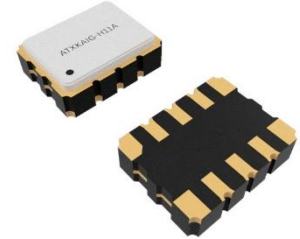


Description

Abrakon's ATXKAIG-H11A series is an automotive grade low power 32.768 kHz temperature compensated crystal oscillator with a miniature 3.2 mm x 2.5 mm x 1.0 mm package, perfect for reducing board space. This series offers a CMOS output with a continuous supply voltage range of 2.0V to 5.5V. The ATXKAIG-H11A delivers an overall frequency stability of ± 5 ppm over an operating temperature range of $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$.



Features

- Automotive Grade: AEC-Q200 Qualified
- TS16949 Production Line Certified
- PPAP Available Upon Request
- Hermetically Seam-sealed Ceramic Package
- Tight frequency stability: ± 5 ppm $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- Output Waveform CMOS
- Supply Voltage Range 2.0V to 5.5V

Typical Applications

- Infotainment Systems
- Keyless Entry & Startup
- GPS & Navigation
- Comfort control
- ADAS (Advanced Driver Assistance Systems)
- Vehicle to Vehicle Communication
- LiDAR (Light Detection and Ranging)
- In-vehicle Networking

Electrical Specifications ^[Note 1]

Parameters		Min.	Typ.	Max.	Units	Notes
Frequency (fc)			32.768		kHz	
Operating Temperature Range		-40		85	$^{\circ}\text{C}$	
Storage Temperature Range		-55		125	$^{\circ}\text{C}$	
Frequency Stability $\Delta f/f_0$ vs:						
Temperature		-5.0		5.0	ppm	-40°C to 85°C , Reference to Nominal Frequency and $V_{DD} = 3.0\text{V}$
Supply Voltage		-1.0		1.0	ppm/V	at $+25^{\circ}\text{C}$, Reference to Nominal Frequency at $V_{DD} = 3.0\text{V}$
Aging		-3.0		3.0	ppm	First year at $+25^{\circ}\text{C} \pm 2^{\circ}\text{C}$
Supply Voltage (V_{DD}) ^[Note 3,4,5]		2.0	3.0	5.5	V	See notes below
Start-up Voltage ^[Note 6]		1.6			V	
Supply Current (I_{DD}) ^[Note 7]			1.6	5.3	μA	OE = V_{DD} , $V_{DD} = 5.0\text{V}$, no load
			1.15	4.5	μA	OE = V_{DD} , $V_{DD} = 3.0\text{V}$, no load
Start-up Time (T_{STA})				1.0	Sec	at $+25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, $V_{DD} = 1.6\text{V}$ to 5.5V
				3.0	Sec	at -40°C to $+85^{\circ}\text{C}$, $V_{DD} = 1.6\text{V}$ to 5.5V
Symmetry		40	50	60	%	At 50% V_{DD} , Output load = 30pf
Output Voltage	V_{OH}	90% V_{DD}			V	
	V_{OL}			10% V_{DD}	V	
Output Load			15	30	pF	CMOS
Output leakage current		-0.5		0.5	μA	Output = V_{DD} or GND
Tri-state function ^[Note 2]		"1" ($V_{IH} \geq 0.8 \cdot V_{DD}$): Oscillation; "0" ($V_{IL} < 0.2 \cdot V_{DD}$): No Oscillation/Hi Z			V	
Output disable current ^[Note 7]			0.59	3.8	μA	OE = GND, $V_{DD} = 5\text{V}$
			0.54	3.6	μA	OE = GND, $V_{DD} = 3\text{V}$
Input leakage current		-0.5		0.5	μA	OE = V_{DD} or GND

- Note 1: All measurements made at +25°C±2°C, at nominal $V_{DD} = 3.0V$ and 30pf 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: Operational voltage range: 2.0V to 5.5V.
- Note 4: This oscillator is sensitive to power supply noise. Thus, the supply voltage should be stabilized to avoid a negative impact on the frequency accuracy and oscillation capability.
- Note 5: Supply voltage (V_{DD}) must remain above 2.0V to maintain proper oscillation. If the supply voltage is reduced below 2.0V, it should be reset to ground (0V) for more than 10 seconds for a proper power-on reset. A power supply (V_{DD}) ramp up of 10 ms/V maximum is needed for proper power-on reset.
- Note 6: Supply voltage (V_{DD}) at which the device begins oscillation.
- Note 7: Oscillator internal compensation interval ($t = 2$ seconds) ON.

