



# PLETRONICS S3880 32.768kHz CMOS Clock Oscillator



S3880  
3.2 x 1.5 x 1.0 mm  
LCC Ceramic Package

## Features

- Pletronics' S3880 is a quartz crystal controlled precision square wave oscillator
- CMOS Output (will interface with TTL devices)
- Enable/Disable Function
- 1.2 ~ 5V nominal Supply Voltage
- 32.768 kHz

## Applications

Smart meters  
Security Systems  
Medical Monitoring  
Set top box  
Home Automation  
Automotive Entertainment system

## Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Frequency Range	-	32.768	-	kHz	
Calibration Tolerance			±20	ppm	
Frequency Stability (-0.035±10% ppm/Δ°C <sup>2</sup> )	-80 -170	-	+20 +20	ppm	Operating Temperature = -20 to +70°C Operating Temperature = -40 to +85°C
Operable Temperature Range	-40	-	+85	°C	
Turnover Temperature	20	25	30	°C	
Supply Voltage <sup>1</sup> V <sub>CC</sub>	1.3	3.0	5.5	V	1.2V~5.5V -30 to +85°C
Supply Voltage Coefficient	-	-	1.5	ppm/V	1.5V ≤ V <sub>CC</sub> ≤ 5.5V
Supply Voltage Slew Rate V <sub>CCSR</sub>			±0.5	V/ms	
Output Disabled Current I <sub>CC</sub> (Pin 3 Low) at 25°C <sup>2</sup>	-	-	0.5 0.55	μA	3.0V 5.0V
Output Waveform	CMOS				
Duty Cycle	40	-	60	%	At 50% V <sub>CC</sub> level  C <sub>LOAD</sub> = 10 pF 10% to 90% of V <sub>CC</sub> See Load Circuit
Output V <sub>HIGH</sub>	V <sub>CC</sub> - 0.4	-	-	V	
Output V <sub>LOW</sub>	-	-	0.4	V	
Output T <sub>RISE</sub> and T <sub>FALL</sub>	-	70	100	ns	
Startup Time	-	-	0.8	s	Time for output to reach specified frequency
V <sub>DISABLE</sub>	-	-	20	%	Of V <sub>CC</sub> applied to Pad 1
V <sub>ENABLE</sub>	80	-			
Synchronized Output Enable Time	15.3	-	45.8	μs	See diagram page 2
Synchronized Output Disable Time	0	-	15.3	μs	See diagram page 2
Aging 1st Year	-	-	±3	ppm	At 25°C
Storage Temperature Range	-55	-	+125	°C	

