Microcontroladores & Control del tiempo y frecuencia

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Helping Innovation

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    - Sobre Geehy Semiconductor
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    - Wi2Wi
  - **Soluciones**
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Microcontroladores

Introducción

Holtek Semiconductors

- Empresa líder en la fabricación de circuitos integrados ubicada en Taiwán.
- Principales actividades: **Diseño de microcontroladores, componentes periféricos**
- En contínua expansión en el diseño y fabricación de microcontroladores para nuevos diseños.

- Gama de productos en la actualidad:
  - MCU de propósito general (8/32 bits)
  - MCU para aplicaciones específicas:
    - Voz, comunicaciones, periféricos de PC, electrodomésticos, equipos médicos, automoción y seguridad, etc.
  - Otros dispositivos:
    - Control energía, control/gestión LCD y Led, sensores de huella de alta precisión, módulos con variedad de sensores y otros periféricos.

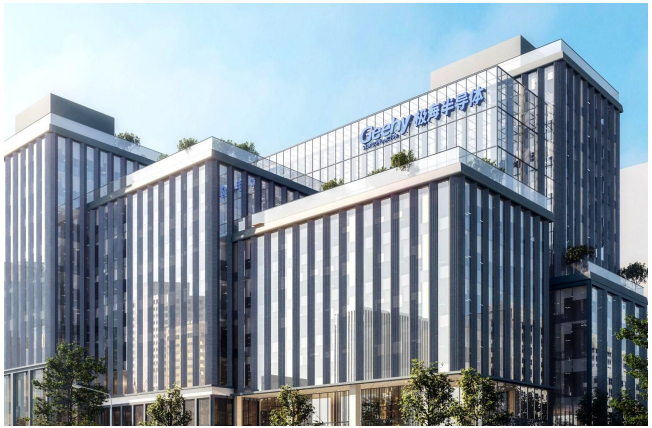
General Purpose MCU	USB MCU	Motor MCU & Peripheral
32-Bit Flash MCU 8-Bit Flash MCU	USB Interface Flash MCU	Motor Controller & Driver Flash MCU Motor Controller & Driver Peripheral
OPA MCU	**Health & Measurement**	**Security & Safety**
OPA Flash MCU	24-Bit A/D Flash MCU 24-Bit A/D Peripheral Health Care Flash MCU Measurement Flash MCU R to F MCU	Security & Safety Flash MCU Sound Effect Flash MCU Security & Safety IC
Touch MCU & Peripheral	**Voice & Music MCU**	**Wireless**
Touch Flash MCU Ultra-Low Power Touch Flash MCU Touch Key IC	Cortex-M0+ 32-Bit Voice / Music Flash MCU Voice & Music MCU Voice Record / Playback Flash MCU	BLE 2.4GHz RF Sub-1GHz RF NFC Infrared Special Purpose Flash MCU

Communication	Battery & Power Management	Display Driver
Interface Bridge Telecom IC	Battery Management Li Battery & Power Management Flash MCU Inverter Flash MCU LDO & Detector DC to DC Converter AC to DC Converter	LCD Controller & Driver LED Controller & Driver AC / DC LED Lighting Driver
Special Purpose MCU	**EEPROM Memory**	**Analog**
Bank & Commercial Flash MCU Special Purpose Flash MCU Low Power Flash MCU CAN Bus Flash MCU USB Data Logger Flash MCU	I^2C EEPROM	General OP Amplifier Audio Amplifier 24-Bit A/D Peripheral
Video	**Miscellaneous**	**MCU Programming Tools**
CCD / CIS Analog Signal Processor Currency Recognition Processor	Real-Time Clock Encoder / Decoder Infrared	32-Bit MCU Programming Tools 8-Bit MCU Programming Tools

