



life.augmented

STM32L4 MCU series Ultra-low-power with performance





STM32 MCUs and MPUs portfolio



 MPU

 High Perf MCUs

 Mainstream MCUs

 Ultra-low Power MCUs

 Wireless MCUs

STM32MP1
4158 CoreMark
Up to 800 MHz Cortex-A7
209 MHz Cortex-M4

STM32F2 Up to 398 CoreMark 120 MHz Cortex-M3	STM32F4 Up to 608 CoreMark 180 MHz Cortex-M4	STM32F7 1082 CoreMark 216 MHz Cortex-M7	STM32H7 Up to 3224 CoreMark Up to 550 MHz Cortex -M7 240 MHz Cortex -M4
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STM32F0 106 CoreMark 48 MHz Cortex-M0	STM32G0 142 CoreMark 64 MHz Cortex-M0+	STM32F1 177 CoreMark 72 MHz Cortex-M3
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STM32F3 245 CoreMark 72 MHz Cortex-M4	STM32G4 569 CoreMark 170 MHz Cortex-M4	<i>Mixed-signal MCUs</i>
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STM32L0 75 CoreMark 32 MHz Cortex-M0+	STM32L1 93 CoreMark 32 MHz Cortex-M3	STM32L4 273 CoreMark 80 MHz Cortex-M4	STM32L4+ 409 CoreMark 120 MHz Cortex-M4	STM32L5 443 CoreMark 110 MHz Cortex-M33	STM32U5 651 CoreMark 160 MHz Cortex-M33
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STM32WL 162 CoreMark 48 MHz Cortex-M4 48 MHz Cortex-M0+	STM32WB 216 CoreMark 64 MHz Cortex-M4 32 MHz Cortex-M0+ 
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Key advantages of STM32L4 series

+

ULP leader and performance booster

ST thought the STM32L4 architecture to reach 100 MIPS based on its ARM Cortex-M4 core with FPU and ST ART Accelerator™ at 80 MHz while keeping best-in-class, ultra-low-power (ULP) figures.

+

Innovation

Innovative peripherals are embedded to optimize the BOM cost.

+

Integration and safety

1 MB of Flash and 320-Kbyte of SRAM with safety and security features, smart and numerous peripherals, advanced and low power analog circuits in packages as small as 2.58 x 3.07 mm.

+

Great Investment

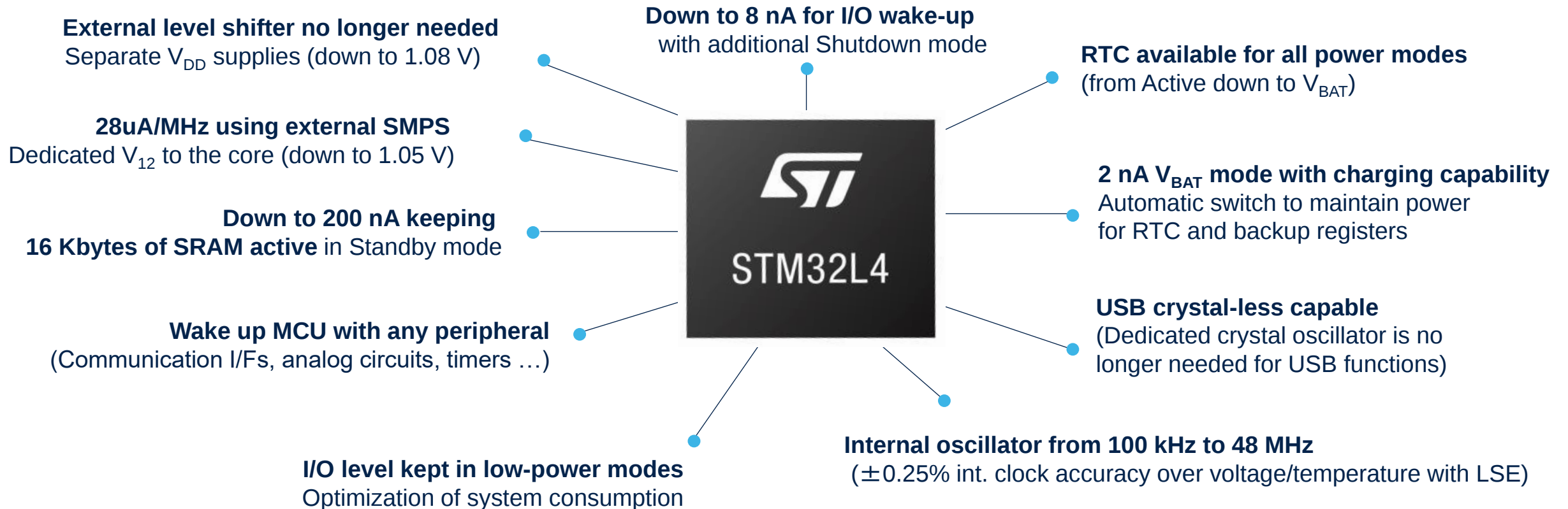
Great Investment This new STM32 member benefits from the pin-to-pin compatibility of the STM32 family and the STM32 Ecosystem.



