

Process/Voltage/Temperature Sensor (Supply voltage 1.8V/0.9V)

OVERVIEW

028UMC_PVT_01 IP library is a unique solution intended to continuously monitor IC status at several on-die locations.

It is able to detect manufacturing process deviation, perform voltage and die temperature measurement. PVT Sensor IP library consists of three main parts: VT module as a calculation center for wide range of voltage and temperature measurements; Voltage/Temperature sensor units for voltage measurements from 0.6V to 3.63V and temperature measurements from -40°C to +125°C; Process detector module includes process units, dedicated for process variation elicitation of transistors with different threshold voltage types.

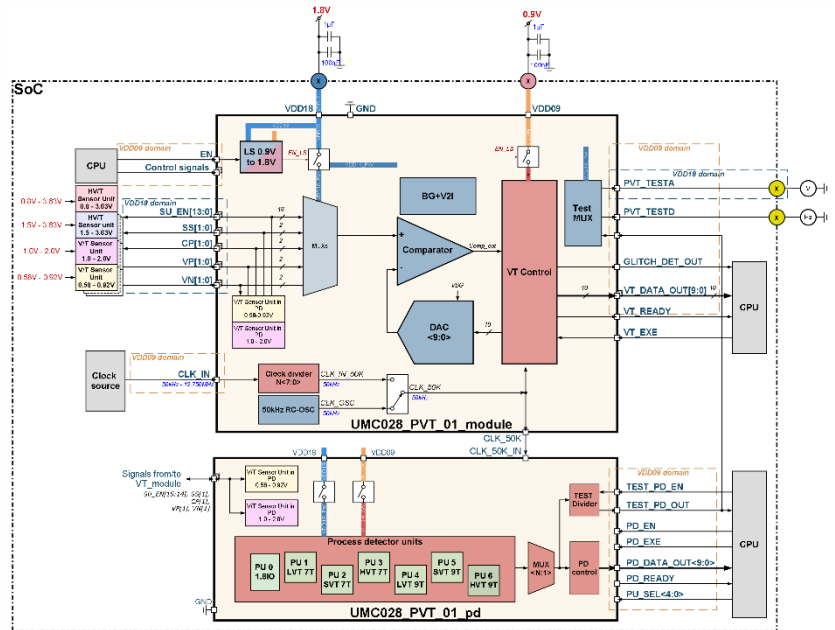
PVT Sensor can operate in Glitch detector mode allowing to monitor and detect rapid fluctuations of voltage and temperature on the die.

IP technology: UMC 28nm HPC+.

IP status: pre-silicon verified.

Area: 0.124mm² for Voltage/temperature processing module

0.0063mm² for Process detector unit; 0.0017mm² for sensor unit09



ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Core supply voltage	V _{DD09}	-	0.81	0.9	0.99	V
IO supply voltage	V _{DD18}	-	1.62	1.8	1.98	V
Operating temperature range	T _j	-	-40	27	+125	°C
VT module current consumption during measurements	I _{CC_VT}	@V _{DD09}	-	0.3	4.5	uA
		@V _{DD18}	-	188	245	
Process detector current consumption during measurements	I _{CC_PD}	@V _{DD09}	-	70	130	uA
		@V _{DD18}	-	505	795	
Shutdown current	I _{SHD}	VT module	@V _{DD09}	-	2	nA
		EN=0	@V _{DD18}	-	4	
		Process detector, PD_EN=0	@V _{DD09}	-	2.7	
			@V _{DD18}	-	3.9	
Input-logic level high	V _{IH}	-	0.9V _{DD09}	-	1.1V _{DD09}	V
Input-logic level low	V _{IL}	-	0	-	0.1V _{DD09}	V
Output-logic level high	V _{OH}	-	0.9V _{DD09}	-	1.1V _{DD09}	V
Output-logic level low	V _{OL}	-	0	-	0.1V _{DD09}	V
Output DATA resolution	K	-	-	10	-	bit
Input clock frequency	f _{CLK_IN}	± 1%	50	-	12750	kHz
Voltage measurement accuracy for 0.9V VT sensor unit	A _{V09}	W/o trimming, voltage measurement range 0.58V to 0.92V	-	-	2	%
Voltage measurement accuracy for 1.8V VT sensor unit	A _{V18}	W/o trimming, voltage measurement range 1.0V to 2.0V	-	-	2.2	%
Voltage measurement accuracy for 3.3V VT sensor unit	A _{V33}	W/o trimming, for voltage measurement range 1.5V to 3.63V	-	-	2.6	%
Voltage measurement accuracy for Vbat VT sensor unit	A _{V_VBAT}	W/o trimming, voltage measurement range 0.8V to 3.63V	-	-	3.5	%
Main temperature measurement range	T _{MR}	-	-40	-	+125	°C
Temperature measurement accuracy	A _T	W/o trimming	-	-	±6.4	°C
		With trimming method T1 (over 80 °C)	-	-	±3.2	°C
		With trimming method T2.A	-	-	±2.3	°C
		With trimming method T2.B	-	-	±3.4	°C
		With trimming method T3	-	-	±1.6	°C