life.augmented

STM32L series

Ultra-low-power 32-bit MCUs
Releasing your creativity

STM32 L

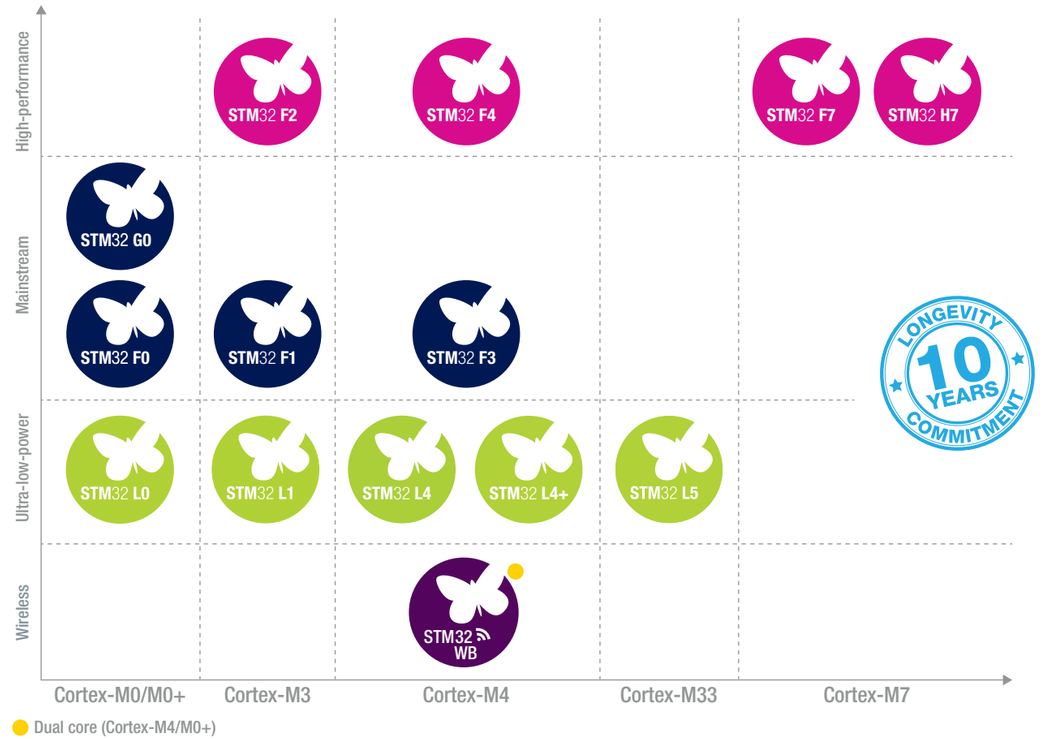
Content

STM32 and ultra-low power

By choosing an STM32 microcontroller for your embedded application, you gain from our market-leading expertise in MCU architecture, technology, multi-source manufacturing and long-term supply.

14 PRODUCT SERIES – MORE THAN 50 PRODUCT LINES

The STM32 MCUs portfolio offers an extraordinary variety of options including Arm® Cortex®-M cores (M0, M0+, M3, M4, M33, and M7), giving developers flexibility to find the perfect match for their application. Particular attention is paid to make it easy to switch from one device to another. The compatibility of binaries combined with the similar pinout assignment, proliferation of hardware IPs and higher-level programming languages greatly facilitates the work of developers.



ST MCU FINDER

Free mobile and desktop application to find the right STM32 MCU
www.st.com/stmcufinder

ST COMMUNITY

Ask, learn, share, discuss, become famous and engage with the community of STM32 enthusiasts on community.st.com

STM32 ULP series

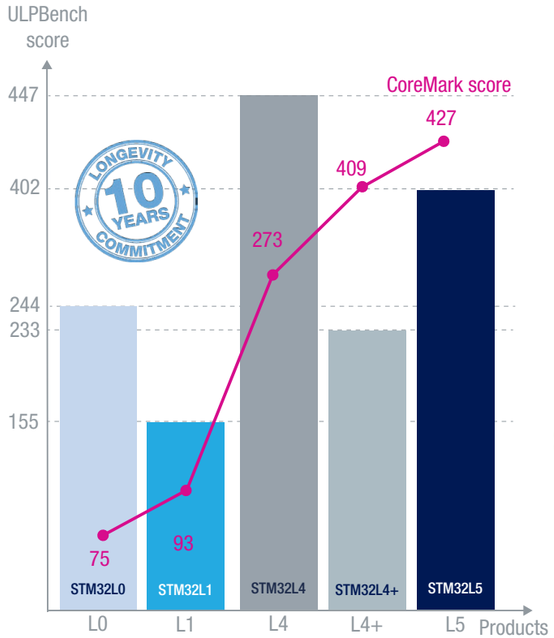
From cost smart up to advanced performance, there is an STM32L series to match all your memory, analog or peripheral needs.

STM32L: ULTRA-LOW-POWER 32-BIT MCU SERIES

ST's ultra-low-power MCU platform is based on a proprietary ultra-low-leakage technology.
STM32L0 (Arm® Cortex®-M0+), STM32L1 (Cortex-M3), STM32L4, STM32L4+ (Cortex-M4), STM32L5 (Cortex-M33) and STM8L (8-bit proprietary core) series represent a large range of microcontrollers addressing devices supplied from batteries or through energy harvesting and help ensure an optimized cost/performance ratio for all kinds of low-power applications.
With the industry's lowest current variation between -40 and +125°C, this ultra-low-power platform has outstandingly low current consumption at elevated temperatures.
The MCUs reach the industry's lowest power consumption of 350 nA in Stop mode (with SRAM retention), while maintaining a wakeup time as low as 3.5 µs.

- The STM32L4 series offers the excellence of ST's ultra-low-power platform with an additional performance dimension by providing
- 100 DMIPS with DSP instructions and floating-point unit (FPU), more memory (up to 1 Mbyte of Flash memory) and innovative features.
- The STM32L4+ series extends STM32L4 technology by offering higher performance (120 MHz/409 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 its ultra-low power consumption capability.
- The STM32L5 series is the answer for embedded application requiring more security and a lower power consumption. It adds more security with Arm® Cortex®-M33 and its TrustZone® and ST security implementation while using the best-in-class ultra-low power technology.

5 PRODUCT SERIES – 16 PRODUCT LINES: A UNIQUE OFFER



STM32 L5
- 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

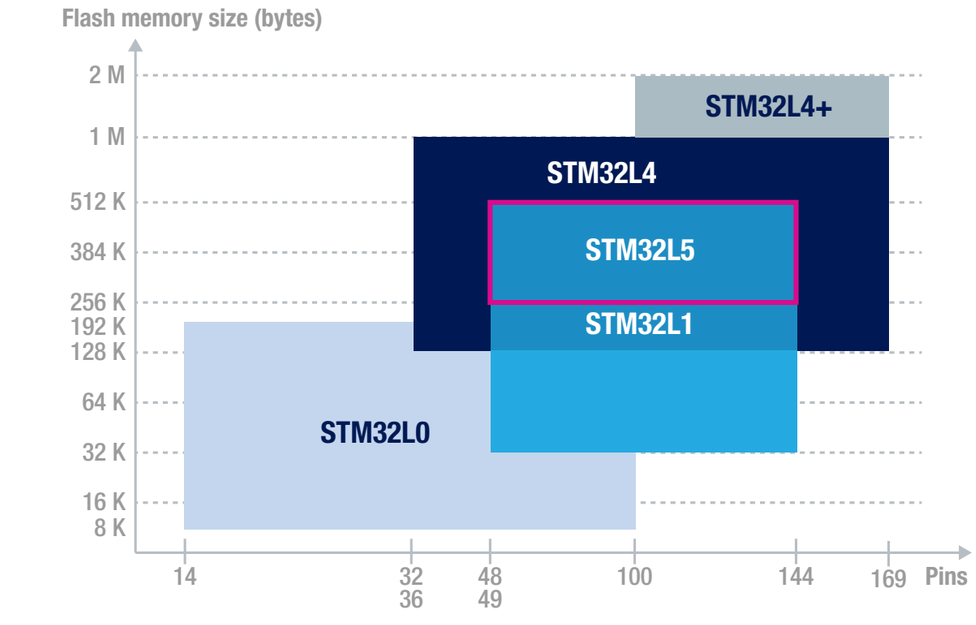
STM32 L4+
- 32-bit Arm® Cortex®-M4 + FPU at 120 MHz
- From 1 to 2 Mbytes of Flash memory
- Lowest power mode + RAM + RTC: 1 µA

