

ATX-14A

MINIATURE 1.2V LOW VOLTAGE SMD TCXO



Description

Abrakon's ATX-14A series is a low power temperature compensated crystal oscillator with a miniature 1.6 mm x 1.2 mm x 0.55 mm package, perfect for reducing board space. This series offers a clipped sinewave output at 26MHz with a low supply voltage of 1.2V. The ATX-14A delivers an overall frequency stability of ± 0.5 ppm over an operating temperature range of $-30^{\circ}\text{C} \sim +85^{\circ}\text{C}$.



Features

- Miniature Hermetically seam-sealed ceramic 1.6 mm x 1.2 mm x 0.55 mm 4 pad SMD package
- Tight frequency stability: ± 0.5 ppm $-30^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- Clipped Sinewave Output
- Pad 1 OE Function
- MSL 1
- [REACH/RoHS II Compliant](#)

Typical Applications

- Frequency reference for real time clocks (RTCs)
- Portable and wearable electronics
- Internet of Things (IoT)
- Consumer electronics
- Industrial control and automation

Electrical Specifications [Note 1,3]

Parameters	Min.	Typ.	Max.	Units	Notes
Frequency (f_0)		26.0		MHz	
Supply Voltage (V_{DD})	1.14	1.20	1.26	V	
Supply Current (I_{DD})			1.5	mA	
Operating Temperature Range	-30		+85	$^{\circ}\text{C}$	
Storage Temperature Range	-40		+85	$^{\circ}\text{C}$	
Initial Frequency Tolerance	-1.5		+1.5	ppm	Reference to f_0 , at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, 24 hours after reflow, two times
Frequency Stability $\Delta f/f_0$ vs:					
Temperature	-0.5		+0.5	ppm	See Options (Table 1) Temperature range from -30°C to 85°C , referenced to f_0 at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$
Supply Voltage	-0.1		+0.1	ppm	$V_{DD} = 1.2\text{V} \pm 5\%$
Load	-0.1		+0.1	ppm	Load: $10\text{ k}\Omega // 10\text{ pF} \pm 10\%$
Aging	-1.0		1.0	ppm	First year at $+25^{\circ}\text{C} \pm 2^{\circ}\text{C}$
Allan Variance			1.0	ppb	$\tau=1\text{s}$
Start-up Time (T_{STA}) [Note 4]			3.0	ms	
Phase Noise		-63		dBc/Hz	@ 1 Hz offset
		-90		dBc/Hz	@ 10 Hz offset
		-114		dBc/Hz	@ 100 Hz offset
		-133		dBc/Hz	@ 1 kHz offset
		-149		dBc/Hz	@ 10 kHz offset
		-152		dBc/Hz	@ 100 kHz offset

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Electrical Specifications (Continued) [Note 1,3]

Parameters		Min.	Typ.	Max.	Units	Notes
Output Type		Clipped Sinewave				1000 pF recommended
Output Load	Resistance	9	10	11	k Ω	
	Capacitance	9	10	11	pF	
Output Level		0.5	0.65	0.75	V	Decoupling capacitor (1000 pF) is required in external circuit
Harmonics				-8	dBc	
Duty Cycle		40	50	60	%	
Tri-state function ^[Note 2]		“1” ($V_{IH} \geq 0.9 * V_{DD}$): Oscillation; “0” ($V_{IL} < 0.1 * V_{DD}$): No Oscillation/Hi Z			V	Pad 1
Output disable current				10	μ A	$V_{IL} < 0.1 * V_{DD}$

Note 1: All measurements made at +25°C±2°C, nominal V_{DD} , and nominal load unless otherwise specified.

Note 2: Do not leave pad 1 (tri-state) floating (no connect). Pad 1 must be tied to VDD (logic 1) for proper oscillation on pad 3.

Note 3: A power supply decoupling capacitor (1000 pF) is required in the external circuit.

