



**GigaDevice**

# RISC-V MCUで広がるGD32エコシステム

June. 2023

# ギガデバイスの概要

## Key Facts

**Y2005**

Headquartered in Beijing

**1500+**

Employees

**Y2016**

Listed in Shanghai Stock Exchange  
(SSE 603986)

A Semiconductor  
Technology Leader  
focused on Flash Memory,  
Microcontroller,  
Sensor and Analog products

## Industry Leadership



No.1 fabless flash memory  
supplier worldwide



Top 3 NOR flash supplier  
worldwide



Top 10 global MCU supplier  
China's No.1 32-bit Arm® general-  
purpose MCU supplier



China's No.2 fingerprint  
sensor supplier








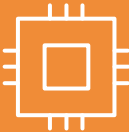










1387 patents filed  
937 granted



ISO9001, ISO14001, ISO 45001  
and DUNS certified

# 多様化する製品・市場

	<p><b>FLASH</b></p> <ul style="list-style-type: none"><li>● SPI NOR FLASH® Series</li><li>● SPI NAND FLASH® Series</li><li>● Parallel NAND FLASH Series</li></ul>	 <p>Automotive/ Industrial</p> 	 <p>IoT</p> 	 <p>Consumer Electronics</p> 
	<p><b>MCU</b></p> <ul style="list-style-type: none"><li>● GD32 MCU</li></ul>	 <p>Network/ Communication</p> 	 <p>PC and Peripherals</p> 	 <p>Mobile</p> 
	<p><b>PMU</b></p> <ul style="list-style-type: none"><li>● GD30 PMU</li></ul>			
	<p><b>Sensor</b></p> <ul style="list-style-type: none"><li>● Fingerprint</li><li>● Biometrics</li><li>● Touch Control</li></ul>			

# グローバルMCU市場をリードするGD32



China's Most Prominent ARM® MCU Product Family

China 1st Cortex® -M3/M4/M23/M33/M7 MCU

World 1st RISC-V 32-bit general-purpose MCU

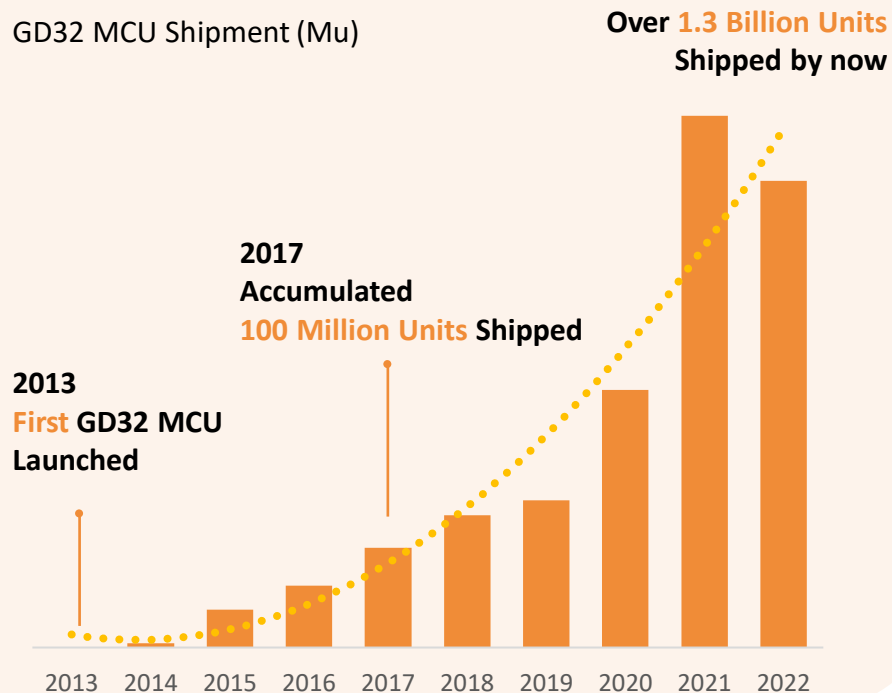
China No.1 local 32-bit MCU Supplier

MCU >1,300Mea Accumulated Shipment

MCU >10 Years Longevity Guarantee

# GD32 MCUの力強い成長

Strong Growth of GD32 MCU  
Over **1.3 Billion** Units Shipped



## TOP 10

Global Top10 MCU Supplier	Market Share	2022 Rank	2021 Rank
ST	17.3%	1	3
Renesas	16.5%	2	2
NXP	16.5%	3	1
Microchip	13.4%	4	5
Infineon	13.1%	5	4
TI	6.8%	6	6
<b>GigaDevice</b>	<b>1.8%</b>	<b>7</b>	<b>8</b>
Nuvoton	1.6%	8	7
Samsung	1.2%	9	9
Silicon Labs	1.2%	10	10

