

Description

Abracon's ASDKDVAIG 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 ASDKDVAIG delivers a CMOS output with a ± 20 ppm frequency tolerance. This series has an output enable/disable feature, with a low 5 μ A typical disable current.



Features

- Continuous V_{DD} 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
- AEC-Q200 Qualified
- Automotive Grade 1: -40°C to +125°C
- TS16949 Production Line Certified
- PPAP Available Upon Request

Typical Applications

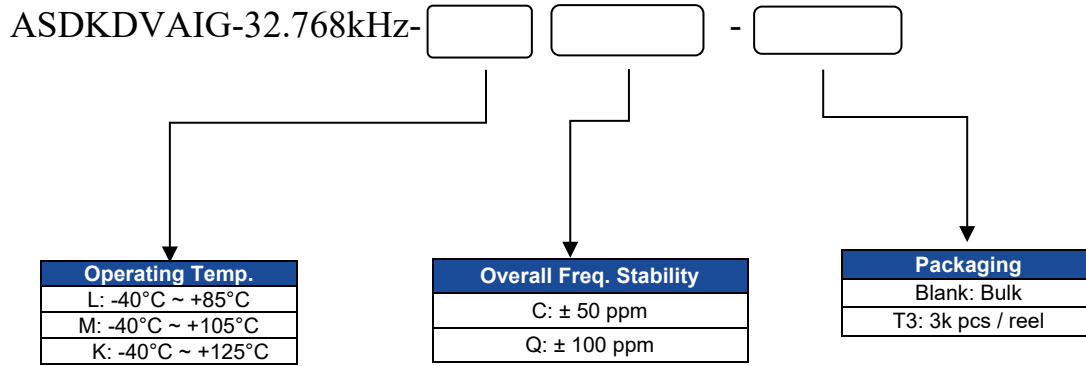
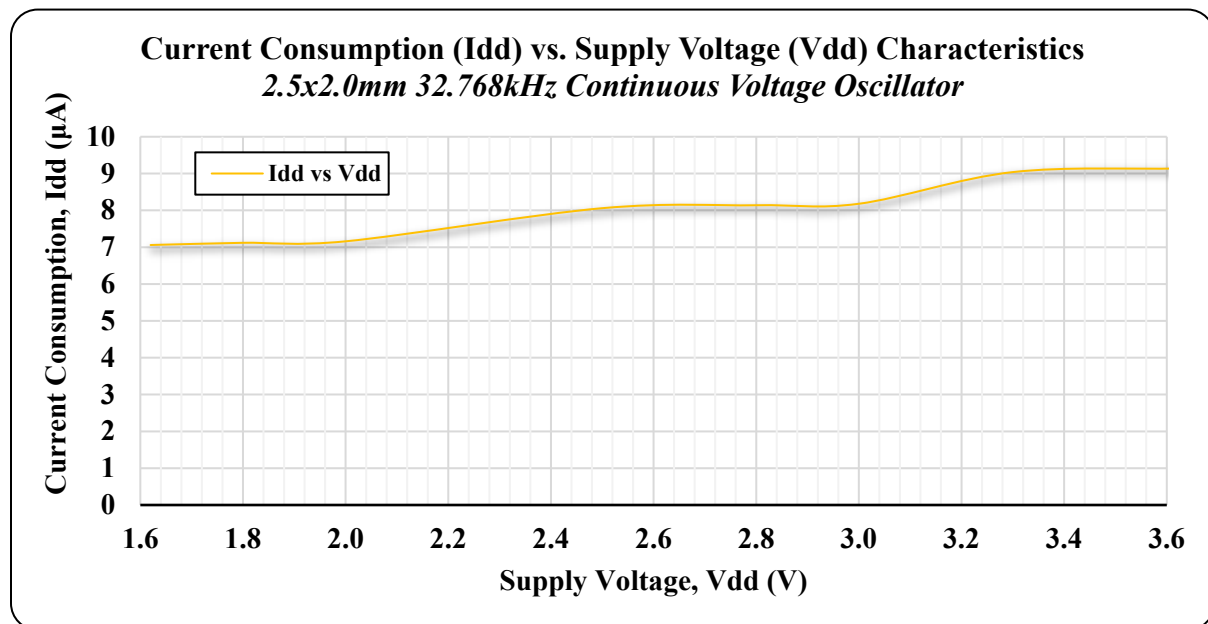
- Infotainment Systems
- Keyless Entry & Startup
- GPS & Navigation
- Comfort control
- ADAS (Advanced Driver Assistance Systems)
- Vehicle to Vehicle Communication
- LiDAR (Light Detection and Ranging)
- In-vehicle Networking
- Powertrain & Drive Control
- Power Control & Conversion
- Industrial Control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

