ASFLK8 Series

32.768KHZ LOW VOLTAGE CRYSTAL OSCILLATOR

Description



Abracon's ASFLK8 series is a low power temperature compensated crystal oscillator designed to operate at 32.768 kHz with a supply voltage of 1.2V in a 5.0 mm x 3.2 mm ceramic package. This series offers a ±25ppm frequency stability over an operating temperature range of -40°C to +85°C with a CMOS output.

Features

- Low Vdd 1.2 V operation
- Ultra Miniature 5.0 x 3.2 x 1.2 mm package
- Ultra-low current
- Tri-state function
- Suitable for high density SMT
- Suitable for RoHS compliant reflow process

Typical Applications

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

Electrical Specifications [Note 1]

Parameters		Min.	Typ.	Max.	Units	Notes
Frequency			32.768		kHz	
Operating Temperature range		-40		+85	°C	See options
Storage Temperature range		-55		+150	°C	
Overall Frequency stability [Note 2]		-25		+25	ppm	See options
Supply voltage (Vdd)		1.08	1.2	1.32	V	
Supply Current (Idd)			6	10	µA	No load
Tri-state function	VIH	≥ 0.7*Vdd or Open: Oscillation			V	
	VIL	< 0.3*Vdd: No Oscillation/Hi Z			V	
Output Voltage	VOH	0.9*Vdd			V	
	VOL			0.1*Vdd		
Output Load				15	pF	CMOS
Aging		-3.0		+3.0	ppm	First year @25°C± 3°C
Symmetry @ ½ Vdd		45	50	55	%	@ ½ Vdd
Start-up Time				2	ms	
Rise/Fall Time (Tr/Tf)			7	30	ns	
Aging (first year)		-3		+3	ppm	
Enable Time				5	ms	
Disable Time				0.2	µs	
Disable Current				3	µA	No load, pad 1 = ground

Note 1: All measurements guaranteed at nominal Vdd, nominal load, and at 25°C unless otherwise specified.

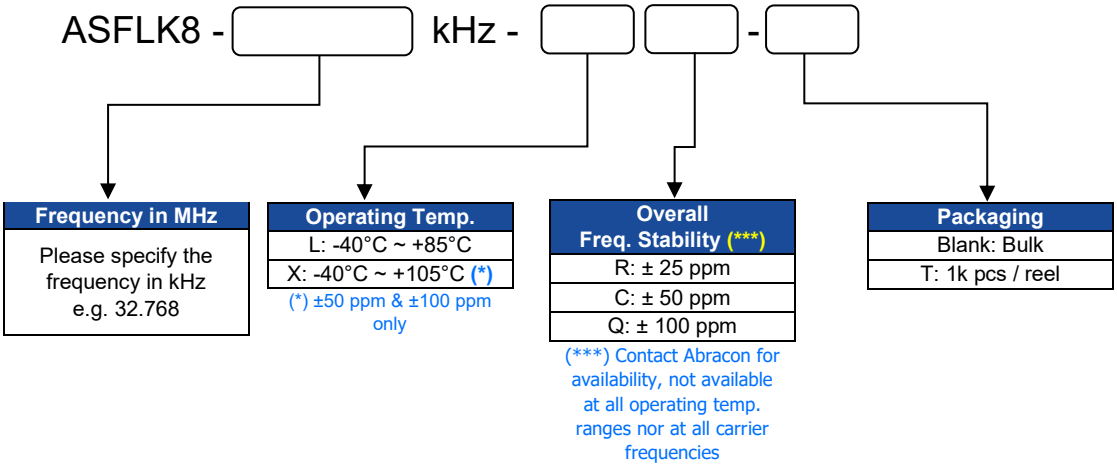
Note 2: Overall frequency stability includes initial frequency tolerance @25°C± 3°C and stability over the operating temperature range.

Absolute Maximum Ratings [Note 3]

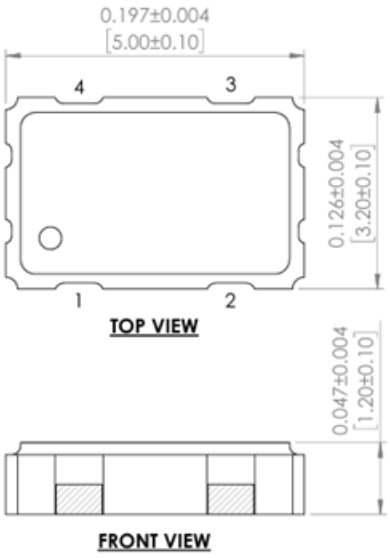
Parameters	Min.	Typ.	Max.	Units	Notes
Supply Voltage	Vss-0.5		5.0	V	
Input Voltage	Vss-0.5		V_{DD}+0.5	V	
Output Voltage	Vss-0.5		V_{DD}+0.5	V	
Maximum Junction Operating Temperature	-55		+150	ºC	
Ambient Operating Temperature Range	-55		+150	ºC	
Reflow Temperature			260	°C	See Reflow Profile
ESD Protection	HBM Class 2 (2kV to <4kV)				
MSL Rating	1				

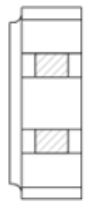
Note 3: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. 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.

