



# S3880 - 32.768K CMOS Clock Oscillator

July 2019



- The Pletronics' S3880 is a quartz crystal controlled precision square wave generator with a CMOS output.
- The package is designed for high density surface mount designs.
- This is a low cost mass produced oscillator.
- Tape and Reel packaging
- 32.768 kHz
- 1.5 x 3.2 x 1.0 mm LCC Ceramic Package
- **Enable/Disable Function on pad 3**
- **Output on pad 1**
- **Excellent shock resistance**
- **Start-up Time of 0.5 Seconds or less**

**Pletronics Inc. certifies this device is in accordance with the  
RoHS 3 (2015/863) and WEEE 2 (2012/19/EU) directives.**

Pletronics Inc. guarantees the device does not contain the following:

Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's

Weight of the Device: 0.04 grams

Moisture Sensitivity Level: 1 As defined in J-STD-020D.1

Second Level Interconnect code: e4

## Absolute Maximum Ratings:

Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.5V to +7.0V
V <sub>i</sub> Input Voltage	-0.5V to V <sub>CC</sub> + 0.5V
V <sub>o</sub> Output Voltage	-0.5V to V <sub>CC</sub> + 0.5V

## Thermal Characteristics

The maximum die or junction temperature is 145°C

The thermal resistance junction to board is 60 to 100°C/Watt depending on the solder pads, ground plane and construction of the PCB.

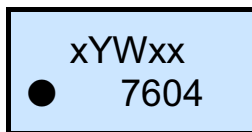
## ESD Rating

Model	Minimum Voltage	Conditions
Human Body Model	1500	MIL-STD-883 Method 3115
Charged Device Model	1000	JESD 22-C101

**Part Number:**

S3880	- 32.768K	-XX	
			<b>Packaging code or blank</b> T1K = 1000 per Tape and Reel T3K = 3000 per Tape and Reel  Smaller quantities or quantities that are not in 1K or 3K increments are all supplied as “cut tape” with no leader or trailer.
			<b>Frequency in kHz</b>
			<b>Series Model</b>

**Part Marking:**



Y Year  
 WW Week  
 xxx Manufacturing lot information  
 7604 Part designation

**Reliability: Environmental Compliance**

Parameter	Maximum Frequency Change	Condition
Mechanical Shock	±5ppm	5000g at 0.3mS, ½ sine
Vibration	±5ppm	20g from 10Hz to 2,000Hz

Parameter	Condition
Solderability	MIL-STD-883 Method 2003
Thermal Shock	MIL-STD-883 Method 1011, Condition A

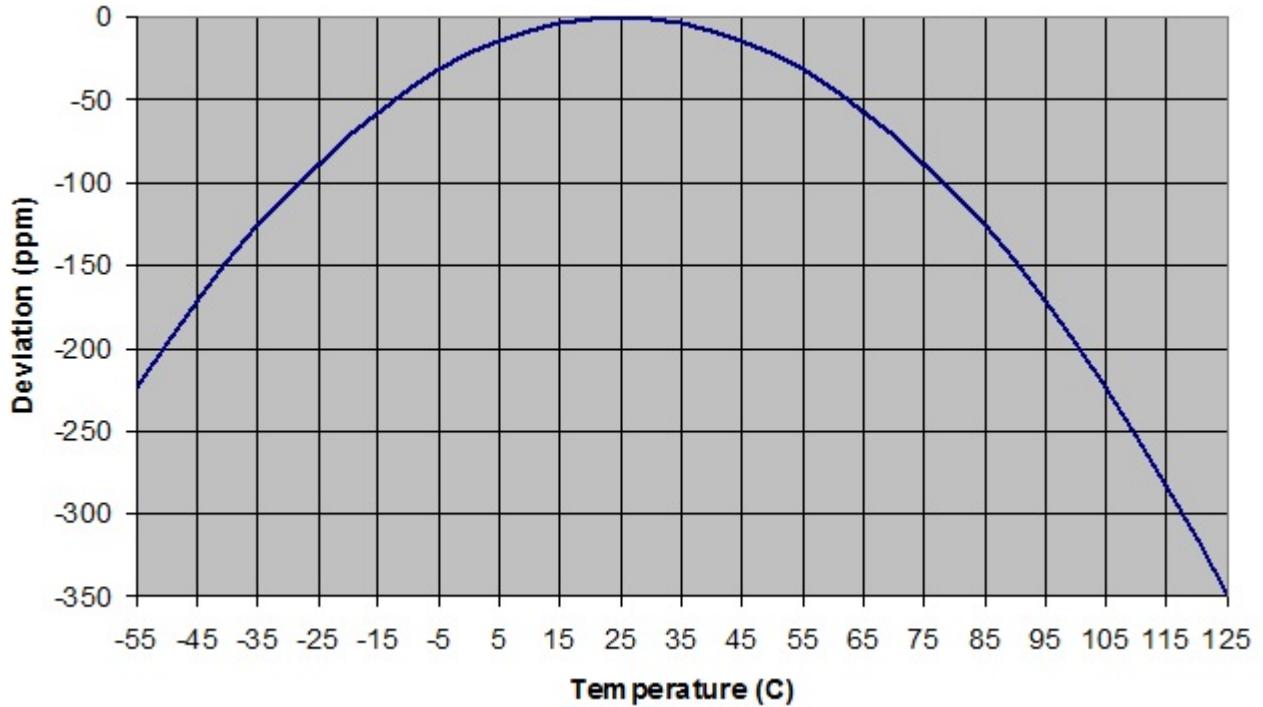
**Electrical Specification for V<sub>CC</sub> 1.2V to 5.5V**