Source: Omdia Microcontroller Market Tracker - 2H22 Database, Apr.2023

# GD32 MCUの製品ラインアップ

40  
Series

500+  
Part No.

Type	Arm® Cortex®-M 32-bit MCUs (Flash KB/RAM KB)						RISC-V MCUs				
	Core	Cortex®-M23	Cortex®-M3	Cortex®-M4		Cortex®-M33	Cortex®-M7	RISC-V			
High-Performance			<b>GD32F207</b> 120MHz, 3M/256K  <b>GD32F205</b> 120MHz, 3M/256K	<b>GD32F470</b> 240MHz, 3M/768K  <b>GD32F425</b> 200MHz, 3M/256K  <b>GD32F407</b> 168MHz, 3M/192K  <b>GD32F403</b> 168MHz, 3M/128K	<b>GD32F427</b> 200MHz, 3M/256K  <b>GD32F450</b> 200MHz, 3M/512K  <b>GD32F405</b> 168MHz, 3M/192K	<b>GD32W515</b> 180MHz, 2048K/448K  <b>GD32E507</b> 180MHz, 512K/128K  <b>GD32E503</b> 180MHz, 512K/128K	<b>GD32E508</b> 180MHz, 512K/128K  <b>GD32E505</b> 180MHz, 512K/128K	<b>GD32H759</b> 600MHz, 3840K/1024K  <b>GD32H757</b> 600MHz, 3840K/1024K  <b>GD32H737</b> 600MHz, 3840K/1024K			
	Main-Stream		<b>GD32L233</b> 64MHz, 256K/32K	<b>GD32F107</b> 108MHz, 1M/96K  <b>GD32F105</b> 108MHz, 1M/96K  <b>GD32F103</b> 108MHz, 3M/96K  <b>GD32F101</b> 56MHz, 3M/80K	<b>GD32F307</b> 120MHz, 1M/96K  <b>GD32F303</b> 120MHz, 3M/96K  <b>GD32E113</b> 120MHz, 128K/32K  <b>GD32E103</b> 120MHz, 128K/32K	<b>GD32F305</b> 120MHz, 1M/96K  <b>GD32C113</b> 120MHz, 128K/32K  <b>GD32C103</b> 120MHz, 128K/32K	<b>GD32E501</b> 100MHz, 512K/32K		<b>GD32VF103</b> 120MHz, 128K/32K		
		Entry-Level	<b>GD32E232</b> 72MHz, 64K/8K  <b>GD32E230</b> 72MHz, 64K/8K	<b>GD32F150</b> 72MHz, 64K/8K  <b>GD32F130</b> 48MHz, 64K/8K	<b>GD32F350</b> 108MHz, 128K/16K  <b>GD32F310</b> 72MHz, 64K/8K	<b>GD32F330</b> 84MHz, 128K/16K					
			Specific			<b>GD32FFPR</b> 168MHz, 1M/128K		<b>GD32EPRT</b> 168MHz, 384K/96K+4M			

