



AT32 | MICROCONTROLLER SELECTION GUIDE

2022

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About

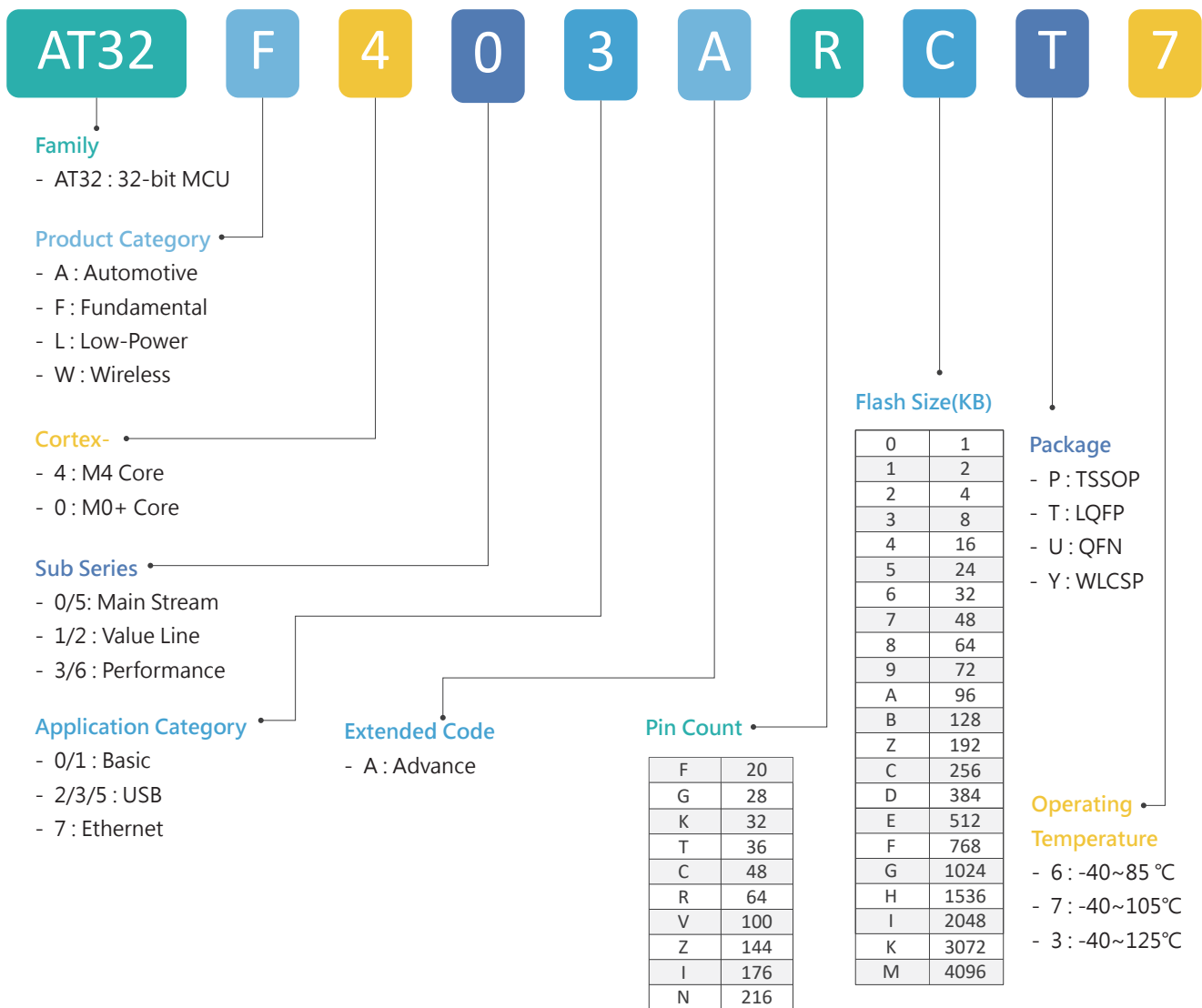
 ARTERY 雅特力

Artery Technology (雅特力科技) is a professional MCU design company founded in 2016. Since its establishment, ARTERY has devoted itself to promoting the innovative development of 32-bit microcontrollers powered by ARM® Cortex®-M4/M0+ in the global market. And R&D and innovation have always been high on the agenda in the company's strategy of development. ARTERY MCU family utilize advanced 55nm process and ARM® Cortex®-M4 core or M0+ low-power core. As of the year of 2021, a total of ten series of MCUs including more than 200 parts have been widely used in various applications, with cumulative shipment surpassing 100 million units by the end of 2021.

With great efforts, ARTERY MCUs are gaining increasing attention and increasingly penetrating into diverse aspects of modern applications ranging from 5G, IoT, consumer, commerce to industrial control terminal device, including micro printer, sweeping robot, optical flow drone, thermal camera, laser radar, industrial sewing machine, servo-drive, gaming, circuit breakers, ADAS, T-BOX, digital power and electric implements.

In addition to powerful IP data base support, ARTERY team have also gained a great wealth of experience in high-end processor application development and mass production, focusing on high-quality microcontrollers and a variety of solutions suited for embedded applications and striving for the building of a world-class industrial ecosystem.

Naming Rules



Package List



20-pin TSSOP
6.5 x 4.4 mm



20-pin QFN
3 x 3 mm



28-pin QFN
4 x 4 mm



32-pin QFN
4 x 4 mm



32-pin QFN
5 x 5 mm



36-pin QFN
6 x 6 mm



48-pin QFN
6 x 6 mm



48-pin QFN
7 x 7 mm



32-pin LQFP
7 x 7 mm



48-pin LQFP
7 x 7 mm



64-pin LQFP
7 x 7 mm



64-pin LQFP
10 x 10 mm

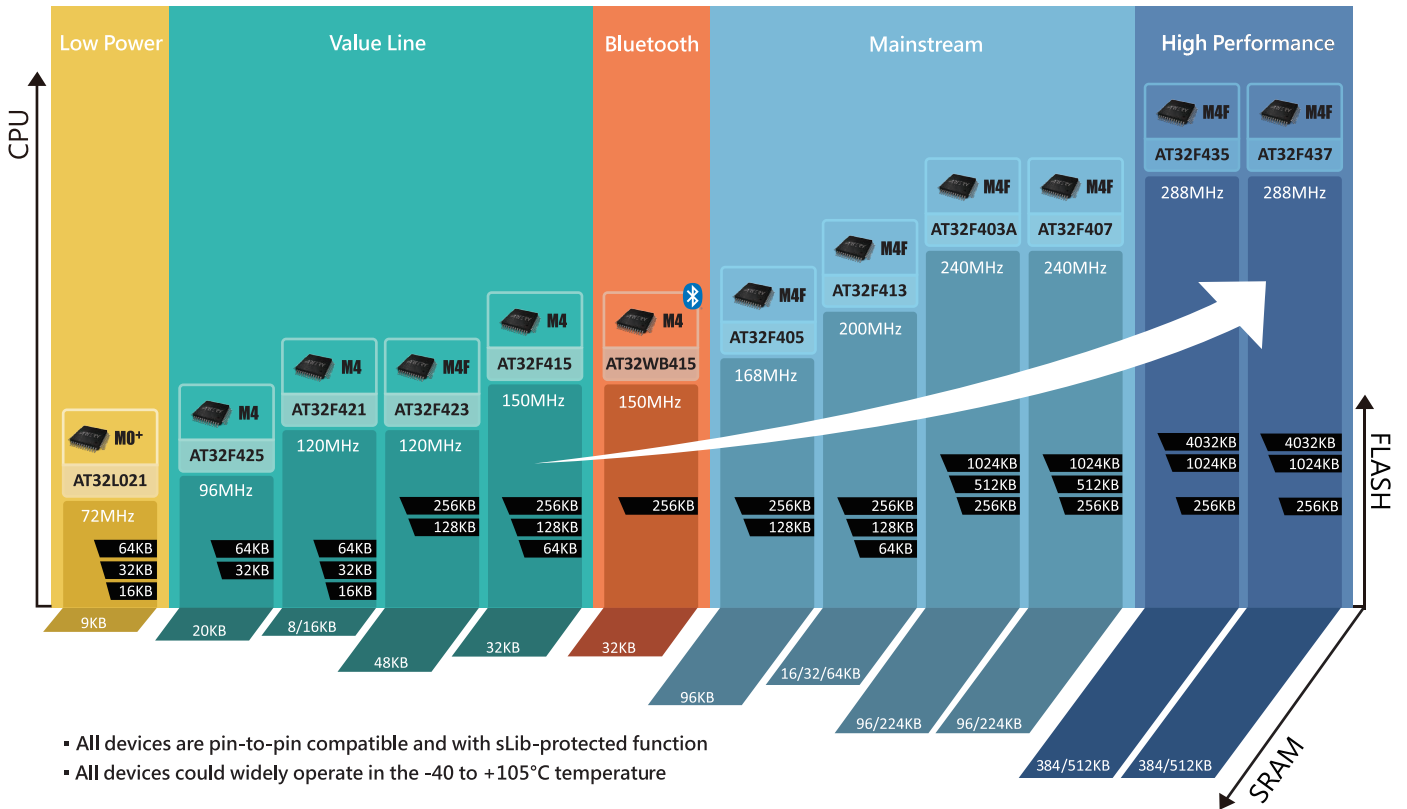


100-pin LQFP
14 x 14 mm



144-pin LQFP
20 x 20 mm

AT32 M4/M0+ MCU FAMILY



- All devices are pin-to-pin compatible and with sLib-protected function
- All devices could widely operate in the -40 to +105°C temperature

Low Power

M0+ AT32L021

- Cortex®-M0+ Core
- 72MHz CPU
- 64KB Flash, 8+1KB SRAM
- 4xUART, CAN, ADC

Bluetooth

M4 AT32WB415

- Cortex®-M4 Core
- 150MHz CPU
- 256KB Flash, 32KB SRAM
- OTG, CAN, 4xUART, 2xCMP
- BT 5.0 dual mode

High Performance

M4F AT32F435

- Cortex®-M4F Core
- 288MHz CPU
- 4032KB Flash, 512KB SRAM
- 2xOTG, 2xCAN, 8xUART
- 3x5.33Mps ADC
- 2xQSPI, SDRAM

M4F AT32F437

- Cortex®-M4F Core
- 288MHz CPU
- 4032KB Flash, 512KB SRAM
- 2xOTG, 2xCAN, 8xUART
- 3x5.33Mps ADC, EMAC
- 2xQSPI, SDRAM

Value Line

M4 AT32F425

- Cortex®-M4 Core
- 96MHz CPU
- 64KB Flash, 20KB SRAM
- OTG, CAN, 4xUART

M4 AT32F421

- Cortex®-M4 Core
- 120MHz CPU
- 64KB Flash, 16KB SRAM
- CMP, ADC, 2xUART

M4F AT32F423

- Cortex®-M4F Core
- 120MHz CPU
- 256KB Flash, 48KB SRAM
- OTG, 2xDAC, 2xCAN
- 24ch ADC

