PLETRONICS S3880 32.768kHz CMOS Clock Oscillator

S3880
3.2 x 1.5 x 1.0 mm
LCC Ceramic Package

Features

- 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

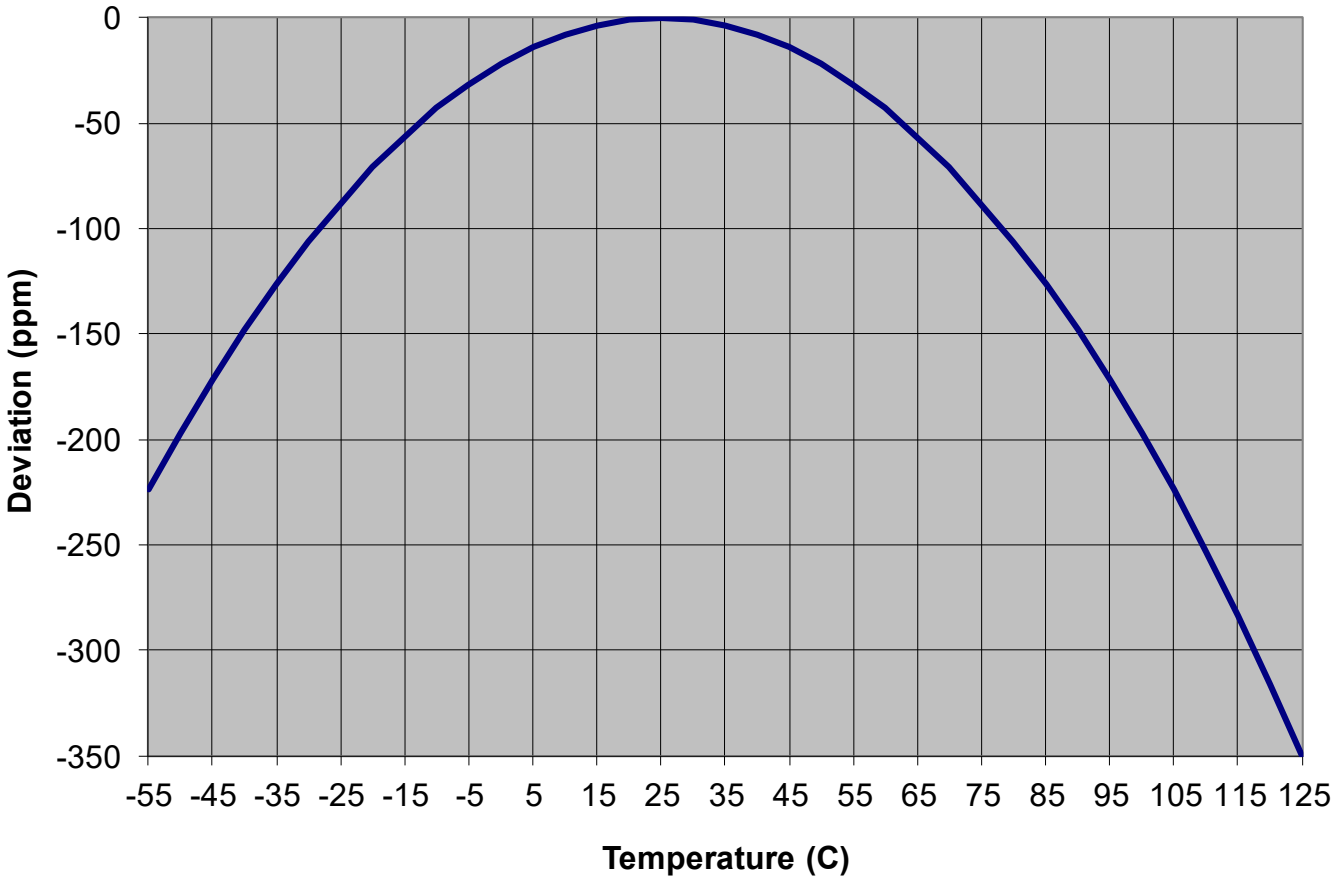
Smart meters
Security Systems
Medical Monitoring
Set top box
Home Automation
Automotive Entertainment system

