



Secured edge connectivity with NXP Enabling CRA Compliance Solutions with NXP EdgeLock and MCX Series

Silica Breda 2025

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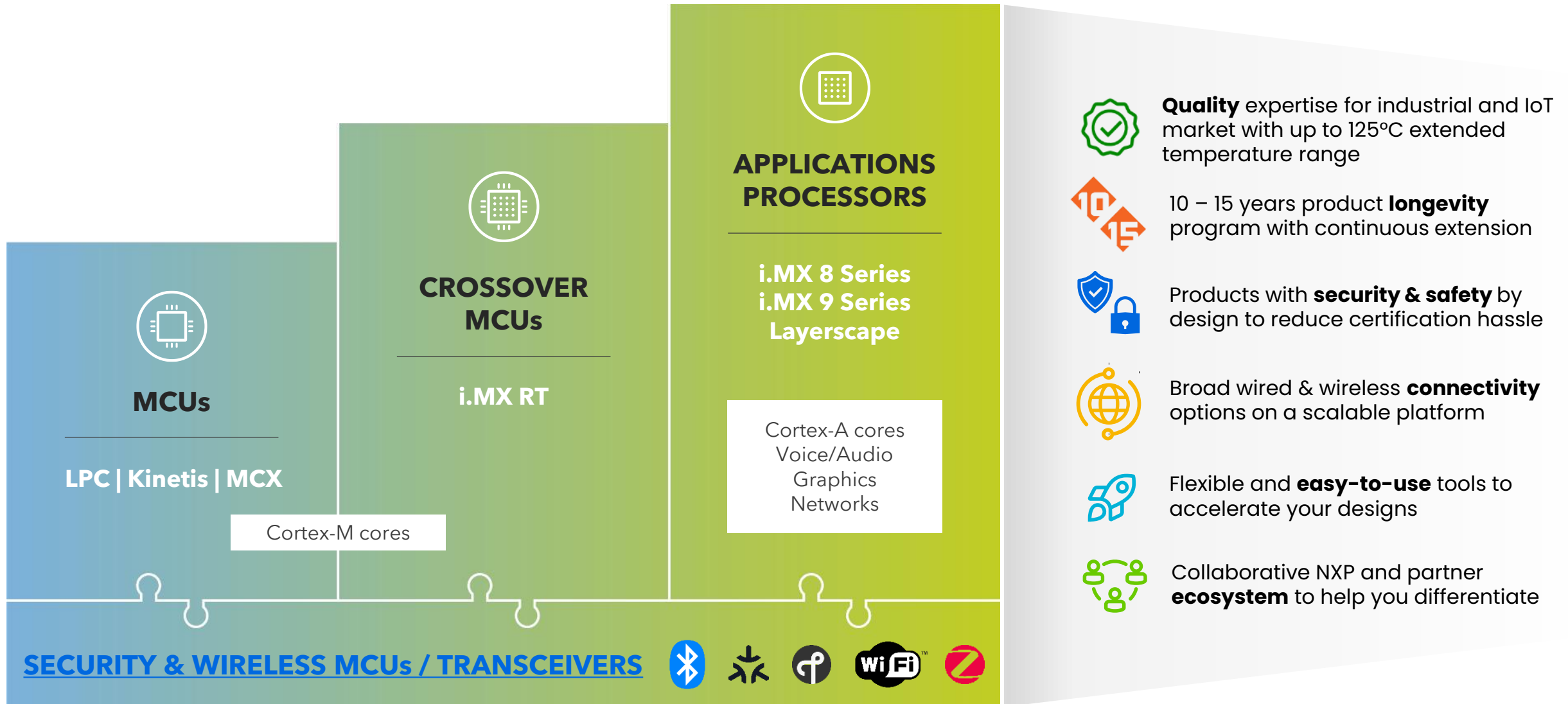
RMM MCU CE, EE & Israel

December 2025

NDA Required

SECURE, CONNECTED EDGE PORTFOLIO

INNOVATE AND SCALE WITH YOUR DESIGNS



Cybersecurity: a rapidly growing problem



Cybercriminals launched around 10 million DDoS attacks worldwide



Ransomware attacks alone are estimated to have cost the world roughly \$20 billion



Every 11 seconds, there is a ransomware attack



Regulators react to foster a more secure cyberspace: a pivotal step

- **Cyber Resilience Act (CRA)**, first ever EU wide legislation of its kind, introducing mandatory cybersecurity requirements for hardware and software products, throughout their whole lifecycle.
- **U.S. Cyber Trust Mark**, a cybersecurity labeling program for smart devices designed to give consumers the tools needed to make informed decisions regarding security, when purchasing products to bring into their homes.
- **Other regulations** emerge, such as PSTI in UK (Product Security and Telecommunications Infrastructure)





EdgeLock hardware



EdgeLock 2GO

Security functions available on NXP products map to regulation requirements

Required security capability (regulations)	Supporting security functions by NXP solutions ¹
Product configuration	Device lifecycle management Secure SW & credential Install Secure boot, Secure Update
Product authentication	Identification & Authentication, Attestation Secure key storage/management
Access to product	Secure debug, Secure connect Secure key storage/management Crypto services for access control
Data Protection	Data encryption/authentication Tamper detection, Tamper resistance Secure key storage/management Privileged access to data, secure connect
Product monitoring & Cyber State awareness	Authentication Device (runtime) attestation Secure Event Audit/Logging
Vulnerability fix and product update	Secure update Secure key storage/management
Reduction of incidents' impact Product availability	Tamper/anomaly detection SW/data/processing isolation Damage control & device recovery Secure key storage/management

1. Please check NXP product datasheets/security manual for availability of specific security functions

Exciting new applications & use-cases are emerging in key market segments



Factory automation

Real-time control
HMI
Robotics



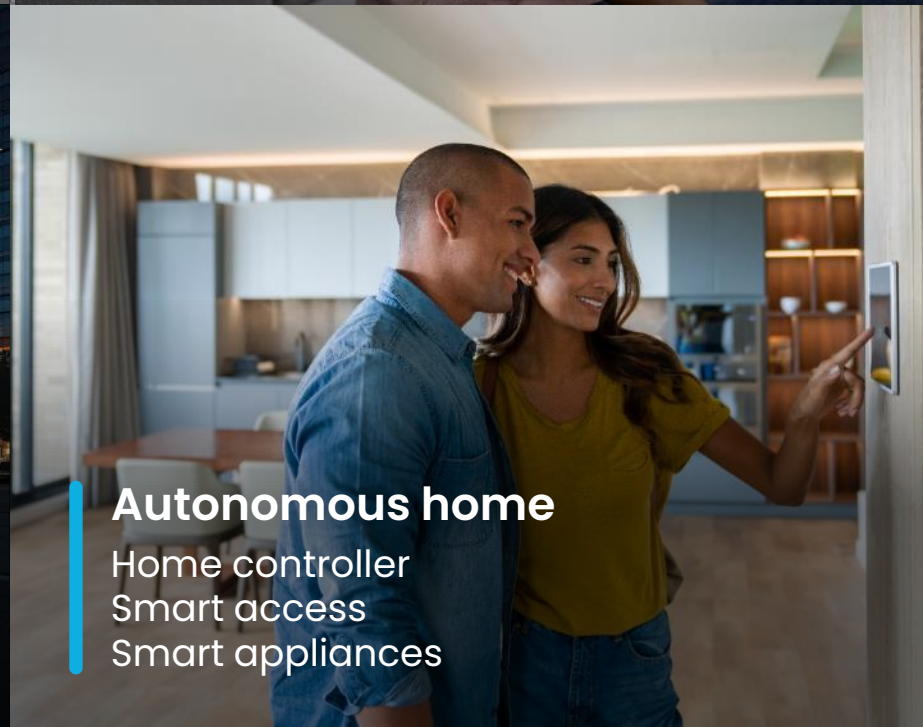
Healthcare

Patient monitoring
Medical instruments
Personal health



Buildings & energy

Energy management
Green energy
Building control



Autonomous home

Home controller
Smart access
Smart appliances

Cut through complexity and scale

Addressing focus markets



3 >

System level solutions



Reference designs

Proof of concepts

Software packs

2 >

Technology pillars



Security



Connectivity



AI/ML



Graphics & Display



Touch



Motor control



Safety



Networking



Voice



Vision



Power Conversion



Low Power



1 >

Hardware & software foundation



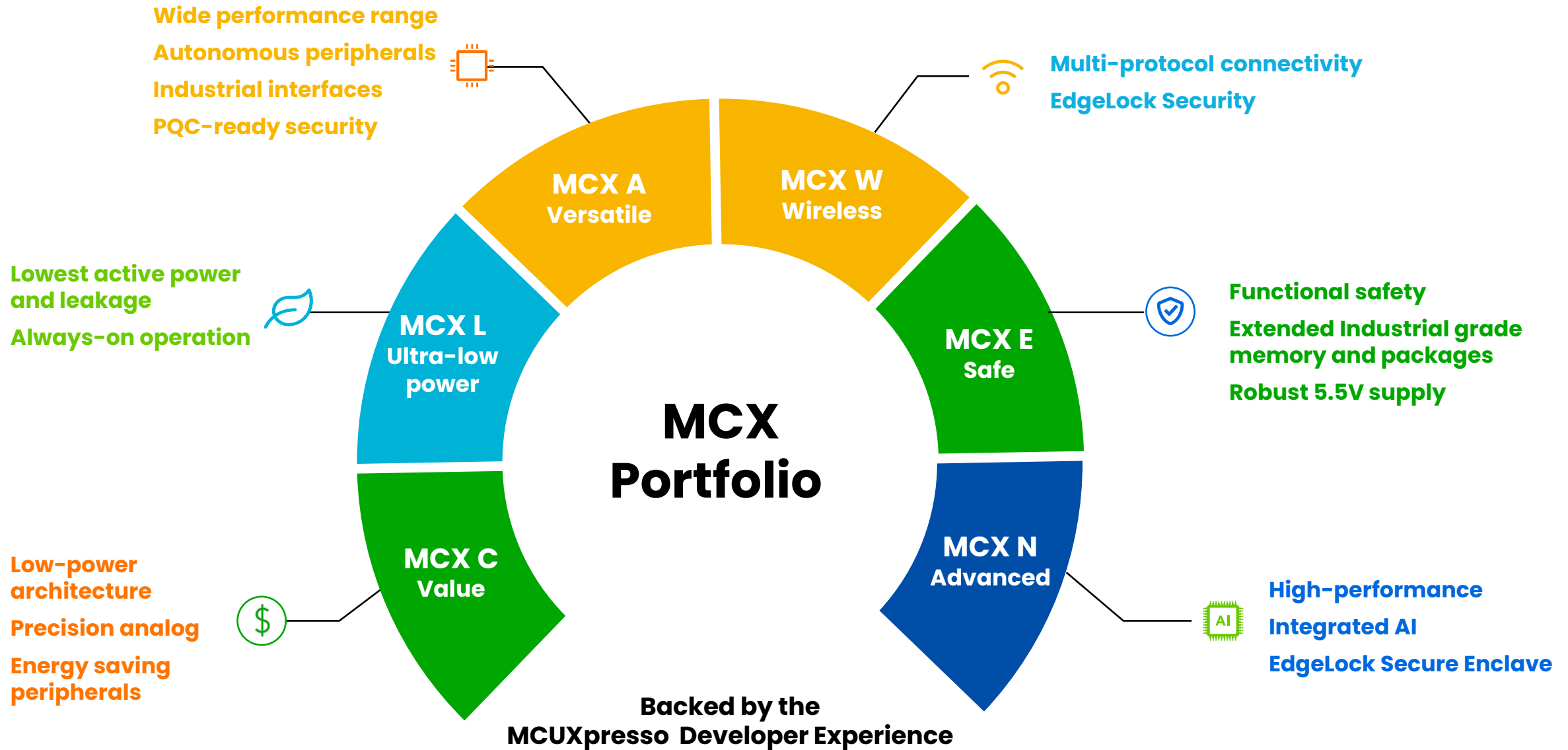
MCU
LPC, Kinetis, MCX

Crossover MCU
i.MX RT

Apps Processor
i.MX

Analog | Power Management | Sensors

Diverse, broad MCX MCU portfolio



MCX N94x/54x Series MCU – Key Features

Multi-tasking & Performance Efficiency

- Dual-core at 150 MHz
- On-chip accelerators with software tool and library support:
 - PowerQuad for DSP and CORDIC Functions
 - eIQ® Neutron NPU for machine learning
 - SmartDMA for parallel CSI, Boolean operation

