



STM8 8-bit MCU family

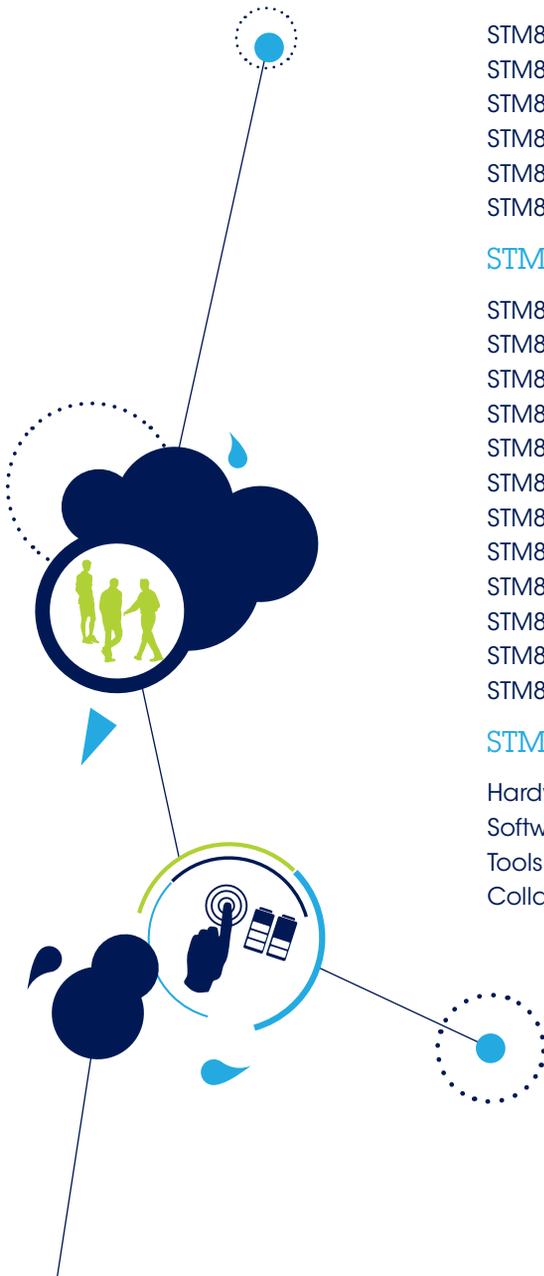
Jump to new record heights! Simply Smarter





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STM8 series

Over two million units delivered worldwide every day !
10 years minimal longevity guaranteed to sustain your growth

STM8 MCU LONGEVITY COMMITMENT

STMicroelectronics provides a minimum longevity of 10 years for its STM8 microcontrollers!

- STM8AF series of multi-purpose 8-bit microcontrollers for automotive applications
- STM8AL series of ultra-low-power 8-bit microcontrollers for automotive applications
- STM8L series of ultra-low-power 8-bit microcontrollers
- STM8S series of mainstream 8-bit microcontrollers



STM8 CORE

ST's 8-bit microcontroller platform is implemented around a high-performance 8-bit core and a state-of-the-art set of peripherals. This platform is manufactured using an ST-proprietary 130 nm embedded non-volatile memory technology. It is able to reach 1.6 cycles per instruction and up to 24 MHz clock frequency, allowing customers to run their applications at low speed with high performance.

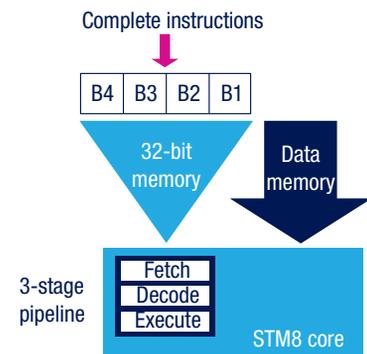
The flexibility of the architecture minimizes switching noise, resulting in improved system robustness and lower power consumption.

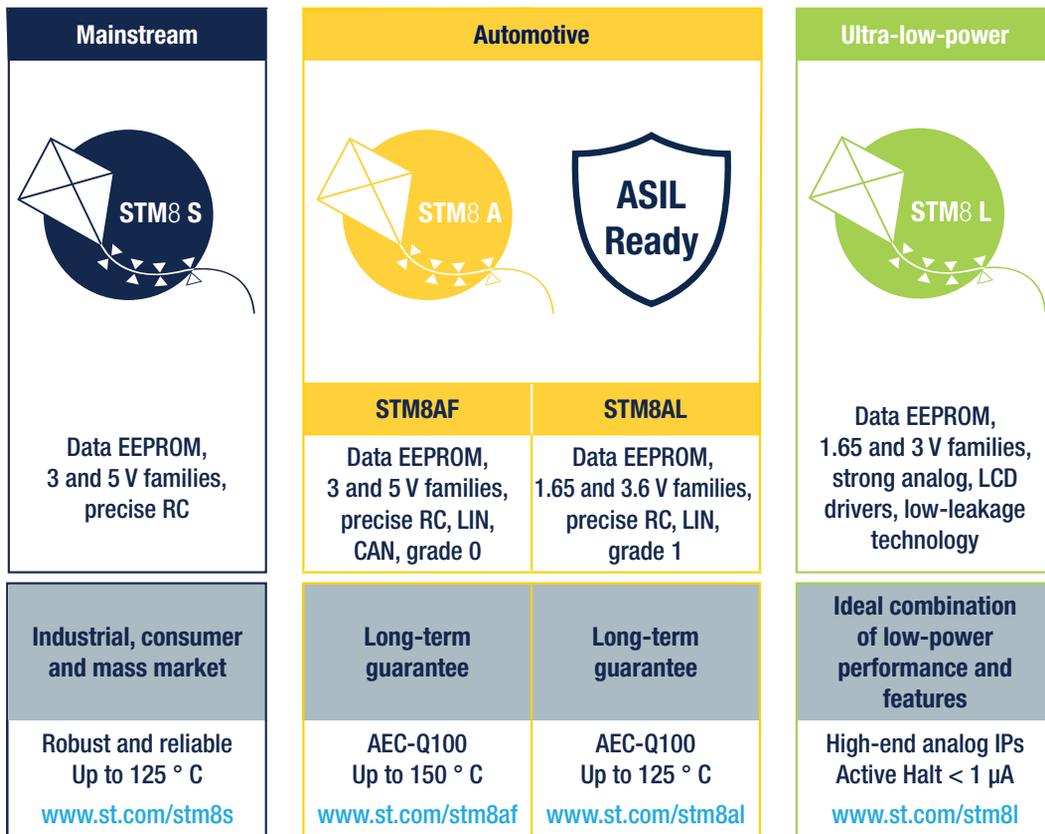
An innovative clock implementation provides strong benefits such as fast wake-ups in only 4 μ s.