Electrical Characteristics

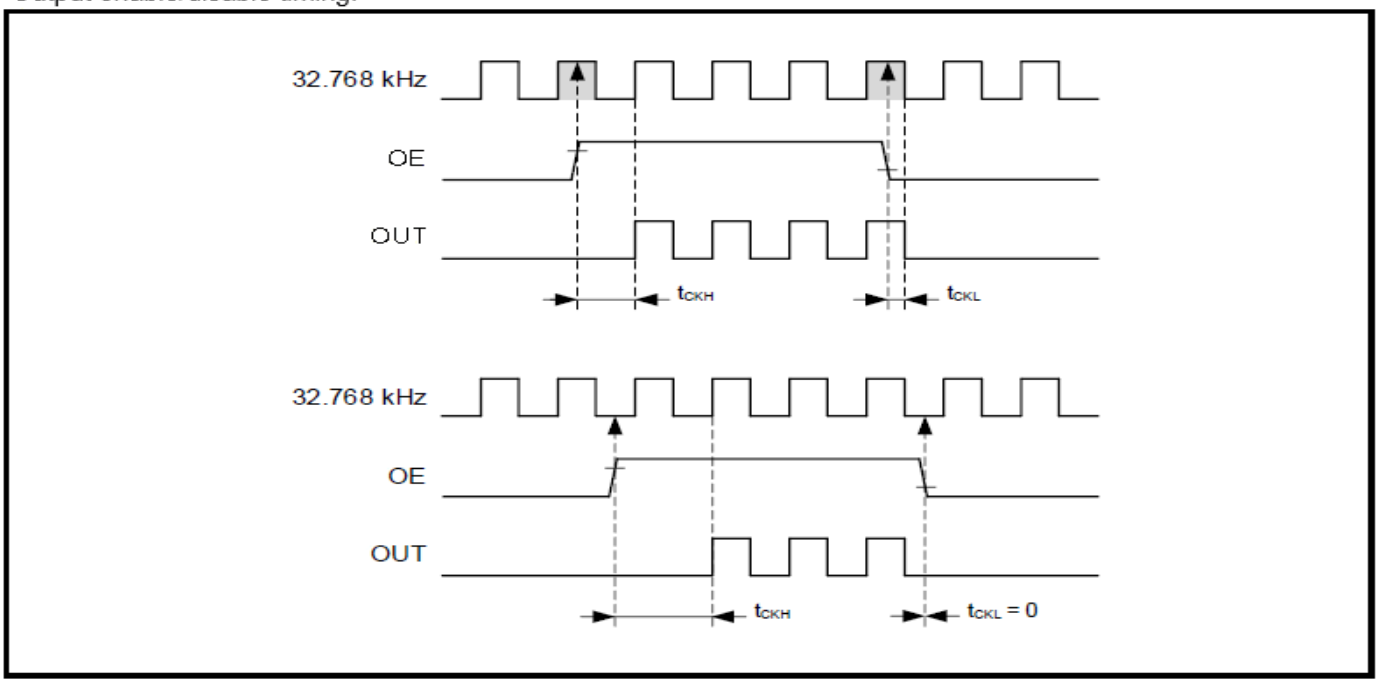
Parameter	Min	Typ	Max	Unit	Condition
Frequency Range	-	32.768	-	kHz	
Calibration Tolerance			±20	ppm	
Frequency Stability (-0.035±10% ppm/Δ°C^2)	-80 -170	-	+20 +20	ppm	Operating Temperature = -20 to +70°C Operating Temperature = -40 to +85°C
Operable Temperature Range	-40	-	+85	°C	
Turnover Temperature	20	25	30	°C	
Supply Voltage [1] V_{CC}	1.3	3.0	5.5	V	1.2V~5.5V -30 to +85°C
Supply Voltage Coefficient	-	-	1.5	ppm/V	1.5V ≤ Vcc ≤ 5.5V
Supply Voltage Slew Rate (V_{CCSR})			±0.5	V/ms	
Supply Current (I_{CC}) [2]					See note 2 below
Output Disabled Current Icc (Pin 3 Low) at 25°C	-	-	0.5 0.55	µA	3.0V 5.0V
Output Disabled Current Icc (Pin 3 Low) -40 to 85°C	- -	- -	1.0 1.1	mA	3.0V 5.0V
Output Logic	CMOS				Output load = 15pF max
Duty Cycle	40	-	60	%	At 50% Vcc level
Output V_{HIGH} (V_{OH}) I_{OH} = -1mA	V_{CC} - 0.4	-	-	V	
Output V_{LOW} (V_{OL}) I_{OL} = 1mA	-	-	0.4	V	
Output T_{RISE} and T_{FALL}	-	70	100	ns	C_{LOAD} = 10 pF 10% to 90% of V_{CC} See Load Circuit
Startup Time	-	-	0.8	s	Time for output to reach specified frequency
$V_{DISABLE}$ (V_{IL})	-	-	0.2Vcc	V	
V_{ENABLE} (V_{IH})	0.8Vcc	-			
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:
[1] Place an appropriate power supply bypass capacitor next to device for correct operation
[2] When Pin 3 High/open, additional supply current, ΔIcc, can be calculated as follows:
ΔIcc = CL * Vcc * 32768 Example: 10pF * 2.5V * 32768 = 819nA

