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Introducing STM32U5, the flagship of ultra-low-power MCUs

STM32

STM32 portfolio

MPU						STM32**MP1** 4158 CoreMark 650 MHz Cortex –A7 209 MHz Cortex –M4
High Perf MCUs			STM32**F2** Up to 398 CoreMark 120 MHz Cortex-M3	STM32**F4** Up to 608 CoreMark 180 MHz Cortex-M4	STM32**F7** 1082 CoreMark 216 MHz Cortex-M7	STM32**H7** Up to 3224 CoreMark Up to 550 MHz Cortex -M7 240 MHz Cortex -M4
Mainstream MCUs	STM32**F0** 106 CoreMark 48 MHz Cortex-M0	STM32**G0** 142 CoreMark 64 MHz Cortex-M0+	STM32**F1** 177 CoreMark 72 MHz Cortex-M3	STM32**F3** ● 245 CoreMark 72 MHz Cortex-M4	STM32**G4** ● **550 CoreMark** **170 MHz Cortex-M4**	
				Optimized for mixed-signal Applications		
Ultra-low-power MCUs	STM32**L0** 75 CoreMark 32 MHz Cortex-M0+	STM32**L1** 93 CoreMark 32 MHz Cortex-M3	STM32**L4** 273 CoreMark 80 MHz Cortex-M4	STM32**L4+** 409 CoreMark 120 MHz Cortex-M4	STM32**L5** 443 CoreMark 110 MHz Cortex-M33	STM32**U5** 651 CoreMark 160 MHz Cortex-M33
Wireless MCUs			STM32**WL** 162 CoreMark 48 MHz Cortex-M4 48 MHz Cortex-M0+	STM32**WB** ● 216 CoreMark 64 MHz Cortex-M4 32 MHz Cortex-M0+		

LONGEVITY 10 YEARS COMMITMENT

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● Optimized for mixed-signal applications

● Cortex-M0+ Radio co-processor

Applications are more and more demanding!

more autonomy

more integration

more security

Application examples:

- Gas and water meter
- Fitness band
- Medical monitoring devices
- POS

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Continuing our leadership in ultra-low-power MCUs

2021

STM32**U5**

First ultra-low-power STM32
with **40 nm technology**

2020	**2 billion ultra-low-power STM32s shipped**	
2019	STM32**L5**	**Introduction of M33**, excellence in ultra-low-power **with certified security**
2017	STM32**L4+**	Ultra-low-power excellence with **more performance**
2015	STM32**L4**	**Leadership** ultra-low-power Cortex-M4 **(#1 ULP 447 ULPBench™)** MCUs
2014	STM32**L0**	**Entry cost** ultra-low-power MCU
2009	STM32**L1**	**World 1st Cortex-M** ultra-low-power MCU

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Enabling key new features for embedded developers

Lower power consumption
New power management
LPBAM*, DMA and IP autonomous in LP mode

