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.
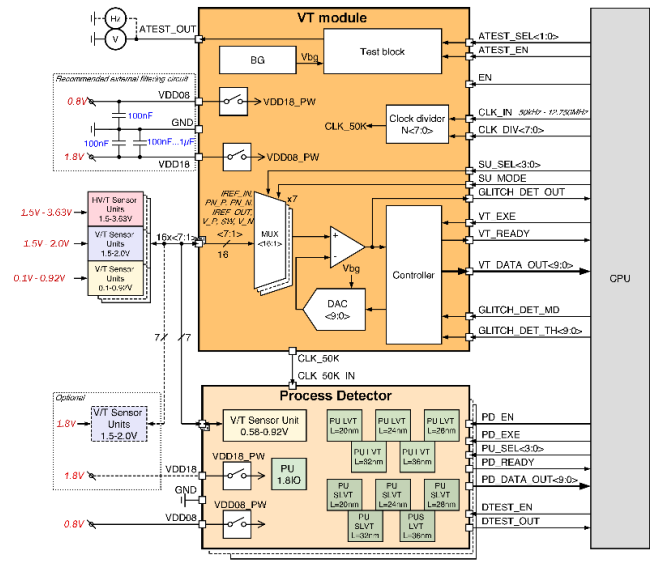
PVT Detector consists of VT module as a calculation center for voltage and temperature measurements, Process detector with process unit for Low VT and Super low VT at different channel length (20, 24, 28, 32, 36 nm) and 1.8V IO transistor, and voltage/temperature sensor units. VT module is able to maintain up to 16 external voltage/ temperature sensor units of three types in any variations: for 0.58V to 0.92V

(Core), for 1.5V÷2.0V (IO) and 1.5V÷3.63V (High IO) voltage measurement ranges. Process units can be placed on the die in quantity up to 16 cells. Glitch detector mode allows to monitor and detect rapid fluctuations of voltage and temperature.

IP technology: GF 22nm FDX technology.

IP status: silicon proven.

Area: VT module – 0.12905 mm^2; Process detector – 0.0045 mm^2;

sensor units for Core/IO/High IO measurements –0.00058 mm^2/0.000564 mm^2/0.001362 mm^2

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Units
			min	typ.	max	
Analog supply voltage	AVDD	-	0.72	0.8	0.88	V
Digital supply voltage	DVDD	-	1.62	1.8	1.98	V
Operating temperature range	T_j	-	-55	27	+150	°C
Current consumption in case of V/T measurement	I_{VDD11_VT}	@VDD08	-	1	20	μA
	I_{VDD33_VT}	@VDD18	-	350	400	
Current consumption in case of process detection	I_{VDD11_P}	@VDD08	-	110	300	μA
	I_{VDD33_P}	@VDD18	-	320	330	
Current consumption in shutdown mode of VT module	I_{STB_VDD11}	@VDD11	-	15	1000	nA
	I_{STB_VDD33}	@VDD33	-	15	400	nA
Output data resolution	K	-	-	10	-	bit
Clock frequency	f_{CLK}	-	-	50	-	kHz
Voltage measurement range	V_{MR08}	-	0.1	-	0.92	V
	V_{MR18}	-	1.5	-	2.0	V
	V_{MR33}	-	1.5		3.63	V
Voltage measurement inaccuracy 0.8V/1.8V/3.3V VT sensor unit	A_V	-	-	±2.0/2.0/4.3	-	%
		After trimming	-	±0.8/0.9/3.1	-	
Temperature measurement range	T_{MR}	-	-40	-	+125	°C
Temperature measurement inaccuracy by one/three temperature point on the die	A_T	-	-	±6.4	-	°C
		After trimming	-	±2.3/1.2	-	

*The values correspond to the results of simulations