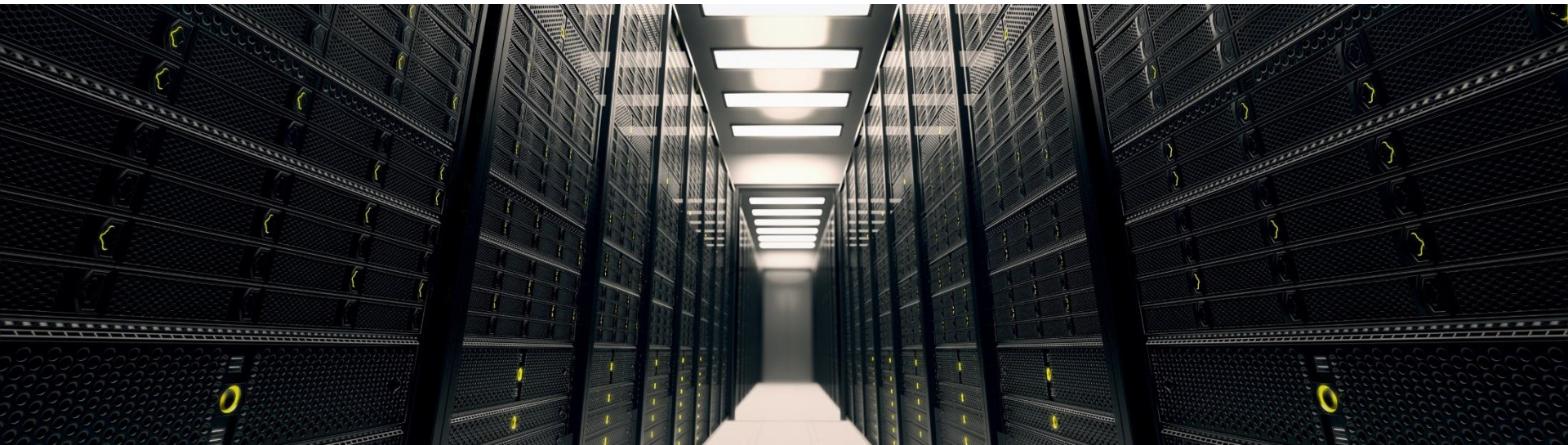


Introducing STM32 MCUs portfolio + STM32L4 Family Introduction



March 2017

AVNET[®] **SILICA**



2 billion STM32

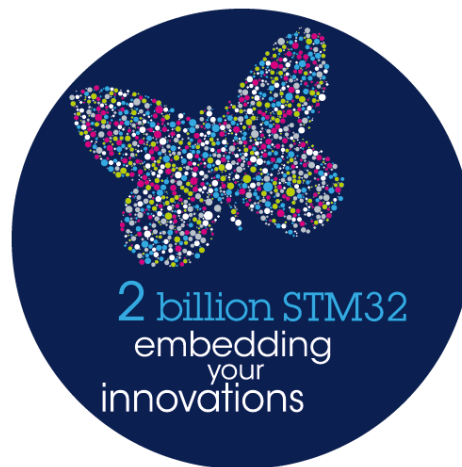
embedding your innovations

2

Press release on 1.5 billion [here](#)