Ultra-low-power and flexibility

FlexPowerControl

STM32L4 is optimized to reduce power consumption and increase flexibility



Best power consumption numbers with full flexibility

Wake-up time	V_{BAT}		
250 μs	Shutdown	2 nA / 200 nA*	Tamper detection: 2 I/Os, RTC
14 μs	Standby	8 nA / 200 nA*	Wake-up sources: reset pin, 5 I/Os, RTC
14 μs	Standby + 8-Kbyte RAM	34 nA / 280 nA*	Wake-up sources: + BOR, IWDG
5 μs	Stop 2 (full retention)	200 nA / 440 nA*	Wake-up sources: + all I/Os, PVD, LCD, COMPs, I ² C, LPUART, LPTIM
4 μs	Stop 1 (full retention)	720 nA / 950 nA*	Wake-up sources: + all I ² C, UART
6 cycles	Sleep	3.2 μA / 3.4 μA *	Wake-up sources: any interrupt or event
	Run at 24 MHz	8 μA /MHz ** / 20 μA /MHz **	
	Run at 80 MHz	28 μA /MHz ** / 79 μA /MHz	
		35 μA /MHz ** / 90 μA /MHz	

Note : * without RTC / with RTC

** with external SMPS



STM32L4

STM32L4 takes off like a rocket

Dhrystone
MIPS **100**

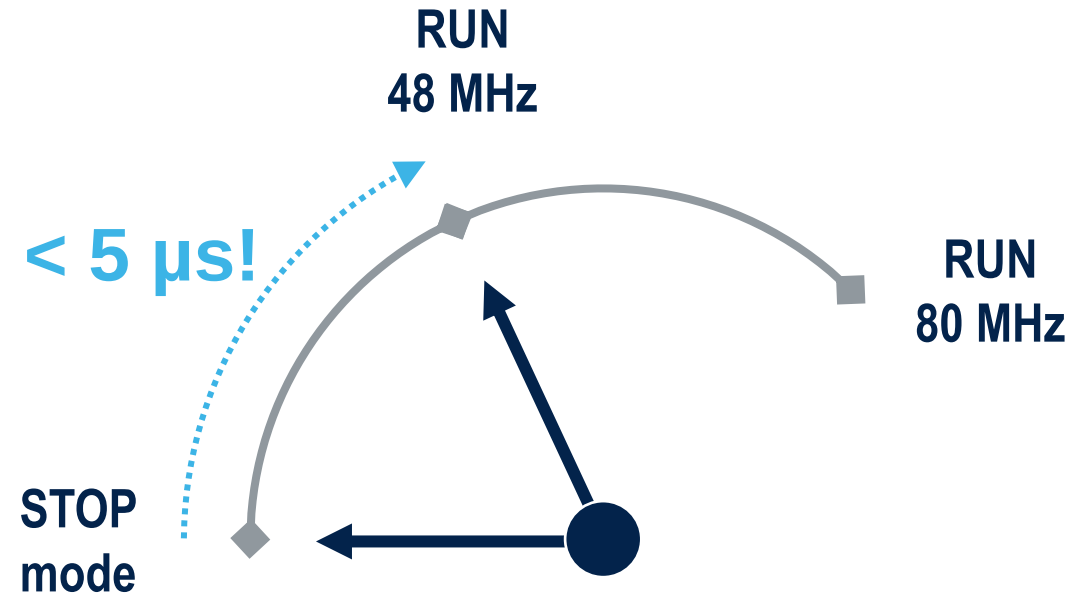
ULPBENCH™
An EEMBC Benchmark **447** ULPMark-CP

