

32.768kHz LOW POWER SMD CRYTAL OSCILLATOR

ASZKDV

Request Samples



Check Inventory



ESD Sensitive



2.0 x 1.2 x 0.7 mm

RoHS/RoHS II Compliant

MSL Level = 1

Features

- Crystal Technology by Micro Crystal
- Oscillator with internal at 32.768 kHz tuning fork resonator
- Ultra-miniature package 2.0x1.2x0.7mm [max.]
- CMOS output
- Continuous supply voltage operation from 1.6V to 5.5V
- Optimized for low current consumption
- Operating temperature range: -40 to +85 °C, -40 to +125 °C
- Output enable/disable function

Applications

- Portable and wearable electronics
- Internet of Things (IoT)
- Consumer electronics
- Industrial control and automation
- General purpose clock generator for digital systems
- Clock reference for Real Time Clocks (RTCs)
- Timekeeping in network servers and computers
- Electricity, gas and water metering

Key Electrical Specifications [\[Note 1\]](#)

Parameters	Minimum	Typical	Maximum	Units	Notes
Output Frequency	32.768			kHz	
Operating Temperature Range (OTR)	-40		+85	°C	Option "L"
	-40		+125		Option "H"
Storage Temperature Range	-55		+125	°C	
Turnover Temperature	+20	+25	+30	°C	
Frequency Tolerance	-20		+20	ppm	
Temperature Coefficient	-0.035±10%			ppm/C ²	
Supply Voltage Range (V _{dd})	+1.6		+5.5	V	@ OTR= -40°C ~ +85°C
	+2.25		+5.5		@ OTR= -40°C ~ +125°C
V _{dd} slew rate			±0.5	V/ms	
Current Consumption (I _{dd}) CLKOUT disabled [Note 2, 3]		0.45	0.65	µA	V _{dd} = 3.0 V, @ +25°C
		0.68	0.90		V _{dd} = 5.0 V, @ +25°C
			1.30		V _{dd} = 3.0 V, over OTR -40 to 85°C
			1.80		V _{dd} = 5.0 V, over OTR -40 to 85°C
			1.95		V _{dd} = 3.0 V, over OTR -40 to 125°C
		2.70	V _{dd} = 5.0 V, over OTR -40 to 125°C		
Output Load (CL)			15	pF	CMOS
Output Voltage	V _{OH}	V _{dd} -0.4		V	I _{OH} = -400µA, V _{dd} = 1.6 to 5.5 V
	V _{OL}		GND+0.4		I _{OL} = 400µA, V _{dd} = 1.6 to 5.5 V
Hi-Z leakage current			±100	nA	OE = GND; OUTPUT= V _{dd} or GND
OE Pin Function	"1" (VIH≥0.7*V _{dd}) or Open: Oscillation "0" (VIL<0.3*V _{dd}): Output disabled				
Aging @ +25°C	-3.0		+3.0	ppm	First year
Duty Cycle	40		60	%	
Voltage Coefficient	-3.0		+3.0	ppm/V	
Start-up Time			0.5	s	
Output Rise Time		30.0	70.0	ns	CL = 10 pF, 10% to 90% V _{dd}
Output Fall Time		30.0	70.0	ns	CL = 10 pF, 10% to 90% V _{dd}
Output Enable Time	0.0		0.5	µS	
Output Disable Time			0.1	µS	

Note 1: V_{dd} = 3.0V; GND = 0V; @ +25 °C unless otherwise indicated

Note 2: See diagram "Typical Supply Current (I_{dd}) vs Supply Voltage (V_{dd})"

Note 3: When OUTPUT is enabled (OE is HIGH) the additional supply current can be calculated as follows: ΔIDD = CL x VDD x Fout



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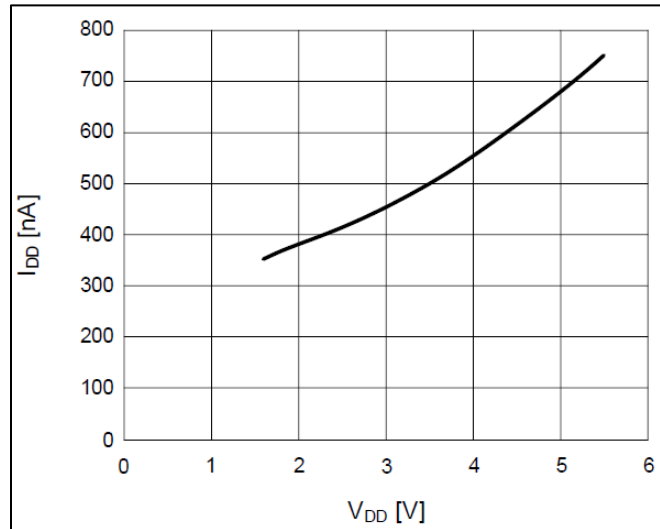
Absolute Maximum Ratings

