STM32L and STM8L MCU families

ST

EnergyLite

Ultra-low-power EnergyLite™ 32-bit and 8-bit microcontrollers

STMicroelectronics ultra-low-power microcontroller EnergyLite™ platform

STMicroelectronics has identified an optimal balance between high performance and ultra-low power, through different modes, in order to optimize the energy consumed by your applications over their whole life.

Commitment to ultra-low power

Lower power consumption is increasingly required in all types of market applications. Several parameters are driving this demand: new national and international norms to reduce power consumption, the increasing number of battery-powered applications, development of new green technologies, or simply the need to be environmentally friendly.

To better serve this market, STMicroelectronics is developing a platform of ultra-low-power MCUs

as a natural extension to the existing successful STM8S and STM32F families.

This platform for the 8-bit STM8L and 32-bit STM32L MCUs is based on a proprietary 130 nm ultra-low-leakage process technology.

The STM8L and STM32L offer specific features for ultra-low-power applications, such as advanced ultra-low-power modes, optimized dynamic run consumption and specific

safety features. The balance between high performance and ultra-low power using different modes ensures optimal energy consumption, whatever your application, and this throughout its life.

ST's commitment to ultra-low power is total, with ongoing development of future technologies and devices that will complement the existing portfolio of ultra-low-power MCUs to give our customers access to a new level of power saving.

8/32-bit ultra-low-power range

STMicroelectronics' ultra-low-power portfolio includes the full range of 8-bit to 32-bit MCUs, and so addresses most applications requiring reduced current consumption, from ultra-simple, cost-optimized feature needs to complex, high-performance requirements.
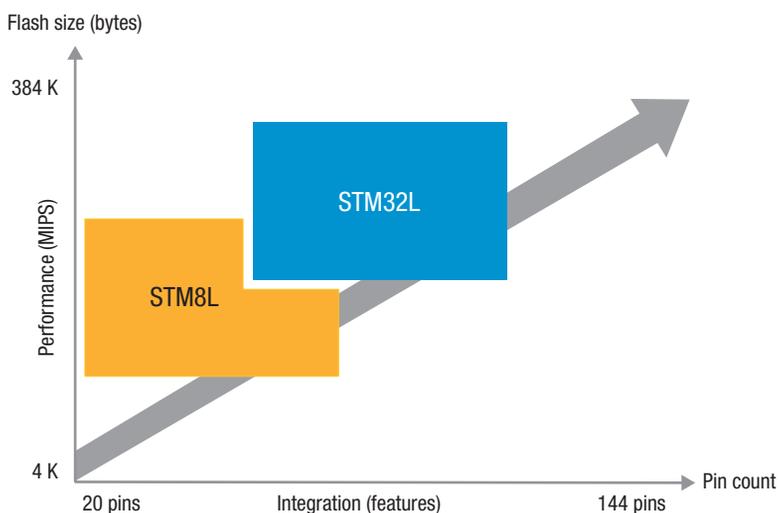
Key features

- Platform for 8-bit STM8L and 32-bit STM32L MCUs
- ST 130 nm ultra-low-leakage process technology – speed and power consumption are independent of MCU power supply
- Ultra-low-power modes: down to 270 nA
- Ultra-low voltage supply: 1.65 to 3.6 V
- Advanced analog functions down to 1.8 V
- Fast wake up
- On-board security and safety features for critical applications
- 33.3 DMIPS at 32 MHz (STM32L) and up to 16 MIPS at 16 MHz (STM8L)

Ultra-low-power product lines

Common core peripherals and architecture:

| Multiple communication peripherals USART, SPI, I²C |
| Multiple timers |
| Internal 16 MHz and 38 kHz RC oscillators |
| 2x watchdogs |
| Reset circuitry POR/PDR |
| 2x comparators |

+

Feature rich 32-bit solution: STM32L151/152/162 line

| ARM 32 MHz Cortex-M3 CPU | Up to 384-Kbyte Flash | Up to 48-Kbyte SRAM | BOR PVD | Main osc. input 1-24 MHz | Data EEPROM | RTC with 32 kHz osc. | DMA | 12-bit ADC (1 µs) Temp. sensor | 2x 12-bit DAC | LCD 8x40 | AES 128-bit | ULP MSI | MPU ETM | USB FS | SDIO | FSMC |

Feature rich 8-bit solution: STM8L151/152/162 line

| ST STM8 core @ 16 MHz | Up to 64-Kbyte Flash | Up to 4-Kbyte SRAM | BOR PVD | Main osc. input 1-16 MHz | Data EEPROM | RTC with 32 kHz osc. | DMA | 12-bit ADC (1 µs) Temp. sensor | 12-bit DAC | LCD 8x40 | AES 128-bit |

Entry level 8-bit solution: STM8L101 line

| ST STM8 core @ 16 MHz | Up to 8-Kbyte Flash | Up to 1.5-Kbyte SRAM |

Abbreviations:
BOR: Brown-out reset
ETM: Embedded trace unit
MPU: Memory protection unit
MSI: Multi-speed internal oscillator

Osc.: Oscillator
POR: Power-on reset
PDR: Power-down reset
PVD: Programmable voltage detector

ULP: Ultra-low-power
RTC: Real-time clock
AES: Advanced encryption standard

Ultra-low-power portfolio

Flash size (bytes)

