Geehy Semiconductor

Corporate Overview

May, 2023



PUBLIC

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Who We Are



Top 10 China IC DesignTop 10 China's Fabless Companies (MCU)

Listed company in Shenzhen Stock Market

Sector 450* Millions Annual Shipments



Over **100** sales offices & agencies serving over **20,000** customers across the globe

Our Mission

Drive industry innovation Create value for customers continually

Our Vision

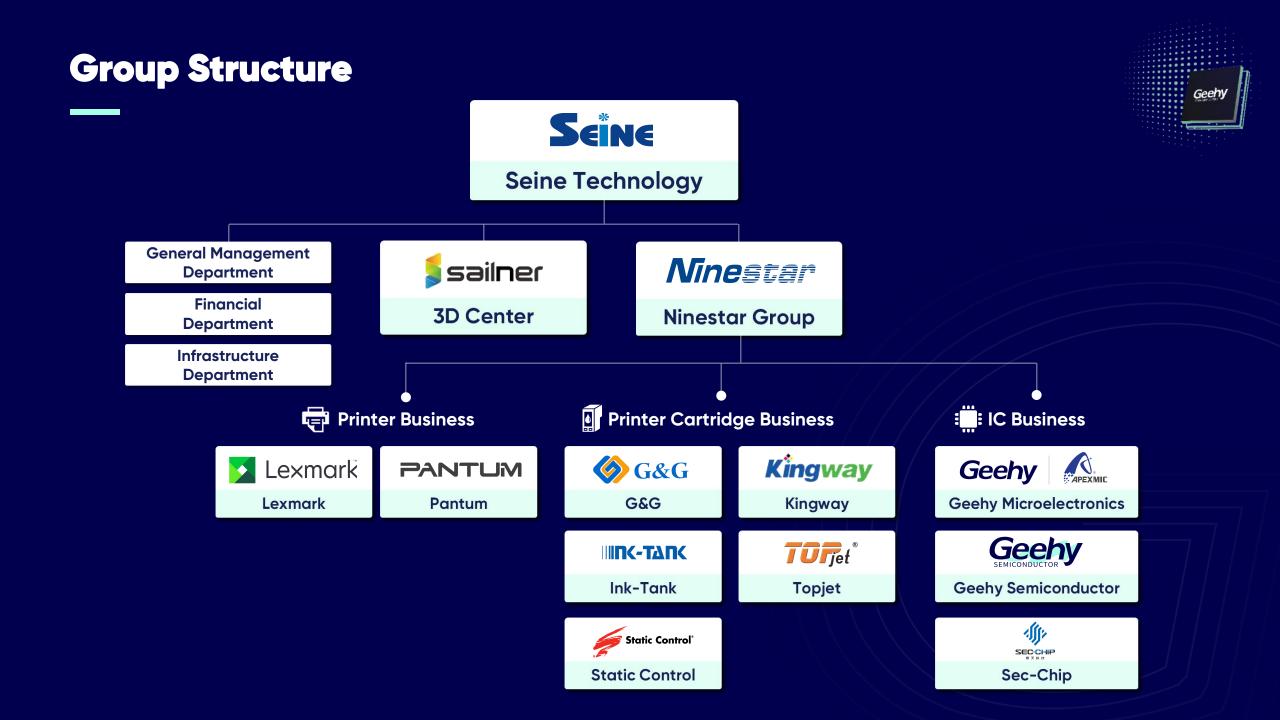
Become an international leading integrated circuit design enterprise



Overview of the develop history, R&D strengths, supply chain and distribution web.

Product & Solution of 3 independent Business Units

Intellectual Property Rights Support & Eco-system



Our Development Process

2004~2017

Focus on dedicated encryption chips and expand in the printing field.

2012

Launched multicore SoC chips.

2004

Established in Zhuhai, China. Started dedicated encryption chip business.

2018

Obtained permanent authorization of CPU from Arm® Cortex®-M0+/M3/M4 and released first 32-bit general-purpose MCU.

2019

Geehy Semiconductor was founded and strives for the market of MCUs.

2015

Became the world's top manufacturer of encryption chips in the printing field.

2020

Established Geehy US branch and entered into the international market.

2022

Completed the overall technical and product layout of non-printing chips; launched AEC-Q100 compliant automotive MCUs.

2019~ Future

Focus on general-purpose MCUs, and mixed signal analog ICs and expand in industrial, automotive, consumer electronics fields.

2023

Awarded "TOP 10 China IC Design Brands" in the 2023 China IC Design Awards. Geehy

R&D Investments



R&D Centers





Zhuhai, China

R&D headquarters, 20 years of research and development experience in IC security and certification, responsible for product definition, system simulation testing, and end product application software development.



Hangzhou, China

With more than 20 years of industry experience, the team is mainly composed of advanced doctors from Zhejiang University. The team leads the completion of the domestic CPU industrialization project and has the strongest chip industrialization capability in China.



North Carolina, USA

Over 30 years of experience in digital/analog IC design, responsible for IC simulation, digital/analog hybrid integrated circuit design, fault analysis, and IP design.



Shanghai, China

With more than 20 years of industry experience and doctors from Fudan University as the core team strength. Rapid integration with international chip design capabilities, so Geehy's R&D level has leapfrogged development.