Item	Min	Max	Unit	Condition	
Frequency	32.768		kHz		
Frequency Calibration Tolerance	-20	+20	ppm	at V <sub>CC</sub> = 3.3V and 25 °C	
Frequency Stability *	-70	+20	ppm	when operating at -20 to +70 °C	
	-170	+20	ppm	when operating at -40 to +85 °C	
Frequency versus Supply	0	±1.5	ppm/V	for V <sub>CC</sub> range of 2.3 V to 5.5V	
Output Waveform	CMOS				
Output High Level	V <sub>CC</sub> - 0.4	-	V	I <sub>OH</sub> = 1.0mA	C <sub>LOAD</sub> =10pF (See load circuit)
Output Low Level	-	0.4	V	I <sub>OL</sub> = -1.0mA	
Output T <sub>RISE</sub> and T <sub>FALL</sub>	-	70	nS	C <sub>LOAD</sub> = 10pF T <sub>R</sub> / T <sub>F</sub> 10% to 90% and D.C. at 50% point of V <sub>CC</sub> (See load circuit)	
Output Symmetry	40	60	%		
V disable	-	20	%	of V <sub>CC</sub> applied to pad 3	
V enable	80	-	%	of V <sub>CC</sub> applied to pad 3	
Output leakage V <sub>OUT</sub> = V <sub>CC</sub>	-10	+10	uA	Pad 3 low, device disabled	
	V <sub>OUT</sub> = 0V	-10	+10		
Supply Current (I <sub>CC</sub> )	-	0.3	uA	V <sub>CC</sub> = 1.2 V	C <sub>LOAD</sub> = 10 pF
	-	0.5	uA	V <sub>CC</sub> = 3.0 V	
	-	0.9	uA	V <sub>CC</sub> = 5.5 V	
Enable time	-	100	nS	Time for output to reach a logic state	
Disable time	-	100	nS	Time for output to reach a high Z state	
Start up time	-	0.5	S	Time for output to reach specified frequency	
Operating Temperature Range	-40	+85	°C		
Storage Temperature Range	-55	+125	°C		

