ASDKDV

32.768KHZ CONTINUOUS VOLTAGE SMD CRYSTAL XO

Description

Abracon's ASDKDV series is a low power 32.768 kHz crystal oscillator within a 2.5 mm x 2.0 mm x 1.0 mm package. This series offers a variable supply voltage, capable of operating with 1.62V to 3.63V. The ASDKDV delivers a CMOS output with a ±20 ppm frequency tolerance. This series has an output enable/disable feature, with a low 5 µA typical disable current.



Features

- Continuous Vdd operation from 1.62 V ~ 3.63 V
- Optimized for low current consumption
- Output Enable/Start & Disable/Stop function
- Output waveform CMOS/LVCMOS compatible
- Hermetically seam-sealed ceramic package

Typical Applications

- Portable & wearable electronics
- Internet of Things (IoT)
- Consumer electronics
- Industrial control & automation
- Mobile communication

Electrical Specifications

Parameters		Min.	Typ.	Max.	Unit	Notes
Frequency			32.768		kHz	
Operating Temperature Range		-40.0		+85	°C	See options
Storage Temperature Range		-55.0		+125	°C	
Overall Frequency Stability [Note 1]		-25.0		+25	ppm	See options
Supply Voltage (Vdd)		+1.62		+3.63	V	
Tri-state function [Note 2]		"1" (VIH≥0.7*Vdd) or Open: Oscillation; "0" (VIL<0.3*Vdd): No Oscillation/Hi Z			V	
Output Load				15	pF	CMOS
Output Voltage	V_{OH}	0.9*Vdd			V	
	V_{OL}			0.1*Vdd		
Aging 1 year @25°C± 3°C		-3.0		+3.0	ppm	
Aging 5 years @25°C± 3°C		-5.0		+5.0	ppm	
Symmetry @ ½ Vdd		45	50	55	%	
Start-up Time				30	ms	
Rise and Fall Time (Tr/Tf) @10%Vdd-90%Vdd, 15pF load				30	ns	
Disable Current				5	µA	
Supply Current (Idd) [Note 1]	Vdd = 3.3V		10	15	µA	No Load
	Vdd = 2.5V		9	14	µA	No Load
	Vdd = 1.8V		8	13	µA	No Load

Note 1: Overall frequency stability includes initial frequency tolerance @25°C± 3°C and stability over the operating temperature range.
Note 2: Do not leave pin 1 ($\overline{INH}$) floating. If pin 1 ($\overline{INH}$) is not utilized for toggling, it must be tied to Vdd (logic 1).

Part Identification

ASDKDV-32.768kHz-[ ][ ]-[ ]

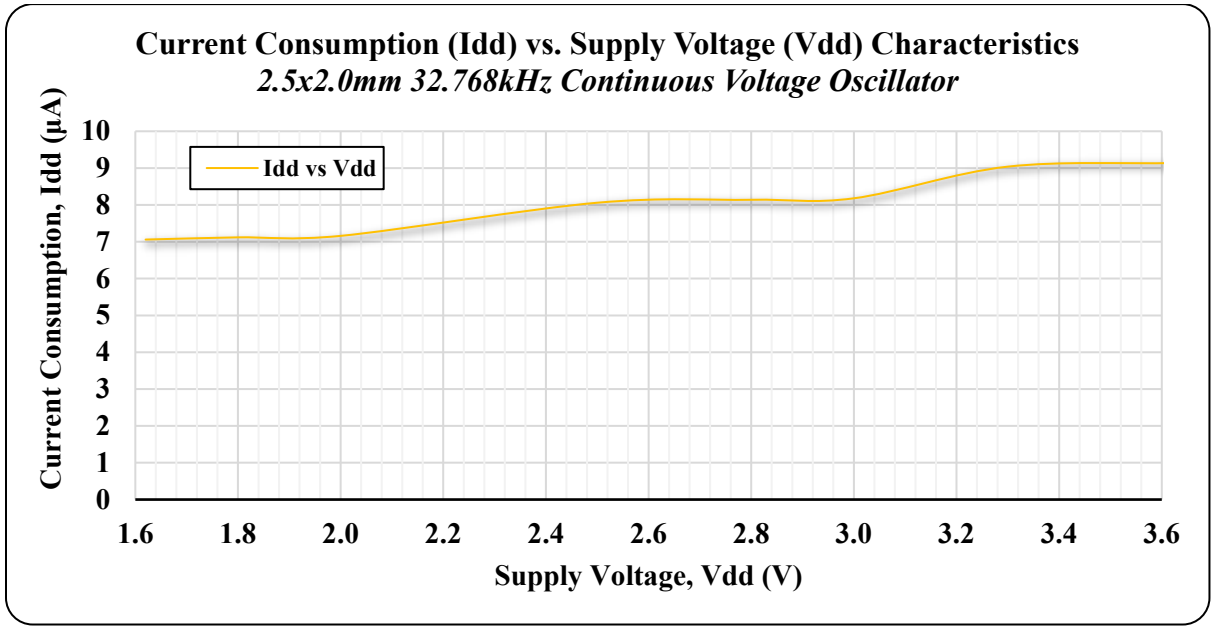
Operating Temp.
E: -20°C ~ +70°C
L: -40°C ~ +85°C