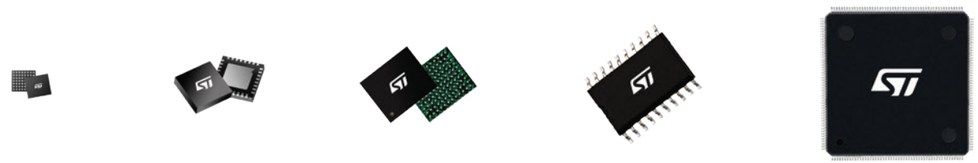
STM32 L4
- 32-bit Arm® Cortex®-M4 + FPU at 80 MHz
- From 64 Kbytes to 1 Mbyte of Flash memory
- Lowest power mode + RAM + RTC: 0.34 µA

STM32 L1
- 32-bit Arm® Cortex®-M3 at 32 MHz
- From 32 to 512 Kbytes of Flash memory
- Lowest power mode + RAM + RTC: 1.2 µA

STM32 L0
- 32-bit Arm® Cortex®-M0+ at 32 MHz
- From 8 to 192 Kbytes of Flash memory
- Lowest power mode + RAM + RTC: 0.67 µA

MORE MEMORY, PERFORMANCE, PERIPHERALS AND PACKAGES





WLCSP
WLCSP25 (~2x2 mm)
WLCSP36 (~2x3 mm)
WLCSP49 (~3x3 mm)
WLCSP63 (~3x4 mm)
WLCSP64 (~4x5 mm)
WLCSP72 (~3x4 mm)
WLCSP81 (~3x4 mm)
WLCSP100 (~4x4 mm)
WLCSP104 (~4x5 mm)
WLCSP144 (~5x5 mm)

QFN
UFQFN20 (3x3 mm)
UFQFN28 (4x4 mm)
UFQFN32 (5x5 mm)
UFQFN48 (7x7 mm)

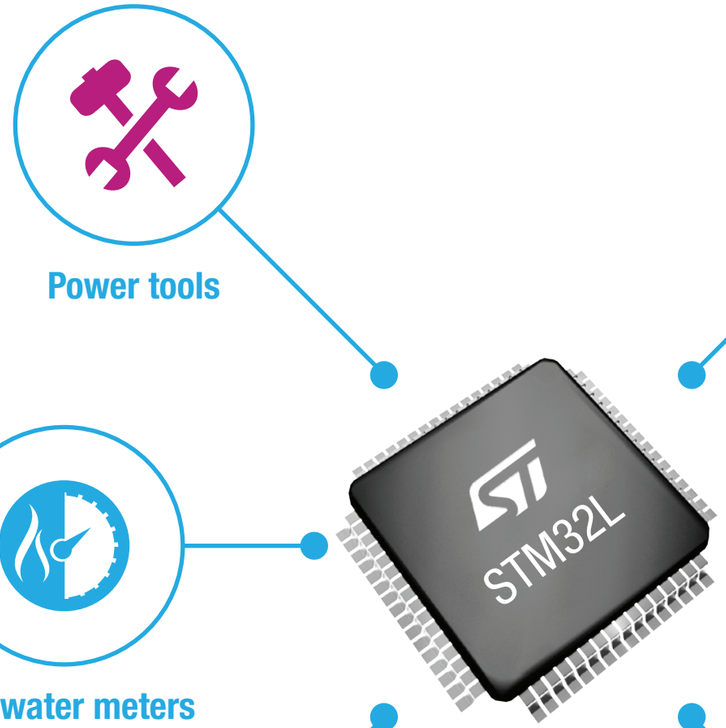
BGA
UFBGA64 (5x5 mm)
UFBGA100 (7x7 mm)
UFBGA132 (7x7 mm)
UFBGA144 (10x10mm)
UFBGA169 (7x7 mm)

TSSOP
TSSOP14 (4.4x4.1 mm)
TSSOP20 (4.4x6.6 mm)

LQFP
LQFP32 (7x7 mm)
LQFP48 (7X7 mm)
LQFP64 (10X10 mm)
LQFP100 (14X14 mm)
LQFP144 (20x20 mm)

Form factor

STM32 ULP MCUs are THE answer, whatever the application



Power tools

- -40 to +125 ºC temperature range
- 1.65 to 3.6 V power supply range
- RTC with anti-tamper at 0.95 ppm
- Safety with ECC on Flash, CRC, and parity bit on SRAM
- Independent dual-bank Flash memory and EEPROM (RWW)
- Internal RC ± 1% accuracy over temperature and V_{DD}
- Wide package offer from 14 to 144 pins
- Full Arm® Cortex®-M0+/M3/M4/M33 range offer

Electricity smart meters

- Dynamic Efficiency 28 µA/MHz
- FSMC for external memories
- LCD (4x52 or 8x48) for Display control
- TRNG and 256-bit AES for Security
- Digital filter for Sigma-Delta modulators
- V_{BAT} with RTC for Battery backup domain
- Arm® Cortex®-M4 up to 120 MHz for computational power

Gas/water meters

- Down to 450 nA mode with RTC, 16 Kbytes of SRAM
- LP-UART, Pulse counter, 16-bit LP-Timer
- 3.5 µs wakeup with 16 wakeup lines
- Dual-bank Flash memory (up to 2 Mbytes) for firmware upgrade
- Up to 16 Kbytes of true EEPROM for data login
- Built-in comparator and Op Amp with PGA
- TrustZone®, PCROP, ECC, CRC, JTAG fuse for security purposes
- Full Arm® Cortex®-M0+/M3/M4/M33 range offer

Fitness/healthcare

- 8 nA Shutdown mode to extend battery life
- Up to 2-Mbyte Flash memory to support advanced algorithms
- Dynamic Efficiency 28 µA/MHz
- I²C FM+ for sensors and HS communication
- 12-/16-bit ADC analog sensing and monitoring
- FS USB host for data transfer + device charging
- Full Arm® Cortex®-M0+/M3/M4/M33 range offer
- Up to 640 Kbytes of SRAM
- Graphic accelerator: Chrom-ART Accelerator™ and memory optimization Chrom-GRC™ round display
- MIPI-DSI, LCD-TFT and parallel interface for advanced graphics

Sensor hub Mobile phone/gaming

- 1.4 µA Stop mode with 128 Kbytes of RAM+RTC
- 4 µs wakeup time for fast system response
- USB 2.0 OTG for fast application processors
- 640 Kbytes of SRAM (including 64 Kbytes with parity bit)
- Down to 1.65 V full speed and feature capable
- I²C FM+, Fast SPI, Fast ADC for sensor acquisition
- Arm® Cortex®-M4 with FPU 150 DMIPS with ART Accelerator™

Audio and voice recognition

- 28 nA Standby mode to extend battery life
- 4 to 14 µs wakeup time for a better user experience
- Digital filter for Sigma Delta for MEMS microphone
- 12-bit ADC at 200 µA / MSPS
- SAI / I2S for audio peripheral connections
- Arm® Cortex®-M4 up to 120 MHz with 31 µA/MHz at 100 DMIPS
- Quad or Octo-SPI Memory interface for data or execution in place

