



GigaDevice

GD32VF103

RISC-V内蔵MCUのご紹介

GD32 product family and development ecosystem

ギガデバイス ジャパン
影山賢二

May., 2022

www.GigaDevice.com

Key Facts

- Founded in Silicon Valley in 2004, moved headquarter to Beijing in 2005, 1300+ employees globally;
- Successfully listed in the Shanghai Stock Exchange in 2016 (SSE 603986);
- A semiconductor technology leader in China focusing on Flash Memory, Microcontroller, Sensor.

Industry Leadership

- No.1 fabless Flash Memory supplier worldwide
- Top 3 NOR Flash supplier worldwide
- China's No.1 32-bit Arm® general-purpose MCU supplier
- China's No.2 fingerprint sensor supplier
- 1325 patents filed, 879 granted
- ISO9001 and ISO14001 certified



GD32 MCUの歩み

Products + Ecosystem Market



China's Most Prominent ARM® MCU Product Family

China's 1st ARM® Cortex®-M3/M4/M23/M33 MCU Series

World's 1st 32-bit General-purpose RISC-V MCU Series

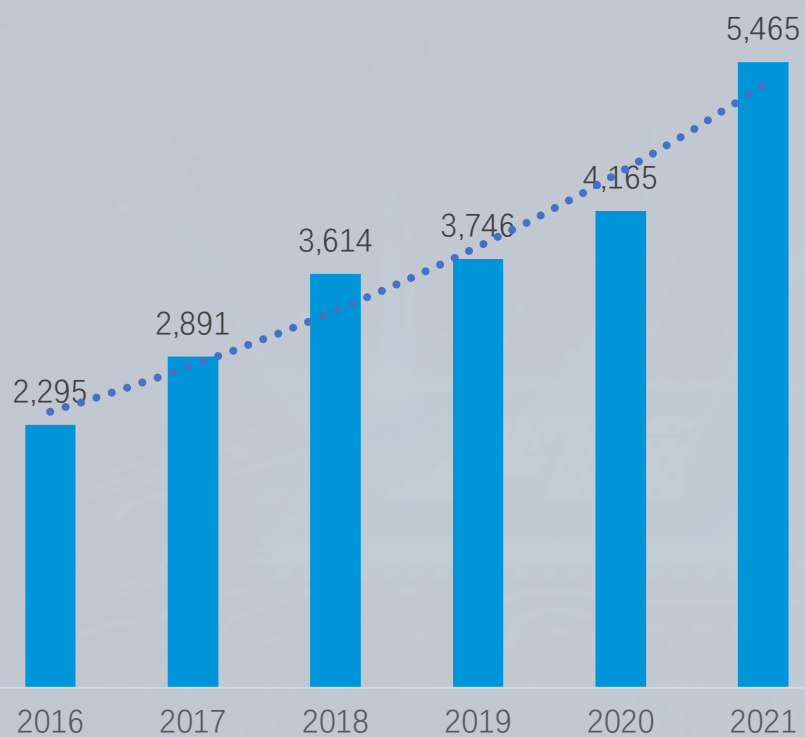
China's No.1 Local 32-bit MCU Supplier

MCU Annual Shipment > 200,000,000 ea

MCU > 10 Years Longevity Guarantee

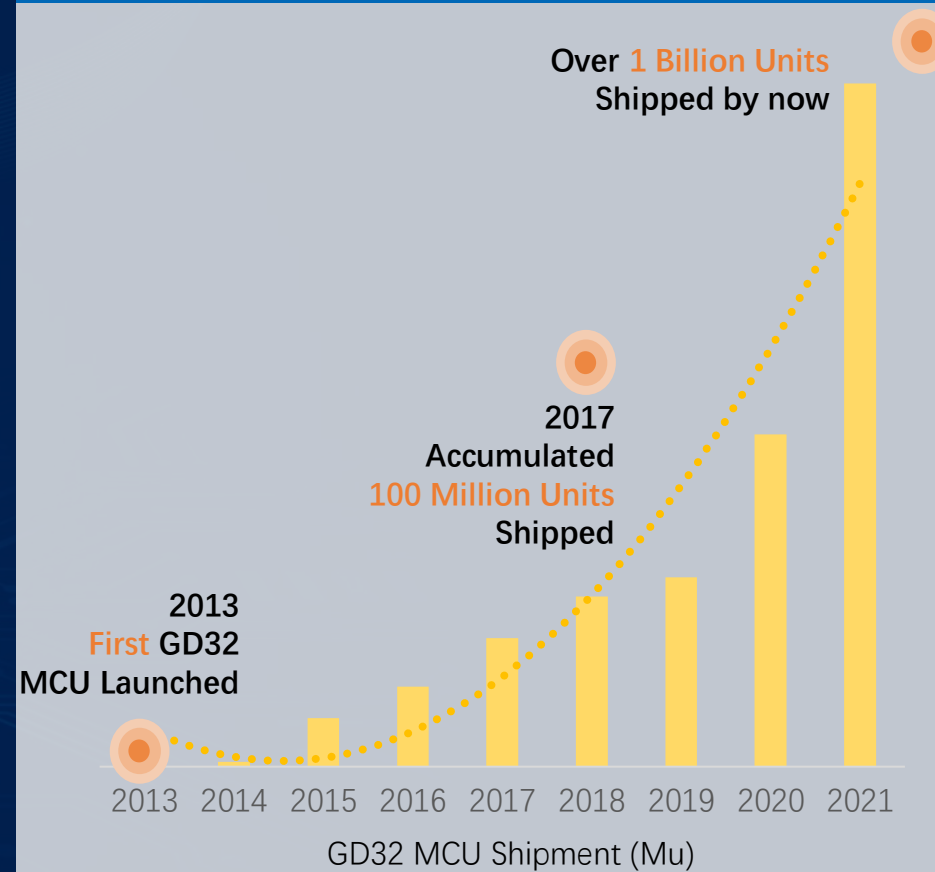
GD32 年間出荷数量

Fast Growing 32-bit MCU Global Market



32-bit MCU Shipment (Mu) in Global Market

Strong Growth of GD32 MCU Over 1 Billion Units Shipped



GD32 MCU Shipment (Mu)