Higher security
AES and PKA, side attack resistant

Higher level of safety
ECC on Flash and SRAM

Improved data storage
100 kcycles for 512 kB of Flash

Better accuracy
ADC 14-bit

* Low Power Background Autonomous Mode

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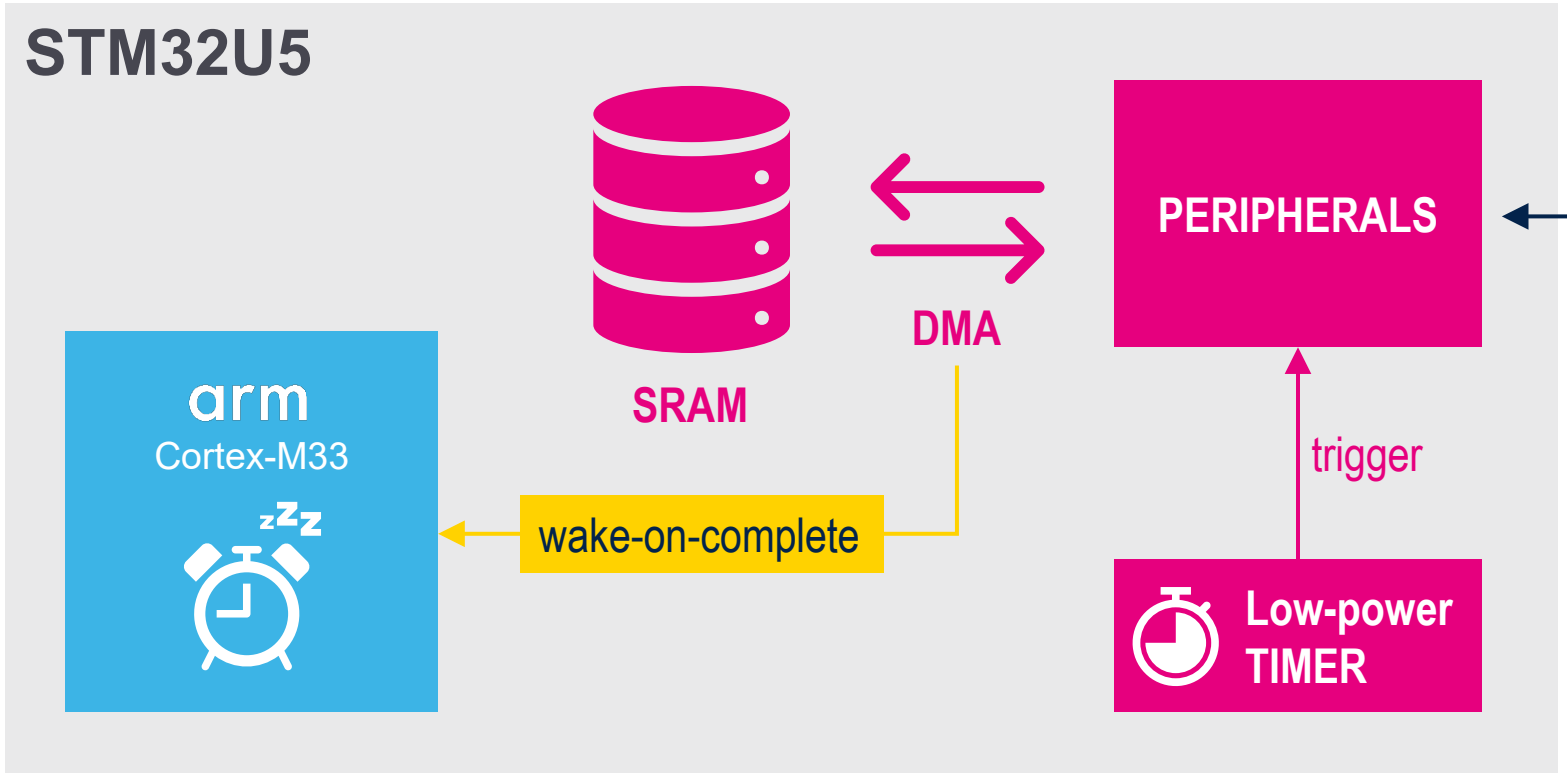
Cut MCU power consumption by 90%*

Low Power Background Autonomous Mode (LPBAM)



Peripherals:

- I2C master or slave
- SPI / UART reception or transmission
- ADC / DAC
- Voice Activity Detection
- LPTIM
- I/O

** Typical application where peripherals need to acquire data regularly*

Extends battery life

Improved flexibility versus existing STM32L series

- The STM32U5 provides a **large choice of low power modes** with fast wake-up times

See below some examples to illustrate the best-in class power consumption:

300 nA Standby

1.7 µA Stop3 (with 16kB SRAM)

6.6 µA Stop 2 (full retention: 786-Kbyte RAM)

Down to 19 µA / MHz (Run up to 160 MHz)

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STM32U5 efficiency proven by benchmarks

Best performances among 32-bit MCUs available on the market

ULPBENCH™ An EEMBC Benchmark **535 ULPMark-CP**	True energy cost of deep-sleep modes
ULPBENCH™ An EEMBC Benchmark **149 ULPMark-PP**	Common peripherals' energy impact on deep-sleep
ULPBENCH™ An EEMBC Benchmark **58 ULPMark-CM**	Active power, using CoreMark as the workload
ULPBENCH™ An EEMBC Benchmark **133000 SecureMark-TLS**	Efficiency of cryptographic processing solutions