STM32L0 series

A tiny consumption budget for a wide application range

STM32L0 PRODUCT LINES

Arm® Cortex®-M0+ (32 MHz with MPU)	Product	Flash (KB)	RAM (KB)	EEPROM (Bytes)	Power supply	PVD[2]	TEMP sensor	2x ULP COMP	2x 12-bit DAC	Touch sense	TRNG	USB 2.0 FS Crystal-less	Segment LCD Driver
• Ultra low leakage process • Dynamic voltage scaling • 14 to 100-pin • 5 clock sources • Advanced RTC w/ calibration • 12-bit ADC 1.14 Msps • Multiple USART, SPI, I²C • Multiple 16-bit timers • LP UART[1] • LP Timers[1] • 2 watchdogs • Reset circuitry POR/PDR • Brown-out Reset • DMA • AES-128	**STM32L0x0 Value line**	Up to 128	Up to 20	Up to 512	Down to 1.8V								
	STM32L0x1 Access	Up to 192	Up to 20	Up to 6K	Down to 1.65V	•	•	•					
	STM32L0x2 USB	Up to 192	Up to 20	Up to 6K	Down to 1.65V	•	•	•	•	•	•	•	
	STM32L0x3 USB & LCD	Up to 192	Up to 20	Up to 6K	Down to 1.65V	•	•	•	•	•	•	•	Up to 4x52 or 8x48

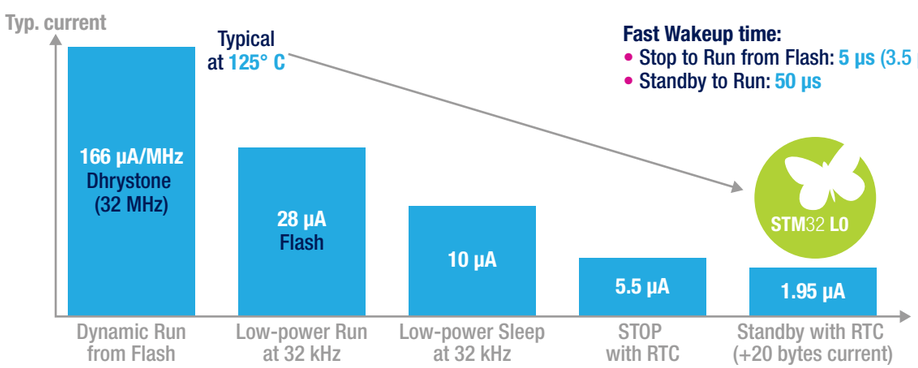
Note 1: Low-power peripherals available in ultra-low-power modes
Note 2: PVD = Programmable voltage detector

STM32L0 ULTRA-LOW-POWER

- 33 DMIPS
- Dynamic run mode down to 49 µA/MHz (with external DC/DC) and 76 µA/MHz (with LDO)
- Stop mode with RAM + LTC (low-power time clock): 420 nA

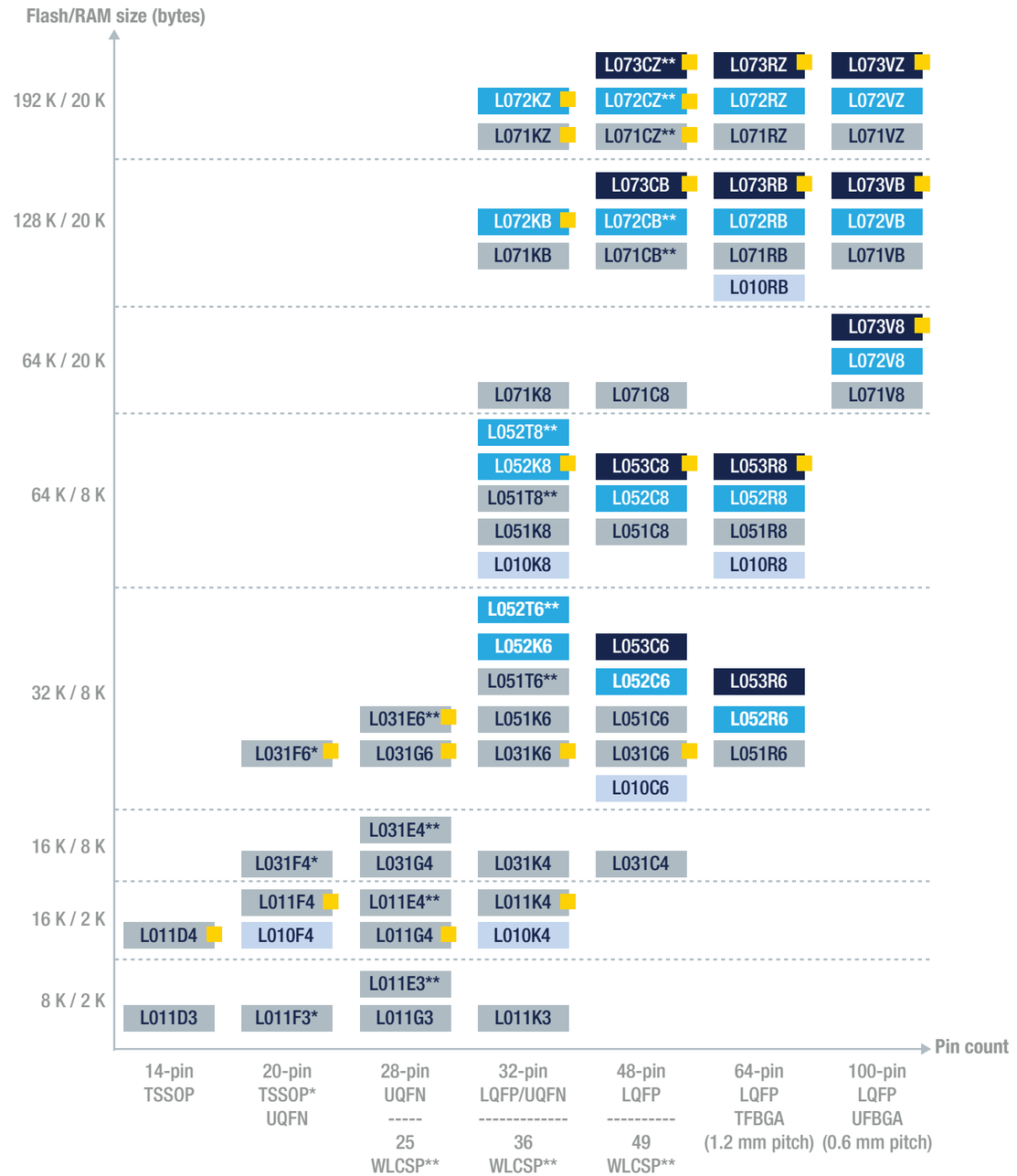
ULPBENCH™
An EEMBC Benchmark
ULPMark-CP™ 244
ULPMark-PP™ 95
COREMARK®
An EEMBC Benchmark
75

www.st.com/stm32l0



Fast Wakeup time:
- Stop to Run from Flash: 5 µs (3.5 µs from RAM)
- Standby to Run: 50 µs

A WIDE PORTFOLIO IN FULL PRODUCTION



Legend
- STM32L0x0: Value line
- STM32L0x1: Access line
- STM32L0x2: USB 2.0 FS + Advanced analog and peripherals
- STM32L0x3: STM32L0x2 + LCD
- 128-bit AES hardware encryption

STM32L1 series

A market-proven solution

STM32L1 PRODUCT LINES

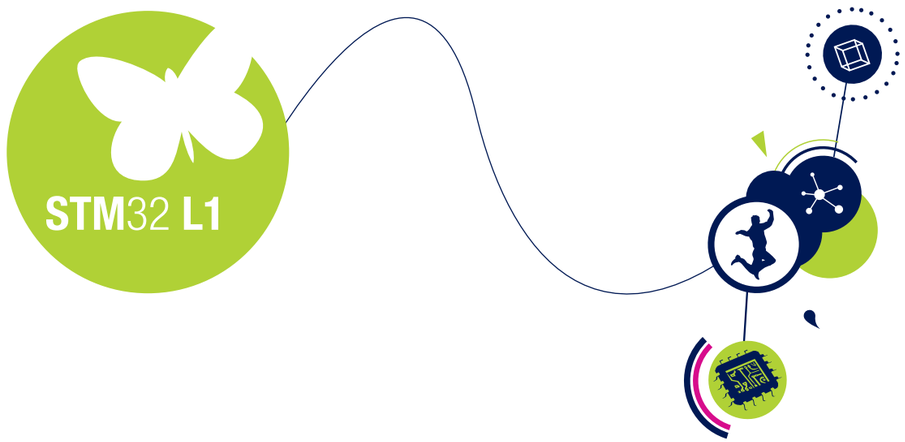
Arm® Cortex®-M3 — 32 MHz	Product lines	Flash (KB)	RAM (Kbytes)	EEPROM (KB)	Memory I/F	Op amp	Comp.	Temp. Sensor	Capacitive Touch	Segment LCD Driver	AES 128-bit
• Ultra-low-power POR/PDR • 2x watchdogs • Hardware CRC • Internal RC • Crystal oscillators • PLL • RTC calendar • 16- and 32-bit timers • 1x12-bit ADC • Temperature sensor • Multiple-channel DMA • Single-wire debug • Unique ID	**STM32L100 Value line**	32 to 256	4 to 16	2						Up to 8 x 28	
	STM32L151 STM32L152	32 to 512	16 to 80	4 to 16	SDIO FSMC	•	•	•	•	Up to 8 x 40	
	STM32L162	256 to 512	32 to 80	8 to 16	SDIO FSMC	•	•	•	•	Up to 8 x 28	•