Intelligent & Autonomous Peripherals

- Mixed-signal and on-chip analog peripherals to save space and BOM cost
- Rich digital communication including Ethernet, CAN, USB, audio and serial comms
- Motor control subsystem for fast and precise real-time control loop, with PMSM and BLDC software examples and tuning tools
- Unique peripherals for smart HMI such as graphic LCD, audio and capacitive touch sensing complemented by comprehensive software and design tools

Advanced security

- Physical isolation of core security functions, with dedicated resources
 - Cryptographic services (incl. TRNG and key generation/derivation)
 - Secure key store with key usage policies
 - Key management over-the-air with pre-integration of NXP EdgeLock 2GO service platform
 - Device Unique Identity based on Physically Unclonable Function (PUF)
 - Device Attestation (Device Identifier Composition Engine - DICE)
- Performance
 - Dual Secure Boot Mode (asymmetric mode and Fast, Post-Quantum Secure symmetric mode)
 - High-performance on-the-fly memory encryption with additional authentication for external Flash
 - EdgeLock Accelerator (Public Key Cryptography)
- Data/SW integrity & confidentiality
 - Immutable ROM, eFuses, secure firmware update support, secure debug
 - Secure install of credentials and SW in untrusted factory
 - Protected Flash Region (PFR)
 - Security Monitoring (tamper & intrusion detection)

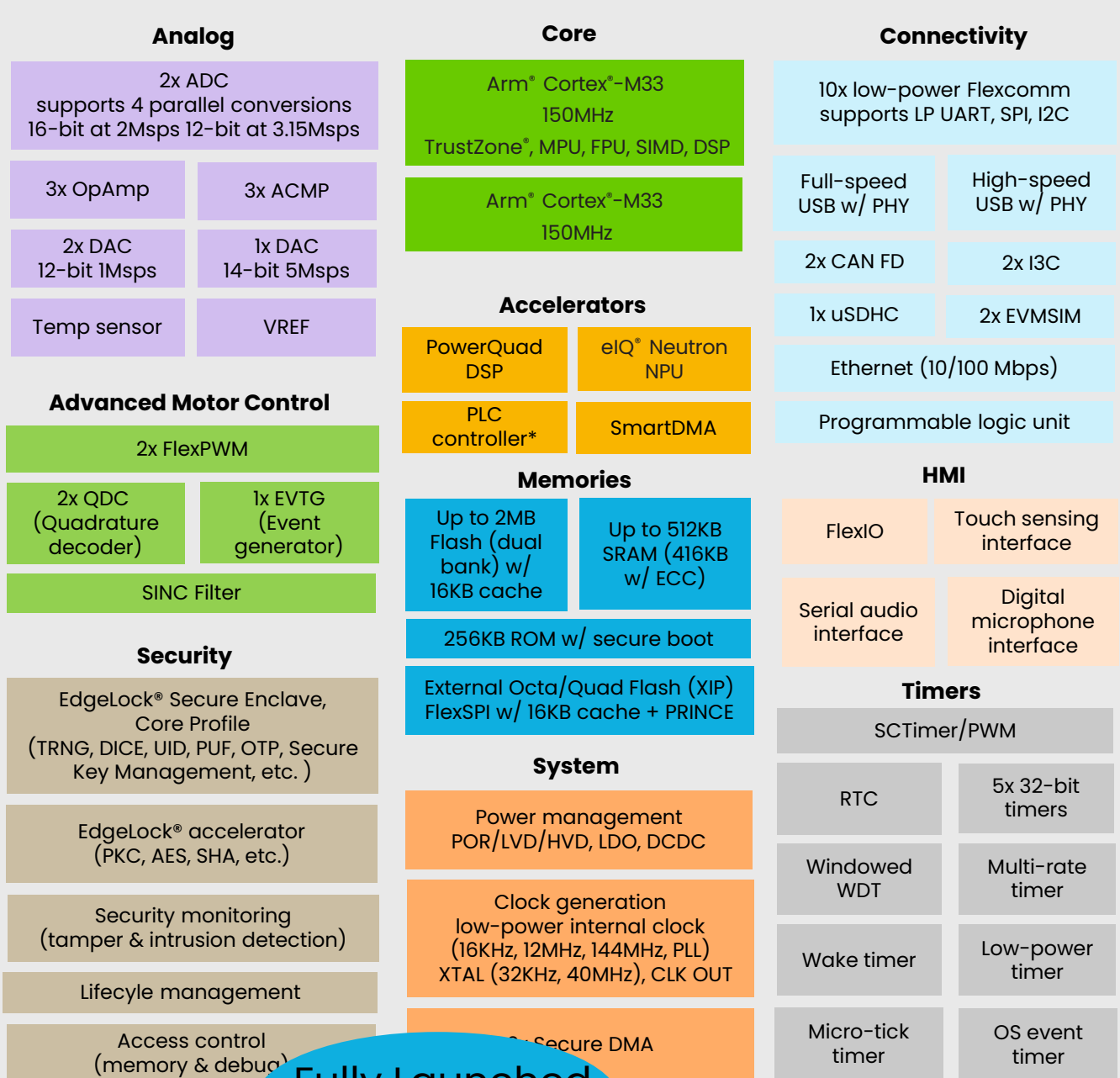
Power and Operation

- LDO, Buck & Boost DC-DC, <70uA/MHz running Coremark
- Operating voltage: 1.71V to 3.6V
- Temperature range: -40 to 125 °C (TjMax=125C)

Package Options

- VFBGA184: 9 x 9 x 0.86 mm, 0.5 mm pitch, up to 124 GPIOs
- HLQFP100: 14 x 14 x 1.4 mm, 0.5 mm pitch, up to 74 GPIOs **MCXN957VKLT # NEW 02-2025**
- HDQFP172: 16 x 16 x 1.65 mm, 0.65 mm pitch, up to 124 GPIOs
- **WLCSP108**: 5,2 x 4 x 0.5 mm, 0,4 mm pitch

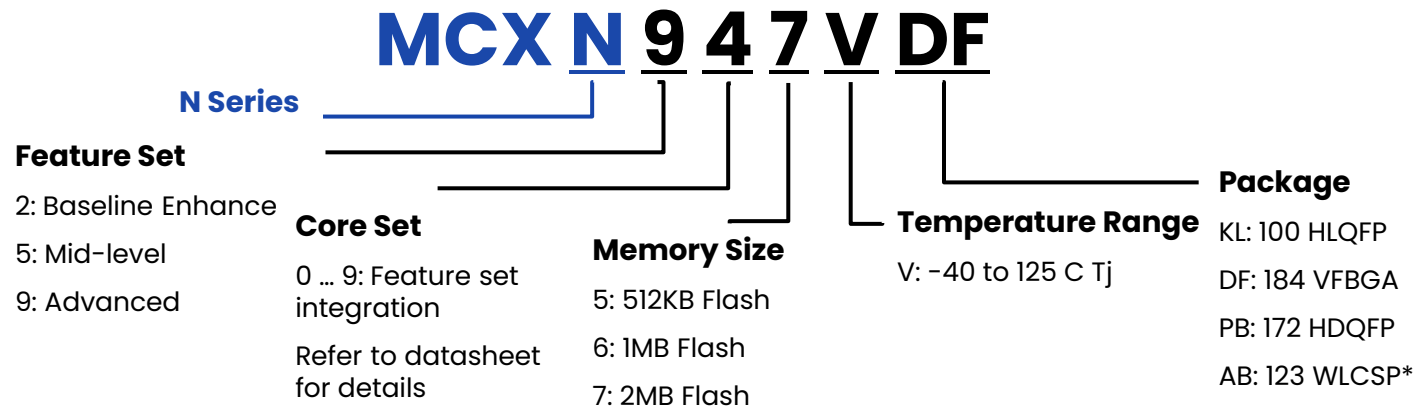
Samples April 25



**Fully Launched
Jan 2024**

MCX N Series – Orderable Part Numbers

Part Number	Cortex-M33 (MHz)	Embedded Memory	
		Flash (MB)	SRAM (KB)
MCXN947Vxx	Dual-core 150	2	512 (416 w/ full ECC)
MCXN946Vxx	Dual-core 150	1	352 (288 w/ full ECC)
MCXN547Vxx	Dual-core 150	2	512 (416 w/ full ECC)
MCXN546Vxx	Dual-core 150	1	352 (288 w/ full ECC)
MCXN537Vxx	Dual-core 150	2	512 (416 w/ full ECC)
MCXN536Vxx	Dual-core 150	1	352 (288 w/ full ECC)
MCXN527Vxx	Dual-core 150	2	512 (416 w/ full ECC)
MCXN526Vxx	Dual-core 150	1	352 (288 w/ full ECC)
MCXN247Vxx	Single-core 150	2	512 (416 w/ full ECC)
MCXN236Vxx	Single-core 150	1	352 (288 w/ full ECC)
MCXN235Vxx	Single-core 150	0.5	192 (160 w/ full ECC)
MCX-N5xx-EVK	MCX N5xx Full Evaluation Kit		
MCX-N9xx-EVK	MCX N9xx Full Evaluation Kit		
FRDM-MCXN947	MCX N94x/54x FRDM Development Board		
FRDM-MCXN236	MCX N23x FRDM Development Board		





MCX A Series

Wide performance range
Autonomous peripherals
Industrial interfaces



MCX A Series Mainstream

Purpose-built for industrial and IoT real-time control

Real-time efficiency

Efficient Cortex-M33 at up to **1000 CoreMark**

Internal cache for fast memory access

Math Acceleration for **17x** faster trig. operation than CMSIS-DSP

Autonomous peripherals

Flexible PWM with motor control subsystem

Fast interface for serial comms, CAN, USB, Ethernet, LCD, etc.

Rich analog integration with up to 4x 16-bit ADC

Low power

Runtime efficiency as low as **53uA/MHz**

Various low power modes down to **0.4uA** with RAM retention

Low-power peripherals to offload main CPU

Scalable portfolio

Flash memory options from **64KB** to **1MB** with pin compatibility

Wide range of package options offering from **32** to **169 pins**

Unified core architecture

15 years longevity, extended industrial qualification



- Security offerings
- SESIP level 2/3*
 - Secure boot



- Functional Safety certification target
- IEC 60730 Class B*
 - IEC 61508 SIL2 systematic capability*

MCX A target applications

Sensing &
data acquisition

Motor control

Interface & HMI

Power & Energy

- HVAC control
- Smart circuit breaker
- Solar inverter
- Edge Nodes



Factory Automation

- Water pump
- AC motor drive
- Process control
- Instruments and meters
- Sensor gateway
- Simple LCD panel



Home & Building

- Appliances motor control
- Appliance cap touch interface
- Induction cooker
- Building control
- Fan control
- Smart lighting