Geehy Semiconductor

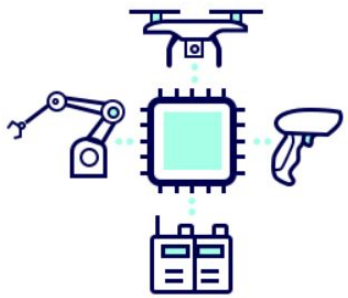
- **Geehy** Semiconductor, es una empresa de diseño de circuitos integrados dedicada al desarrollo de **microprocesadores** de grado **industrial** y **automotriz**, chips analógicos de alto rendimiento y SoC. es una subsidiaria de propiedad total de Apex Microelectronics, anteriormente conocida como el departamento de I+D para chips IoT de Apex, cuya empresa matriz es **Ninestar** Corporation (002180.SZ)

Ninestar



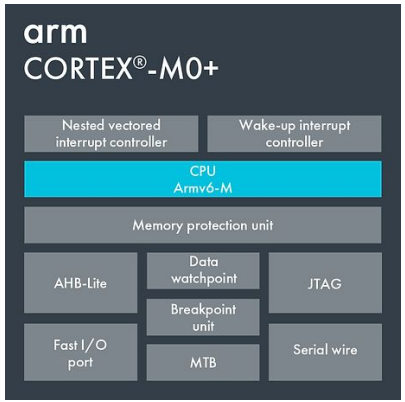
- Con 20 años de experiencia en el diseño de circuitos integrados, **Geehy** puede proporcionar a los clientes productos de chips básicos y confiables que permiten una detección precisa, una transmisión segura y un control en tiempo real, ayudándolos a expandirse en los sectores de automoción, industrial, de nuevas energías y de electrónica de consumo.

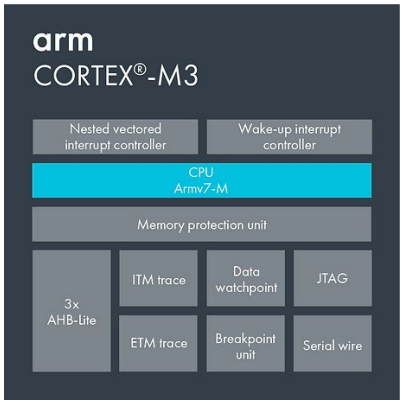
- Con 6 centros de investigación y desarrollo de chips en China y EEUU, así como múltiples bases de cooperación de investigación y desarrollo y un equipo de investigación y desarrollo de más de 500 empleados.

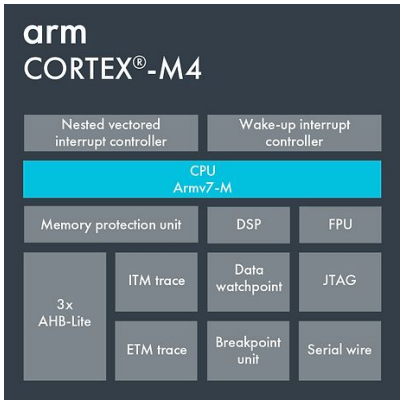


APM32 MCU

Industrial grade
Low-power consumption
High performance







Microcontroladores 8 bits

32-Bit Flash MCU | 8-Bit Flash MCU | 8-Bit OTP MCU

- Low Pin Count Flash MCU
- Low Pin Count Flash MCU with Multi-interface
- Flash MCU with EEPROM
- Flash MCU with LCD Driver
- A/D Flash MCU with LCD & High Current LED Driver
- A/D Flash MCU with six Timer & High Current LED Driver
- A/D Flash MCU with High Accuracy / Low Current LIRC
- Flash MCU with High Accuracy HIRC
- A/D Flash MCU with LCD Driver & High Accuracy HIRC
- Advanced A/D Flash MCU
- Advanced A/D Flash MCU with LCD Driver
- 24-Bit Delta Sigma A/D Flash MCU with LCD Driver
- A/D Flash MCU
- A/D Flash MCU with High Current LED Driver