Overall Freq. Stability
J: ± 20 ppm (*)
R: ± 25 ppm
K: ± 30 ppm
C: ± 50 ppm
Q: ± 100 ppm

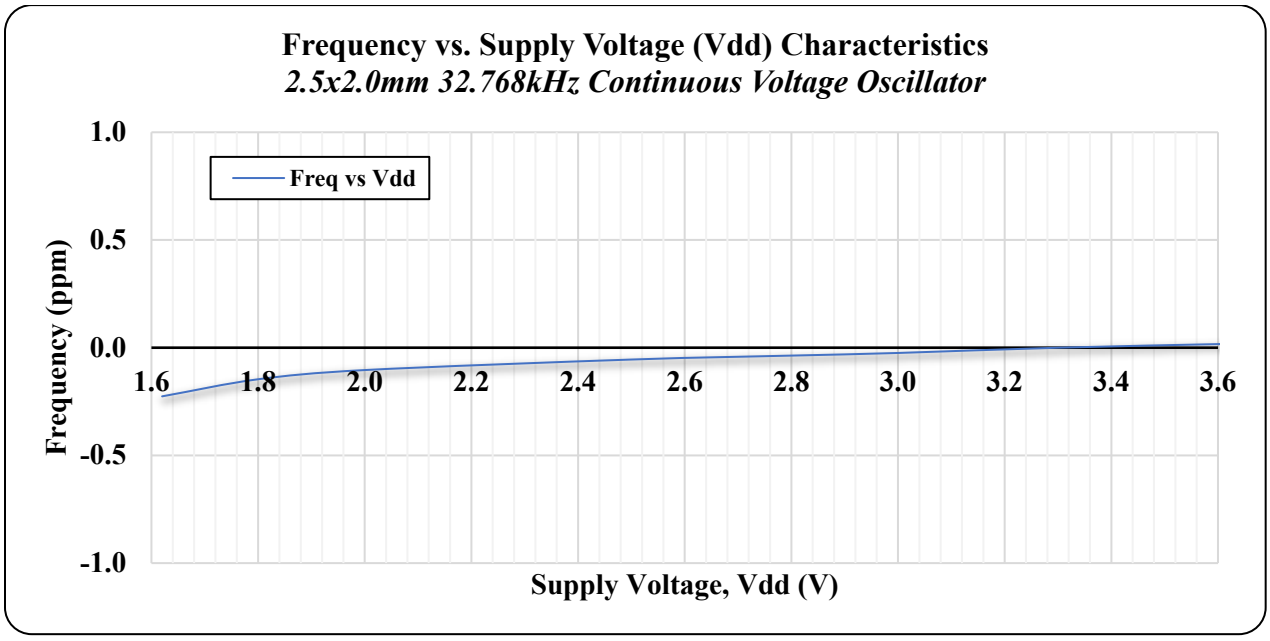
(*) Contact Abracon for availability

Packaging
Blank: Bulk
T: 1k pcs / reel
T3: 3k pcs / reel

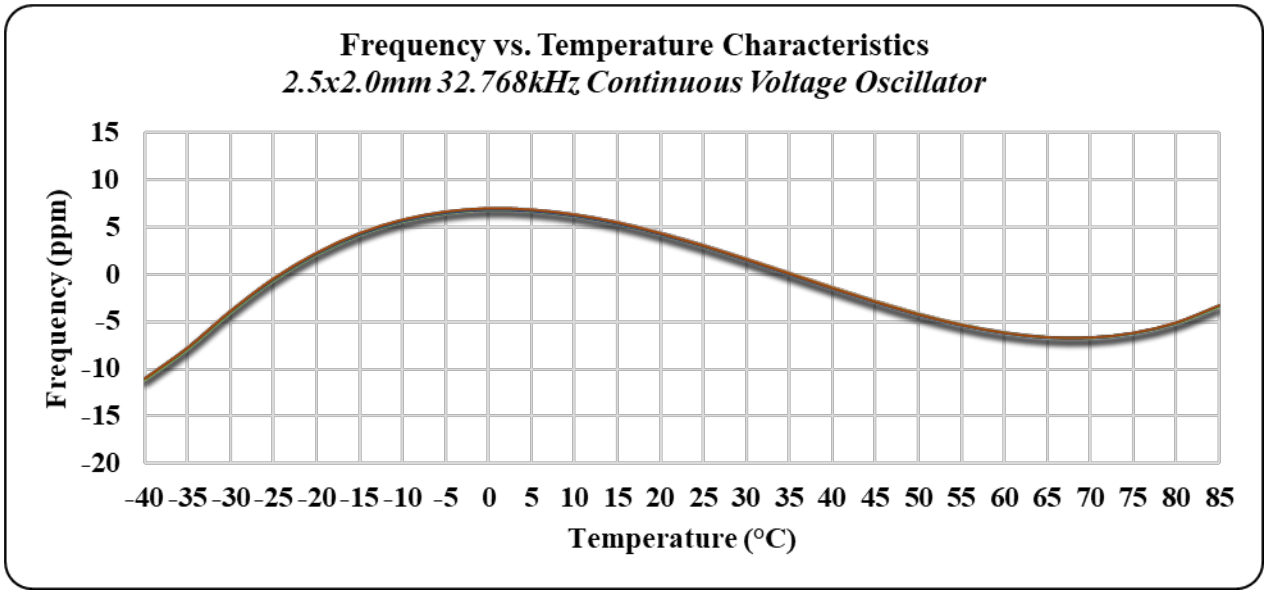