Source: Microcontroller Market Tracker - H1 2020, The Omdia Research

GD32 マイルストーン

Apr, 2013

Sept, 2016

Nov, 2018

Aug, 2019

Jul, 2020



GD32F103

China's first
Cortex[®]-M3
MCU

Mainstream



GD32F450

China's first
Cortex[®]-M4
MCU

High Performance



GD32E230

China's first
Cortex[®]-M23
MCU

Low Cost



GD32VF103

China's first
RISC-V general-
purpose MCU

New Architecture




GD32E503

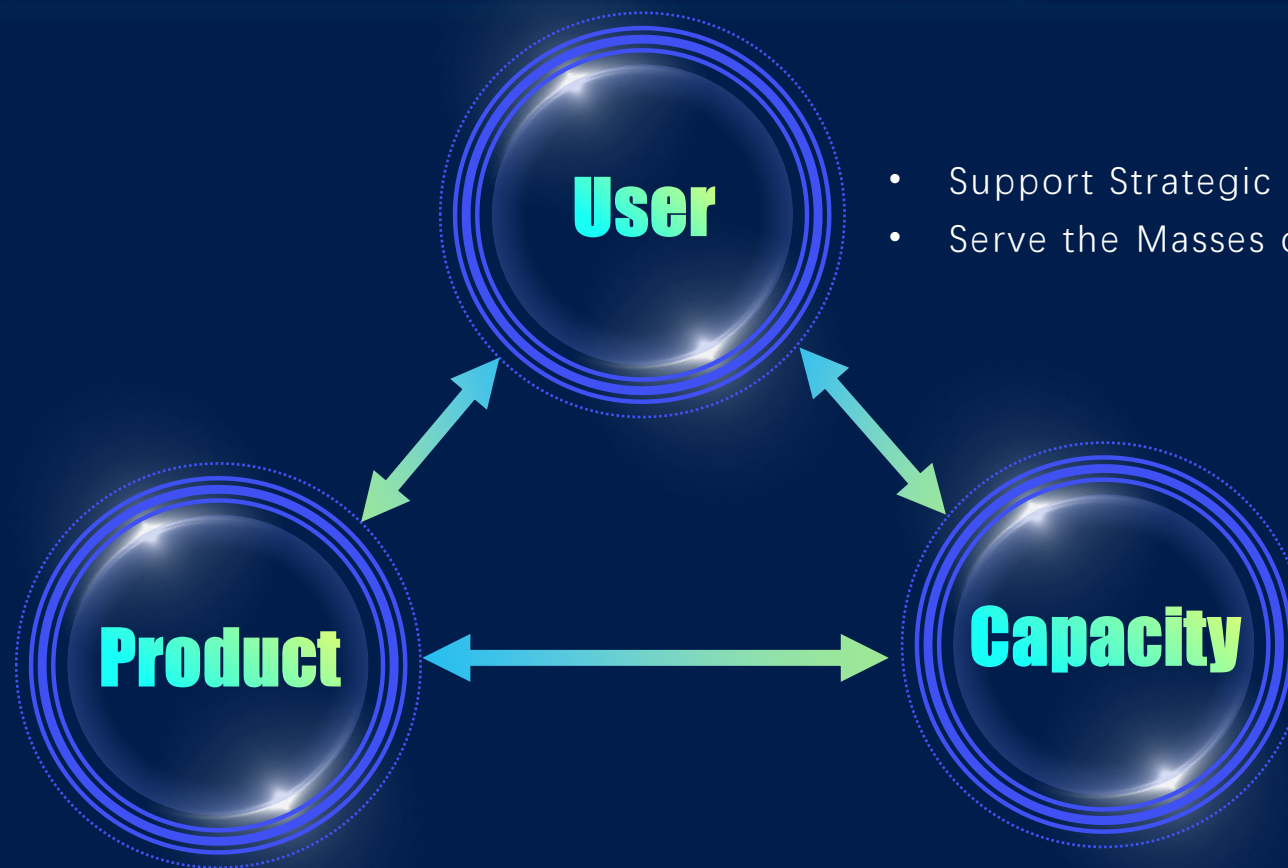
China's first
Cortex[®]-M33
MCU

Real-Time

GD32 MCU 製品ファミリー

Type	Arm® Cortex® -M 32-bit MCUs (Flash KB/RAM KB)					RISC-V MCUs		
Core	Cortex® -M23	Cortex® -M3		Cortex® -M4		Cortex® -M33	RISC-V	
GD32 MCU Family	High-Performance		GD32F205 120MHz, 3M/256K GD32F207 120MHz, 3M/256K	GD32F450 200MHz, 3M/512K GD32F470 240MHz, 3M/768K GD32F407 168MHz, 3M/192K GD32F427 200MHz, 3M/256K GD32F405 168MHz, 3M/192K GD32F425 200MHz, 3M/256K GD32F403 168MHz, 3M/128K	GD32E505 180MHz, 512K/128K GD32E507 180MHz, 512K/128K GD32E503 180MHz, 512K/128K GD32E508 180MHz, 512K/128K GD32W515 180MHz, 2048K/448K			
	Main-stream	GD32L233 64MHz, 256K/32K	GD32F105 108MHz, 1M/96K GD32F103 108MHz, 3M/96K	GD32F107 108MHz, 1M/96K GD32F101 56MHz, 3M/80K	GD32F305 120MHz, 1M/96K GD32F303 120MHz, 3M/96K GD32F307 120MHz, 1M/96K	GD32E103 120MHz, 128K/32K GD32C103 120MHz, 128K/32K	GD32E501 100MHz, 512K/32K	GD32VF103 120MHz, 128K/32K
	Entry-Level	GD32E232 72MHz, 64K/8K GD32E230 72MHz, 64K/8K	GD32F130 48MHz, 64K/8K	GD32F150 72MHz, 64K/8K	GD32F330 84MHz, 128K/16K GD32F310 72MHz, 64K/8K	GD32F350 108MHz, 128K/16K	 35 Series 450+ Part Numbers	
	Specific				GD32FFPR 168MHz, 1M/128K	GD32EPRT 168MHz, 384K/96K+4M		