ULPBENCH™
An EEMBC Benchmark **167** ULPMark-PP

COREMARK®
An EEMBC Benchmark **273**

From 0 to 48 MHz in less than 5 μ s

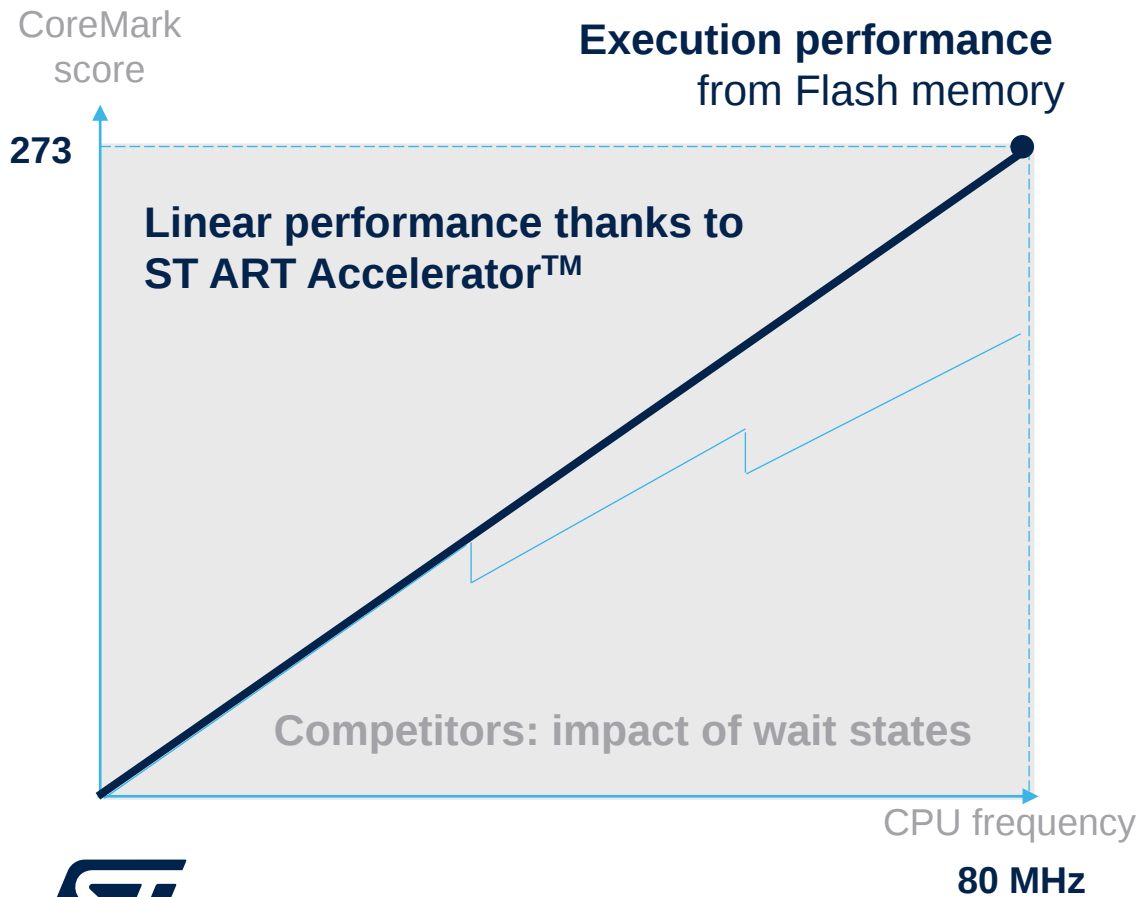
From 0 to 80 MHz in less than 20 μ s





Providing more performance

No compromise on performance with STM32L4 MCUs

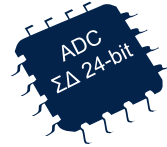


- **Up to 80 MHz/ 100 DMIPS** with Chrom-ART Accelerator™
- **Up to 273** CoreMark result
- Arm® Cortex®-M4 with FPU and DSP instructions
- 2x DMA (14 channels)
- SPI up to 40 Mbit/s, USART 10 Mbit/s

Smart peripherals metering

Digital Filter for Sigma Delta Modulators

8 x parallel inputs
with up to 24-bit data output resolution



V_{BAT} with RTC for battery backup

200 nA in V_{BAT} mode
for RTC and
32 x 32-bit backup registers



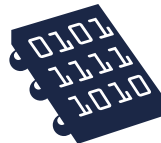
TRNG & AES for Security

128-/256-bit AES
key encryption hardware accelerator



FSMC

External memory interface
for static memories supporting SRAM,
PSRAM, NOR and NAND



STM32L4

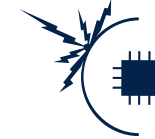


Electricity/Gas
/ Water
Smart Meter



LCD Display

SPI, Parallel or TFT Interface



Anti Tamper pin

3 x tamper pins
for battery domain



SPI / UART/ SDIO for Wireless

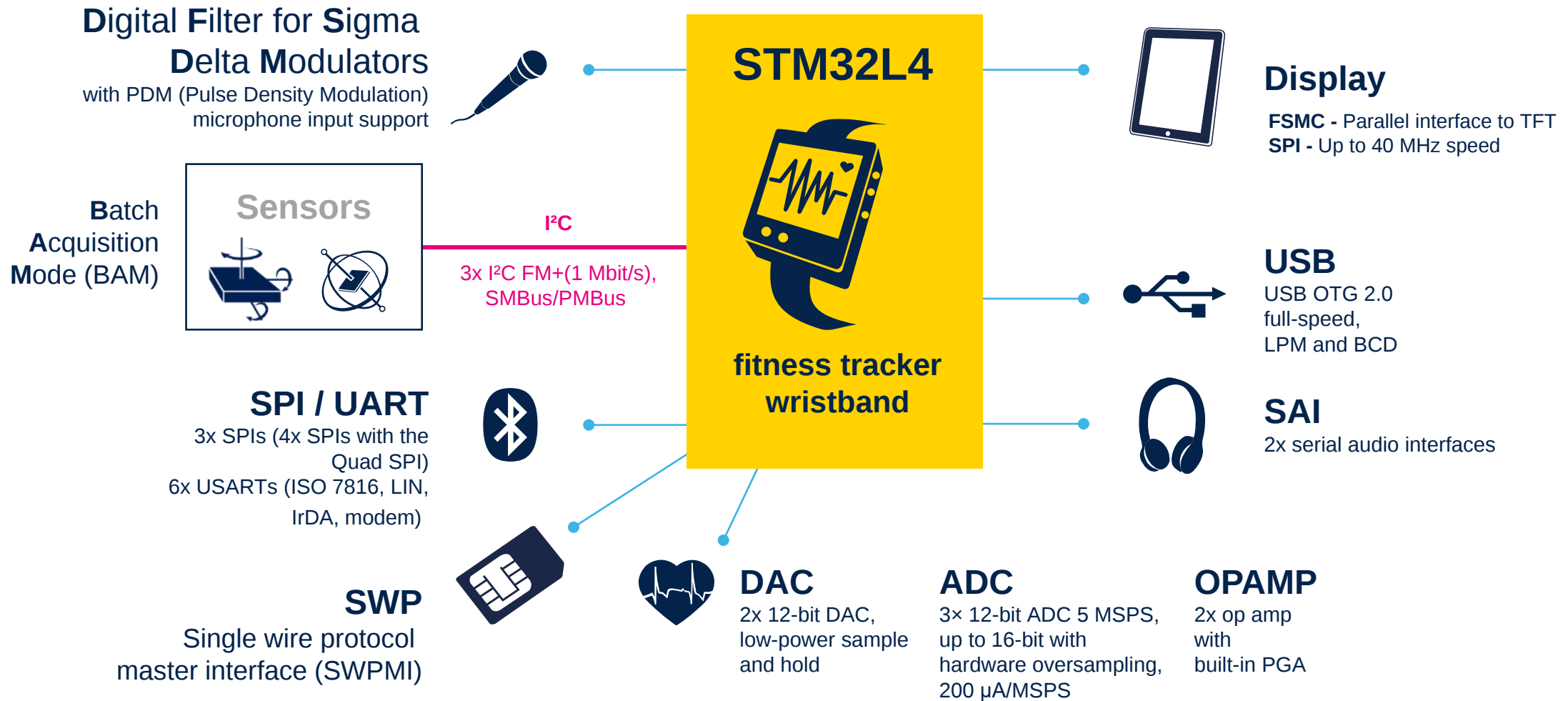
3x SPIs (4x SPIs with the Quad SPI)
6x UARTs (ISO 7816, LIN, IrDA, modem)
1 x SDIO