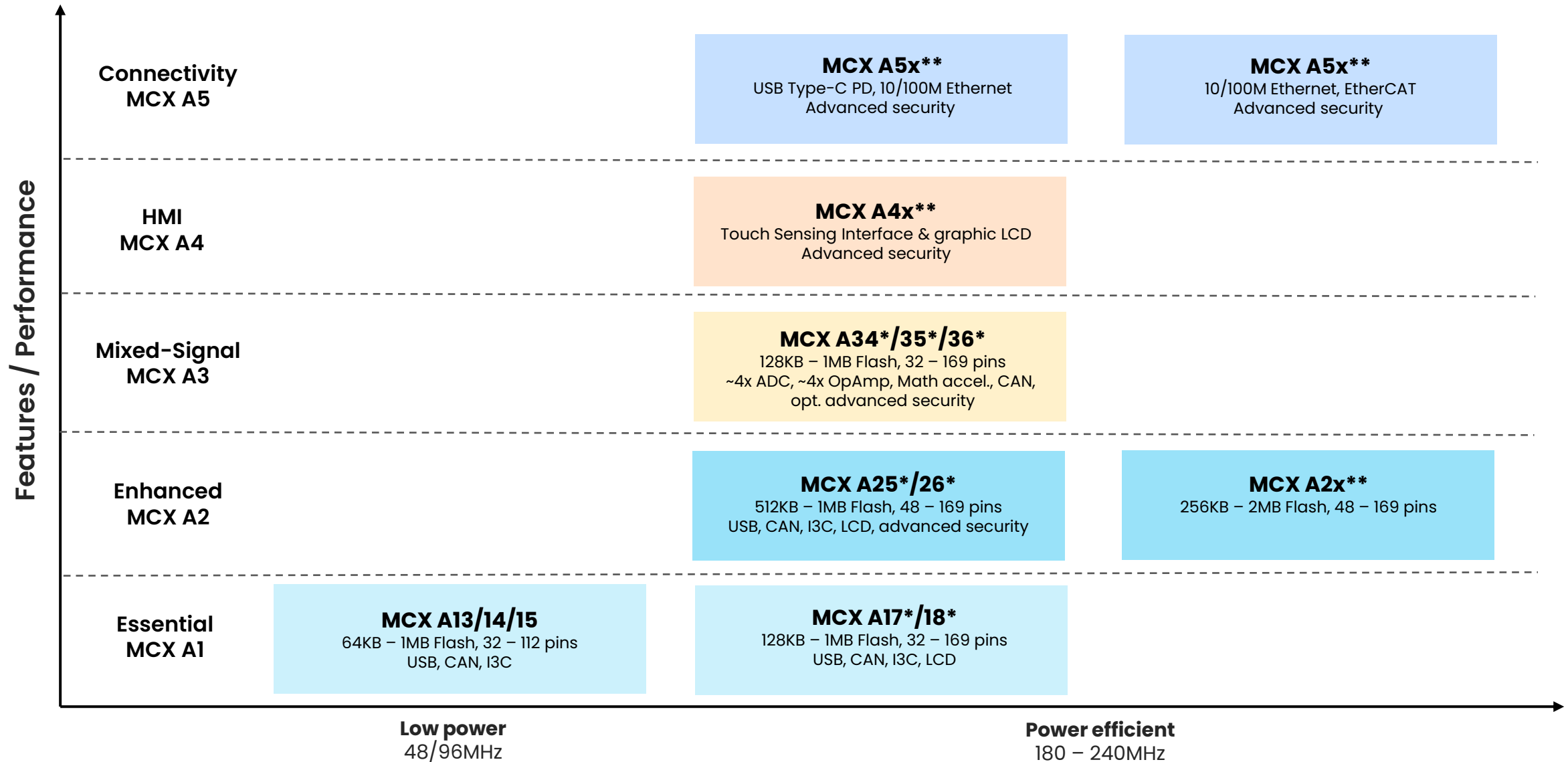


General Embedded

- Medical pump
- Healthcare device
- Power tools
- Drones and mobile robots

MCX A series – mainstream portfolio overview

*upcoming NPI
**future products



MCX A feature set positioning

- ✓ Pin compatible on same packages
- ✓ Unified peripherals and software

Series	Product	Key Features														
		Main clock	ADC	Op Amp	I3C	USB	CAN	LCD	Adv. security							
Connectivity	MCXA5x	Details coming soon										MCXA5x5	MCXA5x6	MCXA5x7		
		Details coming soon										MCXA4x5	MCXA4x6			
Mixed-signal	MCXA36	240MHz	4x	4x	1x	FS	2x	Y	Y			MCXA365	MCXA366			
	MCXA35	240MHz	4x	4x			1x					MCXA355	MCXA356			
	MCXA34	180MHz	2x/4x	3x/4x			1x			MCXA343	MCXA344	MCXA345	MCXA346			
Enhanced	MCXA2x	Details coming soon										MCXA2x5	MCXA2x6	MCXA2x7		
		MCXA26	240MHz	2x	1x	1x	FS	2x	Y	Y			MCXA265	MCXA266		
		MCXA25	180MHz	2x	1x	1x	FS	1x		Y			MCXA255	MCXA256		
Essential	MCXA18	240MHz	2x	1x	1x	FS	2x	Y				MCXA185	MCXA186			
	MCXA17	180MHz	2x	1x	Opt.	FS	1x			MCXA173	MCXA174	MCXA175	MCXA176			
	MCXA15	96MHz	1x/2x	Opt.	1x	FS	Opt.			MCXA152	MCXA153	MCXA154	MCXA155	MCXA156		
	MCXA14	48MHz	1x/2x		1x	FS	Opt.			MCXA142	MCXA143	MCXA144	MCXA145	MCXA146		
	MCXA13	96MHz	1x		1x					MCXA132	MCXA133					
									Flash:	64 KB	128 KB	256 KB	512 KB	1 MB	2 MB	
									Pin count:	32 - 64	32 - 100	32 - 169	48 - 169	48 - 169	48 - 169	

MCX A package scalability

Essential low-power
MCX A13/14/15

Enhanced
MCX A25/26

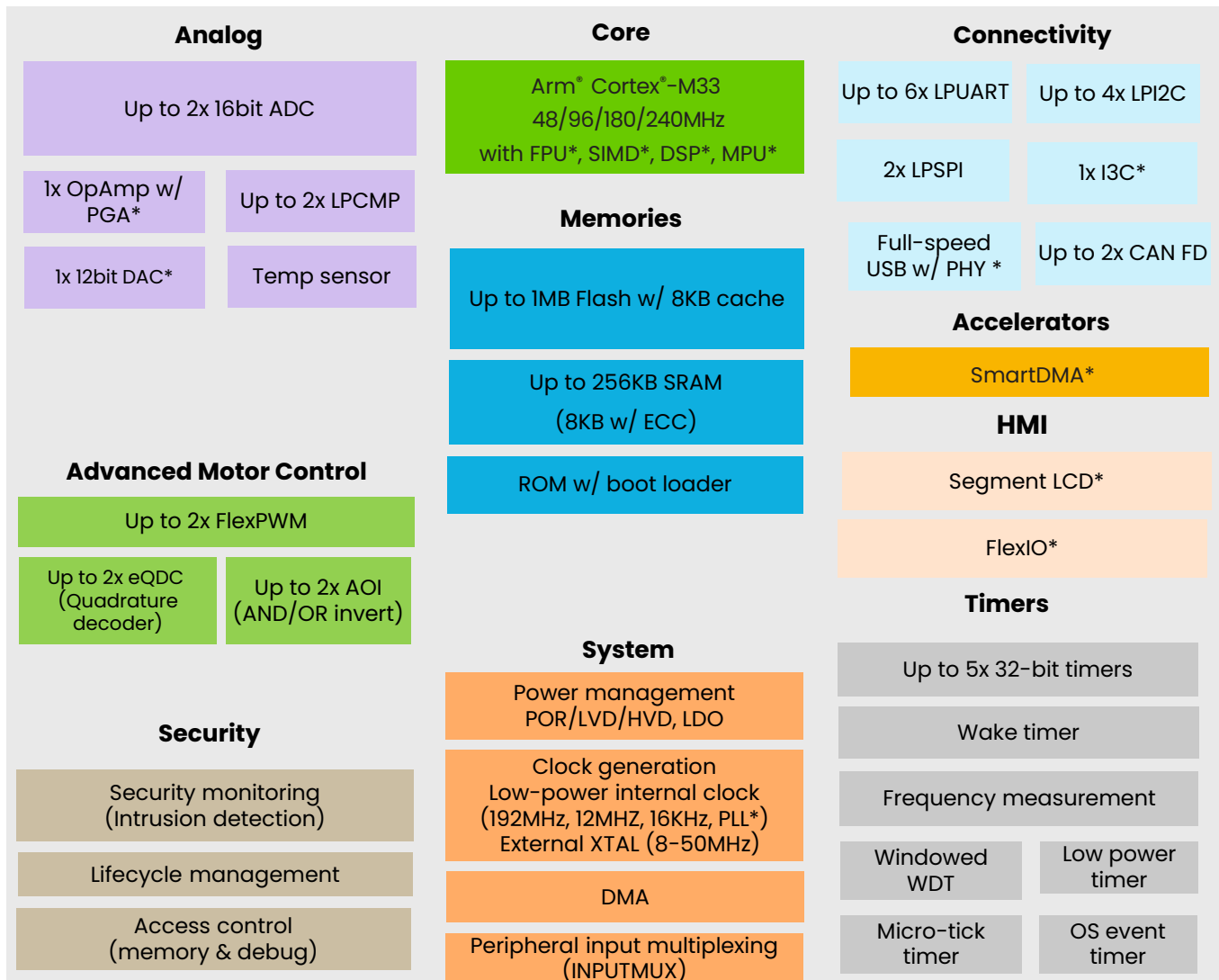
Essential performance
MCX A17/18

Advanced Motor control
MCX A34/35/36

- ✓ Pin compatible on same packages
- ✓ Unified peripherals and software

Flash	2MB MCXAxx7									
	1MB MCXAxx6				A34/35/36	A34/35/36	A34/35/36			A34/35/36
					A25/26	A25/26	A25/26			A25/26
					A17/18	A17/18	A17/18			A17/18
			A14/15		A14/15	A14/15		A14/15	A14/15	
	512KB MCXAxx5				A34/35/36	A34/35/36	A34/35/36			A34/35/36
					A25/26	A25/26	A25/26			A25/26
					A17/18	A17/18	A17/18			A17/18
			A14/15		A14/15	A14/15		A14/15	A14/15	
	256KB MCXAxx4	A34		A34	A34	A34				
A17			A17	A17	A17					
		A14/15		A14/15	A14/15		A14/15	A14/15		
128KB MCXAxx3	A34		A34	A34	A34					
	A17		A17	A17	A17					
	A13/14/15	A13/14/15	A13/A14/15	A14/15						
64KB MCXAxx2										
	A13/14/15	A13/14/15	A13/A14/15	A14/15						
	HVQFN32 5x5mm	HVQFN48 7x7mm	LQFP48 7x7mm	LQFP64 10x10mm	LQFP100 14x14mm	LQFP144 20x20mm	BGA64 5x5mm	VBGA112 7x7mm	WFBGA169 7x7mm	

MCX A1xx block diagram



I/O Capability and Intelligent Peripherals

- Up to 8 Hi-drive 20mA pins
- 50MHz IOs on select ports
- 5V tolerant IOs on select pins
- Up to 2x 16bit ADC with 3.2Msps, supporting 12bit mode with 4Msps
- Built in OpAmp
- New SmartDMA is designed for flexible data handling and IO control.
- Rich digital communication including CAN, USB, FlexIO and serial comms
- Motor control subsystem for fast and precise real-time control loop, with PMSM and BLDC software examples and tuning tools

Power and Operation

- Capless LDO power architecture
- Operating voltage: 1.71V to 3.6V
- Temperature range: -40 to 125°C
- IOs: 1.71V to 3.6V