Advanced A/D Flash MCU with LCD Driver

Part No.	Max. Freq.	VDD	Program Memory	Data Memory	Data EEPROM	Stack	IAP	I/O	Timer	ADC	LCD	RTC	Comp-arator	CRC	Interface	Package
HT67F2350	16MHz	2.2V~5.5V	8K×16	768×8	256×8	16	√	57	10-bit PTM×6 16-bit PTM×2 16-bit STM×3	12-bit ×12	46×4 44×6 42×8	√	2	√	SPI/I²C×1 SPIA×1 UART×2	48/64LQFP
HT67F2360	16MHz	2.2V~5.5V	16K×16	1536×8	256×8	16	√	71	10-bit PTM×6 16-bit PTM×2 16-bit STM×3	12-bit ×16	56×4 54×6 52×8	√	2	√	SPI/I²C×1 SPIA×1 UART×2	64/80LQFP
HT67F2362		1.8V~5.5V		2048×8	1024×8			57			46×4 44×6 42×8					48/64LQFP
HT67F2370	16MHz	2.2V~5.5V	32K×16	3072×8	512×8	16	√	71	10-bit PTM×6 16-bit PTM×2 16-bit STM×3	12-bit ×16	56×4 54×6 52×8	√	2	√	SPI/I²C×1 SPIA×1 UART×3	64/80LQFP
HT67F2372		1.8V~5.5V			2048×8			57			46×4 44×6 42×8					48/64LQFP
HT67F2390	16MHz	2.2V~5.5V	64K×16	4096×8	1024×8	16	√	71	10-bit PTM×6 16-bit PTM×2 16-bit STM×3	12-bit ×16	56×4 54×6 52×8	√	2	√	SPI/I²C×1 SPIA×1 UART×3	64/80LQFP

Note: These devices conform to the European standard IEC 60730 and the U.S. standard UL 60730 certified.

Low Power A/D Flash MCU

Part No.	Max. Freq.	VDD	Program Memory	Data Memory	Data EEPROM	Stack	IAP	I/O	Timer	ADC	Temp. Sensor	SCOM	RTC	CRC	Interface	Package
HT66L2540A	16MHz	1.8V~5.5V	4K×16	256×8	256×8	8	√	26	16-bit PTM×1 16-bit STM×1	10/12-bit ×8	√	4	√	√	SPI/I²C/UART×1	16NSOP 24/28SSOP 28QFN
HT66L2550A	16MHz	1.8V~5.5V	8K×16	512×8	256×8	8	√	30	16-bit PTM×2 16-bit STM×1	10/12-bit ×8	√	4	√	√	SPI/I²C/UART×1	24/28SSOP 32QFN

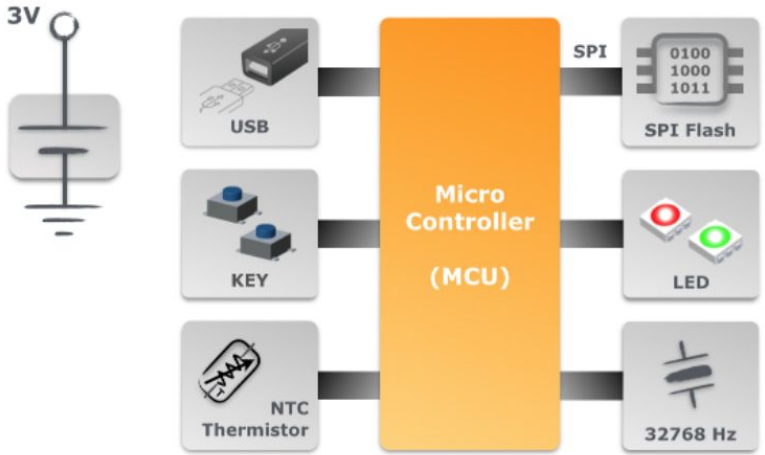
Servo Motor Flash MCU with H-Bridge Driver