Flash	20 pins TSSOP/QFN	28 pins QFN/WLCSP	32 pins LQFP/QFN	48 pins LQFP/QFN	64 pins LQFP/BGA	80*/100 pins LQFP/BGA	144 pins LQFP/BGA
384 K					STM32L152RD / STM32L151RD	STM32L152/162VD / STM32L151VD	STM32L152/162ZD / STM32L151ZD
256 K					STM32L152RC / STM32L151RC	STM32L152VC / STM32L151VC	STM32L152ZC / STM32L151ZC
128 K			STM32L152CB / STM32L151CB	STM32L152RB / STM32L151RB	STM32L152VB / STM32L151VB		
			STM32L152C8 / STM32L151C8	STM32L152R8 / STM32L151R8	STM32L152V8 / STM32L151V8		
64 K			STM8L152C8 / STM8L151C8	STM8L152/162R8 / STM8L151R8	STM8L152/162M8 / STM8L151M8		
			STM32L152C6 / STM32L151C6	STM32L152R6 / STM32L151R6			
32 K		STM8L152K6 / STM8L151G6→STM8L151K6	STM8L152C6 / STM8L151C6	STM8L152R6 / STM8L151R6			
16 K		STM8L151G4	STM8L152K4 / STM8L151K4	STM8L152C4 / STM8L151C4			
8 K	STM8L151F3 / STM8L101F3	STM8L151G3 / STM8L101G3	STM8L151K3 / STM8L101K3	STM8L151C3			
4 K	STM8L151F2 / STM8L101F2	STM8L151G2 / STM8L101G2	STM8L151K2				

Pin count →

Note:
*80 pins for STM8L15x/16x only

Legend:
■ STM8L (production/sampling)
■ STM32L (production/sampling)
■ Available in Q1/2011

Features and benefits

Features	Benefits
Ultra-low-power proprietary 130 nm technology	Speed and power consumption independent of MCU power supply, ultra-low leakage
Ultra-low-power design (clock gating, low-power Flash with power-off capability, voltage scaling)	Reduced overall run and low-power mode current consumption by turning off clocks of unused peripherals or Flash Optimized power consumption in run mode according to the performance required
Very low consumption/performance ratio	Very low power consumption over time to give energy saving and extended battery life
Sub 1 µA hardware RTC and AWU system unit	Ultra-low-power modes for applications requiring regular wake up
Sub-second hardware RTC	Precise synchronization in RF networks, sensors and alarms
Fine-grain calibration accuracy down to +/- 2 ppm	Very high efficiency of RTC calibration within a 10 s time frame; compliant with latest Chinese regulations
HW anti-tamper filters	Ultra-low-power debounce circuitry
Range of low-power modes (up to 6)	Suitable for many applications from complete switch off to continuous monitoring at ultra-low frequency
Advanced and flexible clock system (multiple internal and external clock sources)	Switch and adjust frequency and clock sources on the fly depending on application needs
Direct memory access on board (up to 7-channel DMA)	Autonomy for peripherals, independent from core; can switch off Flash memory and CPU (large current consumption contributors) while keeping peripherals active
Ultra-fast wake-up from lowest low-power mode	Fast switching from static and dynamic power modes
Power supply V_{DD} min: 1.65 V	Fitting applications supplied with external 1.8 V +/-10% regulator
Analog functional down to 1.8 V, programming down to 1.65 V	Full functionality over the complete V_{DD} range
Ultra-low-power and ultra-safe features (POR, PDR, BOR, PVD, unique ID, backup clock, Flash protection, Flash with error code correction (ECC), dual watchdog, and more)	Integrated safety and security for applications; user data confidentiality/reliability

Targeted applications

Medical
- Glucose meters
- Insulin pumps
- Diabetes care
- Blood pressure monitors
- Cholesterol electronic monitors
- Patient monitoring
- Heart monitors

Metering
- Electricity meters
- Gas meters
- Water meters
- Scales
- Heat meters

EnergyLite

GP portable devices
- Mobile accessories
- 3D mouse and remote controls
- Gaming
- GPS watches
- Sports equipment
- Games and toys

Alarm systems
- Central processor units
- Wired sensors
- Wireless sensors
- Door locks

STM8L ultra-low-power MCU family

STMicroelectronics proposes an ultra-low-power family of MCUs based on the 8-bit and 32-bit cores. The STM8L MCU family, based on the STM8 proprietary core, is the entry point of the platform.

The STM8L family combines high performance and ultra-low power consumption using a new proprietary ultra-low leakage process and optimized architecture. This family is available in four different lines, making the STM8L an optimal family to support many applications with special care on power savings.

The STM8L101 is the entry point for the ultra-low-power 8-bit portfolio. It is cost optimized and offers a high level of integration in an ultra-small footprint. The STM8L151 is the feature-rich 8-bit solution. The STM8L152 has an additional LCD-segment driver compared to the STM8L151.