M4 AT32F415

- Cortex®-M4 Core
- 150MHz CPU
- 256KB Flash, 32KB SRAM
- OTG, 2xCMP, CAN

Mainstream

M4F AT32F413

- Cortex®-M4F Core
- 200MHz CPU
- 256KB Flash, 64KB SRAM
- 2xADC, 2xCAN, USB

M4F AT32F403A

- Cortex®-M4F Core
- 240MHz CPU
- 1024KB Flash, 224KB SRAM
- 2xCAN, 8xUART, USB, XMC

M4F AT32F405

- Cortex®-M4F Core
- 168MHz CPU
- 256KB Flash, 96+6KB SRAM
- QSPI, 8xUART
- HS+FS OTG with PHY

M4F AT32F407

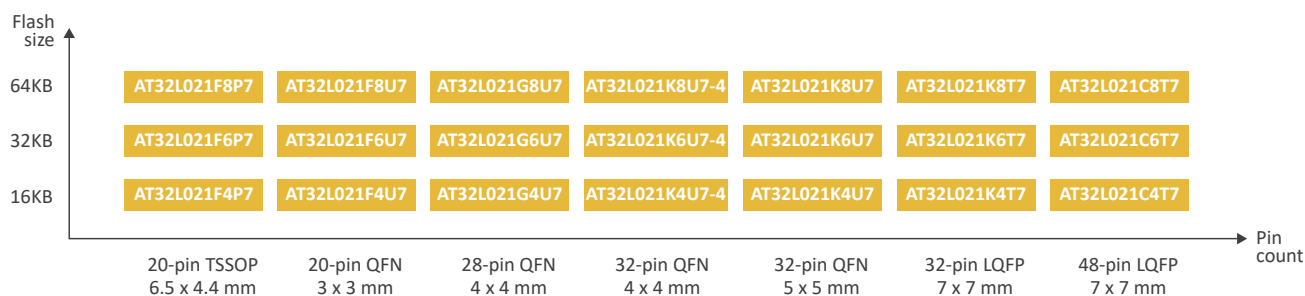
- Cortex®-M4F Core
- 240MHz CPU
- 1024KB Flash, 224KB SRAM
- 2xCAN, 8xUART, USB, EMAC

AT32L021

AT32L021 (low power) series, powered by ARM® Cortex®-M0+ core, features up to 72 MHz CPU computing speed and hardware divider, 64 KB Flash memory and 8+1 KB SRAM (with parity check). Besides being a boot loader, the system memory (4 KB) can be configured as user instruction and data memory at one time, achieving a maximum of 64+4 KB of space. It boasts 1x CAN, 4xUSARTs (with RS-485), 2x SPIs/I²Ss, 2x I²Cs, 1x 16-bit advanced timer, 5x 16-bit general-purpose timers and 1x 16-bit basic timer, 1x12-bit high-speed 2 Msps ADC to meet the requirements of high-speed data collection, industrial control and motor applications. In addition, almost fast I/Os are 5 V-tolerant with multiple port remapping, achieving fast entry/exit from low-power and standby mode. There is no doubt that this series will be your first choice as low-power entry MCU.

The AT32L021 device can perform well in the temperature range of -40 to 105°C , and provides a wide range of chip selection including LQFP48, LQFP32, QFN32 and QFN28, TSSOP20 and mini QFN20 package types. With powerful on-chip resource allocation, higher integration and cost-effectiveness, the AT32L021 series is gradually becoming the top choice for the applications that require low-power consumption such as IoT, wireless communication, motor control and consumer electronics.

- Max Frequency : 72 MHz
- Operating Voltage : 1.71-3.6V
- Operating Temperature : -40-105°C
- Key Features : 64+4 KB Flash, 8+1 KB SRAM, CAN, 4x USARTs, 2x SPIs, 2x I²Cs, 12-bit ADC, sLib
- Main Applications : IoT, wireless communication, OBD, BMS, RF industrial control, small-sized meters, motor control, 5G



Part No.	Frequency (MHz)	Flash (KB)	SRAM (KB)	I/O	Timer							Connectivity							Analog Interface		Package	
					Advanced TMR (16bit)	GP TMR (32bit)	GP TMR (16bit)	Basic TMR (16bit)	Systick (24bit)	WDT	WWDT	RTC (Enhanced)	I ² C	SPI	(1) F/H I ² S	USART/UART	OTG	CAN	IRTRM	ADC Engine		12-bit ADC ch.
AT32L021F4P7	72	16	8+1	15	1	-	5	1	1	1	1	1	2	1	0/1	2/2	-	1	1	1	9	TSSOP20 6.5 x 4.4 mm
AT32L021F6P7	72	32	8+1	15	1	-	5	1	1	1	1	1	2	1	0/1	2/2	-	1	1	1	9	
AT32L021F8P7	72	64	8+1	15	1	-	5	1	1	1	1	1	2	1	0/1	2/2	-	1	1	1	9	
AT32L021F4U7	72	16	8+1	15	1	-	5	1	1	1	1	1	2	1	0/1	2/2	-	1	1	1	9	QFN20 3 x 3 mm
AT32L021F6U7	72	32	8+1	15	1	-	5	1	1	1	1	1	2	1	0/1	2/2	-	1	1	1	9	
AT32L021F8U7	72	64	8+1	15	1	-	5	1	1	1	1	1	2	1	0/1	2/2	-	1	1	1	9	QFN28 4 x 4 mm
AT32L021G4U7	72	16	8+1	23	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	10	
AT32L021G6U7	72	32	8+1	23	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	10	
AT32L021G8U7	72	64	8+1	23	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	10	QFN32 4 x 4 mm
AT32L021K4U7-4	72	16	8+1	27	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	11	
AT32L021K6U7-4	72	32	8+1	27	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	11	
AT32L021K8U7-4	72	64	8+1	27	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	11	QFN32 5 x 5 mm
AT32L021K4U7	72	16	8+1	27	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	11	
AT32L021K6U7	72	32	8+1	27	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	11	
AT32L021K8U7	72	64	8+1	27	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	11	LQFP32 7 x 7 mm
AT32L021K4T7	72	16	8+1	25	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	10	
AT32L021K6T7	72	32	8+1	25	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	10	
AT32L021K8T7	72	64	8+1	25	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	10	LQFP48 7 x 7 mm
AT32L021C4T7	72	16	8+1	39	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	15	
AT32L021C6T7	72	32	8+1	39	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	15	
AT32L021C8T7	72	64	8+1	39	1	-	5	1	1	1	1	1	2	2	0/2	4/0	-	1	1	1	15	

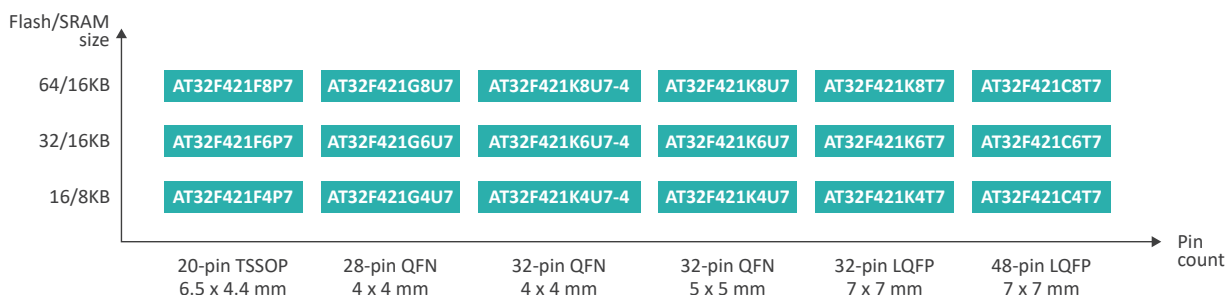
(1) F/H: Full Duplex I²S / Half Duplex I²S

AT32F421

AT32F421 series is based on ARM® Cortex®-M4 32-bit core operating at a frequency of up to 120 MHz. This device features a digital signal processor (DSP), up to 64 KB Flash memory and 16 KB SRAM. In addition, it boasts up to 2x USARTs, 2x SPIs/I²Ss, 2x I²Cs, 1x 16-bit advanced timer, 5x 16-bit general-purpose timers, 1x high-speed rail to rail input/output analog comparator, and 1x 12-bit 15-channel high-speed 2 Msps ADC to fully meet the requirements of high-speed data collection, mixed signal processing, industrial control and motor applications. Almost fast I/Os are 5V – tolerant, offering various optional functions such as port remapping. With all this, the AT32F421 series provides users with excellent performance and ease of use for a variety of applications.

AT32F421 series also embeds a Security Library (sLib) developed by ARTERY, allowing users to program any part of the internal Flash memory protected by such mechanism. This security library is code-executable but non-readable, making it more secure for the solution providers to write core algorithm in it, but also be more convenient for them to carry out second-level development. The device can operate in the temperature range of -40 to 105 °C, and provides a wide range of chip selection, including packages such as LQFP48, LQFP32, QFN32 and QFN28, and mini TSSOP20 in response to diverse demands. The powerful on-chip resource allocation, higher integration and cost-effectiveness has made it stand out from the global market with keen competition.

- **Max Frequency** : 120 MHz
- **Operating Voltage** : 2.4-3.6 V
- **Operating Temperature** : -40 to 105 °C
- **Key Features** : ultra-value M4, 16 KB SRAM, 1x CMP, 12-bit ADC, hardware infrared (IR) timer, sLib
- **Main Applications** : IoT node, optical module, wireless charging, motor control, industrial automation, surveillance, household electric appliances, electronic toy, robot, 5G



Part No.	Frequency (MHz)	Flash (KB)	SRAM (KB)	I/O	Timer							Connectivity						Analog Interface			Package			
					Advanced TMR (16bit)	GP TMR (32bit)	GP TMR (16bit)	Basic TMR (16bit)	Systick (24bit)	WDT	WWDT	RTC (Enhanced)	I ² C	SPI	(1)/F/(H) I ² S	USART/UART	OTG	CAN	IR TMR	ADC Engine		12-bit ADC ch.	DAC Engine	CMP
AT32F421F4P7	120	16	8	15	1	-	5	1	1	1	1	1	2	1	0/1	1/1	-	-	1	1	9	-	1	TSSOP20 6.5 x 4.4 mm
AT32F421F6P7	120	32	16	15	1	-	5	1	1	1	1	2	1	0/1	1/1	-	-	1	1	9	-	1		
AT32F421F8P7	120	64	16	15	1	-	5	1	1	1	1	2	1	0/1	1/1	-	-	1	1	9	-	1		
AT32F421G4U7	120	16	8	23	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	10	-	1	QFN28 4 x 4 mm	
AT32F421G6U7	120	32	16	23	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	10	-	1		
AT32F421G8U7	120	64	16	23	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	10	-	1		
AT32F421K4U7-4	120	16	8	27	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	11	-	1	QFN32 4 x 4 mm	
AT32F421K6U7-4	120	32	16	27	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	11	-	1		
AT32F421K8U7-4	120	64	16	27	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	11	-	1		
AT32F421K4U7	120	16	8	27	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	11	-	1	QFN32 5 x 5 mm	
AT32F421K6U7	120	32	16	27	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	11	-	1		
AT32F421K8U7	120	64	16	27	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	11	-	1		
AT32F421K4T7	120	16	8	25	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	10	-	1	LQFP32 7 x 7 mm	
AT32F421K6T7	120	32	16	25	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	10	-	1		
AT32F421K8T7	120	64	16	25	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	10	-	1		
AT32F421C4T7	120	16	8	39	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	15	-	1	LQFP48 7 x 7 mm	
AT32F421C6T7	120	32	16	39	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	15	-	1		
AT32F421C8T7	120	64	16	39	1	-	5	1	1	1	1	2	2	0/2	2/0	-	-	1	1	15	-	1		