Zhengzhou, China

In 2020, an IC research Institute was established with Zhengzhou University. After two years of talent training and operation, the main team force, is mainly responsible for the back-end verification and testing.

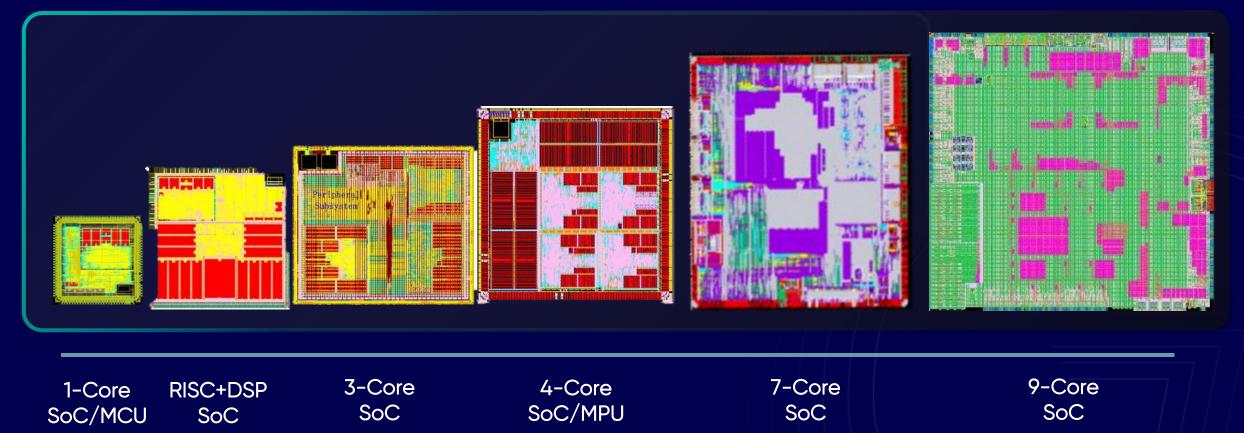


Chengdu, China

With more than 20 years of industry experience and doctors from the University of Electronic Science and Technology of China as the core team strength, and the team members come from famous international IC companies.

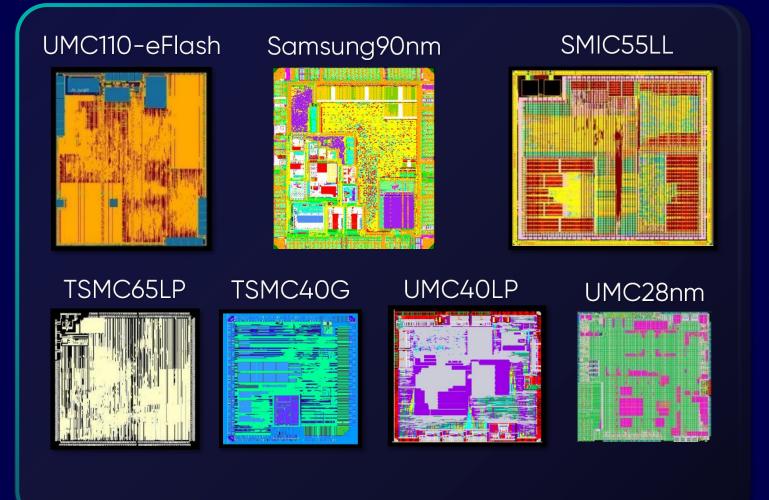
SoC Design Capability on Multicore Architecture





Cases on Different Silicon Process





 Tightly connection with main foundries

Attractive price and stable manufacturing resource

 Capability for chip services at main process nodes

180 nm to 28 nm

Different silicon process: Logic, Mixed-signal, RF, eFlash, EEPROM, Low Power, High Voltage, etc. **8-inch to 12-inch wafer**

Supply Chain

Continue to promote the cooperation of the whole industry chain

Through upstream and downstream cooperation between IC design companies and manufacturing enterprises, an independent and controllable industrial chain in IC design, key IP, characteristic processes, packaging, testing and production capacity is formed to improve the quality of products.

100

FAB France



Cooperative Foundry/Assembly



Back-end



Reliability Test to Verify System Capability Chip Design Chip Manufacturina Defect Screening **Reliability Test** Lest. Chip Manufacturina Packagina Electrical Package Integrity Performance Tes Visual Inspection Verification Test Screening and Aging Functional, Parametric, and Electrical Testing Flectrical Accelerated Accelerated Life Seal Device Performance Environmental Simulation lest Integrity lest Verification Test Stress Test

Failure Mechanism Based Stress Test Qualification for Integrated Circuits

- ESD Human Body Model as per AEC Q100-002
- ESD Charged Device Model as per AEC Q100-011
- Latch-Up as per AEC Q100-004
- Electrical Distributions as per AEC Q100-009
- Fault Grading as per AEC-Q100-007
- Characterization as per AEC Q003
- Electromagnetic Compatibility as per SAE J1752/3
- Short Circuit Characterization as per AEC Q100-012

Build an Independent Laboratory for Automotive-grade ICs

- Testing exceeds AEC-Q100 Requirements
- Developed automotive-grade testing platform to ensure high reliability, security and durability

Facility

- Over 2100m² Laboratory Floor Space
- Over US\$13,800,000 investment in on-site equipment
- Five CNAS accredited labs: electrical verification, component reliability, environmental reliability, failure analysis







Reliability



Analysis



Reliability Analysis & Verification Platform



Functional Safety Certification

APM32 MCU-based functional safety certification helps reduce development costs and shorten development time.



