10 to 40 MHz crystal oscillator

OVERVIEW

180GF_OSC_01 is a crystal oscillator with Pierce architecture. The block consists of a feedback amplifier, amplitude detector, reference source with POR signal and comparator for generating CMOS output signal. The POR signal allows to avoid clock glitches during power up.

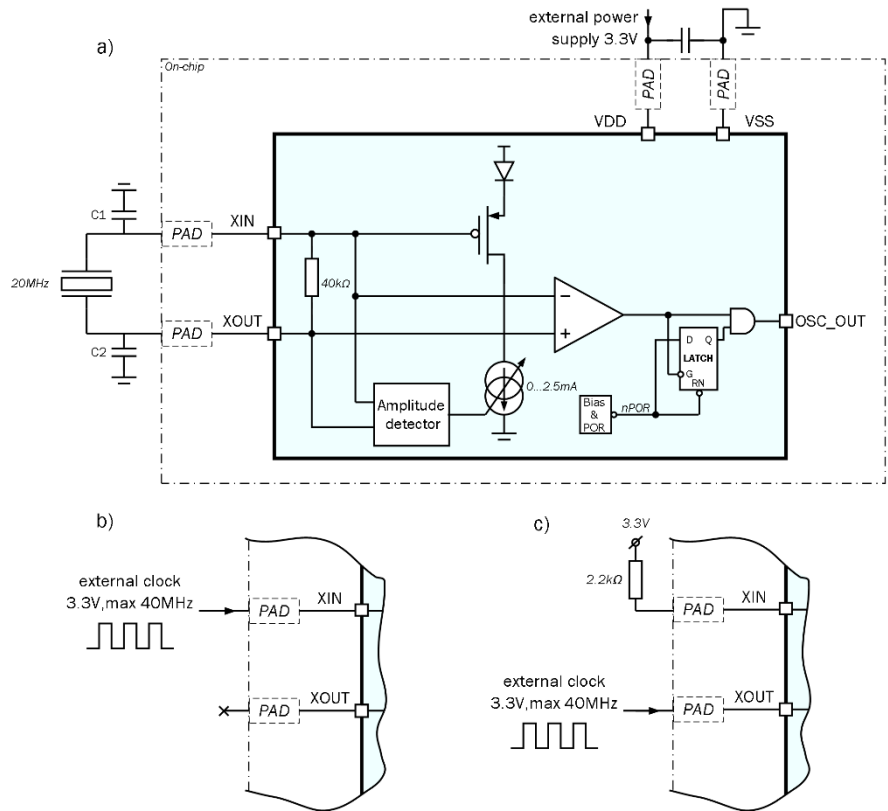The crystal oscillator has no external control and starts to operate after power-on.

Oscillator has 3 modes:

- quartz mode (a);
- bypass mode when external clock is applied to XIN (b);
- bypass mode when external clock is applied to XOUT (c).

IP technology: Global Foundries 180nm MCU CMOS

IP status: pre-silicon verification

Total area: 0.1mm^2

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions		Value			Units
				min	typ.	max	
Operating temperature range	T_j	-		-40	27	125	°C
Input supply voltage	VDD	-		2.97	3.3	3.63	V
Input logic-high level	V_{IH}	-		VDD-0.3	-	VDD+0.3	V
Input logic-low level	V_{IL}			0	-	0.3	
Current consumption	I_{cc}	quartz mode	F_{OSC} = 10MHz	-	1.4	2.2	mA
			F_{OSC} = 20MHz	-	1.5	2.3	
			F_{OSC} = 40MHz	-	2.4	3.2	
		bypass mode	clock is applied to XIN	-	3.4	4.1	
			clock is applied to XOUT	-	3.5	4.1	
Output frequency	F_{OSC}	quartz mode		10	-	40	MHz
		bypass mode		-	-	40	MHz
Output logic-high level	V_{OH}	-		VDD-0.3	-	VDD+0.3	V
Output logic-low level	V_{OL}			0	-	0.3	
Frequency stability over the operating temperature	F_{TS}	-		-	-	50*	ppm
Duty cycle	DC_{OSC}	-		44.5	50	55.5	%
Startup time	T_{start}	quartz mode		-	-	10	ms
		bypass mode		-	170	220	us

* Frequency stability of crystal oscillator is determined by external quartz crystal resonator.