STM32L1 ULTRA-LOW-POWER

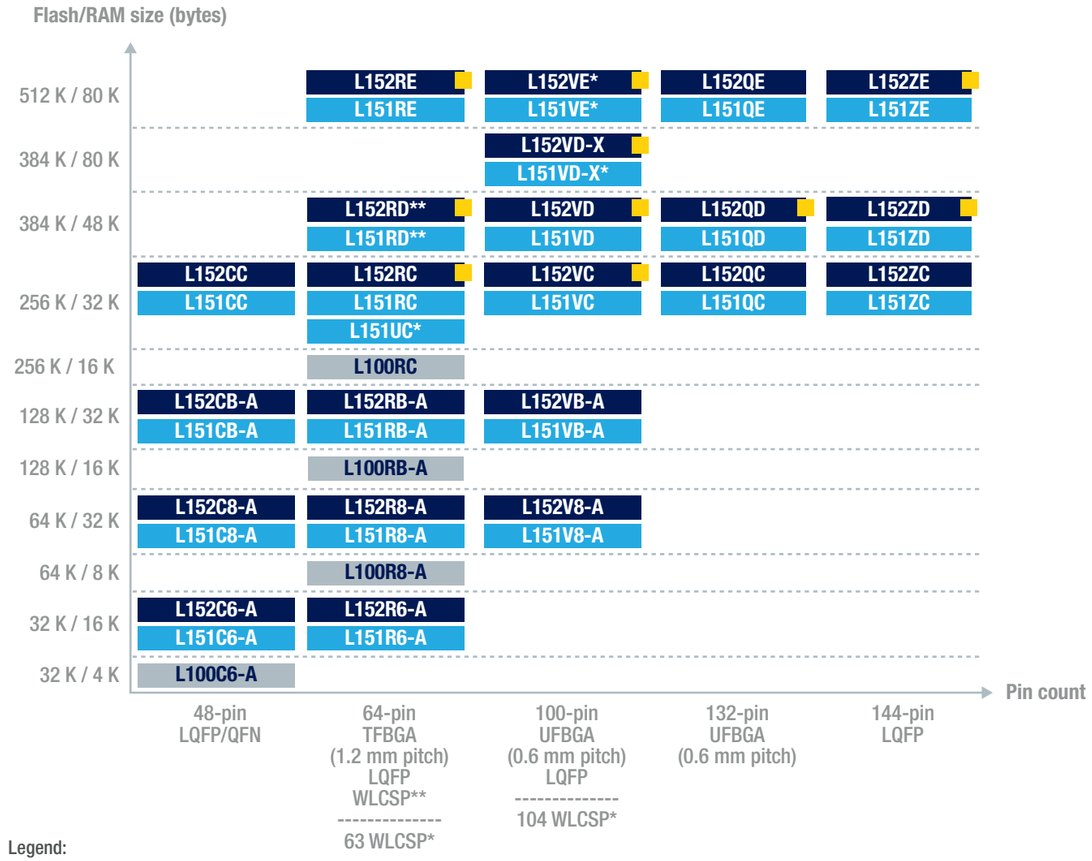
- Arm® Cortex®-M3+ at 32 MHz, 33 DMIPS
- Dynamic run mode: down to 177 µA/MHz
- Stop with Full RAM retention 435 nA (1.3 µA with RTC)
- Standby mode + RTC: 900 nA with backup registers
- Standby mode: 280 nA with backup registers
- Dual-bank Flash memory and True embedded EEPROM
- Operates at up to 105 °C

ULPBENCH™ An EEMBC Benchmark
ULPMark-CP™ 155
COREMARK® An EEMBC Benchmark
92.4

www.st.com/stm32l1



A WIDE, FULLY-DEPLOYED PORTFOLIO



Legend:
- STM32L100: Value line
- STM32L151: USB 2.0 FS + Advanced analog and peripherals
- STM32L152: STM32L151 + LCD
- STM32L162: STM32L152 + 128-bit AES

STM32L4 series

Successfully meet all challenges

STM32L4 PRODUCT LINES

Arm® Cortex®-M4 (DSP + FPU) – 80 MHz

- 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
- V_{BAT} mode
- Unique ID
- Capacitive touch sensing
- AES-128/256* and SHA-256**

STM32 L4 Product line	Flash (KB)	RAM (KB)	Memory I/F FSMC	Op-Amp	CAN	Sigma Delta Interface	12-bit ADC 5 Msps 16-bit HW oversampling	DAC	SAI	USB2.0 OTG FS	USB Device	Segment LCD driver	Chrom-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

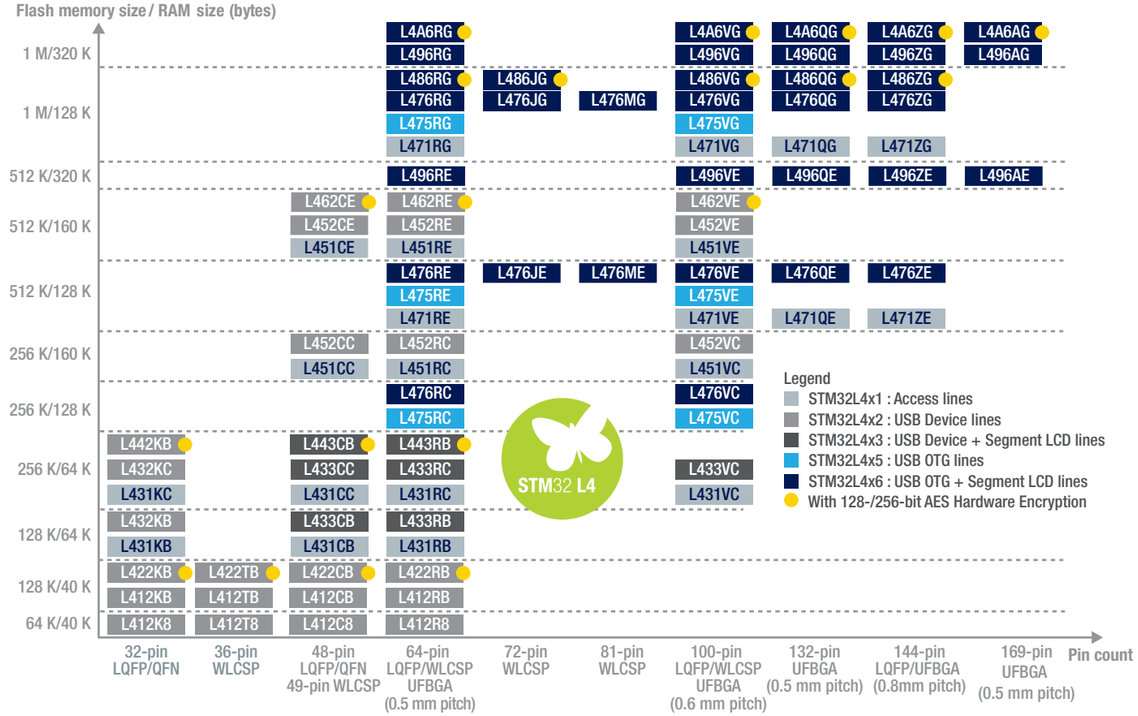
STM32L4 ULTRA-LOW-POWER

- 100 DMIPS
- Dynamic run mode at 28 µA/MHz
- Down to 450 nA with 32 kHz RTC + 16 Kbytes of RAM + I/Os
- Down to 200 nA with 32 kHz RTC or 8 nA without RTC
- Operates at up to 125 °C