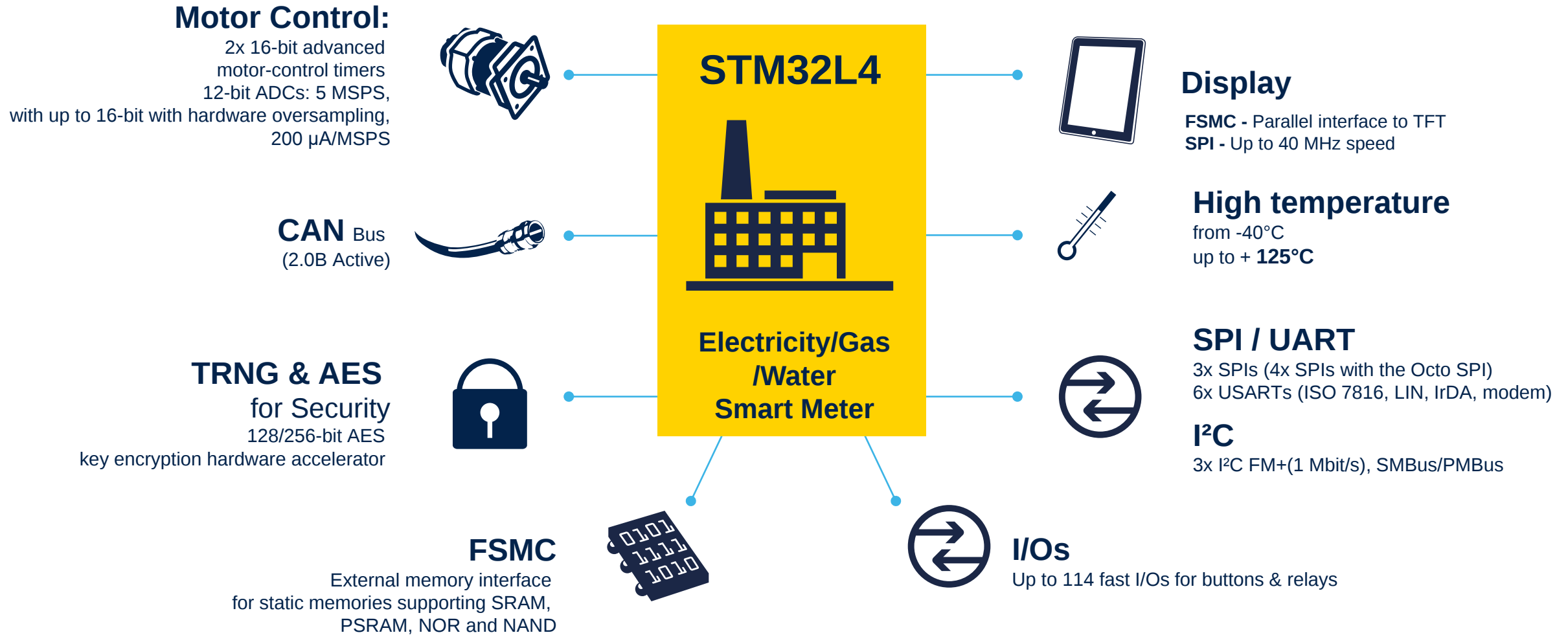
I/Os

Up to 114 fast I/Os for buttons & relays

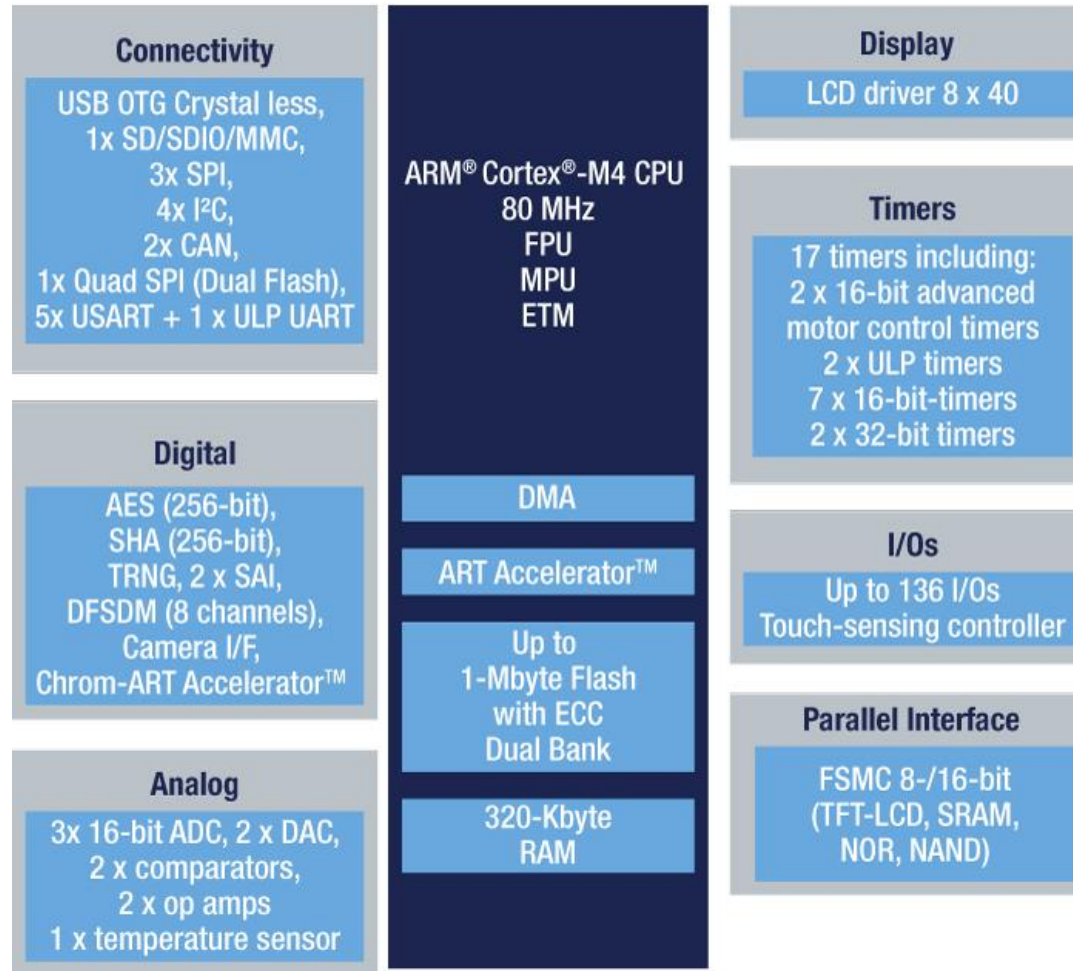
Smart peripherals fitness tracker - wristband