Parameters	Symbol	Conditions	Rating	Unit
Supply voltage range (4)	V_{dd}	Between V_{dd} and V_{SS}	-0.5 to +6.0	V
Input voltage range (4)	V_{IN}	Between INH and V_{SS}	-0.5 to +6.0 (5)	V
Output voltage range (4)	V_{OUT}	Output pad	-0.5 to +6.0 (5)	V
Electrostatic discharge voltage	V_{ESD}	HBM	± 1000	V
Solder reflow profile		Per JEDEC J-STD-020C	+260 max	$^{\circ}\text{C}$

Note 4: 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 5: V_{dd} is a V_{dd} value of recommended operating conditions

Typical Supply Current (I_{DD}) vs Supply Voltage (V_{DD}), Output Disabled, TOPR = 25 $^{\circ}\text{C}$



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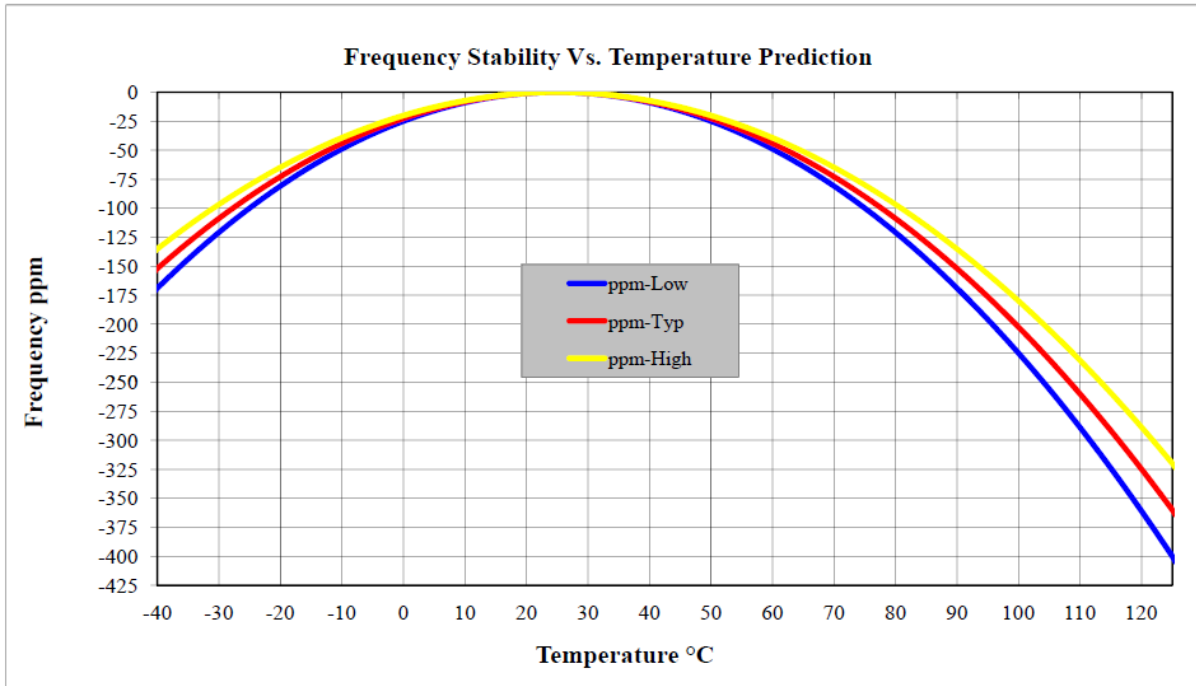


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Typical Frequency Temperature Characteristics



Options and Part Identification

ASZKDV-32.768kHz- -

Operating Temp.
L: -40°C ~ +85°C
H: -40°C ~ +125°C

Packaging
Blank: Bulk
T: 1000pcs/Reel
T3: 3000pcs/Reel

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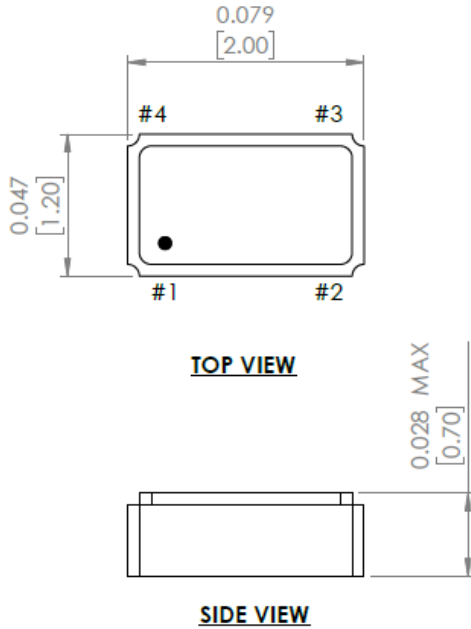


