PVT Detector

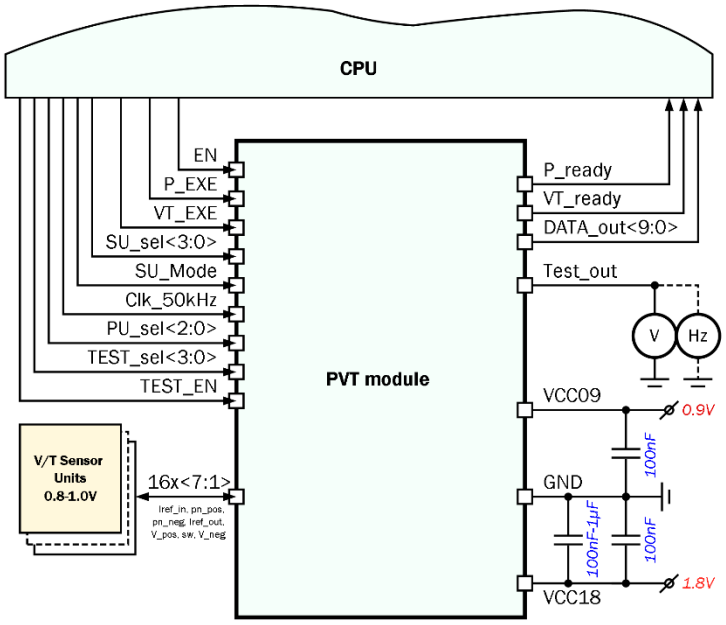
OVERVIEW

PVT Detector 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 Detector consists of PVT module as a calculation center with embedded process detector units, and voltage/temperature sensor units. PVT module is able to maintain up to 16 external voltage/temperature sensor units for Core voltage measurement from 0.8V to 1.0V.

IP technology TSMC 28HPC+ CMOS 28nm.

IP status: silicon proven.

Total area: PVT module – 0.140mm^2;
sensor unit – 0.0005mm^2;
trimming unit1 – 0.00019mm^2;
trimming unit2 – 0.00031mm^2.



ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions		Value Min	Value Typ.	Value Max	Units
Core supply voltage	V_{CC09}	-		0.81	0.9	0.99	V
IO supply voltage	V_{CC18}	-		1.62	1.8	1.98	V
Operating temperature range	T_j	-		-40	25	+125	°C
Current consumption in case of V/T measurement	I_{CC09_VT}	@ V_{CC09}		-	150	400	uA
	I_{CC18_VT}	@ V_{CC18}		-	320	530	
Current consumption in case of Process detection	I_{CC09_P}	@ V_{CC09}		-	153	405	
	I_{CC18_P}	@ V_{CC18}		-	304	306	
Current consumption in standby mode	I_{STBY09}	@ V_{CC09}		-	2.0	95	uA
	I_{STBY18}	@ V_{CC18}		-	0.01	1	uA
Digital input-logic high	V_{IH}	-		*	-	*	V
Digital input-logic low	V_{IL}	-		*	-	*	
Digital output-logic high	V_{OH}	-		*	-	*	
Digital output-logic low	V_{OL}	-		*	-	*	
Output DATA resolution	K	-		-	10	-	bit
Clock frequency	f_{CLK}	-		-	50	-	kHz
Voltage bandgap	V_{bg}	-		-	711.8	-	mV
Voltage measurement range	V_{MR09}	-		0.8	-	1.0	V
Voltage measurement accuracy	A_V	w/o trimming	δ	-	-	0.7	%
			3δ	-	-	2.1	
Temperature measurement range	T_{MR}	-		-40	-	+125	˚C
Temperature measurement accuracy	A_T	with trimming	δ	-	-	1.45	˚C
			3δ	-	-	4.35	
		w/o trimming	δ	-	-	1	
			3δ	-	-	4.5	

*Value is defined by TSMC 28HPC+ standard cell library TBD