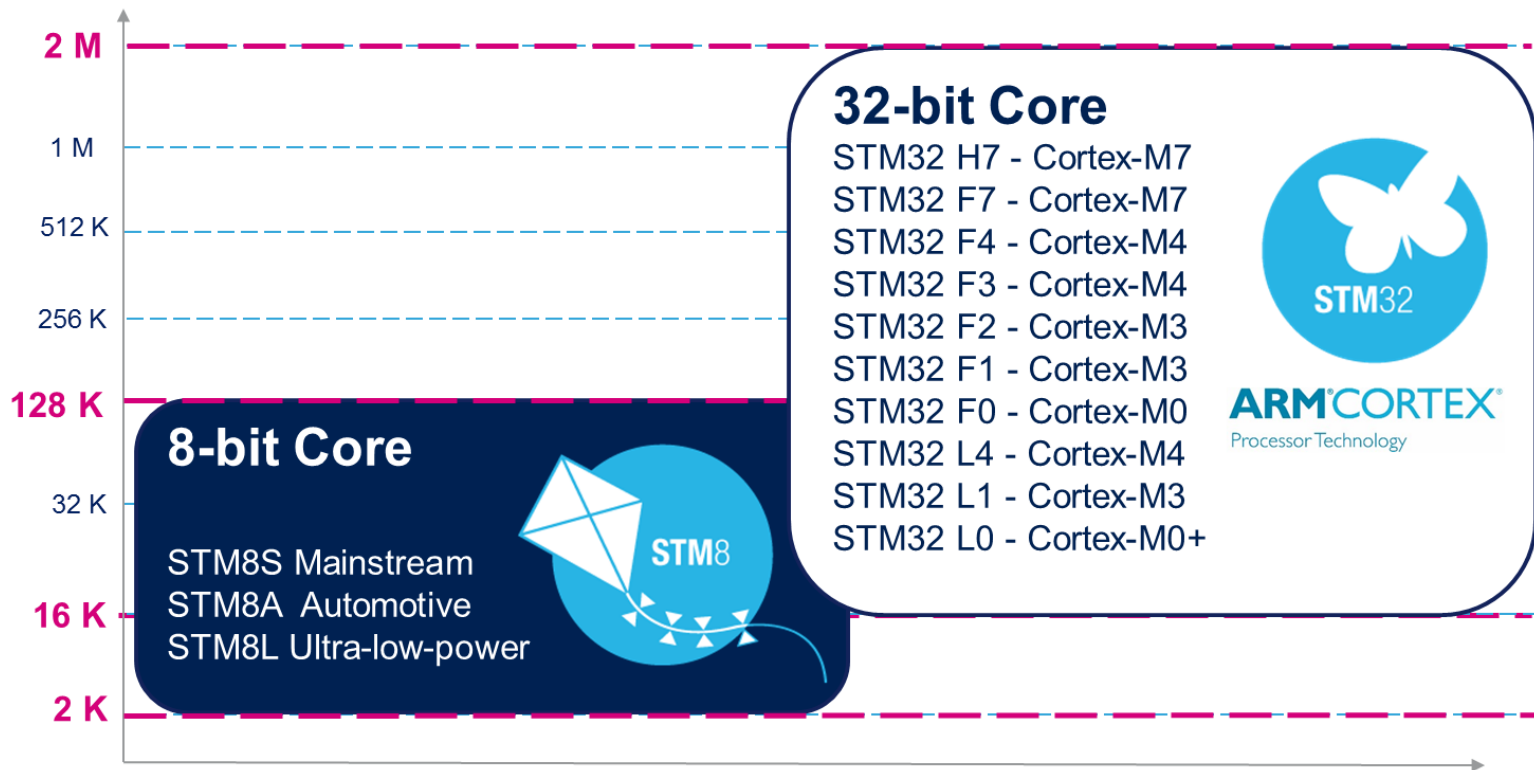
More than
40,000 customers



MCUs portfolio

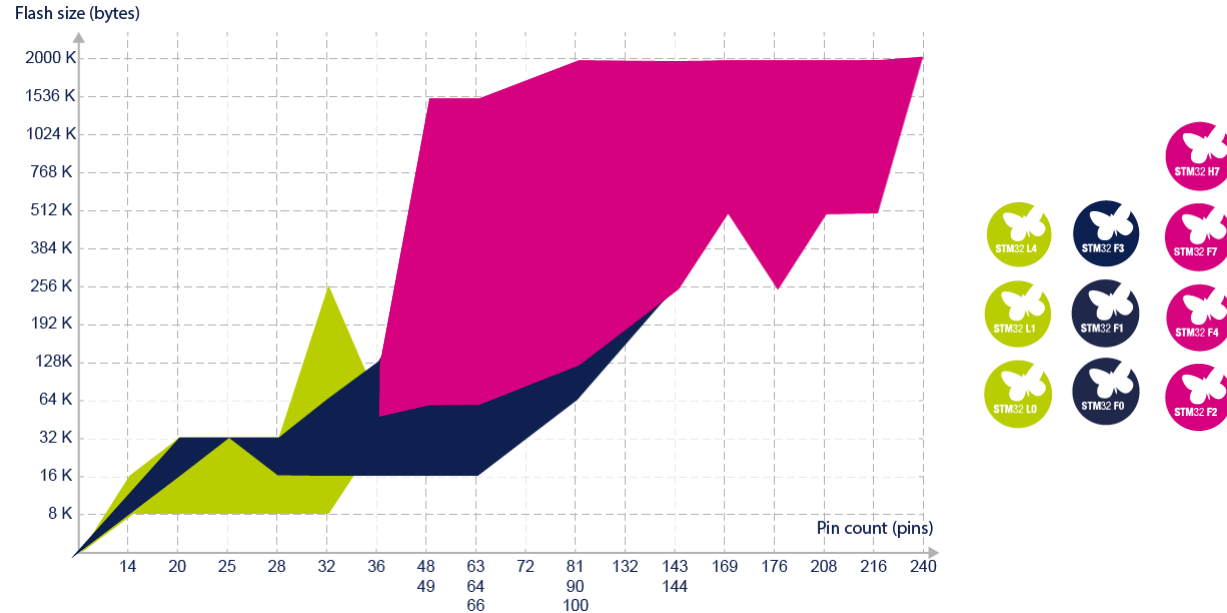
new families development focus

Flash (bytes)