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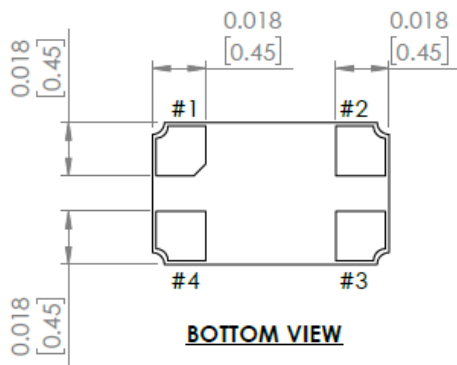
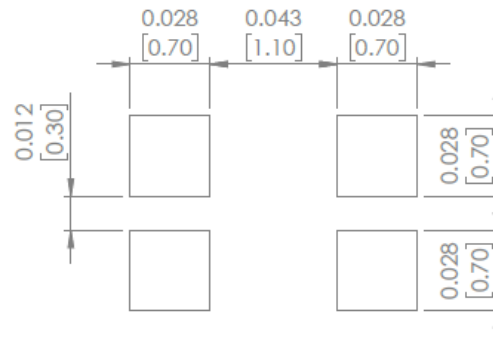


2.0 x 1.2 x 0.7 mm
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Mechanical Dimensions



Recommended Land Pattern



Pin No.	Function
1	Output
2	GND*
3	OE
4	Vdd

*Metal lid is connected to GND (pin #2)

Sealing Method = Solder Sealing

Dimensions: [inches] mm

Unless specified, all dimensions are typical values.

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Reflow Profile [JEDEC J-STD-020]

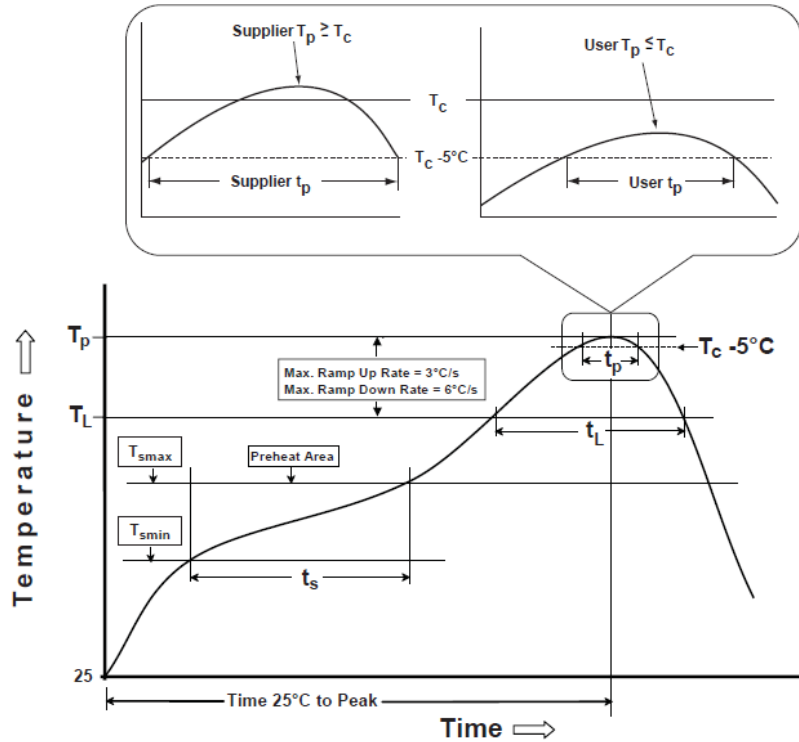


Table 1

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.