The STM8L162 has an additional 128-bit encryption (AES) feature compare to STM8L152.
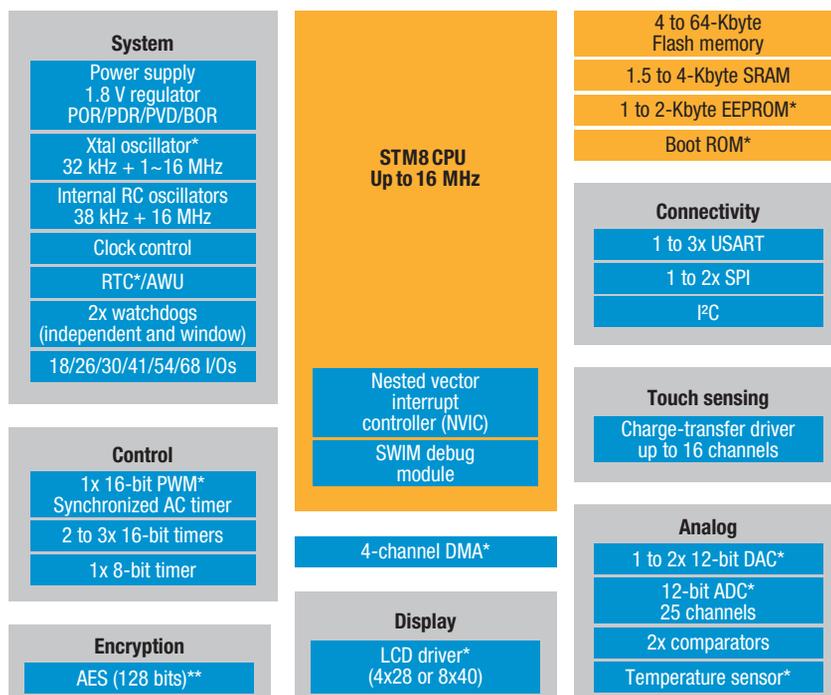
STM8L family description

You can upgrade to a higher or downgrade to a lower memory size or use a different package across lines without changing your initial design or software.

- STM8 16 MHz CPU
- 4 to 64 Kbytes of embedded Flash, up to 4 Kbytes of SRAM
- Four lines: pin-to-pin, software and peripheral compatibility
- Supply voltage: 1.65 to 3.6 V (down to 1.65 V at power down)
- Up to four ultra-low-power modes: down to 350 nA with SRAM and context retention
- Run mode dynamic consumption down to 150 µA/MHz
- State-of-the-art digital and analog peripherals
- -40 to +85 °C, or up to 125 °C operating temperature range
- Free touch-sensing library

STM8L enriches ultra-low-power platform and STM8 portfolio

The STM8L is part of both our ultra-low-power platform and the STM8S portfolio. The STM8L microcontroller, powered by the STM8 core, complements the STM8S portfolio with lower overall power consumption, new ultra-low-power modes (low-power run, low-power wait), new peripherals (RTC, LCD, comparators and 12-bit ADC).

STM8L block diagram

System

- Power supply 1.8 V regulator POR/PDR/PVD/BOR
- Xtal oscillator* 32 kHz + 1~16 MHz
- Internal RC oscillators 38 kHz + 16 MHz
- Clock control
- RTC*/AWU
- 2x watchdogs (independent and window)
- 18/26/30/41/54/68 I/Os

Control

- 1x 16-bit PWM* Synchronized AC timer
- 2 to 3x 16-bit timers
- 1x 8-bit timer

Encryption

- AES (128 bits)**

STM8 CPU Up to 16 MHz

- Nested vector interrupt controller (NVIC)
- SWIM debug module

4-channel DMA*

Display

- LCD driver* (4x28 or 8x40)

- 4 to 64-Kbyte Flash memory
- 1.5 to 4-Kbyte SRAM
- 1 to 2-Kbyte EEPROM*
- Boot ROM*

Connectivity

- 1 to 3x USART
- 1 to 2x SPI
- I²C

Touch sensing

- Charge-transfer driver up to 16 channels

Analog

- 1 to 2x 12-bit DAC*
- 12-bit ADC* 25 channels
- 2x comparators
- Temperature sensor*

Notes:
*STM8L15x/16x
**STM8L16x only

Abbreviations:
AWU: Auto wake up from halt
BOR: Brown-out reset
I²C: Inter integrated circuit
AES: Advanced encryption standard
PDR: Power-down reset
POR: Power-on reset
PVD: Programmable voltage detector
RTC: Real-time clock
SPI: Serial peripheral interface
USART: Universal sync/async receiver transmitter

STM8L: power-saving features and benefits

The STM8L lines embed up to 4 different ultra-low-power modes to offer users a high level of flexibility for their applications. In addition, the dynamic run consumption has been optimized.

Supply monitoring and resets

- Full reset circuitry, supply monitoring
  - Power-on reset/power-down reset, permanently enabled (zero power)
  - Brown-out detection (BOR) can be on or off in low-power mode
  - Programmable voltage detection – can be on or off
- Extended battery lifetime down to 1.65 V
- BOR complies with all V_{DD} rise/fall times, so no constraints on power supply shape