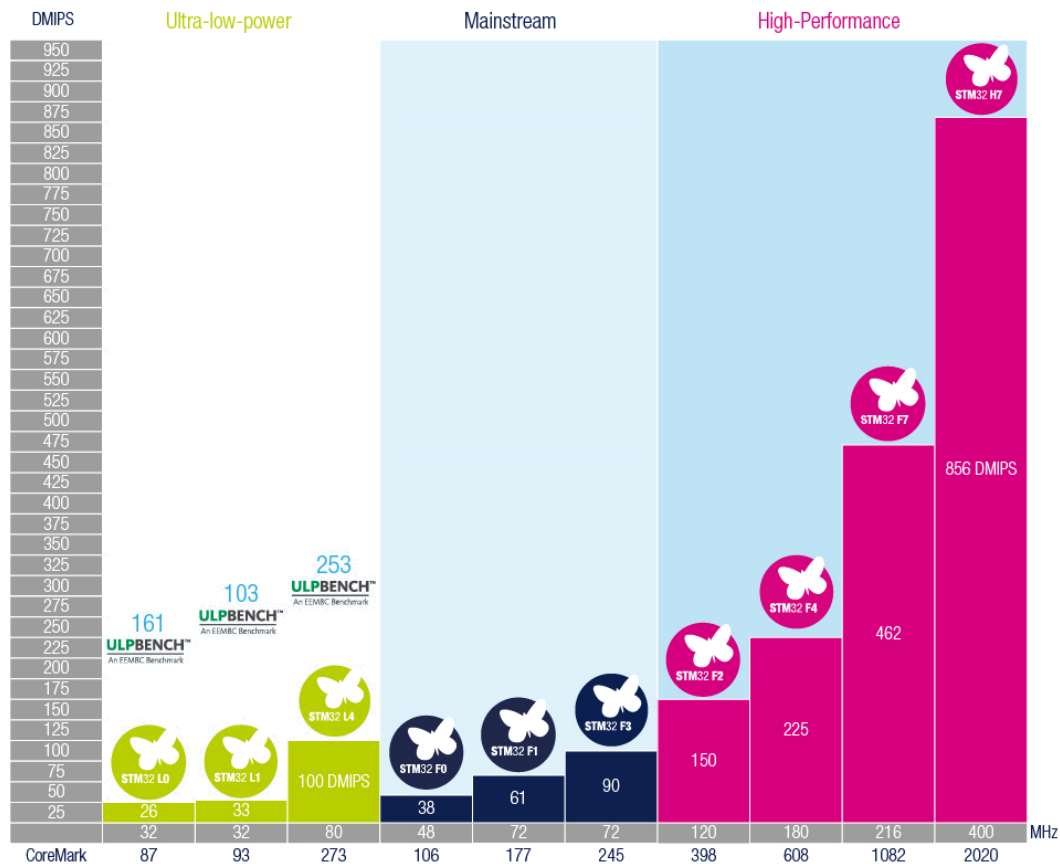


STM32 today – platform effect

Select your fit product inside a wide, compatible portfolio

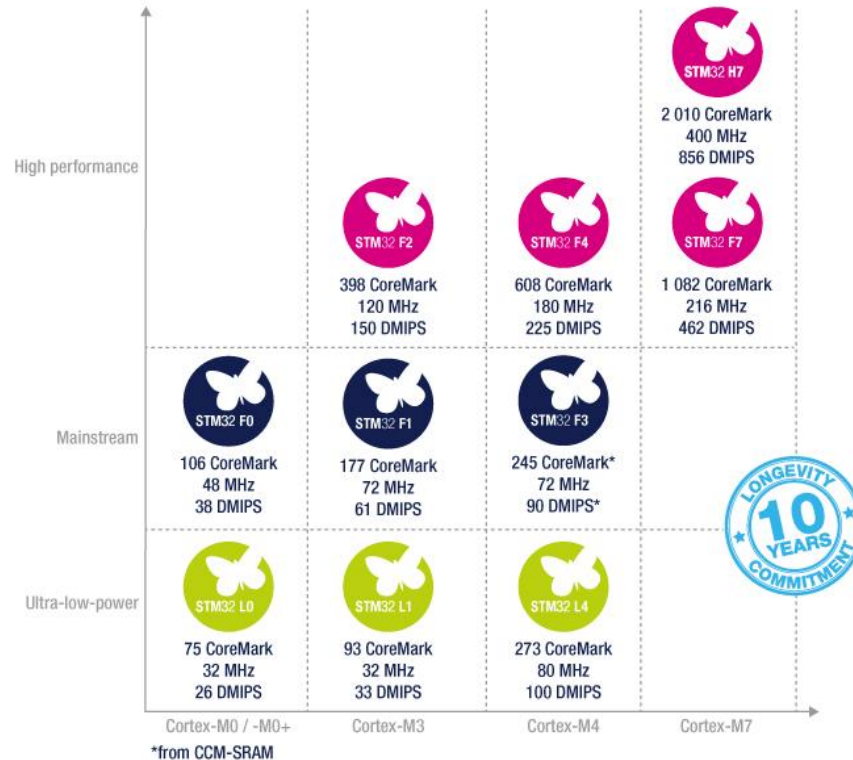


Broadest 32-bit MCU product portfolio



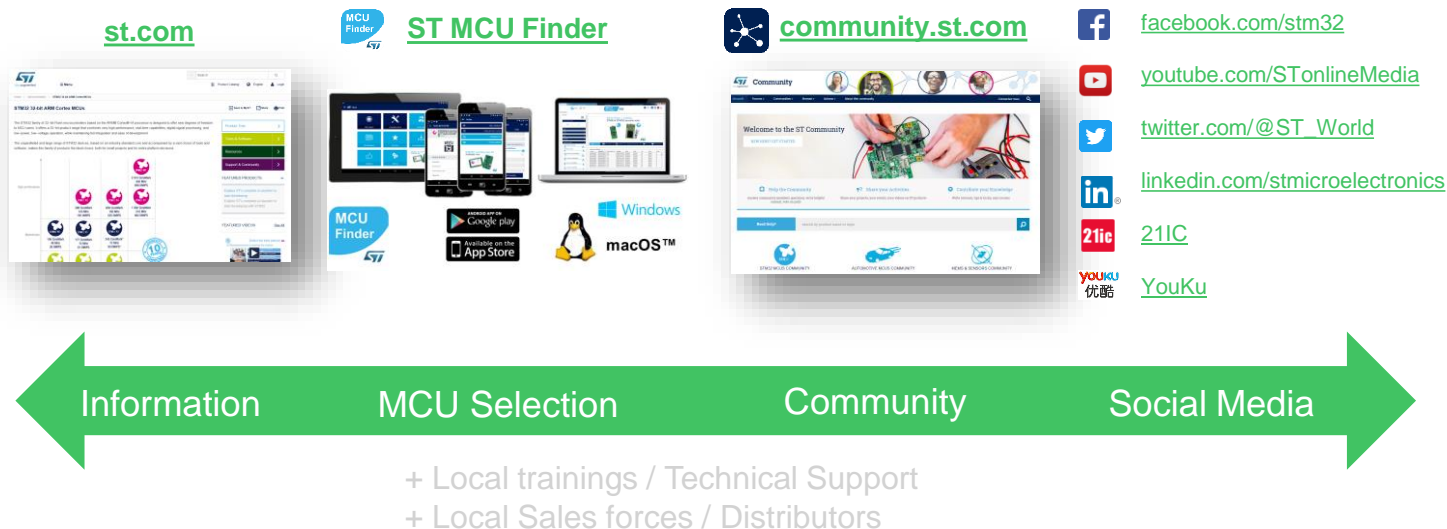
Today - STM32 portfolio positioning

10 product series / More than 40 product lines



Information and Sharing

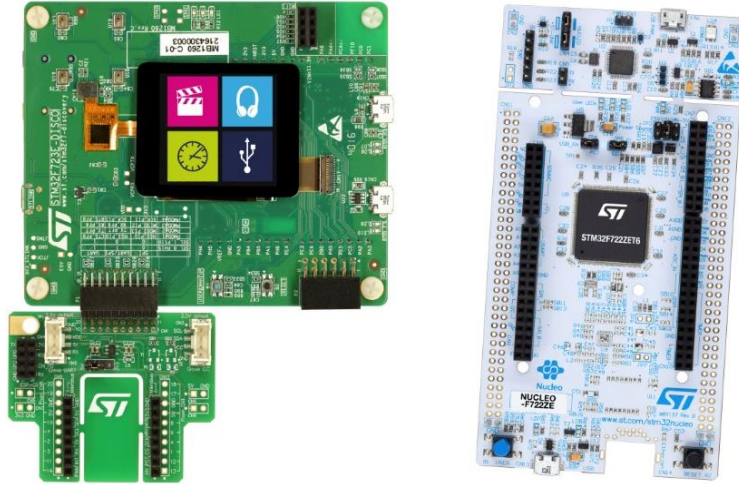
Get connected to STM32 world !



-> STM32 Education is now available [here](#)

Latest STM32F722 Nucleo board STM32F723 Discovery kit

On-chip USB High-Speed PHY
Expands STM32F7 MCU ecosystem



NEW Hi-Perf
Mat 29

www.st.com/stm32f7

AVNET SILICA

IoT connectivity made easier

STM32 MCUs & LoRa®

Get ready for the largest IoT development ecosystem



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®)

More info here:

www.st.com/stm32-lrwan

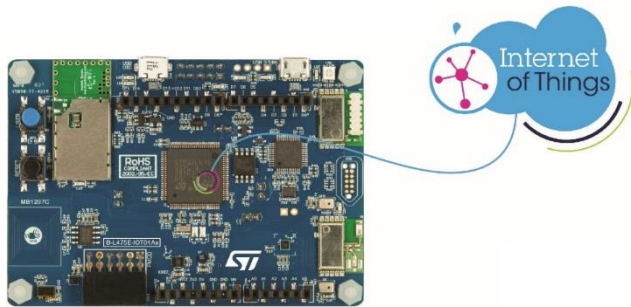
NEW IoT

AVNET SILICA

STM32 Discovery Kit IoT node

Everything you need for building IoT

The comprehensive selection of sensors, leveraging ST's large portfolio of MEMS and laser-ranging devices using



www.st.com/disco-l475e-iot



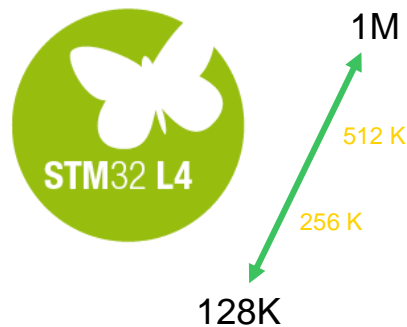
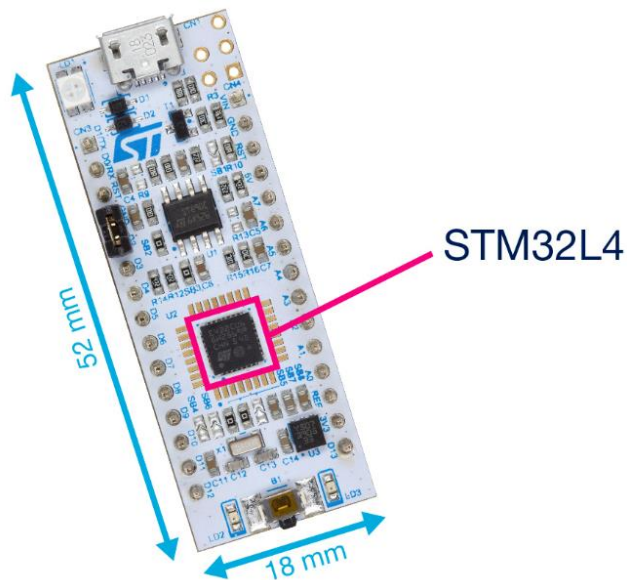
[More pictures here](#)

