



# STM32L4+ – Series Presentation

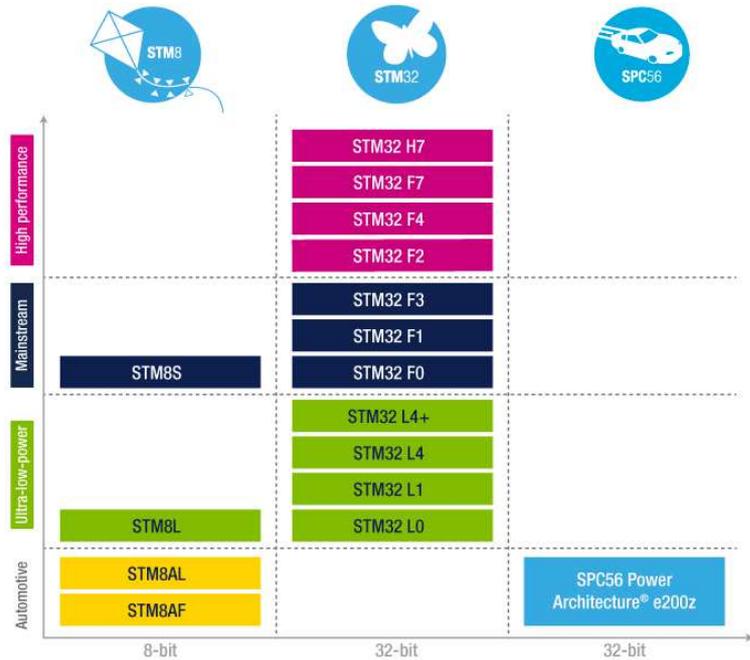
Revision 1



This presentation provides information about the various product lines available in the STM32L4+ series.



# Microcontrollers



By choosing one of ST's microcontrollers for your embedded application, you gain from our leading expertise in MCU architecture, technology, multi-source manufacturing and support.

ST's product portfolio contains a comprehensive range of microcontrollers, from robust, low-cost 8-bit MCUs up to 32-bit ARM®-based Cortex®-M0 and M0+, Cortex®-M3, Cortex®-M4, Cortex®-M7 Flash microcontrollers with a great choice of peripherals. ST has also extended this range to include an ultra-low-power MCU platform.

Extensive support through a combination of flexible and powerful development tools, training courses, consultancy and web support gives you a plus for a faster time to market.

The STM32L4+ series shatters processing capability limits in the ultra-low-power world by delivering 150 DMIPS/405

CoreMark score while executing from internal Flash memory and by embedding 640 Kbytes SRAM enabling more advanced consumer, medical and industrial low-power applications and devices.

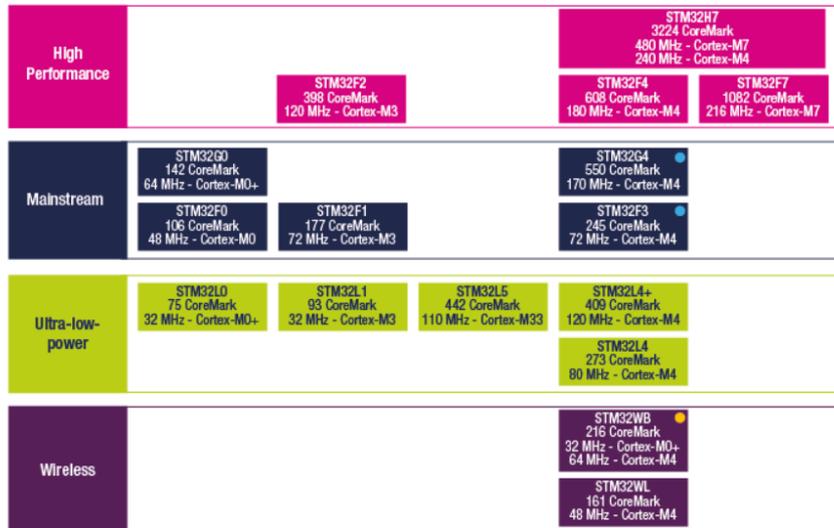


# STM32 32-bit ARM Cortex MCUs



## STM32 32-bit Arm® Cortex®-M MCUs

## STM32 Solutions



- Artificial Neural Networks
- Graphic User Interface
- STM32 Motor Control
- STM32 Connectivity
- STM32Cube Ecosystem
- STM32 Community
- STM32 Education



Legend: ● Optimized for Mixed-signals applications ● Cortex-M0+ Radio Co-processor

The STM32 family of 32-bit Flash microcontrollers based on the ARM® Cortex® M processor is designed to offer new degrees of freedom to MCU users. It offers a 32-bit product range that combines very high performance, real-time capabilities, digital signal processing, and low-power, low-voltage operation, while maintaining full integration and ease of development.