Smart peripherals industrial sensors



High integration level with high memory size in small packages

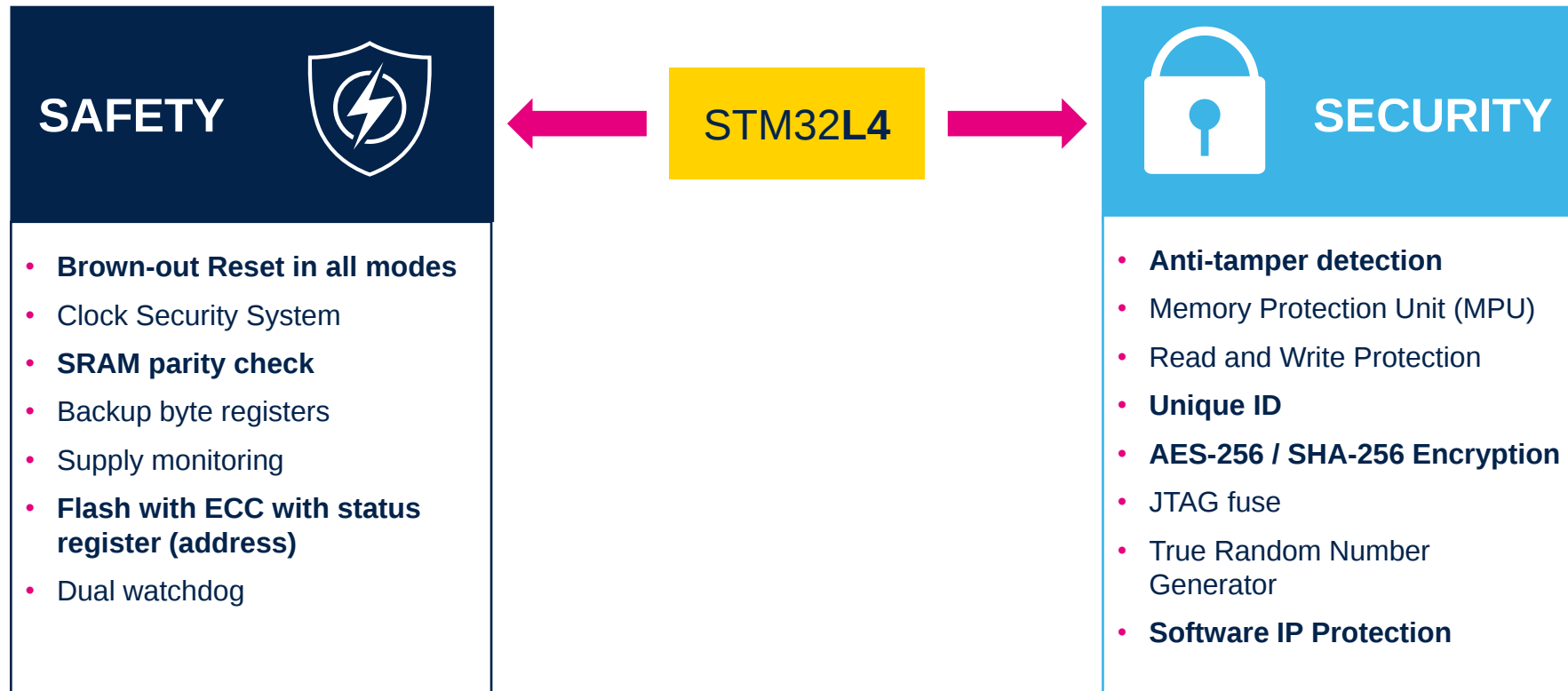


**Package size down
to 2.58 x 3.07 mm**



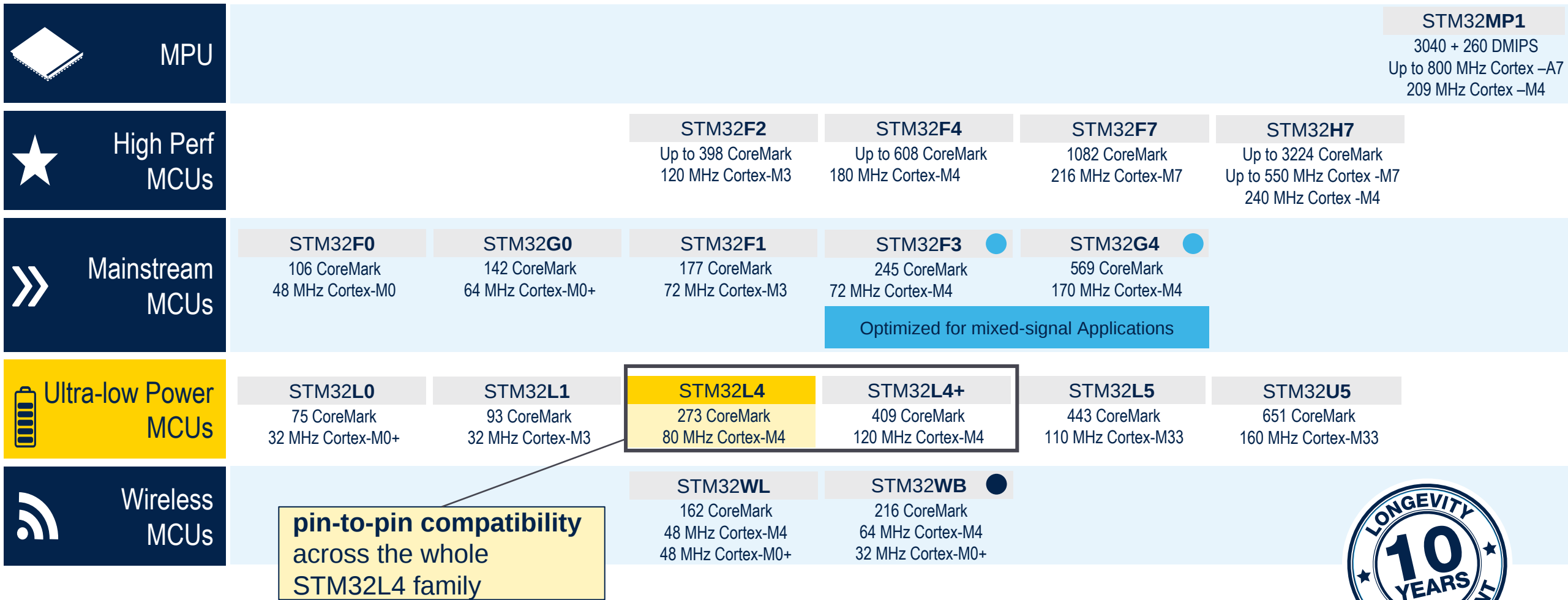
Safety and security

Integrated safety and security features





STM32 MCU : Continuity in the STM32 portfolio



● Optimized for mixed-signal applications

● Cortex-M0+ Radio co-processor



STM32L ULP portfolio

STM32L4 completes the ultra-low-power family

**Cost-smart
ULP champion**

STM32L0

Cortex-M0+ at 32 MHz
1.65 to 3.6V
8-/16-bit applications
Wide range of pin-counts

3 product lines,
Cost-effective,
Smaller packages,
USB, LCD, Analog
8 to 192 Kbytes of Flash,
Up to 20 Kbytes of SRAM

**Broad-range
foundation**

STM32L1

Cortex-M3 at 32 MHz
1.65 to 3.6V
Wide choice of
memory sizes

3 product lines,
USB, LCD, AES,
Rich Analog
True EEPROM,
Dual-bank Flash memory
(RWW),
32 to 512 Kbytes of Flash,
Up to 80 Kbytes of SRAM

**ULP With
performance**

STM32L4

Cortex-M4 w/ FPU at 80 MHz
1.71 to 3.6V
High-performance,
advanced analog circuits

5 product lines,