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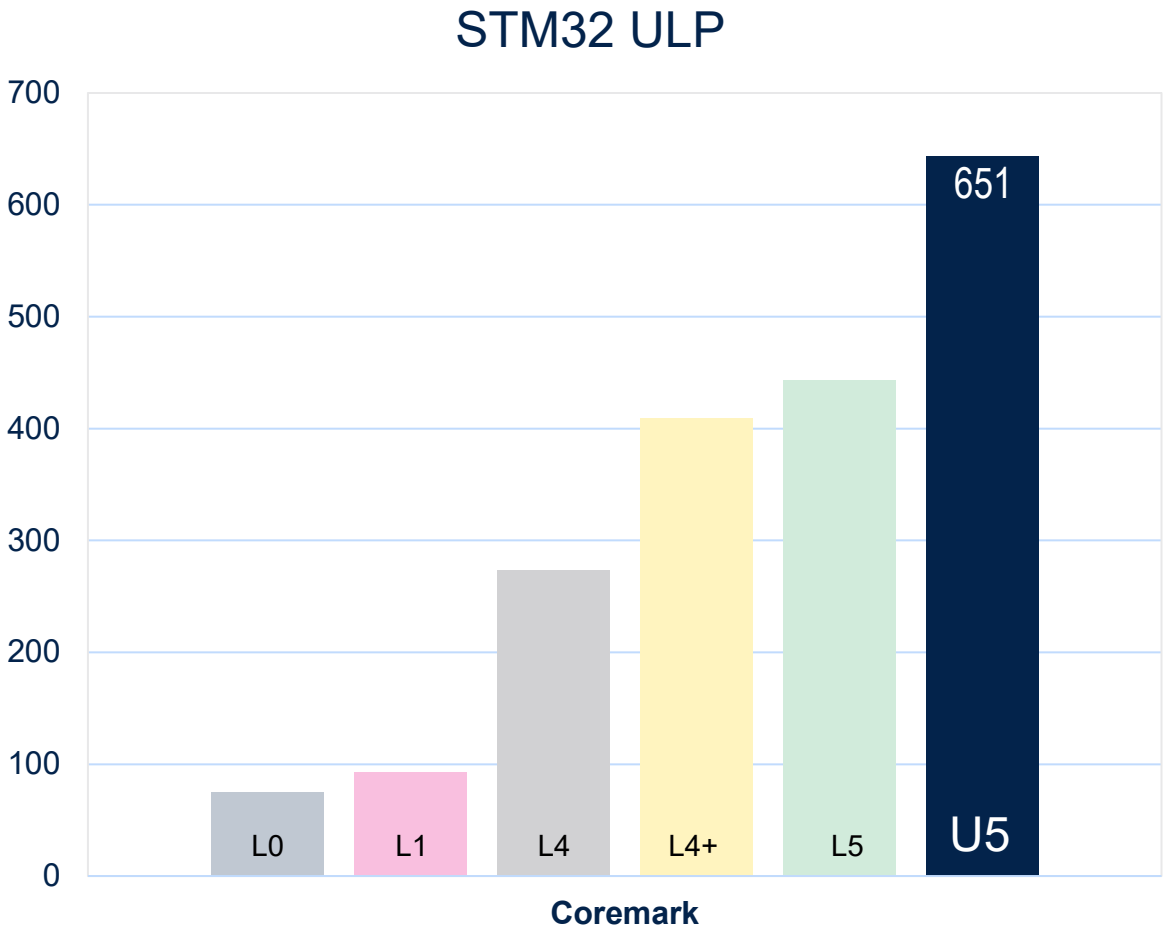
Unparalleled performance for an ULP MCU

STM32**U5**

- Arm® Cortex®-M33 at **160 MHz**
  240 DMIPS or **651 Coremark**
- Mathematics accelerators:
  FMAC and **Cordic**
- Cache for execution and **data** for internal and external memory (ART Accelerator)