- APM32A091RCT7 •
- APM32F103RCT7
- APM32F072RBT7/CBT7 •

- APM32F072
- APM32F030

- APM32E103
- APM32F103ZE/VB •

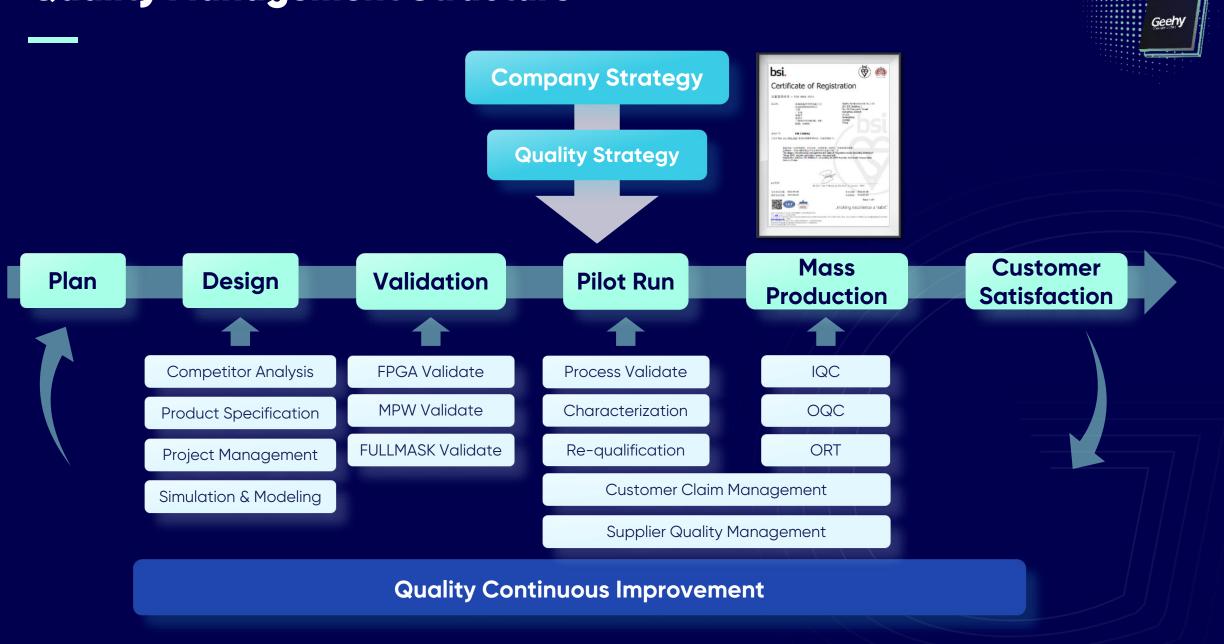
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APM32F072VBT6 •

Quality Management Structure



Connect the World

Agencies in North America and Canada



() SOURCEABILITY



US OFFICE 3010 Lee Avenue PO Box 152, Sanford, NC, 27332, USA

Headquarter

Research & Development

Agencies

Agencies in Asia JRE SRE Bentec TECTU **SUBSIDIARY** Zhengzhou, Henan

> SUBSIDIARY&OFFICE Shanghai

OFFICE Guangzhou, Guangdong

SUBSIDIARY

Chengdu, Sichuan

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OFFICE Shenzhen, Guangdong

SEGTRO ...

SUBSIDIARY Hangzhou, Zhejiang

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Geehy

HEADQUATER Zhuhai, Guangdong

Over 100 sales offices & agencies serving over **20,000** customers across the globe



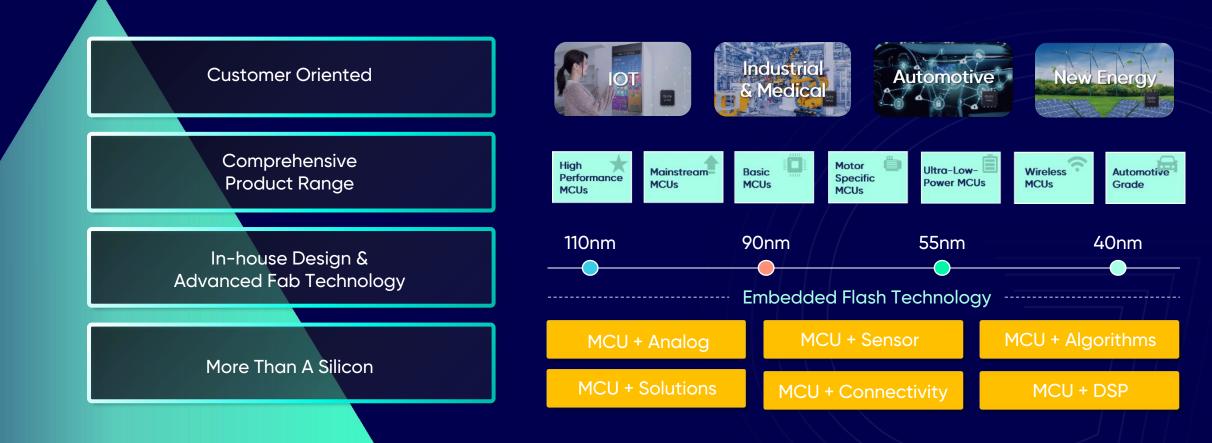
Overview of the develop history, R&D strengths, supply chain and distribution web.

