

## Overview

CH32V003 series is an industrial-grade general-purpose microcontroller designed based on QingKe RISC-V2A core, which supports 48MHz system main frequency in the product function. The series features wide voltage, single-wire serial debug interface, low-power consumption and ultra-small package. It provides commonly used peripheral functions, built-in 1 group of DMA controller, 1 group of 10-bit analog-to-digital conversion ADC, 1 group of op-amp comparator, multiple timers, standard communication interfaces such as USART, I2C, SPI, etc. The rated operating voltage of the product is 3.3V or 5V, and the operating temperature range is -40°C~85°C industrial-grade.

## Features

- **Core**
  - QingKe 32-bit RISC-V core, RV32EC instruction set
  - Fast programmable interrupt controller + hardware interrupt stack
  - Support 2-level interrupt nesting
  - Support system main frequency 48MHz
- **Memory**
  - 2KB volatile data storage area SRAM
  - 16KB program memory CodeFlash
  - 1920B BootLoader
  - 64B non-volatile system configuration memory
  - 64B user-defined memory
- **Power management and low-power consumption**
  - System power supply  $V_{DD}$ : 3.3V or 5V
  - Low-power mode: Sleep, Standby
- **Clock & Reset**
  - Built-in factory-trimmed 24MHz RC oscillator
  - Built-in 128KHz RC oscillator
  - High-speed external 4~25MHz oscillator
  - Power on/down reset, programmable voltage detector
- **1 group of 1-channel general-purpose DMA controller**
  - 7 channels, support ring buffer
  - Support TIMx/ADC /USART/I2C/SPI
- **1 group of OPA and comparator: connected with ADC and TIM2**
- **1 group of 10-bit ADC**
  - Analog input range: 0~ $V_{DD}$
  - 8 external signals + 2 internal signals
  - Support external delayed triggering
- **Multiple timers**
  - 1 16-bit advanced-control timers, with dead zone control and emergency brake; can offer PWM complementary output for motor control
  - 1 16-bit general-purpose timers, provide input capture/output comparison/PWM/pulse counting/incremental encoder input
  - 2 watchdog timers (independent watchdog and window watchdog)
  - SysTick: 32-bit counter
- **Communication interfaces**
  - 1 USART interfaces
  - 1 I2C interfaces
  - 1 SPI interfaces
- **GPIO port**
  - 3 groups of GPIO ports, 18 I/O ports
  - Mapping 1 external interrupt
- **Security features: 64-bit unique ID**
- **Debug mode: 1-wire serial debug interface (SDI)**
- **Package: SOP, TSSOP or QFN**

Model	Flash memory	SRAM	Pin No.	General- purpose I/O	Advanced- control timer	General- purpose timer	Watchdog	System clock source	ADC Channel No.	SPI	I2C	USART	Package Form
CH32V003F4P6	16K	2K	20	18	1	1	2	3	8	1	1	1	TSSOP20
CH32V003F4U6													QFN20
CH32V003A4M6	16K	2K	16	14	1	1	2	3	6	-	1	1	SOP16
CH32V003J4M6	16K	2K	8	6	1	1	2	3	6		1	1	SOP8