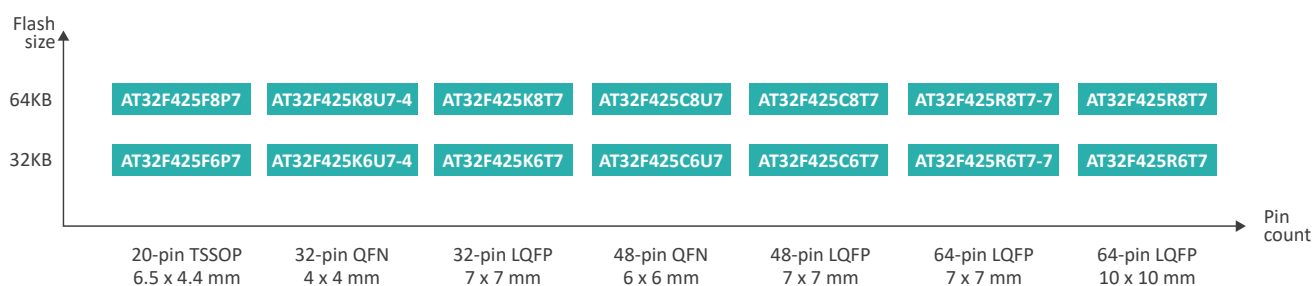
(1) F/H: Full Duplex I²S / Half Duplex I²S

AT32F425

AT32F425 (value line) series is based on ARM® Cortex®-M4 32-bit core operating at a frequency of up to 96 MHz. This device features a digital signal processor (DSP), up to 64 KB Flash memory and 20 KB SRAM (parity check support). Besides, it embeds a 4 KB system memory that can not only act as a Bootloader, but also can be configurable as user instruction and data memory at one time, achieving a maximum of 64 + 4 KB of space. Meanwhile, it boasts 1x OTG controller (support Xtal-less in device mode), 1x CAN, 4x USARTs, 3x SPIs/I²Ss (support full-duplex), 2x I²Cs, 1x 16-bit advanced timer, 6x 16-bit and 1x32-bit general-purpose timers, 2x 16-bit basic timers, with the combination of timers being used as independent 24-channel PWM output, and 1x 12-bit 16-channel high-speed 2 Msps ADC. What's more, almost fast I/Os are 5 V-tolerant with multiple port remapping, far beyond its counterparts in the field of USB OTG.

The AT32F425 device can operate in the temperature range of -40 to 105 °C, with the provision of a wide range of chip selection, including LQFP64, LQFP48, QFN48, LQFP32, QFN32, and mini TSSOP20 package types in response to diverse demands. Its powerful on-chip resource allocation, higher integration and cost-effectiveness has made itself get an edge on the competition in the global market. With this, this device is also especially suitable to applications that require high-speed computation and USB function such as gaming, industrial automation, motor control, IoT and consumer electronics.

- Max Frequency : 96 MHz
- Operating Supply : 2.4-3.6 V
- Operating Temperature :-40-105°C
- Key Features : 64+4 KB Flash, 20 KB SRAM, USB OTG, CAN, 4x USARTs, 12-bit ADC, sLib
- Main Applications : gaming keyboard, gaming mouse, USB accessories, micro printer, OBD, industrial control, motor control, 5G



Part No.	Frequency (MHz)	Flash (KB)	SRAM (KB)	I/O	Timer								Connectivity					Analog Interface		Package		
					Advanced TMR (16bit)	GP TMR (32bit)	GP TMR (16bit)	Basic TMR (16bit)	Systick (24bit)	WDT	WWDT	RTC (Enhanced)	I ² C	SPI	(I ² S/F/H) ^{1,2}	USART/UART	OTG	CAN	IRTTM		(3) ADC Engine	12-bit ADC ch.
AT32F425F6P7	96	32	20	15	1	1	6	2	1	1	1	1	2	2	0/2	2/2	FS	1	1	1	9	TSSOP20 6.5 x 4.4 mm
AT32F425F8P7	96	64	20	15	1	1	6	2	1	1	1	1	2	2	0/2	2/2	FS	1	1	1	9	TSSOP20 6.5 x 4.4 mm
AT32F425K6U7-4	96	32	20	27	1	1	6	2	1	1	1	1	2	3	0/3	4/0	FS	1	1	1	10	QFN32 4 x 4 mm
AT32F425K8U7-4	96	64	20	27	1	1	6	2	1	1	1	1	2	3	0/3	4/0	FS	1	1	1	10	QFN32 4 x 4 mm
AT32F425K6T7	96	32	20	25	1	1	6	2	1	1	1	1	2	3	0/3	4/0	FS	1	1	1	10	LQFP32 7 x 7 mm
AT32F425K8T7	96	64	20	25	1	1	6	2	1	1	1	1	2	3	0/3	4/0	FS	1	1	1	10	LQFP32 7 x 7 mm
AT32F425C6U7	96	32	20	39	1	1	6	2	1	1	1	1	2	3	0/3	4/0	FS	1	1	1	10	QFN48 6 x 6 mm
AT32F425C8U7	96	64	20	39	1	1	6	2	1	1	1	1	2	3	0/3	4/0	FS	1	1	1	10	QFN48 6 x 6 mm
AT32F425C6T7	96	32	20	39	1	1	6	2	1	1	1	1	2	3	0/3	4/0	FS	1	1	1	10	LQFP48 7 x 7 mm
AT32F425C8T7	96	64	20	39	1	1	6	2	1	1	1	1	2	3	0/3	4/0	FS	1	1	1	10	LQFP48 7 x 7 mm
AT32F425R6T7-7	96	32	20	55	1	1	6	2	1	1	1	1	2	3	0/3	4/0	FS	1	1	1	16	LQFP64 7 x 7 mm
AT32F425R8T7-7	96	64	20	55	1	1	6	2	1	1	1	1	2	3	0/3	4/0	FS	1	1	1	16	LQFP64 7 x 7 mm
AT32F425R6T7	96	32	20	55	1	1	6	2	1	1	1	1	2	3	0/3	4/0	FS	1	1	1	16	LQFP64 10 x 10 mm
AT32F425R8T7	96	64	20	55	1	1	6	2	1	1	1	1	2	3	0/3	4/0	FS	1	1	1	16	LQFP64 10 x 10 mm

(1) F/H: Full Duplex I²S / Half Duplex I²S

(2) Each 2 Half Duplex could be combined with 1 Full Duplex

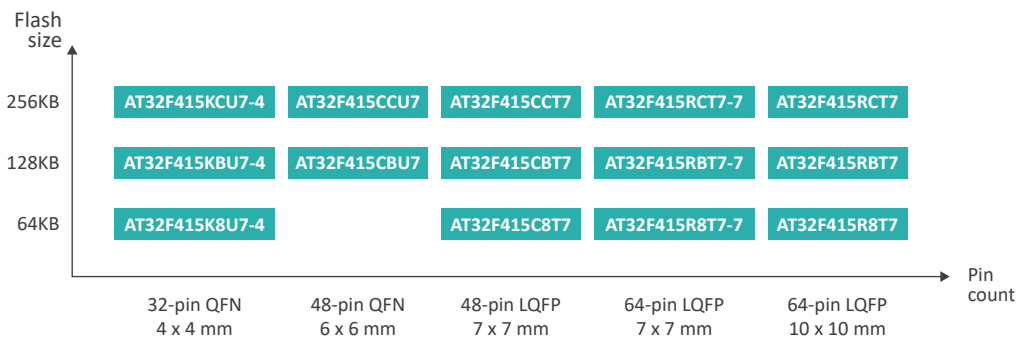
(3) 5.33 Msps ADC

AT32F415

AT32F415 (value line) series is based on ARM® Cortex®-M4 32-bit core operating at a frequency of up to 150 MHz. This device features a digital signal processor (DSP), up to 256 KB Flash memory and 32 KB SRAM. It boasts up to 5x UARTs, 2x SPIs/I²Ss, 2x I²Cs, 1x SDIO, 1x CAN, 1x 16-bit advanced timer, 5x 16-bit and 2x 32-bit general-purpose timers, 1x 14-channel DMA controller, 2x high-speed rail to rail input/output analog voltage comparators, 1x 12-bit 16-channel high-speed 2 Msps ADC. Almost fast I/Os are 5V-tolerant that support high-speed data collection and mixed signal processing, among others, with the competitive edge far beyond its counterparts in the field of USB OTG MCU.

AT32F415 devices can perform well in the temperature range of -40 to 105 °C, with the provision of a wide range of chip selection, including packages such as LQFP64, LQFP48, QFN48 and QFN32 in response to diverse demands. With powerful on-chip resource allocation, higher integration and cost-effectiveness, the AT32F415 series is particularly useful for applications that require high-speed computation and USB function such as gaming, industrial automation, motor control, IoT and consumer electronics.

