

## IP Data Sheet

### 8MHz / 40MHz Pierce Oscillator

The TS\_XOSC\_40M\_X8 is a 8MHz / 40MHz Pierce oscillator that generates a VCC-level logic square wave when a 8MHz / 40MHz quartz crystal is connected between its output XOUT and input XIN with external grounded load capacitors. If there is no quartz crystal and load capacitors present, and XIN is hardwired externally to 0V, the circuit only forwards the external clock signal applied on XOUT through its internal Schmitt-trigger circuit to the output FOUT.

The circuit operates with the supply voltage VCC (3.3V typical) and features an enable signal EN.

The Pierce oscillator consists of an amplitude regulation feedback loop which ensures that the amplitude of stable oscillations are limited, so that the crystal maximum drive level is not exceeded.

The Pierce oscillator can be followed by the TES IP clock buffer circuit TS\_CLKBUF\_25pF\_X8 which allows driving loads of maximum total capacitance of 25pF while maintaining rise-/fall times in the range of 1.5ns to 3ns.

**Technology:** X-FAB XT018-0.18µm BCD-on-SOI CMOS

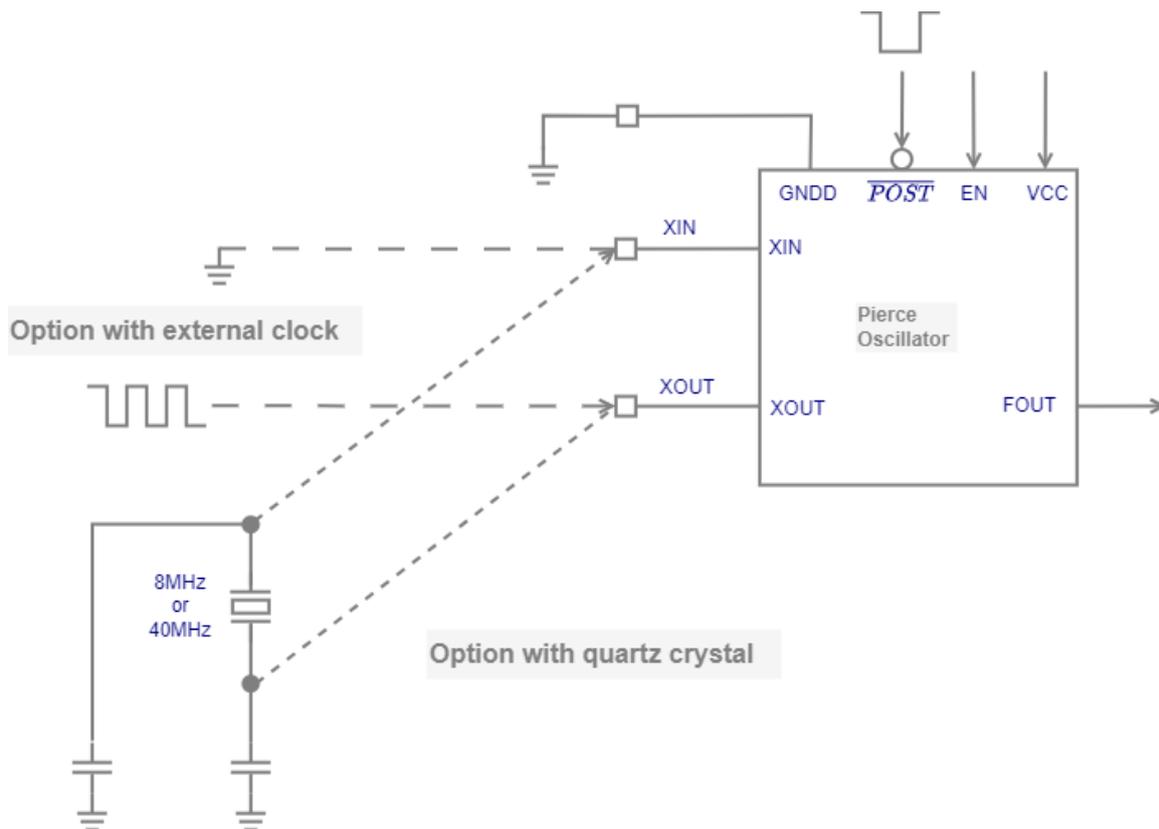


Fig. 1: Pierce Oscillator Symbol

## OPERATING CONDITIONS

Parameters	Values
Junction temperature range	-40 °C to 150 °C
Supply voltage	3.2V to 3.4V
Quartz crystal series load capacitance ( $C_L$ )	12pF
Quartz crystal equivalent series resistance (ESR)	14.3Ω to 462.3Ω
Quartz crystal shunt capacitance ( $C_0$ )	0.9pF to 1.1pF
8MHz quartz crystal drive level	100μW max
40MHz quartz crystal drive level	50μW max
Quartz series resonance frequency or external clock square-wave frequency (F_XOUT)	8MHz or 40MHz

