

ARM KNOWLEDGE LAB 2026

DESIGNING THE FUTURE DAY 1

Securing Next-Gen Embedded Systems with PSOC™ Control C3
Venkata Appanabhotla, Infineon

Arm Knowledge Lab: Three short and compact sessions



Day 1

Secure by Design – From
Threats to Trusted Devices



Day 2

AI at the Edge – Building
Smarter Embedded Systems



Day 3

Safety-Critical Systems –
Engineering Reliability

Find more presentations from our Arm Knowledge Lab:
<https://www2.hitex.com/arm-knowledge-lab-2026-download>

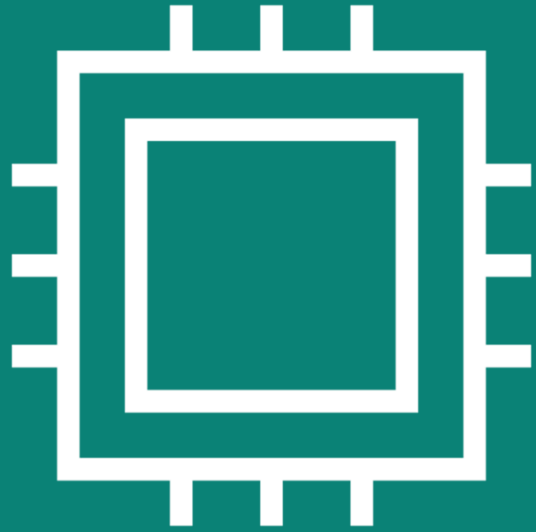


Securing next-gen embedded systems with PSOC™ Control C3 MCUs

Venkata Appanabhotla



#1



Microcontroller

Infineon is the
market leader
in the **global**
microcontroller
market*

*Based on or includes research from Omdia: 'Annual 2001-2024 Semiconductor Market Share Competitive Landscaping Tool – 4Q24. March 2025.'