It enables immediate clock switching on the fly to allow clock accelerations for PWM or calculation routines.

The 32-bit robust NVM memory addressed through a 3-stage pipeline interface, the 16-bit index registers and stack pointers and the advanced instruction set with hardware multiplication/division are key elements that significantly improve the efficiency of this 8-bit device family.

The STM8 allows fast and safe development through enhanced stack pointer operations, advanced addressing modes and new instructions.

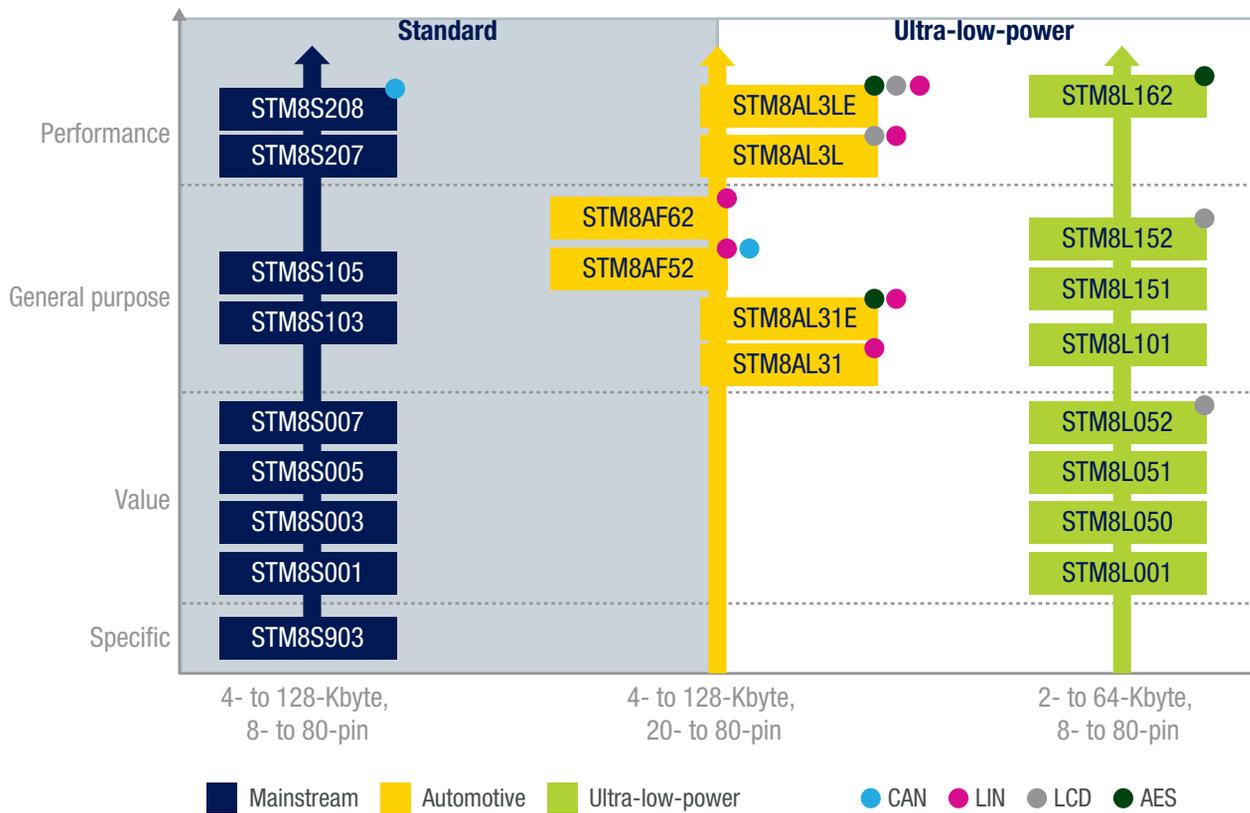




PORTFOLIO OVERVIEW

A large product portfolio to meet all your needs

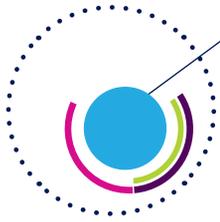
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SUPERIOR AND INNOVATIVE CAPABILITIES

Parameters	STM8S	STM8A		STM8L
		STM8AF	STM8AL	
Global features				
Voltage domain	2.95 to 5.5 V	2.95 to 5.5 V	1.65 to 3.6 V	1.65 to 3.6 V
Max. temperature	- 40 to +125 °C	- 40 to +150 °C	- 40 to +125 °C	- 40 to +125 °C
Internal clock, high speed	Internal RC up to 16 MHz 1%			
Internal clock, low speed	RC 128 KHz	RC 128 KHz	RC 38 KHz	RC 38 KHz
Max. clock speed	24 MHz	24 MHz	16 MHz	16 MHz
Min. clock speed	128 KHz	128 KHz	32 KHz	300 KHz
Watchdog	2 Watchdogs (One window)			
Low power, Halt	5 µA	5 µA	0.5 µA	0.3 µA
Low power, Active Halt	10 µA (Run in 50 µs)	25 µA (Run in 50 µs)	0.8 µA (Run in 4 µs)	0.8 µA (Run in 4 µs)
Power consumption, Run	1.8 mA @ 16 MHz from RAM	4.4 mA @ 16 MHz from RAM	1.6 mA @ 16 MHz from RAM	1.6 mA @ 16 MHz from RAM
Data EEPROM endurance	300	100	100	300
SAE EMI level	2.5 (24 MHz)	2.5 (24 MHz)	2.5 (16 MHz)	1.5 (16 MHz)
DMA	No	No	Yes, 4 channels	Yes, 4 channels
Boot ROM	Yes			
RTC	No	No	Yes, +/- 0.5 ppm	Yes, +/- 0.5 ppm
The need for speed				
USART	1 Mbit/s, up to 2 UARTs	1 Mbit/s, up to 2 UARTs	1 Mbit/s, up to 2 UARTs	1 Mbit/s, up to 3 UARTs
SPI	10 Mbit/s			
I²C	100 and 400 Kbit/s			
3-phase MC timer	12 MHz max PWM	12 MHz max PWM	8 MHz max PWM	8 MHz max PWM
CAN	1Mbit/s, up to 3 mailboxes	1Mbit/s, up to 3 mailboxes	-	-
The need for analog				
ADC	Up to 16 channels, 10 bits, 2.3 µs, TUE 2.2 mV	Up to 16 channels, 10 bits, 3.5 µs, TUE 2.2 mV	28 channels, 12 bits, 1 µs, TUE 0.4 mV	28 channels, 12 bits, 1 µs, TUE 0.4 mV
DAC	-	-	2 channels, 12 bits, 1 MSPS, TUE 3.5 mV	2 channels, 12 bits, 1 MSPS, TUE 3.5 mV
Comparators	-	-	3 µs propagation delay, 0.2 µA consumption	3 µs propagation delay, 0.2 µA consumption
Touch Sensing	STM8S RC library	-	STM8L CT library	STM8L CT library
Internal voltage reference	1.8 V or + 1.2V +/-2.5% on STM8S903	1.22V +/-2.4%	1.22 V +/-1.6%	1.22 V +/-1.6%
Temperature sensor	-	-	+/-1 °C	+/-1 °C
The need for connectivity				
CAN	BeCAN 2.0B	BeCAN 2.0B	-	-
UART	Smartcard, IrDA, single wire, LIN 2.2	LIN 2.2 compliant (master/slave)	LIN 2.0 compliant (master/slave)	Smartcard, IrDA, single wire, LIN 2.0
SPI	Yes			
I²C	Yes			
CEC	Software IP			
DALI	Software IP			
SWIM	Non-intrusive debug and programming			
IR interface	-	-	-	Hardware IP
LCD	Software IP	Software IP	4 x 44 or 8 x 40 segments (320 pixels)	4 x 44 or 8 x 40 segments (320 pixels)
Unique ID	Individual die identification on 96 bits			
LNB	STM8SPLNB1 DiSEqC™	-	-	-