# GD32 MCUフォーカス・アプリケーション



IoT



New Energy



Industrial Control



Surveillance



Network &  
Communication



Healthcare



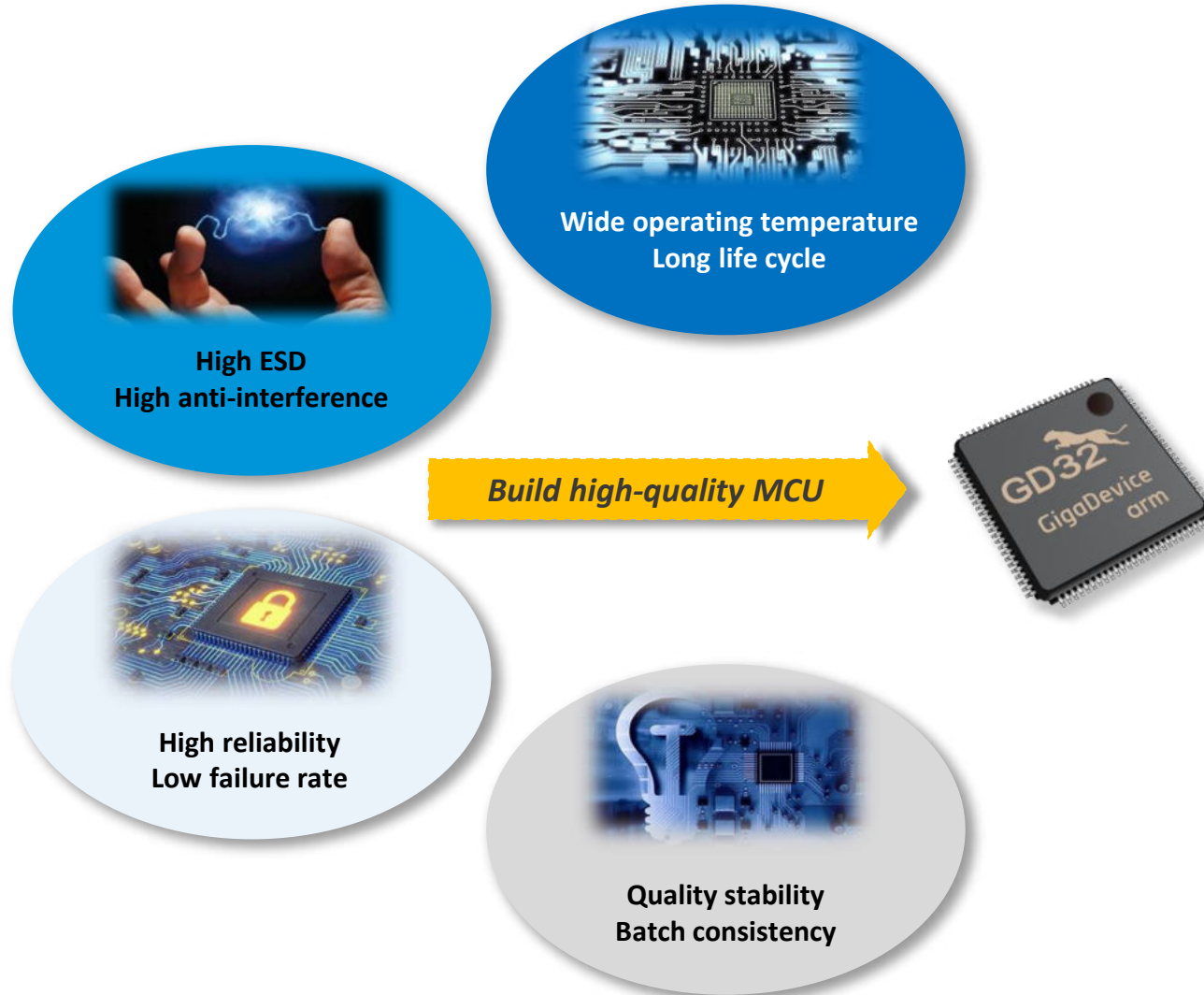
Home Appliances



Automotive



# 高品質な製品基準



- High-quality MCU support industrial temperature range  $-40^{\circ}\text{C}$  to  $105^{\circ}\text{C}$
- MCU works stably for more than 10 years

- Excellent electrostatics protection (ESD) class and anti-surge (EFT) levels

- The failure rate of high-quality MCU is less than 100ppm, far exceeding the consumer-grade standard


- Excellent reliability, stability, and consistency meet the demands of the industrial grade for complex, harsh applications




# GD32 MCUトレンド


- 40 Series, 500+ Part Numbers
- Industrial and automotive grade
- Fully compatible and support various IDE
- Comprehensive ecosystem support