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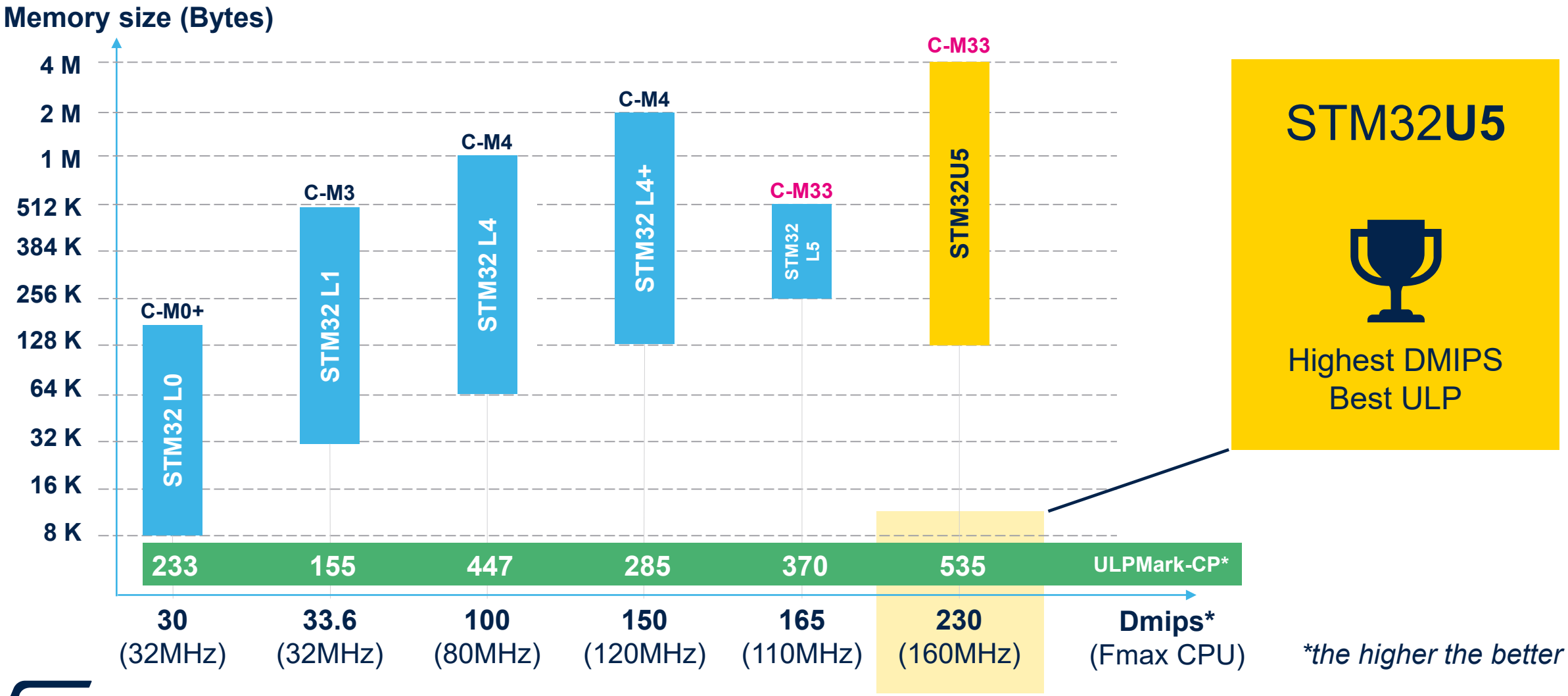
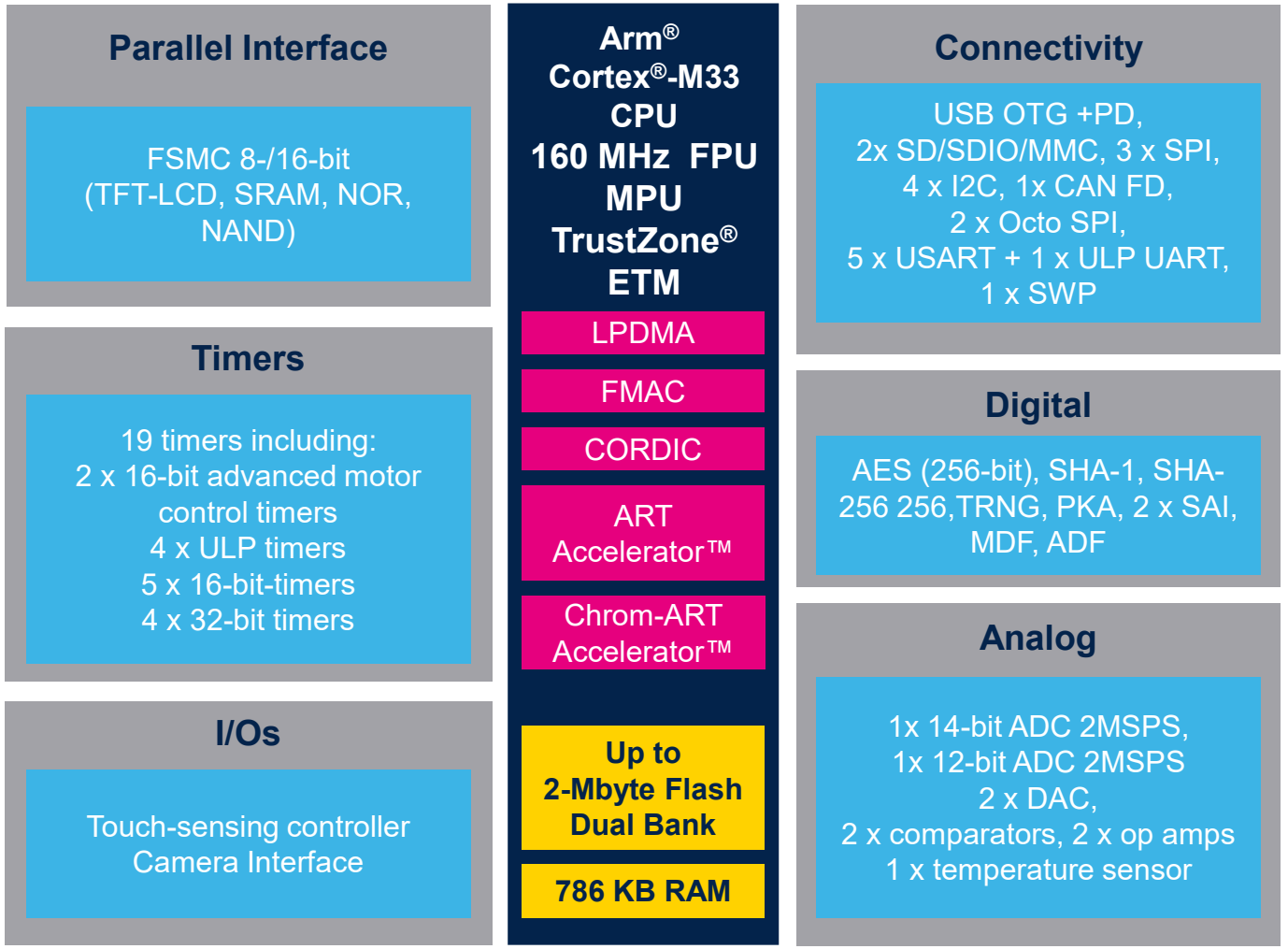
STM32U5, the new flagship of STM32 ULP series