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Innovative definition - "MCU+"

APM32 MCU provides the performance and functional capabilities to meet the requirements of industrial, customer electronics and automotive applications from general-purpose microcontroller control to wireless connectivity solutions and beyond.



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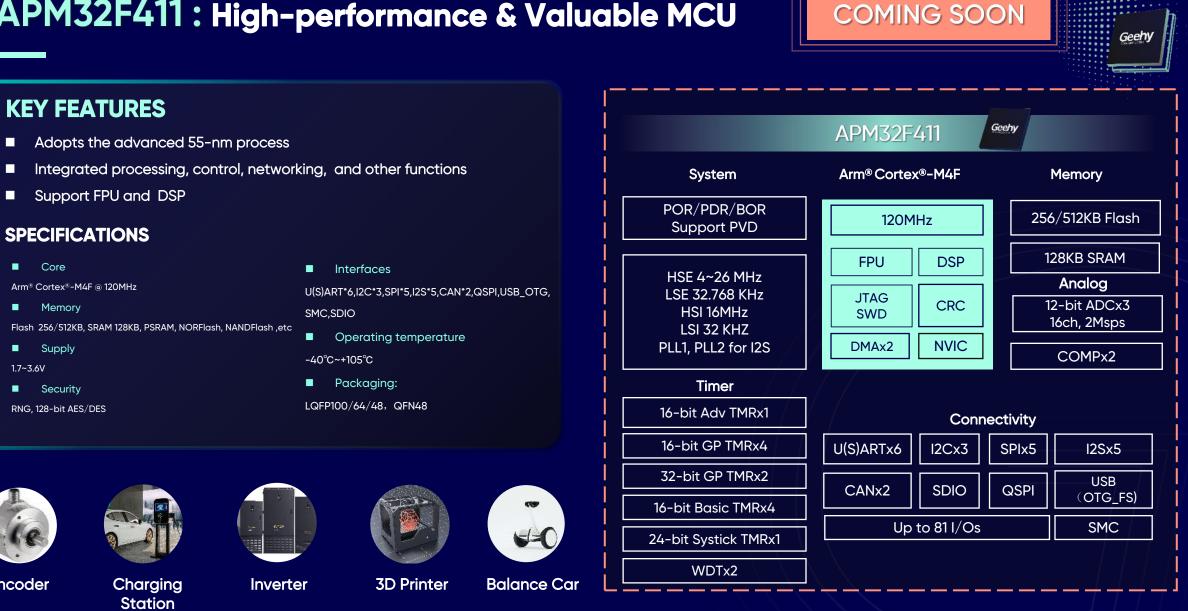
APM32 N	1CU Fam	ily Tree				Geehy
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Automotive & Industrial	Functional Safe & Security	ty Motor C	Control Co	nnectivity	Ultra-Low Power	Touch
	Based on Arm M0+/M3/M4F		APM32 MCU	160+ sku	S	
High Performance MCUs	Mainstream MCUs	Basic MCUs	Motor Dedicated MCUs	Ultra-Low- Power MCUs	Wireless MCUs	Automotive Grade
APM32H723	APM32E103	APM32F091	APM32F035	APM32L072	GW8811(BLE4.2)	APM32A407
APM32E501/502	APM32S103	APM32F072	APMSPIN32F020	APM32L083	GW3323(BLE5.2)	APM32A103
APM32E430	APM32F107/105	APM32F051	Cortex-M0+	Cortex-M0+	Cortex-M0	APM32F103RCT7
APM32F417	APM32F103	APM32S030			RISC-V	APM32A091
APM32F411	Cortex-M3	APM32F030	Cortex	OWERE *		APM32F072RBT7
APM32F407/405		APM32F003	Intelligent Processors by Arm®	rm =		APM32F072CBT7
Cortex-M5x/M7/M4F		Cortex-M0+				Cortex-M4F/M3/M0+

APM32 MCU HOT Models



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Geehy



APM32F411 : High-performance & Valuable MCU



Encoder

APM32F035: Motor Dedicated MCU

KEY FEATURES

- Highly integrated
- Integrated mathematical accelerators commonly used in FoC algorithms
- Integrated operational amplifier, comparator and other analog peripherals
- Built-in CAN controller
- Meet cost and high performance

SPECIFICATIONS

- Core
- Arm[®] Cortex[®]-M0+ @ 72MHz
- Memory
- Flash 64KB, SRAM 8KB
- Cordic
- Divider, trigonometric operation, etc
- Supply
- 2.0~3.6V