 **High Computing Power** GD32H Series

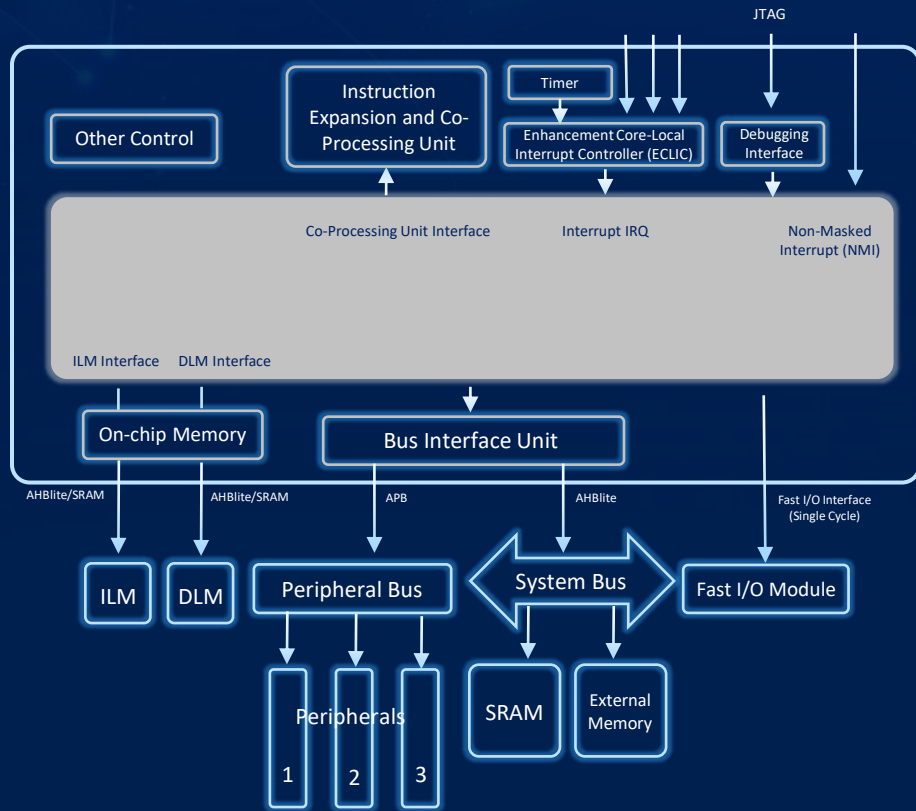
 **Wireless** GD32W Series

 **Low Power** GD32L Series

 **Automotive** GD32A Series

# 世界をリードするRISC-V MCU

# 完全最適化されたRISC-Vプロセッサコア



Dhrystone Test: **1.42** DMIPS/MHz

CoreMark® Test: **3.34** CoreMark/Mhz

- Two-stage Variable-length Pipeline Microarchitecture
- Streamlined Dynamic Branch Predictor and Instruction Pre-fetch Unit
- Support RISC-V RV32IMAC Instruction Set
- Support 32-bit Wide Instruction memory (ILM) and data memory (DLM)
- AHB with 32-bit Data, for ILM/DLM Accesses
- Integrated Hardware Multiplier and Divider
- Incorporate Low-power Design Concepts
  
- Provide up to 68 External Interrupts
- 16 Nested with Programmable Priority Levels
  
- Standard JTAG Interfaces and RISC-V Debug Standards
- Suitable Hardware Breakpoints and Interactive Debugging

Advanced Micro-architecture Design to  
Balance Performance And Die Size Requirements

# オンチップリソースの最適化

GD32  
RISC-V  
GD32V  
GigaDevice

## Efficient Data Processing

Two Multi-channel DMA  
Efficient Communication between  
Memory and Peripherals  
Reduce CPU Workload

## Generate Complex Waveforms

Advanced Timer  
General-purpose Timer  
Three-phase PWM Complementary Outputs  
No CPU Assistance Required