Note: Typical values are indicated. Depending on part numbers, other characteristics may apply. Refer to datasheet for more details.



STM8S mainstream series

ST's STM8S series of mainstream 8-bit microcontrollers covers a large variety of applications in the industrial, consumer and computer markets, particularly where large volumes are concerned. Based on the STM8 proprietary core, the STM8S series benefits from ST's 130 nm technology and advanced core architecture performing up to 20 MIPS at 24 MHz. Embedded EEPROM, RC oscillators and a full set of standard peripherals provide a robust and reliable solution for designers.

The associated toolchain, from affordable Discovery kits to more complex evaluation kits and third-party tools, make it easy to develop with STM8S microcontrollers.

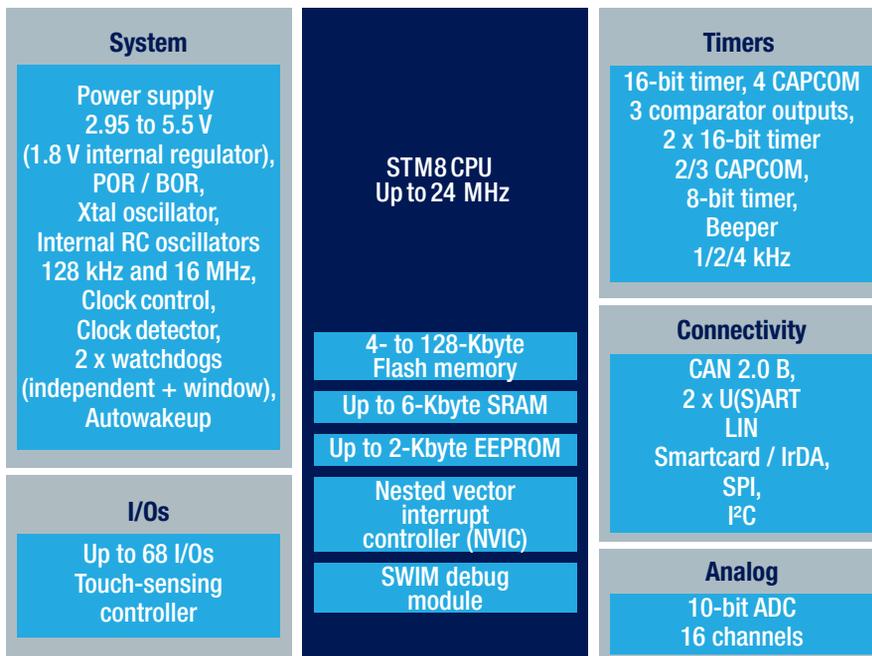
STM8S DESCRIPTION

Upgrade to a higher or downgrade to a lower memory size, or use a different package across lines without changing the initial layout or software.

- STM8 24 MHz CPU
- 4 to 128 Kbytes of embedded Flash memory, up to 6 Kbytes of SRAM
- Supply voltage: 2.95 to 5.5 V
- Up to four low-power modes: down to 5 μ A with complete context retention
- State-of-the-art digital and analog peripherals
- Specific interfaces such as IrDA and smartcard for support of consumer applications
- -40 to +85 $^{\circ}$ C, or up to 125 $^{\circ}$ C temperature range
- Free class B self-diagnostic library for IEC 60335/IEC 60730 compliant applications
- Many software libraries and examples are available for download



STM8S BLOCK DIAGRAM



STM8S APPLICATIONS

- Appliances, power tools
- HVAC
- Power management
- Lighting
- Factory automation
- Devices with rechargeable batteries
- Motor control
- e-vehicles
- Toys and games
- Sensors
- Power supplies
- User interfaces