Typical Current Consumption (Idd) vs. Supply Voltage (Vdd) Characteristics [@ 25°C± 3°C, No Load]



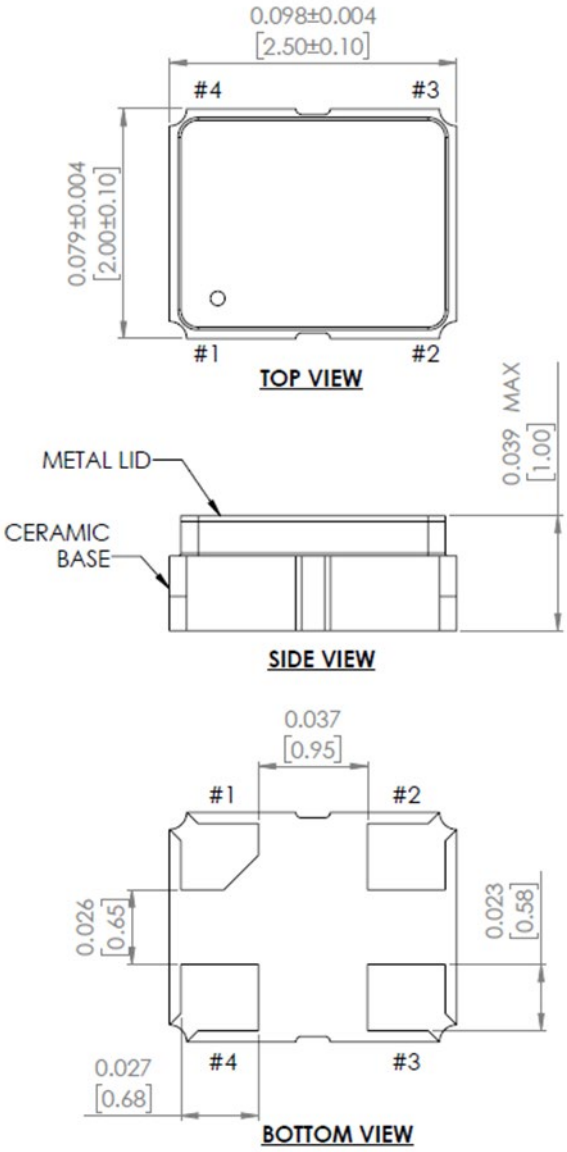
Typical Frequency vs. Supply Voltage (Vdd) Characteristics [@ 25°C± 3°C, Normalized to Vdd=3.3Vdc]