## Signal Chain Integration

High Speed ADC  
Dual-channel DAC

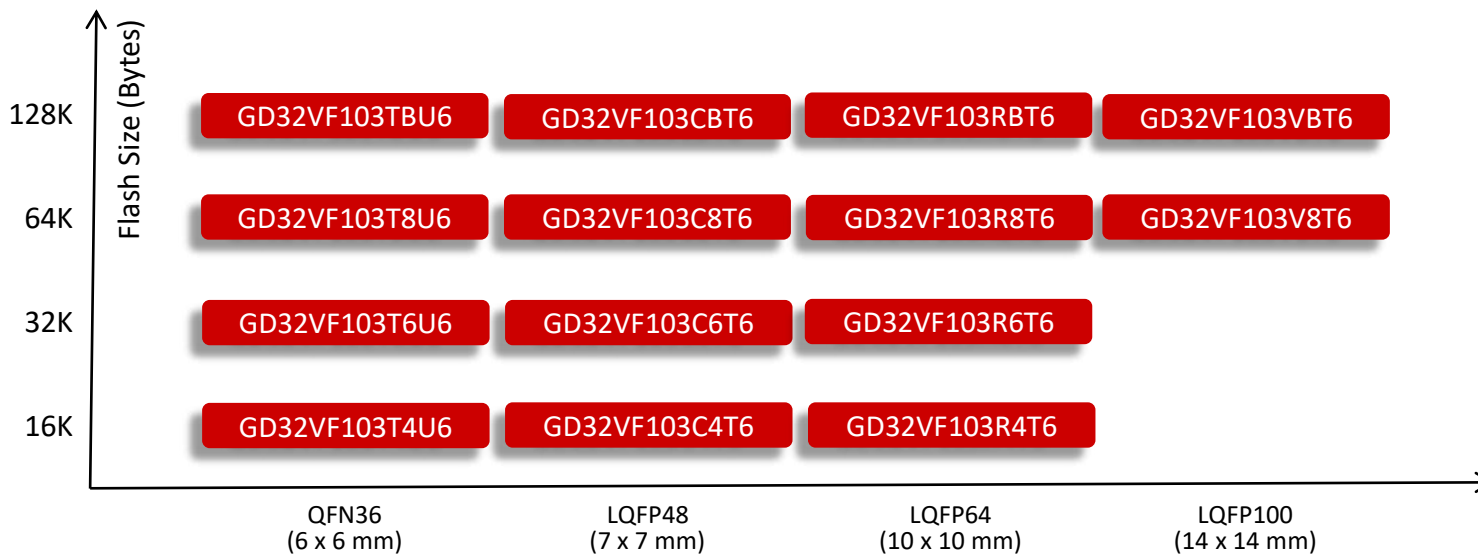
## Security

96-bit Unique ID  
gFlash® Patented Technology  
High-speed Core Accesses to  
Flash in Zero Wait Time

# GD32VF103 RISC-VメインストリームMCUポートフォリオ



- ☑ GD32VF103 RISC-V Bumblebee Core Mainstream Line
- ☑ Max  $F_{cpu}$  108MHz, 16K-128K Flash, 8K-32K SRAM
- ☑ 2.6-3.6V supply; 5V tolerance I/Os; all support USB OTG & CAN 2.0B
- ☑ -40°C to +85°C industrial level operating temperature
- ☑ Series pin to pin compatible and flexible S/W compatible