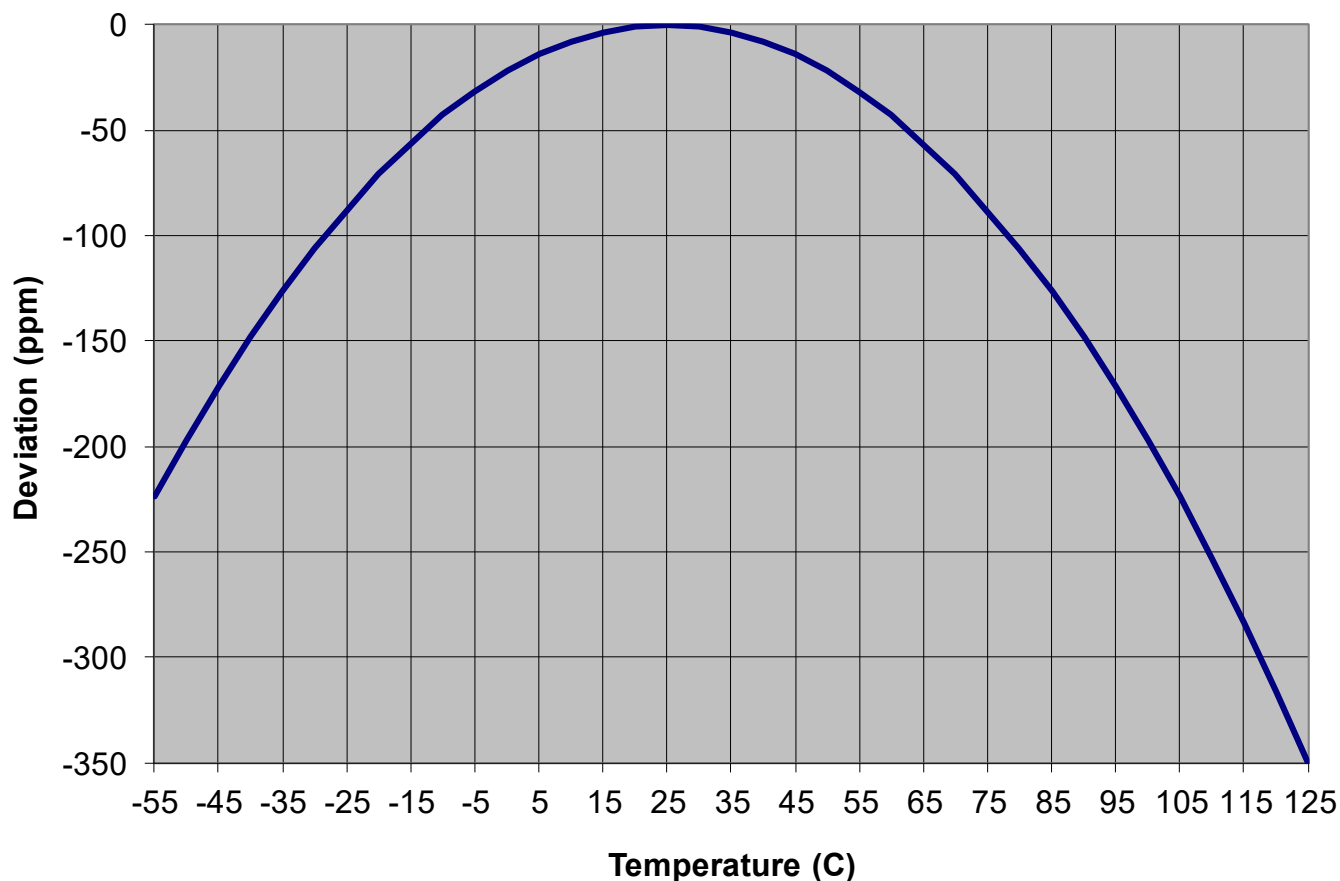
### Notes:

<sup>1</sup> Place an appropriate power supply bypass capacitor next to device for correct operation

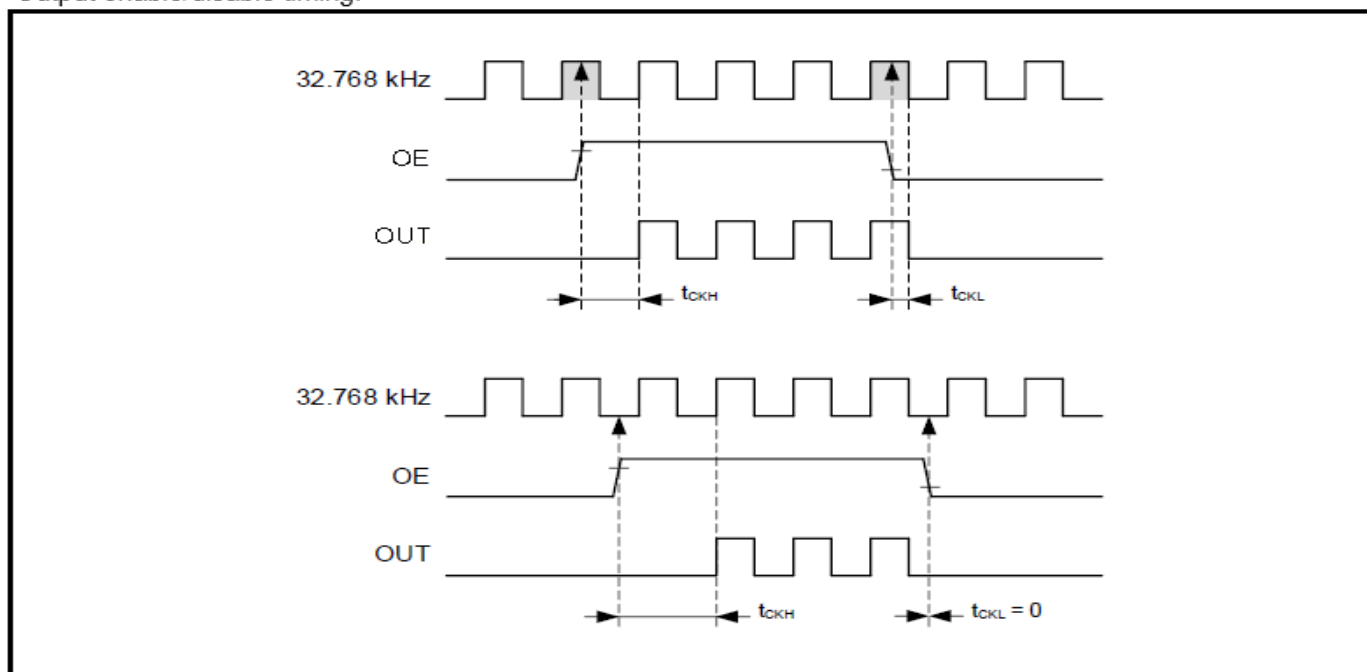
<sup>2</sup> When Pin 3 High/open, additional supply current, ΔI<sub>CC</sub>, can be calculated as follows:

