AURIX™ TC4Dx

High performance hexa core MCU for zone controllers, integration platforms and safety applications

Infineon releases its third generation AURIX™ TC4x microcontroller. It comes with an increase in performance, memory sizes, connectivity, and scalability to address latest automotive trends and challenges. In terms of performance, the TC4Dx offers 6/6 lockstep cores at 500 MHz, up to 20 MB non-volatile memory in eFlash technology, 10 MB SRAM and rich connectivity features including two 5 Gbps and four 10/100 Mbps Ethernet interfaces.

For applications like sensor fusion and integration platforms (e.g. vehicle motion controllers) TC4Dx offers high performance with extended connectivity and AI capability. For such use-cases TC4Dx includes smart accelerators like the PPU with private scalar core and 256bit wide vector unit. The new security module CSRM (Cybersecurity Realtime Module) with 10x performance vs. TC3x HSM. TC4Dx also offers native support for virtualization via hypervisor which enables software with freedom from Interference.

For connectivity applications like zone controllers and gateways TC4Dx offers features for improved data routing and integration of functions from end-point ECUs. The optimized architecture with accelerators enables high throughput without main cores intervention through the Data Routing Engine (DRE) and Ethernet bridges for efficient data routing. TC4Dx also features a de-centralized security concept with Crypto Satellites (CSS) for offloading main security module.

To address the need for high speed communication & new interfaces TC4Dx features a rich connectivity set: up to 2x 5Gbit Ethernet incl. bridge, 4x 10/100Mbit Ethernet, 20 CAN nodes, 4x CAN-XL and up to 2x 8 Gbit PCIe 3.0.

In order to ensure the scalability, the whole TC4x family shares its core architecture (TriCore™ based), allowing a maximum of software re-use, but also offers pin compatibility on two main packages (BGA-292 and BGA-436). With this approach, customers can develop on this TC4Dx for high end application and build a complete portfolio ECU with lower end devices.

Target applications:
– Zone Controller
– Domain Controller
– Gateway
– ADAS/AD & Sensor Fusion
– Safety companion for central computing

Key features

Safety & Security:
– Safety architecture is compliant to **ISO 26262** (ASIL-D support)
– Cyber Security architecture is compliant to **ISO/SAE 21434** and supports post quantum cryptography

Key Figures:
– 6/6 lockstep cores
– 500 MHz core frequency
– Up to 20 MB eFlash
– Up to 10 MB SRAM
– Up to 15x performance increase of cyber security module compared to TC3x HSM
– Up to 8 virtual machines per core
– 20+4 CAN FD + CAN XL interfaces
– 4x 10/100 Mb ethernet modules
– 2x 5 Gbps ethernet module
– Up to 60 analog input pins

Key benefits

– **Large local memories** for fast access to more data
– **HW routing engines & bridges**
– **CSRM:** high-performance security module with private CPU, memories & crypto accelerators
– **CSS:** Distributed crypto and hash engines for secure CAN/Ethernet communication
– Software backwards compatible with the AURIX™ TC3x MCUs
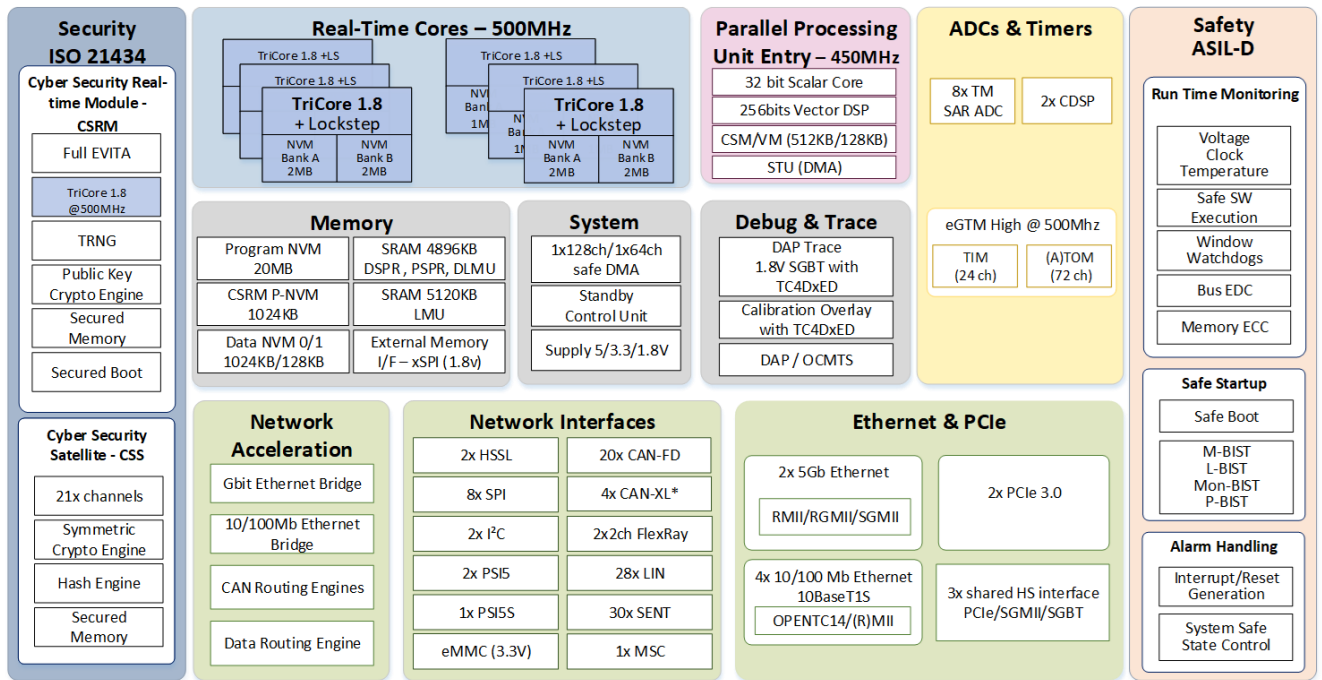– **Strong SW partner ecosystem**

AURIX™ TC4x product family

TC4x will be the most comprehensive AURIX™ portfolio, featuring more ASIL-D performance, more security and connectivity features and new SW development methods.

Infineon is providing high quality automotive microcontrollers along with operational excellence, premium sales and application support worldwide.

TC4Dx Block Diagram for COM Packages (BGA 436/292)

Product Table

Sales Name	SP number	Description
SAK-TC4D7XP-20MF500MC	SP006011939	500 MHz, 20 MB, 256bit PPU, BGA-292, STD, OM, -40/125°C
SAK-TC4D9XP-20MF500MC	SP005969288	500 MHz, 20 MB, 256bit PPU, BGA-436, STD, OM, -40/125°C
SAK-TC4D9XP-20MF500CC	SP005967320	500 MHz, 20 MB, 256bit PPU, BGA-436, COM, CuP, -40/125°C

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