Safety and Security

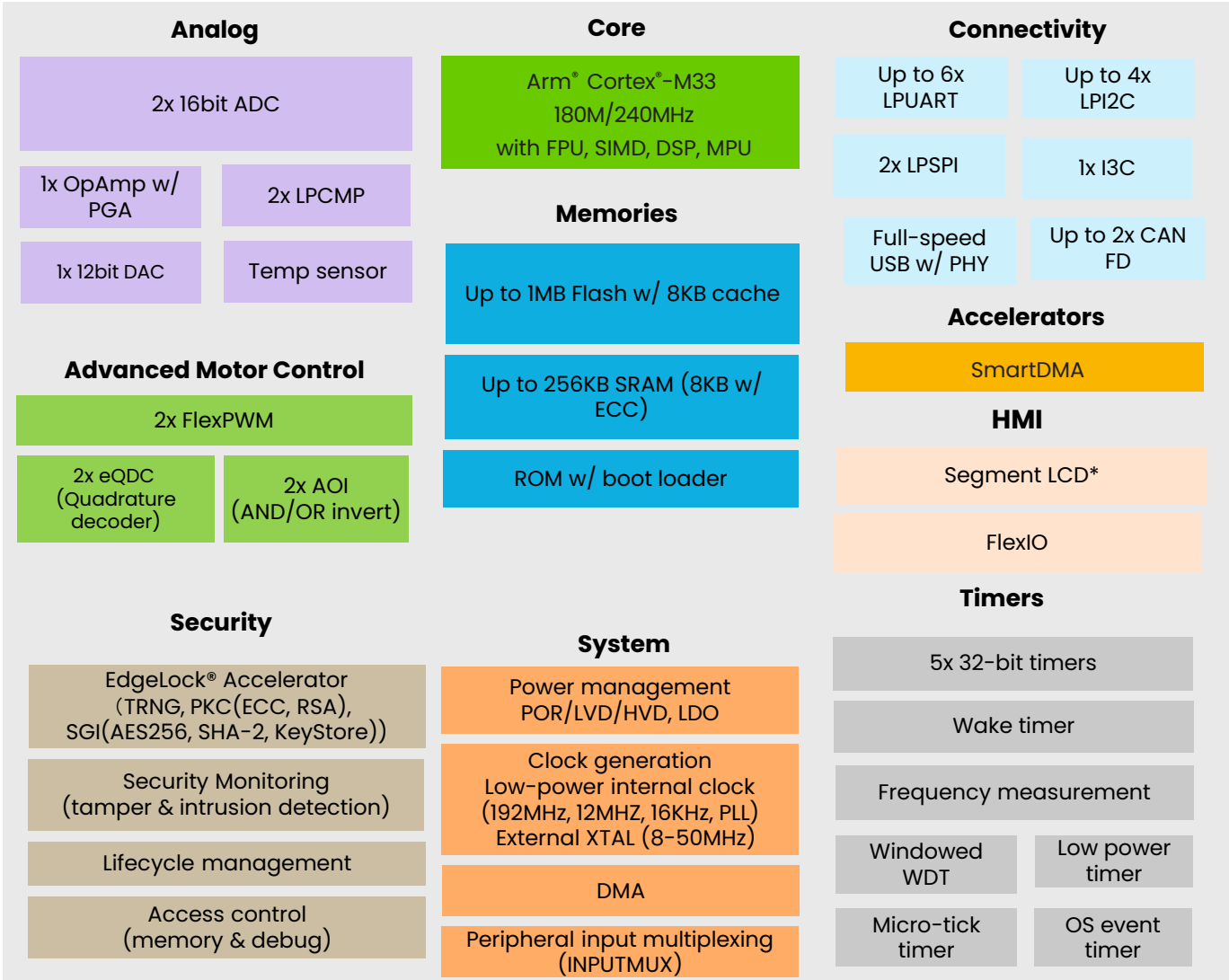
- IEC60730 Class B
- IEC61508 core self-test M33 + MCX safety framework in 2025
- Essential security for secure access and data protection

*: Feature is only enabled on selected products

MCX A1x series comparison

	MCX A133/2	MCX A143/2	MCX A146/5/4	MCX A153/2	MCX A156/5/4	MCXA174/173	MCX A176/175	MCX A 186/185
Cortex-M33	96MHz	48MHz	48MHz w FPU, SIMD, DSP	96MHz	96MHz w FPU, SIMD, DSP	180MHz w FPU, SIMD, DSP	180MHz w FPU, SIMD, DSP	240MHz w FPU, SIMD, DSP
Flash	128KB / 64KB	128KB / 64KB	1024KB / 512KB / 256KB	128KB / 64KB	1024KB / 512KB / 256KB	256KB / 128KB	1024KB / 512KB	1024KB / 512KB
RAM	32KB / 16KB w/ 8KB ECC	32KB / 16KB w/ 8KB ECC	128KB / 96KB / 64KB w/ 8KB ECC	32KB / 16KB w/ 8KB ECC	128KB / 96KB / 64KB w/ 8KB ECC	64KB / 32KB w/ 8KB ECC	256KB / 128KB w/ 8KB ECC	256KB / 128KB w/ 8KB ECC
Serial I/F	LPUARTx3, LPSPI x2 LPI2C x1, I3C x1	LPUARTx3, LPSPI x2 LPI2C x1, I3C x1	LPUARTx5, LPSPI x2 LPI2C x4, I3C x1	LPUARTx3, LPSPI x2 LPI2C x1, I3C x1	LPUARTx5, LPSPI x2 LPI2C x4, I3C x1	LPUARTx5, LPSPI x2 LPI2C x4, I3C x1	LPUARTx5, LPSPI x2 LPI2C x4, I3C x1	LPUARTx6, LPSPI x2 LPI2C x4 I3C x1
Other I/F	-	FS USB Dev	FS USB Dev, CAN x1	FS USB Dev	FS USB Dev, CAN FD x1	CAN FD x1	FS USB Dev, CAN FD x1	FS USB Dev & Host CAN FD x2
DMA	1x 4ch	1x 4ch	1x 8ch	1x 4ch	1x 8ch	1x 8ch	1x 8ch	1x 8ch
Security	Only Code Read Protect	Only Code Read Protect	Only Code Read Protect	Only Code Read Protect	Only Code Read Protect	Only Code Read Protect	Only Code Read Protect	Only Code Read Protect
Analog	1x 16bit ADC w/ 3.2Msps	1x 16bit ADC w/ 3.2Msps	2x 16bit ADC w/ 3.2Msps	1x 16bit ADC w/ 3.2Msps	2x 16bit ADC w/ 3.2Msps 1x 12bit DAC 1x OpAmp w/PGA	2x 16bit ADC w/ 3.2Msps 1x OpAmp w/o PGA	2x 16bit ADC w/ 3.2Msps 1x 12bit DAC 1x OpAmp w/o PGA	2x 16bit ADC w/ 3.2Msps 1x 12bit DAC 1x OpAmp w/o PGA
Comparators	2	2	2	2	2	2	2	2
Motor Control	1xFlexPWM w/3 sub 1xeQDC, 1xAOI	1xFlexPWM w/3 sub 1xeQDC, 1xAOI	1xFlexPWM w/3 sub 1xeQDC, 2xAOI	1xFlexPWM w/3 sub 1xeQDC, 1xAOI	2xFlexPWM w/3 sub 2xeQDC, 2xAOI	2xFlexPWM w/3 sub 2xeQDC, 2xAOI	2xFlexPWM w/3 sub 2xeQDC, 2xAOI	2xFlexPWM w/3 sub 2xeQDC, 2xAOI
HMI	-	-	FlexIO	-	FlexIO	-	FlexIO	FlexIO, Seg-LCD
GPIO	Up to 44 on HVQFN48	up to 52 on LQFP64	Up to 82 on VFBGA112	up to 52 on LQFP64	Up to 82 on VFBGA112	Up to 86 on LQFP100	Up to 114 on LQFP144	Up to 114 on LQFP144
Package	HVQFN32, HVQFN48, LQFP48	HVQFN32, HVQFN48, LQFP64 LQFP48	LQFP100, LFBGA64, VFBGA112 LQFP64, HVQFN48	HVQFN32, HVQFN48, LQFP64 LQFP48	LQFP100, LFBGA64, VFBGA112 LQFP64, HVQFN48	LQFP100, LQFP64, LQFP48, HVQFN32	LQFP144, LQFP100, LQFP64 WFBGA169	LQFP144, LQFP100, LQFP64 WFBGA169

MCX A2xx block diagram



Enhancement on MCXA1xx family

- Booting the main frequency to 240MHz, offers a faster response times and the ability to handle more complex tasks.
- New SmartDMA is designed for flexible data handling and IO control.
- Segment LCD for HMI interface
- Dual CAN supports flexible communication

Advanced security

- Comprehensive security tools for device configuration, code signing and programming
- Device Life cycle management incl. secure authenticated debug
- Secure System, Crypto, PKC, Intrusion & Tamper detection
- Secure boot, Life-cycle management

I/O Capability and Intelligent Peripherals

- Up to 8 Hi-drive 20mA pins
- 50MHz IOs on select ports
- 5V tolerant IOs on select pins
- Up to 114 GPIOs on LQFP144 package

Power and Operation

- Capless LDO power architecture
- Operating voltage: 1.7 to 3.6V
- Temperature range: -40 to 125°C
- IOs: 1.71V to 3.6V

Safety and Security

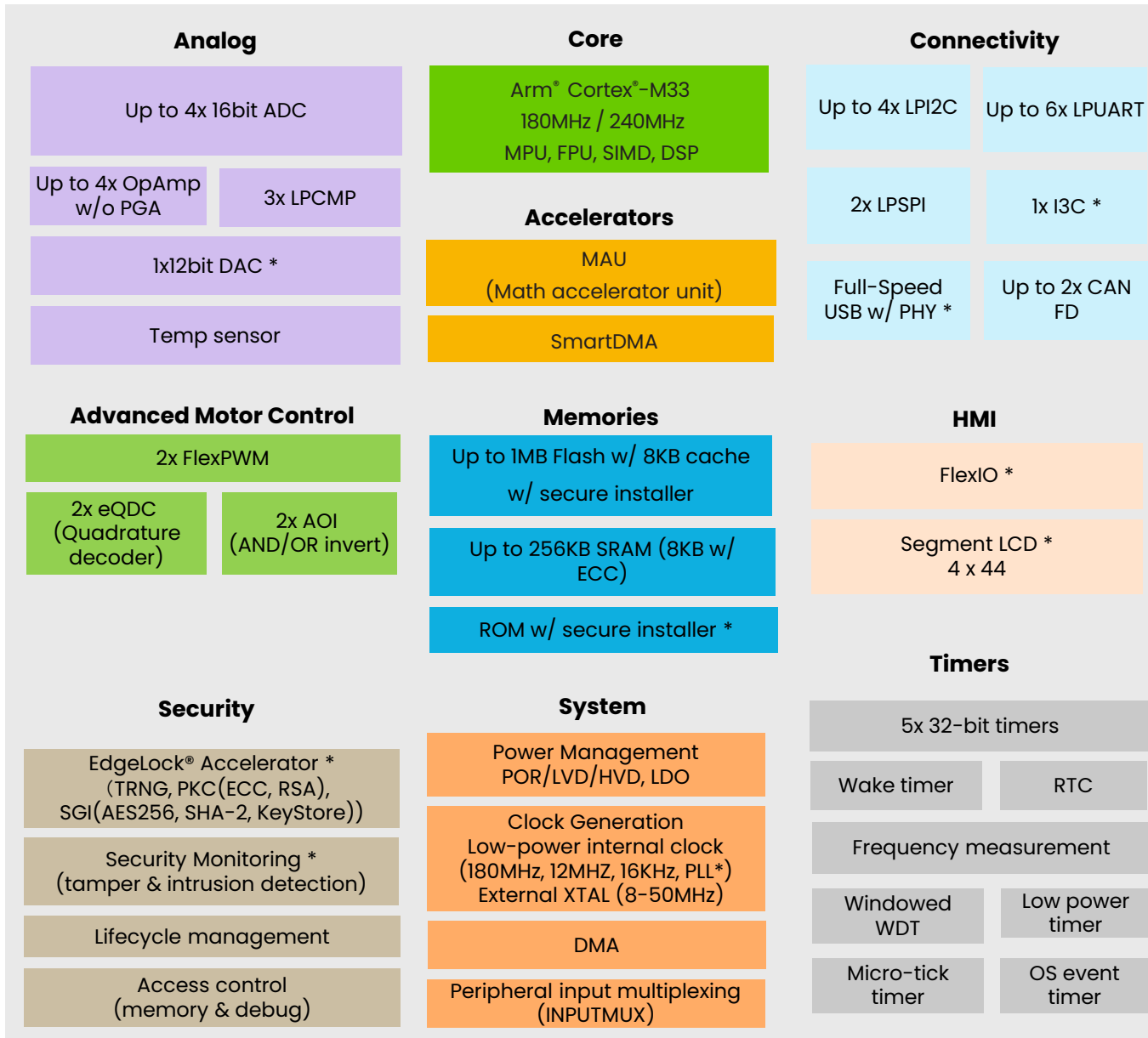
- IEC60730 Class B
- IEC61508 core self-test M33 + MCX safety framework in 2025
- Enhanced security with secure boot