Up to four ultra-low-power modes

The following modes are ideal for applications that need constant monitoring with a sub 6 μA budget.
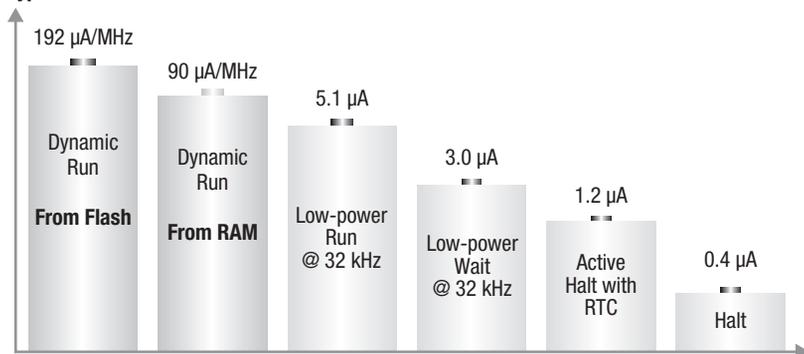
- **Low-power run mode**: the CPU is still running. Execution is done from RAM with a low-speed oscillator (RTC or internal). Consumption is less than 6 μA typical.
- **Low-power wait**: offers the capability to keep the RTC and a few other peripherals active (such as the timer) with a consumption of about 3 μA typical. The CPU is off. The Flash is switched off and the regulator is put in ultra-low-power mode, the CPU is stopped, the RTC and peripherals can be activated.

The following modes are ideal for applications that need low-power modes with sub 1.2 μA budget.

- **Active halt mode**: the CPU, main clocks and peripherals are off. The RTC can be still running. Wake up can be done through an interrupt on the peripherals. SRAM and context are kept.
- **Halt mode**: the CPU, main clocks and peripherals are off, the RTC is off, SRAM and context are kept.

STM8L15x consumption values

Typical @ 25 °C

- 192 μA/MHz — Dynamic Run **From Flash**
- 90 μA/MHz — Dynamic Run **From RAM**
- 5.1 μA — Low-power Run @ 32 kHz
- 3.0 μA — Low-power Wait @ 32 kHz
- 1.2 μA — Active Halt with RTC
- 0.4 μA — Halt

Notes:
- POR/PDR on
- RAM content preserved
- BOR option at 2.4 μA
- Startup time from active Halt 5 μs
- Run and Wait consumption values are independent of V_{DD}
- Active Halt and Halt values measured at V_{DD} = 1.8 V

STMTouch open library

STMicroelectronics' touch-sensing software library is a complete, free-of-charge source-code solution to transform any 8-bit STM8L microcontroller into a capacitive touch-key controller. Designers can combine the touch-sensing function with multiple configurations (touch keys, wheels, sliders) and the traditional MCU features (communication, LED control, beeper, LCD control). The touch-sensing software library is part of the application firmware.

STM8L ultra-low power consumption values

Operating mode	STM8L101	STM8L15x/STM8L16x	
	Typ 1.8 V – 3.3 V, 25 °C	Typ 1.8 V, 25 °C	Typ 3.0 V, 25 °C
Run from Flash mode	150 μA/MHz	192 μA/MHz	192 μA/MHz
Run from RAM mode	75 μA/MHz	90 μA/MHz	90 μA/MHz
Low-power Run from RAM	n.a	5.1 μA	5.1 μA
Low-power Wait	n.a	3.0 μA	3.0 μA
Active Halt with RTC	n.a	1.2 μA	1.35 μA
Active Halt with AWU	0.8 μA	1 μA	1 μA
Halt mode	0.35 μA	0.4 μA	0.4 μA

STM32L ultra-low-power MCU family

The STM32L MCU family, based on the Cortex™-M3 core, extends the ultra-low-power portfolio in performance, features, memory size and package pin count. The STM32L family combines very high performance and ultra-low power consumption, using optimized architecture and our proprietary ultra-low leakage process, shared with the STM8L family. The STM32L family is available in three different lines, so optimizing the STM32F family for many applications requiring performance with special care on power savings.

STM32L family description

- ARM Cortex-M3 32 MHz CPU
- 32 to 384 Kbytes of embedded Flash, up to 48 Kbytes of SRAM and up to 12 Kbytes of data EEPROM
- Three lines: pin-to-pin, software and peripheral compatibility
- Pin-to-pin compatibility with STM32F series (except V_{BAT} not present on the STM32L)
- Ultra-low energy consumption: down to 185 µA/DMIPS
- Supply voltage: 1.65 to 3.6 V
- Six ultra-low-power modes: down to 270 nA
- Ultra-low-power dynamic modes: low-power run down to 10.4 µA; low-power sleep down to 6.1 µA with one timer
- Economical Run mode consumption down to 230 µA/MHz from Flash at zero wait states with dynamic voltage scaling (3 ranges)
- Rich set of high-end analog and digital peripherals
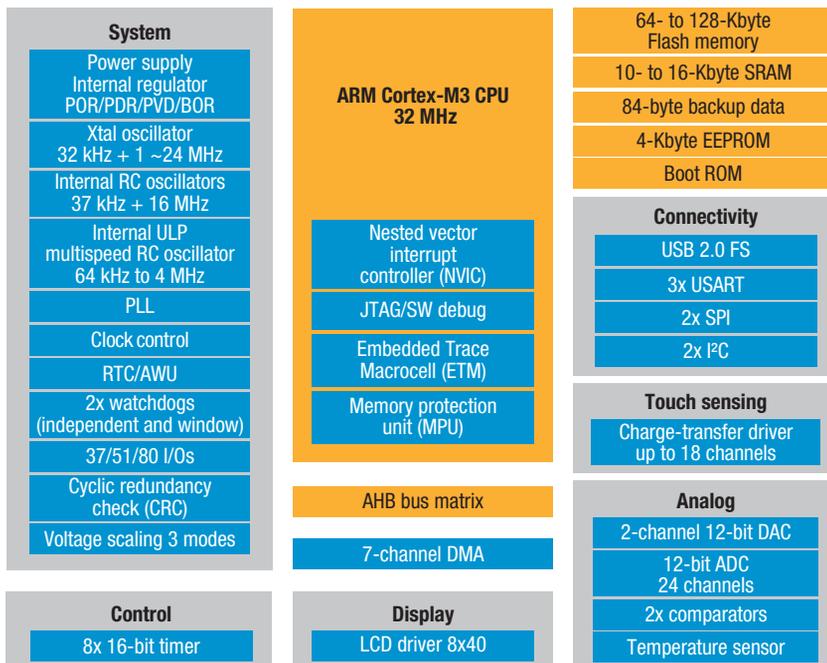- -40 to +85 °C operating temperature range