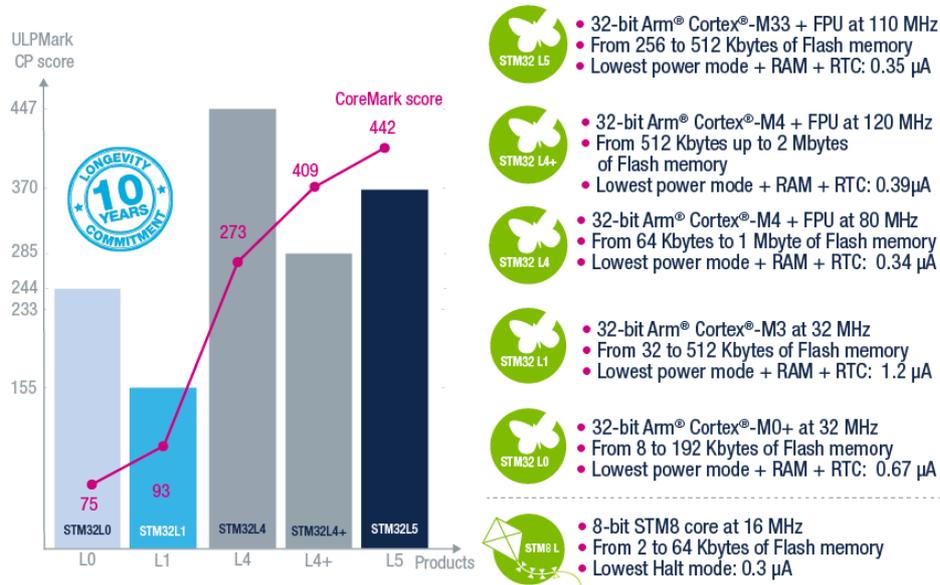
The unparalleled and large range of STM32 devices, based on an industry-standard core and accompanied by a vast choice of tools and software, makes this family of products the ideal choice, both for small projects and for entire platform decisions.

To simplify the migration and give you all the flexibility you need, the STM32L4+ is pin-to-pin compatible with the different STM32 series and opens the door to the full STM32 ecosystem.

# STM32L portfolio

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## Ultra low power now extended in 6 series



ST's ultra-low-power MCU platform is based on a proprietary ultra-low-leakage technology and optimized design.

The wide portfolio offers a large choice of MCUs from the STM8L (8-bit proprietary core) up to the STM32L4 (ARM® Cortex®-M4) including the STM32L0 (ARM® Cortex®-M0+) and the STM32L1 (ARM® Cortex®-M3).

ST's ultra-low-power solution is the right choice for applications operating on a battery or supplied by energy harvesting, which require an extra-long life.

With the industry's lowest current variation between 25 and 125 °C, STM8L/STM32L solutions guarantee outstandingly low current consumption at elevated temperatures. The MCUs reach the industry's lowest power consumption of 170 nA in lowest power mode with SRAM retention. Wake-up times have also

been taken into consideration and are as low as 3.5  $\mu$ s from Stop mode.

The STM32L4+ series stretches the STM32L4 technology by offering higher performance (120 MHz/405 CoreMark executing from internal Flash memory ), larger embedded memories (up to 2 Mbytes of Flash memory and 640 Kbytes of SRAM), and more advanced graphic features with no compromise on the ultra-low power consumption capability.