Getting started video – in progress

NEW
Ecosystem

1st Nucleo-32 with (QFN32) STM32L4

Releases Development Ecosystem and Adds New Devices in
ultra low-power STM32L4 Series



With the new STM32L4 lines we
can cover down to 128 Kbytes
Flash memory size.
STM32L4x1, 4x2 and x3 are now
in full prod

NEW ULP
Mat 29

www.st.com/stm32l4

AVNET SILICA

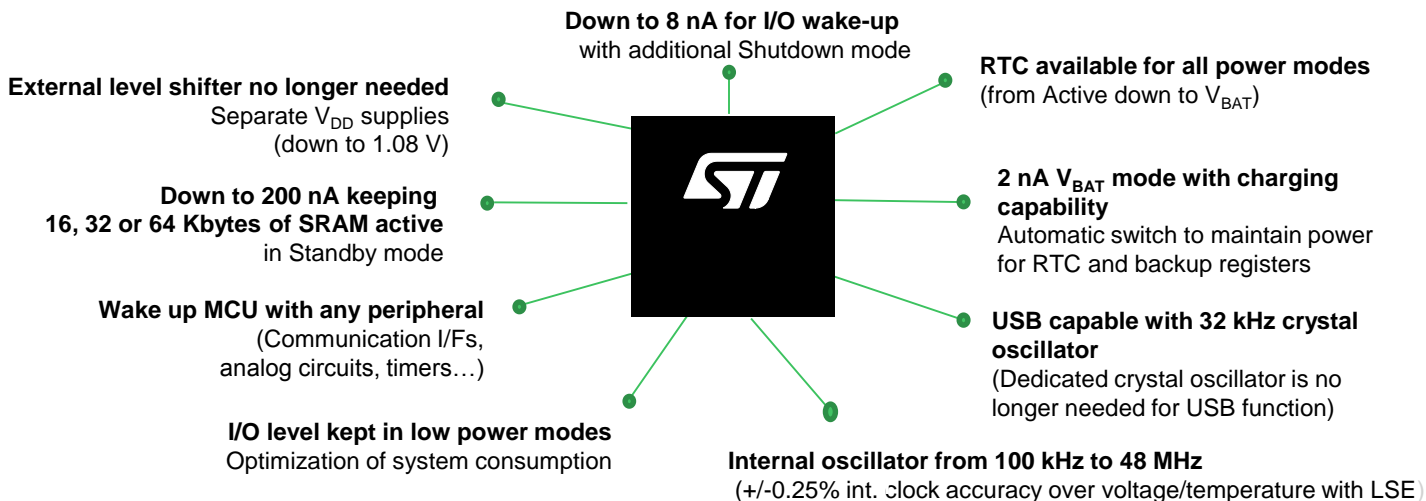
STM32L4 MCU series

Excellence in **ultra-low-power** with **performance**



FlexPowerControl

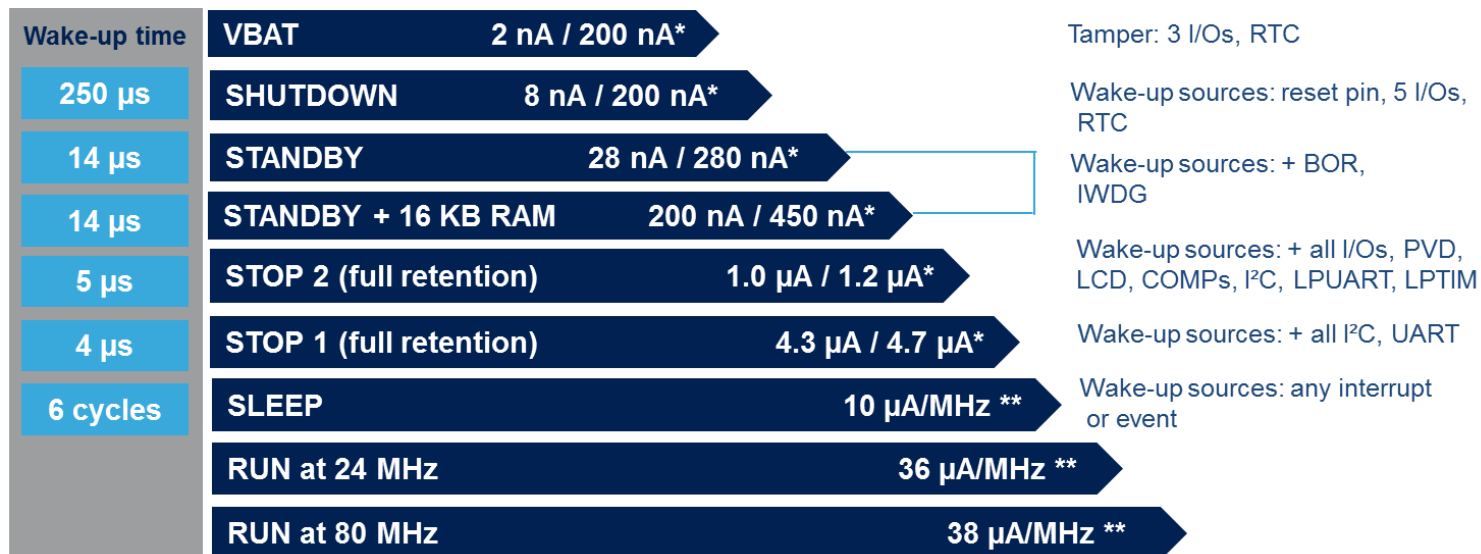
STM32L4 is based on a new platform optimized to reduce power consumption and increase flexibility