Absolute Maximum Ratings

Parameters	Symbol	Conditions	Rating (Maximum)	Unit
Supply voltage range (Note 8)	V_{DD}	Between V_{DD} and V_{SS}	GNE - 0.3 to +6.5	V
Output voltage range (Note 8)	VOUT	Output pad	GND - 0.3 to $V_{DD} + 0.3$ (Note 9)	V
Input voltage range (Note 8)	VIN	OE pad	GND - 0.3 to +6.5 (Note 9)	V
Junction temperature (Note 8)	T_j	-	150	°C
Operating temperature range	TOPR	-	-40 to +85	°C
Storage temperature range	TSTG	-	-55 to +125	°C
Moisture sensitivity level	MSL	-	1	-
Reflow temperature		-	260	°C

Note 8: Absolute maximum ratings are the values that must not be exceeded. This product may suffer damage if any one of these parameter ratings is exceeded. Operation and characteristics are guaranteed only when the product is operated per the specification datasheet.

Note 9: V_{DD} is a V_{DD} value of recommended operating conditions.

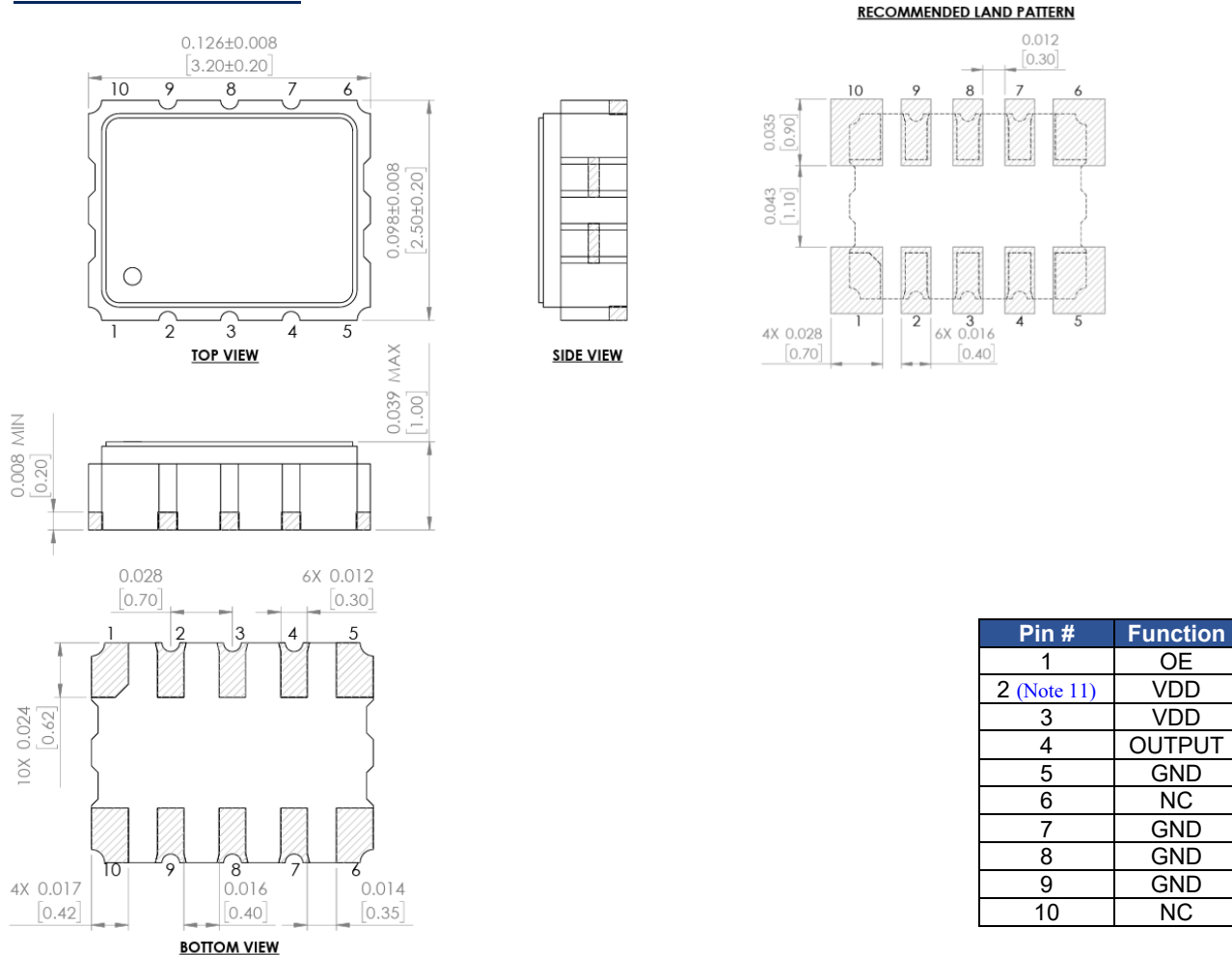
Part Identification

ATXKAIG-H11A-32.768kHz - E50-



Packaging
Blank: Bulk
T3: 3000pcs/reel

Mechanical Dimensions



Dimensions: inches (mm)

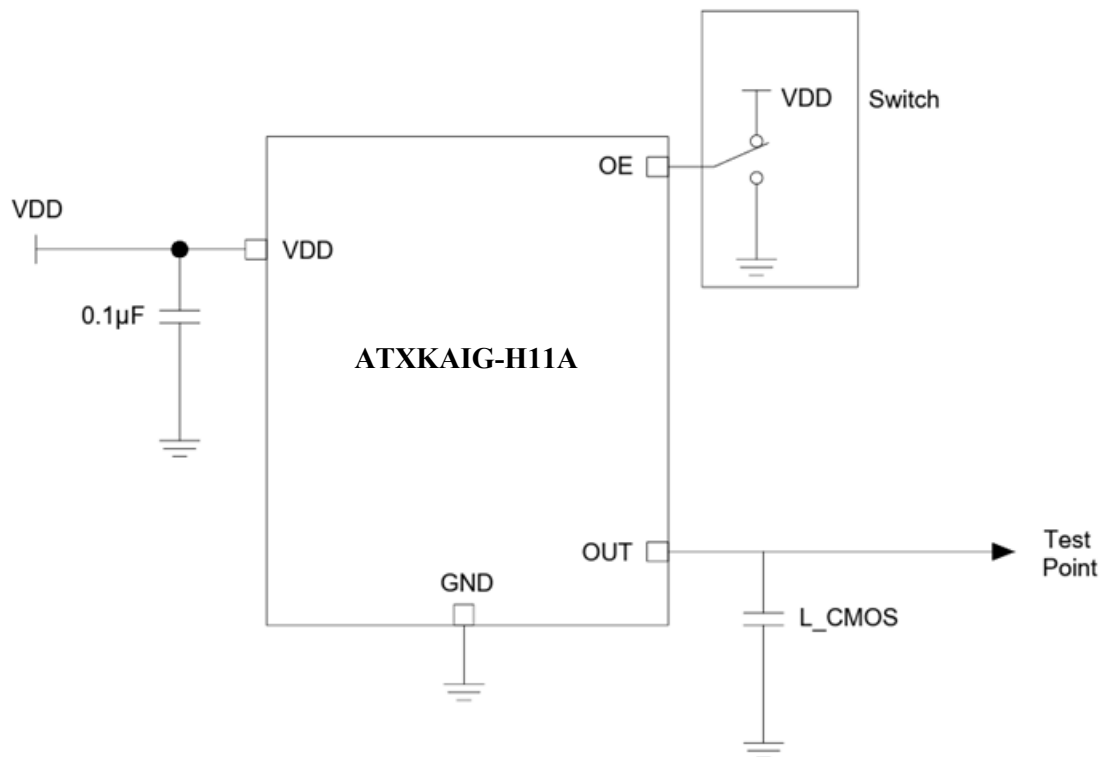
INH Function	
#1 (Input) (Note 10)	#4 (Output)
This input pad is used to control the output mode of the OUTPUT pad #4. When pad #1 level is logic high, the OUTPUT pad is ACTIVE (output oscillation). When it is logic low, the OUTPUT pad is stopped (no oscillation).	This is the CMOS output pad with output control provided via the OE pad (#1). OE = "H" (high level), this pad outputs a 32.768 kHz signal. When OE = "L" (low level), output is stopped, and the OUT pad = Hi-Z (high impedance).
"H" Level	Active
"L" Level	High Z (No Oscillation)