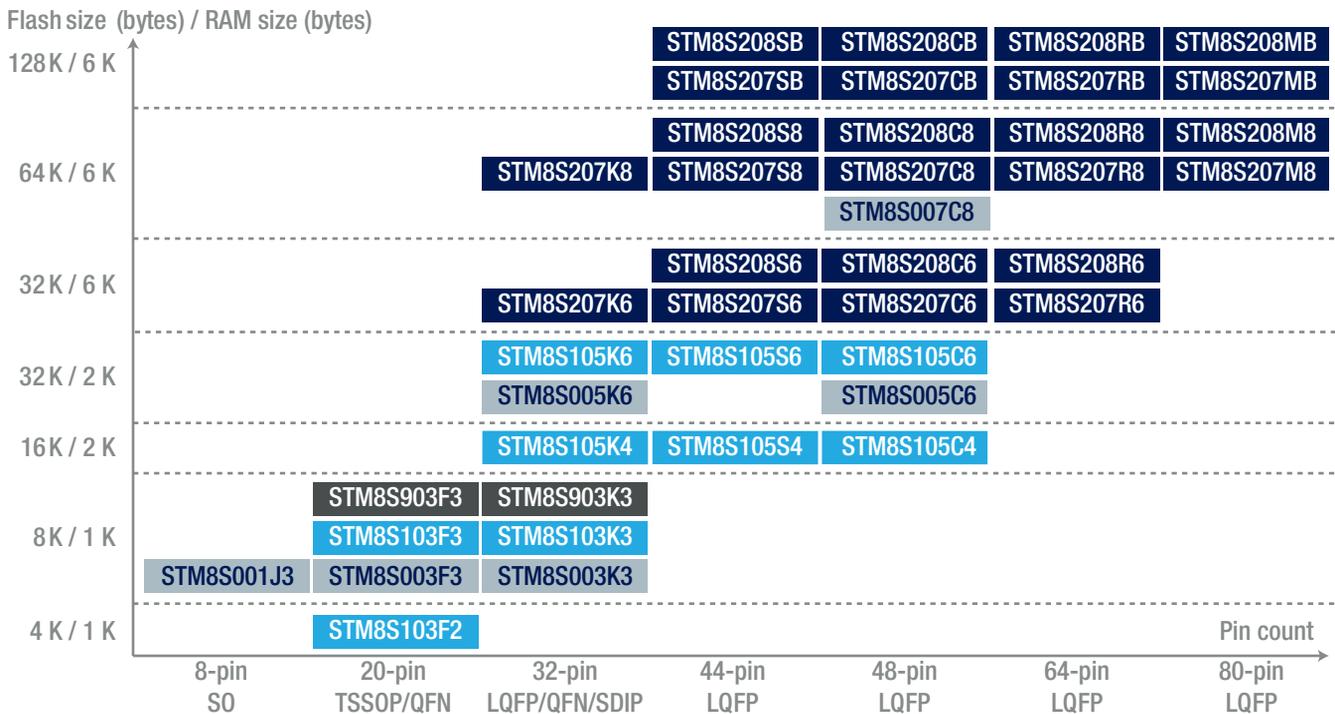
STM8S PRODUCT LINES

The STM8S series consists of four lines with differentiated features with full compatibility and upgradability to simplify design changes.

- The STM8S003/005/007 Value line is the entry-level series with a basic features set.
- The STM8S103/105 Access line offers more features and a larger variety of packages.
- The STM8S207/208 Performance line features a full set of peripherals and provides performance for medium to higher-end applications.
- The STM8S Application-specific line provides more analog features and dedicated firmware solutions.

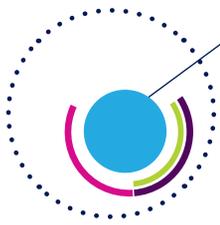
STM8 core - Up to 24 MHz	<ul style="list-style-type: none"> • 10-bit ADC • USART, SPI, I²C • 8- and 16-bit timers • 16 MHz crystal oscillator and 128 kHz internal RC oscillators • SWIM debug module 	 Product line	F _{CPU} (MHz)	Flash memory (Kbytes)	RAM (Kbytes)	Data EEPROM (bytes)	CAN 2.0B	2 nd UART	Additional analog channels	LNB firmware	
		STM8S001/003/005/007 Value line	16	8 to 64	1 to 6	128					
		STM8S103/105	16	4 to 32	1 to 2	640 to 1024					
		STM8S207/208	24	32 to 128	6	1024 to 2048	●	●	●		
		STM8S Application-specific line	16	8	1	640			●	●	

STM8S PORTFOLIO



Legend:

- Performance line
- Access line
- Application-specific line
- Value line



STM8L ultra-low-power series

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

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

The STM8L101 is the entry-line 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 / 152 and STM8L162 Performance lines offer more features with advanced digital and analog features. The STM8L Value line is a streamlined version of the STM8L151 series, offering the best price/performance ratio.

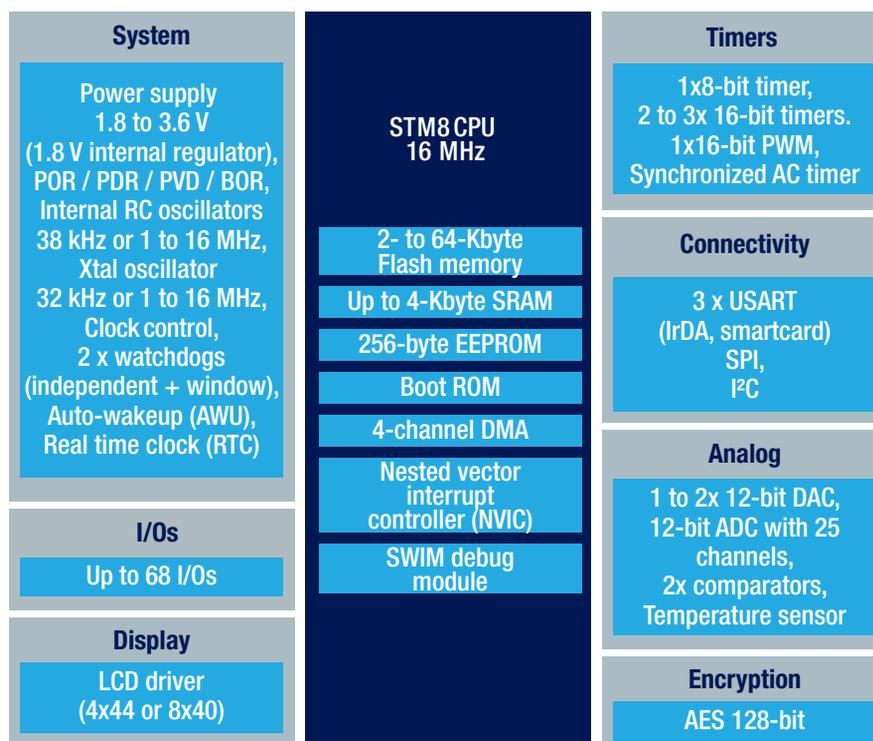
STM8L DESCRIPTION

Upgrade or downgrade to a different memory size, or package across lines without changing your initial design or software.

- STM8 16 MHz CPU
- 2 to 64 Kbytes of embedded Flash memory, up to 4 Kbytes of SRAM and up to 2 Kbytes of EEPROM
- Four lines: pin-to-pin, software and peripheral compatibility
- Supply voltage: 1.65 to 3.6 V
- Up to four ultra-low-power modes: down to 350 nA with SRAM and context retention
- Run mode dynamic consumption down to 150 μ A/MHz
- State-of-the-art digital and analog peripherals
- -40 to +85 $^{\circ}$ C, or up to 125 $^{\circ}$ C operating temperature range
- Free touch-sensing library
- LCD driver
- AES-128 encryption



STM8L BLOCK DIAGRAM



STM8L APPLICATIONS

- Medical equipment
 - Glucose meters and insulin pumps
 - Blood pressure and cholesterol monitors
 - Patient monitoring
- Metering (electricity/gas/water/heat meters, and scales)
- Alarm systems (central units, sensors, door locks, and fire alarms)
- GP portable devices
 - Mobile phones, and accessories
 - Gaming and remote controls
- GPS watches and sports equipment