ΔI<sub>CC</sub> = CL \* V<sub>CC</sub> \* 32768 Example: 10pF \* 2.5V \* 32768 = 819nA

## Typical Frequency vs Temperature:



## Output enable/disable timing:





# PLETRONICS S3880 32.768kHz CMOS Clock Oscillator

## Part Number

Series Model	Frequency	Optional T&R Packaging code
S3880	- 32.768K	-XX
	32.768kHz	T1K = 1000 per Reel (Std) T3K = 3000 per Reel Quantities below 1K or not in 1K or 3K increments are supplied as 'cut tape' with no leader/trailer

## Device Marking

xYWWxx • 7604	x YWW 7604	= Internal Code = Date Code, Year WeekWeek = Part Designation
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## Package Labeling

P/N Label is 1" x 2.6" (25.4mm x 66.7mm)  
Font is Courier New  
Bar code is 39-Full ASCII

RoHS Label is 1" x 2.6" (25.4mm x 66.7mm)  
Font is Arial

P/N: 	
S3880-32.768K	
Customer P/N: 	
12345678	
Qty: 	D/C: 
1000	9DW
MSL: 1	

### RoHS Compliant

2nd Lvl Interconnect

Category=e4

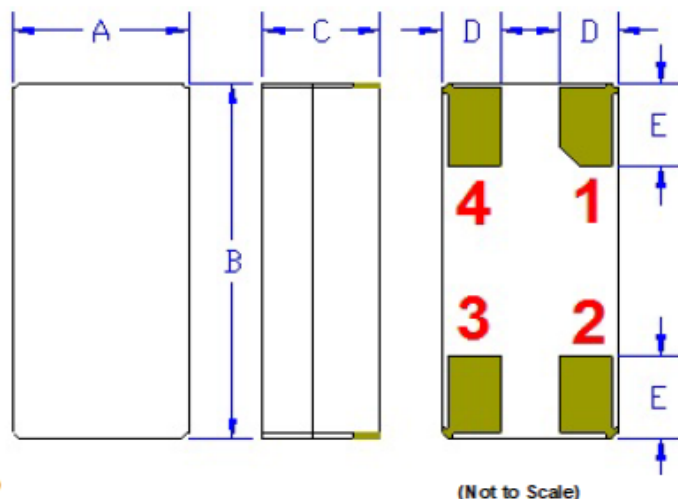
Max Safe Temp=260C for 10s 2X Max

**Pletronics Inc. certifies this device is in accordance with the RoHS and REACH directives.**

Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's  
Weight of the Device: 0.012 grams  
Moisture Sensitivity Level: 1 As defined in J-STD-020D  
Second Level Interconnect code: e4