- **Max Frequency** : 150 MHz
- **Operating Voltage** : 2.6-3.6 V
- **Operating Temperature** : -40 to 105 °C
- **Key Features** : 32 KB SRAM, USB OTG, 2x CMPs, CAN, 12-bit ADC, ERTC, sLib
- **Main Applications** : micro printer, barcode scanner, electric scooter controller, gaming keyboard/mouse, gaming pad, PC accessories, industrial control, surveillance, 5G



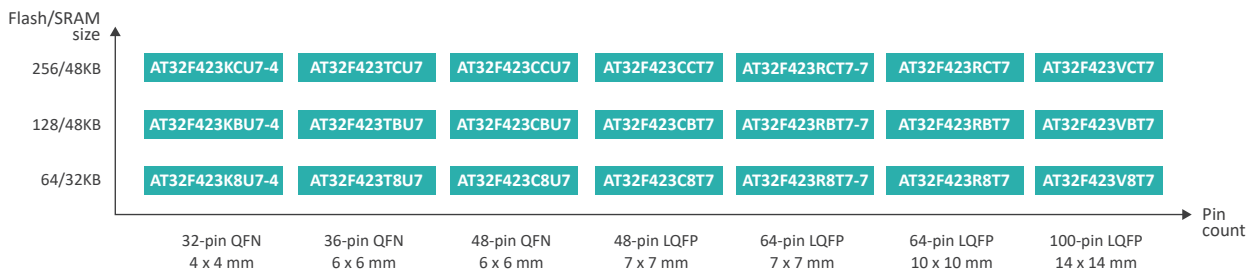
Part No.	Frequency (MHz)	Flash (KB)	SRAM (KB)	I/O	Timer							Connectivity							Analog Interface			SPIM	Package		
					Advanced TMR (16bit)	GP TMR (32bit)	GP TMR (16bit)	Basic TMR (16bit)	Systick (24bit)	WDT	WWDT	RTC (Enhanced)	I ² C	SPI	(1) F/H I ² S	USART/UART	SDIO	OTG	CAN	ADC Engine	12-bit ADC ch.			DAC Engine	CMP
AT32F415K8U7-4	150	64	32	27	1	2	5	-	1	1	1	1	2	2	0/2	2/0	1	FS	1	1	10	-	2	-	QFN32 4 x 4 mm
AT32F415KBU7-4	150	128	32	27	1	2	5	-	1	1	1	1	2	2	0/2	2/0	1	FS	1	1	10	-	2	-	
AT32F415KCU7-4	150	256	32	27	1	2	5	-	1	1	1	1	2	2	0/2	2/0	1	FS	1	1	10	-	2	-	
AT32F415CBU7	150	128	32	39	1	2	5	-	1	1	1	1	2	2	0/2	3/0	1	FS	1	1	10	-	2	-	QFN48 6 x 6 mm
AT32F415CCU7	150	256	32	39	1	2	5	-	1	1	1	1	2	2	0/2	3/0	1	FS	1	1	10	-	2	-	
AT32F415C8T7	150	64	32	39	1	2	5	-	1	1	1	1	2	2	0/2	3/0	1	FS	1	1	10	-	2	-	LQFP48 7 x 7 mm
AT32F415CBT7	150	128	32	39	1	2	5	-	1	1	1	1	2	2	0/2	3/0	1	FS	1	1	10	-	2	-	
AT32F415CCT7	150	256	32	39	1	2	5	-	1	1	1	1	2	2	0/2	3/0	1	FS	1	1	10	-	2	-	
AT32F415R8T7-7	150	64	32	55	1	2	5	-	1	1	1	1	2	2	0/2	3/2	1	FS	1	1	16	-	2	-	LQFP64 7 x 7 mm
AT32F415RBT7-7	150	128	32	55	1	2	5	-	1	1	1	1	2	2	0/2	3/2	1	FS	1	1	16	-	2	-	
AT32F415RCT7-7	150	256	32	55	1	2	5	-	1	1	1	1	2	2	0/2	3/2	1	FS	1	1	16	-	2	-	
AT32F415R8T7	150	64	32	55	1	2	5	-	1	1	1	1	2	2	0/2	3/2	1	FS	1	1	16	-	2	-	LQFP64 10 x 10 mm
AT32F415RBT7	150	128	32	55	1	2	5	-	1	1	1	1	2	2	0/2	3/2	1	FS	1	1	16	-	2	-	
AT32F415RCT7	150	256	32	55	1	2	5	-	1	1	1	1	2	2	0/2	3/2	1	FS	1	1	16	-	2	-	

(1) F/H: Full Duplex I²S / Half Duplex I²S

AT32F423 series is based on ARM® Cortex®-M4 core operating at a frequency of up to 120 MHz. This device features a single-precision floating point unit (FPU), digital signal processor (DSP), up to 256 KB Flash memory and 48 KB SRAM. Besides, it embeds a 20 KB system memory that can not only act as a Bootloader, but also can be configurable as user instruction and data memory at one time, achieving a maximum of 256 + 20 KB of space. It has an extensive range of peripherals that enhance connectivity, and incorporates XMC interface (extend PSRAM and NOR memories, or 8080/6800 mode parallel LCD), 1x OTG controller (support Xtal-less in device mode), 2x CANs, 8x UARTs, 3x SPIs/I²Ss (full-duplex support), 3x I²Cs, 1x 16-bit advanced timer, 8x 16-bit general-purpose timers, 1x 32-bit general-purpose timer, 2x 16-bit basic timers, 1x 12-bit 24-channel high-speed 5.33 Msps ADC, 2x 12-bit DACs and independent VBAT battery-powered domain. Almost fast I/Os are 5 V – tolerant, offering various optional functions such as port remapping. With all this, the AT32F423 series provide users with outstanding performance and reliability at attractive prices.

AT32F423 series also embeds a Security Library (sLib) developed by ARTERY, allowing users to program any part of the internal Flash memory protected by such mechanism. This security library is code-executable but non-readable, making it more secure for the solution providers to write core algorithm in it, but also be more convenient for them to carry out second-level development. The device operates in the temperature range of -40 to 105 °C , and provides a wide range of chip selection, including packages such as LQFP100, LQFP64, LQFP48, QFN48, QFN36 and QFN32 to meet diverse demands. With all this, the AT32F423 series will be undoubtedly the best choice for industrial automation, motor control, IoT, consumer electronics, among others.

- **Max Frequency :** 120 MHz
- **Operating Voltage :** 2.4-3.6 V
- **Operating Temperature :** -40 to 105 °C
- **Key Features :** 24-channel 5.33 Msps ADC engine, 2x DACs, USB OTG, 8x UARTs, 2x CANs and XMC
- **Main Applications :** sweeping robot, LED control card, household electric appliances, motor control, industrial automation, industrial control, surveillance, robot, 5G



Part No.	Frequency (MHz)	Flash (KB)	SRAM (KB)	I/O	Timer								Connectivity						Analog Interface			XMC	Package	
					Advanced	GP TMR (32bit)	GP TMR (16bit)	Basic TMR (16bit)	Systick (24bit)	WDT	WWDT	RTC (Enhanced)	I ² C	SPI	(4x2) I ² S	USART/UART	CAN	OTG	IR TMR	(3) ADC Engine	12-bit ADC ch.			DAC Engine
AT32F423K8U7-4	120	64	32	27	1	1	8	2	1	1	1	1	3	3	0/3	4/3	2	FS	1	1	11	2	-	QFN32 4 x 4 mm
AT32F423KBU7-4	120	128	48	27	1	1	8	2	1	1	1	1	3	3	0/3	4/3	2	FS	1	1	11	2	-	QFN36 6 x 6 mm
AT32F423KCU7-4	120	256	48	27	1	1	8	2	1	1	1	1	3	3	0/3	4/3	2	FS	1	1	11	2	-	QFN48 6 x 6 mm
AT32F423T8U7	120	64	32	29	1	1	8	2	1	1	1	1	3	3	0/3	4/3	2	FS	1	1	11	2	-	QFN36 6 x 6 mm
AT32F423TBU7	120	128	48	29	1	1	8	2	1	1	1	1	3	3	0/3	4/3	2	FS	1	1	11	2	-	QFN48 6 x 6 mm
AT32F423TCU7	120	256	48	29	1	1	8	2	1	1	1	1	3	3	0/3	4/3	2	FS	1	1	11	2	-	QFN48 6 x 6 mm
AT32F423C8U7	120	64	32	39	1	1	8	2	1	1	1	1	3	3	0/3	4/3	2	FS	1	1	17	2	-	LQFP48 7 x 7 mm
AT32F423CBU7	120	128	48	39	1	1	8	2	1	1	1	1	3	3	0/3	4/3	2	FS	1	1	17	2	-	LQFP48 7 x 7 mm
AT32F423CCU7	120	256	48	39	1	1	8	2	1	1	1	1	3	3	0/3	4/3	2	FS	1	1	17	2	-	LQFP48 7 x 7 mm
AT32F423C8T7	120	64	32	39	1	1	8	2	1	1	1	1	3	3	0/3	4/3	2	FS	1	1	17	2	-	LQFP64 7 x 7 mm
AT32F423CBT7	120	128	48	39	1	1	8	2	1	1	1	1	3	3	0/3	4/3	2	FS	1	1	17	2	-	LQFP64 7 x 7 mm
AT32F423CCT7	120	256	48	39	1	1	8	2	1	1	1	1	3	3	0/3	4/3	2	FS	1	1	17	2	-	LQFP64 7 x 7 mm
AT32F423R8T7-7	120	64	32	53	1	1	8	2	1	1	1	1	3	3	0/3	5/3	2	FS	1	1	23	2	1	LQFP64 7 x 7 mm
AT32F423RBT7-7	120	128	48	53	1	1	8	2	1	1	1	1	3	3	0/3	5/3	2	FS	1	1	23	2	1	LQFP64 7 x 7 mm
AT32F423RCT7-7	120	256	48	53	1	1	8	2	1	1	1	1	3	3	0/3	5/3	2	FS	1	1	23	2	1	LQFP64 7 x 7 mm
AT32F423R8T7	120	64	32	53	1	1	8	2	1	1	1	1	3	3	0/3	5/3	2	FS	1	1	23	2	1	LQFP64 10 x 10 mm
AT32F423RBT7	120	128	48	53	1	1	8	2	1	1	1	1	3	3	0/3	5/3	2	FS	1	1	23	2	1	LQFP64 10 x 10 mm
AT32F423RCT7	120	256	48	53	1	1	8	2	1	1	1	1	3	3	0/3	5/3	2	FS	1	1	23	2	1	LQFP64 10 x 10 mm
AT32F423V8T7	120	64	32	87	1	1	8	2	1	1	1	1	3	3	0/3	8/0	2	FS	1	1	24	2	1	LQFP100 14 x 14 mm
AT32F423VBT7	120	128	48	87	1	1	8	2	1	1	1	1	3	3	0/3	8/0	2	FS	1	1	24	2	1	LQFP100 14 x 14 mm
AT32F423VCT7	120	256	48	87	1	1	8	2	1	1	1	1	3	3	0/3	8/0	2	FS	1	1	24	2	1	LQFP100 14 x 14 mm

(1) F/H: Full Duplex I²S / Half Duplex I²S
 (2) Each 2 Half Duplex could be combined with 1 Full Duplex

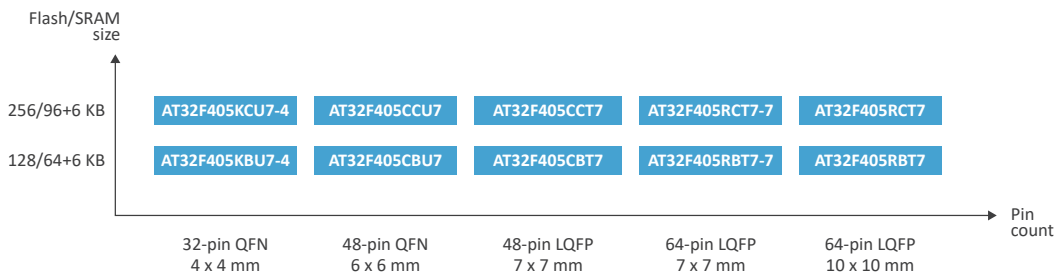
(3) 5.33 Msps ADC
 (4) Sample available in 2022/Q4

AT32F405

AT32F405 series is based on ARM® Cortex®-M4 core operating at a frequency of up to 168 MHz. This device features a single-precision floating point unit (FPU), digital signal processor (DSP), up to 256 KB Flash memory and 96+6KB SRAM (parity check support). Besides, it embeds a 20 KB system memory that can not only act as a Bootloader, but also can be configurable as user instruction and data memory at one time, achieving a maximum of 256 + 20 KB of space. It embeds HS USB OTG (internal PHY) and FS USB OTG (internal PHY) (support Xtal-less in device mode), and features an extensive range of peripherals that enhance connectivity, including 1x QSPI, 1x CAN, 8x UARTs, 3x SPIs/I²Ss, 1x I²S (full-duplex support), 3x I²Cs, 1x 16-bit advanced timer, 7x 16-bit general-purpose timers, 1x 32-bit general-purpose timer, 2x 16-bit basic timers, and 1x 12-bit 16-channel high-speed 2MSPS ADC. Almost fast I/Os are 5 V – tolerant that support port remapping, beating its counterparts in the market.