Table 1: Pierce Oscillator Operating Conditions

## SPECIFICATION

Parameters	Values
VCC average current consumption, 8MHz crystal	477μA max
VCC average current consumption, 40MHz crystal	596μA max
Quartz crystal drive current intensity, 8MHz crystal	188 μA <sub>RMS</sub> to 304μA <sub>RMS</sub>
Quartz crystal drive current intensity, 40MHz crystal	742 μA <sub>RMS</sub> to 1481μA <sub>RMS</sub>
Circuit transconductance at the start of oscillation	11.4mS to 15.9mS
Start-up time until output oscillations available at frequency 8MHz	3.2ms to 4.1ms
Start-up time until output oscillations available at frequency 40MHz	1.1ms to 1.8ms

Table 2: Pierce Oscillator Specifications

## Sales & Marketing Contact



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LAYOUT VIEW

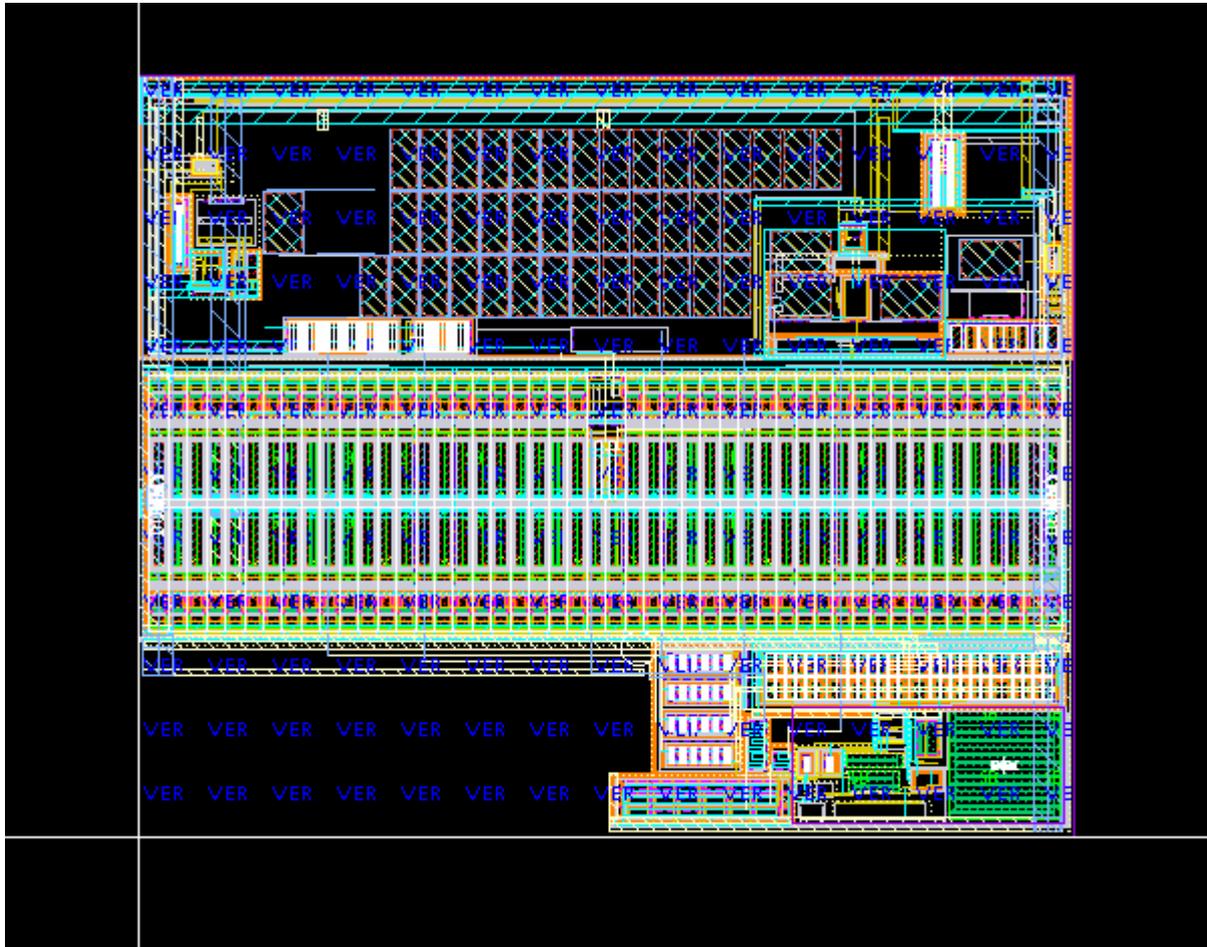


Fig. 2: Pierce Oscillator Layout View