GD32 MCU 継続的な価値の提案



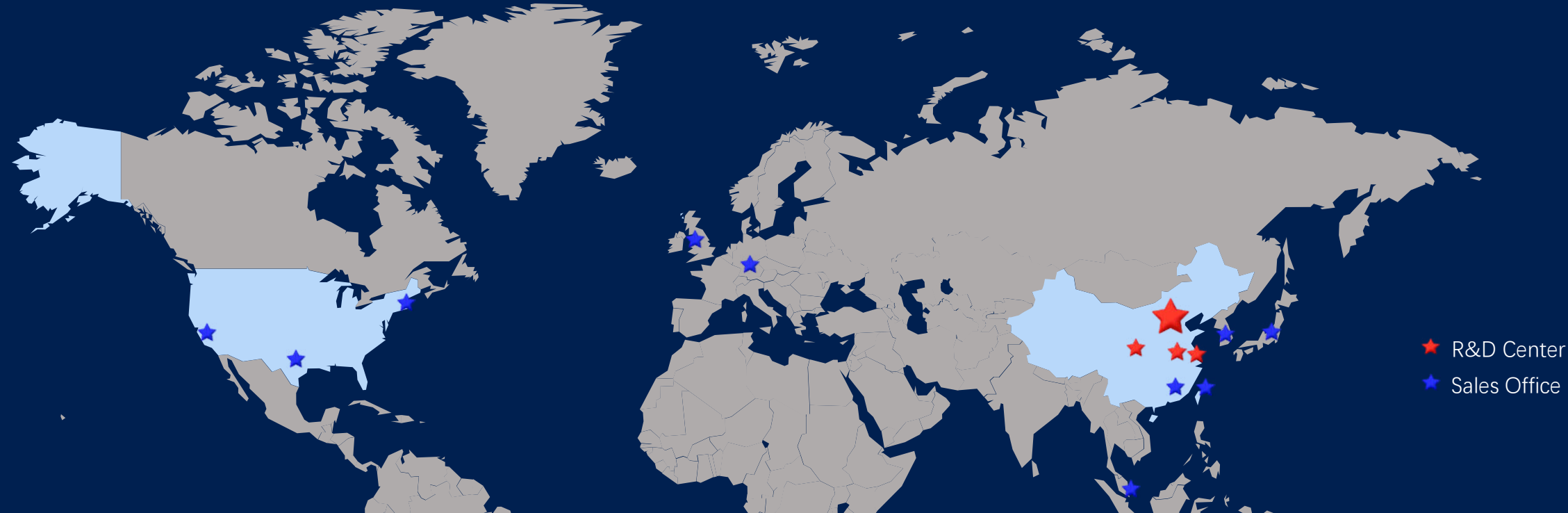
- Support Strategic Customers
- Serve the Masses of Users

- Extensive Product Coverage
- Focus on General and Vertical Markets
- Stable and Reliable Quality

Market

- Multi-production Line Resource
- Stable Supply Guarantee
- Flexible Deployment

GD32 グローバルサービス拠点



★ R&D Center
★ Sales Office

US

San Jose, CA
Dallas, TX
Boston, MA

Europe

London, UK
Munich, Germany

Asia

Beijing(Headquarter),
Hefei, Shanghai, Xi'an,
Shenzhen, Suzhou,
Taiwan, Singapore, Korea,
Japan