# STM32L4+ lines

Arm® Cortex®M4 (DSP + FPU) – 120 MHz  • ART Accelerator™ • USART, SPI, PC • 2 x Octo-SPI • 16 and 32-bit timers • SAI + audio PLL • CAN • Camera IF • TFT-LCD Controller • Chrom-ART Accelerator™  • 2x 12-bit DAC • Temperature sensor  • Low voltage 1.71V to 3.6V • V <sub>BAT</sub> Mode • Unique ID • Capacitive Touch sensing	Product line	FLASH (KB)	RAM (KB)	Memory IF	2 x Op-Amp	2 x Comp	8ch / 4x Sigma Delta Interface	12-bit ADC 5 Msps 16 bit HW oversampling	USB2.0 OTG FS	MIPI DSI	TFT Display Interface	Chrom-GRC™ (*)	PKA	AES 128/256-bit	
	STM32L4P5/Q5 - USB lines														
	STM32L4P5 USB OTG	1024 To 512	320	SDIO FSMC	•	•	•	2	•		•				
	STM32L4Q5 USB OTG & AES	1024	320	SDIO FSMC	•	•	•	2	•		•			•	•
	STM32L4R5/S5 - USB lines														
	STM32L4R5 USB OTG	2048 to 1024	640	SDIO FSMC	•	•	•	1	•						
	STM32L4S5 USB OTG & AES	2048	640	SDIO FSMC	•	•	•	1	•						•
	STM32L4R7/S7 with TFT interface														
	STM32L4R7 USB OTG & TFT Interface	2048 to 1024	640	SDIO FSMC	•	•	•	1	•			•	•		
	STM32L4S7 USB OTG & TFT Interface & AES	2048	640	SDIO FSMC	•	•	•	1	•			•	•		•
STM32L4R9/S9 with MIPI-DSI and with TFT interface															
STM32L4R9 USB OTG & MIPI DSI	2048 to 1024	640	SDIO FSMC	•	•	•	1	•	•	•	•	•			
STM32L4S9 USB OTG & MIPI DSI & AES	2048	640	SDIO FSMC	•	•	•	1	•	•	•	•	•		•	

Note: \* Graphic memory optimizer for round displays



STM32L4+ microcontrollers offer dynamic voltage scaling to balance power consumption with processing demand, low-power peripherals (LP UART, LP timers) available in Stop mode, safety and security features, smart and numerous peripherals, advanced and low-power analog peripherals such as op amps, comparators, 12-bit DACs and 16-bit ADCs (hardware oversampling).

The new STM32L4+ series also embeds advanced graphic features enabling state-of-the-art Graphic User Interfaces.

The Chrom-ART Accelerator™, the ST proprietary 2D hardware graphic accelerator, efficiently handles repetitive graphic operations releasing the main CPU capabilities for real-time processing or even more advanced graphic operations.

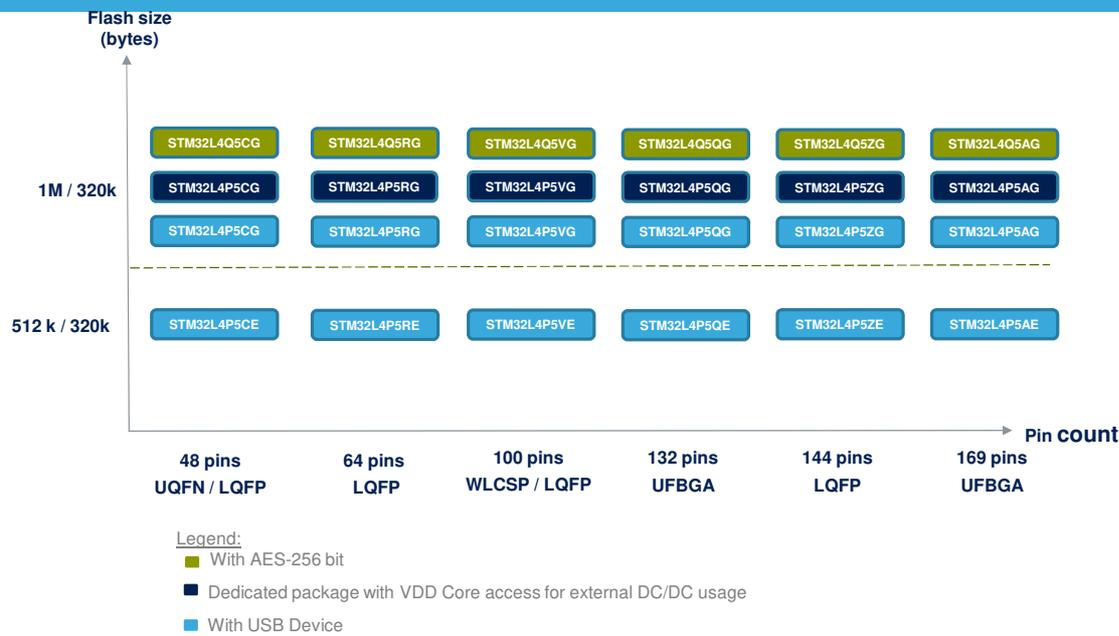
The Chrom-ART Accelerator is coupled with the large embedded SRAM, the Chrom-GRC™ round display memory optimizer, the high-throughput OctoSPI interface and to the advanced TFT and DSI controllers, allowing you to achieve ‘smartphone-like’ graphic user interfaces in a single-chip and ultra-low power solution.