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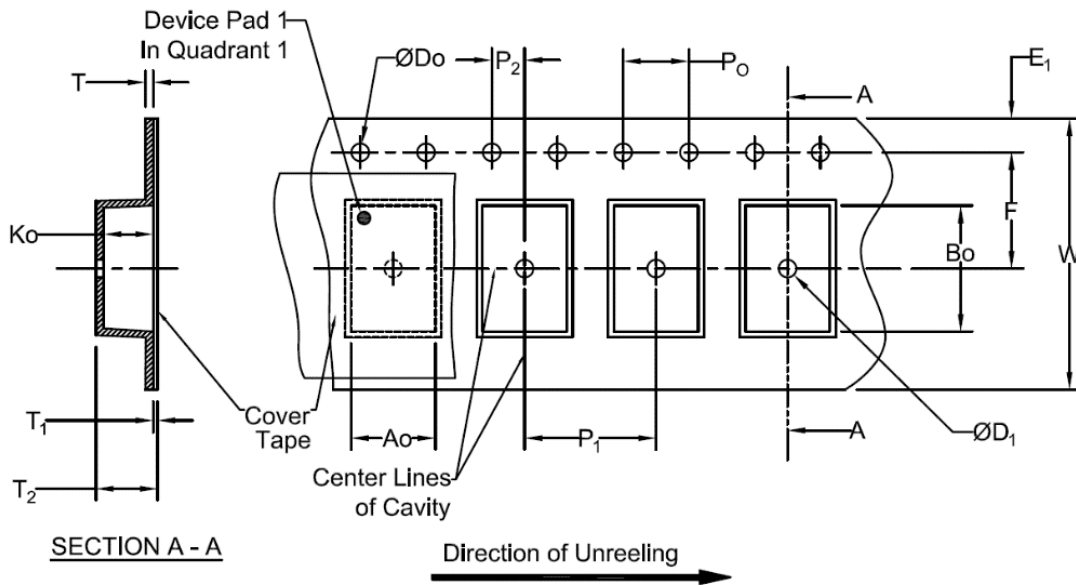


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Packaging

T= Tape and reel (1,000pcs/reel)

T3= Tape and reel (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: mm



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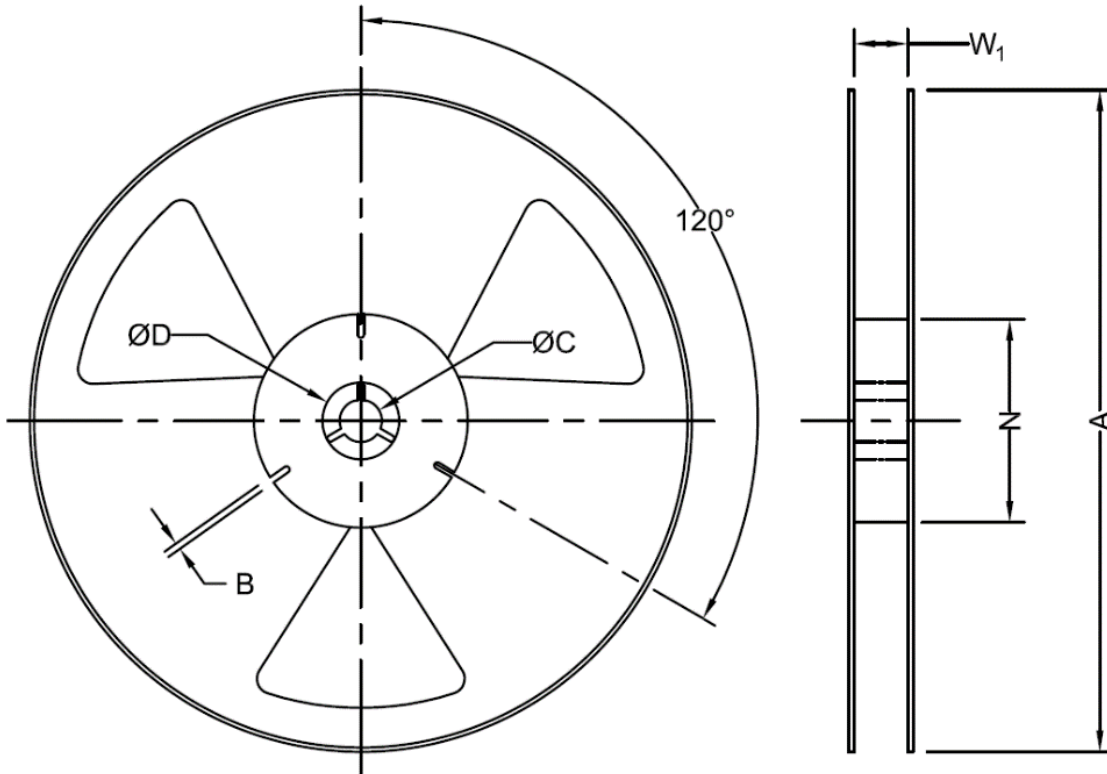
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Reel Specifications (mm)

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
	2000	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
	5000	178	1.5	13.0+0.5/-0.2	20.2	50	8.4+1.5/-0.0

*Note: Measured at Hub

Dimensions: mm

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