Ultra-low-power modes



Best power consumption numbers with full flexibility



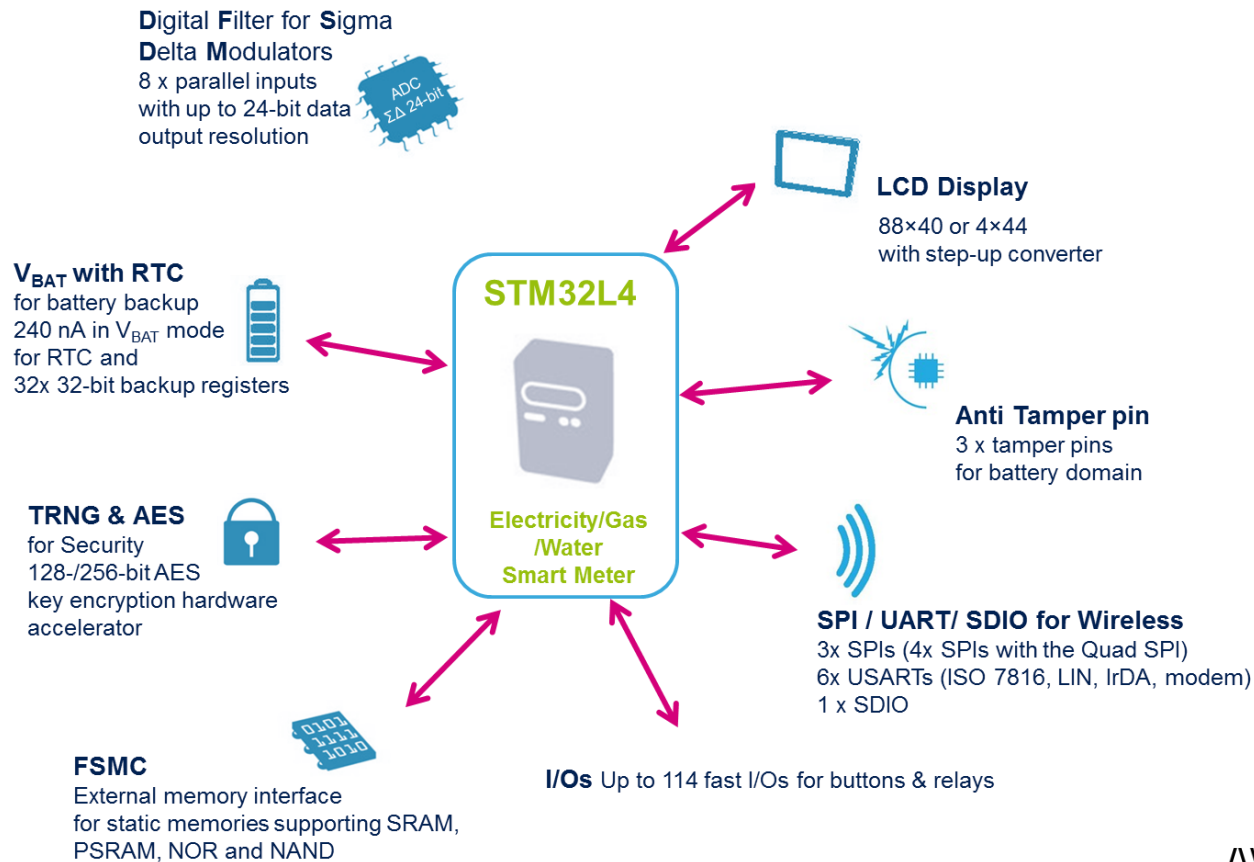
Note : * without RTC / with RTC

** with external SMPS



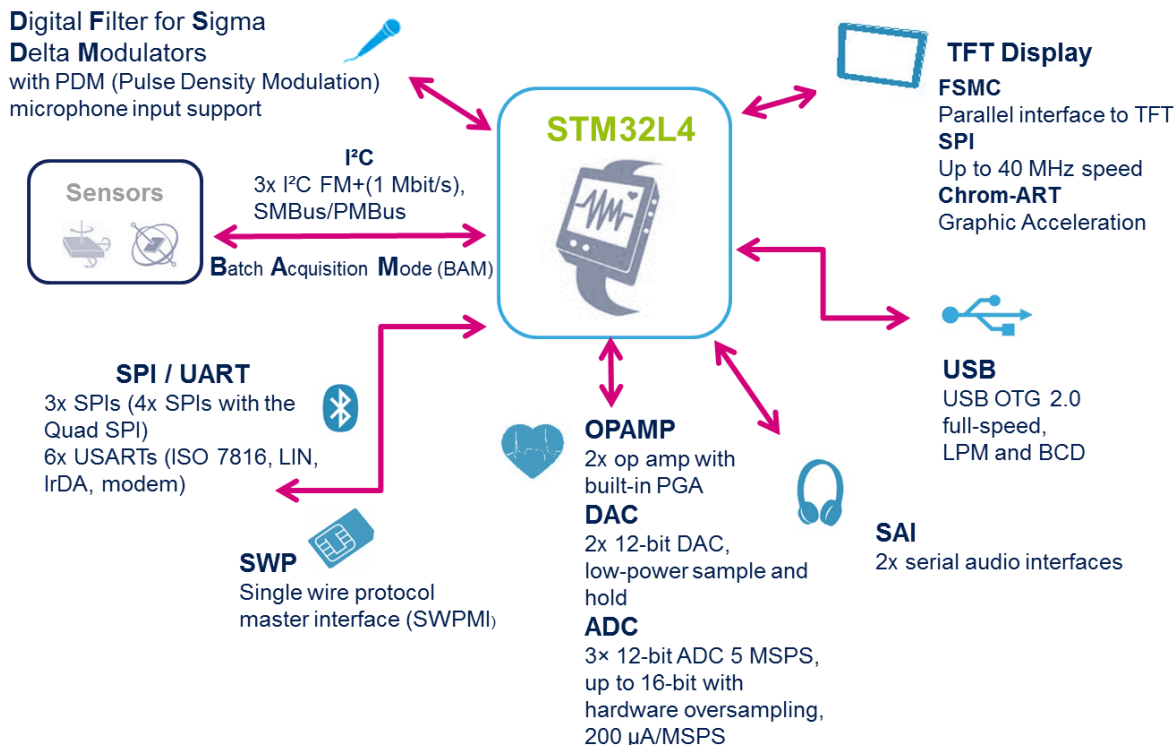
Smart peripherals

Metering

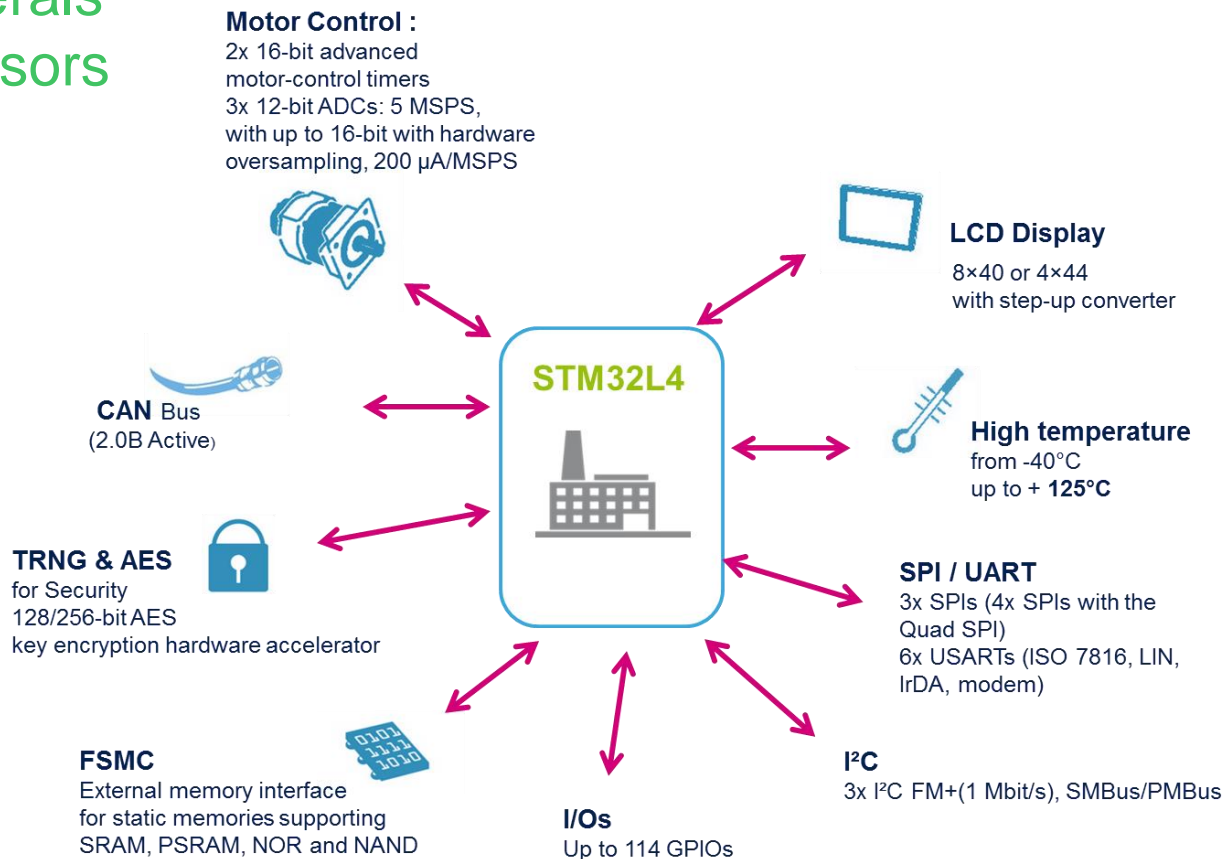


Smart peripherals

Fitness tracker - Wristband



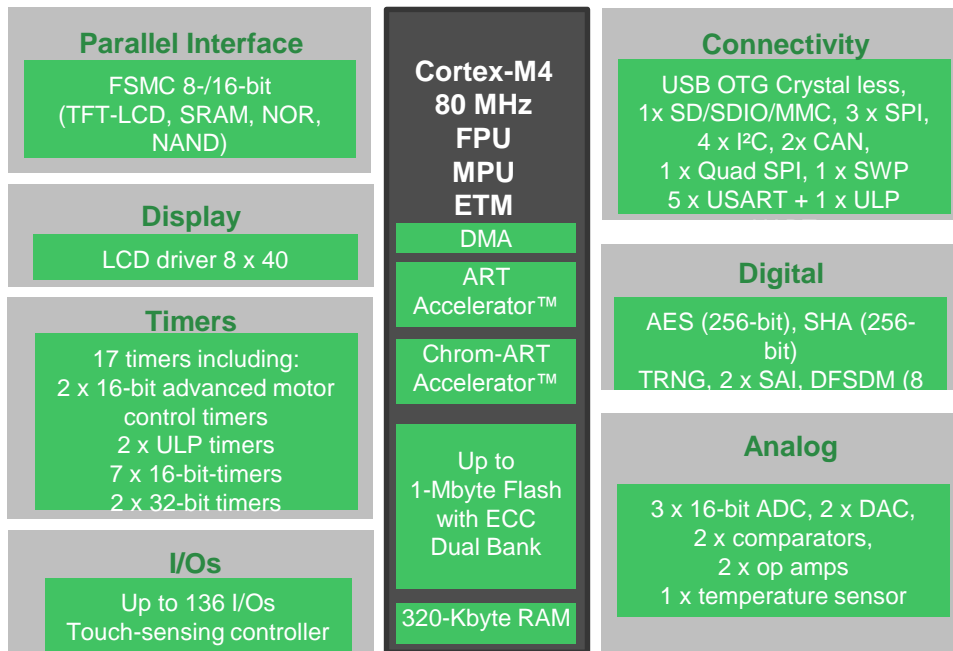
Smart peripherals Industrial Sensors



High integration



High integration with high memory size in small packages

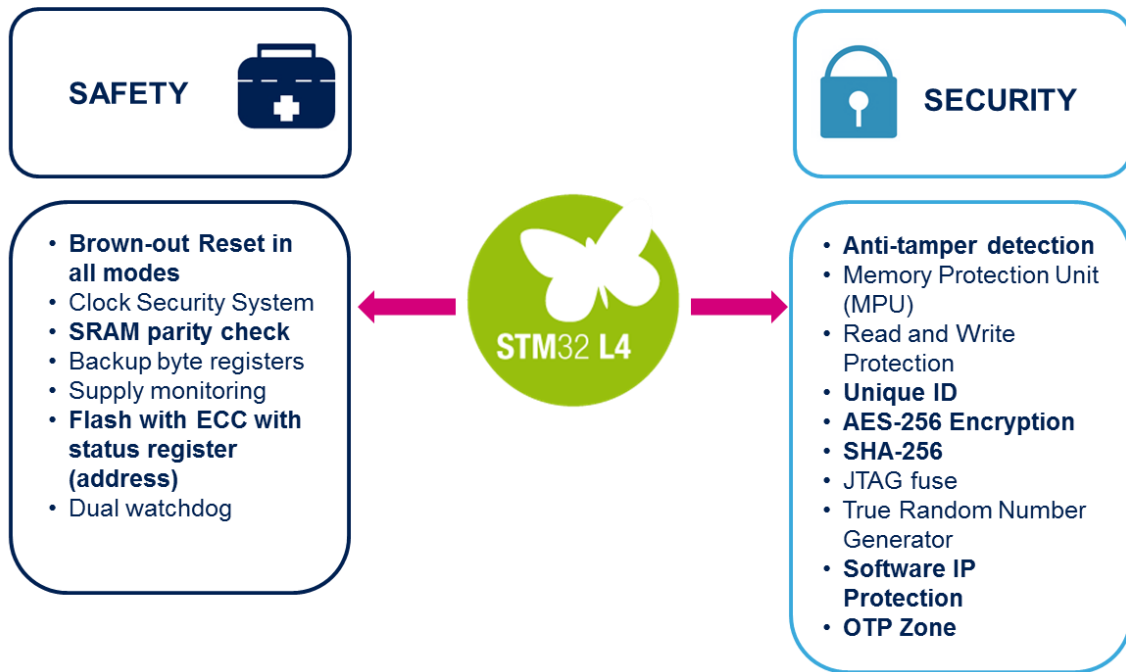


**Package size
down
to 3.13 x 3.14 mm**



Safety and security

Integrated safety and security features



STM32L4 series

4 Great investment

Cortex®-M4 (DSP + FPU) – 80 MHz	<ul style="list-style-type: none">• ART Accelerator™• USART, SPI, I²C• QuadSPI• 16 and 32-bit timers• SAI + audio PLL• SWP• 2x CAN• 2x 12-bit DAC• Temperature sensor• Low voltage 1.71V to 3.6V• Vbat Mode• Unique ID• Capacitive Touch sensing• TRNG	Product line	FLASH (KB)	RAM (KB)	Op-Amp	Comp	12- bit ADC 5 Msp/s 16 bit HW oversampling	USB2.0 FS Crystal-less	USB2.0 OTG FS	Segment LCD Driver	Chrom-ART + Camera I/F	AES 128-256 bit	SHA-256
		STM32L431 Access	Up to 256	64	x1	x2	x1						
		STM32L432 USB FS	Up to 256	64	x1	x2	x1	●					