*: Feature is only enabled on selected products

MCX A2x series comparison

	MCX A255/6	MCX A265/6
Cortex-M33	180MHz	240MHz
Flash	512KB / 1024KB	512KB / 1024KB
RAM	256KB / 128KB w/ 8KB ECC	256KB / 128KB w/ 8KB ECC
Serial I/F	LPUARTx5, LPSPI x2 LPI2C x4, I3C x1	LPUARTx6, LPSPI x2 LPI2C x4, I3C x1
Other I/F	FS USB Dev & Host CAN FD x1	FS USB Dev & Host CAN FD x2
DMA	1x 8ch	1x 8ch
Security	EdgeLock® Accelerator Security Monitoring Access control Secure Boot with Secure-Installer	EdgeLock® Accelerator Security Monitoring Access control Secure Boot with Secure-Installer
Analog	2x 16bit ADC w/ 3.2Msps 1x 12bit DAC 1x OpAmp w/o PGA	2x 16bit ADC w/ 3.2Msps 1x 12bit DAC 1x OpAmp w/o PGA
Comparators	2	2
Motor Control	2xFlexPWM w/3 sub 2xeQDC, 2xAOI	2xFlexPWM w/3 sub 2xeQDC, 2xAOI
HMI	FlexIO	FlexIO, Seg-LCD
GPIO	Up to 114 on LQFP144	Up to 114 on LQFP144
Package	LQFP144, LQFP100, LQFP64 WFBGA169	LQFP144, LQFP100, LQFP64 WFBGA169

MCX A3xx block diagram



High Performance Architect and Intelligent Peripherals

- Boosting the main frequency to 240MHz, offers a faster response times and the ability to handle more complex tasks.
- MAU (Math Accelerator Unit) is a dedicated accelerator has significantly enhanced the computational performance, particularly in the computation of trigonometric functions.
- Advanced peripheral interaction capabilities and enhanced GPIO control capabilities with SmartDMA.
- Up to 4 integrated 16bit ADC accommodates a wider range of analog inputs
- Up to 4 built-in OpAmp ensures that signal processing is both faster and more accurate
- 5V tolerant IOs on select pins
- Advanced Motor control subsystem for fast and precise real-time control loop, with PMSM and BLDC SW examples & tuning tools

Advanced security

- Comprehensive security tools for device configuration, code signing and programming
- Device Life cycle management incl. secure authenticated debug
- Secure System, Crypto, PKC, Intrusion & Tamper detection
- Secure boot, Life-cycle management

Power and Operation

- Capless LDO power architecture
- Operating voltage: 1.7 to 3.6V
- Temperature range: -40 to 125°C
- IOs: 1.71V to 3.6V

Safety and Security

- IEC60730 Class B
- IEC61508 core self-test M33 + MCX safety framework in 2025
- Enhanced security with secure boot

MCX A3x series comparison

	MCX A344/3	MCX A346/5	MCX A356/5	MCX A366/5
Cortex-M33	180MHz	180MHz	240MHz	240MHz
Flash	256KB / 128KB	1024KB / 512KB	1024KB / 512KB	1024KB / 512KB
RAM	64KB / 32KB w/ 8KB ECC	256KB / 128KB w/ 8KB ECC	256KB / 128KB w/ 8KB ECC	256KB / 128KB w/ 8KB ECC
Serial I/F	LPUARTx4, LPSPi x2 LPI2C x4	LPUARTx6, LPSPi x2 LPI2C x4	LPUARTx6, LPSPi x2 LPI2C x4	LPUARTx6, LPSPi x2 LPI2C x4, I3C x1
Other I/F	CAN FD x1	CAN FD x1	CAN FD x1	FS USB Dev & Host CAN FD x2
DMA	1x 8ch	1x 8ch	1x 8ch	1x 8ch
Security	Only Code Read Protect	Only Code Read Protect	Only Code Read Protect	EdgeLock® Accelerator Security Monitoring Access control Secure Boot with Secure-Installer
Analog	2x 16bit ADC w/ 3.2Msps 3x OpAmp w/o PGA	4x 16bit ADC w/ 3.2Msps 1x 12bit DAC 4x OpAmp w/o PGA	4x 16bit ADC w/ 3.2Msps 1x 12bit DAC 4x OpAmp w/o PGA	4x 16bit ADC w/ 3.2Msps 1x 12bit DAC 4x OpAmp w/o PGA
Comparators	3	3	3	3
Motor Control	2xFlexPWM w/4 sub 2xeQDC, 2xAOI	2xFlexPWM w/4 sub 2xeQDC, 2xAOI	2xFlexPWM w/4 sub 2xeQDC, 2xAOI	2xFlexPWM w/4 sub 2xeQDC, 2xAOI
HMI	-	-	-	FlexIO, Seg-LCD
GPIO	Up to 86 on LQFP100	Up to 114 on LQFP144	Up to 114 on LQFP144	Up to 114 on LQFP144
Package	LQFP100, LQFP64, LQFP48, HVQFN32	LQFP144, LQFP100, LQFP64 WFBGA169	LQFP144, LQFP100, LQFP64 WFBGA169	LQFP144, LQFP100, LQFP64 WFBGA169



MCX C

Low-power architecture
Precision analog
Energy saving peripherals

MCX C Series Roadmap – NDA Required

Production Execution Planning Proposal

- ◆ Sample
- ▲ Alpha Program
- Mass Production

Concept
Subject to change

Features and Performance

MCX C14x/24x/44x

Features up to

- M0+ 48MHz
- 256KB Flash, 32KB SRAM
- LPUART, SPI, I2C, FlexIO, ADC, DAC, LP timer, RTC
- Segment LCD interface, USB

MCX C041

Features up to

- M0+ 48MHz
- 32KB Flash, 2KB SRAM
- LPUART, SPI, I2C, ADC, DAC, LP timer

MCX C174/175

MCX C455

Features up to

- CM23 96MHz, **512KB** Flash, **64KB** SRAM
- LPUART, LPSPI, LPI2C, 16-bit ADC, DAC, OpAmp

MCX C453/454

Features up to

- CM23 72MHz, **256KB** Flash, **24KB** SRAM
- LPUART, LPSPI, LPI2C, 16-bit ADC,
- LP timer, FlexPWM, RTC, I3C, **Segment LCD, Touch**
- TRNG, ROP, LCM, AES256

MCX C163/164

Features up to

- CM23 72MHz, **256KB** Flash, **24KB** SRAM
- LPUART, LPSPI, LPI2C, 16-bit ADC,
- LP timer, FlexPWM, RTC, I3C
- TRNG, ROP, LCM, **AES256**

MCX C161/162

Features up to

- CM23 **72MHz**, **64KB** Flash, **12KB** SRAM
- LPUART, LPSPI, LPI2C, 16-bit ADC, OpAmp
- LP timer, FlexPWM, RTC
- TRNG, ROP, LCM

MCX C151

Features up to

- CM23 48MHz, 32KB Flash, **6KB** SRAM
- LPUART, LPSPI, LPI2C, **16-bit** ADC, **OpAmp**,
- LP timer, **FlexPWM, RTC**
- **TRNG, ROP, LCM**

Available Now

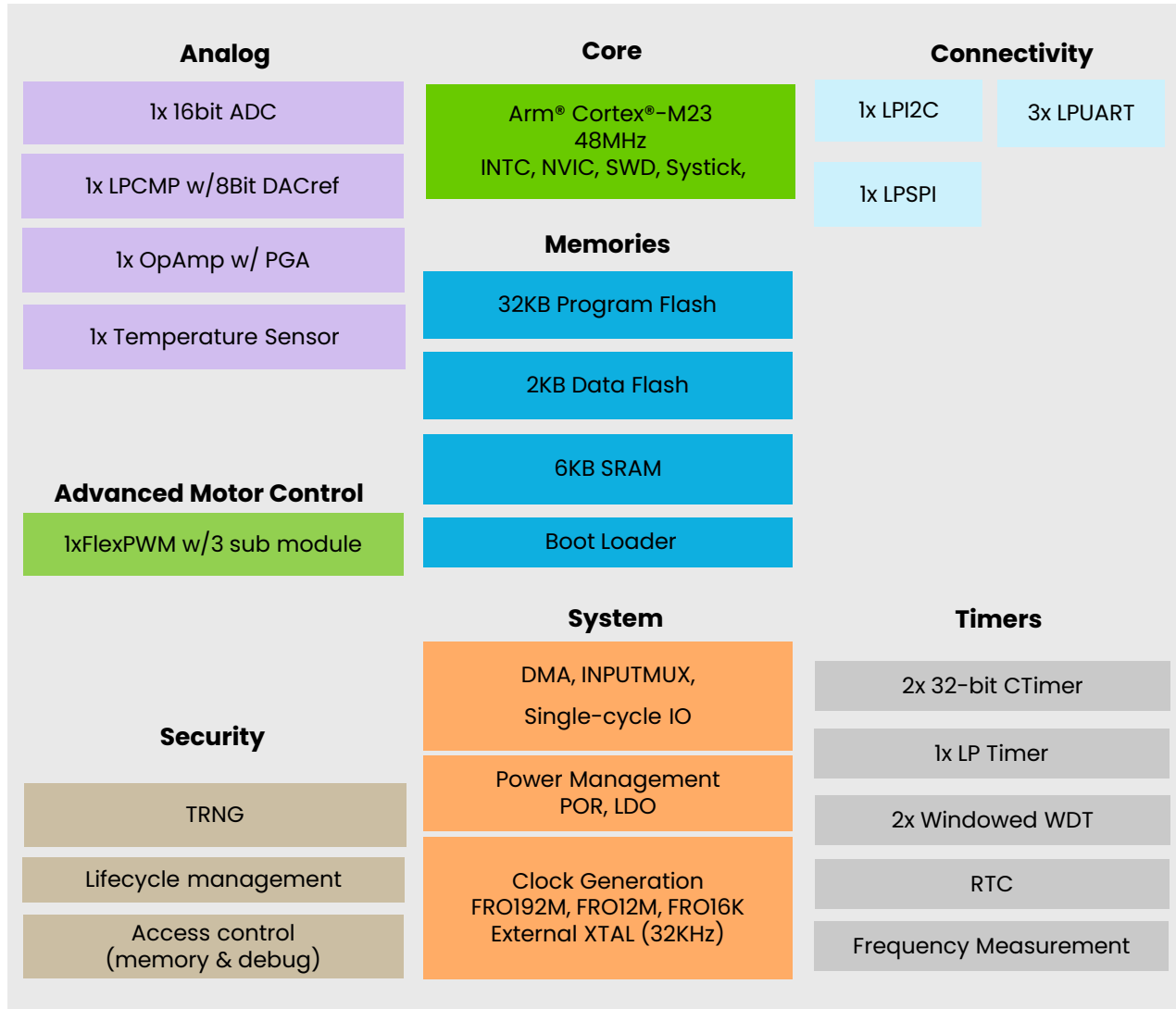
2024

2025

2026

2027

MCXC151 Block Diagram – NDA Required



Performance with Low Power

- Two times more CoreMarks®/mA than the closest 8/16-bit
- Single-cycle fast I/O access port facilitates bit banging and software protocol emulation, maintaining an 8-bit 'look and feel.'
- Multiple, flexible low-power modes (including a new compute mode) that reduce dynamic power by placing peripherals in an asynchronous stop mode
- LPUART, SPI, I2C, ADC,, LP timer and DMA support low-power mode operation without waking up the core

I/O Capability and Advanced Analog

- 16-bit SAR ADC, up to 4Msps and 12 channels
- High-speed comparator with internal 8-bit DAC
- OpAmp with programable gain

Timers

- 2x 32-bit General CTimer and 1x FlexPWM for PWM
- Low-power timer allows operation in all power modes
- RTC with 32KHz OSC supporting

Security

- TRNG
- Device life cycle manager
- Device access control to protect IP (memory / Debug)

