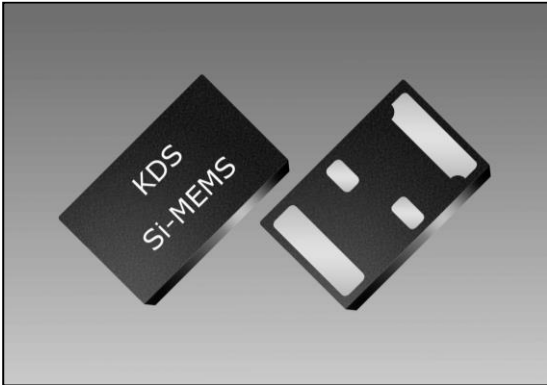


kHz Band MEMS Oscillator

MO1630



■ Features

- Fixed 32.768 kHz
- Small SMD package: 2.0 x 1.2 mm
- Ultra-low power: +1.0 μ A (typ.)
- Internal filtering eliminates external Vdd bypass cap
- $\leq \pm 20 \times 10^{-6}$ frequency tolerance
- $< 100 \times 10^{-6}$ Stability over -40°C to +85°C

■ Applications

- Tablets
- e-Readers
- Sport Video Camcorders
- Industrial and Automotive



■ Standard Specification

Item	symbol	Min.	Typ.	Max.	Unit	Condition
Output Frequency	Fout	32.768			kHz	
Operating Supply Voltage	Vdd	+1.5	-	+3.63	V	T _A = over temperature
Operating Temperature Range	T _{use}	-10~+70 / -40~+85 / -40~+105			°C	
Frequency stability Over Temperature [1]	F _{stab}	-	-	+75	x10 ⁻⁶	T _A = -10°C to +70°C, Vdd: +1.5V – +3.63V
		-	-	+100		T _A = -40°C to +85°C, Vdd: +1.5V – +3.63V
		-	-	+150		T _A = -40°C to +105°C, Vdd: +1.5V – +3.63V
Initial Tolerance [2]	F _{init}	-20	-	+20	x10 ⁻⁶	T _A = +25°C, post reflow, Vdd: +1.5V – +3.63V.
First year Frequency Aging		-1.0	-	+1.0	x10 ⁻⁶	T _A = +25°C
Operating Current	I _{dd}	-	+1.0	-	μ A	T _A = +25°C, Vdd: +1.5V – +3.3V. No load
		-	-	+1.90		T _A = -10°C to +70°C, Vdd max: +3.63V. No load
		-	-	+2.20		T _A = -40°C to +85°C, Vdd max: +3.63V. No load
		-	-	+2.80		T _A = -40°C to +105°C, Vdd max: +3.63V. No load
		-	-	-		T _A = -40°C to +105°C, Vdd max: +3.63V. No load
Start-up Time at Power-up	T _{start}	-	180	300	ms	T _A = +25°C $\pm 10^\circ$ C
		-	-	450		T _A = -40°C to +70°C
		-	-	500		T _A = +85°C
		-	800	-		T _A = +105°C
		-	-	-		
Output Clock Duty Cycle	DC	48	-	52	%	
Output Voltage Low	V _{OL}	-	-	Vdd x 0.1	V	Vdd: +1.5V – +3.63V. I _{OL} = +10 μ A, 15 pF
Output Voltage High	V _{OH}	Vdd x 0.9	-	-	Vdd	Vdd: +1.5V – +3.63V. I _{OH} = -10 μ A, 15 pF
Output Rise/Fall Time	tr,tf	-	100	200	ns	10-90%, 15 pF load, Vdd = +1.5V to +3.63V

[1]. Measured peak-to-peak. Inclusive of Initial Tolerance at +25°C, and variations over operating temperature, rated power supply voltage and load.

[2]. Measured peak-to-peak. Tested with Keysight 53132A frequency counter.

Due to the low operating frequency, the gate time must be ≥ 100 ms to ensure an accurate frequency measurement.

Consult our sales representative for other specifications.

■ Dimensions and Patterns

Package Size – Dimensions (Unit: mm)	Recommended Land Pattern (Unit: mm)										
<p>2.0 x 1.2 mm SMD</p> <div style="margin-top: 10px;"> <p>Pin Connections</p> <table border="1" style="font-size: small;"> <thead> <tr> <th>Pin No.</th> <th>Connection</th> </tr> </thead> <tbody> <tr> <td>#1</td> <td>NC</td> </tr> <tr> <td>#2</td> <td>GND</td> </tr> <tr> <td>#3</td> <td>CLK Output</td> </tr> <tr> <td>#4</td> <td>Vdd</td> </tr> </tbody> </table> </div>	Pin No.	Connection	#1	NC	#2	GND	#3	CLK Output	#4	Vdd	
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