## Mechanical Dimensions

### 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

<sup>1</sup> Typical dimensions

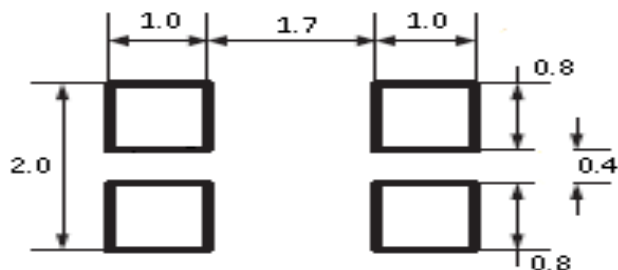
Contacts (pads): Gold 11.8 to 39.4 pinches (0.3 to 1.0  $\mu$ m) over Nickel 50 to 350 pinches (1.27 to 8.89  $\mu$ m)

**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 <sub>CC</sub> if the oscillator is to be always on.
4	Supply Voltage (V <sub>CC</sub> )	Recommend connecting appropriate power supply bypass capacitors as close as possible.

## Soldering Layout

### Recommended Solder Pad:



Pad Layout mm shown

Disclaimer: Recommended layout shown.  
Adjust layout as needed for individual  
process requirements.

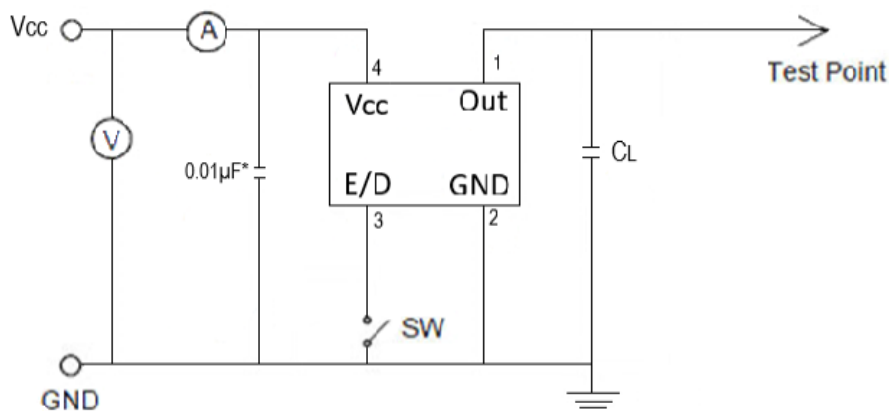
For Optimum Jitter Performance, Pletronics recommends:

- A ground plane under the device
- Do not route large transient signals (both current and voltage) under the device
- Do not place 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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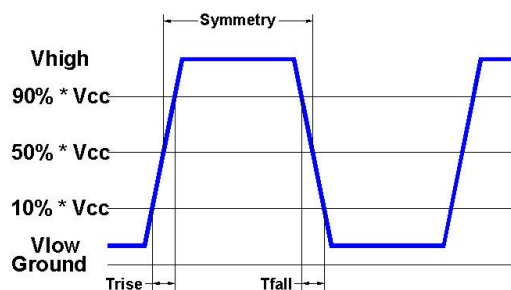
## Electrical Test / Load Circuit



Notes:

CL: 10pF Includes the input capacitance of oscilloscope

\* 0.01µF external by-pass filter is recommended



## Environmental / ESD Ratings

Reliability: Environmental

ESD Rating

Parameter	Condition
Mechanical Shock	MIL-STD-883, Method 2002, Condition B
Vibration	MIL-STD-883, Method 2007, Condition A
Solderability	IPC J-STD-002
Thermal Cycle	MIL-STD-883 Method 1010, Condition B

Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114

Absolute Maximum Ratings

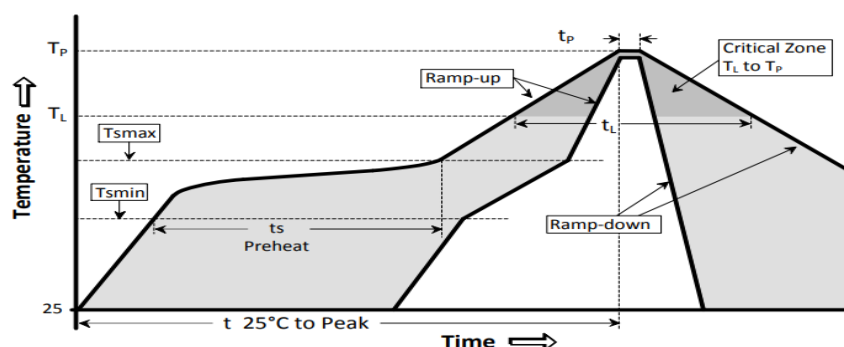
Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.3V to +6.0V
V <sub>i</sub> Input Voltage	-0.3V to +6.0V
V <sub>o</sub> Output Voltage	-0.3V to +6.0V