Infineon MCUs deliver unique capabilities for industrial applications

Home appliances



Power conversion and Lighting



Transportation



Factory and Building automation



Applications



Infineon MCUs deliver

- Form factor, size and weight
- Family concept
- Copy protection
- Fast ramp-up

- Energy efficiency
- Ease of use
- Remote monitoring
- Form factors

- Robustness
- Functional safety
- Reliability & quality
- Lifetime

- Connectivity (EtherCAT)
- Reliability & quality
- Lifetime
- Functional safety

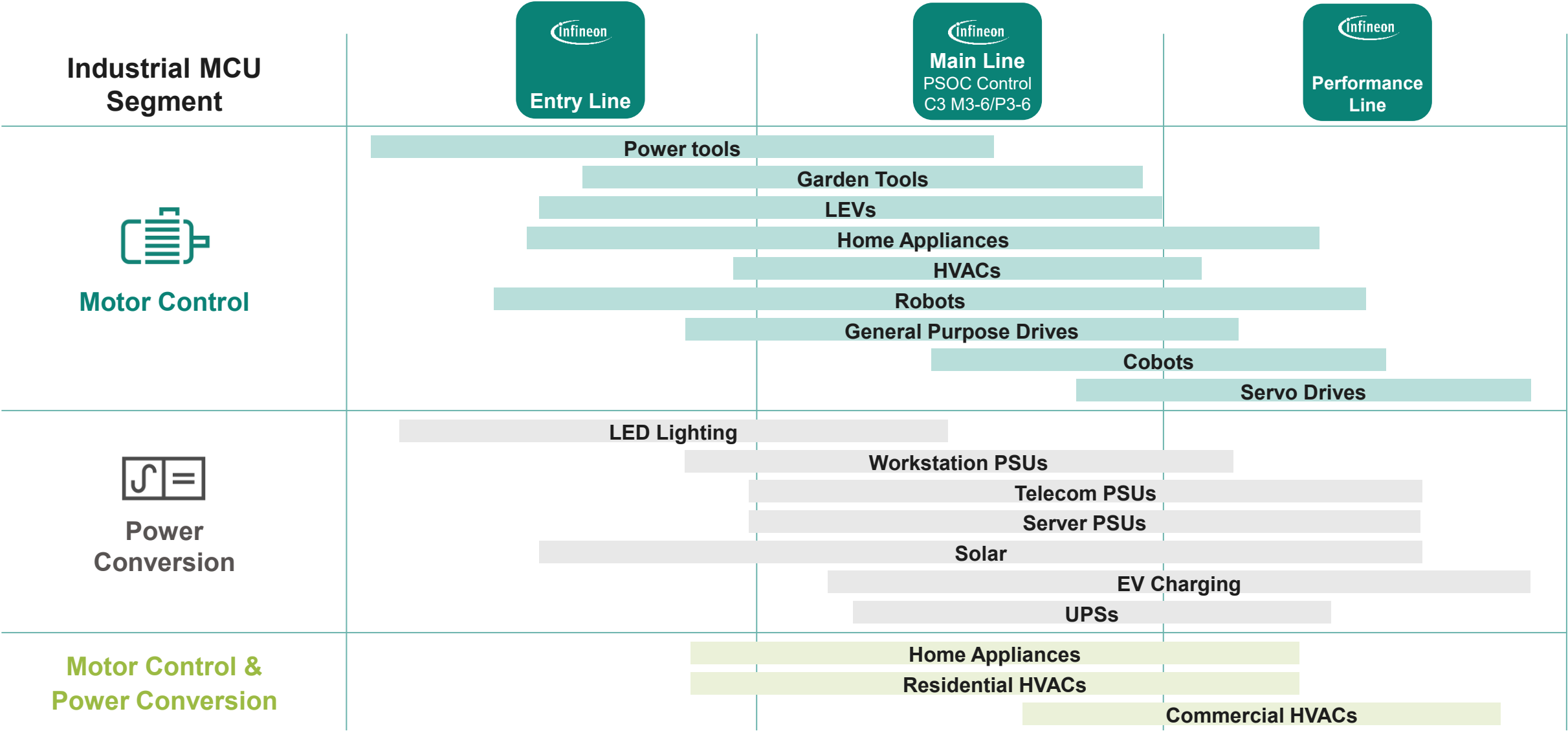
PSOC™ & XMC™

XMC™

XMC™

XMC™ / FM / AURIX™

To enable a variety of applications with optimized solutions, we offer three different PSOC™ C3 product lines: Entry, Main & Performance