		STM32L433 USB FS & LCD	Up to 256	64	x1	x2	x1	●		Up to 8x40			
		STM32L443 USB FS & LCD & AES	256	64	x1	x2	x1	●		Up to 8x40		●	
		STM32L451 Access	Up to 512	160	x1	x2	x1						
		STM32L452 USB FS	Up to 512	160	x1	x2	x1	●					
		STM32L462 USB FS & AES	512	160	x1	x2	x1	●				●	
		STM32L471 Access	Up to 1024	128	x2	x2	x3						
		STM32L475 USB OTG	Up to 1024	128	x2	x2	x3		●				
		STM32L476 USB OTG & LCD	Up to 1024	128	x2	x2	x3		●	Up to 8x40			
		STM32L496 USB OTG & LCD	Up to 1024	320	x2	x2	x3		●	Up to 8x40	●		
		STM32L486 USB OTG & LCD & AES	1024	128	x2	x2	x3		●	Up to 8x40		●	
		STM32L4A6 USB OTG & LCD & AES	1024	320	x2	x2	x3		●	Up to 8x40	●	●	●

STM32L4 Road map – Now and next silicons



Unit parameters	STM32L47x	STM32L43x	STM32L49x	STM32L45x	STM32L412
Core, frequency	ARM Cortex-M4, 80 MHz, MPU, FPU, ART				
Flash (Up to) SRAM (Up to)	1MB (dual bank) 128KB	256KB (1x bank) 64KB	1MB (dual bank) 320KB	512K (1x bank) 160KB	128KB (1x bank) 40KB
FSMC	Yes	-	Yes	No	-
12-bit ADC SAR	3x 12-bit @ 5 MSPS	1x 12-bit @ 5 MSPS	3x 12-bit @ 5 MSPS	1x 12-bit @ 5 MSPS	2x 12-bit @ 5 MSPS
Comparator	2	2	2	2	1
Op amp	2	1	2	1	1
12-bit DAC	2	2	2	1	-
SAI	2	1	2	1	-
USB	OTG FS	Device Xtal-less	OTG Xtal-less	Device Xtal-less	Device Xtal-less
