ATXKAIG-H15

32.768KHZ MINIATURE TCXO AUTO GRADE

Description

Abracon's ATXKAIG-H15 series is a low power 32.768 kHz automotive grade temperature compensated crystal oscillator with a miniature 1.6 mm x 1.2 mm x 0.57 mm package, perfect for reducing board space. This series offers a CMOS output with a supply voltage option of 1.8V, 2.5V or 3.3V. The ATXKAIG-H15 delivers an overall frequency stability of ±5 ppm over an operating temperature range of -40°C ~ +85°C.

Features

- Automotive Grade - AEC-Q200 Qualified
- IATF16949 Production Line Certified
- Sealing: alloy
- Tight frequency stability: ±5 ppm -40°C ~ +85°C
- Output Waveform CMOS
- Supply Voltage Options 1.8V, 2.5V, and 3.3V
- Low current consumption
- REACH/RoHS II Compliant

Typical Applications

- Infotainment Systems
- GPS & Navigation
- Comfort control
- ADAS (Advanced Driver Assistance Systems)
- Vehicle to Vehicle Communication
- LiDAR (Light Detection and Ranging)
- In-vehicle Networking
- Powertrain & Drive Control
- Industrial Control & Automation

Electrical Specifications [Note 1]

Parameters		Min.	Typ.	Max.	Units	Notes
Frequency (fc)			32.768		kHz	
Operating Temperature Range		-40		+85	°C	
Storage Temperature Range		-40		+85	°C	
Frequency Stability $\Delta f/f_o$ vs:						
Temperature		-5.0		+5.0	ppm	-40°C to 85°C Reference to Nominal Frequency
Aging		-3.0		+3.0	ppm	First year at +25°C±2°C
Supply Voltage (V_{DD}) [Note 3]		+3.135	+3.3	+3.465	V	Option E
		+2.375	+2.5	+2.625		Option C
		+1.71	+1.8	+1.89		Option D
Operating Voltage Range [Note 2,4]		1.5		3.63		See notes below
Start-up Voltage [Note 5]		1.5			V	
Supply Current (I_{DD})			1.26	2.43	µA	V_{DD} = 1.8V, no load, Average
			1.42	2.76	µA	V_{DD} = 2.5V, no load, Average
			1.59	3.12	µA	V_{DD} = 3.3V, no load, Average
Start-up Time (T_{STA})				0.5	s	90% of steady state frequency
Rise and Fall Time (Tr/Tf)				40	ns	10% to 90% of waveform
Symmetry		40		60	%	@ ½ VDD
Output Voltage	V_{OH}	90%V_{DD}			V	
	V_{OL}			10%V_{DD}	V	
Output Load				15	pF	CMOS

Note 1: All measurements made over specified operating temperature range, at nominal V_{DD}, and 15pf load, unless otherwise specified.
Note 2: Operational voltage range: 1.5V to 3.63V. Frequency accuracy is only guaranteed at the chosen supply voltage (V_{DD}).
Note 3: 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 4: Supply voltage (V_{DD}) must remain above 1.5V to maintain proper oscillation. If the supply voltage is reduced below 1.5V, it should be reset to ground (0V) for more than 10 seconds for a proper power-on reset. A supply voltage (V_{DD}) ramp up of 10 ms/V maximum is needed for proper power-on reset.
Note 5: Supply voltage (V_{DD}) at which the device begins oscillation.

Absolute Maximum Ratings

Parameters	Symbol	Conditions	Rating (Maximum)	Unit
Supply voltage range (Note 6)	V_{DD}	Between V_{DD} and V_{SS}	-0.3 to +4.5	V
Output voltage range (Note 6)	VOUT	Output pad	-0.3 to V_{DD}+0.3 (Note 7)	V
Junction temperature (Note 6)	Tj	-	150	°C
Operating temperature range	TOPR	-	-40 to +85	°C
Storage temperature range	TSTG	-	-40 to +85	°C
Moisture sensitivity level	MSL	-	1	-
Reflow temperature		-	260	°C

Note 6: 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 7: V_{DD} refers to a Supply voltage (V_{DD}) value of recommended operating conditions.