Note 4: Frequency within ±1ppm and Output Level 90% of Vdd minimum

Part Identification

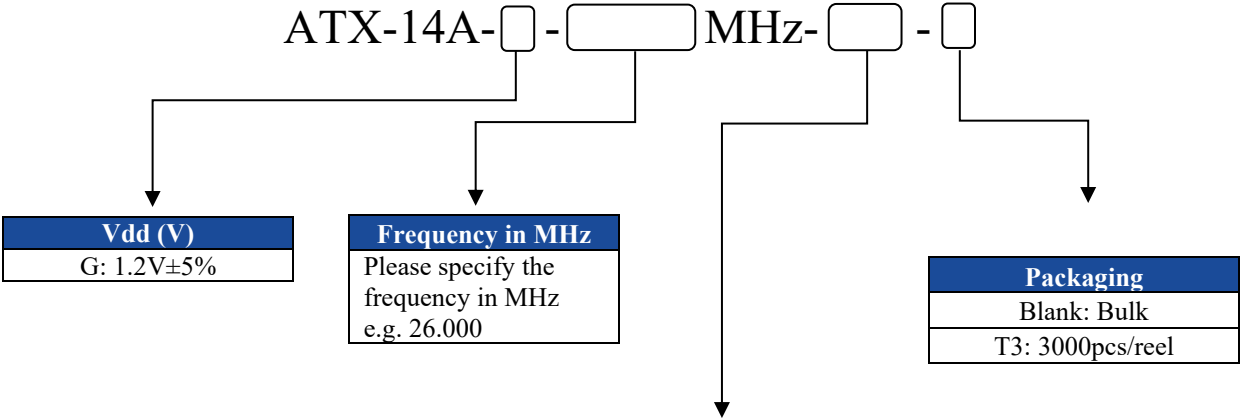
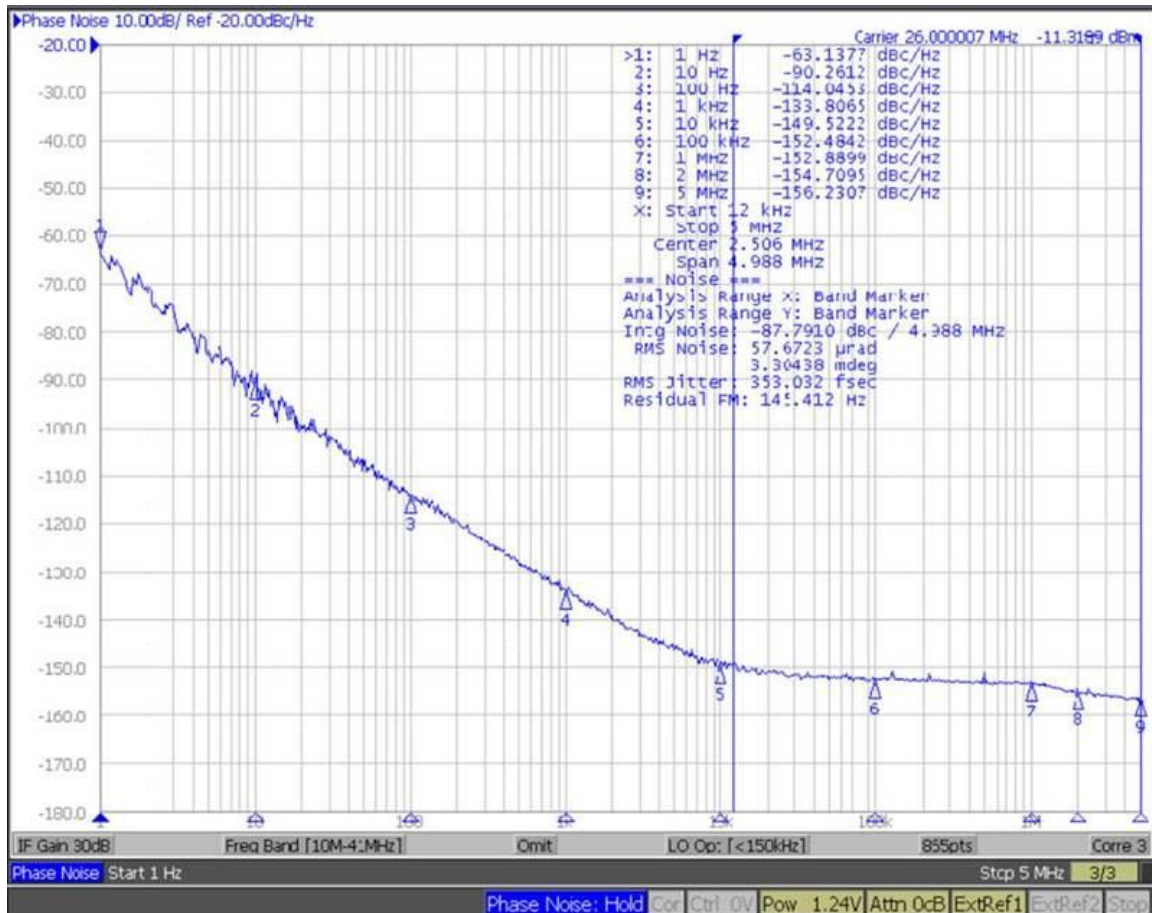