Note 10:

- Do not leave Pad 1 (INH) floating
- If Pad 1 (INH) is not utilized for toggling, it must be tied to Vdd (logic 1)

Note 11:

Recommended to use approximately 0.1 μF bypass capacitor between pad 2 and pad 9

Recommended Test Circuit

Reflow Profile [JEDEC J-STD-020]

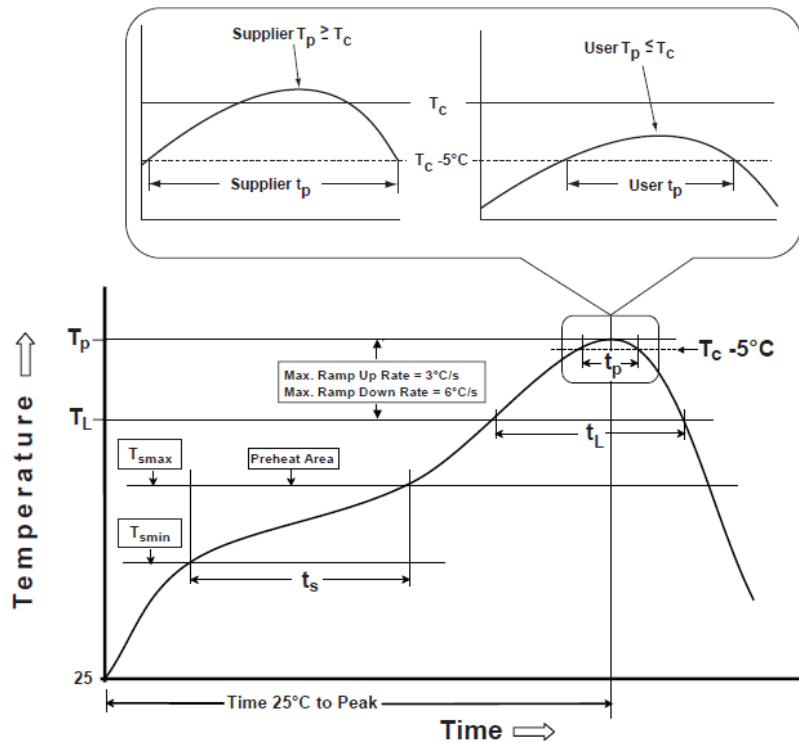


Table 1

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

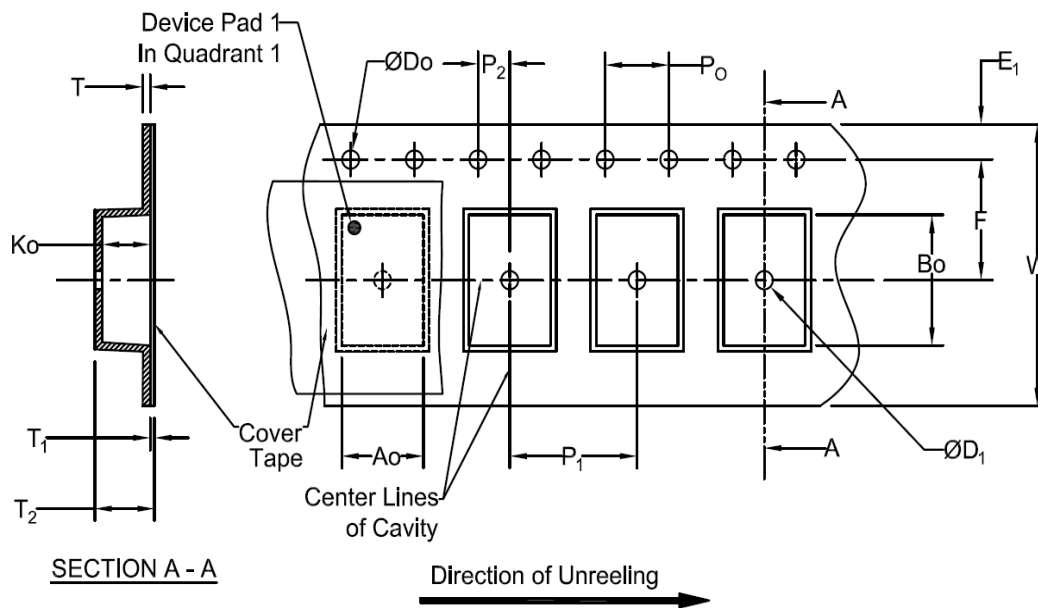
Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T_{smin})	100°C	150°C
Temperature maximum (T_{smax})	150°C	200°C