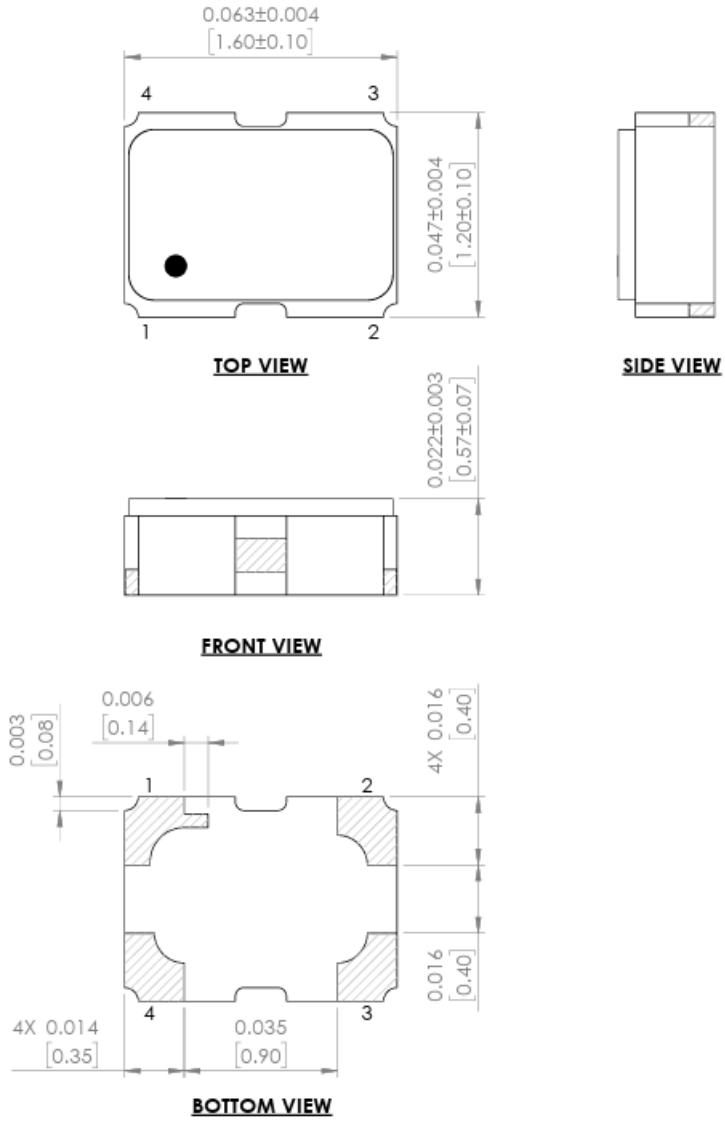
Part Identification

ATXKAIG-H15-☐- 32.768kHz - E50 - ☐

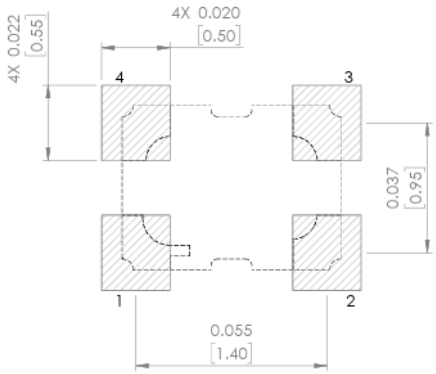
V_{DD} (V)
C: 2.5V±5%
D: 1.8V±5%
E: 3.3V±5%