AT32F405 series also embeds a Security Library (sLib) developed by ARTERY, allowing users to program any part of the internal Flash memory protected by such mechanism. This security library is code-executable but non-readable, making it more secure for the solution providers to write core algorithm in it, but also be more convenient for them to carry out second-level development. The device operates in the temperature range of -40 to 105 °C, and provides a wide range of chip selection, including packages such as LQFP64, LQFP48, QFN48 and QFN32 to meet diverse demands. All this has made AT32F405 series best suited for high-speed USB applications like gaming, industrial automation, motor control, IoT, consumer electronics, among others.

- **Max Frequency :** 168 MHz
- **Operating Voltage :** 2.4-3.6 V
- **Operating Temperature :** -40 to 105 °C
- **Key Features :** 96+6KB SRAM, FS+HS USB OTG (embedded PHY), QSPI, full-duplexed I²S, 8x UARTS, CAN
- **Main Applications :** gaming keyboard/mouse, gaming pad, PC accessories, LED control card, audio, micro printer, barcode scanner, industrial control, surveillance, 5G



Part No.	Frequency (MHz)	Flash (KB)	SRAM (KB)	I/O	QSPI	Timer							Connectivity							Analog Interface		Package		
						Advanced TMR (16bit)	GPTMR (32bit)	GPTMR (16bit)	Basic TMR (16bit)	Systick (24bit)	WDT	WWDT	RTC (Enhanced)	I ² C	SPI	(D/H) I ² S	USART/UART	OTGHS	OTGFS	CAN	I ² TMR		ADC Engine	12-bit ADC ch.
AT32F405KBU7-4	168	128	64+6	25	1	1	1	7	2	1	1	1	1	3	2	1/2	5/2	1	1	1	1	1	10	QFN32 4x4 mm
AT32F405KCU7-4	168	256	96+6	25	1	1	1	7	2	1	1	1	1	3	2	1/2	5/2	1	1	1	1	1	10	QFN32 4x4 mm
AT32F405CBU7	168	128	64+6	37	1	1	1	7	2	1	1	1	1	3	3	1/3	5/2	1	1	1	1	1	10	QFN48 6x6 mm
AT32F405CCU7	168	256	96+6	37	1	1	1	7	2	1	1	1	1	3	3	1/3	5/2	1	1	1	1	1	10	QFN48 6x6 mm
AT32F405CBT7	168	128	64+6	37	1	1	1	7	2	1	1	1	1	3	3	1/3	5/2	1	1	1	1	1	10	LQFP48 7x7 mm
AT32F405CCT7	168	256	96+6	37	1	1	1	7	2	1	1	1	1	3	3	1/3	5/2	1	1	1	1	1	10	LQFP48 7x7 mm
AT32F405RBT7-7	168	128	64+6	53	1	1	1	7	2	1	1	1	1	3	3	1/3	6/2	1	1	1	1	1	16	LQFP64 7x7 mm
AT32F405RCT7-7	168	256	96+6	53	1	1	1	7	2	1	1	1	1	3	3	1/3	6/2	1	1	1	1	1	16	LQFP64 7x7 mm
AT32F405RBT7	168	128	64+6	53	1	1	1	7	2	1	1	1	1	3	3	1/3	6/2	1	1	1	1	1	16	LQFP64 10x10 mm
AT32F405RCT7	168	256	96+6	53	1	1	1	7	2	1	1	1	1	3	3	1/3	6/2	1	1	1	1	1	16	LQFP64 10x10 mm

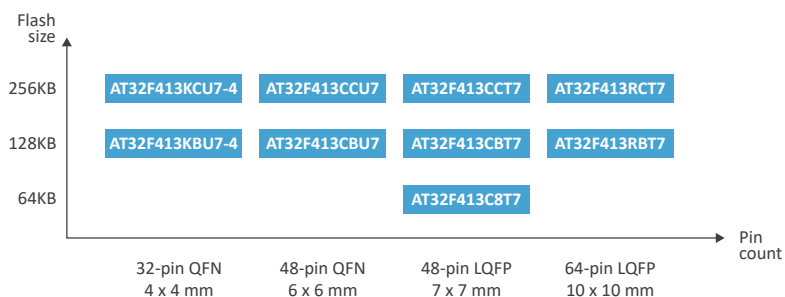
(1) F/H: Full Duplex I²S / Half Duplex I²S
(2) Sample available in 2023/Q1

AT32F413

AT32F413 series is based on ARM® Cortex®-M4 32-bit core operating at a frequency of up to 200 MHz. This device features a single-precision floating point unit (FPU), digital signal processor (DSP), rich peripherals and flexible clock control mechanism. It embeds up to 256 KB Flash memory and 64 KB SRAM, and up to 16 MB SPIM extend memory. The zero-wait Flash memory access, in particular, goes far beyond its counterparts. The device has an extensive range of peripherals that enhance connectivity, and incorporates 1x USB interface, 2x CANs, 1x SDIO, 5x UARTs, 2x SPIs/I²Ss, 2x I²Cs, 1x 16-bit advanced timer, 5x 16-bit general-purpose timers, 2x 32-bit general-purpose timers, 2x 12-bit 16-channel high-speed 2 Msps ADC, and independent VBAT battery-powered domain. Almost fast I/Os are 5 V – tolerant, offering various optional functions such as port remapping. With all this, the AT32F413 series provide users with outstanding performance and reliability at attractive prices.

AT32F413 series also embeds a Security Library (sLib) developed by ARTERY, allowing users to program any part of the internal Flash memory protected by such mechanism. This security library is code-executable but non-readable, making it more secure for the solution providers to write core algorithm in it, but also be more convenient for them to carry out second-level development. The device operates in the temperature range of -40 to 105 °C, and provides a wide range of chip selection, including packages such as LQFP64, LQFP48, QFN48 and QFN32 to meet diverse demands. The AT32F413 series has been seen more applicable to those applications that require high-speed computation but appropriate prices, including consumer electronics, industrial automation, motor control, IoT, among others.

- Max Frequency : 200 MHz
- Operating Voltage : 2.6-3.6 V
- Operating Temperature : -40 to 105 °C
- Key Features : 64 KB SRAM, USB Xtal-less, sLib, 2x CANs, SPIM extend memory (program execution and data can be encrypted)
- Main Applications : micro printer, stage lighting, electric scooter controller, three-axis stabilizer, flight controller, industrial control, surveillance, 5G



Part No.	Frequency (MHz)	Flash (KB)	SRAM (KB)	I/O	Timer							Connectivity							Analog Interface			SPIM	Package		
					Advanced TMR (16bit)	GP TMR (32bit)	GP TMR (16bit)	Basic TMR (16bit)	Systick (24bit)	WDT	WWDT	RTC	I ² C	SPI	(1)F/H I ² S	USART/UART	SDIO	USB Device	CAN	ADC Engine	12-bit ADC ch.			DAC Engine	XMC
AT32F413KBU7-4	200	128	32/16/64	27	1	2	5	-	1	1	1	1	2	2	0/2	2/0	1	FS	2	2	10	-	-	1	QFN32 4 x 4 mm
AT32F413KCU7-4	200	256	32/16/64	27	1	2	5	-	1	1	1	1	2	2	0/2	2/0	1	FS	2	2	10	-	-	1	
AT32F413CBU7	200	128	32/16/64	39	1	2	5	-	1	1	1	1	2	2	0/2	3/0	1	FS	2	2	10	-	-	1	QFN48 6 x 6 mm
AT32F413CCU7	200	256	32/16/64	39	2	2	5	-	1	1	1	1	2	2	0/2	3/0	1	FS	2	2	10	-	-	1	
AT32F413C8T7	200	64	32	39	1	2	5	-	1	1	1	1	2	2	0/2	3/0	1	FS	2	2	10	-	-	1	LQFP48 7 x 7 mm
AT32F413CBT7	200	128	32/16/64	39	1	2	5	-	1	1	1	1	2	2	0/2	3/0	1	FS	2	2	10	-	-	1	
AT32F413CCT7	200	256	32/16/64	39	2	2	5	-	1	1	1	1	2	2	0/2	3/0	1	FS	2	2	10	-	-	1	
AT32F413RBT7	200	128	32/16/64	55	1	2	5	-	1	1	1	1	2	2	0/2	3/2	1	FS	2	2	16	-	-	1	LQFP64 10 x 10 mm
AT32F413RCT7	200	256	32/16/64	55	2	2	5	-	1	1	1	1	2	2	0/2	3/2	1	FS	2	2	16	-	-	1	

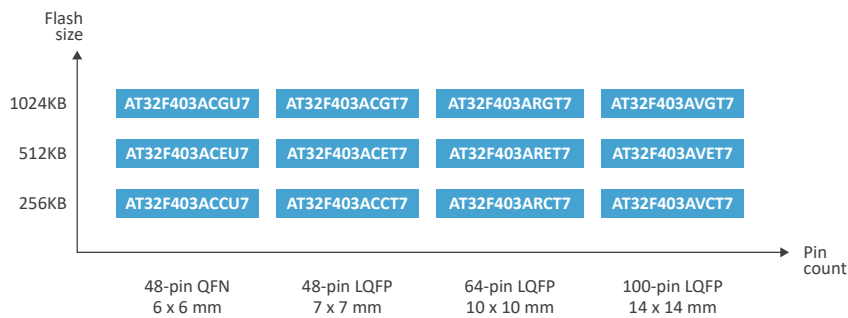
(1) F/H: Full Duplex I²S / Half Duplex I²S

AT32F403A

AT32F403A series is based on ARM® Cortex®-M4 32-bit core and advanced process, operating at a frequency of up to 240 MHz. With the internal single precision floating-point unit (FPU) and digital signal processor (DSP), it is also provided with rich peripherals and flexible clock control mechanism for a wide range of applications. More than that, it boasts excellent memory design supporting up to 1 MB Flash memory and 224 KB SRAM, in particularly its zero-wait Flash access far beyond its counterparts in terms of performance.