5-MSPS ADC,
PGA, Compar.,
DAC, Op Amp, USB
OTG, LCD, AES
64 Kbytes to 1 Mbyte
Up to 320 Kbytes of SRAM

**ULP with
more performance**

STM32L4+

Cortex-M4 w/ FPU at 120 MHz
1.71 to 3.6V
Wide choice of
memory sizes

4 product lines,
5-MSPS ADC,
PGA, Compar.,
DAC, Op Amp, USB
OTG, LCD, AES
1 to 2 Mbytes of Flash,
Up to 640 Kbytes of SRAM

**Advanced
security**

STM32L5

Cortex-M33 w/ FPU at 110 MHz
1.71 to 3.6V
Wide choice of
memory sizes

1 product line,
5-MSPS ADC,
PGA, Compar.,
DAC, Op Amp,
USB Type C, AES
256 to 512 Kbytes of Flash,
Up to 256 Kbytes of SRAM

STM32L, a complete offer

STM32L4+ completes the ultra-low-power family



STM32 Ultra-low power MCUs 32-bit Arm® Cortex®-M



STM32L5

- 32-bit Arm® Cortex®-M33 + FPU at 110 MHz
- From 256 to 512 Kbytes of Flash memory
- Lowest power mode + RAM + RTC: 0.35 µA

STM32L4+

- 32-bit Arm® Cortex®-M4 + FPU at 120 MHz
- From 512 Kbytes up to 2 Mbytes of Flash memory
- Lowest power mode + RAM + RTC: 0.39 µA

STM32L4

- 32-bit Arm® Cortex®-M4 + FPU at 80 MHz
- From 64 Kbytes to 1 Mbyte of Flash memory
- Lowest power mode + RAM + RTC: 0.34 µA