Packaging
Blank: Bulk
T3: 3000pcs/reel

Mechanical Dimensions



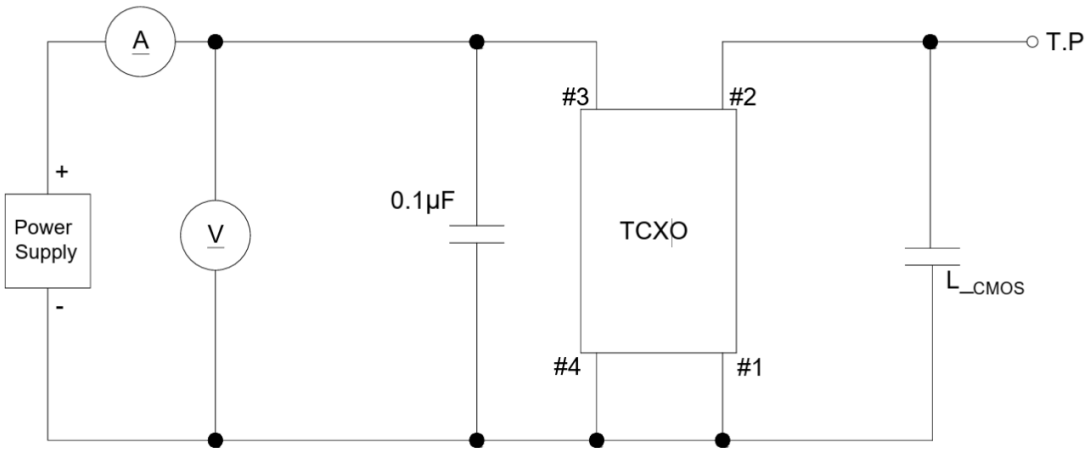
Recommended Land Pattern



Pin #	Function
1	GND
2	Output
3	VDD
4	GND

Dimensions: inches [mm]

Recommended Test Circuit



LOAD_C: Include jig stray capacitance

Reflow Profile [JEDEC J-STD-020]

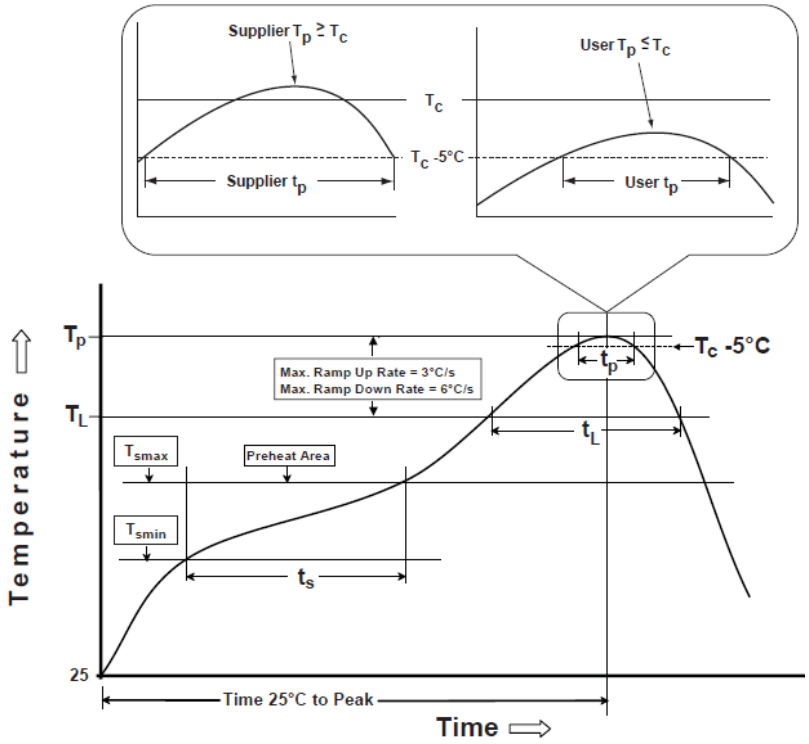


Table 1

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

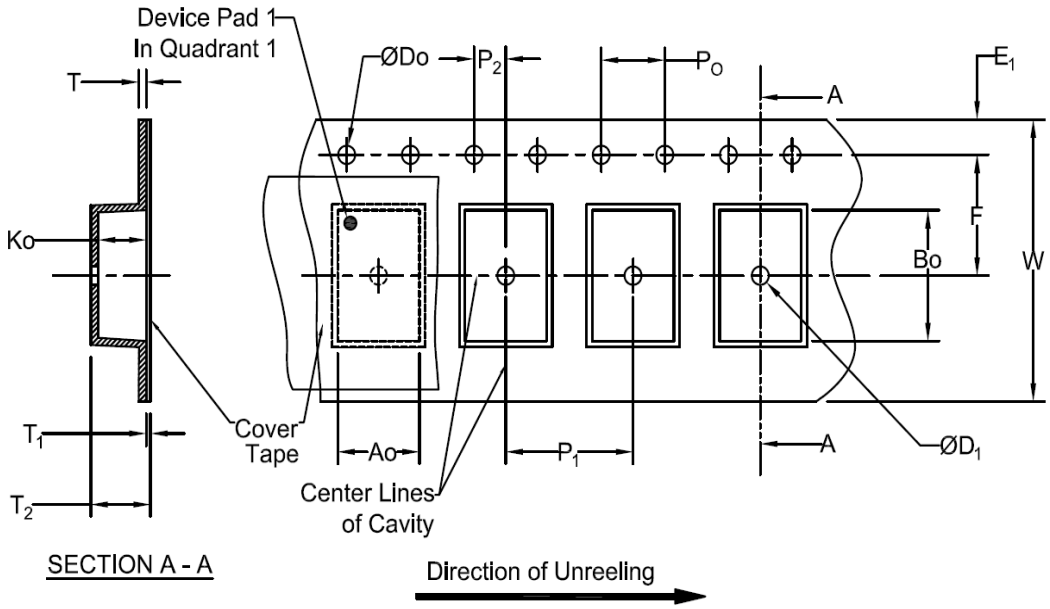
Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T_{smin})	100°C	150°C
Temperature maximum (T_{smax})	150°C	200°C
Time (T_{smin} to T_{smax}) (t_s)	60 - 120 sec.	60 - 120 sec.
Average ramp-up rate (T_{smax} to T_P)	3°C/sec. max	3°C/sec. max
Liquidous temperature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