Sigma delta interface	8ch / 4 filters	-	8ch / 4 filters	4ch / 2 filters	-
USART	6	4	6	5	4
LCD	8x40/4x44	8x40/4x44	8x40/4x44	-	-
Camera Interface	-	-	Yes	-	-
Chrome ART	-	-	Yes	-	-
Other digital (except timers)	1x SDIO, 1x Quad SPI, 3 x SPI, 3 x I2C, 1x CAN, Charge-Transfer Touch sense, AES 256, TRNG, SWPMI	1x SDIO, 1x Quad SPI, 3x SPI, 3x I2C, 1x CAN, Charge-Transfer Touch sense, AES 256, TRNG, SWPMI	1x SDIO, 1x Quad SPI, 3x SPI, 4x I2C, 2x CAN, Charge-Transfer Touch sense, AES 256, TRNG, SWPMI, SHA-2	1x SDIO, 1x Quad SPI, 3x SPI, 4x I2C, Charge-Transfer Touch sense, AES 256, TRNG	1x Quad SPI, 2x SPI, 3x I2C, Charge-Transfer Touch sense, AES 256, TRNG
Package (pin number)	64/72/81/100/132/144	32/48/49/64/100	64/100/132/144/169	48/64/100	32/36/48/64
Schedule	Mass Prod	Mass Prod	Mass Prod	Mass Prod	Samples Feb 2018 Prod Sept 2018

STM32L4

New Package for
lower Power
consumption

STM32L4 SMPS

new packages for a lower power consumption

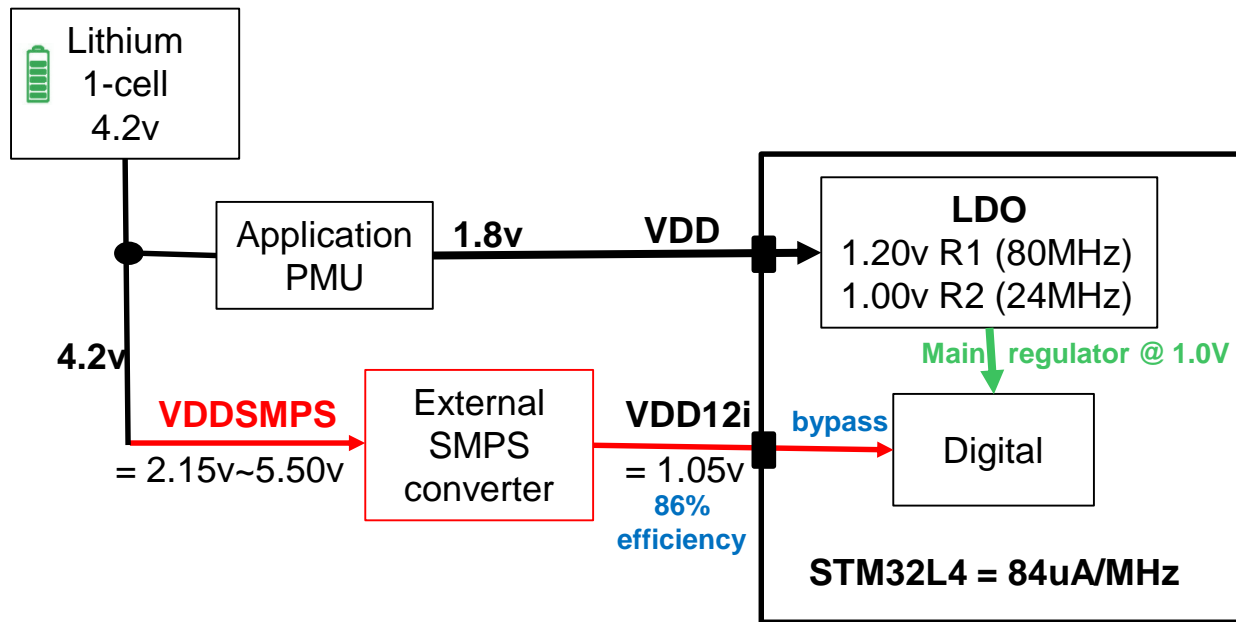


- Provide the possibility to get a lower power consumption while using current STM32L4
 - Same application
- Possibility to supply externally the voltage core (bypass)
- New packages proposed in Q1 2017 / Q2 2017
 - Start with L49x (LQFP144 + WLCSP) / L45x (LQFP-64 + WLCSP)
 - Other packages on demand