Power and Operation

- Temperature range: -40 to 125°C (Tj)
- IOs: 1.71V to 3.6V

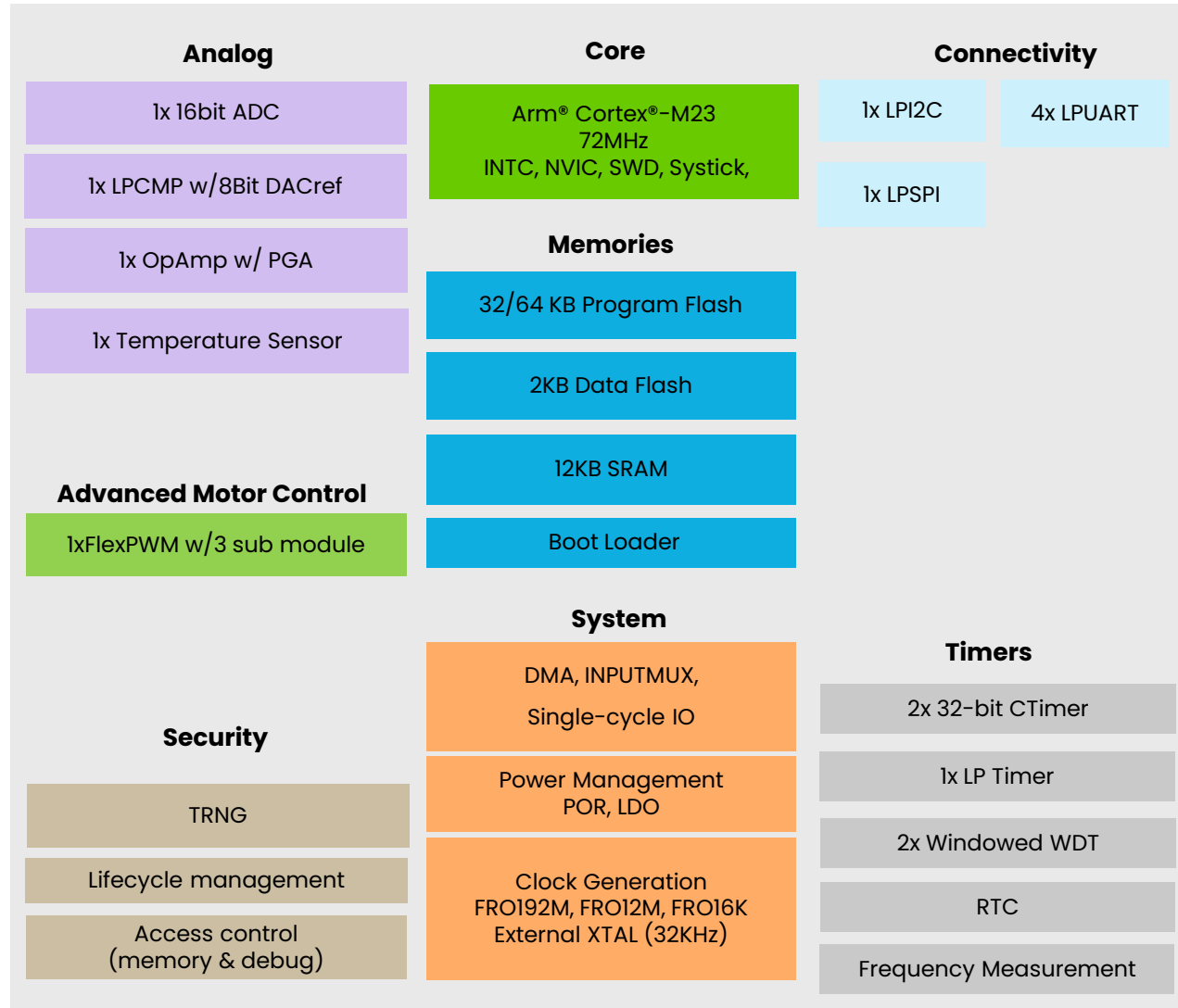
Package Options

- TSSOP20 (TBD)
- QFN16/24/32/48
- LQFP48
- WLCSP(TBD)

Timeline

- Launch in Q3 2026

MCXC161/162 Block Diagram – NDA Required



Performance with Low Power

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Timeline

- Launch in Q3 2026

[FRDM-MCXC444](#) / [FRDM-MCXC242](#) / [FRDM-MCXC041](#)

FRDM Development Board for MCXC Series

MCX C FRDM board Highlights

Key Features

- Arm® Cortex®-M0 48MHz
- FXLS8974CFR3 3-axis Accelerometer & Visible light sensor
- Arduino, FRDM, Pmod and mikroBUS headers
- MCU-Link debugger



Industrial

Industrial/Consumer
HMI
Low-Power
Medical Equipment



Smart Home

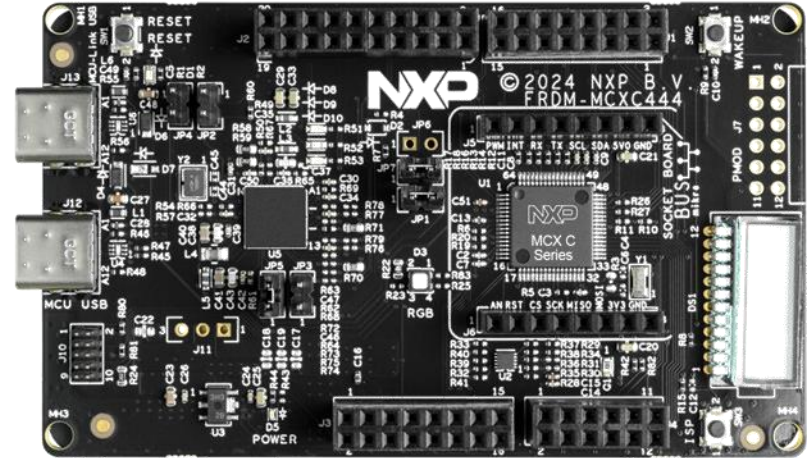
Control &
Surveillance
Smart Appliances
Health & Fitness



General
Embedded

Hand-held Devices
Power Tools
General Purpose
Embedded Control

Available Now



Board	Price	SW Examples	Key Differences
FRDM-MCXC041	\$10.00	SDK ACH	32KB Flash, 2KB RAM
FRDM-MCXC242	\$10.00	SDK ACH	256 KB Flash, 32KB RAM, FS USB ,
FRDM-MCXC444	\$10.00	SDK ACH	256 KB Flash, 32KB RAM, FS USB , SLCD , Visible light sensor



MCX E

Functional safety

**Extended Industrial grade
memory and packages**

Robust 5.5V supply

MCX E Series overview

Availability



- H1 2025 : Engineering Samples
- H2 2025 : Mass Production

Robust

- Up to 5.5V supply
- Extended temperature mission profile
- Various LQFP package options

Reliable

- Large set of peripherals allows for high redundancy
- Up to 6x CAN-FD and Ethernet with TSN

Safe

- Program flow monitor
- Full data integrity
- Clock, power and temperature monitoring

Secure

- EdgeLock Security essential and advanced
- Security certification up to SESIP level 3

Reliability and safety in industrial and commercial applications



- Security certification
 - SESIP level 3
 - IEC 62443 compliant



- Functional Safety certification target
 - IEC60730 Class B
 - IEC61508 SIL 3 systematic capability

Industrial and Appliances

MCX E series target applications

Safe Appliances

- HVAC
- Heat pumps
- Boilers
- Heaters
- Power tools



Motor Control

- Factory conveyor diverter
- Industrial automation
- Robots / drones
- Electric bike powertrains
- Unmanned vehicles
- Hydraulic system control unit

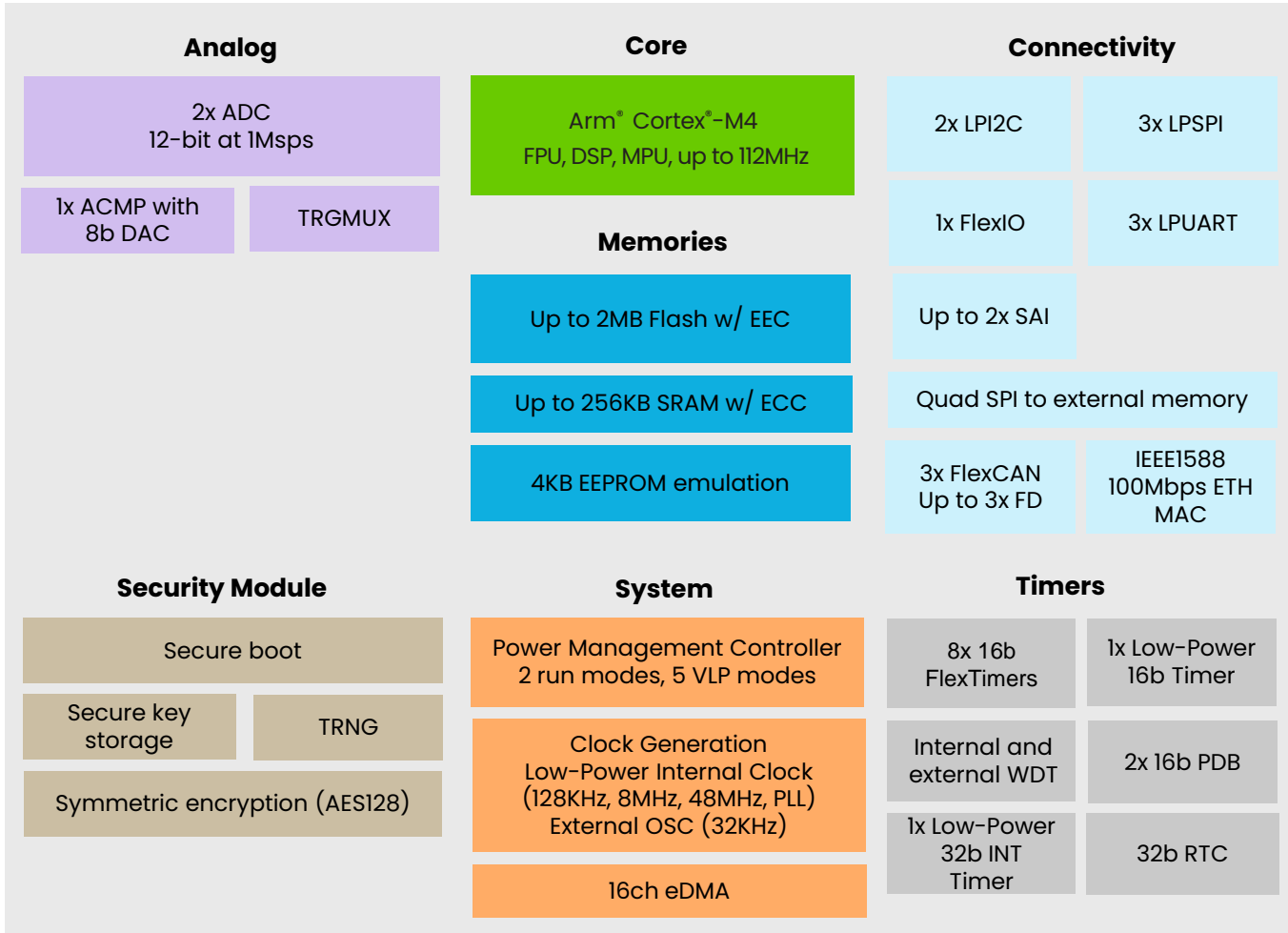


Energy Storage

- Home energy storage
- Industrial power storage
- Mobile energy storage
- Distributed battery systems



MCX E24x series block diagram



Safe

- SIL-2 Capable
- ECC on flash and SRAM
- MPU, CRC, Watchdogs

Secure

- EdgeLock Essential security with crypto acceleration
- Flashloader to assist Boot & In System Programming

Scalable & Robust

- Up to 112MHz Cortex-M4F with 16 ch eDMA
- Up to 2MB FLASH with ECC
- Up to 256KB RAM with ECC
- Optional QSPI to external memory
- EEPROM emulation