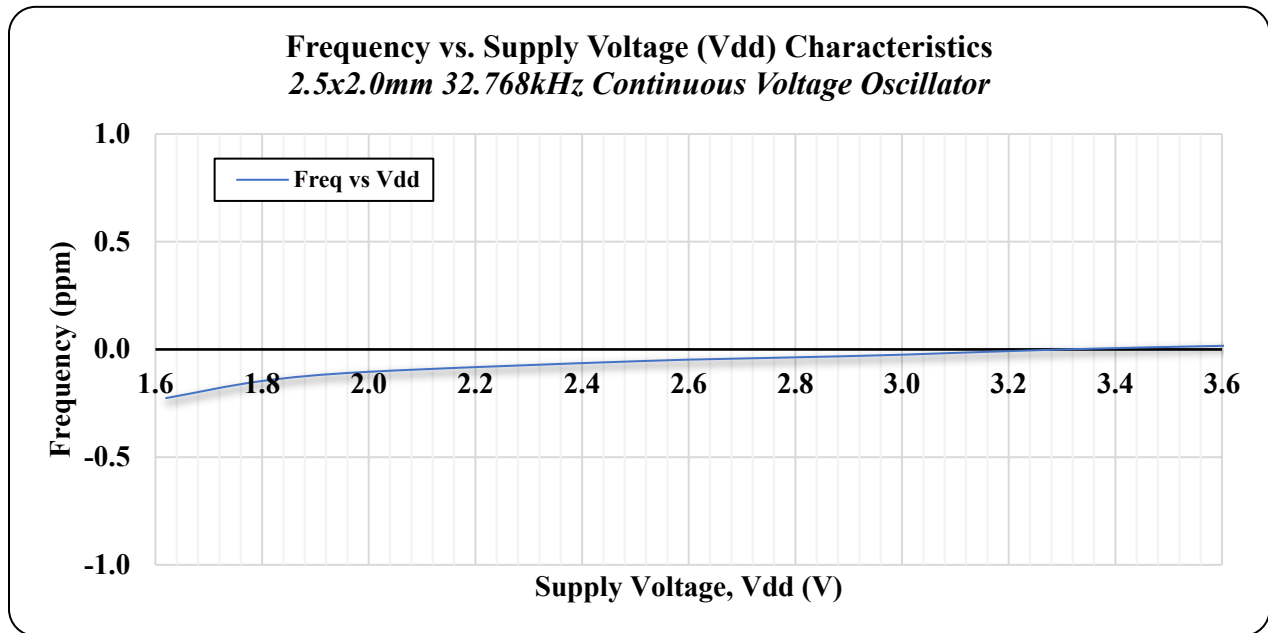
Electrical Specifications

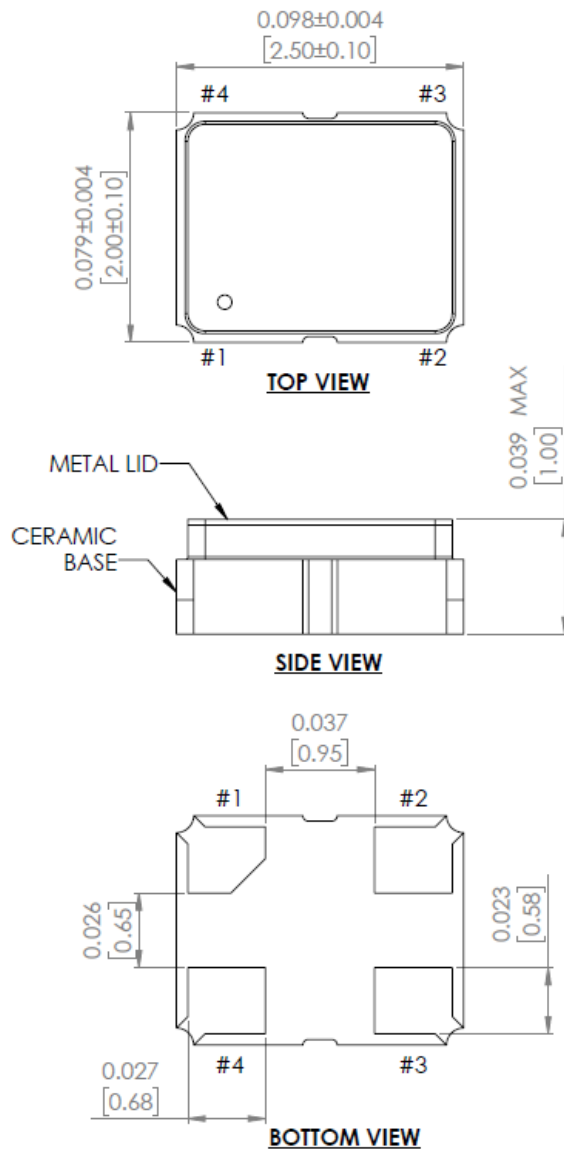
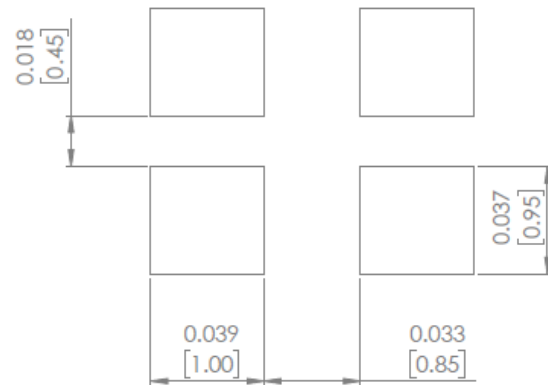
Parameters		Min.	Typ.	Max.	Unit	Notes
Frequency		32.768			KHz	
Operating Temperature Range		-40.0		+85	°C	See options
Storage Temperature Range		-55.0		+125	°C	
Overall Frequency Stability [Note 1]		-100		+100	ppm	See options
Supply Voltage (V_{DD})		+1.62		+3.63	V	
Tri-state function [Note 2]		"1" ($V_{IH} \geq 0.7 \cdot V_{DD}$) or Open: Oscillation; "0" ($V_{IL} < 0.3 \cdot V_{DD}$): No Oscillation/Hi Z			V	
Output Load				15	pF	CMOS
Output Voltage	V_{OH}	0.9* V_{DD}			V	
	V_{OL}			0.1* V_{DD}		
Aging 1 year @25°C $\pm$ 3°C		-3.0		+3.0	ppm	
Aging 5 years @25°C $\pm$ 3°C		-5.0		+5.0	ppm	
Symmetry @ $\frac{1}{2} V_{DD}$		45	50	55	%	
Start-up Time				30	ms	
Rise and Fall Time (T_r/T_f)				30	ns	
Disable Current				5	μ A	
Supply Current (I_{DD}) @25°C $\pm$ 3°C	$V_{DD} = 3.3V$		10	15	μ A	No Load
	$V_{DD} = 2.5V$		9	14	μ A	No Load
	$V_{DD} = 1.8V$		8	13	μ A	No Load

Note 1: Overall frequency stability includes initial frequency tolerance @25°C $\pm$ 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 V_{DD} (logic 1).

