

## Crystal oscillator 32.768kHz

### SPECIFICATION

#### 1 FEATURES

- TSMC CMOS 40LP technology
- Precise frequency 32.768 kHz
- Low power consumption (<1uA)
- Supported foundries: TSMC, UMC, Global Foundries, iHP

#### 2 APPLICATION

- RTC generator
- Electronic metering for electricity, water, and gas
- Timekeeping instruments with high precision
- GPS equipment to reduce time to first fix
- Applications that require an accurate process timing
- Products with long automated unattended operation time

#### 3 OVERVIEW

The oscillator is a CMOS inverter of a Pierce-type variation with an integrated Crystal (Xtal) Oscillator optimized in parallel mode for very high accuracy and very low power consumption.

#### 4 STRUCTURE

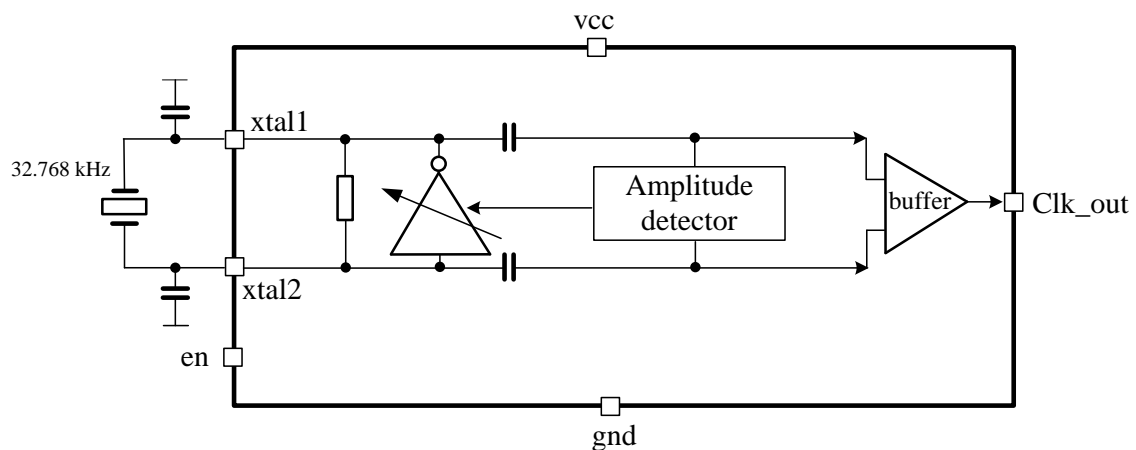


Figure 1: Crystal oscillator 32.768kHz structure.

## 5 PIN DESCRIPTION

Name	Direction	Description
en	I	Enable/ disable
Clk_out	O	Oscillator digital output
xtal1	IO	Quartz crystal connection
xtal2	IO	
vcc	IO	Supply voltage
gnd	IO	Ground

## 6 OPERATING CHARACTERISTICS

### 6.1 TECHNICAL CHARACTERISTICS

Technology \_\_\_\_\_ TSMC CMOS 40LP  
 Status \_\_\_\_\_ pre-silicon verification

### 6.2 ELECTRICAL CHARACTERISTICS

The values of electrical characteristics are specified for  $V_{cc} = 1.0 \div 1.26$  V and  $T = -45 \div +90$  °C. Typical values are at  $V_{cc}=1.1$  V and  $T = +27$  °C, unless otherwise specified.

Parameter	Symbol	Condition	Value			Condition
			min	typ	max	
Supply voltage	$V_{cc}$	-	1.0	1.1	1.26	V
Oscillator operating temperature range	T	-	-40	27	90	°C
Start time	$t_{start}$	-	-	-	3	s
Oscillation frequency tolerance	dF/F	-	-	20	-	ppm
Current consumption	$I_{cc}$	-	-	-	1	uA
Current consumption in a standby mode	$I_{stb}$	-	-	-	0.01	μA

## 7 DELIVERABLES

IP contents include:

- Schematic or NetList
- Layout or blackbox
- Extracted view (optinal)
- GDSII
- DRC, LVS, antenna report
- Test bench with saved configurations (optinal)
- Documentation

## REVISION HISTORY

From version 1.1:

- Section 3