Part No.	Max. Freq.	VCC (HV)	VDD	Program Memory	Data Memory	Data EEPROM	Stack	IAP	I/O	Timer	ADC	H-Bridge Driver	LDO	Inter-face	Package
HT45F4830	8MHz	3.5V~10V	3.0V	2K×16	128×8	32×8	4	—	4	10-bit PTM×1 16-bit PTM×1	12-bit ×4	600mA Min.	3.0V	—	8SOP-EP
HT45F4840	16MHz	6.0V~12V	3.3V or 5.0V	4K×16	256×8	—	6	√	8	10-bit PTM×1 16-bit STM×1 16-bit CTM×1	12-bit ×4	—	3.3V or 5.0V	UART×1	10SOP 16NSOP/QFN
HT45F4842									6			√			10SOP-EP 24QFN

Li Battery Protection Flash MCU

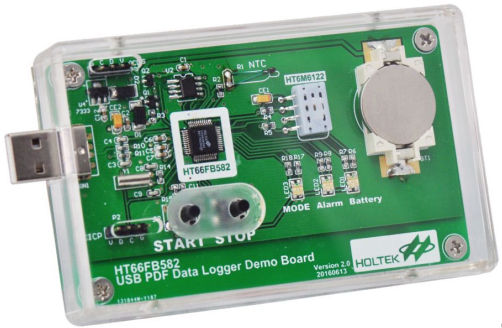
Part No.	Max. Freq.	VIN	LDO*1	Program Memory	Data Memory	Data EEPROM	IAP	I/O	Timer	ADC	NMOS Gate Driver	Cell Balance	HV Wake Up	V_{MON}*2 Accuracy	Current Monitor	Inter-face	Package
HT45F8544	16MHz	7.5V~36V	5V±1% 30mA	4K×16	256×8	128×8	√	14	10-bit PTM×1 16-bit CTM×1 16-bit STM×1	12-bit ×5	—	—	√	1/n±0.5% (Ratio)	—	SPI/I²C×1 UART×1	28SSOP
HT45F8554				8K×16	512×8			21		12-bit ×8							28SSOP 48LQFP-EP
HT45F8566				16K×16	1024×8	1024×8		25	10-bit PTM×2 16-bit CTM×1 16-bit STM×1							SPI/I²C×1 UART×2	48LQFP-EP
HT45F8640	16MHz	7.5V~36V	5V±1% 50mA	4K×16	256×8	128×8	√	11	10-bit PTM×1 16-bit CTM×1 16-bit STM×1	12-bit ×5	Low-side×1 High-side×1	√	√	1/n±0.5% (Ratio)	—	I²C×1	28SSOP
HT45F8650				8K×16	512×8			21		12-bit ×8	Low-side×2 High-side×1					SPI/I²C×1 UART×1	28SSOP 48LQFP-EP
HT45F8662				16K×16	1024×8	1024×8		25	10-bit PTM×2 16-bit CTM×1 16-bit STM×1	12-bit ×8						SPI/I²C×1 UART×2	48LQFP-EP