Freq	Algorithm	SMPS ON	SMPS OFF	Gain	SMPS efficiency
24MHz	Reduce code @ 3.3v	37uA/MHz	86uA/MHz	57%	74%
80MHz		44uA/MHz	103uA/MHz	57%	74%

STM32L4 solution

Parallel SMPS architecture

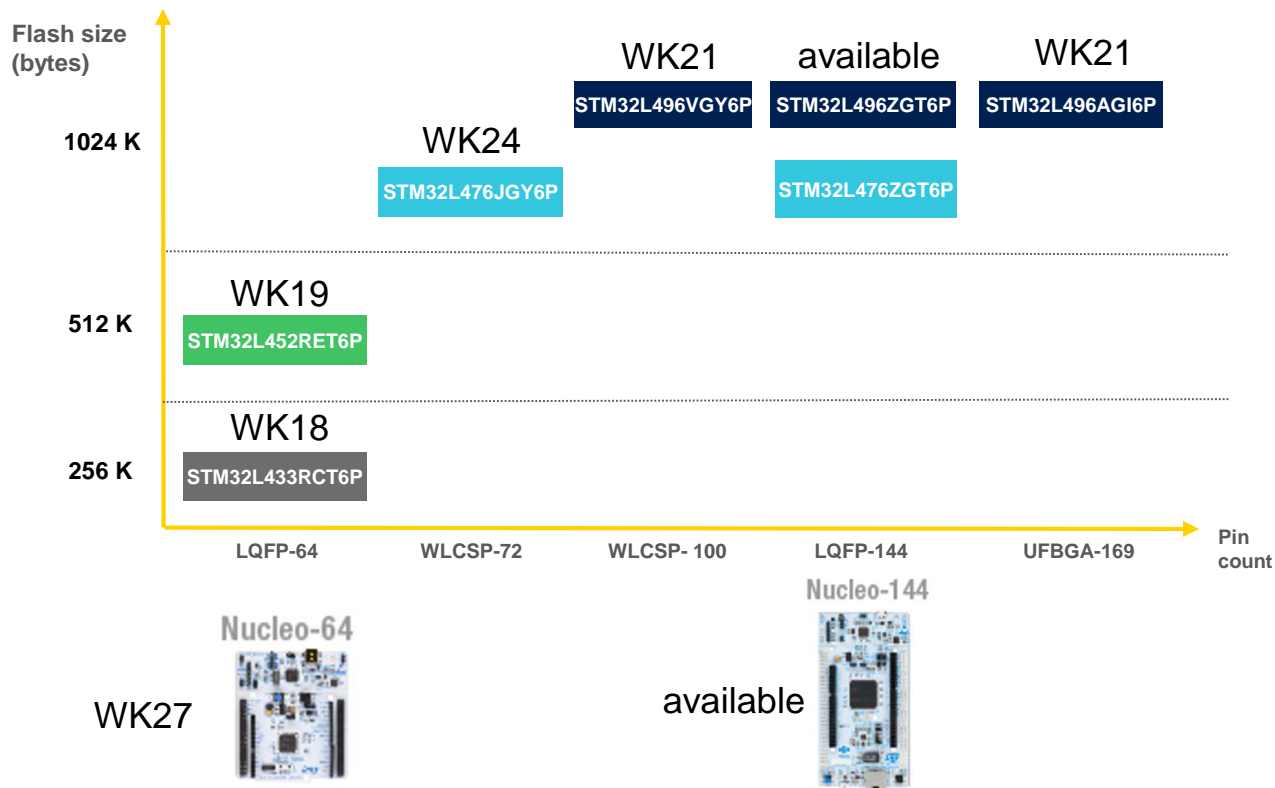


ST STPS01 (86% efficiency) = $4.2\text{v} / 1.05\text{v} \times 0.86 = 3.44 \rightarrow 24.4\mu\text{A/MHz}$ (@ 4.2v)

$24.4\mu\text{A/MHz} \times 4.2\text{v} = 102.5\mu\text{W/MHz} \rightarrow 31\mu\text{A/MHz}$ @ 3.3v or $57\mu\text{A/MHz}$ @ 1.8v

STM32L4x SMPS – portfolio

CortexTM-M4 @ 80MHz



STM32L4

**Keeps moving on
with STM32L4+**

STM32 L4+



STM32L4 scaling:

- Upgrade L4 performance
- Unique object reaching best-in-class ULP and performance



80 MHz
100 μ A/MHz
1.2 μ A stop 2



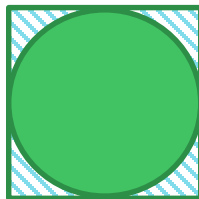
120 MHz
100 μ A/MHz
stop 2 < 3 μ A

Main modifications versus STM32L4



- Increase frequency up to 120 MHz while keeping state of the art Ultra-low power figures.
- Increase SRAM size up to 640KB
- Add MIPI DSI
- Update architecture to optimize Graphics/ low power / CPU load:
Chrom- GRC allowing up to 20% of graphic resources optimization (RAM)
- Updated IPs including 2 x Octo SPI supporting Flash and SRAM.

- Graphic Resources Cutter for non square displays
 - No modification nor special management at SW level
- ➔ **Saving up to 20% of RAM needs**



 Saved Memory

- For **360x360 round display**
 - @16bpp ~**205kBytes** (vs.253kBytes)
 - @24bpp ~**307kBytes** (vs.380kBytes)
- For **400x400 round display**
 - @16bpp: **250kBytes** (vs.312kBytes)
 - @24bpp: **372kBytes** (vs.469kBytes)

STM32L4R/Sx series



Cortex®-M4 (DSP + FPU) – 120 MHz	<ul style="list-style-type: none">• ART Accelerator™• USART, SPI, I²C• 2 xQuadSPI• 16 and 32-bit timers• SAI + audio PLL• CAN• Camera IF• Chrom-ART• 2x 12-bit DAC• Temperature sensor• Low voltage 1.71V to 3.6V• Vbat Mode• Unique ID• Capacitive Touch sensing	Product line	FLASH (KB)	RAM (KB)	Memory I/F	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	Display Memory Optimizer	AES 128/256-bit
		STM32L4R5 USB OTG	2048 to 1024	640	SDIO FSMC	●	●	●	1	●				
		STM32L4S5 USB OTG & AES	2048	640	SDIO FSMC	●	●	●	1	●				●
		STM32L4R7 USB OTG & TFT Interface	2048 to 1024	640	SDIO FSMC	●	●	●	1	●		●	●	
		STM32L4S7 USB OTG & TFT Interface & AES	2048	640	SDIO FSMC	●	●	●	1	●		●	●	●
		STM32L4R9 USB OTG & MIPI DSI	2048 to 1024	640	SDIO FSMC	●	●	●	1	●	●	●	●	
		STM32L4S9 USB OTG & MIPI DSI & AES	2048	640	SDIO FSMC	●	●	●	1	●	●	●	●	●

Releasing your creativity



www.st.com/stm32



Thank you!