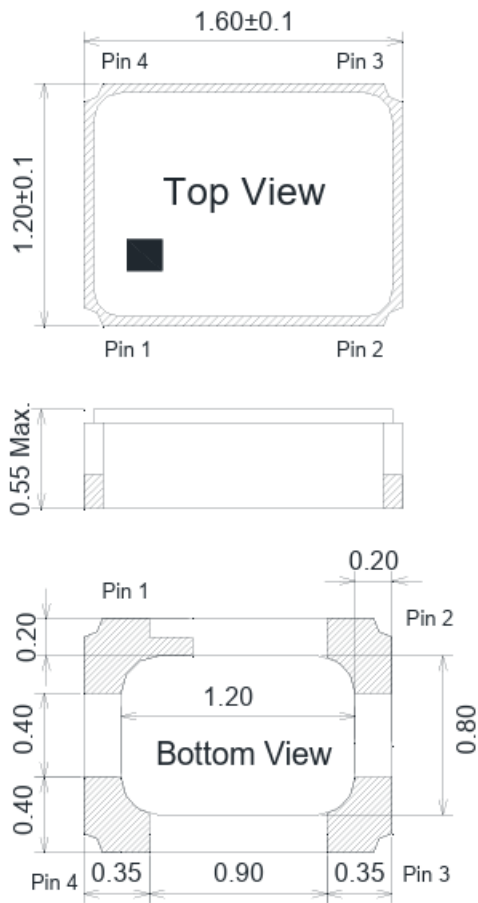
Table 1: Frequency Stability vs Operating Temperature