PDF Data Logger | LCD PDF Data Logger

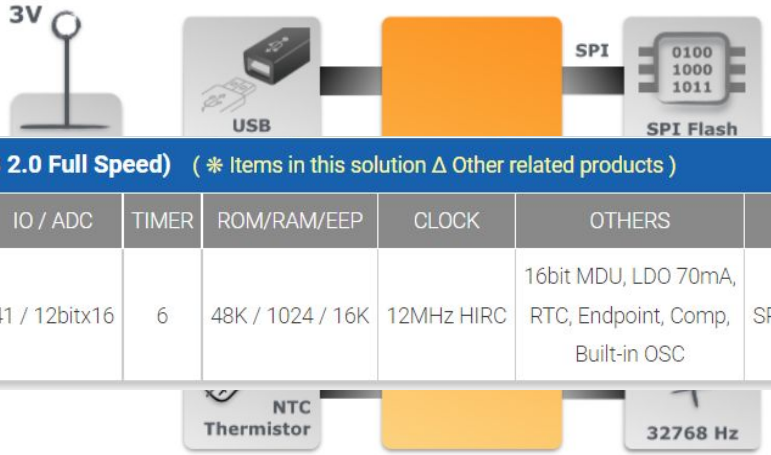


No.WAS-16A1

Wireless
ASIC/Memory
Non Holtek
MCU
Analog/Power



PDF Data Logger | LCD PDF Data Logger

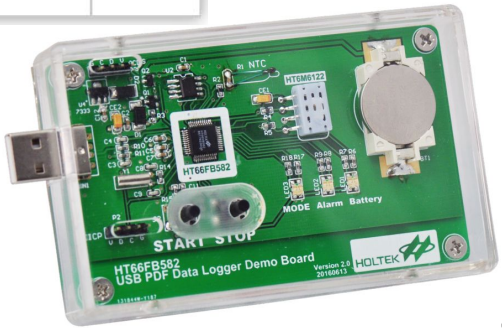


• A/D Flash USB MCU (USB 2.0 Full Speed) (❋ Items in this solution Δ Other related products)

	Part Number	VDD	IO / ADC	TIMER	ROM/RAM/EEP	CLOCK	OTHERS	INTERFACE	PACKAGE
❋	HT66FB582	2.2 ~ 5.5V	41 / 12bitx16	6	48K / 1024 / 16K	12MHz HIRC	16bit MDU, LDO 70mA, RTC, Endpoint, Comp, Built-in OSC	SPI/I²C,SPI,UART	48LQFP 46QFN

No.WAS-16A1

Wireless
ASIC/Memory
Non Holtek
MCU
Analog/Power



Microcontroladores 32 bits

32-Bit Flash MCU | 8-Bit Flash MCU | 8-Bit OTP MCU

- Cortex-M0+ 32-Bit MCU
- Cortex-M0+ 32-Bit USB MCU
- Cortex-M0+ 32-Bit LCD MCU
- Cortex-M0+ 32-Bit 5V MCU
- Cortex-M0+ 32-Bit 5V USB MCU
- Cortex-M0+ 32-Bit 5V USB Smart Card Reader MCU
- Cortex-M0+ 32-Bit Data Bridge MCU
- Cortex-M0+ 32-Bit BLDC Motor MCU
- Cortex-M0+ 32-Bit BLDC Motor MCU with Gate-Driver
- Cortex-M0+ 32-Bit BLDC Flash MCU with Driver
- Cortex-M0+ 32-Bit USB Data Logger LCD MCU
- Cortex-M0+ 32-Bit 5V Touch MCU

32-Bit Flash MCU | 8-Bit Flash MCU | 8-Bit OTP MCU

- Cortex-M0+ 32-Bit BLE MCU
- Cortex-M0+ 32-Bit Music Synthesizer MCU with Data Flash ROM
- Enhanced 24-Bit A/D Cortex-M0+ 32-Bit MCU
- Enhanced 24-Bit A/D Cortex-M0+ 32-Bit LCD MCU
- 2.4GHz RF Transceiver Cortex-M0+ 32-Bit MCU
- Sub-1GHz RF Transceiver Cortex-M0+ 32-Bit MCU
- Cortex-M0+ 32-Bit Li Battery Protection MCU
- Cortex-M0+ 32-Bit Power Deilvery MCU
- Cortex-M0+ 32-Bit Music Synthesizer MCU
- Cortex-M3 32-Bit MCU
- Cortex-M3 32-Bit Fingerprint MCU

32-Bit Flash MCU

Enhanced 24-Bit A/D Cortex-M0+ 32-Bit MCU

Part No.	Max. Freq.	VDD	Flash	SRAM	ADC		Timers*1	Cap.*2 or PWM	Cpm. PWM*3	RTC	Interface	Others	I/O	Package
HT32F59041	20MHz	2.5V~ 5.5V	64KB	8KB	SAR ADC 1Msps 12-bit×12	Delta Sigma ADC 24-bit×4	BFTM×2 PWM×2 GPTM×1 MCTM×1	16	3	√	USART×1 UART×2 SPI×1 I²C×1	CRC DIV	30	48LQFP

