

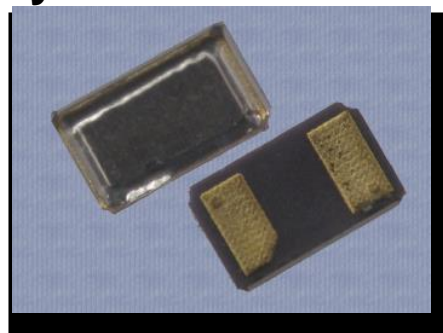


## KO PRODUCT FAMILY

### Surface Mount Tuning Fork Crystal 3.2 x 1.5

#### Features

- Ultra-Small Package
- 32.768 kHz
- Precision Sealed Unit



#### ❖ Specifications

Parameter	Value
Nominal Frequency	32.768 kHz
Frequency Tolerance at 25°C	±50 ppm Standard (±10 and ±20 ppm available)
Parabolic Curvature Constant	(-0.03 ±0.01) ppm/°C <sup>2</sup>
Operating Temperature Range	-40°C to +85°C Standard
Storage Temperature Range	-55°C to +125°C
Aging	±3 ppm per Year Maximum
Load Capacitance	9 pF or 12.5 pF
Equivalent Series Resistance	90K ohms Maximum
Shunt Capacitance	1.5 pF Typical
Drive Level	0.5 μW typical, 1 μW Max
Shock Resistance	±5 ppm Maximum 75 cm Drop Test in 3 axes onto a hardwood surface

#### ❖ Environmental

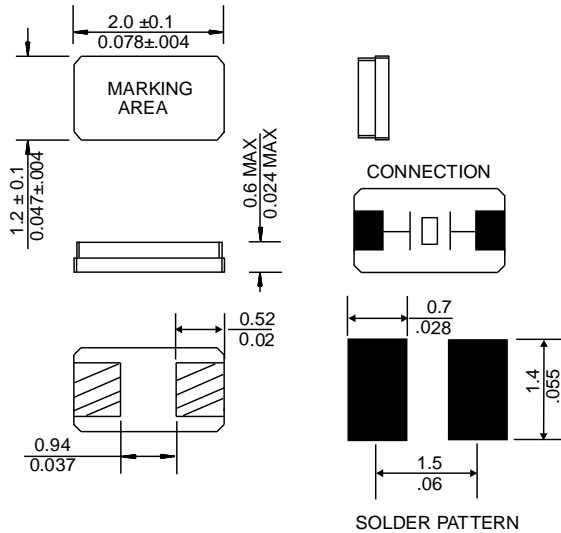
Parameter	Value
Moisture Sensitivity Level	1
RoHS	6/6 Complaint & Lead Free
REACH SVHC	Compliant
Halogen Free	Compliant
ESD Classification Level	N/A
Termination Finish	Au
Unit Weight (grams)	0.051

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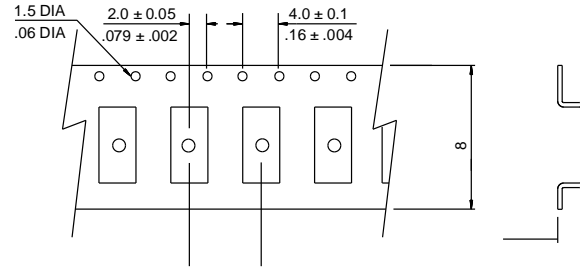


# KO PRODUCT FAMILY

## ❖ Mechanical Specification



## ❖ Carrier Tape Dimension



NOTE: REFER TO EIA-481 FOR DIMENSIONS

## ❖ Packaging

180 mm Reel Diameter  
8 mm Tape Width, 4 mm Pitch  
Quantity: 3000 pcs per Reel

In accordance with EIA-481

## ❖ Part Numbering

KO	-	32.768	-	12.5	-	XXXX
Product Family		Frequency (MHz)		Load Capacitance (pF)		1) Tolerance, 2) Stability, 3) Mode, 4) Temperature
				9 or 12.5		Tolerance: E=±10 ppm, D=±20 ppm, B=±50 ppm standard
						Stability: blank
						Mode: blank
						Temperature range: blank standard, E=Extended

