

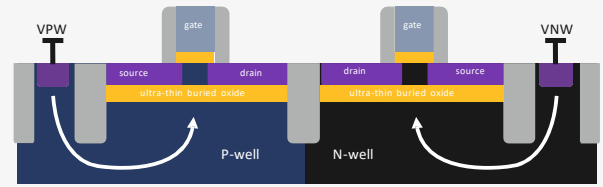
Racyics® ABX® Automotive Adaptive Body Bias Generator

GLOBALFOUNDRIES® 22FDX®



CHALLENGE

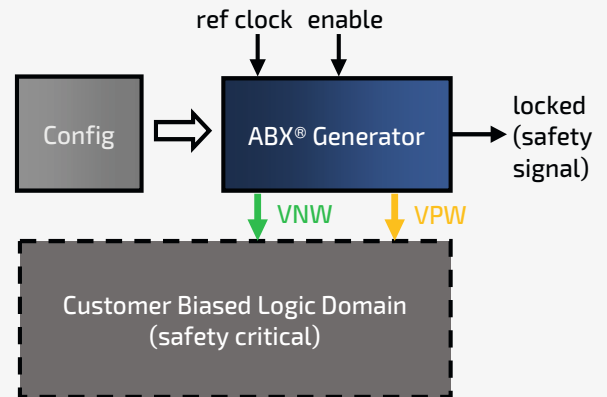
RI_ABB_GF22FDX_AM is an adaptive body bias voltage generator for automotive applications in **GlobalFoundries® 22FDX®** technology. It contains a closed loop body bias regulation loop to generate N-well and P-well bias voltages for compensation of process, voltage and temperature (PVT) variations during operation. This results in up to 76 % leakage power improvement for automotive grade-1 applications up to 150° C junction temperature.



KEY FACTS

- ▶ Integrated adaptive body bias (ABB) control loop
- ▶ Charge pumps for N-Well and P-Well voltages, operated from IO supply voltage level
- ▶ Integrated PVT monitors for true independent adaption of NMOS and PMOS performance
- ▶ Operation from typically 10 MHz, up to 50 MHz reference clock
- ▶ Available for forward (FBB) and reverse body bias (RBB)
- ▶ Available in multiple charge pump drive strengths supporting a wide range of active chip areas
- ▶ Delivered as hardmacro for easy and seamless integration
- ▶ ISO26262 Safety Element out of Context (SEooC) with ASIL D capability
- ▶ Interoperable with foundation IP standard cells and SRAM
- ▶ Compliant to automotive grade-1 and grade-2

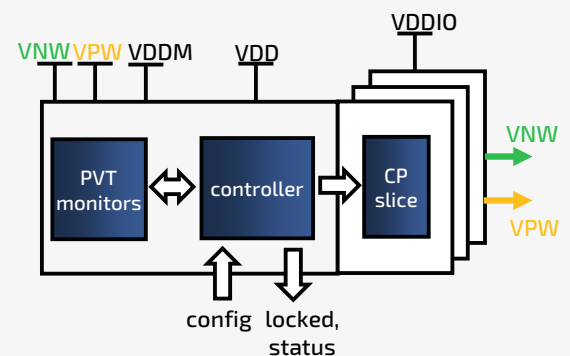
ABX® GENERATOR INTEGRATION SCHEME



DESIGN VIEWS

- ▶ Verilog simulation models
- ▶ .lib /.db timing and power models
- ▶ .lef layout abstract views
- ▶ NDM and Milkyway libraries
- ▶ GDSII layout
- ▶ LVS netlist
- ▶ EMIR models
- ▶ DFT models

ABX® GENERATOR IP SCHEMATIC



IP SPECIFICATION

IP Type	Supplier	Specification	Nominal Supply Voltages
Automotive ABB controller IP hardmacro	Racyics®	$f_{ref} = < 10 \text{ MHz to } 50 \text{ MHz } >$ $P_{active} < 200 \mu\text{W (typical)}$ area < 0.0066 mm ² (smallest pump strength) - 0.2 V < VNW < 2.4 V - 2.4 V < VPW < 0.2 V Automotive grade-1 and grade-2 compliant ISO26262 SEooC with ASIL D capability	Body bias generation: 1.80 V Control logic: 0.80 V PVT monitors: 0.80 V



Racyics GmbH

Main Office
Bergstraße 56
01069 Dresden
Germany

Duisburg Office
Schifferstraße 196
47059 Duisburg
Germany

Frankfurt Office
Siemensstraße 10a
63263 Neu-Isenburg
Germany

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