Cortex-M3 32-Bit MCU

Part No.	Max. Freq.	VDD	Flash	SRAM	PDMA	ADC	CMP	Timers*1	Cap.*2 or PWM	Cpm. PWM*3	RTC	SCI*4	USB*5	EBI*6	I²S	Inter-face	Others	I/O	Package
HT32F12345	96MHz	2.0V ~ 3.6V	64KB	16KB	12CH	1Msps 12-bit ×12	2	BFTM×2 GPTM×2 MCTM×2	16	6	√	—	√	√	√	SDIO×1 USART×2 UART×2 SPI×2, I²C×2	CRC	37 37 51	46QFN 48LQFP 64LQFP
HT32F12365	96MHz	2.0V ~ 3.6V	256KB	64KB	12CH	1Msps 12-bit ×16	2	BFTM×2 GPTM×2 MCTM×2	16	6	√	2	√	√	√	SDIO×1 USART×2 UART×2 SPI×2, I²C×2	AES CRC	37 37 51 80	46QFN 48LQFP 64LQFP 100LQFP
HT32F12366			256KB	128KB															
HT32F12364	72MHz	1.65V ~ 3.6V	256KB	128KB	6CH	1Msps 12-bit ×8	—	BFTM×2 SCTM×2 PWM×1 GPTM×1	10	—	√	1	√	√	—	USART×1 UART×2 SPI×2, I²C×2	AES CRC	32 38 52	40QFN 48LQFP 64LQFP

Cortex-M0+ 32-Bit BLDC Motor MCU																
Part No.	Max. Freq.	VDD	Flash	SRAM	PDMA	ADC	CMP	OPA	Timer*1	Cap.*2 or PWM	Cpm. PWM*3	RTC	Interface	Others	I/O	Package
HT32F65232	60MHz	2.5V~ 5.5V	32KB	4KB	6CH	2Msps×1 12-bit×12	2	1	BFTM×2 SCTM×4 GPTM×1 MCTM×1 LSTM×1	12	3	—	USART×1 UART×1 SPI×1 I²C×1	CRC DIV	20 28 44	24SSOP 32QFN 48LQFP
HT32F65230						1Msps×2 12-bit×8	3	2	BFTM×2 SCTM×4 GPTM×1 MCTM×1			√			40	48LQFP
HT32F65240			64KB	8KB												

BLE

Cortex-M0+ 32-Bit BLE MCU														
Part No.	Max. Freq.	VDD	Flash	SRAM	ADC	Timers#	Ver.	Data Rate	Output Power	Sensitivity	Interface	Others	I/O	Package
HT32F67741	40MHz	2.0V~ 3.6V	64KB	8KB	1Msps 12-bit×6	RTC×1, WDT×1, BFTM×2, SCTM×4, GPTM×1, MCTM×1	5.2	1/2Mbps	+3.5dBm	-94/-91dBm	USART×1, UART×2, SPI×2, I²C×2	CRC×1 TRNG×1	25	46QFN

2.4GHz RF

2.4GHz RF Transceiver Cortex-M0+ 32-Bit MCU

Part No.	Max. Freq.	VDD	Flash	SRAM	PDMA	ADC	Timers*1	RTC	Frequency	Data Rate	Output Power	Sensitivity	Interface	Others	I/O	Package
HT32F67041*	60MHz	2.0V~3.6V	64KB	8KB	6CH	1Msps 12-bit×16	BFTM×2 SCTM×4 GPTM×1	√	2402~2480 MHz	125/250/500Kbps	-10~+6 dBm	-97dBm @ 250Kbps	UART×2 SPI×2 I²C×2	AES CRC	16	32QFN
HT32F67051*			128KB												29 31	46QFN 48LQFP-EP

* Under development, available in 2Q, 2023.
Note: BFTM: Basic Function Timer, SCTM: Single-Channel Timer, GPTM: General-Purpose Timer.