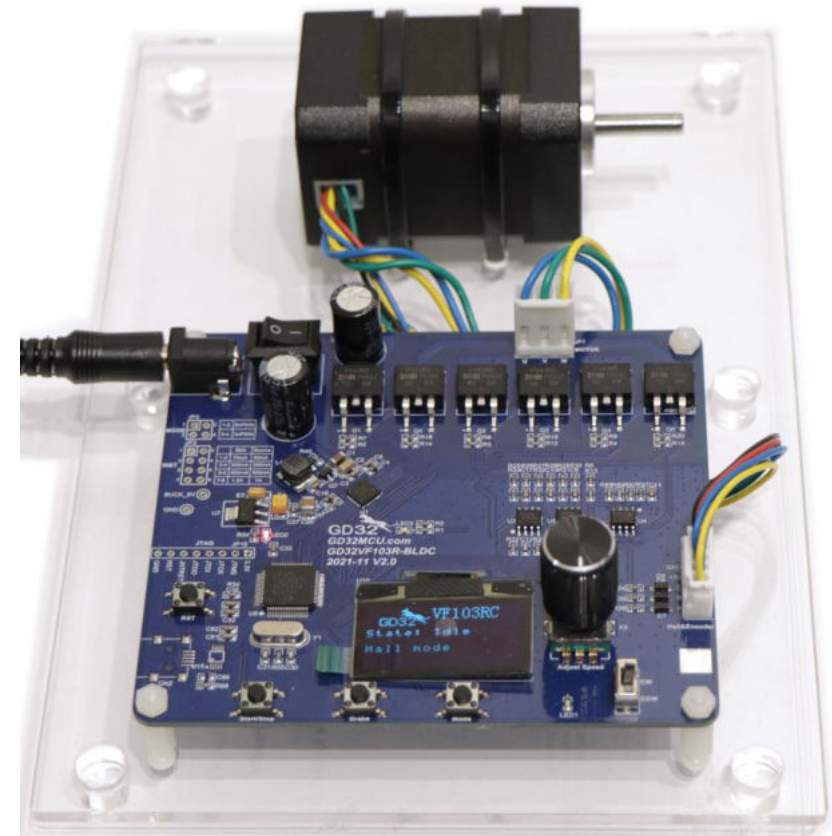


# モーター制御開発キット



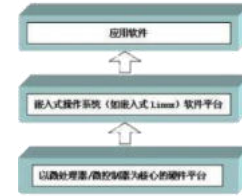
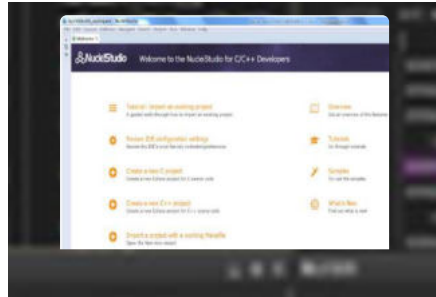
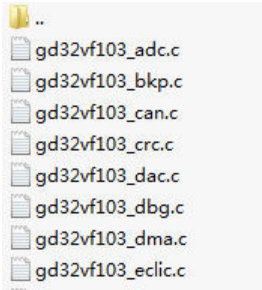
Industry's first RISC-V core-based motor control MCU

<p><b>SYSTEM</b></p> <ul style="list-style-type: none"> <li>POR/PDR/LVD</li> <li>XTAL 4 to 32 MHz</li> <li>XTAL 32.768 KHz</li> <li>Internal 8 MHz RC</li> <li>Internal 40 KHz RC</li> <li>PLL</li> <li>CCU/RCU</li> <li>RTC</li> <li>2x Watchdog</li> <li>Systick Timer</li> </ul>	<p><b>RISC-V</b> Core 108MHz</p> <ul style="list-style-type: none"> <li>DSP/FPU</li> <li>NVIC</li> <li>MPU</li> <li>JTAG/SW DEBUG</li> </ul>	<p><b>MEMORY</b></p> <ul style="list-style-type: none"> <li>Up to 128k P-Flash</li> <li>Up to 32K SRAM</li> <li>EXMC interface</li> </ul>
<p><b>CONTROL</b></p> <ul style="list-style-type: none"> <li>2x GP Timer(16bit)</li> <li>1x AD Timer</li> <li>2x basic Timer</li> </ul>		<p><b>CONNECTIVITY</b></p> <ul style="list-style-type: none"> <li>3x USART, 2x UART</li> <li>3x SPI, 2x I2S</li> <li>2x CAN 2.0B</li> <li>1x USB Device/OTG</li> <li>2x I2C</li> </ul>
	<p>AHB/APB Interconnect</p> <p>DMA0/DMA1</p>	<p><b>ANALOG</b></p> <ul style="list-style-type: none"> <li>2x ADC(21 CHs)</li> <li>2x 12Bits DAC</li> </ul>



GD32VF103+GD30DR8306 BLDC Motor Control (Six-step Commutation)	
<b>Function</b>	Support hall, CMP, ADC
<b>Development Resource</b>	Dev Kit, User Guide, Schematic, S/W code

# RISC-V開發プラットフォーム READY



## Software Library

GD32V Library

## IDE Support

Nuclei Studio  
IoT Studio  
SEGGER Embedded Studio  
IAR Embedded Workbench for RISC-V  
Embeetle IDE  
MounRiver Studio

## Programmer & Debugger

GD-Link  
SEGGER J-Link V10  
IAR I-Jet  
PowerWriter

## Embedded Software

FreeRTOS  
 $\mu$ C/OS II  
 $\mu$ C/OS III  
RT-Thread  
TencentOS-tiny  
LVGL

## Demo & Solution

BLDC Motor Control  
Robotic Arm  
Display Control  
Drone

# RISC-Vコア向けGD32開発エコシステム



# GD32 エコシステム



# RISC-V開発プラットフォーム - SEGGER

SEGGER announces full support for the first commercially available flash-based RISC-V core microcontroller introduced by GigaDevice Semiconductor Inc. from 2019

This support includes:

- ✓ SEGGER's Embedded Studio
- ✓ J-Link debug probe,
- ✓ Ozone debugger,
- ✓ SEGGER's emPack



with the RTOS embOS and Software Libraries in the fields of communication, data storage, compression and IoT, as well as the portfolio of Flasher production programmers.