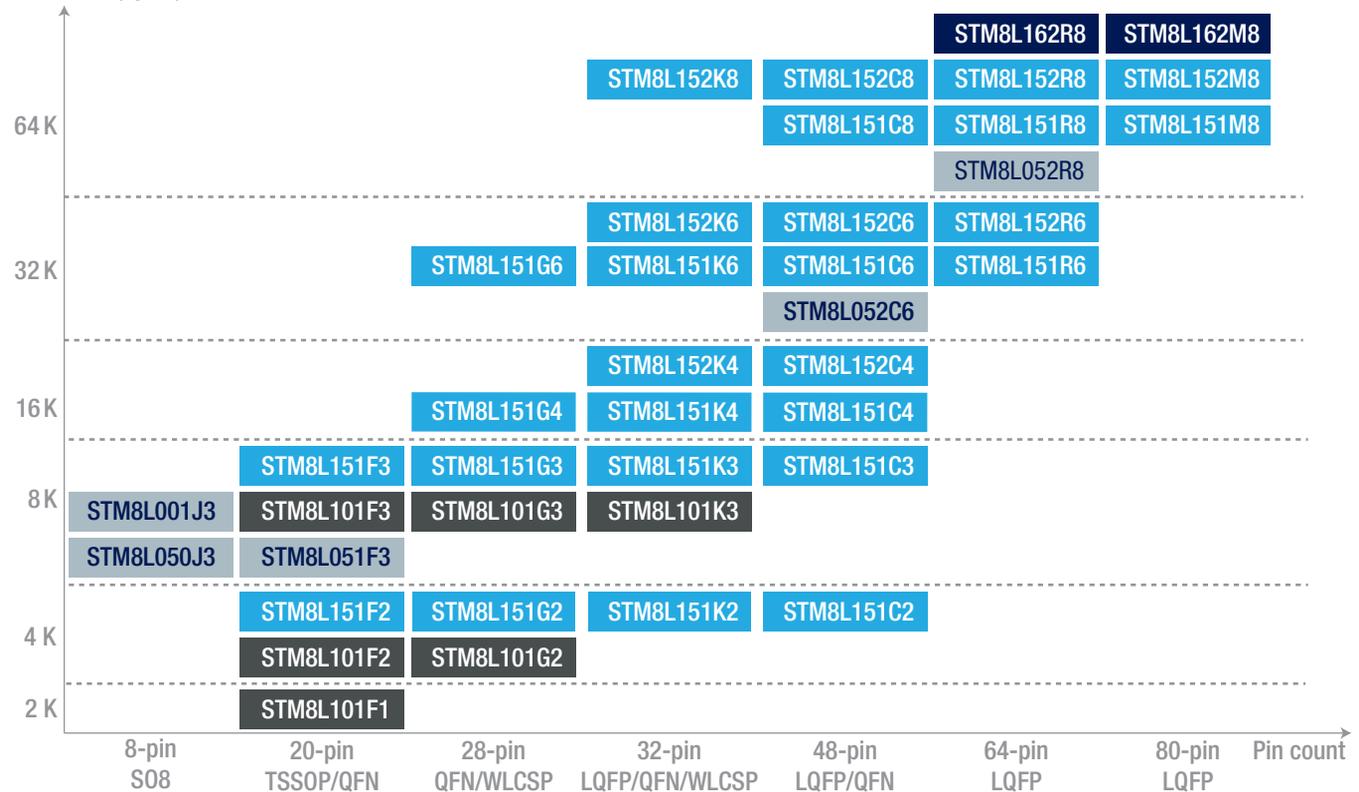
Note: * STM8L15x/STM8L16x only

STM8L PRODUCT LINES

STM8 core - Up to 16 MHz	<ul style="list-style-type: none"> 12-bit ADC 12-bit DAC USART, SPI, I²C RTC with 32 kHz oscillator 8-bit and 16-bit timers Temperature sensor Comparators SWIM debug module 	 Product lines	f _{CPU} (MHz)	Flash memory (Kbytes)	RAM (Kbytes)	Data EEPROM (bytes)	Four DMA channels	LCD Interface	AES 128-bit Crypto
		STM8L Value line	16	8 to 64	1 to 4	256	•	•	
		STM8L101	16	2 to 8	1.5				
		STM8L151/152	16	4 to 64	6	256 to 2048	•	•	
		STM8L162	16	64	1	2048	•	•	•

STM8L PORTFOLIO

Flash size (bytes)



Legend:

Performance line with LCD and AES
Performance line with LCD (LCD only on STM8L152xx)
Entry-line
Value line

STM8L ULTRA-LOW-POWER MODES



Notes:

- POR/PDR on
- RAM content preserved
- BOR option at 2.4 µA
- Startup time from Active Halt 5 µs

The STM8L series is available in four different lines making the STM8L an optimal series to support many applications requiring special care on power savings.

- STM8L101 line
 - Lowest power mode: 0.30 µA
 - Dynamic run mode: 150 µA/MHz
- STM8L151/152 line
 - Lowest power mode: 0.35 µA
 - Dynamic run mode: 180 µA/MHz
- STM8L162 line
 - Lowest power mode: 0.35 µA
 - Dynamic run mode: 180 µA/MHz
- STM8L Value line
 - Lowest power mode: 0.30 µA
 - Dynamic run mode: 180 µA/MHz





STM8A automotive series

This series of 8-bit Flash microcontrollers responds to the specific needs of automotive applications. From product specifications on through design and manufacturing, the focus is on reliability, application robustness and system cost improvement.

The integrated true data EEPROM features top notch endurance and data retention throughout the full temperature range. With its extended temperature range up to 150 °C the STM8A is the ideal and economic solution for the growing market of 8-bit automotive applications.

With the multiplication of electronic subsystems, saving power is becoming a key consideration, and the ultra-low-power STM8AL series responds to the specific needs of low power in automotive applications.