Apart from higher performance, AT32F403A series features 8x UARTs and 2x CANs for IoT applications. The USB device applications, without the need of external crystal oscillators, can not only enhance the reliability of terminal products but reduce costs as well. AT32F403A devices can perform well in the temperature range of -40 to 105 °C . It also provides a variety of chips for selection in response to diverse memory requirements, with powerful on-chip resource allocation, higher integration and cost-effectiveness. With this, the AT32F403A series is undoubtedly the top choice for applications that seek for higher performance but lower price, including industrial automation, motor control, IoT and consumer electronics.

- **Max Frequency** : 240 MHz
- **Operating Voltage** : 2.6-3.6 V
- **Operating Temperature** : -40 to 105 °C
- **Key Features** : 1 MB Flash, 224 KB SRAM, 3x 12-bit ADC engine, 8x UARTs, 2x CANs, XMC, USB Xtal-less, SPIM extend memory (program execution and data can be encrypted), sLib
- **Main Applications** : sweeping robot, micro printer, stage lighting, HMI, LED display, QR code scanner, electric scooter controller, flight controller, industrial control, 5G



Part No.	Frequency (MHz)	Flash (KB)	SRAM (KB)	I/O	Timer								Connectivity						Analog Interface			SPIM	Package		
					Advanced TMR (16bit)	GPTMR (32bit)	GPTMR (16bit)	Basic TMR (16bit)	Systick (24bit)	WDT	WWDT	RTC	I ² C	SPI	(1)F/H) I ² S	USART/UART	SDIO	USB Device	CAN	ADC Engine	12-bit ADC ch.			DAC Engine	XMC
AT32F403ACCU7	240	256	96/224	37	2	2	8	2	1	1	1	1	3	4	2/2	3/4	1	FS	2	3	10	2	-	1	QFN48 6 x 6 mm
AT32F403ACEU7	240	512	96/224	37	2	2	8	2	1	1	1	1	3	4	2/2	3/4	1	FS	2	3	10	2	-	1	
AT32F403ACGU7	240	1024	96/224	37	2	2	8	2	1	1	1	1	3	4	2/2	3/4	1	FS	2	3	10	2	-	1	LQFP48 7 x 7 mm
AT32F403ACCT7	240	256	96/224	37	2	2	8	2	1	1	1	1	3	4	2/2	3/4	1	FS	2	3	10	2	-	1	
AT32F403ACET7	240	512	96/224	37	2	2	8	2	1	1	1	1	3	4	2/2	3/4	1	FS	2	3	10	2	-	1	LQFP64 10 x 10 mm
AT32F403ACGT7	240	1024	96/224	37	2	2	8	2	1	1	1	1	3	4	2/2	3/4	1	FS	2	3	10	2	-	1	
AT32F403ARCT7	240	256	96/224	51	2	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FS	2	3	16	2	1	1	LQFP64 10 x 10 mm
AT32F403ARET7	240	512	96/224	51	2	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FS	2	3	16	2	1	1	
AT32F403ARGT7	240	1024	96/224	51	2	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FS	2	3	16	2	1	1	LQFP100 14 x 14 mm
AT32F403AVCT7	240	256	96/224	80	2	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FS	2	3	16	2	1	1	
AT32F403AVET7	240	512	96/224	80	2	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FS	2	3	16	2	1	1	LQFP100 14 x 14 mm
AT32F403AVGT7	240	1024	96/224	80	2	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FS	2	3	16	2	1	1	

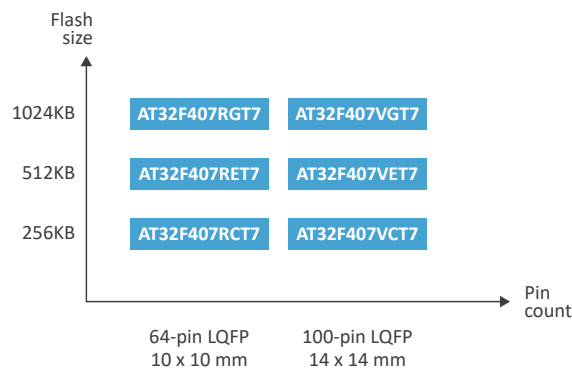
(1) F/H: Full Duplex I²S / Half Duplex I²S

AT32F407

AT32F407 series is based on ARM® Cortex®-M4 32-bit core operating at a frequency of up to 240 MHz. This device features a single-precision floating point unit (FPU), digital signal processor (DSP). It is also provided with rich peripherals and flexible clock control mechanism for a wide range of applications. More than that, it boasts excellent memory design supporting up to 1 MB Flash memory and 224 KB SRAM, in particularly its zero-wait Flash access far beyond its counterparts in terms of performance.

AT32F407 series features 8x UARTs, 2x CANs, IEEE-802.3 10/100 Mbps Ethernet port controllers for IoT applications. The USB device applications, without the need of external crystal oscillators, can not only enhance the reliability of terminal products but also reduce costs. The AT32F407 devices can also perform well in the temperature range of -40 to 105 °C, and provides a variety of chips for selection to meet diverse memory requirements through its powerful on-chip resource allocation, higher integration and cost-effectiveness. With this, the AT32F407 series is an excellent device for applications that seek for higher performance but lower price, including industrial automation, motor control, IoT and consumer electronics.

- Max Frequency : 240 MHz
- Operating Voltage : 2.6-3.6 V
- Operating Temperature : -40 to 105 °C
- Key Features : 1 MB Flash, 224 KB SRAM, 10/100 Mbps Ethernet, 3x ADC engines, 8x UARTs, 2x CANs, XMC, USB Xtal-less, SPI-M extend memory (execution program and data can be encrypted), sLib
- Main Applications : IoT gateway, serial server, micro printer, stage lighting, industrial control, surveillance, LED display, industrial robot, 5G



Part No.	Frequency (MHz)	Flash (KB)	SRAM (KB)	I/O	Timer								Connectivity								Analog Interface			Package		
					Advanced TMR (16bit)	GPTMR (32bit)	GPTMR (16bit)	Basic TMR (16bit)	Systick (24bit)	WDT	WWDT	RTC	I ² C	SPI	(1)F/H) I ² S	USART/UART	SDIO	USB Device	CAN	Ethernet MAC	ADC Engine	12-bit ADC ch.	DAC Engine		XMC	SPI-M
AT32F407RCT7	240	256	96/224	51	2	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FS	2	1	3	16	2	1	1	LQFP64 10 x 10 mm
AT32F407RET7	240	512	96/224	51	2	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FS	2	1	3	16	2	1	1	
AT32F407RGT7	240	1024	96/224	51	2	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FS	2	1	3	16	2	1	1	
AT32F407VCT7	240	256	96/224	80	2	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FS	2	1	3	16	2	1	1	LQFP100 14 x 14 mm
AT32F407VET7	240	512	96/224	80	2	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FS	2	1	3	16	2	1	1	
AT32F407VGT7	240	1024	96/224	80	2	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FS	2	1	3	16	2	1	1	

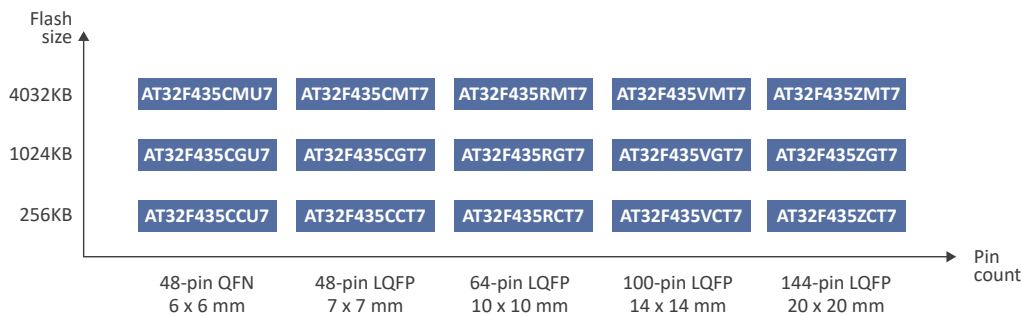
(1) F/H: Full Duplex I²S / Half Duplex I²S

AT32F435

As a microcontroller with excellent performance, AT32F435 series powered by ARM® Cortex®-M4 has brought about up to 288 MHz computing speed to the world. Featuring internal single precision floating-point unit (FPU), digital signal processor (DSP) and memory protection unit (MPU), it is provided with rich peripherals and flexible clock control mechanism for a wide range of applications. In particular, it supports up to 4032 KB Flash memory and 512 KB SRAM, far beyond its counterparts in terms of performance.

AT32F435 series incorporates 2x OTG controllers (Xtal-less in device mode), 2x QSPIs for external SPI Flash memory or SPI RAM extension, 8x UARTs, 2x CANs, 4x SPIs/I²Ss (2x full-duplex), 3x high-speed ADC engines (5.33 Msps), 8~14 bit digital video parallel interface (DVP). And XMC can be used for the extension of SDRAM, SRAM and PSRAM, greatly improving the reliability while lowering the costs. AT32F435 devices can perform well in the temperature range of -40 to 105 °C. It also provides a variety of chips for selection in response to diverse memory requirements, with powerful on-chip resource allocation, higher integration and cost-effectiveness. Bringing all this together, the AT32F435 series is of course the best solution partner for applications that seek for higher computation and larger memory including industrial automation, motor control, IoT and consumer electronics.