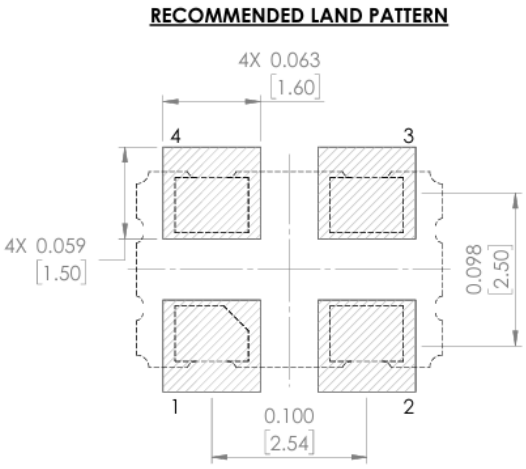
Options and Part Identification

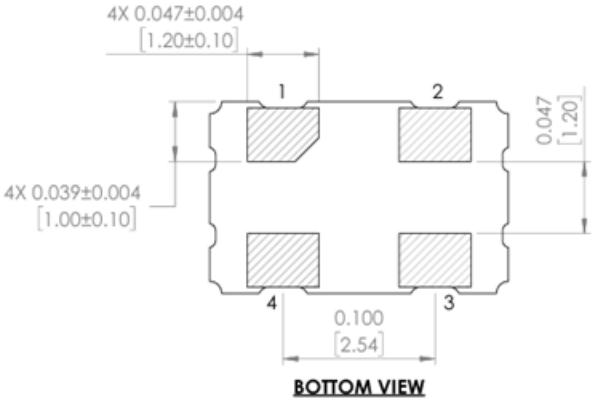


Mechanical Dimensions







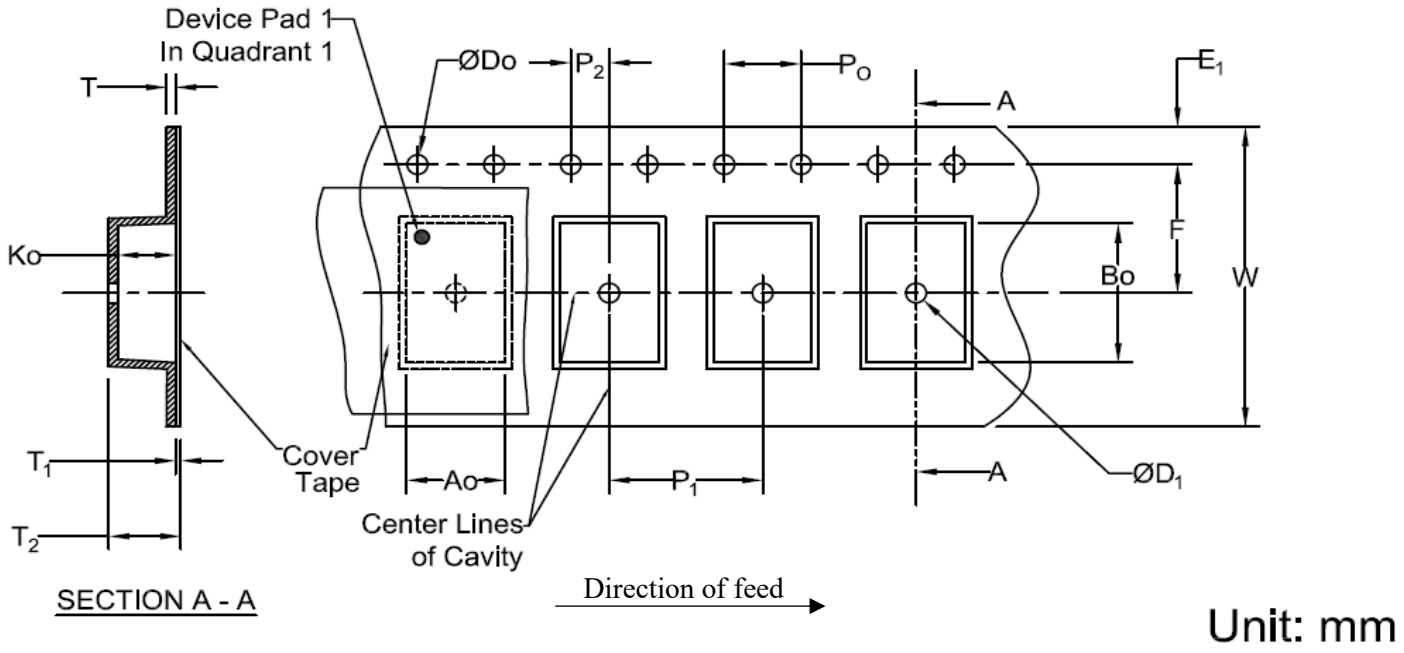


Pin #	Function
1	Tri-State
2	GND
3	Output
4	Vdd

Dimensions: Inches [mm]