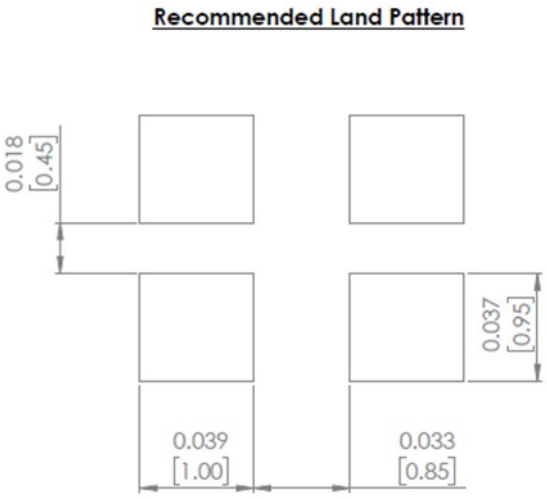


Typical Frequency vs. Temperature Characteristics



Mechanical Dimensions





Pin #	Function
1	$\overline{\text{INH}}$
2	GND
3	Output
4	Vdd

$\overline{\text{INH}}$ Function	
#1	#3 (Output)
Open	Active
"H" Level	Active
"L" Level	High Z (No Oscillation)

Note 3:
-Do not leave Pin 1 ($\overline{\text{INH}}$) floating
-If Pin 1 ($\overline{\text{INH}}$) is not utilized for toggling, it must be tied to Vdd (logic 1)

Note 4:
Recommended to use approximately 0.01µF bypass capacitor between PIN 2 and PIN 4

Dimensions: inches (mm)

Reflow Profile [JEDEC J-STD-020]

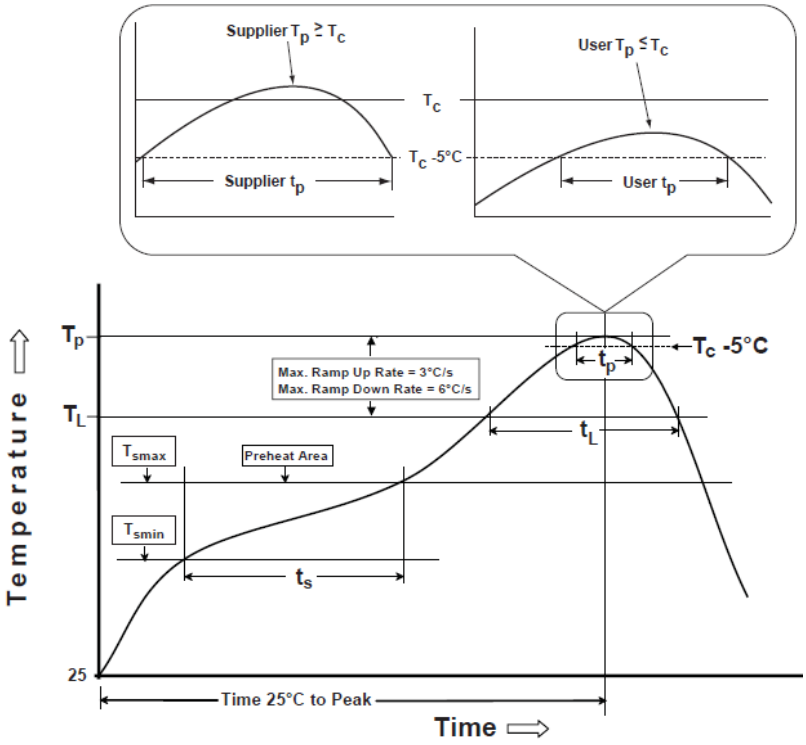


Table 1

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.