STM32L1

- 32-bit Arm® Cortex®-M3 at 32 MHz
- From 32 to 512 Kbytes of Flash memory
- Lowest power mode + RAM + RTC: 1.2 µA

STM32L0

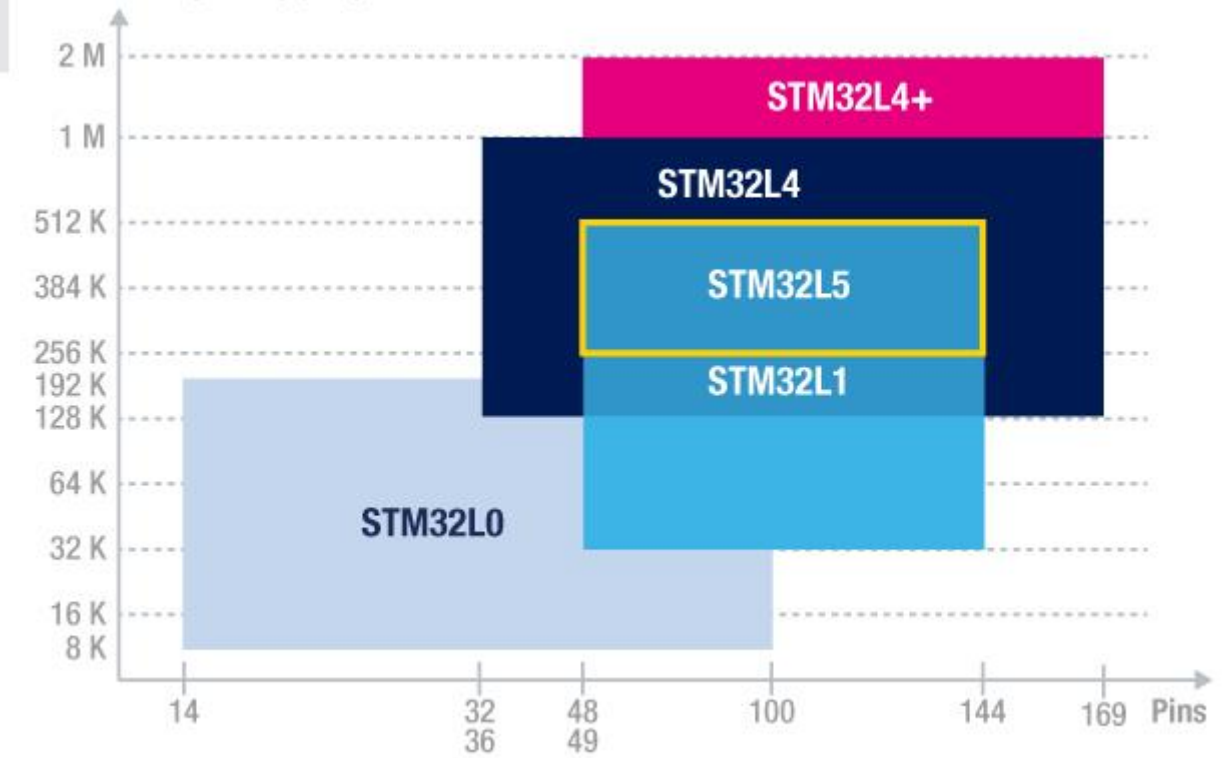
- 32-bit Arm® Cortex®-M0+ at 32 MHz
- From 8 to 192 Kbytes of Flash memory
- Lowest power mode + RAM + RTC: 0.67 µA

STM8L

- 8-bit STM8 core at 16 MHz
- From 2 to 64 Kbytes of Flash memory
- Lowest Halt mode: 0.3 µA



Flash memory size (bytes)



STM32L0 STM32L1 STM32L4 STM32L4+ STM32L5

STM32L4 serie

• ART Accelerator™ • USART, SPI, I²C • Quad-SPI • 16- and 32-bit timers • SAI + audio PLL • SWP • 2x CAN • 2x 12-bit DACs • Temperature sensor • Low voltage 1.71 to 3.6 V • VBAT mode • Unique ID • Capacitive touch sensing • AES-128/256* and SHA-256**	Product line	Flash (KB)	RAM (KB)	Memo - ry I/F FSMC	Op-Amp	CAN	Sigma Delta Interface	12-bit ADC 5 Msps 16-bit HW oversampling	DAC	SAI	USB2.0 OTG	USB Device	Segment LCD driver	Chron-ART Accelerator™
	STM32L4x6 - USB OTG + Segment LCD Lines													
	STM32L496**	512 to 1024	320	•	2	2	8x ch	3	2	2	•		Up to 8x40	•
	STM32L476*	256 to 1024	128	•	2	1	8x ch	3	2	2	•		Up to 8x40	
	STM32L4x5 - USB OTG lines													
	STM32L475	256 to 1024	128	•	2	1	8x ch	3	2	2	•			
	STM32L4x3 - USB Device + Segment LCD lines													
	STM32L433*	128 to 256	64		1	1		1	2	1		•	Up to 8x40	
	STM32L4x2 - USB Device lines													
	STM32L452*	256 to 512	160		1	1	4x ch	1	1	1		•		
	STM32L432*	128 to 256	64		1	1		1	2	1		•		
	STM32L412*	64 to 128	40		1			2				•		
	STM32L4x1 - Access lines													
	STM32L471	512 to 1024	128	•	2	1	8x ch	3	2	2				
	STM32L451	256 to 512	160		1	1	4x ch	1	1	1				
	STM32L431	128 to 256	64		1	1		1	2	1				