Sub-1GHz RF Transceiver Cortex-M0+ 32-Bit MCU

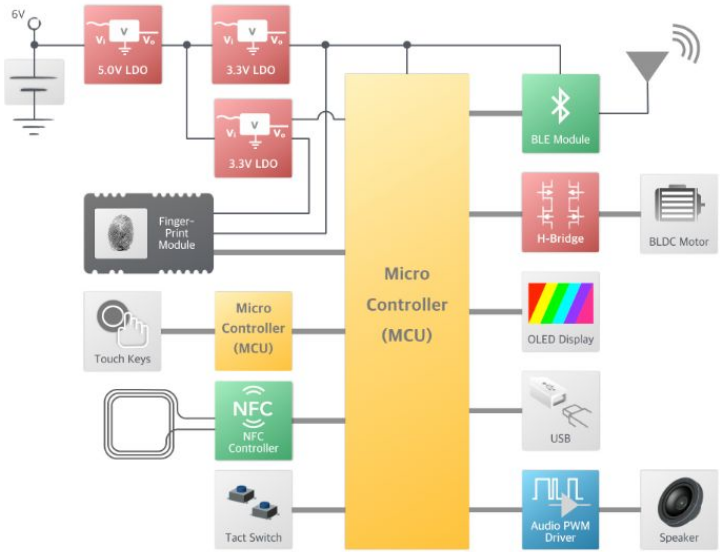
Part No.	Max. Freq.	VDD	Flash	SRAM	ADC	Timers#	Band	Data Rate	Max. Output Power	Rx Current Consumption	Interface	I/O	Package
HT32F67233*	40MHz	2.0V~3.6V	32KB	4KB	1Msps 12-bit×8	BFTM×1 SCTM×2 GPTM×1	315/433/470/868/915MHz	OOK: 0.5~20Kbps GFSK: 2~250Kbps	20dBm	5.8mA@433MHz 6.8mA@868MHz	USART×1 UART×1 SPI×1, I²C×1	21	46QFN

Sub-1GHz RF

Sub-1GHz RF Transceiver Cortex-M0+ 32-Bit MCU

Part No.	Max. Freq.	VDD	Flash	SRAM	ADC	Timers#	Band	Data Rate	Max. Output Power	Rx Current Consumption	Interface	I/O	Package
HT32F67233*	40MHz	2.0V~3.6V	32KB	4KB	1Msps 12-bit×8	BFTM×1 SCTM×2 GPTM×1	315/433/470/868/915MHz	OOK: 0.5~20Kbps GFSK: 2~250Kbps	20dBm	5.8mA@433MHz 6.8mA@868MHz	USART×1 UART×1 SPI×1, I²C×1	21	46QFN