### Thermal Characteristics:

The maximum die or junction temperature is 125°C

## Reflow Cycle

**Maximum Reflow Conditions in accordance with IPC/JEDEC J-STD-020C "Pb-free"**

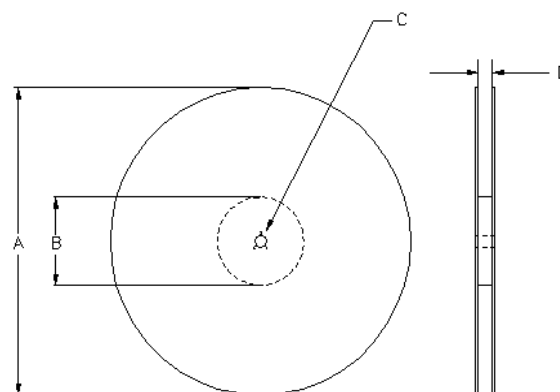
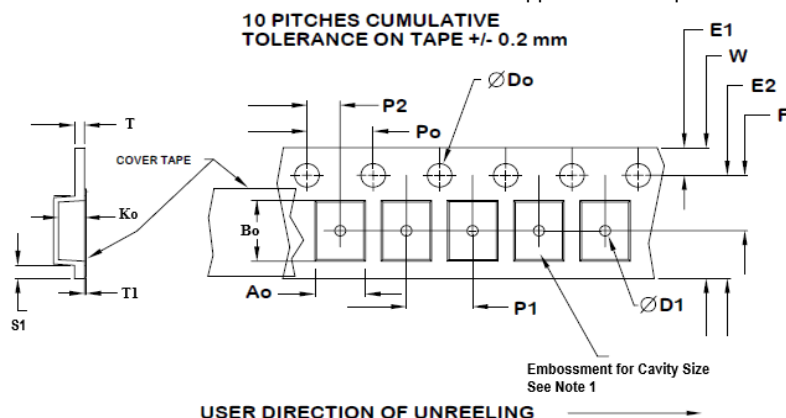


The part may be reflowed 2 times without degradation (typical for lead free processing).

Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	$(T_{S_{max}} \text{ to } T_P)$	3°C / second max	°C / s
Ramp down Rate	$T_{cool}$	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to-peak}$	8 minutes max	min
<b>Preheat</b>			
Temperature min	$T_{S_{min}}$	150	°C
Temperature max	$T_{S_{max}}$	200	°C
Time $T_{S_{min}}$ to $T_{S_{max}}$	$t_s$	60 – 180	sec
<b>Soldering above liquidus</b>			
Temperature liquidus	$T_L$	217	°C
Time above liquidus	$t_L$	60 – 150	sec
<b>Peak temperature</b>			
Peak Temperature	$T_p$	260	°C
Time within 5°C of peak temperature	$t_p$	20 – 40	sec

## Tape and Reel

Quantities below 1K or not in 1K or 3K increments are supplied as 'cut tape' with no leader/trailer



Tape Variable Dimensions Table 2							
Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
12mm	10.25	5.5 +0.05	4.0 +0.1	12.2	1.75±0.1	3.45±0.1	1.1±0.1

Dimensions in mm      Drawing Not to scale  
Note 1: Embossed cavity to conform to EIA-481-B

Tape Constant Dimensions Table 1								
Tape Size	Do	D1 typ	E1	Po	P2	S1 min	T max	T1 max
12mm	1.5	1.5	1.75	4.0	2.0	0.6	0.3	0.1
	±0.1		±0.1	±0.1	±0.05			

Reel Dimensions (may vary) Table 3						
	A		B		C	D
Reel Size	Inches	mm	Inches	mm	mm	mm
7	7.0	177.8	2.42	61.5	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0



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