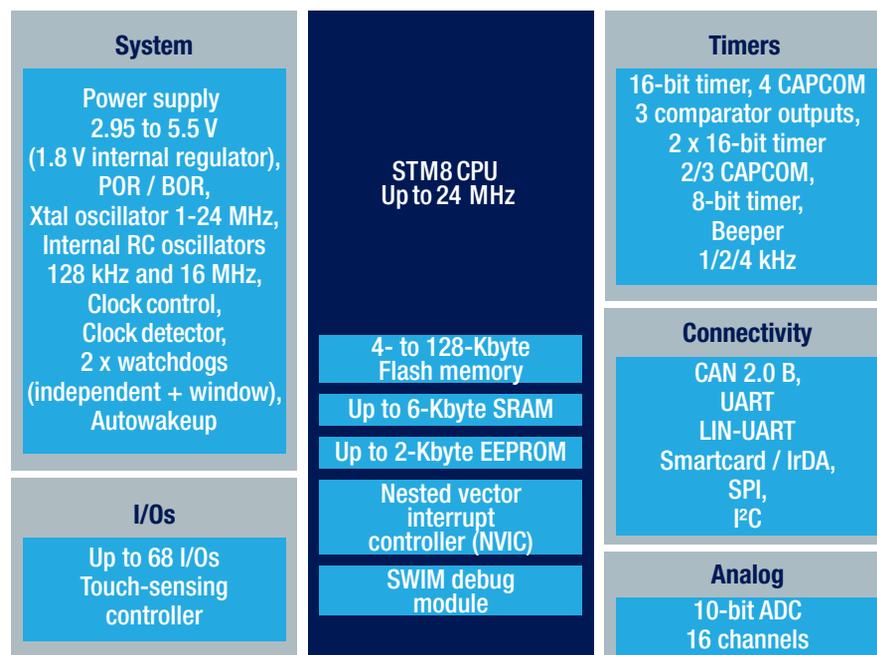
STM8AF DESCRIPTION

Upgrade to a higher or downgrade to a lower memory size or use a different package across lines without changing the initial layout or software.

- STM8 up to 24 MHz CPU
- 4 to 128 Kbytes of embedded Flash memory, up to 6 Kbytes of SRAM and up to 2 Kbytes of data EEPROM
- Packages up to 80 pins
- Supply voltage: 2.95 to 5.5 V for STM8AF, 1.65 to 3.6 V for STM8AL
- Up to four low-power modes: down to 1 µA with complete context retention
- State-of-the-art digital and analog peripherals
- Up to 150 °C ambient temperature
- Qualified to AEC-Q100
- Certified CAN drivers
- Free certified LIN drivers
- Touch-sensing and LCD lines



STM8AF BLOCK DIAGRAM



STM8AF APPLICATIONS

- CAN controllers
- LIN nodes
- Actuators
- Sensors
- Safety microcontrollers
- Car radios
- Immobilizers
- DC motor control
- HVAC



STM8AF DESCRIPTION

STM8AF is the mainstay of the STM8A multi-purpose 8-bit microcontrollers for automotive applications. Based on our proprietary STM8 core able to deliver up to 6 DMIPS à 24Mhz, the STM8AF62 line features a full set of timers, interfaces (LIN 2.1, UART, SPI, I²C), 10-bit ADC, internal and external clock control system, watchdogs, auto wake-up unit, and an integrated single-wire debug module.

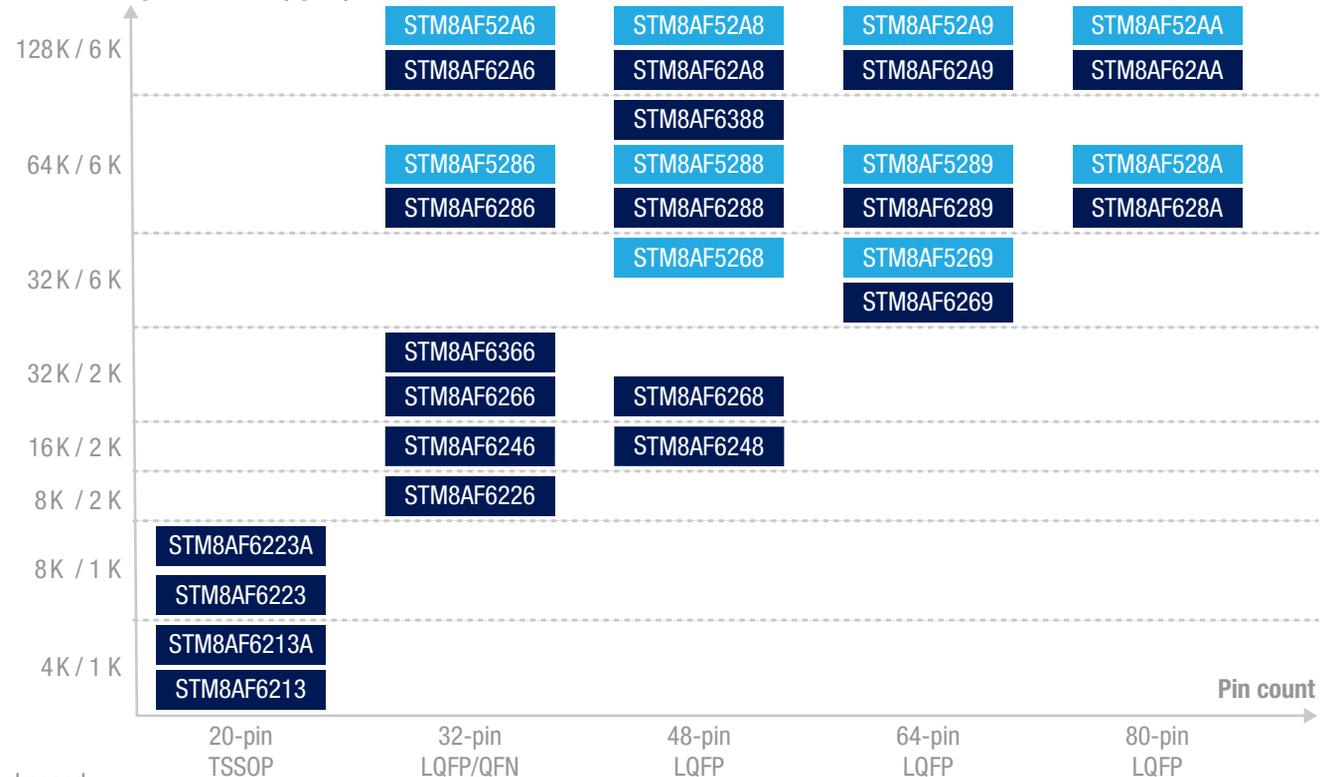
Conceived to offer a smart combination of features, to be easy to use and reliable, it covers a wide range of operating conditions such as up to 150 °C ambient temperature and down to 3.0 V supply. It is the perfect solution for automotive applications where no compromises can be made.