PSOC™ Control C3

is the Brain of Every Power
Application



Industrial/Consumer Focus: Markets and Applications

Smart Home



Home Appliances



Renewables



SMPS



Industrial



Markets



- Power/Gardening Tools
- Lawn mower robots
- Home robots



- Residential Aircon ODU
- Large and medium Home Appliances Drives



- LEV
- PV Inverters
- EV Charging



- Telecom PSUs
- Server PSUs
- Workstation PSUs



- General purpose drives
- LED Lighting
- Servo Drives
- Commercial AirCons

Motor

Power

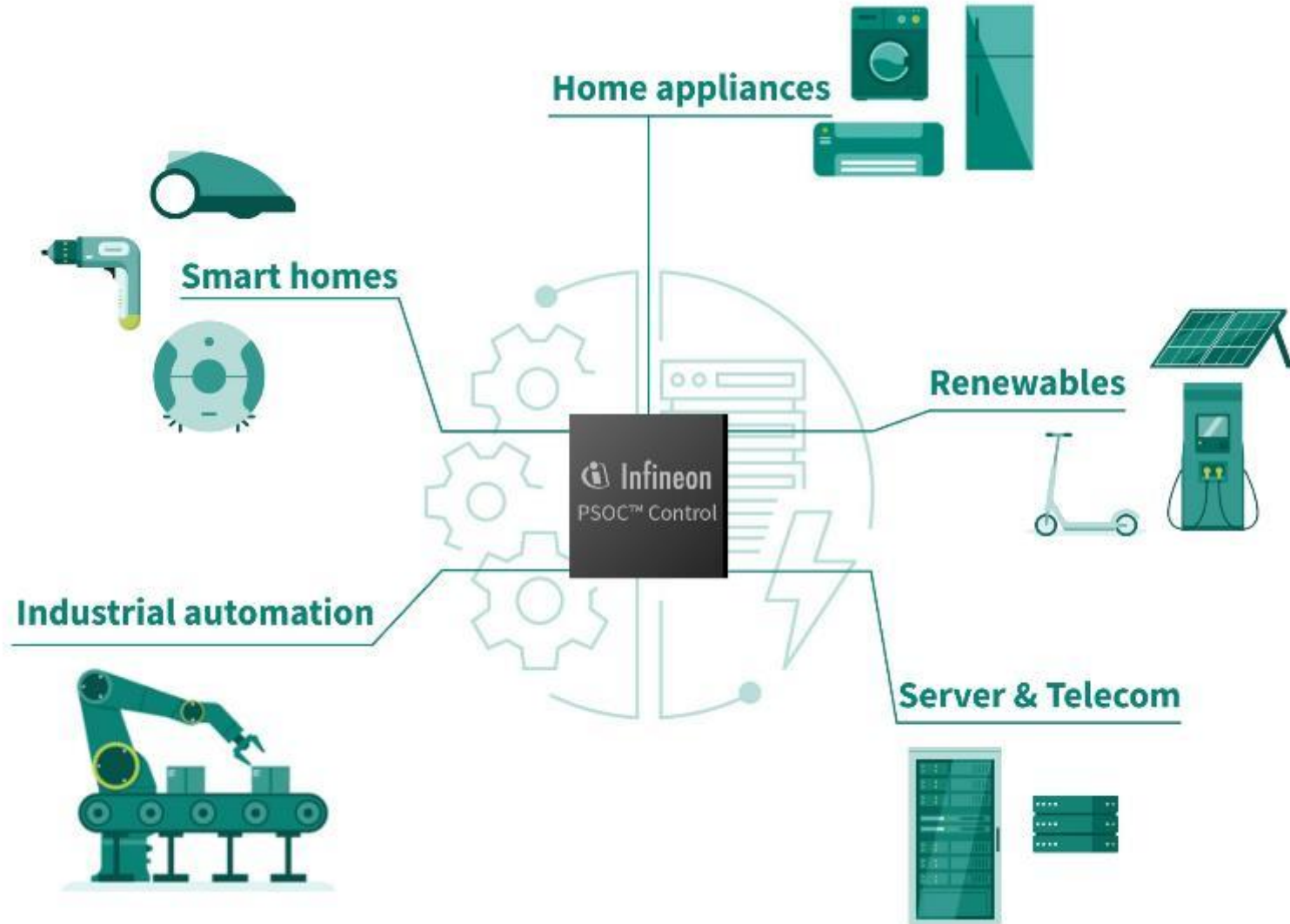
Communication

WBG ready (GaN, SiC)

Critical to P2S Strategy

PSOC™ Control C3

PSOC™ Control Enhancing Precision and Performance of Motor Control and Power Conversion



Home Appliances

- Air Conditioner
- Washing Machine
- Refrigerator

Smart homes

- Robotic vacuum cleaner
- Robotic lawn mowers
- Robotic pool cleaners
- Cordless gardening tools

Industrial automation

- General purpose drives
- Servo drives
- Service robot
- Automated guided vehicles

Renewables

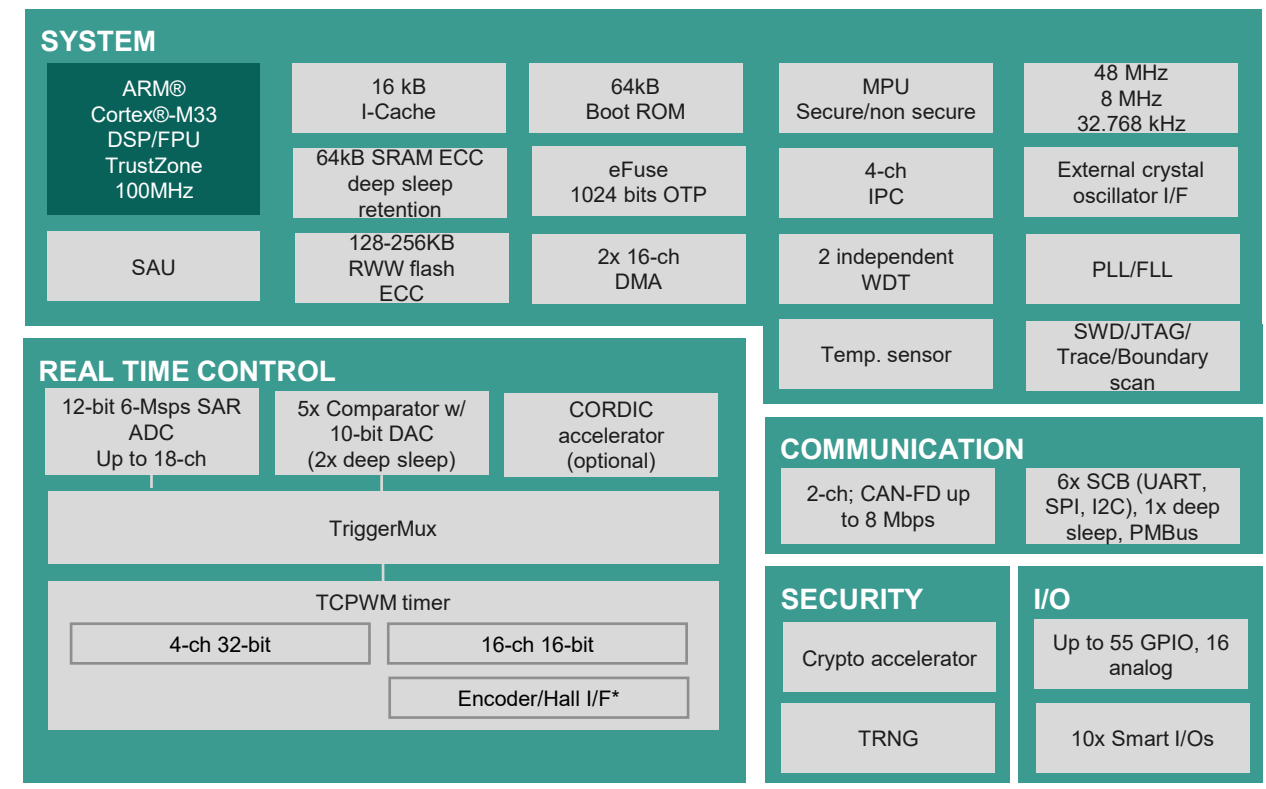
- Solar inverter
- EV charger
- Light electric vehicle