OTR	±0.5ppm	±1.0ppm	±2.0ppm	±3.0ppm	±5.0ppm
-30°C ~ +85°C	E05	E10	E20	E30	E50

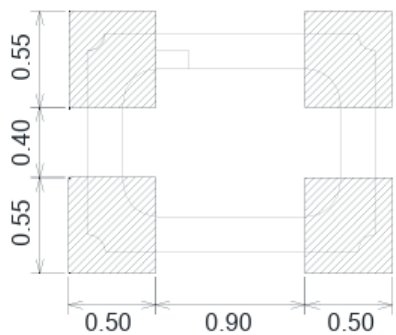
Typical Phase Noise Performance @ 25°C



Mechanical Dimensions



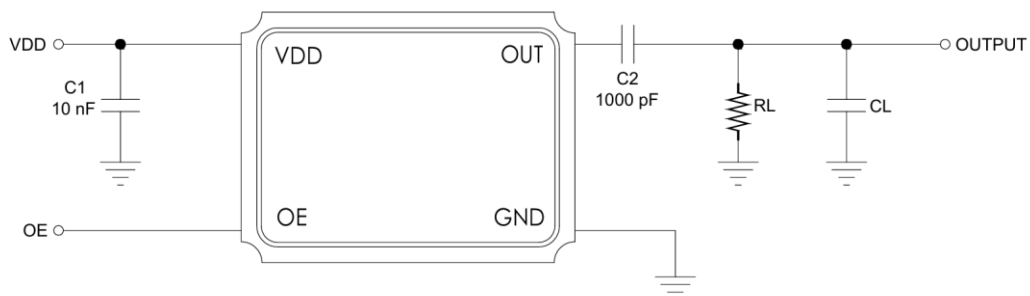
Recommended Land Pattern



Pin #	Function
1	INH
2	GND
3	Output
4	VDD

Dimensions: mm

Recommended Test Circuit



Reflow Profile [JEDEC J-STD-020]

