

Process/Voltage/Temperature 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 of two types: for Core voltage measurement from 0.65V to 1.15V and for IO voltage measurement from 2.0V to 3.6V.

IP technology TSMC 28HPC+ CMOS 28nm.

IP status: pre-silicon verification.

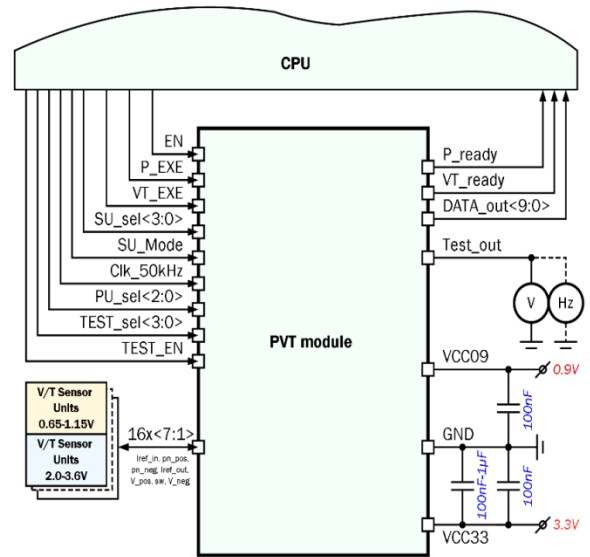
Total area: PVT module – 0.159mm²;

sensor unit09 – 0.0007mm²;

sensor unit33 – 0.0008mm²;

trimming unit1 – 0.00019mm²;

trimming unit2 – 0.00031mm².



ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Units
			Min	Typ.	Max	
Core supply voltage	VCC09	-	0.81	0.9	0.99	V
IO supply voltage	VCC33	-	2.0	3.3	3.6	V
Operating temperature range	T _j	-	-40	27	+125	°C
Current consumption in case of V/T measurement	I _{VCC09 VT}	@ V _{CC09}	-	3.5	200	uA
	I _{VCC33 VT}	@ V _{CC33}	-	390	530	
Current consumption in case of Process detection	I _{VCC09 P}	@ V _{CC09}	-	110	300	uA
	I _{VCC33 P}	@ V _{CC33}	-	312	322	
Current consumption in standby mode	I _{STB VCC09}	@ V _{CC09}	-	0.8	95	uA
	I _{STB VCC33}	@ V _{CC33}	-	0.024	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}	-	0.65	-	1.15	V
	V _{MR33}	-	2.0	-	3.6	
Voltage measurement accuracy for 3.3V VT sensor unit	A _{V33}	w/o trimming	3δ	-	3.0	%
Voltage measurement accuracy for 0.9V VT sensor unit	A _{V09}	w/o trimming	3δ	-	1.8	%
Temperature measurement range	T _{MR}	-	-40	-	+125	°C
Temperature measurement accuracy	A _T	with trimming	3δ	-	2.4	°C
		w/o trimming	3δ	-	5.1	

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