Typical Frequency vs Temperature:



Output enable/disable timing:



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

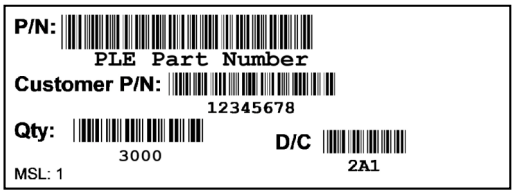
Device Marking

xYWWxx
• *7604*

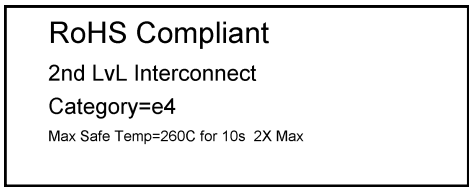
x	= Internal Code
YWW	= Date Code, Year WeekWeek
7604	= Part Designation

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



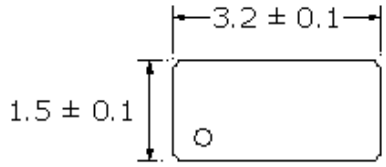
RoHS Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Arial



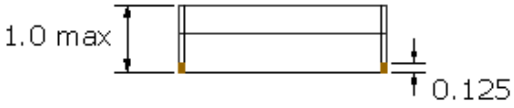
Pletronics Inc. certifies this device is in accordance with the RoHS and REACH directives.

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

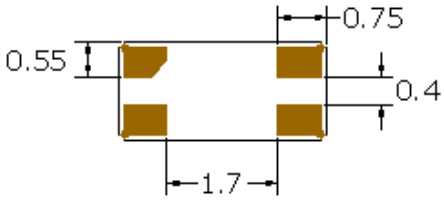


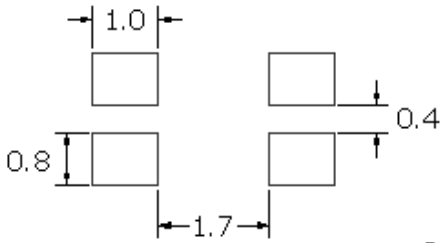
Pin Connections	
Pin	Function
1	Output
2	Ground
3	Output Enable
4	Vcc



Enable/Disable (Pad 3)	
VIH/Open	Output Enabled
VIL/Gnd	Output Disabled / Tristate

Recommended solder pad layout





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

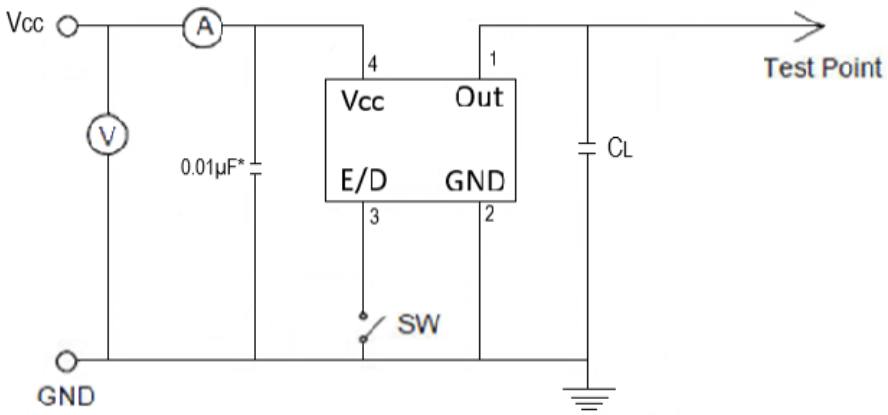
Dimensions in mm

Contacts (pads): Gold (0.3 to 1.0 µm) over Nickel (1.27 to 8.89 µm)

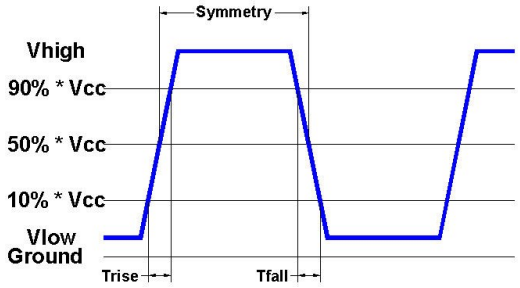
For Optimum Jitter Performance, Pletronics recommends:

- 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

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

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

Thermal Characteristics:
The maximum die or junction temperature is 125°C

ESD Rating

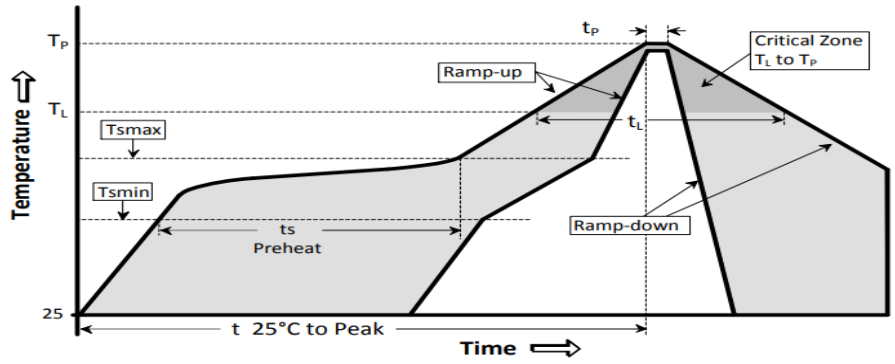
Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114

Absolute Maximum Ratings

Parameter	Unit
V_{CC} Supply Voltage	-0.3V to +6.0V
Vi Input Voltage	-0.3V to +6.0V
Vo Output Voltage	-0.3V to +6.0V

Reflow Cycle

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

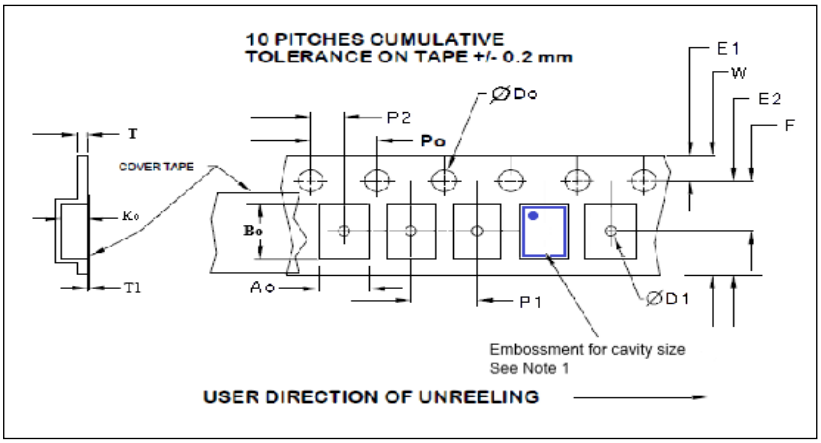


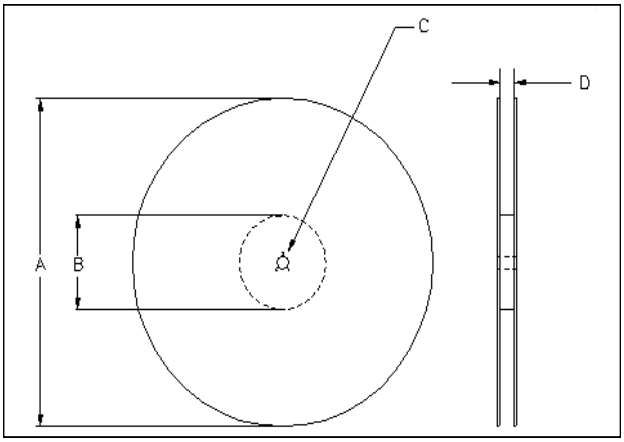
Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	(Ts_{max} to T_P)	3°C / second max	°C / s
Ramp down Rate	T_{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to\text{-}peak}$	8 minutes max	min
Preheat			
Temperature min	Ts_{min}	150	°C
Temperature max	Ts_{max}	200	°C
Time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

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

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	12.3	1.75 ± 0.05	3.45 ± 0.05	1.05 ± 0.05

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	T max	T1 max
12mm	1.5 ±0.1	1.5	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.3	0.1

Reel Dimensions (may vary) Table 3						
	A		B		C	D
Reel Size	Inches	mm	Inches	mm	mm	mm
7	7.0	178	2.42	61.5	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0

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Contacting Pletronics Inc.

Pletronics, Inc.
19013 36th Ave. West
Lynnwood, WA 98036-5761
U.S.A.

Tel: 425.776.1880
Fax: 425.776.2760
email: ple-sales@pletronics.com
URL: www.pletronics.com