Part Identification**Typical Current Consumption (I_{dd}) vs. Supply Voltage (V_{dd}) Characteristics [@ 25°C ± 3°C, No Load]**

Typical Frequency vs. Supply Voltage (Vdd) Characteristics [$@ 25^{\circ}\text{C} \pm 3^{\circ}\text{C}$, Normalized to $V_{\text{dd}}=3.3\text{Vdc}$]

Mechanical Dimensions**Recommended Land Pattern**

Pin#	Function
1	INH
2	GND
3	Output
4	V _{DD}

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 V_{dd} (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]

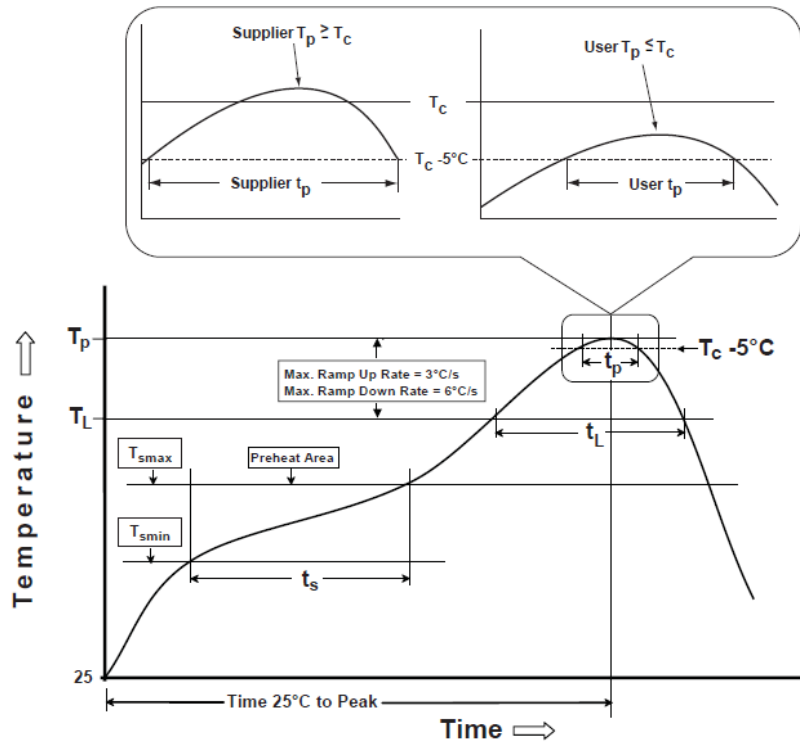


Table 1

SnPb Eutectic Process
Classification Temperatures (T_c)

Package Thickness	Volume 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.