Note: * HW crypto/hash functions are available on STM32L486, STM32L443, STM32L462, STM32L442 and STM32L422 - ** on STM32L4A6

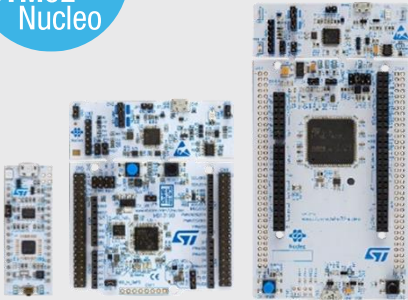
1001





STM32L4 ecosystem

HARDWARE TOOLS



STM32 Nucleo boards

Flexible prototyping



Discovery kits

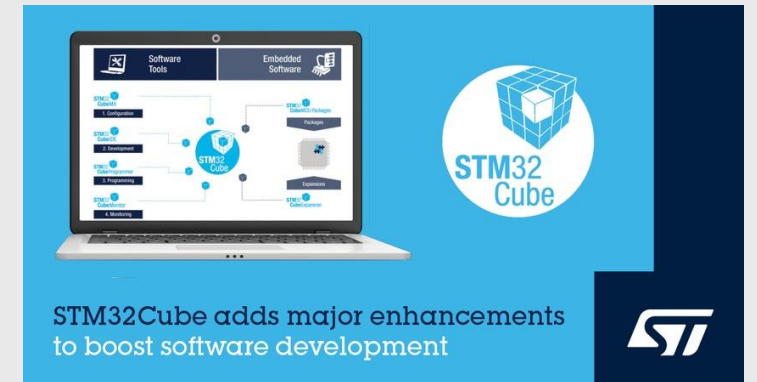
Key feature prototyping



Evaluation board

Full feature evaluation

SOFTWARE TOOLS



STM32
CubeMX



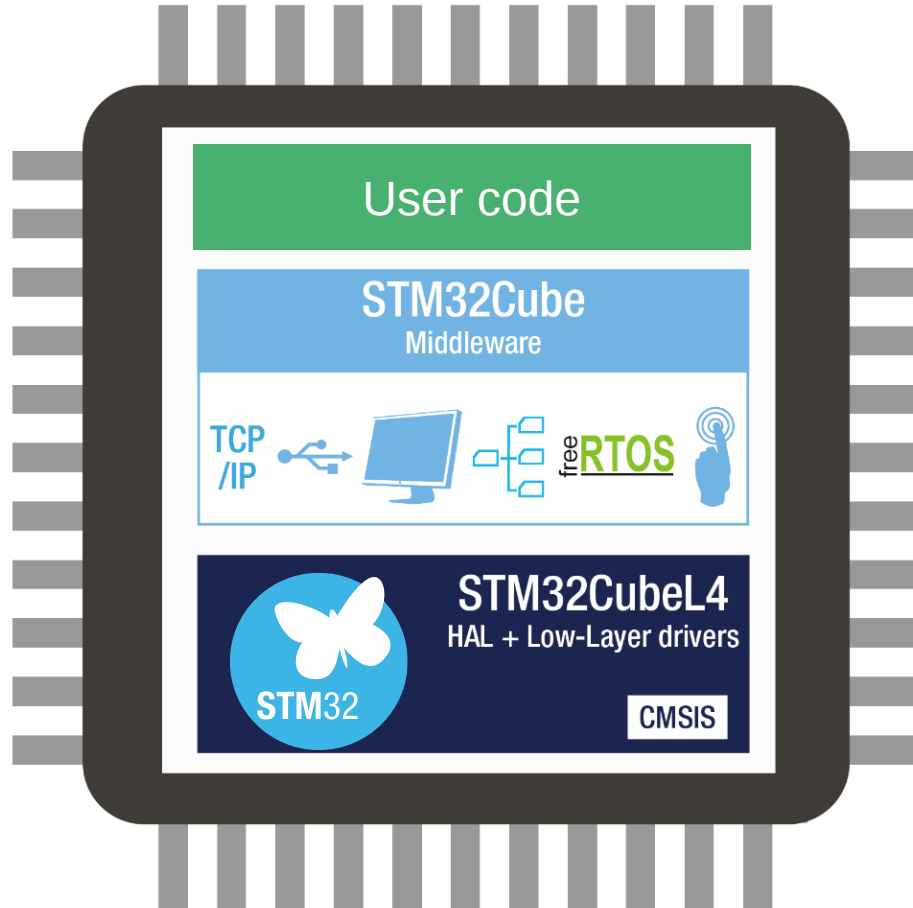
wiki.st.com/stm32mcu



github.com/STMicroelectronics



STM32L4/L4+ ecosystem



EMBEDDED SOFTWARE

- Open-source TCP/IP stack (lwIP)
 - USB Host and Device library from ST **Qualified HAL firmware**
 - STemWin graphical stack library from ST and SEGGER
 - Open-source FAT file system (FatFs)
 - Open-source real-time OS (FreeRTOS)
 - Touch-sensing library
 - Dozens of examples
-
- STM32L4 Hardware Abstraction Layer (HAL) portable APIs
 - **High-performance, light-weight low-layer (LL) APIs**
 - High coverage for most STM32 peripherals
 - Production-ready and fully qualified
 - Dozens of usage examples
 - Open-source BSD license

Summary

4 keys of STM32 L4 series

- + More performance and still ULP leader**
- + More Graphics and Innovation**
- + More Integration**
- + Great Investment**

Releasing your creativity



[/STM32](#)



[community.st.com](#)



[www.st.com/STM32L4](#)



[STM32L4 Online training](#)



[STM32L4 MOOC](#)



Our technology starts with You



Find out more at www.st.com/STM32L4

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