STM32L enriches ultra-low-power platform and STM32 portfolio

The STM32L15x/STM32L16x extends both our ultra-low-power platform and the STM32 portfolio. The STM32L microcontroller, powered by the ARM Cortex-M3, offers more features and performance compared to the STM8L. It complements the STM32 portfolio with lower overall power consumption, new ultra-low-power modes (low-power run, low-power sleep), new peripherals (LCD, comparators), new ultra-low-power architecture (voltage scaling, ultra-low-power MSI oscillator). The pin-to-pin compatibility between the STM32L and STM32F gives greater flexibility to the application designer and supports a strategy based on a unique platform.

The STM32L152 has an additional LCD-segment driver compared to the STM32L151.

The STM32L162 embeds a 128-bit AES.

STM32L block diagram (64- and 128-Kbyte configurations)

System
Power supply Internal regulator POR/PDR/PVD/BOR
Xtal oscillator 32 kHz + 1 ~24 MHz
Internal RC oscillators 37 kHz + 16 MHz
Internal ULP multispeed RC oscillator 64 kHz to 4 MHz
PLL
Clock control
RTC/AWU
2x watchdogs (independent and window)
37/51/80 I/Os
Cyclic redundancy check (CRC)
Voltage scaling 3 modes

Control
8x 16-bit timer

ARM Cortex-M3 CPU 32 MHz

- Nested vector interrupt controller (NVIC)
- JTAG/SW debug
- Embedded Trace Macrocell (ETM)
- Memory protection unit (MPU)

- AHB bus matrix
- 7-channel DMA

Display
LCD driver 8x40

- 64- to 128-Kbyte Flash memory
- 10- to 16-Kbyte SRAM
- 84-byte backup data
- 4-Kbyte EEPROM
- Boot ROM

Connectivity
USB 2.0 FS
3x USART
2x SPI
2x I²C

Touch sensing
Charge-transfer driver up to 18 channels

Analog
2-channel 12-bit DAC
12-bit ADC 24 channels
2x comparators
Temperature sensor

Abbreviations:
AWU:	Auto wake up from halt	PDR:	Power-down reset	RTC:	Real-time clock
BOR:	Brown-out reset	POR:	Power-on reset	SPI:	Serial peripheral interface
I²C:	Inter integrated circuit	PVD:	Programmable voltage detector	USART:	Universal sync/async receiver transmitter

STM32L: power-saving features and benefits

The STM32L lines propose 6 different ultra-low-power modes to offer users a high level of flexibility depending on their application. In addition, the dynamic run consumption has been optimized.

Up to six ultra-low-power modes

- **Low-power run mode**: the CPU is still running. Execution is done from RAM with a low-speed oscillator (RTC or internal). Consumption is 10.4 µA typical.
- **Low-power sleep mode**: offers the possibility of keeping the RTC and a few other peripherals active (such as the timer) with a consumption of 6.1 µA typical with one timer activated. The CPU is off. The Flash is switched off and the regulator is put into ultra-low-power mode, the CPU is stopped, the RTC and peripherals can be activated.
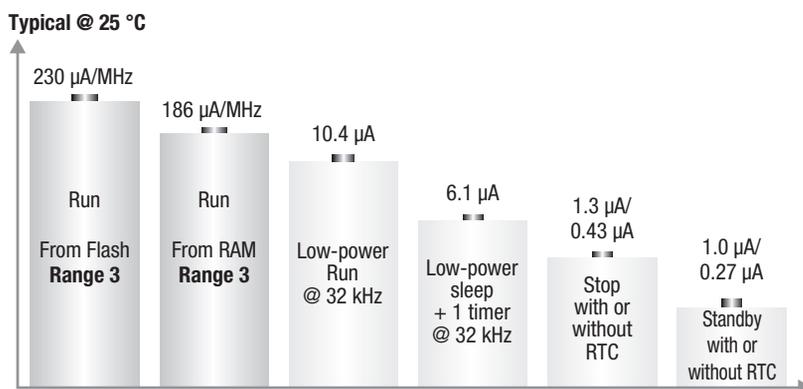
The 2 modes above are ideal for applications that need constant monitoring.

- **Stop modes (2 modes)**: the CPU, main clocks and peripherals are off. The RTC can be on or off (2 modes). Wake up can be done through an interrupt on the peripherals. SRAM and context are kept.
- **Standby modes (2 modes)**: the CPU, main clocks and peripherals are off. The RTC can be on or off (2 modes). Backup registers are preserved. Wakeup can be done through wake-up pins.