- **Max Frequency :** 288 MHz
- **Operating Supply :** 2.6-3.6V
- **Operating Temperature :** -40-105°C
- **Key Features :** 4032 KB Flash, 512 KB SRAM, SDRAM, 2x QSPI, 2x USB OTG, DVP, 3x 12-bit 5.33 Msps ADC engine, sLib
- **Main Applications :** sweeping robot, micro printer, stage lighting, HMI, LED display, QR code scanner, surveillance, industrial control, 5G



Part No.	Frequency (MHz)	Flash (KB)	SRAM (KB)	I/O	QSPI	Timer							Connectivity							Analog Interface			DVP	Package				
						Advanced TMR (16bit)	GP TMR (32bit)	GP TMR (16bit)	Basic TMR (16bit)	System (24bit)	WDT	WWDT	RTC (Enhanced)	I ² C	SPI	(1) F/H/I ² S	USART/UART	SDIO	OTG	CAN	IIR TMR	Ethernet MAC			(2) ADC Engine	12-bit ADC ch.	DAC Engine	XMC
AT32F435CCU7	288	256	384/512	39	2	3	2	8	2	1	1	1	1	3	4	2/2	3/4	2	FSx2	2	1	-	3	10	2	-	1	QFN48 6 x 6 mm
AT32F435CGU7	288	1024	384/512	39	2	3	2	8	2	1	1	1	1	3	4	2/2	3/4	2	FSx2	2	1	-	3	10	2	-	1	
AT32F435CMU7	288	4032	384/512	39	2	3	2	8	2	1	1	1	1	3	4	2/2	3/4	2	FSx2	2	1	-	3	10	2	-	1	
AT32F435CCT7	288	256	384/512	39	2	3	2	8	2	1	1	1	1	3	4	2/2	3/4	2	FSx2	2	1	-	3	10	2	-	1	LQFP48 7 x 7 mm
AT32F435CGT7	288	1024	384/512	39	2	3	2	8	2	1	1	1	1	3	4	2/2	3/4	2	FSx2	2	1	-	3	10	2	-	1	
AT32F435CMT7	288	4032	384/512	39	2	3	2	8	2	1	1	1	1	3	4	2/2	3/4	2	FSx2	2	1	-	3	10	2	-	1	
AT32F435RCT7	288	256	384/512	53	2	3	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	-	3	16	2	1	1	LQFP64 10 x 10 mm
AT32F435RGT7	288	1024	384/512	53	2	3	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	-	3	16	2	1	1	
AT32F435RMT7	288	4032	384/512	53	2	3	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	-	3	16	2	1	1	
AT32F435VCT7	288	256	384/512	84	2	3	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	-	3	16	2	1	1	LQFP100 14 x 14 mm
AT32F435VGT7	288	1024	384/512	84	2	3	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	-	3	16	2	1	1	
AT32F435VMT7	288	4032	384/512	84	2	3	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	-	3	16	2	1	1	
AT32F435ZCT7	288	256	384/512	116	2	3	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	-	3	24	2	1	1	LQFP144 20 x 20 mm
AT32F435ZGT7	288	1024	384/512	116	2	3	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	-	3	24	2	1	1	
AT32F435ZMT7	288	4032	384/512	116	2	3	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	-	3	24	2	1	1	

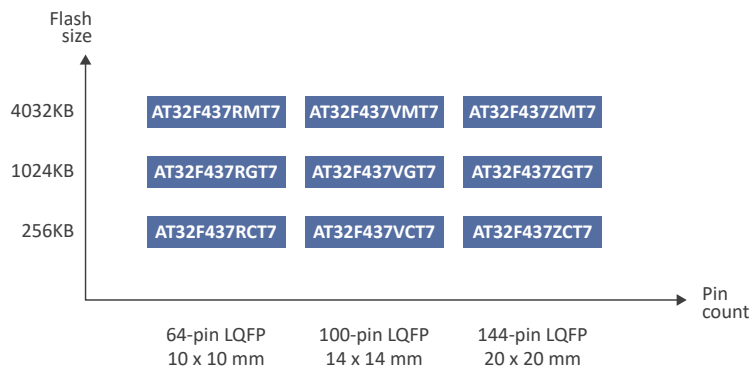
(1) F/H: Full Duplex I²S / Half Duplex I²S
(2) 5.33 Msps ADC

AT32F437

Ultra-high performance — AT32F437 series, powered by ARM® Cortex®-M4 core, has brought about up to 288 MHz computing speed to the world. Featuring internal single precision floating-point unit (FPU), digital signal processor (DSP) and memory protection unit (MPU), it is provided with rich peripherals and flexible clock control mechanism for a wide range of applications. In particular, it supports up to 4032 KB Flash memory and 512 KB SRAM, far beyond its counterparts in terms of performance.

AT32F437 series incorporates 2x OTG controllers (Xtal-less in device mode), 2x QSPIs for external SPI Flash memory or SPI RAM extension, 8x UARTs, 2x CANs, 4x SPIs/I²Ss (2x full-duplex), 3x high-speed ADC engines (5.33 Msps), 8~14-bit digital video parallel interface (DVP), XMC for the extension of SDRAM, SRAM and PSRAM, and IEEE-802.3 10/100Mbps Ethernet port controller for IoT applications, greatly improving the reliability while lowering the costs. AT32F437 devices can perform well in the temperature range of -40 to 105 °C. It also provides a variety of chips for selection in response to diverse memory requirements through its powerful on-chip resource allocation, higher integration and cost-effectiveness. Thanks to its outstanding performance, the AT32F437 series will be undoubtedly the best partner for applications that seek for higher computation and larger memory including industrial automation, motor control, IoT and consumer electronics.

- **Max Frequency** : 288 MHz
- **Operating Voltage** : 2.6-3.6V
- **Operating Temperature** : -40 to 105 °C
- **Key Features** : 4032 KB Flash, 512 KB SRAM, 10/100 Mbps Ethernet, SDRAM, 2x QSPI, 2x OTG, DVP, 3x 12-bit 5.33 Msps ADC, sLib
- **Main Applications** : IoT gateway, serial server, micro printer, stage lighting, HMI, LED display, QR code scanner, surveillance, industrial control, 5G



Part No.	Frequency (MHz)	Flash (KB)	SRAM (KB)	I/O	QSPI	Timer								Connectivity								Analog Interface			Package			
						Advanced TMR (16bit)	GPTMR (32bit)	GPTMR (16bit)	Basic TMR (16bit)	Systick (24bit)	WDT	WWDT	RTC (Enhanced)	I ² C	SPI	(1) F/H I ² S	USART/UART	SPIO	OTG	CAN	IRTMR	Ethernet MAC	(2) ADC Engine	12-bit ADC ch.		DAC Engine	XMC	DVP
AT32F437RCT7	288	256	384/512	53	2	3	2	8	2	1	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	1	3	16	2	1	1	LQFP64 10 x 10 mm
AT32F437RGT7	288	1024	384/512	53	2	3	2	8	2	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	1	3	16	2	1	1		
AT32F437RMT7	288	4032	384/512	53	2	3	2	8	2	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	1	3	16	2	1	1	LQFP100 14 x 14 mm	
AT32F437VCT7	288	256	384/512	84	2	3	2	8	2	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	1	3	16	2	1	1		
AT32F437VGT7	288	1024	384/512	84	2	3	2	8	2	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	1	3	16	2	1	1	LQFP144 20 x 20 mm	
AT32F437VMT7	288	4032	384/512	84	2	3	2	8	2	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	1	3	16	2	1	1		
AT32F437ZCT7	288	256	384/512	116	2	3	2	8	2	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	1	3	24	2	1	1	LQFP144 20 x 20 mm	
AT32F437ZGT7	288	1024	384/512	116	2	3	2	8	2	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	1	3	24	2	1	1		
AT32F437ZMT7	288	4032	384/512	116	2	3	2	8	2	1	1	1	3	4	2/2	4/4	2	FSx2	2	1	1	3	24	2	1	1		

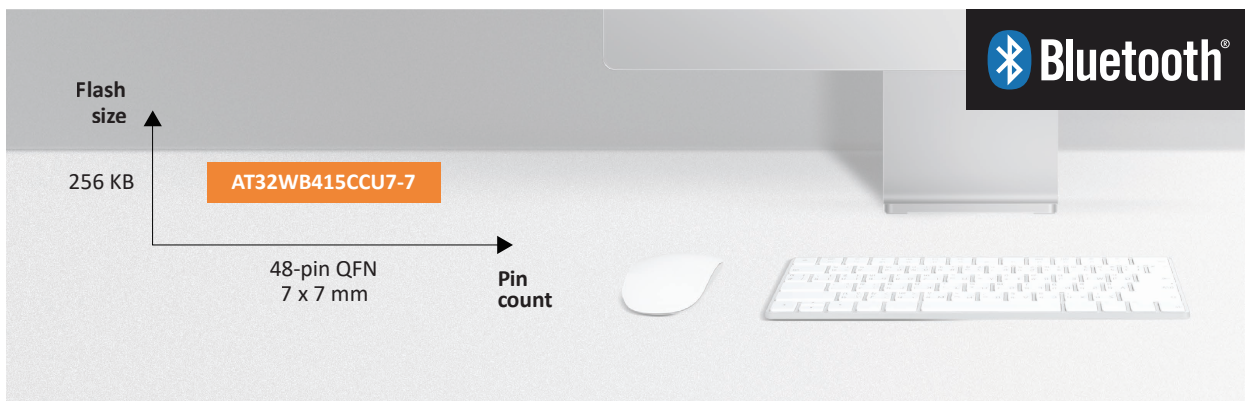
(1) F/H: Full Duplex I²S / Half Duplex I²S
(2) 5.33 Msps ADC

AT32WB415

AT32WB415 embeds a low-power radio that is compliant with Bluetooth Low Energy SIG specification 5.0. It contains rich communication interfaces, Bluetooth radio frequency (RF) transceiver and baseband features, delivering robust wireless data signal processing capability, with up to -97 dBm sensitivity in Bluetooth RX, and -20 dBm ~ +4 dBm in Bluetooth TX. The antenna embedded in the device can cover as far as 30m, up to 2Mbps, for powerful connectivity.

The device is based on ARM® Cortex®-M4 core operating at a frequency of up to 150 MHz. It integrates a digital signal processor (DSP) and memory protection unit (MPU), up to 256 KB Flash memory and 32 KB SRAM. The device also incorporates a Security Library (sLib) developed by ARTERY, allowing users to program any part of the internal Flash memory protected by such mechanism. This security library is code-executable but non-readable, making it more secure for the solution providers to write core algorithm in it, but also be more convenient for them to carry out second-level development. The device features a comprehensive range of peripherals, namely 1x 12-bit 8-channel ADC, 2x CMPs, 4x UARTs, 1x SPI, 1x I²C, 1x CAN, 1x advanced timer and 7x general-purpose timers. The AT32WB415 series operates in the temperature range of -40 to 105°C. Compared to legacy MCUs, in which functions are relatively scattered, AT32WB415 provides an all-in-one solution for the development of Bluetooth technology products. Besides, its reduced PCB size and the optimized RF layout will bring more excellent solutions for various applications such as consumer electronics, smart home, Internet of Things (IoT), among others.

- **Max Frequency** : 150 MHz
- **Operating Voltage** : 2.6-3.6 V
- **Operating Temperature** : -40 to 105 °C
- **Key Features** : Bluetooth 5.0, 256KB Flash, 32KB SRAM, 4x UARTs, USB OTG, CAN, 12-bit ADC, 2x CMPs
- **Main Applications** : IoT, wearables, PC accessories, household electric appliance, smart home, printer, electronic toy, robot



Part No.	Frequency (MHz)	Flash (KB)	SRAM (KB)	I/O	Timer							Connectivity					Analog Interface			Package				
					Advanced TM R(16bit)	GPTMR (32bit)	GPTMR (16bit)	Basic TMR (16bit)	Systick (24bit)	WDT	WWDT	RTC (Enhanced)	I ² C	SPI	(1)F/H)I ² S	USART/UART	CAN	OTG	ADC Engine		12-bit ADC ch.	DAC Engine	CMP	
AT32WB415CCU7-7	150	256	32	30	1	2	5	-	1	1	1	1	1	1	1	0/1	3/1	1	FS	1	8	-	2	QFN48 7x 7 mm

(1) F/H: Full Duplex I²S / Half Duplex I²S

Development Tools

Systematically, ARTERY provides a complete set of software (BSP, ICP/ISP) and hardware (AT-START board, SURF board and AT-Link Family) for engineers with the aim of making it easier the product development, programming and firmware upgrade.