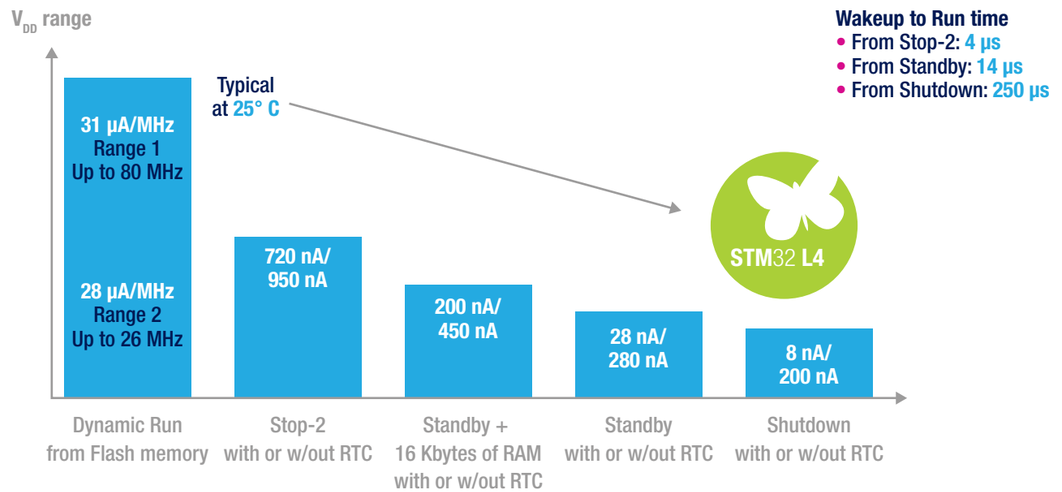
ULPBENCH™ An EEMBC Benchmark
ULPMark-CP™ 447
ULPMark-PP™ 167
COREMARK® An EEMBC Benchmark
273

www.st.com/stm32l4

A WIDE PORTFOLIO IN FULL PRODUCTION



STM32L4 DEVICES OFFER THE LOWEST POWER CONSUMPTION VALUES ON THE MARKET (25 °C)



STM32L4 ON-LINE TRAINING
www.st.com/stm32l4-online-training

STM32L4+ series

Longer battery life and superior user experience

STM32L4+ PRODUCT LINES

Arm® Cortex®-M4 (DSP + FPU) – 120 MHz

- USART, SPI, I2C
- 2x Octo-SPI
- 16- and 32-bit timers
- SAI + audio PLL
- CAN
- Camera IF
- ART Accelerator™
- Chrom-ART Accelerator™
- 2x 12-bit DACs
- Temperature sensor
- Low voltage 1.71 to 3.6V
- VBAT mode
- Unique ID
- Capacitive touch-sensing

STM32 L4+ Product line	Flash (KB)	RAM (KB)	Memory I/F	Op amp	Comp.	Sigma Delta Interface	12-bit ADC 5 Msps 16-bit HW oversampling	USB2.0 OTG FS	TFT Display Interface	*Chrom-GRC™	MIPI-DSI	AES 128-/256-bit
STM32L4R5/S5												
STM32L4R5 USB OTG	1024 to 2048	640	SDIO FSMC	2	2	8x ch	1	•				
STM32L4S5 USB OTG & AES	2048	640	SDIO FSMC	2	2	8x ch	1	•				•
STM32L4R7/S7												
STM32L4R7 USB OTG & TFT Interface	1024 to 2048	640	SDIO FSMC	2	2	8x ch	1	•	•	•		
STM32L4S7 USB OTG & TFT Interface & AES	2048	640	SDIO FSMC	2	2	8x ch	1	•	•	•		•
STM32L4R9/S9												
STM32L4R9 USB OTG & MIPI-DSI	1024 to 2048	640	SDIO FSMC	2	2	8x ch	1	•	•	•	•	
STM32L4S9 USB OTG & MIPI-DSI & AES	1024 to 2048	640	SDIO FSMC	2	2	8x ch	1	•	•	•	•	•

Note: * Graphic memory optimizer for round displays

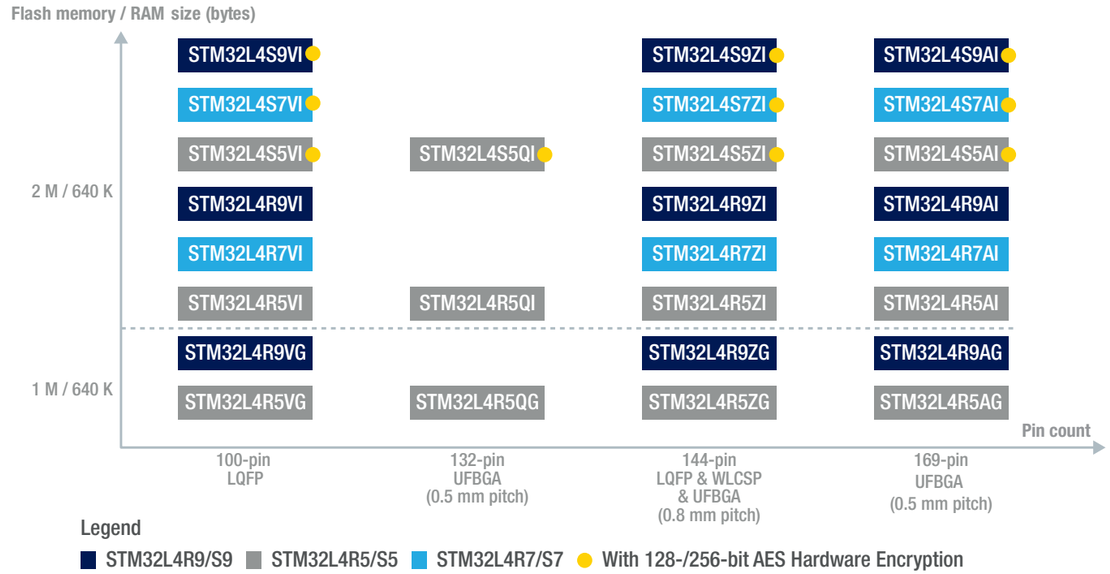
STM32L4+ ULTRA-LOW-POWER

- 233 ULPMark-CP score
- Chrom-GRC™ round display memory optimizer
- 20 nA in shutdown mode
- 2.5 µA in stop mode with full SRAM and peripheral states retention and with 4 µs wakeup time
- Down to 43 µA/MHz in active mode
- Superior graphic effects and fluid user interfaces thanks to ST's Chrom-ART Accelerator™
- Zero wait state execusion from internal Flash memory thanks to ST's ART-Accelerator™