E-Bike









Interfaces

• -40°C~+105°C

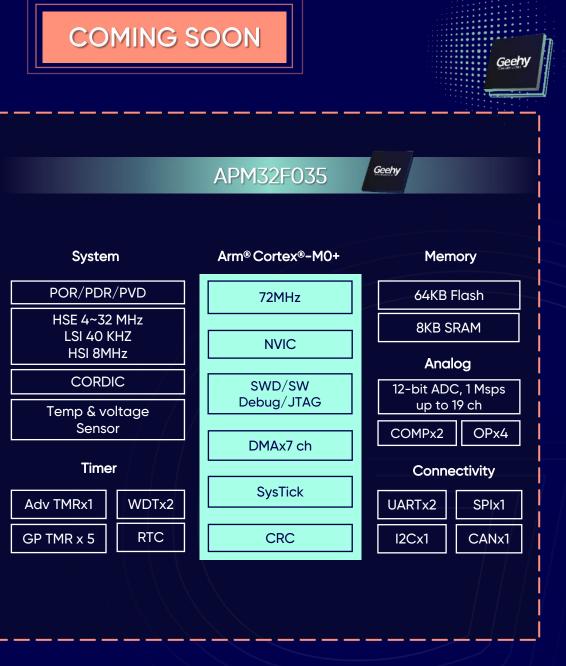
Packaging:

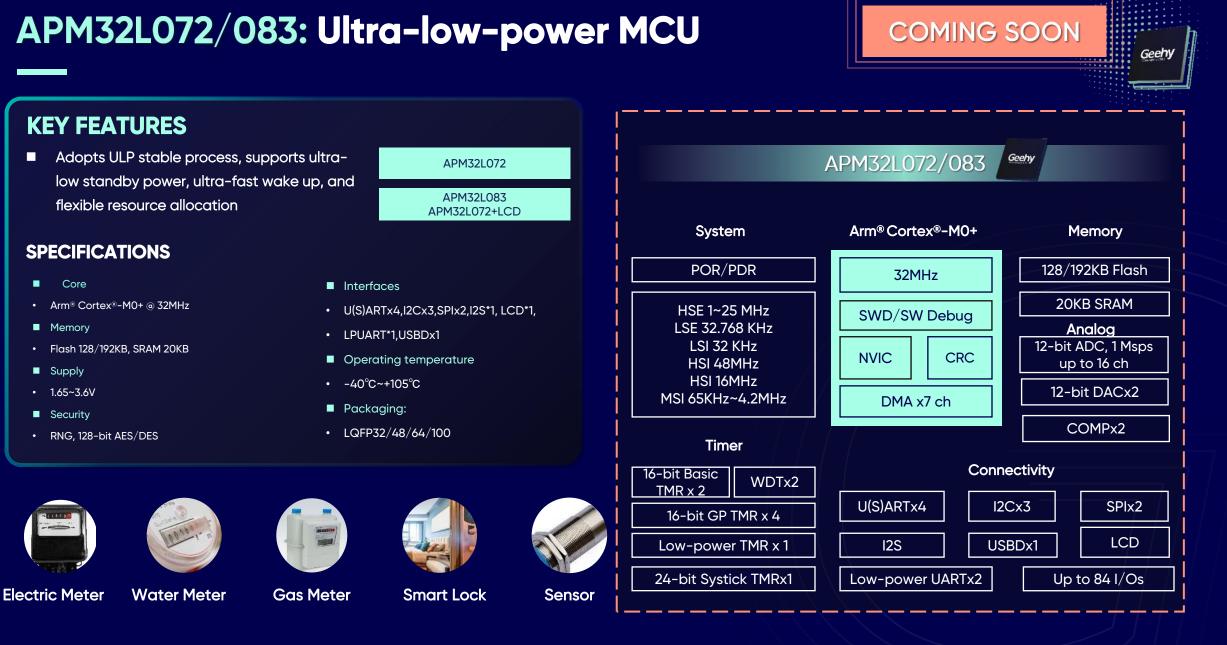
• LQFP32/48

• I2Cx1, SPIx1,CANx1, UARTx2

Operating temperature

Power tool





High Performance MCU–APM32F4 Series

Based on Arm[®] Cortex [®]-M4F Core

Equipped with a 55nm process technology platform, this series integrates processing, control, and networking, considering the characteristics of high computing, high real-time, large storage, and ease of use.

APM32F417

APM32F407

APM32F405

Specification

- Operating frequency: 168MHz
- Flash 512/1024KB, SRAM 192+4KB
- Support FPU and DSP
- Power supply: 1.8~3.6V
- Operating temperature: -40°C~+105°C
- Package
- LQFP64/100/144/176, BGA176
- Application

Servo Driver, PLC, Encoder, Inverter, Charging Pile, 3D Printer, Industrial Controller, Ventilator, Inverter, Vehicle Multimedia and Balance Car.