▪ AT32F4xx Std library (BSP)

- | | | | | |
|---|---|--|---|---|
| <ul style="list-style-type: none"> - Project <ul style="list-style-type: none"> ▫ Applicable to AT32 MCU family ▫ Support Keil MDK, IAR EWARM ▫ Abundant example codes - Utilities <ul style="list-style-type: none"> ▫ sLib Demo, IAP Demo ▫ Random Number Generator Demo | <ul style="list-style-type: none"> - Middleware <ul style="list-style-type: none"> ▫ AT32 USB application cases ▫ Support RT-Thread Studio/OS ▫ Support FreeRTOS ▫ Support LittlevGL graphic library ▫ Support LwIP and FatFs | <ul style="list-style-type: none"> - IEC 60730 CLASSB software library <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> Start-up detection: <ul style="list-style-type: none"> ▫ CPU ▫ Watchdog ▫ Flash integrity ▫ RAM function ▫ System clock ▫ Control flow </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> Runtime detection: <ul style="list-style-type: none"> ▫ Partial CPU core registers ▫ Stack overflow ▫ System clock running ▫ Flash CRC segmented detection ▫ Watchdog ▫ Partial RAM self-check (through interrupt service routine) </td> </tr> </table> | <ul style="list-style-type: none"> Start-up detection: <ul style="list-style-type: none"> ▫ CPU ▫ Watchdog ▫ Flash integrity ▫ RAM function ▫ System clock ▫ Control flow | <ul style="list-style-type: none"> Runtime detection: <ul style="list-style-type: none"> ▫ Partial CPU core registers ▫ Stack overflow ▫ System clock running ▫ Flash CRC segmented detection ▫ Watchdog ▫ Partial RAM self-check (through interrupt service routine) |
| <ul style="list-style-type: none"> Start-up detection: <ul style="list-style-type: none"> ▫ CPU ▫ Watchdog ▫ Flash integrity ▫ RAM function ▫ System clock ▫ Control flow | <ul style="list-style-type: none"> Runtime detection: <ul style="list-style-type: none"> ▫ Partial CPU core registers ▫ Stack overflow ▫ System clock running ▫ Flash CRC segmented detection ▫ Watchdog ▫ Partial RAM self-check (through interrupt service routine) | | | |

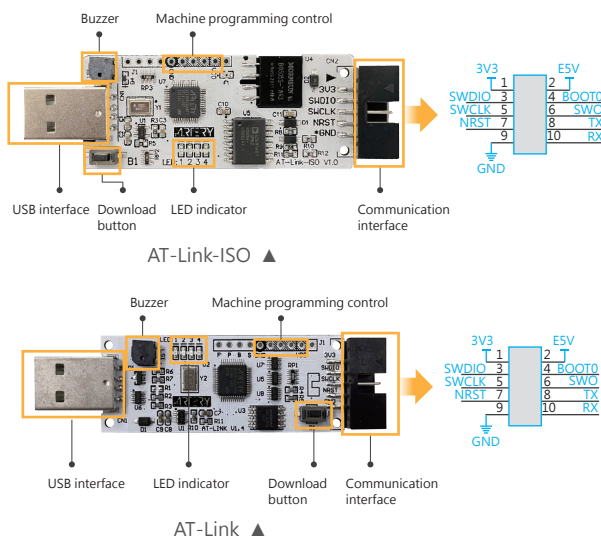
▪ In-Circuit / In-System Programming Tools

- | | |
|---|--|
| <ul style="list-style-type: none"> - ICP Tool(In-Circuit Programming) <ul style="list-style-type: none"> ▫ Program AT32 MCU using AT-Link / J-Link ▫ Program both Flash memory and SPIM Flash (Bank 3) ▫ Program Option Byte (load from file or device) ▫ Support sLib for secondary development and programming ▫ Auto detection of SWD speed through AT-Link ▫ AT-Link offline programming settings | <ul style="list-style-type: none"> - ISP Tool (In-System Programming) <ul style="list-style-type: none"> ▫ Update AT32 MCU via UART or USB DFU ▫ Program both Flash memory and SPIM Flash (Bank3) ▫ Support .hex/.bin file format ▫ Connect to multiple devices simultaneously (Multi-Port tool) |
|---|--|

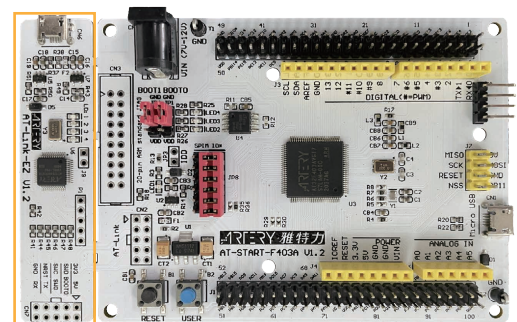
▪ AT-Link (Debugging / Programming Tool)

There are four kinds of tools available for debugging and programming (also called AT-Link Family). They are AT-Link-Pro, AT-Link-ISO, AT-Link and AT-Link-EZ. With various functions, the AT-Link Family, being small, portable, easy to operate, and stable, is particularly useful for AT32 MCU debugging and online/offline programming.

- AT-Link-Pro
 - IDE online debugging, online/offline programming, output voltage regulating, offline parameter settings and USB-to-serial interface
 - Support LCD display and touch operation
- AT-Link-ISO (enhanced isolation protection over AT-Link)
- AT-Link (online/offline programming)
- AT-Link-EZ (online programming is marked in yellow line)



AT-Link-Pro ▲



AT-Link-EZ ▲

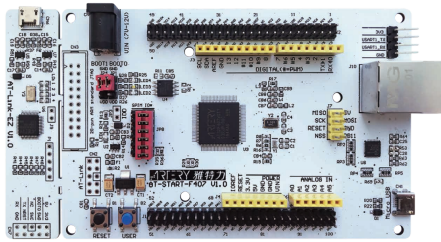
Development Tools

AT32 MCU Evaluation board

- AT-START

AT-START is a simple and easy-to-use evaluation / development kit with rich interfaces. It is compatible with Arduino™ interface, and Keil MDK and IAR EWARM environment.

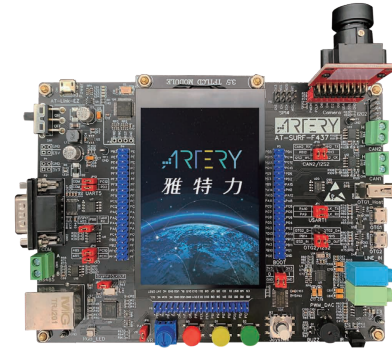
- Connect to main MCU using AT-Link/J-Link
- Compatible with Arduino™ Uno R3 hardware interface
- Update code using UART/USB DFU



AT-START ▲

- AT-SURF-F437

- 288MHz ultra-high speed/Extend 256Mb SDRAM onboard
- Digital camera/3.5-inch 480x320 TFT-LCD screen
- Standard communication interface (RS-232, RS-485 and dual CAN receiver/transmitter)
- Dual OTG and 10/100M Ethernet
- MIC / LINEIN / LINEOUT



AT-SURF-F437 ▲

AT32-Audio-EV

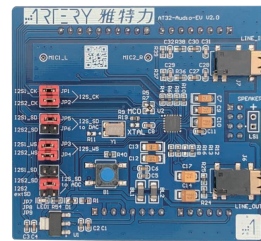
- AT32 Audio Evaluation Board

- Support multi-media playback through audio signal processing
- Standard Arduino™ Uno R3 extension interface
- Support 2 MIC input / LINE IN / LINEOUT

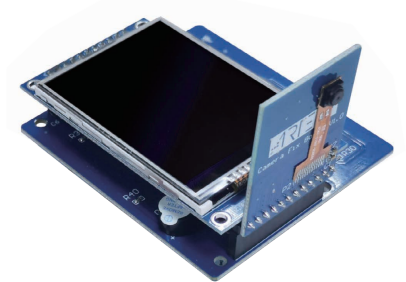
AT32-Video-EV

- AT32 Video Evaluation Board

- Support multiple image data processing applications
- Standard Arduino™ Uno R3 extension interface
- SPI interface QVGA CMOS Sensor
- 2.4-inch TFT LCD screen



AT32 Audio Evaluation Board ▲



AT32 Video Evaluation Board ▲

AT32-LCD-EV

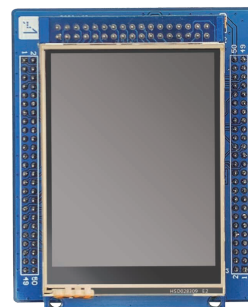
- AT32 LCD Evaluation Board

- 2.8-inch 240x320 TFT-LCD resistance touch screen

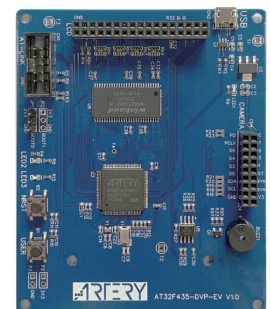
AT32F435-DVP-EV

- AT32F435 DVP Evaluation Board

- Built-in AT32F435VMT7 high-performance MCU
- 256Mb SDRAM on board
- 64Mb QSPI SRAM on board
- 8080 TFT-LCD screen
- Digital video parallel interface (DVP)



AT32 LCD Evaluation Board ▲



AT32F435 DVP Evaluation Board ▲

Development Tools

Third-party programmer (in alphabetical order)

In addition to ICP/ISP tools, the following programmers are also supported for programming.

- Acroview (www.acroview.com)
- Alientek (www.alientek.com)
- Amo (www.amomcu.com)
- Armfly (www.armfly.com)
- Forcreat (www.forcreat.com)
- Galecomm (www.galecomm.com)
- ICWORKSHOP (www.icworkshop.com)
- MaxWiz (www.maxwiz.com.cn)
- Prosystems (www.prosystems.com.cn)
- Rx-prog (www.rx-prog.com)
- Sinaen (sinaen.diytrade.com)
- XELTEK (www.xeltek-cn.com)
- XWOPEN (www.xwopen.com)
- Zhifeng (bbzfkj.world.taobao.com)
- ZLG (www.zlg.cn)



*To find out more, please contact ARTERY sales team.

AT32 Extensive Ecosystems



AT32 Application Scenarios