Server & Telecom

- Telecom PSU's
- Server PSU's
- Workstation PSU's

PSOC™ Control C3P2 and C3M3 Entry Line

Block diagram



Status/Availability

- In Development, prelim. DS available
- Samples & EVK available
- Qualified samples Q3 2024
- SOP: Q4 2024

Packages

QFP-48 (7x7mm, 0.5mm)	QFN-48 (6x6mm, 0.4mm)
QFP-64 (10x10mm, 0.5mm)	QFN-64 (8x8mm, 0.4mm)

Applications and Target Markets

- Single and dual motor control, or PFC
- PFC, Power & Gardening tools, MHA and Aircon drives and compressors, LEV drives, SPMS

Product Highlights

- **Low power modes:** deep sleep (<10uA), sleep, hibernate (<1uA)
- **Idle sampling ADC:**
 - Low jitter and high performance, obsoleting external buffer caps
 - 6 MSPS, 24 ch sync. sampling, 16-bit oversampling, in-built gain
- **Comparators:** < 10ns in-built 10-bit DAC and slope generator
- 10-clock-cycles CORDIC Accelerator
- **Timer/Counter/PWM (TCPWM):**
 - Complementary output/ch, multi-ch control, shadow update, input glitch filter, PRNG dithering
- **TriggerMux:** < 1ns latency programmable peripheral interconnects
- **Memory:**
 - 128-bit RWW Flash @ 20 Mhz, ECC on Flash & RAM
 - 16 kB Instruction Cache
- **Security:** PSA L2 certified, Configurable Flash Partitioning / Protection
- **Safety:** Class B & SIL 2 compliant

Operating Range

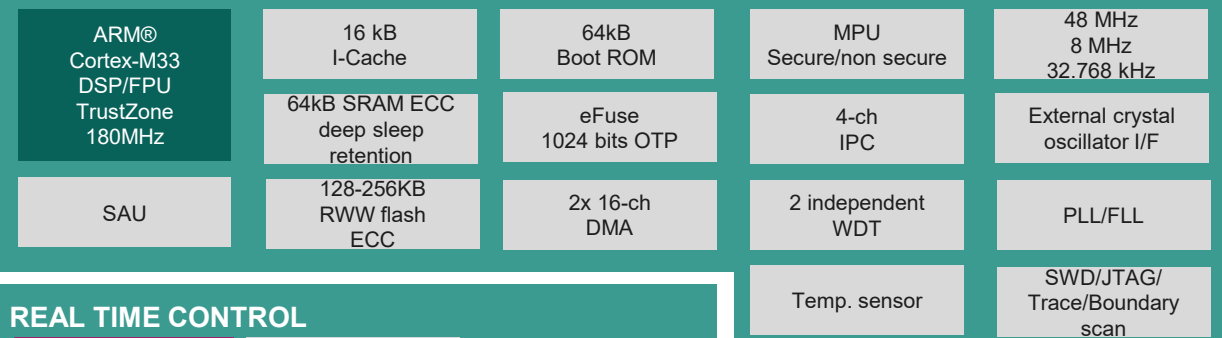
- 1.71 – 3.3V
- <1 – 10 µA low power modes
- -40 – 115°C Ta

PSOC™ Control C3P5 and C3M5 Main Line

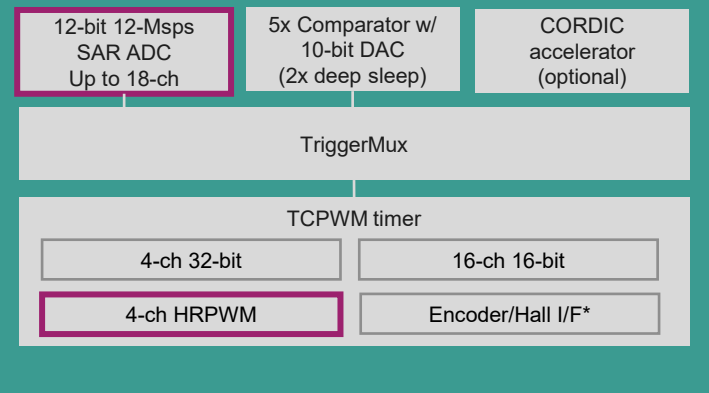
Block diagram

Advanced / New Features

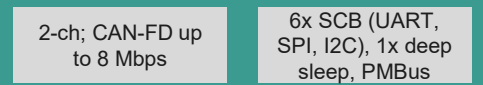
SYSTEM



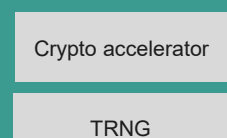
REAL TIME CONTROL



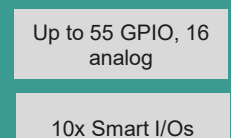
COMMUNICATION



SECURITY



I/O



Applications and Target Markets

- Single and dual motor control, and PFC
- PFC, Power & Gardening tools, MHA and Aircon drives and compressors, LEV drives, SPMS