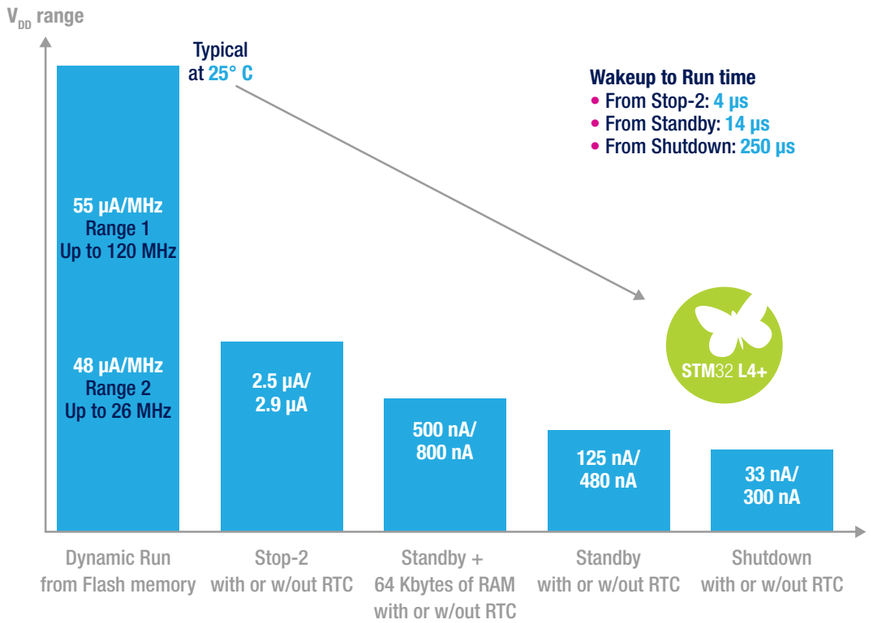
ULPBENCH™
An EEMBC Benchmark
ULPMark-CP™ 233
ULPMark-PP™ 56.5
COREMARK®
An EEMBC Benchmark
409

www.st.com/stm32l4-plus

A BRAND NEW PORTFOLIO IN FULL PRODUCTION



STM32L4+ DEVICES' POWER CONSUMPTION



STM32L4+ ON-LINE TRAINING

www.st.com/stm32l4plus-online-training

STM32L5 series

Excellence in ultra-low-power with more security

STM32L5 PRODUCT LINES

Arm® Cortex®-M33 (TrustZone® + DSP + FPU) – 110 MHz	Product	FLASH (KB)	RAM (KB)	Memory I/F	2 x Op-Amp	2 x Comp	4ch / 2x Sigma Delta Interface	12- bit ADC 5 Msps 16 bit HW oversampling	USB2.0 Device XTAL-less USB Type-C and Power Delivery	CAN-FD	AES, PKA, OTFDEC 128/256-bit
• ART Accelerator™ • USART, SPI, I²C • Octo-SPI • 16 and 32-bit timers • SAI + audio PLL • SHA, TRNG • 2x 12-bit DAC • Temperature sensor • Low voltage 1.71V to 3.6V • Vbat Mode • Unique ID • Capacitive Touch sensing	**STM32L552 USB Device & CAN-FD**	512 to 256	256	SDIO FSMC Octo SPI	•	•	•	2	•	•	
	STM32L562 USB Device & CAN-FD & AES	512	256	SDIO FSMC Octo SPI	•	•	•	2	•	•	•

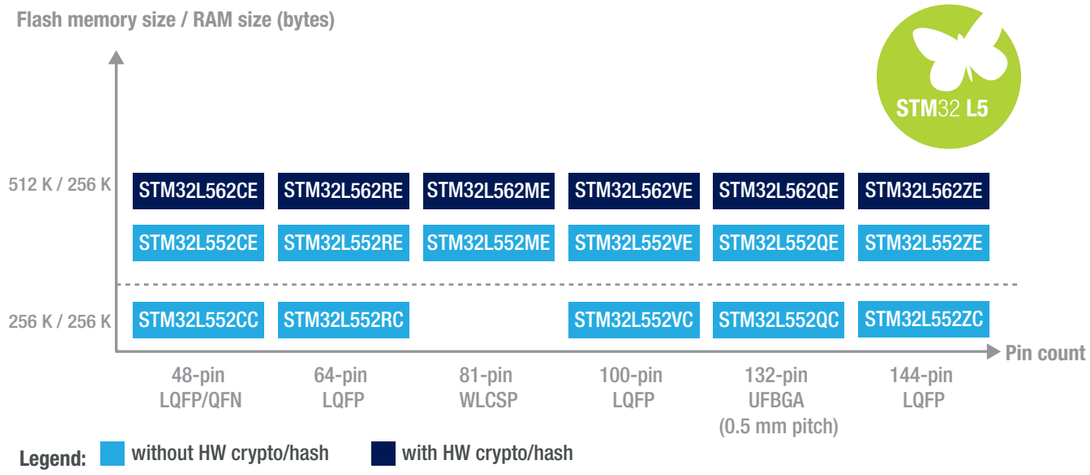
STM32L5 ULTRA-LOW-POWER

- New Arm Cortex-M33 at 110 MHz performance: +20% versus Cortex-M4
- New ST ART Accelerator: working both on internal and external Flash (8 Kbytes of instruction cache)
- Embedded SMPS step down converter (optional)
- Flexible hardware and software secure isolations with TrustZone®
- 33 nA in shutdown mode
- 3.6 µA in stop mode with full SRAM and peripheral states retention and with 5 µs wake-up time
- Down to 60 µA/MHz in active mode
- 165 DMIPS

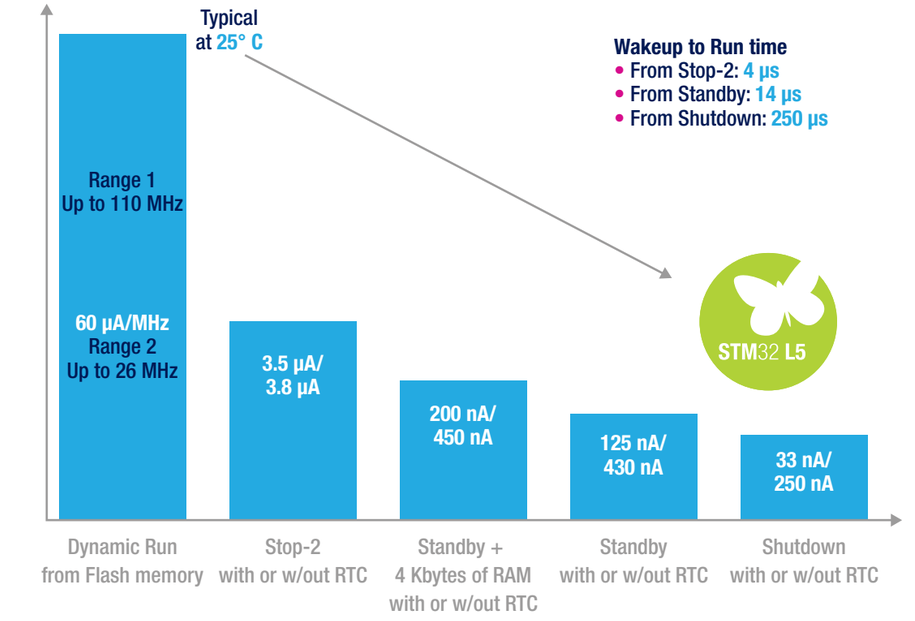
ULPBENCH™
An EEMBC Benchmark
ULPMark-CP™ 402
ULPMark-PP™ 56.5
COREMARK®
An EEMBC Benchmark
427

www.st.com/stm32l5

PORTFOLIO



STM32L5 DEVICES' POWER CONSUMPTION



STM32L5 VIDEO
https://youtu.be/Pa8gaHGDWYY

STM32L ecosystem

STM32 hardware tools

www.st.com/stm32hardwaretools

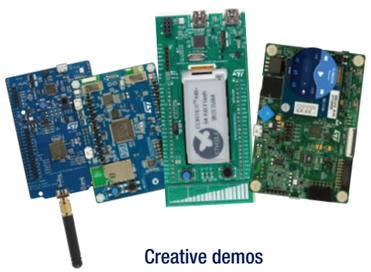
VARIOUS TYPES OF DEVELOPMENT BOARDS ENABLE YOU TO GET STARTED WITH STM32L PRODUCTS

- STM32 Nucleo boards provide an affordable and flexible way for anyone to try out new ideas and build prototypes with a wide choice of specialized expansion boards.
- The Discovery kits enable users to seamlessly explore key low-power features of STM32L products, while the evaluation boards let you evaluate all MCU functions and peripherals.
- All these development boards include an integrated debugger/programmer as well as a comprehensive software library with examples that help developers take advantage of STM32L capabilities.