Features

- Enhanced storage: Built-in 2MB SDRAM (optional), supports various external memories such as PSRAM, NORFlash, NANDFlash, etc.
- Expanded interfaces: U(S)ART, I2C, SPI, I2S, SDIO, CAN, DCI, Ethernet, EMMC, high-speed OTG HS2 with integrated PHY
- Analog peripherals:
- 12-bit ADC: 3, channels:16/24
- 12-bit DAC: 2,dual-channel
- High Security:
- > International Cryptographic Algorithms: AES, DES, TDES-APM32F417
- Secure Hash Algorithms: RNG, HASH



Mainstream MCU–APM32E/S/F1 Series

Based on Arm[®] Cortex [®]-M3 Core

With characteristics of low power consumption, high performance, large capacity, good consistency, fast Flash erasing/writing speed, and rich peripheral resources, this MCU series has been widely used in various industries and unanimously recognized by customers.

APM32E103

APM32F107/105

Specification

- Operating frequency: 96/120MHz
- Flash 16~512KB, SRAM 6~128KB, SDRAM 2MB (optional)
- Support FPU (APM32F103xE/F103xB)
- Built-in RTC, 5/7/12 DMA channels
- Power supply: 2.0~3.6V
- Operating temperature: -40°C~+105°C
- Package
- LQFP48/64/100/144, QFN36/48
- Application

Security Equipment, Solar Energy Storage, Industrial Motors, Convenient Medical Care, Elevator Control and Automotive Instrumentation.

APM32S103

Features

Built-in EMMC, LCD compatible with 8080/6800 mode (APM32F103xE)

APM32F103

- Interfaces:
- > U(S)ART, I2C, SPI, I2S, USBD, SDIO, QSPI; support USBD and CAN to work independently;
- > Built-in "dual CAN" interface , communication rate up to 1Mbit/s (E103/F103xC)
- Analog peripherals:
- > 12-bit ADC: 2/3, channels: 16/21
- > 12-bit DAC: 2 ,dual-channel
- Tsensor: 1 (E103/F103xC)
- Up to 140 I/Os, all mappable to external interrupt vectors
- Reliability:
- Certified IEC 61508 SIL2/SIL3 (F103)
- > Certified IEC 60730 (E103)



Basic MCU–APM32F0 Series

Based on Arm[®] Cortex [®]-M0+ Core

With low power consumption, wide temperature range, high performance, and high stability, this series can provide more flexible options for cost-sensitive applications, helping customers to obtain more complex and innovative product features at a more economical cost.

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APM32F072 AP

APM32F051

APM32F030

Specification

- Operating frequency: 48MHz
- Flash 16~256KB, SRAM 2~32KB
- Power supply: 2.0~5.5V
- Operating temperature: -40°C~+105°C
- Package
- LQFP32/48/64/100, QFN20/28/32/48, TSSOP20, SOP20
- Application

Vehicle GPS, BMS, Industrial Handheld Terminal, VR Glasses, Fingerprint Lock, Home Appliance Control Panel, POS Machine, Vehicle T-box, Driving Recorder, Handheld Vacuum Cleaner, Smoke Alarm, Forehead Thermometer, Electric Toys, Charger, EDR and Computer Peripherals.

Features

- Built-in HDMI CEC (APM32F091/F072)
- Support TSC capacitive touch function (APM32F091/F072/F051)

APM32F003

- Programmable analog comparator: 2 (APM32F091/F072/F051)
- Interfaces:
- Up to U(S)ART, I2C, SPI, I2S, CAN(F072xB, F091xC)
- > Full-speed USB2.0*1 (external-free, support BCD and LPM)-APM32F072
- ESD>8KV, with strong anti-interference & anti-static capability (APM32F003)
- Integrated high-speed internal oscillator with full range accuracy within $\pm 3\%$ and up to $\pm 1\%$ with user calibration (APM32F003)
- Reliability:
- > Certified IEC 60730 (APM32F072/F030)
- Certified USB-IF (APM32F072)



Geehy 4 Business Units

 Industrial & Security
 Automotive
 New Energy
 Consumer Electronics

High-performance MCU\MPU, provide supporting solutions, and promote the research and development of network communication security ICs, analog ICs, and digital/analog hybrid ICs. Launched in line with ISO 26262 functional safety standards of vehicle level MCU, dedicated MCU and sensor series products, the strategic layout of body control, intelligent cockpit, BMS power management, power, safety, domain control, and other fields. Follow the double carbon policy, facing fields of new energy, energy management, and photovoltaic energy storage, providing highly reliable BMS-related products and supporting solutions, and allocating more customer technical support resources. Focusing on middle and highend smart home appliances and personal consumer electronics, relying on differentiated products and customized solutions, with a wide portfolio of products (universal MCU, dedicated ICs for motor, Bluetooth SoC) and complete toolchain support, to meet the needs of largescale applications.