High level of integration



Numerous integrated peripherals

Advanced accelerators

Large embedded memory

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Enhanced security

Extensive functionality to protect your assets

Isolation

TrustZone®
Secure Peripherals
Secure DMA

Cryptography

Side channel AES, PKA
Additional AES, PKA, SHA, TRNG
CAVP certified CryptoLib

Security assurance level

psacertified™ L3

SESIP L3

1st MCU to reach Level 3

Lifecycle

RDP: **4 protection level states**
Password based regression

Memory protections

OTP, HDP, WRP, RDP, MPU
Ext. Flash encryption OTFDec
Secure Debug

Active tamper

4x active pair of tamper pins.
Volt. &Temp. monitoring (**Vbat**)
Total tamper I/Os: **8**

Trust anchor

TF-M, Secure Boot,
Secure Firmware Install
Hardware Unique Keys

New features for STM32 in bold

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Multiple options to meet the needs of developers

8 different packages

48-pin QFN
90-pin WLCSP
48/64/100/144-pin LQFP
132/169-pin UFBGA

2 memory size configurations

1 M Flash / 786 K RAM
2 M Flash / 786 K RAM

Optional security

without HW crypto
with HW crypto

24 variants

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STM32Cube Software Suite

Microsoft Azure RTOS bringing additional Key benefits to well-know STM32Cube software Suite

Microsoft Azure

+ Azure RTOS

Faster & Easier Development

Business-friendly terms

Better Quality

+

Fast performance

Complete consistent solution

Industry certifications

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Early adoption by partners

STM32U5 selected for IoT and cloud connection solutions

twilio

Microvisor

IoT Device Builder Platform

Microvisor simplifies the transition to connected products for embedded engineers, with support for secure boot, over-the-air firmware upgrades, and remote debugging

Microsoft Azure

B-U585I-IOT02A discovery kit selected as reference board for Microsoft Azure Certified Device program

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Start your project based on the STM32U5 now!

STM32U5

Ultra-low-power
Performance
Security

Sampling now

Mass market in Sept -21

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Releasing your creativity

/STM32

@ST_World

community.st.com

www.st.com/STM32U5

wiki.st.com/stm32mcu

github.com/STMicroelectronics

STM32U5 blog articles

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Thank you

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