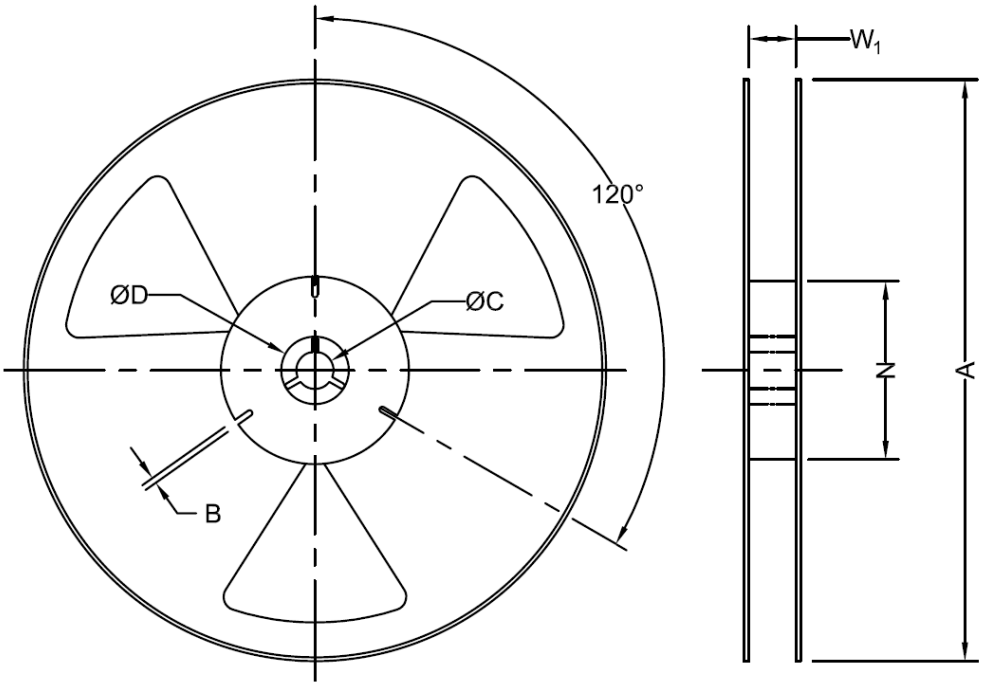
Packaging

T3: 3,000pcs/reel



Tape Specifications (mm)							
Width	Ao	Bo	Do	D_1 (Min)	E_1	F	Ko
8mm	1.45+/-0.1	1.8 ± 0.1	1.55+/-0.05	-	1.75±0.1	3.5±0.05	0.75 ± 0.1
Width	P_1	P_2	P_0	T (Max)	T_1 (Max)	T_2 (Max)	W
8mm	4.0±0.1	2.0±0.05	4.0±0.1	0.30	-	-	8.0±0.2

Dimensions: mm



Reel Specifications (mm)							
Width	Qty/Reel	A	B	C	D	N	*W_1
8mm	---						
	3000	180+0/-3	2.0+/-0.5	13.0+/-0.5	21+/-2.5	60+1.0/-0	9.0+/-0.3

***Note: Measured at Hub**

Dimensions: mm