Tape

T: 1,000pcs/reel

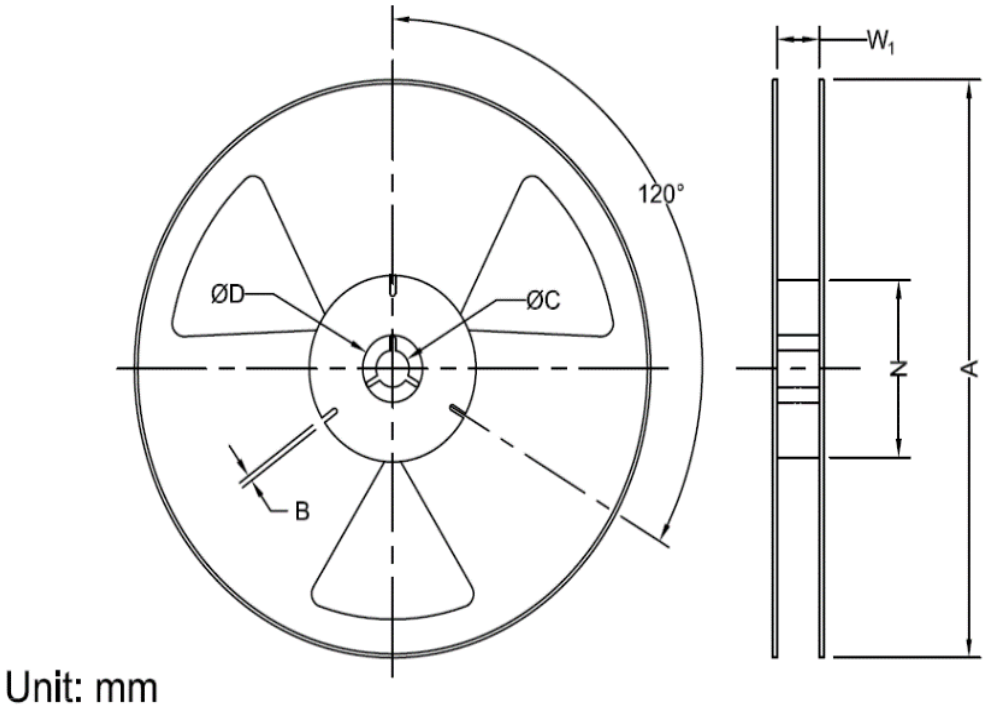


Tape Specifications (mm)							
Width	Ao	Bo	Do	D_1	E_1	F	Ko
12mm	*	*	1.5+0.1/-0.0	1.0	1.75±0.1	5.5±0.05	*

Tape Specifications (mm)							
Width	P_1	P_2	P_0	T	T_1 (Max)	T_2 (Max)	W (Max)
12mm	8.0±0.1	2.0±0.05	4.0±0.1	0.6	0.1	6.5	12.3

(*Note: Compliant to EIA-481)

Reel



Unit: mm

Tape Specifications (mm)							
Suffix	Qty/Reel	A (Nom)	B (Min)	C (Min)	D (Min)	N (Typ)	*W_1
-T1	1000	178	1.5	13.0+0.5/-0.2	20.2	50	12.4+2.0/-0.0

Reflow

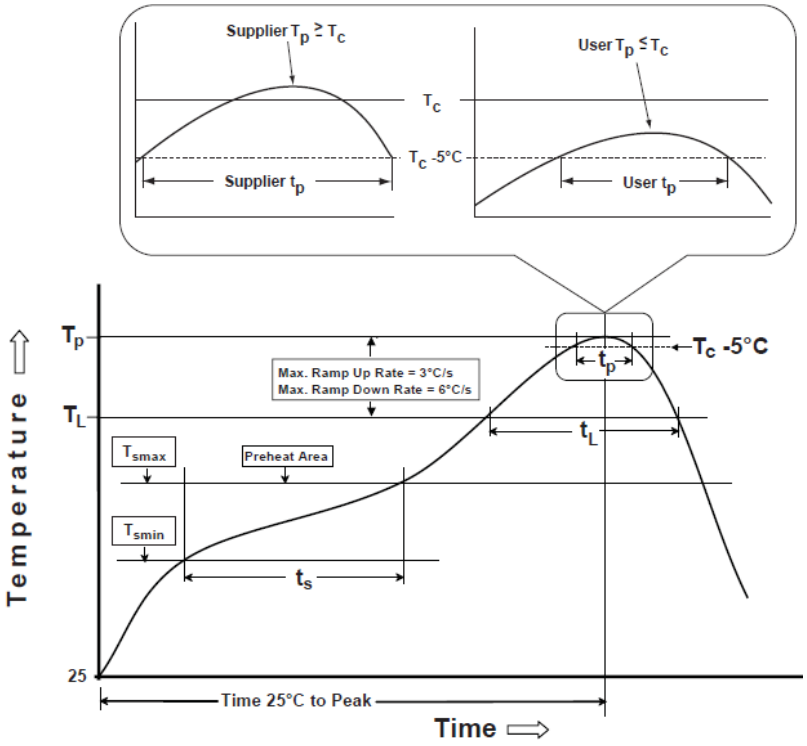


Table 1

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 - 180 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.	20 - 40 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.