# RISC-V開発プラットフォーム - IARシステムズ

## IAR GD32V Evaluation Kit

1. IAR RISC-V GD32V EVAL BOARD
2. I-jet Lite debug probe
3. IAR EWRISCV for RISC-V 30-day evaluation license
4. IAR Academy On-Demand course introduction to RISC-V Evaluation Kit

IAR provides an evaluation kit **free of charge** to companies with commercially viable development projects.



## IAR Embedded Workbench For RISC-V Supports GD32V MCU

Free online video for the IDE and Evaluation Kit are available on YouTube, WeChat and other online platforms.



# RISC-V業界のエコシステムを継続的に拡大



RISC-V International



China RISC-V Industry Alliance



China RISC-V Alliance



NUCLEI



IAR Systems



SEGGER



Embeetle IDE



RiscFree C/C++ IDE



FreeRTOS



RT-Thread



TencentOS Tiny



One Os

# GD32 & サードパーティーパートナーソリューション



IAR Systems

- ✓ RISC-V development kit jointly launched by GD32 and IAR systems.



Motor Control

- ✓ BLDC motor control solution based on GD32VF103 series.



Seed Studio

- ✓ 1<sup>st</sup> RISC-V development board to run GUI, based on the GD32VF103 series and has a wealth of on-chip resources.



Smart Car

- ✓ Electromagnetic smart car based on GD32 RISC-V MCU.



Tencent OS-tiny IoT

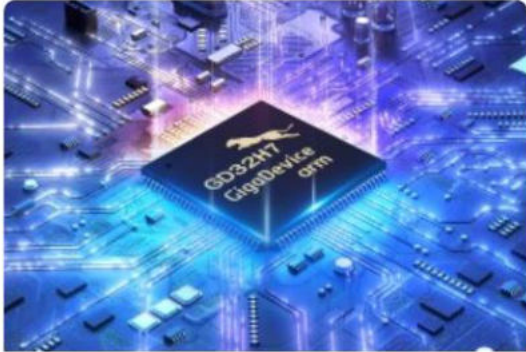
- ✓ PM2.5 monitor built on Tencent OS-Tiny IoT Development Board.



Mechanical Arm Control

- ✓ Mechanical arm control solution based on GD32VF103 series.





GigaDevice Launches the GD32H7 Arm® Cortex®-M7 MCU Product Fami...



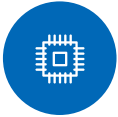
GigaDevice's MCUs Ecosystem at Embedded World 2023, an ever-growi...



GigaDevice's GD32F470/F427/F425 High-Performance MCUs Target Hig...



Established semiconductor manufacturers see great potential in RISC-V



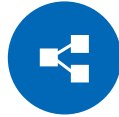
## Product

Arm Cortex-M3 MCU  
 Arm Cortex-M4 MCU  
 Arm Cortex-M23 MCU  
 Arm Cortex-M33 MCU  
 Arm Cortex-M7 MCU  
 RISC-V MCU  
 Analog Devices (PMIC)



## News

New Product Release  
 Market Activities Reports  
 Awards/Recognition  
 Ecosystem Collaboration  
 .....



## Solutions

Portable Power Supply  
 EV Charger  
 Motor Control  
 Inverter  
 Power Management  
 .....



## Downloads

Technical Resources:  
 Datasheets  
 User Manual, APN  
 F/W Library, SDK  
 Dev Board/Ref Design Info  
 .....



## Ecosystem

Development Boards/Kits,  
 IDE, 3<sup>rd</sup> Party Dev Tools,  
 Embedded S/W, University  
 Program, Online Training  
 (Product/Webinar)  
 .....



## Global Support

New Product Release  
 Market Activities Reports  
 Tech Documents Download  
 .....



**GigaDevice**

**Thank You !**