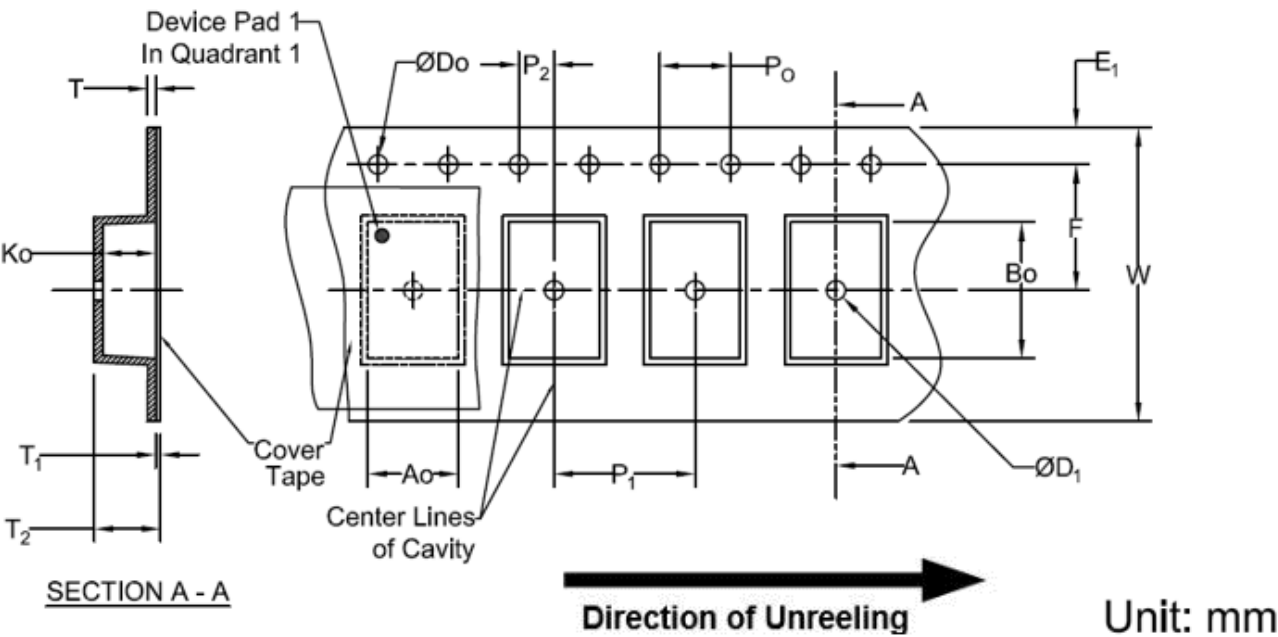
Absolute Maximum Ratings [\[Note 5\]](#)

Parameters	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	V _{SS} -0.3		5.0	V	
Input Voltage	V _{SS} -0.3		V _{DD} +0.5	V	
Output Voltage	V _{SS} -0.3		V _{DD} +0.5	V	
Maximum Junction Operating Temperature			150	°C	
Ambient Operating Temperature Range	-40		85	°C	Industrial
Ambient Operating Temperature Range	-40		105	°C	Extended Industrial
Ambient Operating Temperature Range	-40		125	°C	Automotive
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

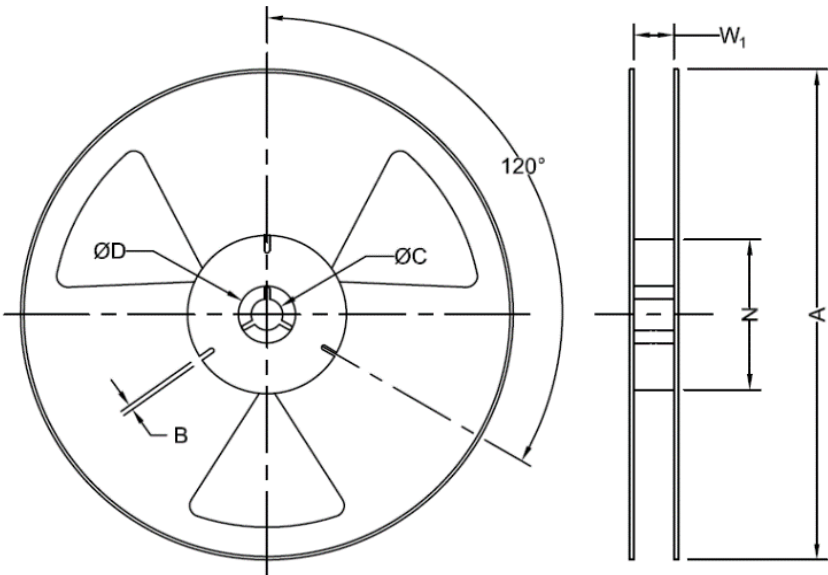
T3: 3,000pcs/reel



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: inches (mm)



Unit: mm

Reel Specifications (mm)							
Width	Qty/Reel	A (Nom)	B (Min)	C (Min)	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: inches (mm)