STM32 Nucleo boards

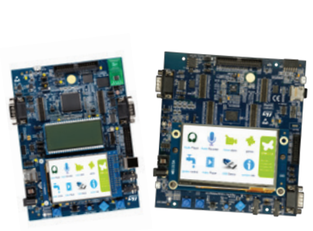
Flexible prototyping

Discovery kits



Creative demos

Evaluation boards

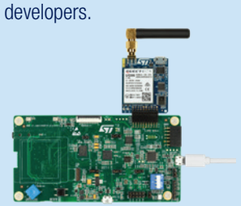


Full-feature evaluation

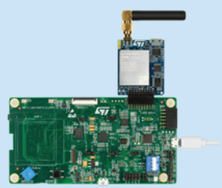
STM32 CELLULAR-TO-CLOUD DISCOVERY PACKS

www.st.com/stm32l4-discovery

ST introduces two STM32 Cellular-to-Cloud Discovery Packs.
P-L496G-CELL01, based on Quectel's UG96 modem for 2G/3G networks, and P-L496G-CELL02, based on Quectel's BG96 modem for emerging LTE Cat M1/NB1+2G networks. Each Pack combines an STM32L496 Discovery board and an STMod+ Cellular add-on board.
Software includes an embedded JavaScript engine running on STM32 for live coding, and an X-CUBE-CLD-GEN STM32Cube expansion package.
Each Pack also includes an ST eSIM comes with a complimentary trial plan from a telecom partner, while various partner Cloud services can be evaluated by mass-market developers.



P-L496G-CELL01*



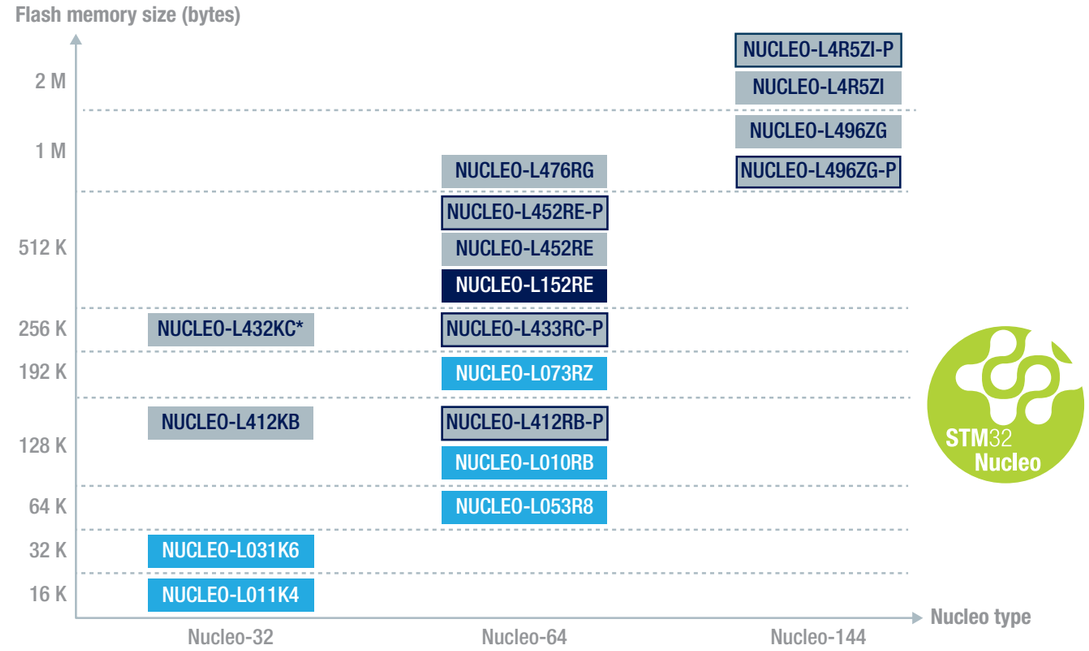
P-L496G-CELL02*

*Available in Q2-2018

STM32 NUCLEO

- Open platform with one MCU and integrated debugger/programmer
- Wide choice of connectors for unlimited extension capabilities :
  - Arduino Uno Rev3 connectors on Nucleo-64 and Nucleo-144, Arduino Nano on Nucleo-32
  - ST Zio connectors to access a wider range of peripherals on Nucleo-144
  - ST Morpho connectors for direct access to all MCU I/Os on Nucleo-64 and Nucleo-144
- Support for multiple IDEs and Arm® mbed™ online tools

Portfolio



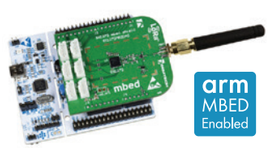
Legend: STM32L0 series | STM32L1 series | STM32L4 series | Available with SMPS version | *QFN version

STM32 NUCLEO EXPANSION BOARDS

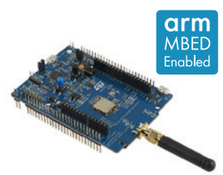
www.st.com/x-nucleo

STM32 Nucleo development boards can easily be expanded through a variety of add-on boards. These expansion boards open the door to any type of application leveraging the appropriate mix of performance/peripherals/power within the comprehensive STM32 family. Each expansion board integrates the necessary components to implement specialized features of a chosen application, and comes with complementary STM32 software modules.

STM32 Nucleo expansion boards from ST and third parties



STM32 NUCLEO PACK
P/N: P-NUCLEO-LRWAN1
(ST and Semtech)



DISCOVERY KIT
P/N: B-L072Z-LRWAN1
(ST and Murata®)

EXPANSION BOARD
P/N: I-NUCLEO-LRWAN1
(ST and USI®)

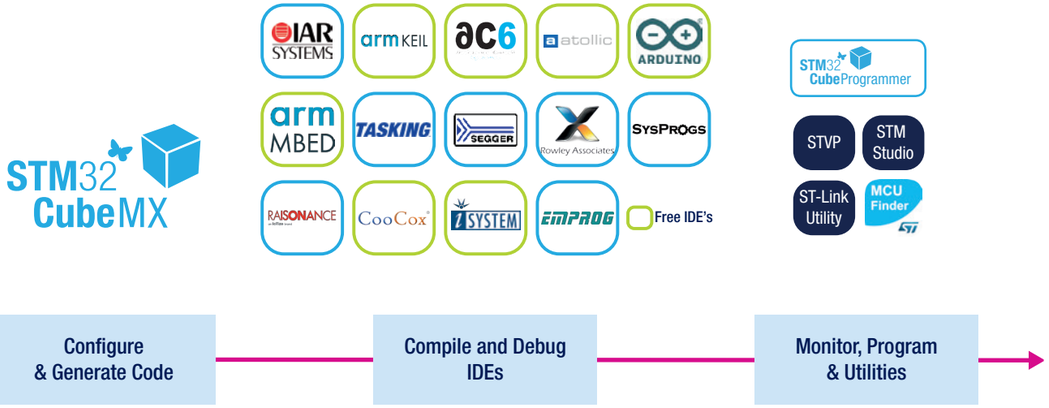
STM32L WIRELESS CONNECTIVITY SOLUTIONS: LoRaWAN™

www.st.com/stm32-lrwan

As a strong player on LPWAN, ST offers up to 3 affordable and easy-to-use sets of hardware tools dedicated to the evaluation and development of LoRa® solutions which combined with the LoRaWAN software expansion package for STM32Cube (I-CUBE-LRWAN) is the quickest way to build a LoRaWAN end-node device. Check out the STM32 LoRa® Discovery kit (B-L072Z-LRWAN1), the STM32 expansion board (I-NUCLEO-LRWAN1) and the STM32 Nucleo pack (P-NUCLEO-LRWAN1).

STM32 software development tools

www.st.com/stm32softwaretools



ST proposes a 3-step approach for standard development in C:

1/ Configure the microcontroller using the STM32CubeMX tool and optionally generate code depending on user choices

2/ Develop the application, compile and debug, using a free or commercial integrated development environment (IDE) such as: IAR, Keil[1], AC6, Atollic[2], Coocox, Emprog, iSystem, Keolabs, Rowley, Segger, or Tasking.