APM32 MCU | Automotive Applications



- 9 MCUs with AEC-Q100 certification.
- September 2022, Geehy was certified to ISO 26262 Functional Safety Management System
- In 2023, Geehy will launch the first ISO 26262 ASIL-B MCU





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Geehy Automotive-grade MCU Application



Body Control

Field	MCU	
Electric Tailgate	APM32A103	
Body Domain Controller	APM32F103	
Remote Window/Central	M3	
Locking/ Light Control	96/120MHz	
Sound Wave Simulation	CAN x 2	

Infotainment System

Field	MCU
Intelligent Seat	
T-box/HUD	APM32A091
Central Control	APM32F072 M0+
Panel/Dashboard	M0+
GPS	48MHz
Bluetooth	CAN x 1
Stereo	



Security System

Field	MCU
Reversing Radar	APM32A091 APM32F072
EDR/OBD	M0+
Drive Recorder	48mhz
Dilve Recorder	CAN X 1

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Power System

Field	MCU	
Chassis Control	APM32A407 APM32A103	
BMS Control	M4/M3 168/120/96MHz	
Panel	CAN x 2	

APM32 MCU | Industrial Field Applications



- Over 60% of Geehy MCU is desinged and produced as Industrial-grade MCU.
- IEC61508 SIL3 certified
- MASS PRODUCTION already for different industrial areas



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Consumer Electronics Layout





Promote energy-
saving, efficient
and intelligent
development of
high-end
consumer
electronics

High-end Consumer MCUs

- Arm[®] Cortex[®] -M0+/M3/M4 cores
- Low power consumption, high performance, high stability
- Operating temperature -40°C~
 105°C, ESD up to 8KV
- IEC61508 SIL3 certified and USB-IF test certified

BLE4.2 / 5.2 SoC

- Arm[®] Cortex[®]-M0/RISC-V
- Support AoA/AoD positioning, MESH networking, transparent transmission, OTA
- Excellent RF characteristics and anti-interference performance

Application Field: Wearable devices, medical devices, location services, human-computer interaction, etc.

Motor Control Solutions

- BLDC motor control dedicated
 SoC
- Motor Control Algorithm Library
- Fast response speed, wide application range, low solution steady-state error
- Provide industry-specific production-grade reference designs

Application Field: Inverter home appliances, cordless vacuum cleaners, fitness equipment, electric bicycles, power tools, etc.

Application Field: Smart home appliances, medical equipment, access control systems, smart lighting, etc.

APM32 General-Purpose MCUs in the Consumer Electronics Field of Existing Application Cases

Continue to provide cost-effective products and services to bring long-term value to customers and users





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Overview of the develop history, R&D strengths, supply chain and distribution web.

Product & Solution of 3 independent Business Units

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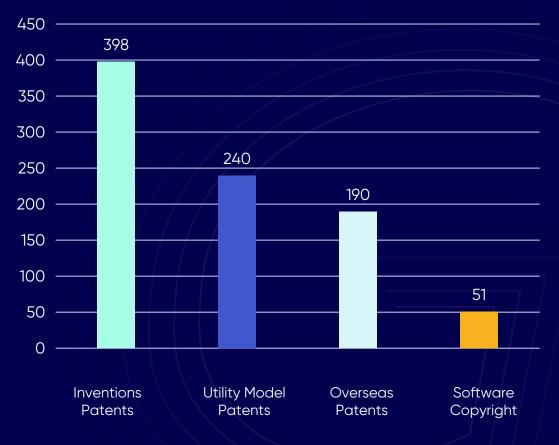
Powerful Intellectual Property Platform and Intellectual Property Risk Management Experience

Long-term focus on intellectual property protection

- Accumulation of Patents: The company has 1185 patents for integrated circuits, of which 255 for MCU. (143 authorized)
- Professional Team: Full-time patent team of 20 people and 5 professional lawyers, 9 of whom are dedicated to patent matters at Geehy.
- Long-term International law firm Partnership: Longterm legal partnership in Europe, Japan and the US.
- Success Cases: Responded to 9 of 337 international investigations and lawsuits, settled 6 cases and won 3 cases.

Available IC patents to the Group

(As of December 2022)





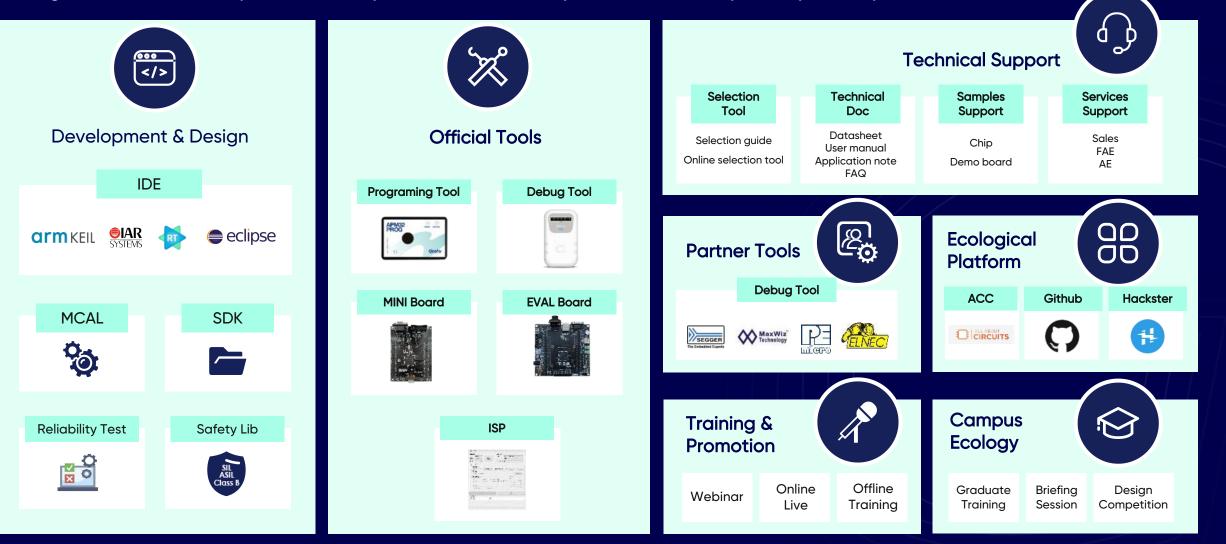
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Ecosystem for Development

With a complete ecosystem, Geehy can provide a wealth of software and hardware development tools, helping engineers to accelerate product development, reduce development costs, and optimize product performance.

