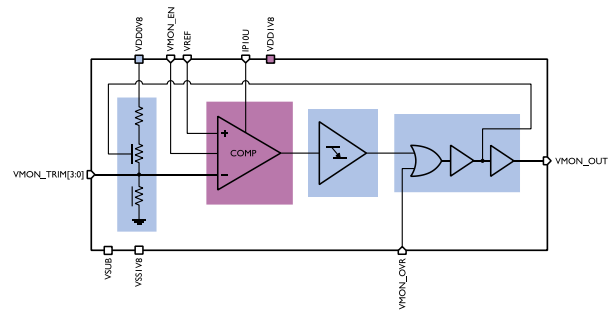


## Product Overview

DARE22G VMON08 implements a 0.8 V voltage monitor for radiation-hardened applications in the commercial GF 22 nm FDSOI CMOS technology.

DARE22G exploits the intrinsic SEL immunity provided by the FDSOI technology in combination with special radiation-hardening-by-design (RHBD) techniques to mitigate TID and single-event effects.



## Features

DARE22G VMON08 main functionalities include:

- Digital calibration with 16 trimming points
- Less than 50  $\mu\text{A}$  static current consumption
- Typically 25 mV hysteresis
- TID immunity over 100 krad ( $\text{SiO}_2$ )
- SET immunity over 60  $\text{MeV}\cdot\text{cm}^2/\text{mg}$
- SEL immunity over 70  $\text{MeV}\cdot\text{cm}^2/\text{mg}$

## Block Diagram

The VMON08 macro consists of a digitally controlled resistive divider, a comparator, a level shifter, and digital buffers, all arranged in a feedback loop to generate hysteresis.

The integrated comparator requires an external high-precision 10  $\mu\text{A}$  current source and a 0.6 V voltage reference to operate. These signals can be provided on chip by the DARE22G IVREF18 IP.

The voltage status output switches to 1 once the input reference voltage and all power supplies are stable.

Digital calibration is supported by input trimming bits controlling the internal resistive divider.

## Operating Conditions

Performance and reliability are not guaranteed outside these recommended operating boundaries.

Parameter	Name	Minimum	Typical	Maximum	Unit
Core supply voltage	$V_{DD0V8}$	0.72	0.8	0.88	V
I/O supply voltage	$V_{DDIV8}$	1.62	1.8	1.98	V
Operating temperature	$T_j$	-40	25	125	$^{\circ}\text{C}$
TID immunity	TID	100			krad ( $\text{SiO}_2$ )
SET hardening	$\text{SET}_{th}$	60			$\text{MeV}\cdot\text{cm}^2/\text{mg}$
SEL hardening	$\text{SEL}_{th}$	70			$\text{MeV}\cdot\text{cm}^2/\text{mg}$

## Pin Interface

Pin Name	Type	Description
VDDIV8	Power	I/O power supply
VDD0V8	Power	Core power supply
VSSIV8	Ground	Ground supply
VSUB	Ground	P-substrate bias voltage
VREF	Analog	0.6 V reference voltage
IPI0U	Analog	10 $\mu\text{A}$ bias current
VMON_OUT	Digital	Output status
VMON_EN	Digital	Enable
VMON_OVR	Digital	Output override
VMON_TRIM[3:0]	Digital	Trimming bits

## Physical Dimensions

DARE22G VMON08 is implemented as a core macro.

IP Name	Width	Height
VMON08	125 $\mu\text{m}$	40 $\mu\text{m}$

## Contact

For further information, please contact us at [dare@imec.be](mailto:dare@imec.be)