Rich interface set

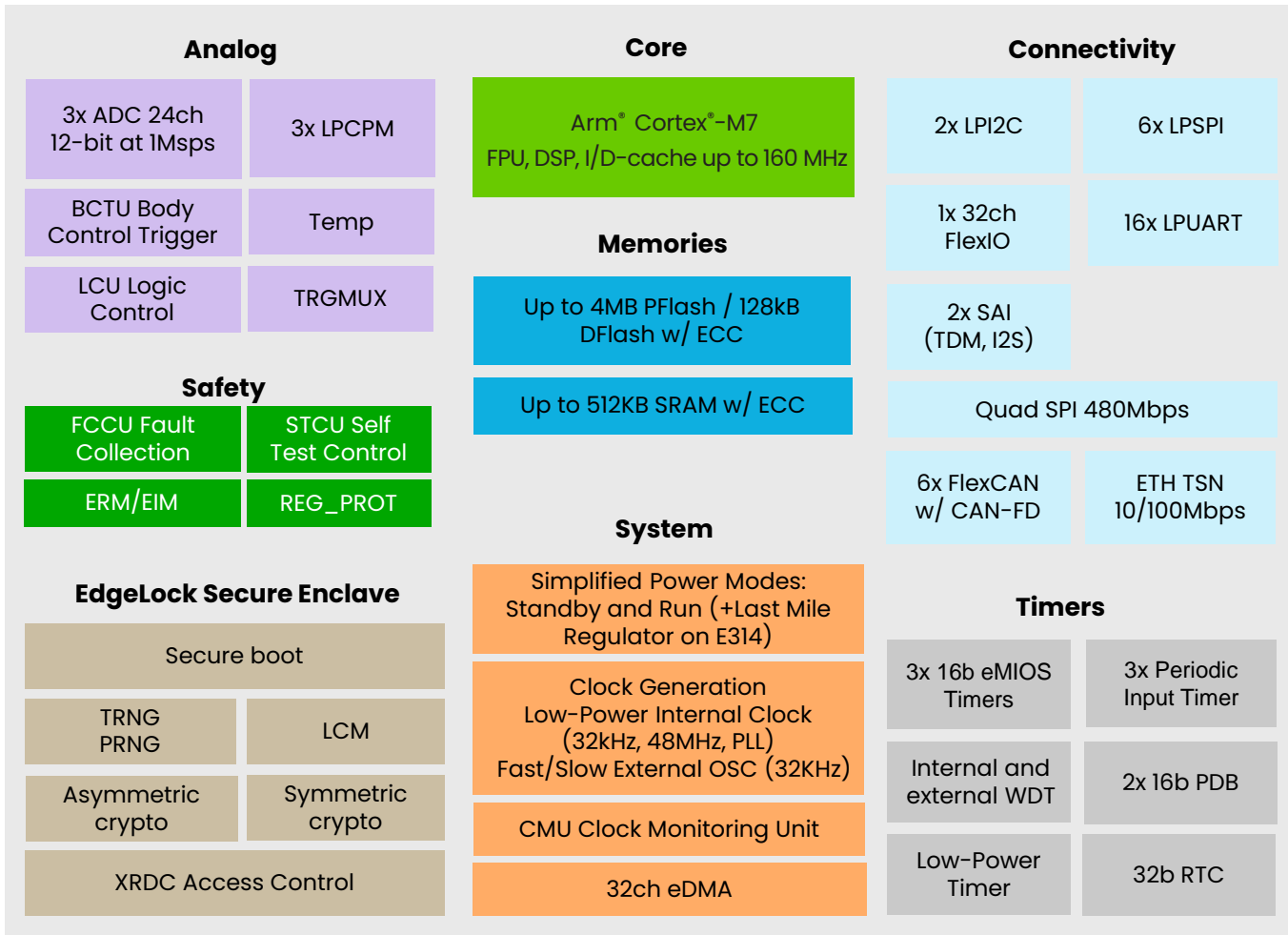
- Mixed-signal and on-chip analog peripherals to save space and BOM cost
- Rich digital communication including Ethernet, multiple CANs, audio and low-power serial comms
- Up to 128x I/Os

Other

- Operating voltage: 2.7 to 5.5V
- Temperature range: -40 to 125°C

Packages	Dimensions	Pitch
LQFP48	7 x 7 x 1.4 mm	0.5 mm
LQFP64	10 x 10 x 1.4 mm	0.5 mm
LQFP100	14 x 14 x 1.4 mm	0.5 mm
LQFP144	20 x 20 x 1.4 mm	0.5 mm

MCX E31x Series – Block diagram



Safe

- SIL-2 HW integrity certified
- XRDC for memory access protection
- Program flow monitor, MPU, CRC, Watchdogs
- Data integrity (ECC on flash and RAM)

Secure

- Root of Trust with dedicated EdgeLock Secure enclave
- Asymmetric and Symmetric Crypto HW accelerators

Scalable & Robust

- Up to 160MHz Cortex-M7 with 32ch eDMA
- Up to 4MB P FLASH + 128kB D FLASH with ECC
- Up to 512kB RAM with ECC
- External memory Quad-SPI up to 480Mbps with 4b data width
- Simplified power modes: FSM optimize Standby current

Rich interface set

- Mixed-signal and on-chip analog peripherals to save space and BOM cost
- Power Conversion and Motor Control (PCMC): ADC, BCTU, eMIOS, LCU, LPCMP, TRGMUX
- Rich digital communication including Ethernet w/ TSN, up to 6x FD-CANs, audio and low-power serial comms
- Up to 156x I/Os

Other

- Operating voltage: 2.7 to 5.5V
- Temperature range: -40 to 135°C

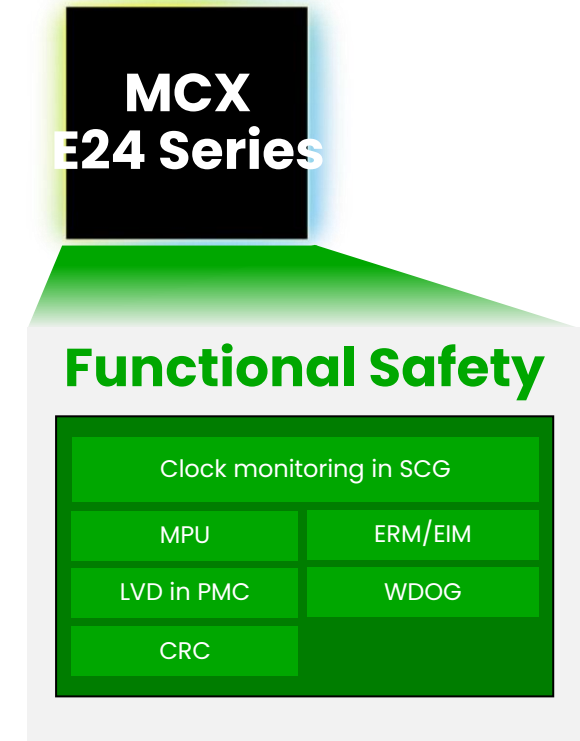
Packages	Dimensions	Pitch
LQFP48	7 x 7 x 1.4 mm	0.5 mm
HDQFP100	10 x 10 x 1.65 mm	0.65 mm
HDQFP172	16 x 16 x 1.65 mm	0.65 mm

MCX E HW safety measures



Program flow monitoring	<ul style="list-style-type: none">• Detect defective program sequence• Internal and external SW watchdogs
Storage interference protection	<ul style="list-style-type: none">• Protect memory, registers & peripherals against internal corruption• XRDC/ASIP-Lite trusted device-sub-device connection
Clock and power monitoring	<ul style="list-style-type: none">• Monitor analog & systems clocks, detect PLL loss of lock• Low-voltage supervision
Data integrity	<ul style="list-style-type: none">• Detect & correct errors on entire SRAM/NVM memories (ECC)• Detect data corruption during transmission (CRC)
Error reporting	<ul style="list-style-type: none">• Fault collection with programmable reaction type (alarm, interrupt, reset)• Error injection/reporting modules to fail in safe state




Safe and robust MCU



- IEC61508: ready for system SIL2 using Safe Assure™ documentation and SW libraries
- IEC60730: Class B certified

MCX E safety deliverables – under NDA



Safety documentation	 MCX E24	 MCX E31	 Other MCX
Safety plan	✓	✓	✓
Safety case	✓	✓	✓
Safety manual	✓	✓	✓
FMEDA report	✓	✓	✓
Safety analysis report	✓	✓	✓
Safety SW			
IEC60730 SW library	✓	✓	✓
ISCST SW library	Post-launch	✓	Post-launch
IFT SW library	Not required	Not required	Post-launch
Safety SW framework (SAF)	Future	Post-launch	Future
External body deliverables			Other MCX
IEC60730 certificate	Class B	Class B	Class B
IEC61508 certificate	×	SIL2 (Q1 2026)	×
IEC61508 technical report	×	Under NDA	×



Quality-managed MCU SW Safety



Safety By Design MCU HW & SW certified



MCX W

Multi-protocol connectivity
EdgeLock Security



AMBIENT COMPUTING
CHANNEL SOUNDING
(W72 only)

DESIGNED FOR THE **EDGE**

-  -40 to 125° C
-  LOW COST RBOM
-  NEAR-ZERO POWER SHELF STATE
-  CAN CONNECTIVITY
-  RICH ANALOG

 matter
  zigbee
 Bluetooth®
  HREAD

MCX W7x
96MHz Arm Cortex-M33
Multiprotocol MCU



POWERFUL RADIO SUBSYSTEM

DEDICATED • ENERGY EFFICIENT
UPGRADABLE • COEXISTENCE



EDGELOCK™
SECURE ENCLAVE



FUTURE-PROOF SCALABILITY

Pin compatible • Large memory
15-year Product Longevity



MCUXpresso
DEVELOPER EXPERIENCE

MCX W71 - Multiprotocol MCU

Optimized for IOT, Industrial and Matter

HIGH PERFORMANCE AND INTEGRATION

- Arm Cortex-M33 (up-to 96 MHz)
- 1 MB Flash / 128 KB RAM Application Memory
- Flexible for standalone and hosted architectures (NCP or RCP mode)

MULTIPROTOCOL CONNECTIVITY

- Bluetooth® LE 5.3 and 802.15.4 (Zigbee and Thread/Matter)
- Dedicated radio sub-system to ensure low-latency connectivity
- Upgradeable software for Bluetooth LE and OpenThread
- Bluetooth LE 5.3 high speed, long range, advertising extensions support
- Built in coexistence with NXP Wi-Fi/BLE to enable robust dual PAN
- +10 dBm transmit power

EDGELOCK SECURE ENCLAVE

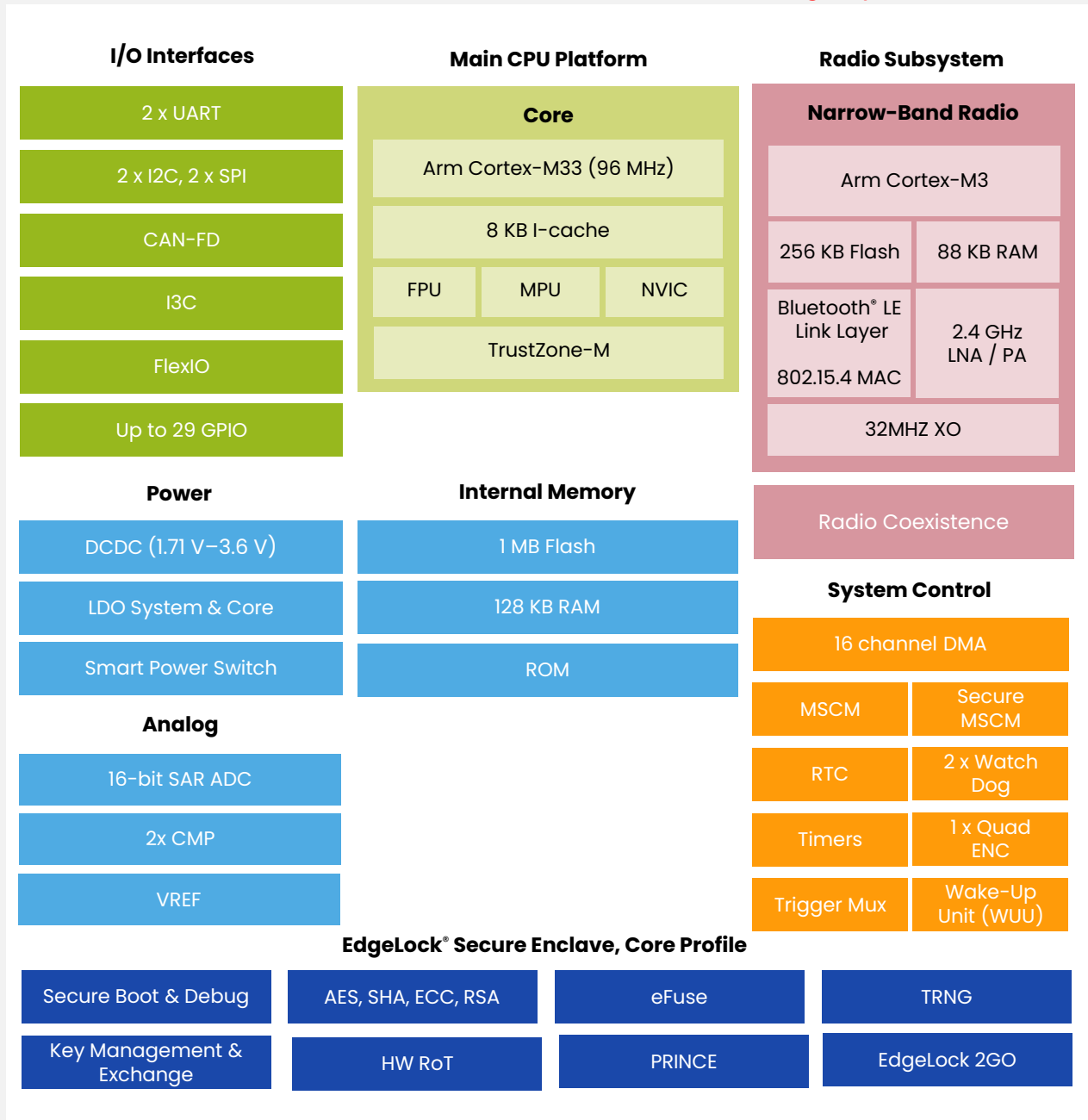
- Secure boot, secure debug and secure over-the-air firmware updates
- Hardware secure subsystem as an immutable root-of-trust
- Fuse-based life cycle management, device config, and trust provisioning
- One-stop Matter Certifications