Time (T_{smin} to T_{smax}) (t_s)	60 - 120 sec.	60 - 120 sec.
Average ramp-up rate (T_{smax} to T_p)	3°C/sec. max	3°C/sec. max
Liquidous temperature (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 supplier minimum and a user maximum.

Packaging

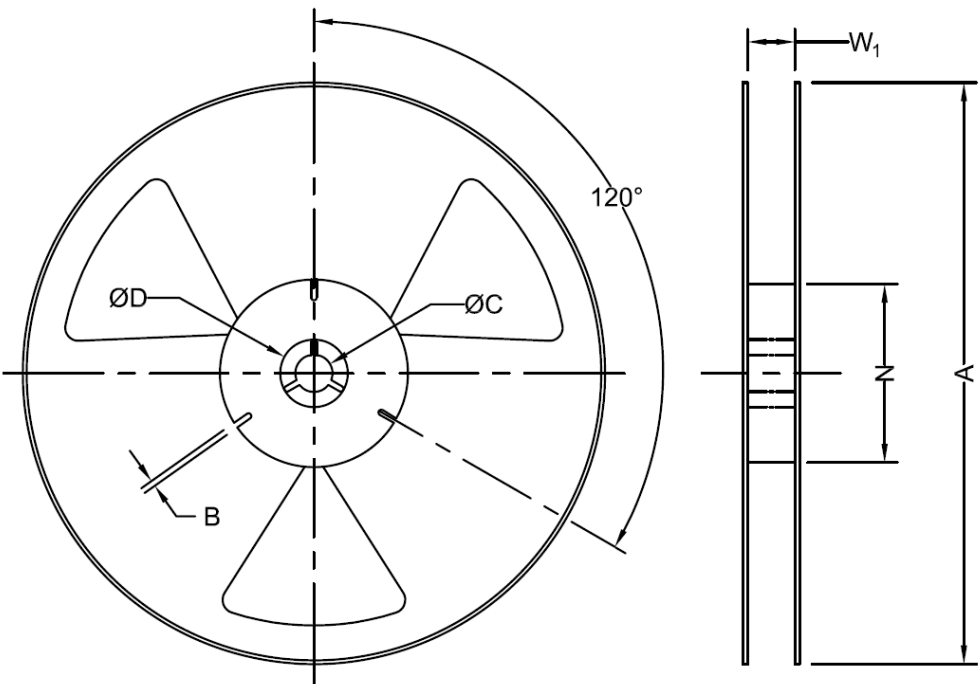
T3: 3,000pcs/reel



Tape Specifications (mm)							
Width	Ao	Bo	Do	D1 (Min)	E1	F	Ko
8mm	*	*	1.5+0.1/-0.0	1.0	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

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