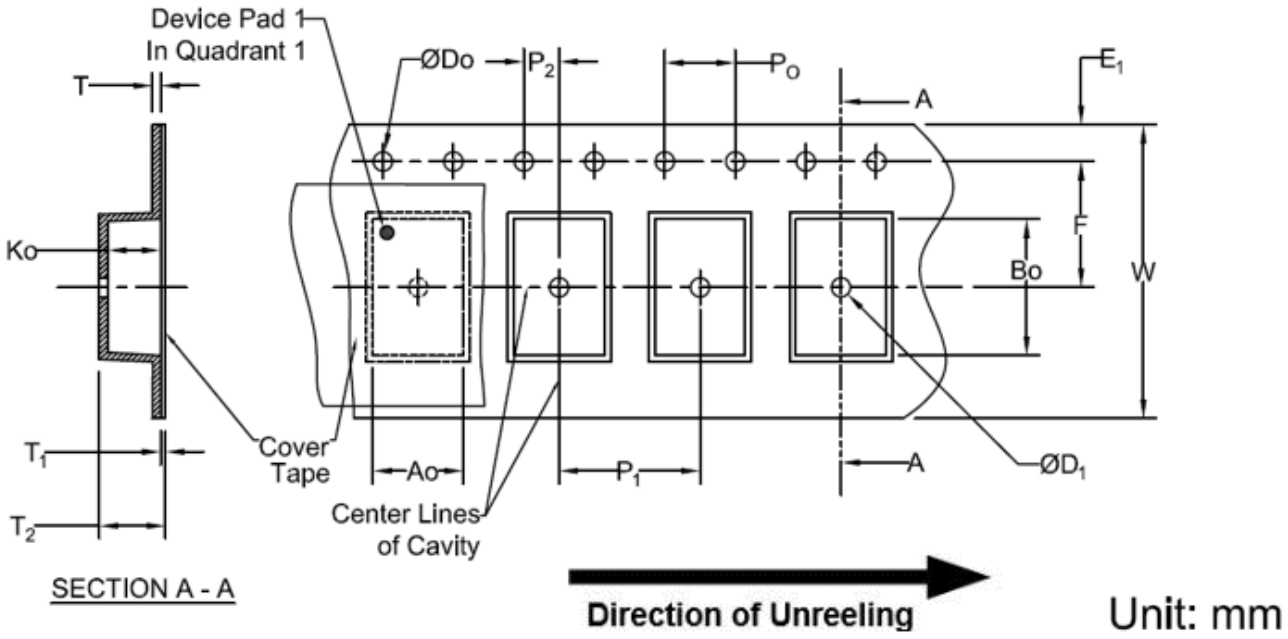
Absolute Maximum Ratings [Note 5]

Parameters	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	Vss-0.3		5.0	V	
Input Voltage	Vss-0.3		V_{DD}+0.5	V	
Output Voltage	Vss-0.3		V_{DD}+0.5	V	
Maximum Junction Operating Temperature	-55		150	ºC	
Ambient Operating Temperature Range	-40		85	ºC	Industrial
Reflow Temperature			260	°C	See Reflow Profile
ESD Protection	4kV HBM, 300V MM, 2kV CDM				

Note 5: Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. Exposure to maximum rating conditions for extended periods may affect device reliability. The data sheet limits are not guaranteed if the device is operated beyond the recommended operating conditions.

Packaging

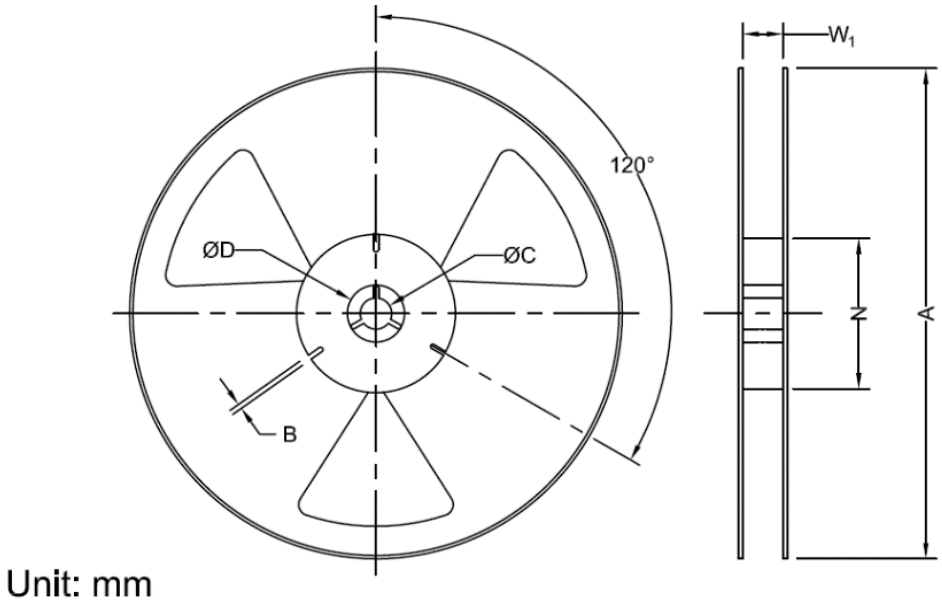
T: 1,000pcs/reel
T3: 3,000pcs/reel



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: inches (mm)



Unit: mm

Reel Specifications (mm)							
Width	Qty/Reel	A (Nom)	B (Min)	C (Min)	D (Min)	N (Min)	*W_1
8mm	1000	178	1.5	13.0+0.5/-0.2	20.2	50	8.4+1.5/-0.0
	3000	178	1.5	13.0+0.5/-0.2	20.2	50	8.4+1.5/-0.0

***Note: Measured at Hub**

Dimensions: inches (mm)