ギガデバイス製品ポートフォリオの連携

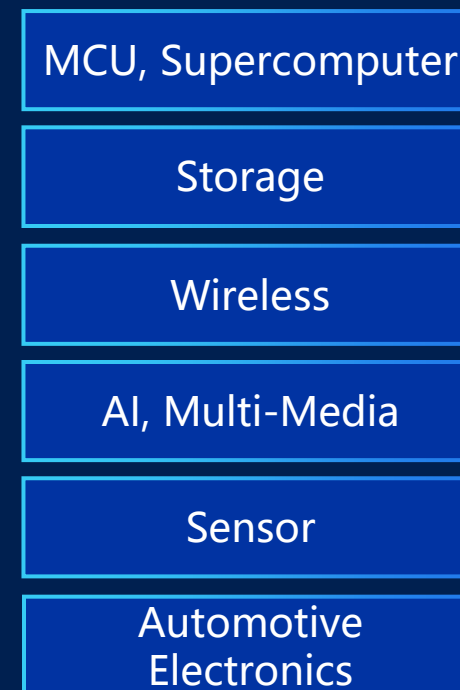


新たなIoTアプリケーション

Various Application Scenario



Mass Chips



IoTアプリケーションのトレンドと課題

CHALLENGES



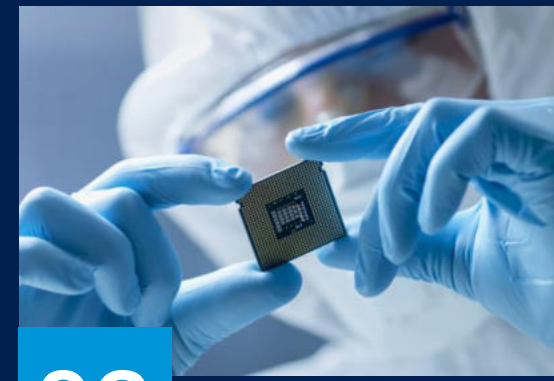
01

Low Power
Portable Device



02

Security Design
Information Safety



03

Moore's law slowdown
Dennard Scaling failed



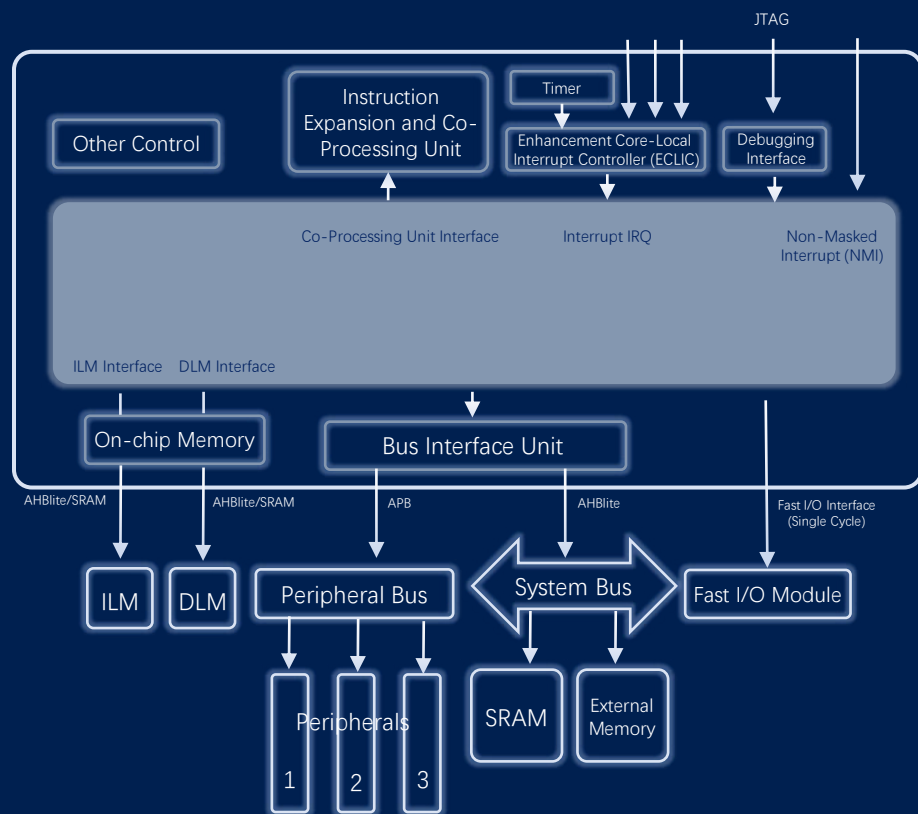
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世界をリードするRISC-V MCU