STM8AF PRODUCT LINES

STM8 core - 24 MHz	<ul style="list-style-type: none"> 10-bit ADC USART, SPI, I²C 8- and 16-bit timers 16 MHz crystal oscillators and 128 kHz internal RC oscillators SWIM debug module 	 Product lines	Flash memory (Kbytes)	RAM (Kbytes)	Data EEPROM (bytes)	CAN 2.0B	LIN 2.2	Additional analog channels	Automotive Grade 0 (150 °C)	
			STM8AF52	32 to 128	6	1024 to 2048	•	•		•
			STM8AF62	4 to 128	1 to 6	640 to 2048		•	•	•
			STM8AF63	4 to 128	1 to 6	640 to 2048		•	•	•

STM8AF PORTFOLIO

Flash memory / RAM size (bytes)



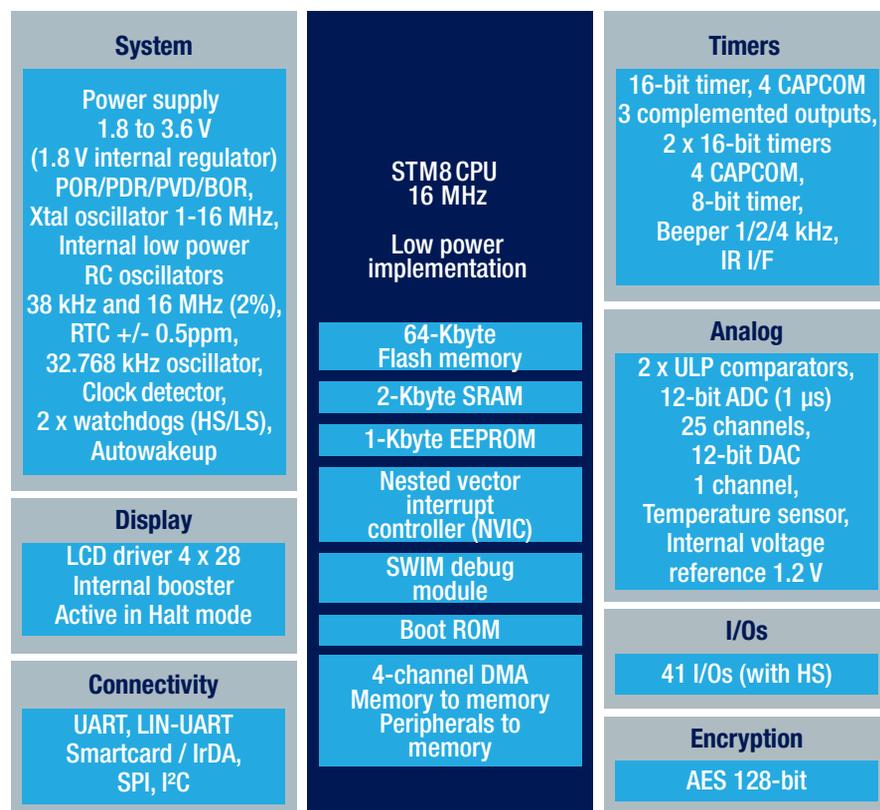
STM8AL DESCRIPTION

ST' STM8AL ultra-low-power series for automotive applications puts green energy, application safety and power efficiency at the forefront. It is particularly suited to battery-operated functions such as remote keyless entry and tire pressure monitoring, as well as for applications where power consumption is critical over time: companion microcontroller, immobilizers and sensors.

Based on the STM8A embedded features for system cost reduction and reliability, the STM8AL series supports LIN communications and offers more features to increase computation performance, save power consumption and save memory space, using the LCD driver, RTC, DMA, comparators, 12-bit ADC and DAC. It offers a unique combination of flexible, innovative and cost-effective solutions for automotive applications.



STM8AL3LE88 BLOCK DIAGRAM



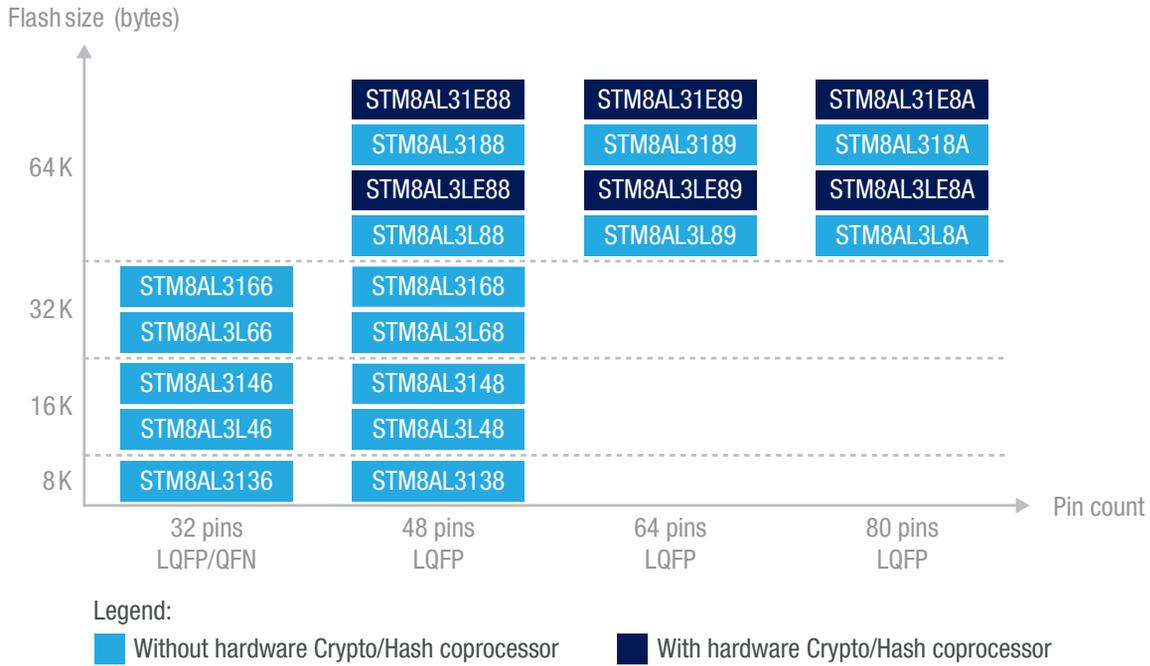
STM8AL APPLICATIONS

- Remote keyless entry
- Tire pressure monitors
- Alarms
- BLDC electric motor control
- Sensors