LOW BOM COST AND EASY TO DEVELOP

- Flexible power architecture with on-chip regulators, a smart power switch & independent power domains
- Near zero power shelf state until device activation (<100 nA)
- Internal 32MHz and 32kHz crystal osc
- VS Code, MCUXpresso SDK, and FreeRTOS support

SPECIFICATIONS

- Packages:
 - 7 x 7 48-pin HVQFN, 29 GPIO (pin compatible with MCX W72)
 - 6 x 6 40-pin HVQFN, 22 GPIO
- Temp / Qual: -40 to 125° C (Tj) Industrial



MCX W72 – Multiprotocol MCU

Optimized for IOT, Industrial and Matter



HIGH PERFORMANCE AND INTEGRATION

- Arm Cortex-M33 (up-to 96 MHz)
- 2 MB Flash / 256 KB RAM Application Memory

MULTIPROTOCOL CONNECTIVITY

- Bluetooth® LE 5.x and 802.15.4 (Zigbee and Thread/Matter)
- Dedicated radio sub-system to ensure low-latency connectivity
- Upgradeable software for Bluetooth LE and OpenThread
- **Bluetooth LE 5.x, channel sounding**, high speed, long range, advertising extensions
- Low power Tx/Rx
- Built in coexistence with NXP Wi-Fi/Bluetooth LE to enable robust dual PAN
- +10 dBm transmit power

EDGELOCK SECURE ENCLAVE, CORE PROFILE

- Secure boot, secure debug and secure over-the-air firmware updates
- Hardware secure subsystem as an immutable root-of-trust
- Fuse-based life cycle management, device configuration and trust provisioning
- One-stop Matter Certifications

LOW BOM COST AND EASY TO DEVELOP

- Flexible power architecture with on-chip regulators, a smart power switch & independent power domains
- Near zero power shelf state until device activation (<100 nA)
- Internal 32MHz and 32kHz crystal osc
- VS Code, MCUXpresso SDK, and FreeRTOS support

SPECIFICATIONS

- Packages:
- 7 x 7 48-pin HVQFN, 29 GPIO (pin compatible with MCX W71)
- Temp / Qual: -40 to 125° C (Tj) Industrial



MCX W23

Bluetooth LE 5.3 Processor Helps Revolutionize **Miniaturized Body-Worn Devices**

Target applications

- Home appliance and automation
- Portable Medical Device
- Asset Tracking



Key benefits

- **Small form-factor** to design light-weight miniaturized devices
- Multiple low-power modes provide **ultra-low energy data transfers** and a **longer battery life**
- Rich set of security features **enabling safe and private data handling**

Block diagram



Key features

- Arm® **Cortex-M33** (up-to 32 MHz)
- **1 MB Flash** / 128 KB RAM Application Memory (640KB Flash / 96 KB RAM option)
- **Bluetooth® LE 5.3** with upgradable software and +6 dBm transmit power

LOW POWER, SMALL SIZE

- Low power Tx/Rx
- <1.5 uA Power-Down with 16K Ram retention
- 25 nA Power-off mode

EDGELOCK SECURE

- Secure boot, secure debug and secure over-the-air firmware updates
- SESIP Level 2 Certification

For more information [click here](#)

Sample Date	Qualification Date	Launch Date	Launch Type	Development boards
March 2025	-	August 2025	NPI	MCXW23-EVK FRDM-MCXW23



MCX W23 – Bluetooth LE MCU



Optimized for battery powered, miniaturized devices

HIGH PERFORMANCE AND INTEGRATION

- Arm Cortex-M33 (up-to 32 MHz)
- Up to 1 MB Flash / 128 KB RAM Application Memory
- Q-SPI interface with XiP

Internal Memory

- **MCX W236:** 1 MB Flash and 128 KB RAM
- **MCX W235:** 512 KB Flash and 96 KB RAM

BLUETOOTH LE CONNECTIVITY

- Bluetooth® LE 5.3
- Bluetooth LE 5.3 high speed, long range, advertising extensions support
- 3.3 mA Rx and 4.8 mA Tx (0 dBm) @ 3V
- +6 dBm transmit power

EDGELOCK SECURE

- Secure boot, secure debug and secure over-the-air firmware updates
- PUF enabled Key Management
- Secure life cycle management, device config, and trust provisioning
- SESIP Level 2 / PSA Level 2 Certifications

LOW BOM COST AND EASY TO DEVELOP

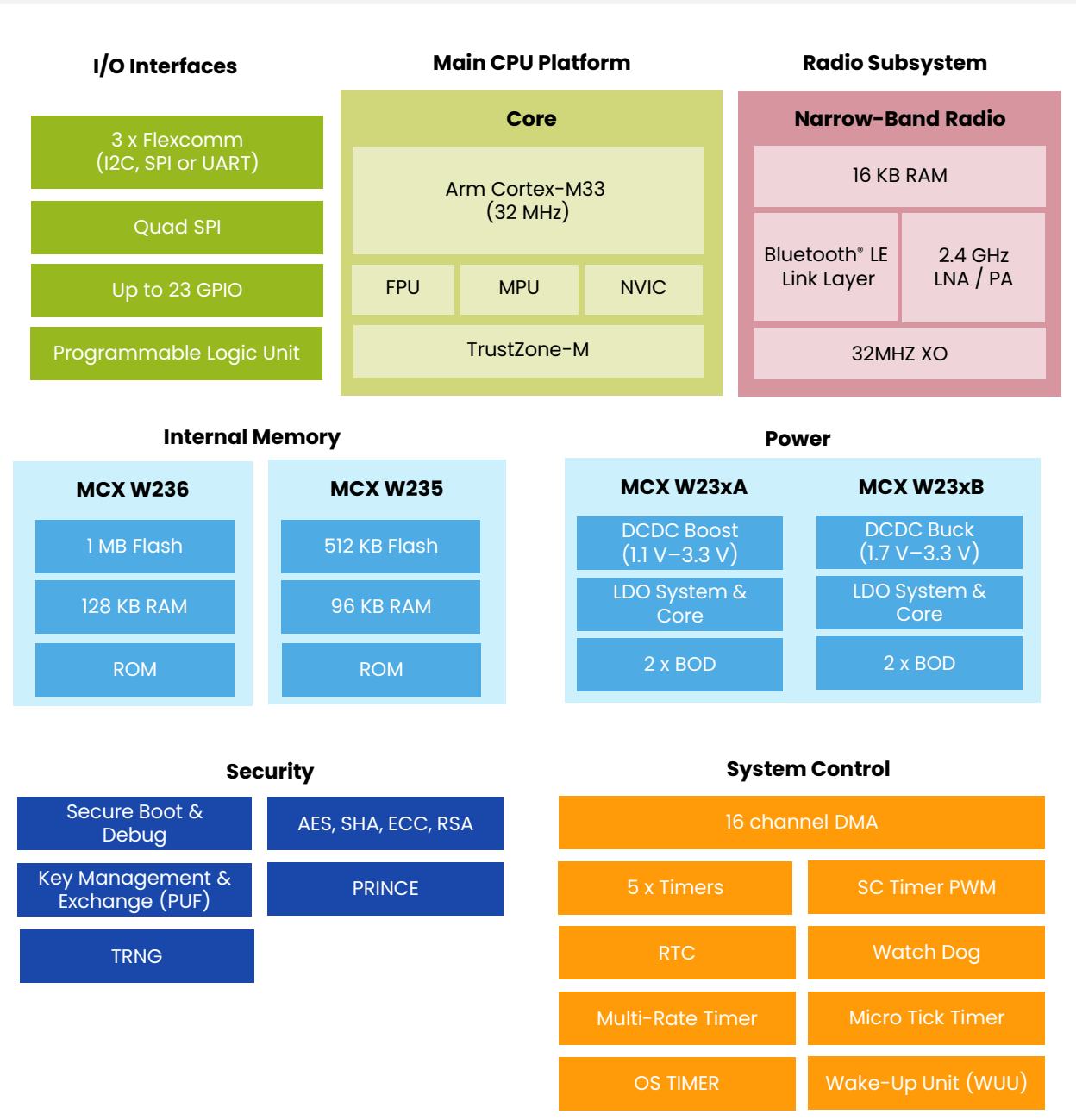
- Flexible power architecture for versatile battery support
 - Boost DCDC for direct operation on Silver Oxide batteries
 - Buck DCDC for direct operation on LI coin cells
- Near zero power shelf state until device activation (<25 nA)
- <1.5 µA Power-Down with 16K RAM retention
- Dedicated BOD for battery supply monitoring
- VS Code, Zephyr, MCUXpresso SDK, and FreeRTOS support

Power Specifications

- **MCX W23xA:** DCDC Boost 1.1 V–3.3 V
- **MCX W23xB:** DCDC Buck 1.7 V – 3.3 V

SPECIFICATIONS

- Packages:
 - 2.5 x 2.6 37-pin WLCSP, 23 GPIO
 - 5 x 5 40-pin HVQFN, 23 GPIO
- Temp / Qual: -40 to 85° C



Security categories overview



Hardware roots of trust scales across NXP edge processing portfolio

	Basic Security	Essential Security	Advanced Security	High Security	
Secure boot capability	✓	✓	✓	✓	
Secure debug & Test, Lifecycle Management	✓	✓	✓	✓	
Memory/resource access protections	✓	✓	✓	✓	
Cryptographic HW support (TRNG, crypto engine)	-	✓	✓	✓	
Process/task isolation, Secure Proc. Environ. (incl. for secure key store or application)	-	-	TrustZone®	Enclave ² + TrustZone	Enclave ² + TrustZone + Secure Element
Secure boot rooted in ROM as immutable memory type	-	Optional ¹	Optional ¹	✓	✓
HW Tamper detection	Optional ¹	Optional ¹	Optional ¹	✓	✓
Factory programmed Unique Keys or PuF	-	Optional ¹	Optional ¹	✓	✓
Remote Key management (EdgeLock 2GO ready)	-	-	-	✓	✓
Runtime device protection	-	-	-	Optional ¹	Optional ¹
Personalization with custom credentials at NXP manufacturing	-	-	-	-	✓
Protections against advanced HW attacks	-	-	-	-	✓
Assurance Level (Note: some products also feature NIST CAVP, CMVP & ESV)	-	-	Up to SESIP/PSA L2	SESIP/PSA L2-L3 + Secure Enclave	SESIP/PSA L2-L3 + Secure Enclave with Secure Element (CC EAL6+ HW/OS, FIPS 140-3 Level 3)
MCU	MCX A13x/A14x/A15x	MCX A2x / A3x	LPC55S6x/2x/1x/0x	LPC 55S3x, K32W148 MCX N9x/N5x/W7x, RW61x	MPUs/MCUs with EdgeLock Secure Enclave (Advanced Security category) + SE05x/A5x
Crossover MCU	-	i.MX RT10xx, i.MX RT116x/7x,	i.MX RT500/600	i.MX RT700, i.MX RT1180	
MPU	-		i.MX 6/7/8M/8/8X	i.MX 8ULP, i.MX 9x	

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