Nov., 2021

www.GigaDevice.com

最適化されたRISC-Vプロセッサコア



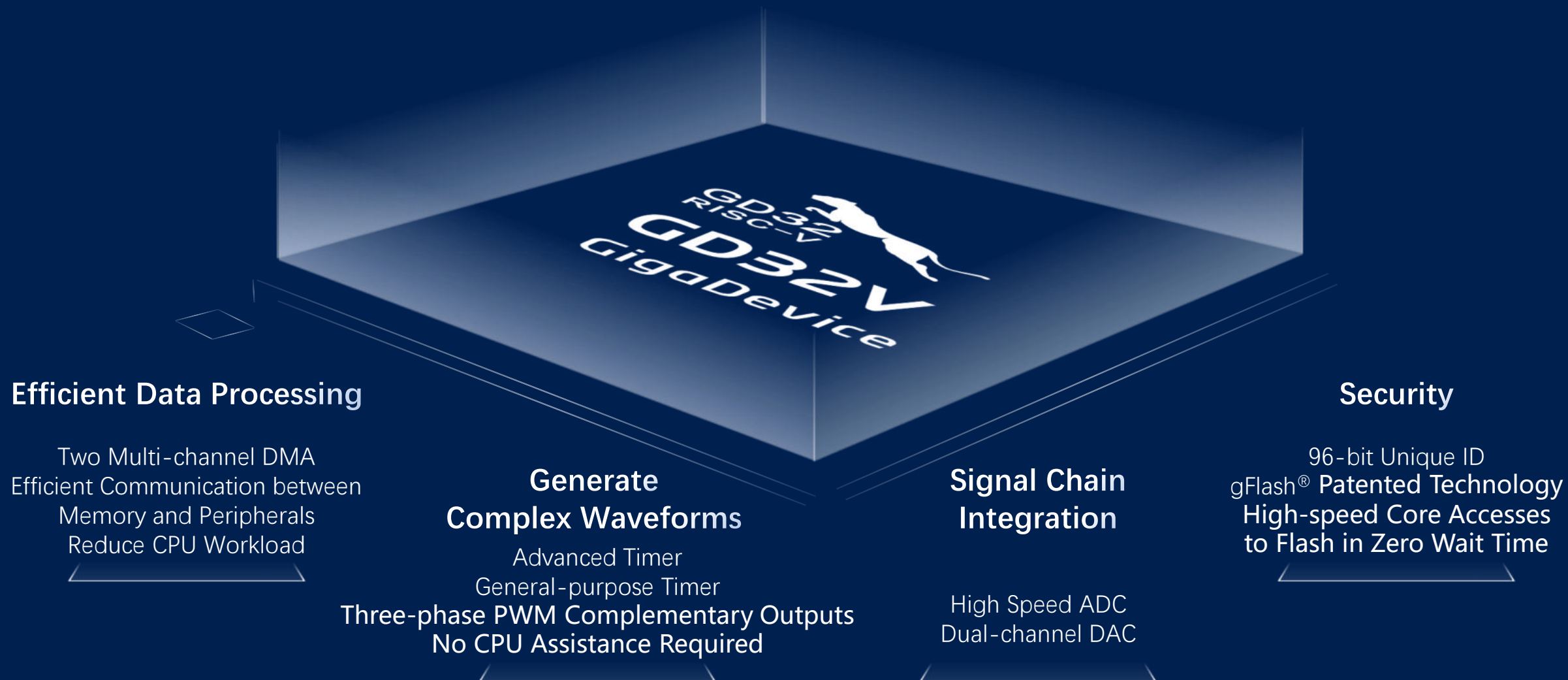
Dhrystone Test: **1.42** DMIPS/MHz

CoreMark® Test: **3.34** CoreMark/MHz

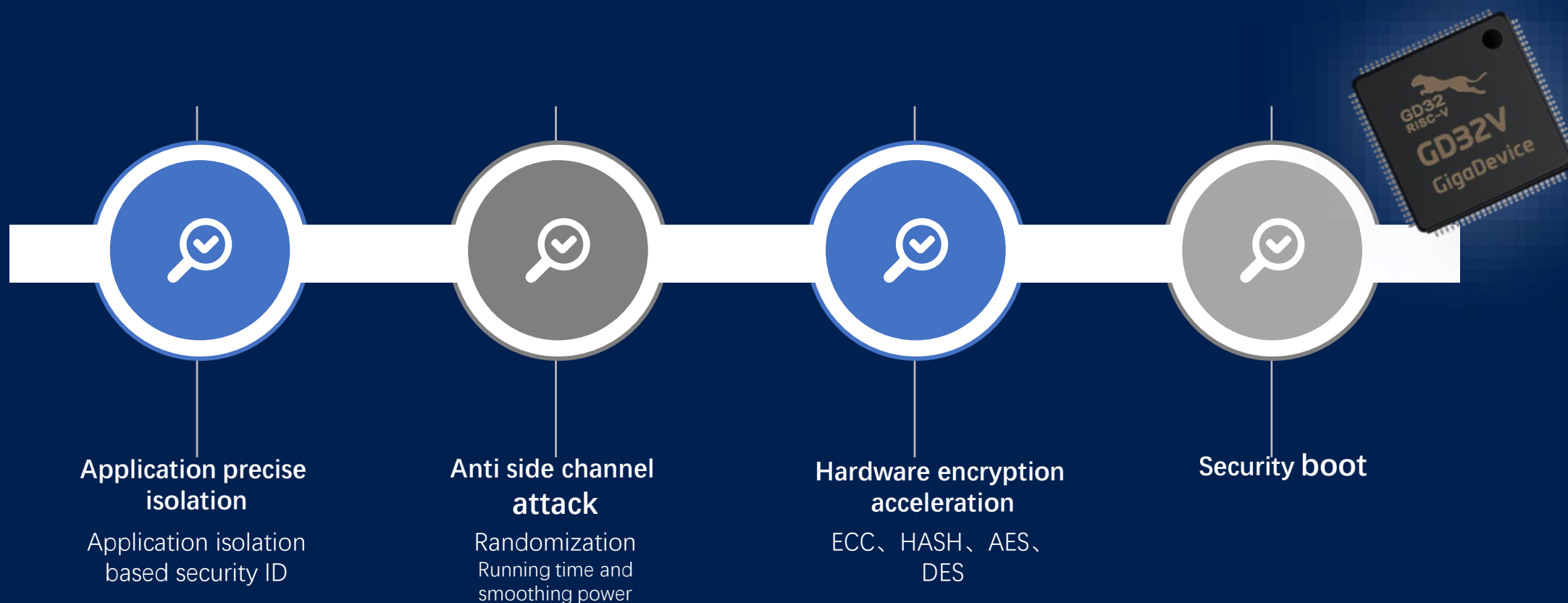
- Two-stage Variable-length Pipeline Microarchitecture
 - Streamlined Dynamic Branch Predictor and Instruction Pre-fetch Unit
 - Support RISC-V RV32IMAC Instruction Set
 - Support 32-bit Wide Instruction memory (ILM) and data memory (DLM)
 - AHB with 32-bit Data, for ILM/DLM Accesses
 - Integrated Hardware 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