Supply monitoring and resets

- Full reset circuitry, supply monitoring
  - Power-on reset/power-down reset, permanently enabled (zero power)
  - Brown-out detection (BOR) can be on or off in low-power modes
  - Programmable voltage detection – can be on or off
- Extended battery lifetime down to 1.65 V
- BOR complies with all V_{DD} rise/fall times, so no constraints on power supply shape. When BOR is not activated, the STM32L starts at V_{DD} = 1.65 V.

STM32L consumption values

Typical @ 25 °C

230 µA/MHz — Run From Flash **Range 3**
186 µA/MHz — Run From RAM **Range 3**
10.4 µA — Low-power Run @ 32 kHz
6.1 µA — Low-power sleep + 1 timer @ 32 kHz
1.3 µA/ 0.43 µA — Stop with or without RTC
1.0 µA/ 0.27 µA — Standby with or without RTC

Notes:
- POR/PDR on
- RAM content preserved
- BOR option at 2.4 µA
- Startup time from Stop 8 µs
- Run and Sleep consumption value are independent of V_{DD}
- Stop and standby values measured at V_{DD} = 1.8 V

STM32L ultra-low power consumption values

Operating mode	STM32L15x/STM32L16x	
	Typ 1.8 V, 25 °C	Typ 3 V, 25 °C
Run from Flash mode 1 ,2, 3	286, 265, 230 µA/MHz	286, 265, 230 µA/MHz
Run from RAM mode 1, 2, 3	270, 218, 186 µA/MHz	270, 218, 186 µA/MHz
Low-power Run from RAM	10.4 µA	10.4 µA
Low-power Sleep + 1 timer	6.1 µA	6.1 µA
Stop with RTC	1.3 µA	1.6 µA
Stop without RTC	0.43 µA	0.46 µA
Standby with RTC	1.0 µA	1.3 µA
Standby without RTC	0.27 µA	0.3 µA

STM8L device summary

Pins	Part number	Flash	Size (Kbytes)	RAM (bytes)	Data EEPROM (bytes)	A/D inputs	16-bit (IC/OC/PWM)	8-bit (IC/OC/PWM)	Others	Serial interface	LVD levels	I/Os (high current)	Packages	Supply voltage (V)	Special features
STM8L101 entry line															
20 pins	STM8L101F2	●	4	1.5 K	-	-	2x16-bit (4/4/4)	1x8-bit	AWU, IWD, beeper	1xSPI, 1xI²C, 1xUART, 1xIRTx	-	18(16)	TSSOP20, UFQFPN 20 (3x3)	1.65 to 3.6	16 MHz and 38 kHz internal RC, AWU, reset system, 2x comparators, touch-sensing FW library
	STM8L101F3	●	8	1.5 K	-	-	2x16-bit (4/4/4)				-	18(16)	TSSOP20, UFQFPN 20 (3x3)		
28 pins	STM8L101G2	●	4	1.5 K	-	-	2x16-bit (4/4/4)				-	26(24)	UFQFPN 28 (4x4)		
	STM8L101G3	●	8	1.5 K	-	-	2x16-bit (4/4/4)				-	26(24)	UFQFPN 28 (4x4)		
32 pins	STM8L101K3	●	8	1.5 K	-	-	2x16-bit (4/4/4)				-	30(28)	LQFP32 (7x7), UFQFPN 32 (5x5)		
STM8L151 line without LCD															
28 pins	STM8L151G4	●	16	2 K	1 K	18x12-bit	3x16-bit (7/7/8)	1x8-bit	2xWDG, RTC, AWU, beeper	1xSPI, 1xI²C, 1xUSART (IrDA, ISO 7816)	7	26(24)	UFQFPN28 (4x4), WLCSP28 (1.7x2.9)	1.8 to 3.6	16 MHz and 32 kHz oscillator, hardware RTC/AWU, 12-bit DAC, 16 MHz and 38 kHz internal RC, 4 low-power modes, 2x comparators, DMA, reset system + BOR, touch-sensing FW library
	STM8L151G6	●	32	2 K	1 K	18x12-bit	3x16-bit (7/7/8)				7	26(24)	UFQFPN28 (4x4), WLCSP28 (1.7x2.9)		
32 pins	STM8L151K4	●	16	2 K	1 K	22x12-bit	3x16-bit (7/7/10)				7	30(28)	LQFP32 (7x7), UFQFPN32 (5x5)		
	STM8L151K6	●	32	2 K	1 K	22x12-bit	3x16-bit (7/7/10)				7	30(28)	LQFP32 (7x7), UFQFPN32 (5x5)		
48 pins	STM8L151C4	●	16	2 K	1 K	25x12-bit	3x16-bit (7/7/10)				7	41(39)	LQFP48, UFQFPN48 (7x7)		
	STM8L151C6	●	32	2 K	1 K	25x12-bit	3x16-bit (7/7/10)				7	41(39)	LQFP48, UFQFPN48 (7x7)		
	STM8L151C8[1]	●	64	4 K	2 K	25x12-bit	4x16-bit (9/9/12)			2xSPI, 1xI²C, 3xUSART (IrDA, ISO 7816)	7	41(39)	LQFP48, UFQFPN48 (7x7)		
64 pins	STM8L151R6[1]	●	32	2 K	1 K	25x12-bit	4x16-bit (9/9/12)				7	54(52)	LQFP64 (10x10)		
	STM8L151R8[1]	●	64	4 K	2 K	25x12-bit	4x16-bit (9/9/12)				7	54(52)	LQFP64 (10x10)		
80 pins	STM8L151M8[1]	●	64	4 K	2 K	25x12-bit	4x16-bit (9/9/12)				7	68(66)	LQFP80 (14x14)		
STM8L152 line with LCD															
32 pins	STM8L152K4	●	16	2 K	1 K	21x12-bit	3x16-bit (7/7/10)	1x8-bit	2xWDG, RTC, AWU, beeper	1xSPI, 1xI²C, 1xUSART (IrDA, ISO 7816)	7	29(27)	LQFP32 (7x7), UFQFPN 32 (5x5)	1.8 to 3.6	LCD segment controller(4x28), 16 MHz and 32 kHz oscillator, hardware RTC/AWU, 12-bit DAC, 16 MHz and 38 kHz internal RC, 4 low-power modes, 2x comparators, DMA, reset system + BOR, touch-sensing FW library
	STM8L152K6	●	32	2 K	1 K	21x12-bit	3x16-bit (7/7/10)				7	29(27)	LQFP48 (7x7), UFQFPN48 (5x5)		
48 pins	STM8L152C4	●	16	2 K	1 K	25x12-bit	3x16-bit (7/7/10)				7	41(39)	LQFP48, UFQFPN48 (7x7)		
	STM8L152C6	●	32	2 K	1 K	25x12-bit	3x16-bit (7/7/10)				7	41(39)	LQFP48, UFQFPN48 (7x7)		
	STM8L152C8[2]	●	64	4 K	2 K	25x12-bit	4x16-bit (9/9/12)			2xSPI, 1xI²C, 3xUSART (IrDA, ISO 7816)	7	41(39)	LQFP48, UFQFPN48 (7x7)		
64 pins	STM8L152R6[2]	●	32	2 K	1 K	25x12-bit	4x16-bit (9/9/12)				7	54(52)	LQFP64 (10x10)		
	STM8L152R8[2]	●	64	4 K	2 K	25x12-bit	4x16-bit (9/9/12)				7	54(52)	LQFP64 (10x10)		
80 pins	STM8L152M8[2]	●	64	4 K	2 K	25x12-bit	4x16-bit (9/9/12)				7	68(66)	LQFP80 (14x14)		
STM8L162 line with LCD															
64 pins	STM8L162R8	●	64	4 K	2 K	25x12-bit	4x16-bit (9/9/12)	1x8-bit	2xWDG, RTC, AWU, beeper	2xSPI, 1xI²C, 3xUSART (IrDA, ISO 7816)	7	54(52)	LQFP64 (10x10)	1.8 to 3.6	AES 128-bit, LCD segment controller (8x40), 16 MHz and 32 kHz oscillator, hardware RTC/AWU, 2x12-bit DAC, 16 MHz and 38 kHz internal RC, 4 low-power modes, 2x comparators, DMA, reset system + BOR, touch-sensing FW library
80 pins	STM8L162M8	●	64	4 K	2 K	25x12-bit	4x16-bit (9/9/12)				7	68(66)	LQFP80 (14x14)		