Product Highlights

- **Low power modes:** deep sleep (<10uA), sleep, hibernate (<1uA)
- **Idle sampling ADC:**
 - Low jitter and high performance, obsoleting external buffer caps
 - 12 MSPS, 24 ch sync. sampling, 16-bit oversampling, in-built gain
- **Comparators:** < 10ns in-built 10-bit DAC and slope generator
- 10-clock-cycles CORDIC Accelerator
- **Timer/Counter/PWM (TCPWM):**
 - Complementary output/ch, multi-ch control, shadow update, input glitch filter, PRNG dithering
 - < 100 ps high resolution PWM (HRPWM) for period, duty & dead time
- **TriggerMux:** < 1ns latency programmable peripheral interconnects
- **Memory:**
 - 128-bit RWW Flash @ 20 Mhz, ECC on Flash & RAM
 - 16 kB Instruction Cache
- **Security:** PSA L2 certified, Configurable Flash Partitioning / Protection
- **Safety:** Class B & SIL 2 compliant

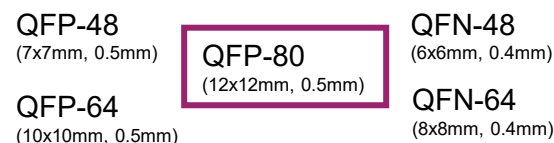
Operating Range

- 1.71 – 3.3V
- <1 – 10 µA low power modes
- -40 – 115°C Ta

Status/Availability

- In Development, prelim. DS available
- Samples & EVK available
- Qualified samples Q3 2024
- SOP: Q4 2024

Packages

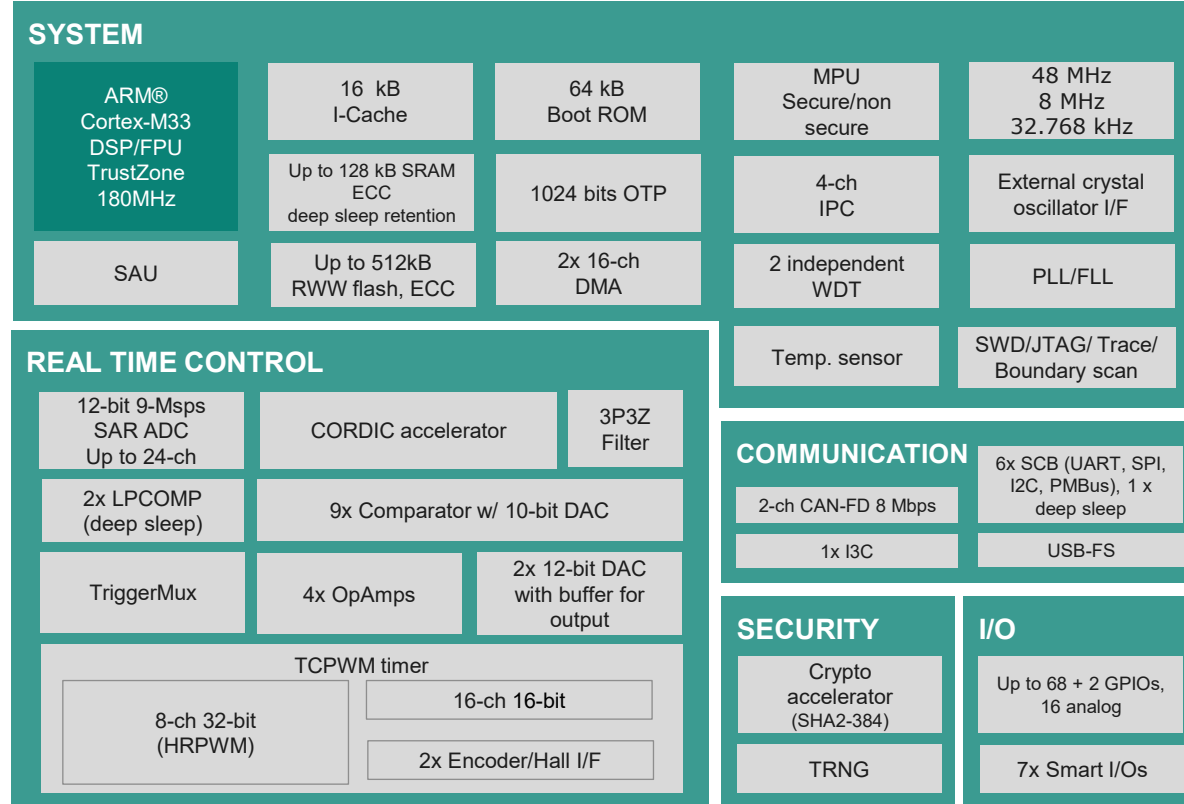


PSOC™ Control C3 Main Line (Sampling)