T3: 3,000pcs/reel

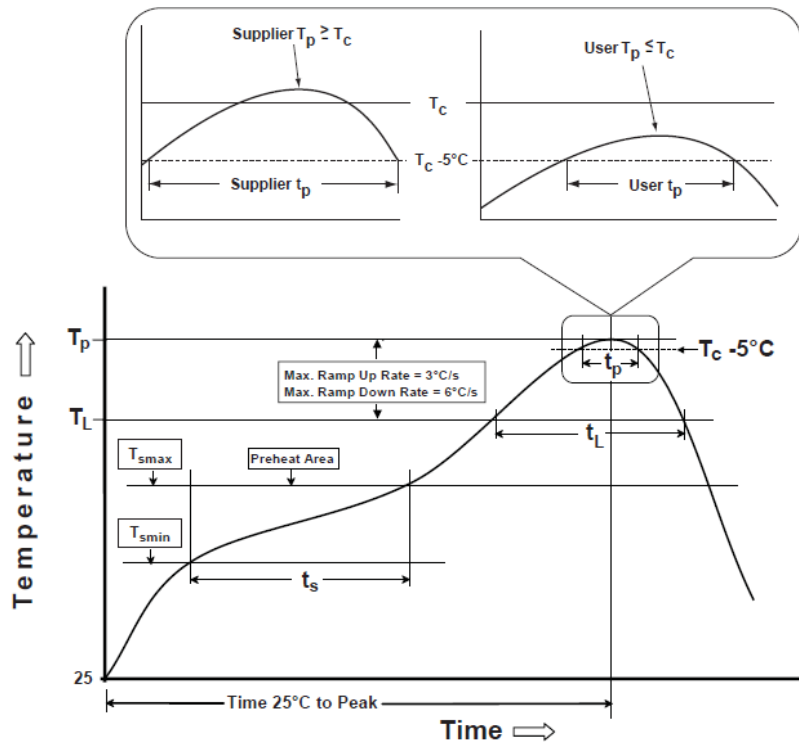


Table 1

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

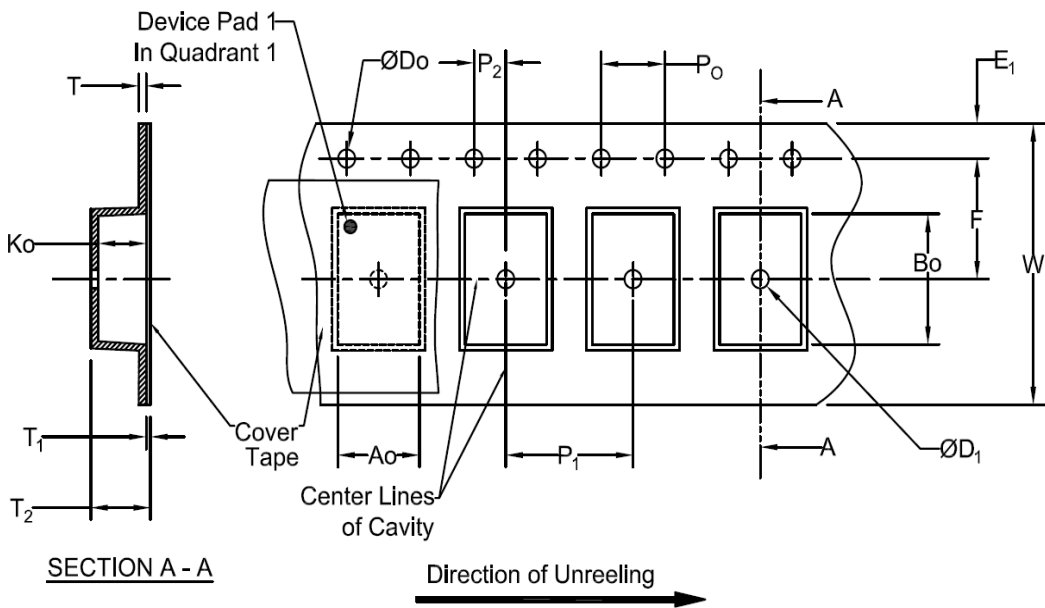
Pb-Free Process Classification Temperatures (T _c)			
Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm - 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

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 supplier minimum and a user maximum.

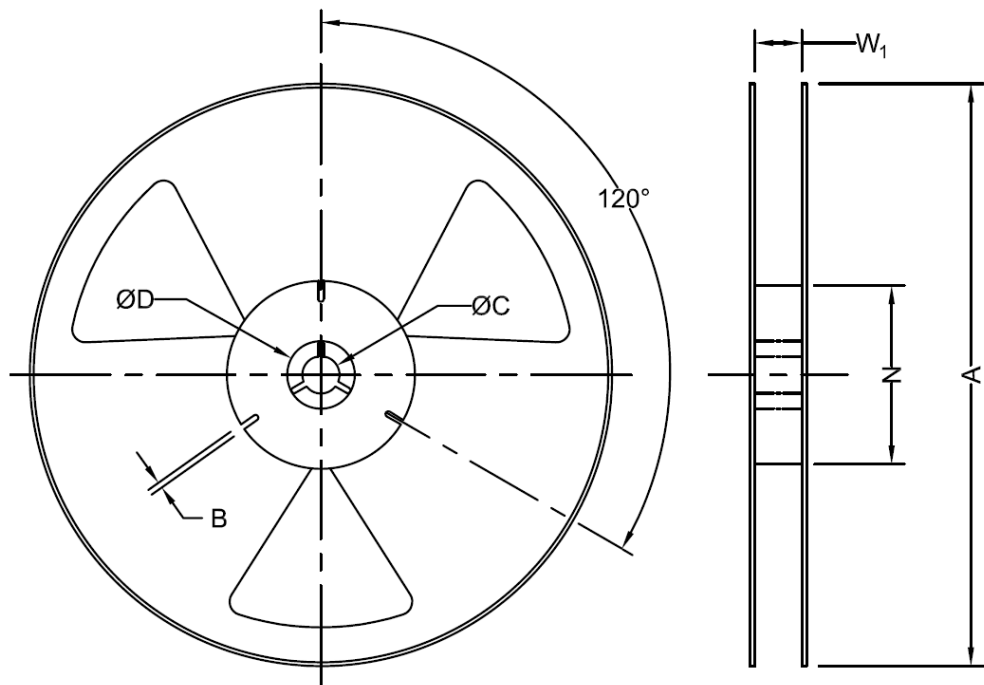
Packaging



Tape Specifications (mm)							
Width	Ao	Bo	Do	D ₁ (Min)	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

Dimensions: mm



Reel Specifications (mm)							
Width	Qty/Reel	A (nom)	B (Min)	C	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

Dimensions: mm