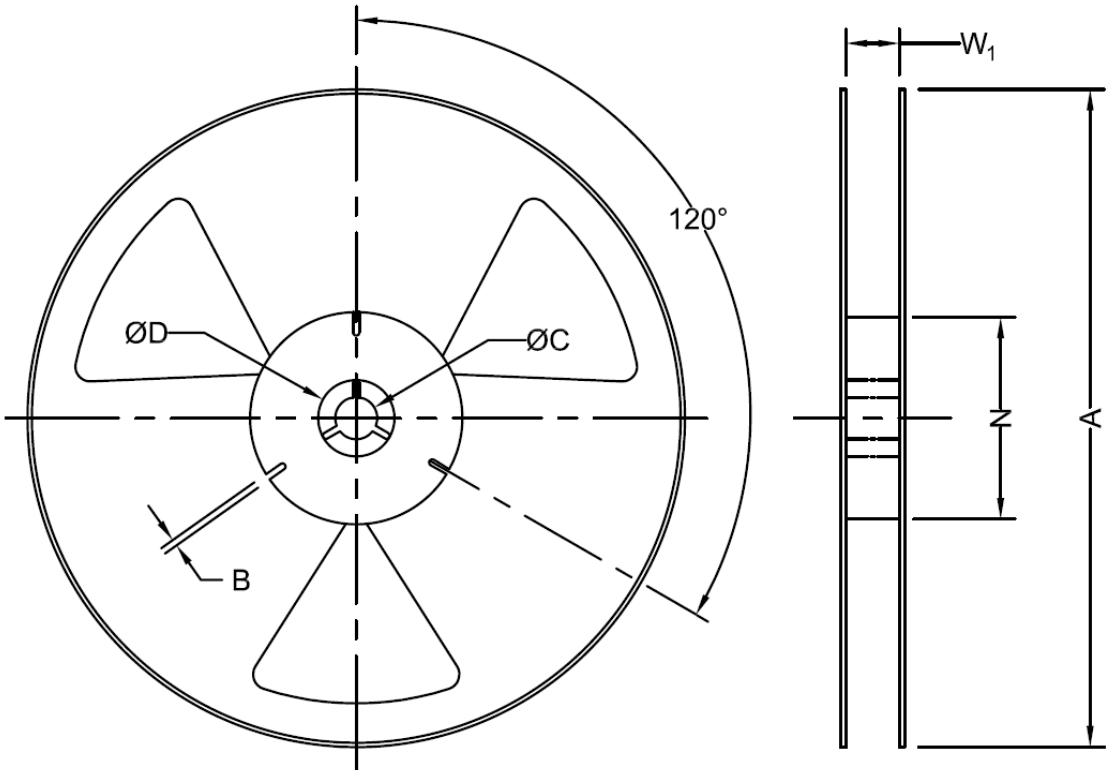
Packaging



Tape Specifications (mm)							
Width	Ao	Bo	Do	D1	E1	F	Ko
8mm	*	*	1.5+0.1/-0.0	0.50	1.75±0.1	3.5±0.05	*
Width	P1	P2	P0	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

Packaging continued



Reel Specifications (mm)							
Width	Qty/Reel	A (Nom)	B (Min)	C (Min)	D (Min)	N (Min)	*W ₁
8mm	5000	178	1.5	13.0+0.5/-0.2	20.2	50	8.4+1.5/-0.0

*Note: Measured at Hub