C3P6 and C3M6



Block Diagram



Status/Availability

- **Samples / EVK** – Available
- **Qualified Samples** – Q3 2026
- **SOP** – end of Q3 2026

Packages

QFP-64 (10x10mm, 0.5mm)	QFP-80 (12x12mm, 0.5mm)	QFP-100 (14x14mm, 0.5mm)
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Applications / Target Markets

- Single and dual motor control and PFC, tri-motor control.
- MHA and Aircon drives and compressors, SPMS, Solar, Robotics and Industrial Drives.

Product Highlights

- **Low power modes** – deep sleep (<10uA), sleep, hibernate (<1uA)
- **Idle sampling ADC:**
 - Low jitter and high performance, obsoleting external buffer caps
 - 9 Msps, 16 ch sync. sampling, 16-bit oversampling, in-built gain
- **Comparators:** 11ns in-built 10-bit DAC and slope generator
- R2R DAC with buffer for external output
- **Timer/Counter/PWM (TCPWM):**
 - Complementary output/ch, multi-ch control, shadow update, input glitch filter, PRNG dithering
 - < 100 ps high resolution PWM (HRPWM) for period, duty & dead time
- **TriggerMux:** < 1ns latency programmable peripheral interconnects
- **Memory:**
 - Up to 512kB RWW Flash, ECC on Flash & RAM
 - 16 kB Instruction Cache
- 10-clock-cycles CORDIC Accelerator
- **Security:** PSA L3 certified, PQC ready, Configurable Flash
- **Safety:** Class B & SIL 2 compliant

Operating range

- 1.8 – 3.3V
- <1 – 10 µA low power modes
- 125°C Tj

PSOC™ Control C3

Security and Safety

PSOC™ Control C3 Safety and Security Offerings

➤ Security Software

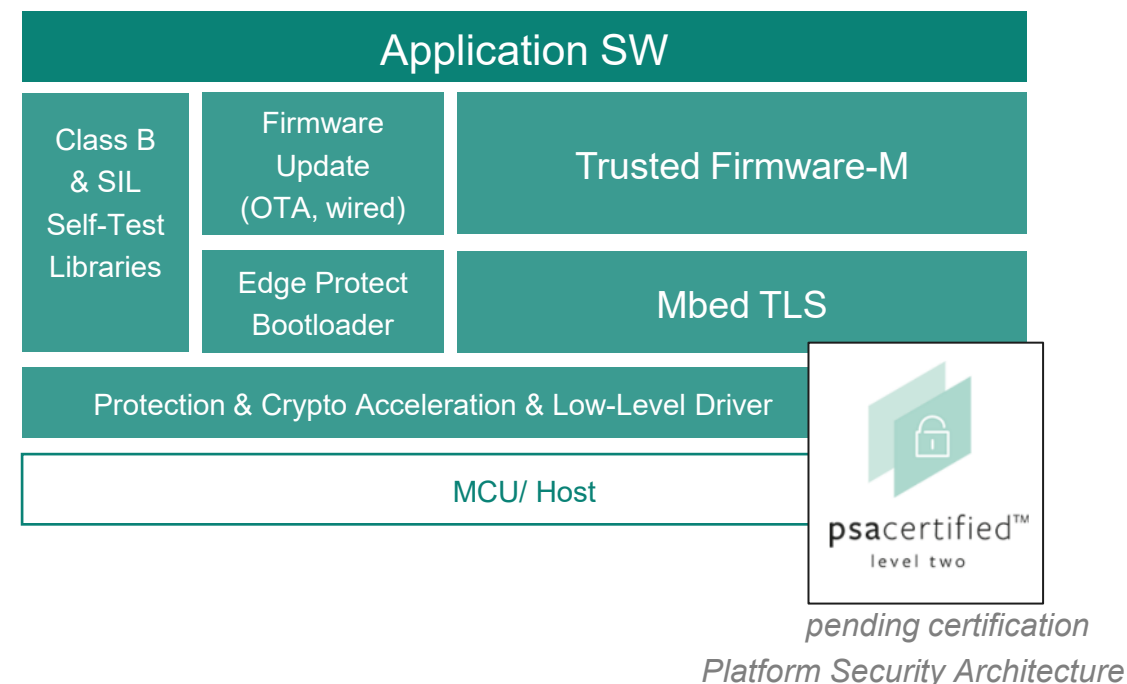
- Secure Boot Firmware
- Secure Firmware Update
- Edge Protect Bootloader based on MCUBoot
- Secure Debug
- Trusted Firmware-M
 - Supporting PSA Level 2 Certification (*pending*)
 - With PSA Firmware Update API
- Security code examples and application template