最適化されたオンチップリソース



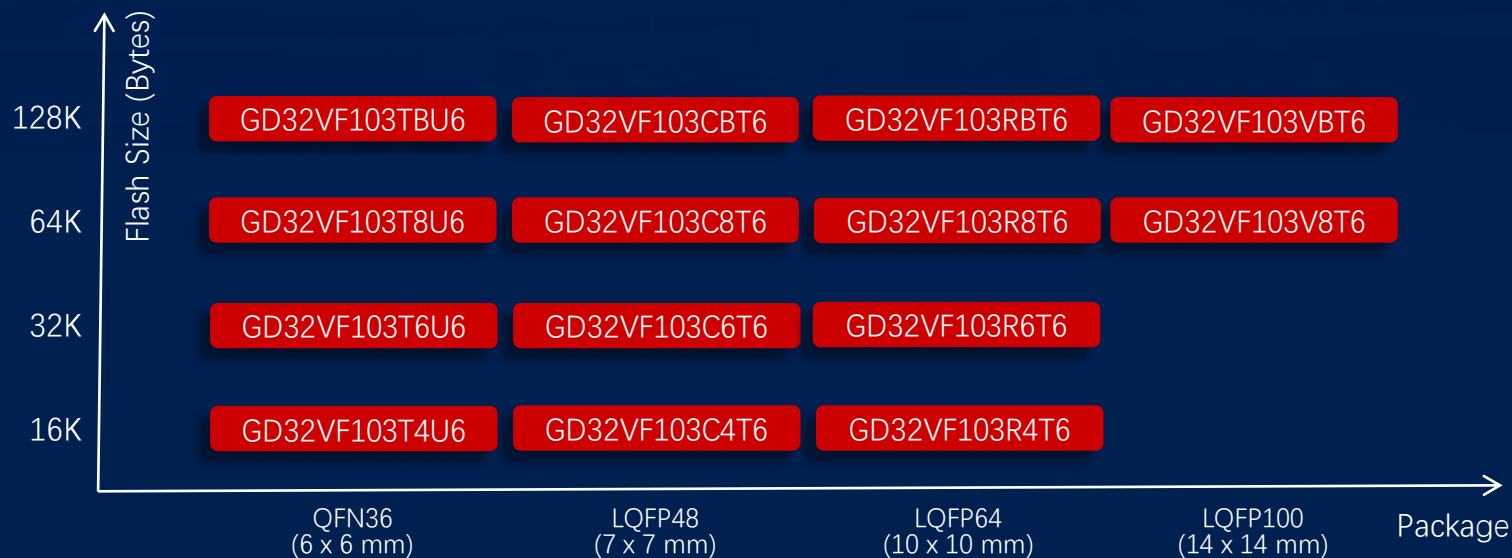
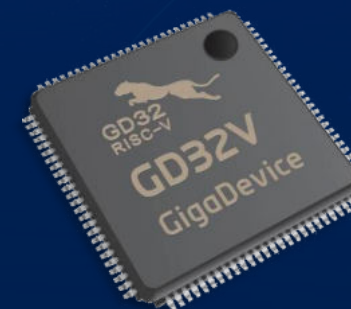
GD32V、セキュリティ用に設計