### EXAMPLE: KO-32.768-12.5-D

Surface Mount Tuning Fork Crystal, 8.0 x 3.8 mm, 32.768 kHz, 12.5 pF load Capacitance, standard tolerance (±20 ppm) standard Temperature range -10°C to +60°C

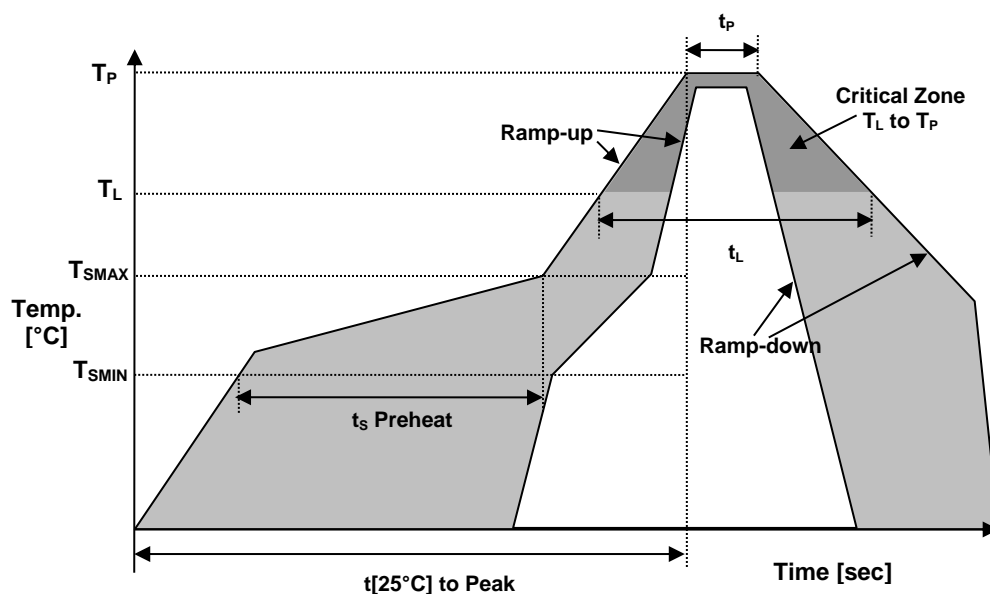
### EXAMPLE: KO-32.768-10-DE

Surface Mount Tuning Fork Crystal, 8.0 x 3.8 mm, 32.768 kHz, 10 pF load Capacitance, standard tolerance (±20 ppm), Extended Temperature range -40°C to +85°C



# KN PRODUCT FAMILY

## Reflow Profile



Reflow Profile (Reference IPC/JEDEC J-STD-020)		
Temperature Min Preheat	$T_{SMIN}$	150°C
Temperature Max Preheat	$T_{SMAX}$	200°C
Time ( $T_{SMIN}$ to $T_{SMAX}$ )	$t_s$	60 – 180 sec.
Temperature	$T_L$	217°C
Peak Temperature	$T_P$	260°C
Ramp-Up Rate	$R_{UP}$	3°C / sec. max
Ramp-Down Rate	$R_{DOWN}$	6°C / sec. max
Time within 5°C of Peak Temperature	$T_P$	10 sec.
Time $t[25^\circ\text{C}]$ to Peak Temperature	$t[25^\circ\text{C}]$ to Peak	480 sec.
Time	$T_L$	60 – 150 sec.

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# KN PRODUCT FAMILY

## ● MARKING

xFLmyR

- x – Internal Production ID code
- F – Frequency Code
- L – Load Capacitance Code
- m – Month code
- y – Year code
- R

LOAD CAPACITANCE CODE	
CODE	C <sub>L</sub> (pF)
9	9
F	12.5

FREQUENCY CODE	
CODE	Frequency (kHz)
3	32.768

YEAR CODE	
Year	Code
2011	1
2012	2
2013	3
2014	4
2015	5
2016	6
2017	7
2018	8
2019	9
2020	0

MONTH CODE	
Month	Code
JANUARY	A
FEBRUARY	B
MARCH	C
APRIL	D
MAY	E
JUNE	F
JULY	G
AUGUST	H
SEPTEMBER	J
OCTOBER	K
NOVEMBER	L
DECEMBER	M

## ● APPROVAL

DRAWN BY	FP, 29 March 2017
APPROVED BY	FP, 29 March 2017
REVISION	A, Initial Release

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