➤ Safety Software

- Class B & SIL 2 self-test libraries, Certification

➤ 3rd Party 'Multi-Tenant' Firmware Support

- Supports confidentiality of pre-installed software IP



PSOC™ microcontrollers offer advanced security features to meet security needs of critical infrastructure applications like data centers



Regulatory Compliance (CNSA 2.0, PQC, CRA)

- US Data Center guidelines for cryptographic algorithms, including Post Quantum Cryptography



psacertified™

Platform Security Architecture (PSA) Certified

- PSA Certified L1, L2 and L3
- Infineon holds Vice Chair of the PSA Certified working group



Full Secure Protocol for Data Model (SPDM)

- Multiple options for SPDM SW Architecture
- M-CRPS is the power supply management FW including SPDM
- Infineon is a OCP security committee member (Device Management TF)



Device Identifier Composition Engine (DICE)

- DICE and DICE-Ready MCUs
- Infineon Tools for DICE UDS Generation
- Infineon is a TCG DICE committee member



Dedicated Security Tools and Examples

- ModusToolbox™
- Edge Protect Tools & Configurator
- Library of security Code Examples and SPDM Code Example



Public Key Infrastructure (PKI)

- Infineon and OEM Public Key Infrastructure
- FW Signing and Private Key Storage



PSOC™ Control C3

Motor Control Ecosystem, Software and Firmware

PSOC™ Control C3 – Motor Control Tools for Comprehensive Development

1. Initial system setup – Out of the Box Demo

- Automatic kit identification
- Run pre-selected motor

2. Adapting firmware and parameters for customized systems involves adjusting for various factors, such as

- Different types of motors.
- Various control and feedback methods, current sampling, and protection mechanisms.
- Distinct power stages.
- Use of different MCUs or allocation of resources on the same MCU, with the help of ModusToolbox™ Solution Personality.

3. High sample rate Oscilloscope functionality

- To evaluate system performance, multiple signals representing physical values or internal parameters are observed

4. Test bench/dashboard for testing and tuning the system

- Real-time access to key parameters used for tuning
- Setting of different protection methods and parameters



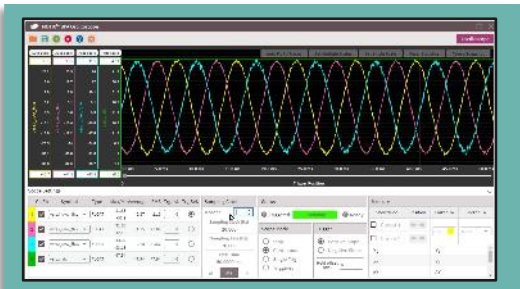
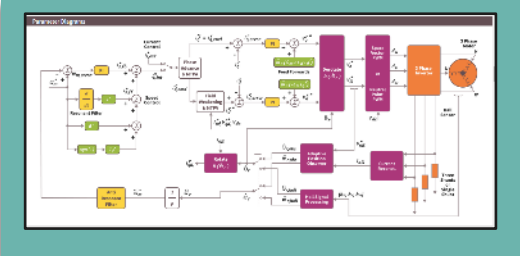
PSOC™ Control C3

Advanced Motor Control

RFO

SFO

TBC



PSOC™ Control C3 – Reliable Software Development Motor Control Algorithms for Ease of Use