The STM32L4+ series are available in different lines: STM32L4R5/S5, STM32L4R7/S7 (with TFT interface) and STM32L4R9/S9 (with MIPI-DSI and with TFT interface).

## STM32L4P5/Q5

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with TFT interface



The STM32L4P5 and STM32L4Q5 devices extend the ultra-low-power portfolio and performance with an ARM® Cortex®-M4 core with DSP and floating-point unit (FPU) at 120 MHz. All STM32L4P5 and STM32L4Q5 devices are available with LCD-TFT (LTDC) interface enabling graphical and Human Machine Interface (HMI) applications.

The STM32L4P5/Q5 portfolio offers 512 Kbytes and 1 Mbytes of internal Flash memory and provides a large package offer from 48- to 169-pin packages.

The STM32L4Q5 is available with 1 Mbytes of Flash memory and provides an additional encryption accelerator engine (AES) and a Public Key Accelerator (PKA).

The STM32L4P5 is available with 512 Kbytes and 1 Mbytes of Flash memory. It is also available with 1 Mbytes of Flash memory and with external SMPS option.

# STM32L4R5/S5 7

without MIPI-DSI and without TFT interface



Legend:

■ With 128-/256-bit AES Hardware Encryption   ■ Without 128-/256-bit AES Hardware Encryption

STM32L4S5 and STM32L4R5 devices extend the ultra-low-power portfolio and performance with an ARM® Cortex®-M4 core with DSP and floating-point unit (FPU) at 120 MHz.

The STM32L4R5 portfolio offers from 1 to 2 Mbytes of Flash memory and from 100- to 169-pin packages.

STM32L4S5 is available with 2 Mbytes of Flash memory and provides an additional encryption accelerator engine (AES, hash).

# STM32L4R7/S7 8

without MIPI-DSI and with TFT interface



Legend:

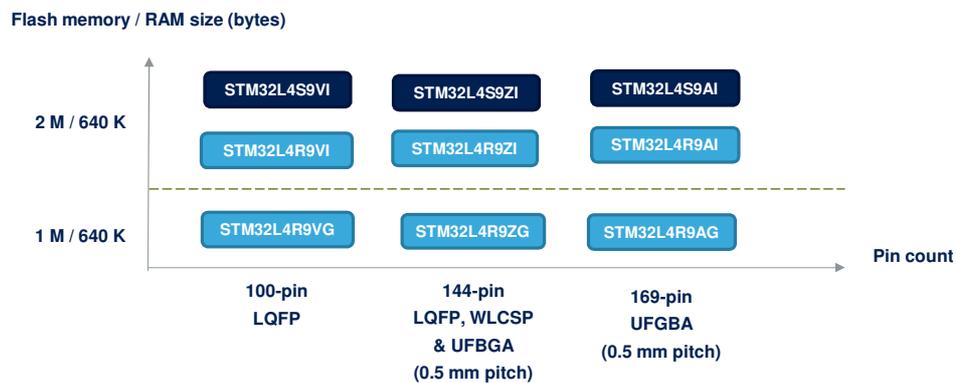
■ With 128-/256-bit AES Hardware Encryption ■ Without 128-/256-bit AES Hardware Encryption

STM32L4S7 and STM32L4R7 devices offer from 2 Mbytes of Flash memory and from 100- to 169-pin packages. This version gets an additional TFT controller and Chrom-GRC versus STM32L4R5 and STM32L4S5. STM32L4S7 provides an additional encryption accelerator engine (AES, Hash).

# STM32L4R9/S9

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with MIPI-DSI and with TFT interface



Legend:

■ With 128-/256-bit AES Hardware Encryption ■ Without 128-/256-bit AES Hardware Encryption



The STM32L4R9 portfolio is the superset version of the STM32L4+ offering an embedded MIPI DSI and from 1 to 2 Mbytes of Flash memory and from 100- to 169-pin packages. STM32L4S9 with 2 Mbytes of Flash memory is the crypto version.