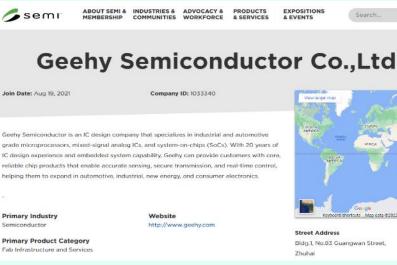


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Connect with International Partner



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IAR Embedded Workbenchが、 **Geehy Semiconductor**社の APM32シリーズMCUをフルサポ - 1

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IAR Embedded Workbanch for Arm 9,30%、スマートホールパワイエンジが売。川 教育学科品、温泉所有年に、スマートエネルギーなどの分野で構成く技用されてい さ、Genty Servicement COPM02シリーンSMCDモッジングルルボート

3027年1月2日、何名人のスキム民地になソフトウェアド、カトリービスホーディイキト、マ 本語をリードはならなアスタスタスをはたは、スリーーデン、ジグラフルーはなか、定 しまたいた所、人気がかけて、予定のない、したかない人が増加てん。「中国にない、 生命な」に一ドはよいに取りた。一ドレインでプラインやの意見を参加」「デビルでの気勢」 Marky Landowscients」(同時)の人間の時代で、ADI Constraints Workbanchをfor Ann/D OIRキバージョン 9305/3cthy Semicinius(の4PM)2シリーズ MIDIチップに対してフルドデーチャレヴすることと発表したした。

The transition is a set of the s 162 Embedded Warsheets for Series, Geens Semicorductor MONDUL 711, 7 (1999) 484

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PEmicro provides powerful and easy-to-use tools for development, debug, and production programming of Geehy Semiconductor's APM32F030xC devices. Our tools include our Multillink and advanced Multilink FX debug probes as well as our Cyclone production programmers, and the top-end-performance Cyclone FX production programmers.

Geehy Semiconductor's APM32F030xC family is fully optimized and upgraded based on the performance of APM32F030x6x8, Improving the capacity of FLASH and SRAM, increasing the number of UART interfaces, a wide range of upgraded peripherals and I/O, which can help customers exhand innovative application fields such as industrial control and smart home at a more economical cost.

Production Programming

Extensive Device Support Owhere production concernments are wasty configured and are versable in their webs; and launch and may be martually certrelied of easily automated. The TX adds high-speed certomance ordensize capabilities for advanced automation and advanced programming certrols. Click all the way through the



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Semiconductor

EtherCAT.

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Geehy Semiconductor 2 www.geehy.com

Geeky Semiconductor Co., Ltd. is a wholly-owned subsidiary of Apex Microelectronics, formerly known as the R&D department for IoT chip of Apex, whose headquarter is Ninestar Corporation Number of the Northeast and Security the fields of industrial control, consumer electronics, medical equipment, smart home, and and monotonian application. Geehy is equipped with first-class R&D design, a full range of software and hardware design services, and complete encryption engine platform. Geehy has established R&D centers in Zhuhai, Shanghai, Hangzhou, and North Carolina in the United States. Geehy always adhere to Market Demand-Oriented, technological innovations as the core. Focusing on providing users with higher quality chips, solutions, and differentiated services, as well as endeavors to build an intelligent and secure new ecosystem for the development of IoT.



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Technical Suppo Support Knowledge

Product Manuals

Application Notes

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SLGGLR and Geehy partner to fully support the APM32 series. MCU



As part of a partnership with Gochy Semiconductor, SEGGER's J-Links debug probes, as well as its family of Flasher in-circuit programmers, fully support the Geehy Polaris APMS2 series MCU. Geehy and their customers now enjoy the benefits of J-Link Prime with these devices being supported right out of the box.

"It is a great honor to cooperate with SEGGER," said Evan Wang, executive VP of Geehy. "Now all of our APM32. series MCUs are fully supported by SEGGER's family of J-Link debug probes. This opportunity helps us to better serve our domestic and international customers and to support engineers in developing embedded systems quickly

"We are thrilled to partner with Geehy, making the most of their high-performance industrial and automotive-grade MCUs," says two Gellenbruegge, Managing Director of SEGGER, "With J-Link Prime, SEGGER makes sure that J-Links and Flashers deliver the best performance possible for debugging and flash programming all APM32 devices. We are looking forward to expanding our partnership with Geehy in the years to come.

Join the International Exhibitions











Upcoming Event



electronica India 2023

September 13-15
 BIEC, Bengaluru
 More information, please visit:
 https://electronica-india.com/en/





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