Notes:
1. 2x12-bit DAC
2. LCD segment controller (8x40) and 2x12-bit DAC

STM32L device summary

Pins	Part number	Flash	Size (Kbytes)	RAM (bytes)	Data EEPROM (bytes)	A/D inputs	16-bit (IC/OC/PWM)	Others	Serial interface	LVD levels	I/Os (high current)	Packages	Supply voltage (V)	Special features
STM32L151 without LCD														
48 pins	STM32L151C8	●	64	10 K	4 K	16x12-bit	8x16-bit (16/16/16)	SysTick, 2xWDG, RTC	2xSPI, 2xI²C, 3xUSART (IrDa, ISO 7816), 1xUSB	7	37(37)	LQFP48/QFN48	1.65 to 3.6	USB, voltage scaling, MPU, ULP MSI, EEPROM, hardware RTC, 6 low-power modes, 2x comparators, reset system + BOR
	STM32L151CB	●	128	16 K	4 K	16x12-bit	8x16-bit (16/16/16)			7	37(37)	LQFP48/QFN48	1.65 to 3.6	
64 pins	STM32L151R8	●	64	10 K	4 K	20x12-bit	8x16-bit (16/16/16)			7	51(51)	LQFP64/BGA64	1.65 to 3.6	
	STM32L151RB	●	128	16 K	4 K	20x12-bit	8x16-bit (16/16/16)			7	51(51)	LQFP64/BGA64	1.65 to 3.6	
100 pins	STM32L151V8	●	64	10 K	4 K	24x12-bit	8x16-bit (16/16/16)			7	83(83)	LQFP100/BGA100	1.8 to 3.6	
	STM32L151VB	●	128	16 K	4 K	24x12-bit	8x16-bit (16/16/16)			7	83(83)	LQFP100/BGA100	1.65 to 3.6	
STM32L152 with LCD														
48 pins	STM32L152C8	●	64	10 K	4 K	16x12-bit	8x16-bit (16/16/16)	SysTick, 2xWDG, RTC	2xSPI, 2xI²C, 3xUSART (IrDa, ISO 7816), 1xUSB	7	37(37)	LQFP48/QFN48	1.8 to 3.6	LCD segment controller (8x40), voltage scaling, MPU, ULP MSI, EEPROM, hardware RTC, 6 low-power modes, 2x comparators, reset system + BOR
	STM32L152CB	●	128	16 K	4 K	16x12-bit	8x16-bit (16/16/16)			7	37(37)	LQFP48/QFN48	1.8 to 3.6	
64 pins	STM32L152R8	●	64	10 K	4 K	20x12-bit	8x16-bit (16/16/16)			7	51(51)	LQFP64/BGA64	1.8 to 3.6	
	STM32L152RB	●	128	16 K	4 K	20x12-bit	8x16-bit (16/16/16)			7	51(51)	LQFP64/BGA64	1.8 to 3.6	
100 pins	STM32L152V8	●	64	10 K	4 K	24x12-bit	8x16-bit (16/16/16)			7	83(83)	LQFP100/BGA100	1.8 to 3.6	
	STM32L152VB	●	128	16 K	4 K	24x12-bit	8x16-bit (16/16/16)			7	83(83)	LQFP100/BGA100	1.8 to 3.6	