1. Accelerate Software Development with Pretested Libraries

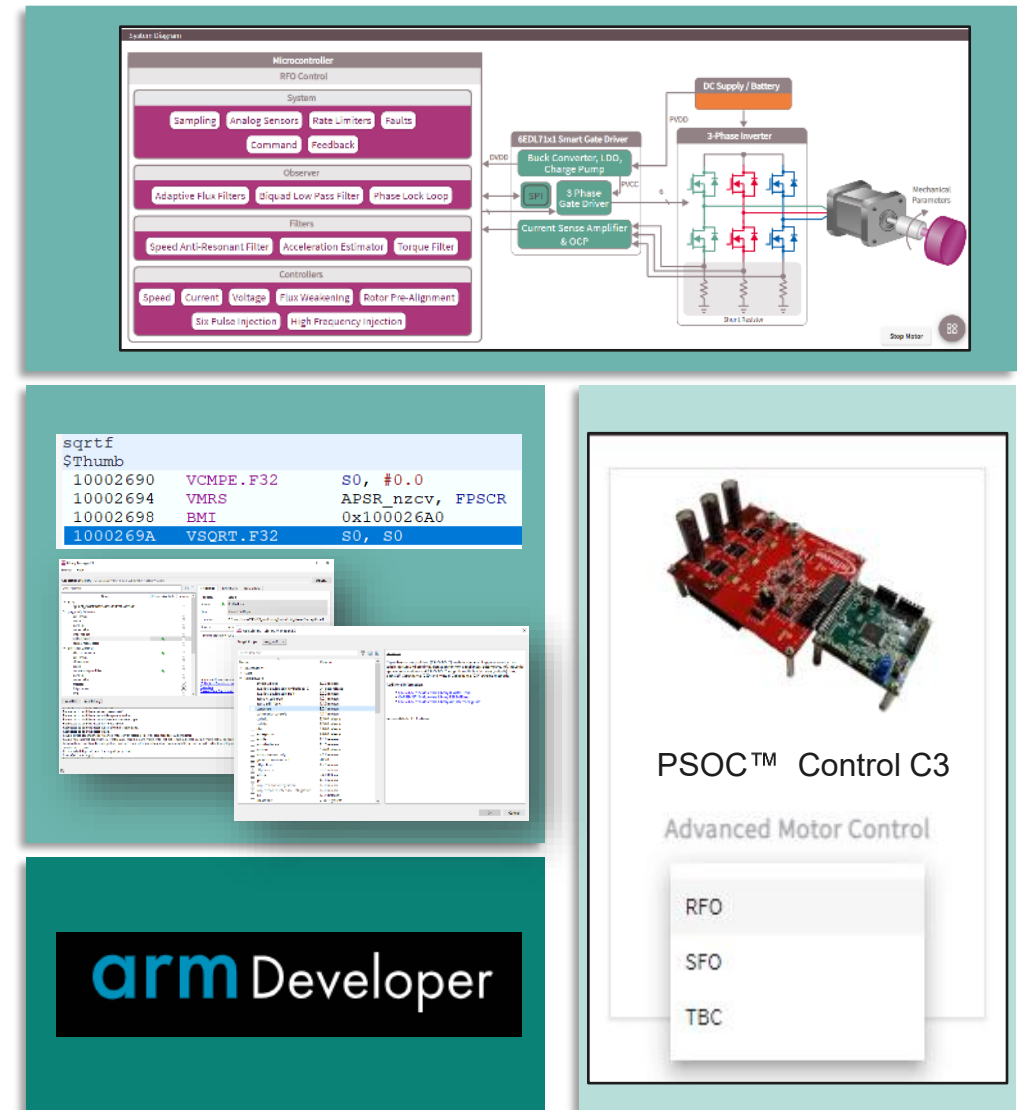
- Control methods
- Current sampling methods
- Modulation schemes
- Startup methods
- Compensation options
- Protection options

2. Optimized software to maximize hardware potential

- Usage of FPU Architecture with floating point libraries for easy readability
- Clear SW architectural separation between HW-agnostic algorithm libraries and HW-specific libraries
- Support for GCC, IAR, Keil MDK

3. Ensure Software Reliability with Automated Regression and Verification Flow

4. Streamline Feature Integration with a Well-Defined Process for Third-Party Code



PSOC™ Control C3 – More information to get started



Web Pages

- [PSOC™ Control MCUs](#)
- [PSOC™ Control C3 Main Line](#)
- [PSOC™ Control C3 Entry Line](#)

Development Kits, Module Partners, and Software

- Evaluation Kits ([PSC3M5 EVK](#), [KIT_PSC3M5_CC2](#), [KIT_PSC3M5_MC1](#))
- [ModusToolbox™ Motor Suite](#)

Sales Enablement Collateral

- [Collateral Documents](#) (login to myInfineon)
 - [Short Form](#) (login to myInfineon)
 - [Long Form](#) (login to myInfineon)
 - [Fight Guide](#) (login to myInfineon)
- Product Briefs ([Entry Line](#) / [Main Line](#))

Developer Community (For Technical Support)

- [PSOC™ Forum](#)

Other

- Datasheet [Entry Line](#) and [Main Line](#)
- [Whitepapers](#)
- [Application Notes](#)



Hitex offerings ...



Ask alexander.hess@hitex.de – he looks forward to receiving your inquiries regarding Hitex offerings, including:

- Arm encryption libraries
- Security stack for Hardware Security Modules
- Support for your ISO 21434 Threat Analysis and Risk Assessment (TARA)
- Training courses for embedded systems with Arm
- SO-DIMM compute modules for PSOC™, TRAVEO™ and more for an easy entry into the Infineon MCs.

**THANK YOU.
SEE YOU NEXT TIME!**

**Stay informed: webinars, training sessions, knowledge labs
Find all the information at www.hitex.de**