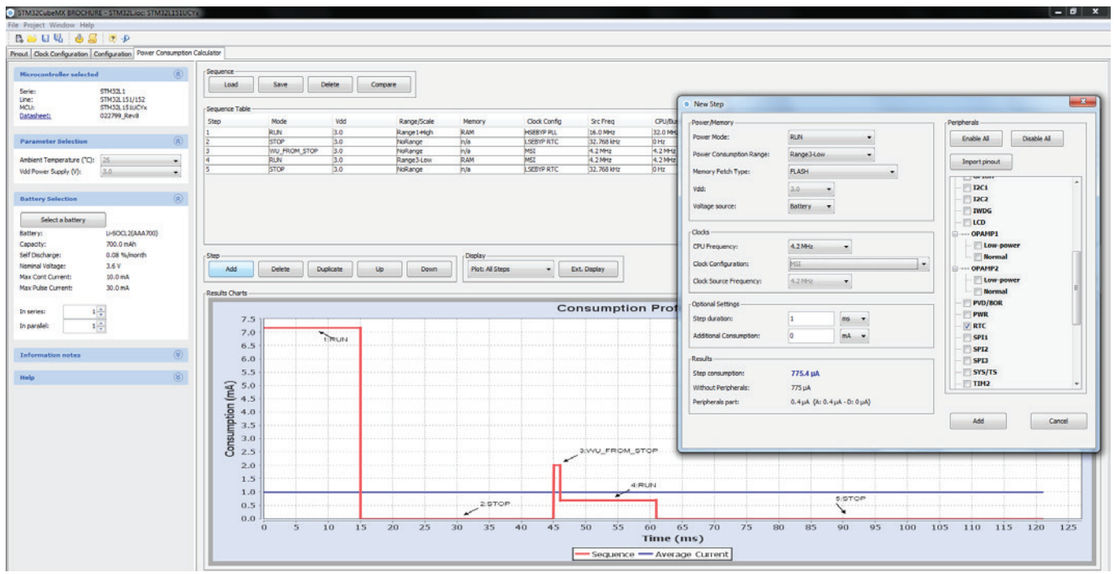
3/ Monitor the application while it is running without being intrusive with STMStudio.

1. Free full version of Keil MDK-Arm on all STM32L0

2. Atollic is an STMicroelectronics brand

SPECIFIC FOCUS ON STM32L SERIES

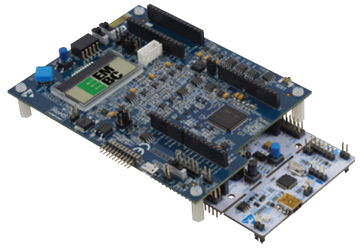
Build your own chip configuration, select the battery type or configure your own, define a sequence of steps representing your application, and use the STM32CubeMX Power Consumption Calculator wizard to determine power consumption and battery life results.



STM32 POWER SHIELD: EEMBC-APPROVED POWER-MONITORING TECHNOLOGY FOR ENERGY-CRITICAL EMBEDDED DEVELOPMENT

To check the power consumption of embedded designs accurately, the STM32 Power shield (X-NUCLEO-LPM01A) provides developers an affordable tool with an ideal measurement range for ultra-low-power devices, such as IoT endpoints.
This STM32 tool features voltage supply to the target down to 1.8V, measures static current, dynamically monitors current from 100nA to 50mA, and directly computes EEMBC ULPMark scores.
Together with the STM32CubeMonitor-Power graphical application (STM32CubeMonPwr), users will be able to visualize the data captured to make better-informed decisions.

STM32 Power shield



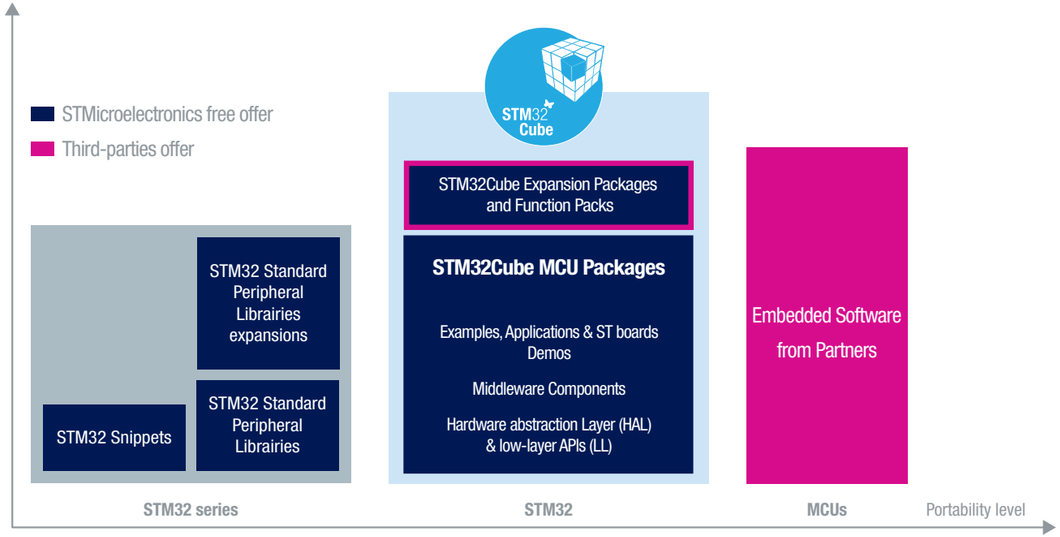
X-NUCLEO-LPM01A

STM32 CubeMonitor-Power

STM32CubeMonPwr

STM32 embedded software

www.st.com/stm32embeddedsoftware



ST's embedded software for the STM32 microcontroller family offers 4 different combinations of portability and optimization criteria:

- STM32Snippets: a collection of highly optimized code examples using direct register access
- Standard Peripheral Library: ensures portability at STM32 series level; for example, easy portability within the STM32L1 series
- STM32Cube embedded software: ensures portability at STM32 family level; facilitating application re-use from one STM32 MCU to another
  - The HAL hardware abstraction layer, enabling portability between different STM32 devices via standardized API calls
  - The low-layer (LL) APIs, a light-weight, optimized, expert oriented set of APIs designed for both performance and runtime efficiency
- CMSIS Driver and mbed abstraction layer: microcontroller abstraction for any Cortex-M-based microcontroller
- Solutions beyond the microcontroller world: STM32Java, .Net Micro framework, or MATLAB/Simulink

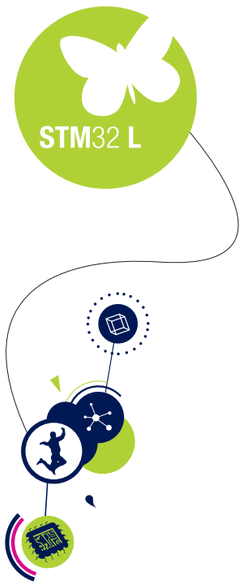
SPECIFIC OFFERS FOR STM32L SERIES

Product	Availability				
	STM32 L0	STM32 L1	STM32 L4	STM32 L4+	STM32 L5
STM32Snippets	Now	Not Available	Not Available	Not Available	Not Available
Standard Peripheral Library	Not Available	Now	Not Available	Not Available	Not Available
STM32Cube HAL	Now	Now	Now	Now	Available in Q2-2019
STM32Cube LL	Now	Now	Now	Now	Available in Q2-2019

USER RECOMMENDATIONS

- STM32L1 users:
  - If only STM32L1 MCUs are required, the Standard Peripheral Library ensures a good portability level between all STM32L1 devices. STM32Cube is still highly recommended for new designs (order code: STSW-STM32077)
- STM32 portability needs:
  - STM32Cube HAL is the best answer when a high level of portability is required (order codes: STM32CubeL0, STM32CubeL1 and STM32CubeL4)
- STM32 optimization needs:
  - STM32Cube LL APIs allow user control down to the register level, thus minimizing software overhead and allowing for power consumption optimization (order codes: STM32CubeL0, STM32CubeL1 and STM32CubeL4)
  - For STM32L0 users, STM32Snippets allow users to control the hardware with minimal software overhead therefore optimizing power consumption. STM32Cube is still highly recommended for new designs (order code: STM32SnippetsL0)

www.st.com/stm32embeddedsoftware



life.augmented