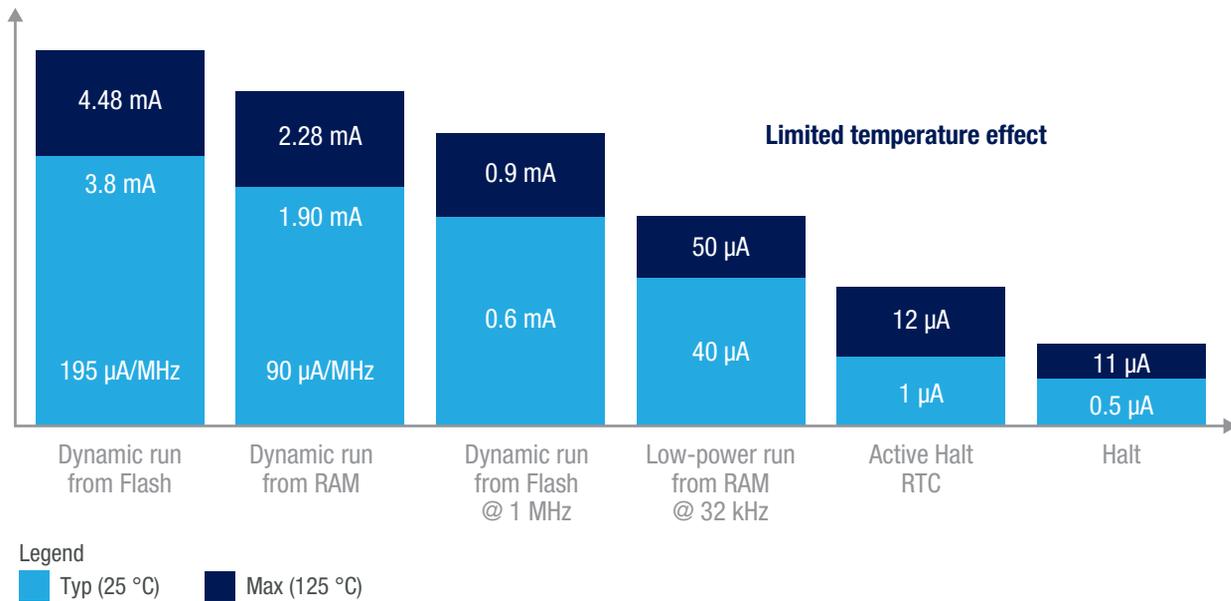
STM8AL PRODUCT LINES

STM8 core - 16 MHz	<ul style="list-style-type: none"> • 12-bit ADC • 12-bit DAC • USART, SPI, I²C • RTC with 32 kHz oscillator • 8- to 16-bit timers • Temperature sensor • Comparators • SWIN debug module • 128-bit AES encryption 	 Product lines	Flash memory (Kbytes)	RAM (Kbytes)	Data EEPROM (bytes)	Four DMA channels	LCD Interface
		STM8AL31	16 to 64	4	2048	•	•
		STM8AL3L	16 to 64	4	2048	•	

STM8AL PORTFOLIO

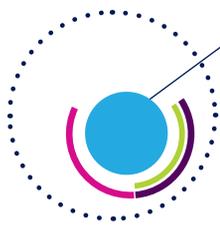


STM8AL ULTRA-LOW-POWER MODES



Notes:

- POR/PDR on
- RAM content preserved
- BOR option at 2.4 μ A
- Startup time from Active Halt 5 μ s
- Run and Wait consumption values are independent of V_{DD}
- Active Halt and Halt values measured at $V_{DD} = 1.8$ V

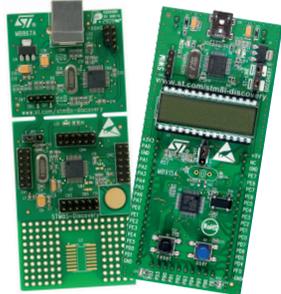


STM8 ecosystem

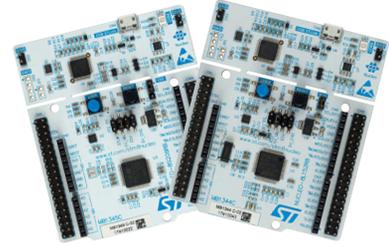
HARDWARE TOOLS



STM8-S08-DISCO



STM8S-DISCOVERY
STM8SVL-DISCOVERY
STM8A-DISCOVERY
STM8L-DISCOVERY



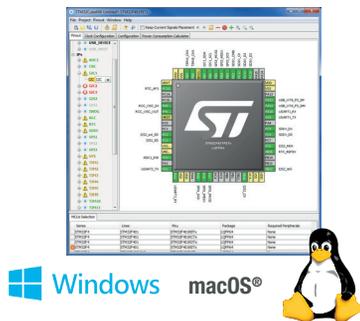
NUCLEO-8S208RB
NUCLEO-8L152R8

Ordering information

Order number	Description
STM8-S08-DISCO	Discovery kit with STM8L001J3,STM8L050J3,STM8S001J3 MCUs
STM8S-DISCOVERY	Discovery kit for STM8S series with STM8S105C6 MCU
STM8SVL-DISCOVERY	Discovery kit for STM8S Value Line with STM8S003K3T6C MCU
STM8A-DISCOVERY	Discovery kit for STM8A Automotive series with STM8AF52C6 and STM8AL3L68 MCUs
STM8L-DISCOVERY	Discovery kit for STM8L series with STM8L152C6 MCU
NUCLEO-8S208RB	Nucleo-64 development board with STM8S208RB MCU, supports Arduino and ST morpho connectivity
NUCLEO-8L152R8	Nucleo-64 development board with STM8L152R8 MCU, supports Arduino and ST morpho connectivity

SOFTWARE TOOLS

STM8CubeMX



Windows macOS®



IDEs



STMStudio



Configure and generate report

Compile and debug

Monitor

TOOLS SUITES, SOFTWARE LIBRARIES AND EXAMPLES

Company	Solution name	Solution Category	Price
 life.augmented	Standard Peripheral Library	Collection of embedded software drivers and examples	Free
 life.augmented	STVD	IDE	Free
	IDEA	IDE with C Compiler	Free
	CXSTM8	C Compiler	Free
	IAR-EWSTM8	IDE with C Compiler	Commercial
	WinIDEA	IDE with C Compiler	Commercial
 Innovative Development Tools	Ride7-STM8	IDE with C Compiler	Commercial
 Innovative Development Tools	STM8 Compiler	C Compiler	Commercial

Note: * Available on ST external website only <http://sdcc.sourceforge.net/>

COLLATERALS

www.st.com is a valuable source of information and support with a documentation repository, forums, video and social media that help provide solutions for any issues or challenges that you may encounter.

Please download our mobile version of the ST MCU Finder which makes MCU selection easy. It is available for Apple, Windows and Android mobile platforms.

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MCU Finder


ST MCU finder
www.st.com/stmcfinder



Windows
macOS®

Join the STM8 community!

-  community.st.com/stm8
-  [@ST_World](https://twitter.com/ST_World)
-  [STMicroelectronics](https://www.youtube.com/STMicroelectronics)

Information
ST MCU Finder application
Communities and social media

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