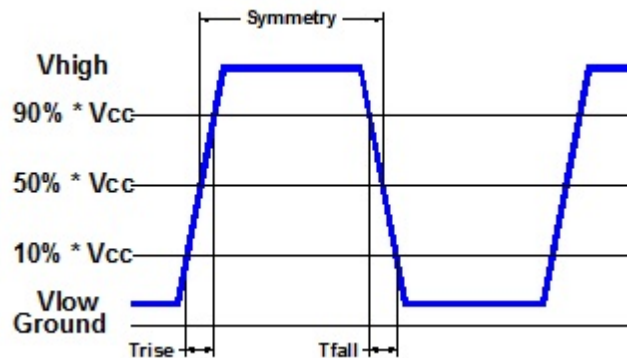
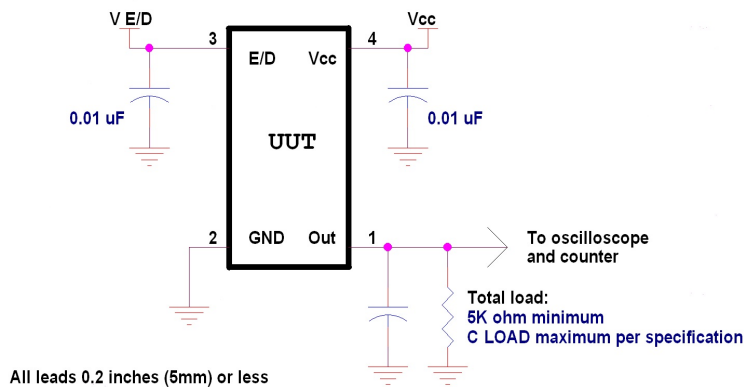
\* Temperature characteristics Deviation in ppm = (T-T<sub>0</sub>)<sup>2</sup> \* (-0.035ppm/°C<sup>2</sup>) ±10%  
T is temperature in °C T<sub>0</sub> is the turn over temperature in °C

Specifications with Pad 3 E/D open circuit unless otherwise stated.

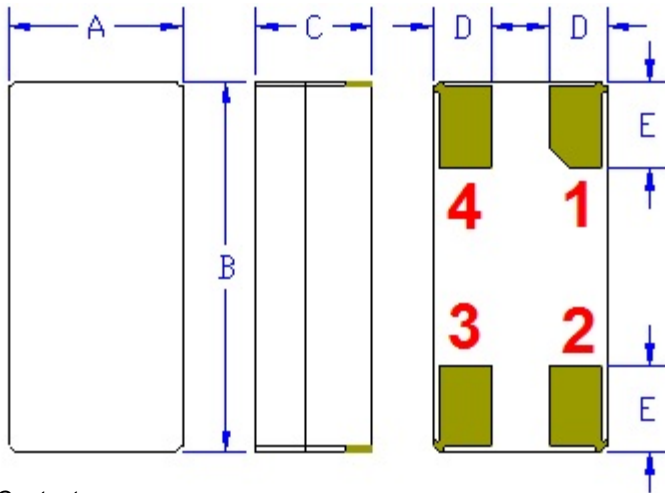
**Typical Frequency versus Temperature Characteristics**



**Load Circuit and Test Waveform**



### Mechanical:



	Inches	mm
A	0.059 $\pm$ 0.006	1.5 $\pm$ 0.15
B	0.126 $\pm$ 0.006	3.2 $\pm$ 0.15
C	0.039 max	1.0 max
D <sup>1</sup>	0.020	0.50
E <sup>1</sup>	0.030	0.75

#### Contacts :

Gold 11.8  $\mu$ mches 0.3  $\mu$ m minimum over  
Nickel 50 to 350  $\mu$ mches 1.27 to 8.89  $\mu$ m

Not to Scale

<sup>1</sup> Typical dimensions

**IMPORTANT: The pin assignments are different from many clock oscillators**

Pad	Function	Note
1	Output	
2	Ground (GND)	
3	Enable/Disable Output	When this pad is not connected the oscillator shall operate. When this pad is logic low the output will be inhibited (high impedance state.) Recommend connecting this pad to $V_{CC}$ if the oscillator is to be always on.
4	Supply Voltage ( $V_{CC}$ )	Recommend connecting appropriate power supply bypass capacitors as close as possible.



### Layout and application information

For Optimum Jitter Performance, Pletronics recommends:

- a ground plane under the device while avoiding connection to the two dot pads on the bottom. Use the PCB solder mask to isolate the two dot pads
- no large transient signals (both current and voltage) should be routed under the device
- do not layout near a large magnetic field such as a high frequency switching power supply
- do not place near piezoelectric buzzers or mechanical fans.



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