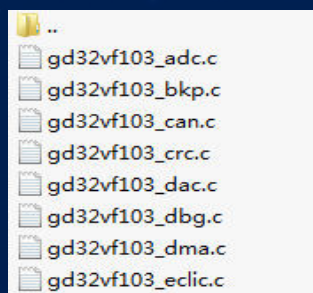
GD32VF103 RISC-V メインストリーム ポートフォリオ



- ☑ 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

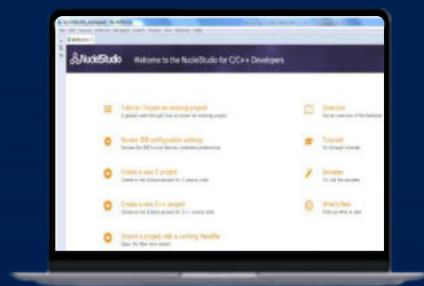


RISC-V開発プラットフォーム READY



Software Library

GD32V Library



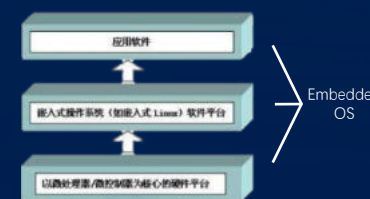
IDE

Nuclei Studio
IoT Studio
SEGGER Embedded Studio
IAR Embedded Workbench
for RISC-V



Program & Debug Tool

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



Embedded OS

μC/OS II
FreeRTOS
RT-Thread
LiteOS
TencentOS Tiny
OneOS



Cloud Link

AWS
Tencent Cloud



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RISC-Vコア内蔵GD32 開発エコシステム

Nov., 2021

www.GigaDevice.com

GD32 開発エコシステム



RISC-V 開発プラットフォーム – SEGGER

SEGGER社は、2019年からGigaDeviceによって導入された世界で最初の市販RISC-Vコア内蔵MCUの完全サポートを発表しました

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.



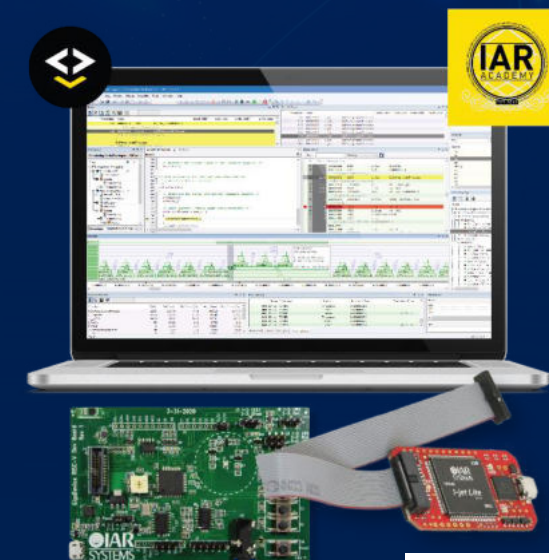
RISC-V 開発プラットフォーム – IAR Systems

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社は評価キットを提供します

商業的に実行可能な開発プロジェクトを持つ企業には無料で



IAR Embedded Workbench For RISC-V Ver1.30 Support 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



NUCLEI



China RISC-V Industry Alliance



China RISC-V Alliance



SEGGER



IAR Systems



RT-Thread



Huawei LiteOS



FreeRTOS



Tencent OS Tiny

GD32 & サードパーティ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

- ✓ 1st 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.



GD32 Product Trends

GD32H

Higher Performance

- High Computing Power >800MHz, Large Capacity Memory
- Dual-core Heterogeneous: MCU+GPU
- New Interface + Hardware Algorithm / Graphic Accelerator

GD32L

Lower Power Consumption

- Ultra-low Power Platform
- Standby Current <200nA

GD32V

More Core Options

- RISC-V Core
- Continuous Layout of Various Series

GD32W

Wireless Connectivity

- High Performance/Low-cost Wi-Fi SOC
- Dual-mode: Wi-Fi + Bluetooth LE
- Support for More Wireless Connectivity Protocols

GD32A

Automotive-grade Platform

- Entry level: Body Electronics BCM
- Mid-range: New Energy Vehicle Control
- AEC-Q100 G1/G2, ISO26262 ASIL

GD32 Keep Up with Market Trends



Industrial Control

Expansion to Algorithm and Peripherals



- High-precision Industrial Control
- High-performance Data Processing
- Motor Control (MCU + Driver + Signal Chain)
- Digital Power and Energy Management
- Infrastructure Construction



Consumer Electronics

Expansion to Connectivity and Intelligence



- Wired and Wireless Applications
- GUI Interface and Display
- Home Appliances, AI Innovative Applications
- Sensor Fusion
- Hot Products



Automotive Electronics

Simultaneous Expansion in the OEM and Aftermarket



- Car Body Electronics (OEM)
- In-vehicle Electronics (Aftermarket Installation)
- Automotive-grade MCU Certification





GigaDevice

Thank You!
ご清聴ありがとうございました!

GD32 product family and development ecosystem



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