STM8L development tools

A complete set of hardware and software tools is available to help designers evaluate the STM8L features and to allow fast application development.

STM8L embedded firmware

STM8L firmware libraries: complete packages consisting of device drivers for all the standard device peripherals.

Each device driver includes a set of functions covering full peripheral functionality.

Hardware	Starter kit	Evaluation board	In-circuit debugger	Emulator	3rd-party programmer	
STM8L101	-	STM8L101-EVAL STEVAL-IAS003V1	ST-LINK STX-RLINK	STICE-SYS005	BP Microsystems Data I/O	www.bpmicro.com www.data-io.com
STM8L15x STM8L16x	STM8L-DISCOVERY STM8L1526PRIMER	STM8L15LPBOARD STM8L1526-EVAL STM8L1526-EVAL STMT/8L-EV1	ST-LINK STX-RLINK	STICE-SYS007 STICE-SYS009	Dataman Elnec HI-LO Phyton RK-System Segger SMH Technologies System General Xeltek	www.dataman.com www.elnec.com www.hilosystems.com.tw www.phyton.com www.rk-system.com.pl www.segger.com www.smh-tech.com www.sg.com www.xeltek.com

Software	Description	Supplier	
IDE	ST MCU toolset, ST Visual Develop (STVD) ST Visual Programmer (STVP), free	STMicroelectronics	www.st.com/mcu
	IAR EWSTM8	IAR	www.iar.com
	RIDE Raisonance, RIDE with RBuilder and Rflasher, free	Raisonance	www.raisonance.com
Compiler	Cosmic C Compiler, free up to 32 Kbytes	Cosmic Software	www.cosmic-software.com
	IAR C compiler, free up to 8 Kbytes	IAR	www.iar.com
	Raisonance C complier, free up to 32 Kbytes	Raisonance	www.raisonance.com

STM8L101 LCD board: STEVAL-IAS003V1

STM8L101 low-power demonstrator with software driven LCD. Featuring 1.25 µA consumption at 36 MHz refresh rate with a 3-digit LCD glass driven by software, this tool highlights the optimized power consumption with the STM8L101. It is also provided at a very low cost.
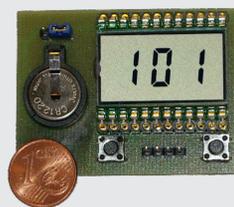
STM8L15x low-power board: STM8L15LPBOARD

Ultra-low-power and low-cost board for STM8L15x to demonstrate the different low-power modes and functionalities and provide a means to measure current sourced by the battery while paused in each of the modes.

STM8L101-EVAL, STM8L1526-EVAL and STM8L1528- EVAL

Complete hardware emulation platforms with respectively the STM8L101, the STM8L152 or STM8L16x, implementing the full range of device peripherals and features.

STMT/8L-EV1

The board manages 10 keys, 1 wheel and 1 slider. The user can easily evaluate the touch-sensing software features and performances, and display or change parameters through an LCD display interface.

Starter kits

STM8L-DISCOVERY

The STM8L-Discovery kit is the cheapest and quickest way to discover the STM8L and its low-power capabilities. It includes a 6-digit LCD display, 2 LEDs, 1 user button, current measurement and the embedded debugger ST-LINK.

STM8L1526PRIMER

Play, explore and develop applications on the EvoPrimer STM8L with Raisonance toolset, free demos and an online community at www.stm8circle.com to stimulate creative designs.

STM32L development tools

A complete set of hardware and software tools is available to help designers evaluate the STM32L features and to allow fast application development.

STM32L embedded firmware

STM32L firmware library: complete package consisting of device drivers for all the standard device peripherals.

Each device driver includes a set of functions covering full peripheral functionality.

STM32L Class B norm certification self-test routines: a full set of ready to-use self-test routines for home-appliance certification under EN/IEC 60335-1 Class B norm (functional safety).

Third-party development solutions

Choose from a full range of solutions that offer start-to-finish control of application development from a single environment that includes development environment, C/C++ compiler and in-circuit emulator. Contact ST sales office for availability.

Evaluation boards

STM32L15x low-power board
Ultra-low-power and low-cost board for STM32L15x to demonstrate all different low-power modes and functionalities and provide a means to measure current sourced by the battery while paused in each of the modes.
Contact ST sales office for availability.

STM32L152-EVAL
Complete hardware emulation platforms with the STM32L152, implementing the full range of device peripherals and features.
Contact ST sales office for availability.