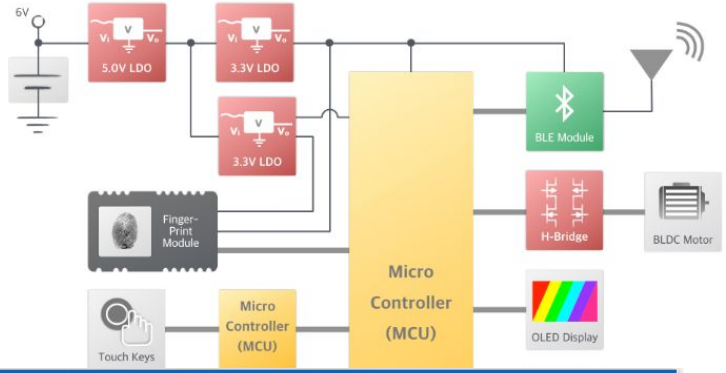
Smart Door Locks



No.WAS-2043

Wireless
ASIC/Memory
Non Holtek
MCU
Analog/Power

Smart Door Locks



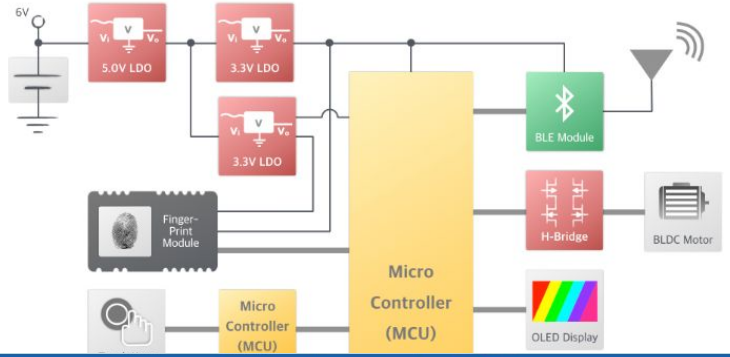
Enhanced Touch I/O Flash MCU (✻ Items in this solution Δ Other related products)

	Part Number	VDD	IO/Touch Key	TIMER	ROM/RAM/EEP	CLOCK	Interface	Others	Package
✻	BS83B12C	2.2V~5.5V	18/12	1	2KW/512B/64B	8/12/16 MHz HIRC	SPI/I²C	High current LED output,LVR	20 SOP/SSOP/QFN
	BS83B16C		22/16						24 SOP/SSOP/QFN

No.WAS-2043

Wireless
ASIC/Memory
Non Holtek
MCU
Analog/Power

Smart Door Locks

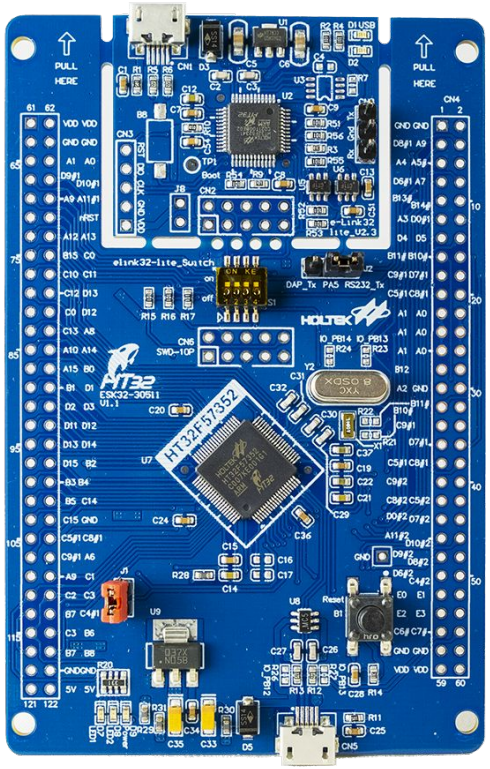


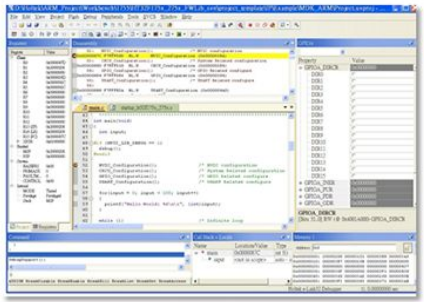
Cortex-M0 32-Bit USB MCU (✳ Items in this solution Δ Other related products)

	Part Number	VDD	Max. Freq.	ROM /SRAM	PDMA	ADC	CMP	Timer	Cap. or PWM Cpm. PWM	Interface	Other	I/O	Package
	HT32F52342	2.0V~3.6V	48MHz	64KB /8KB	6CH	1Msps 12bitx12	2	7	14 3	USART, UART, SPI, I²C, SCI, USB, I²S	EBI, CRC	26 39 51	33 QFN 48 LQFP 64 LQFP
	HT32F52352			128KB 64 LQFP /16KB									
	HT32F52344	1.65V~3.6V	60MHz	64KB /16KB	6CH	1Msps 12bitx12	2	6	10 3	UART, SPI, I²C, USB	EBI, CRC, DIV	26 38 40 54	33 QFN 46 QFN 48 LQFP * 64 LQFP
✳	HT32F52354			128KB /16KB									

No.WAS-2043

Wireless
ASIC/Memory
Non Holtek
Analog/Power

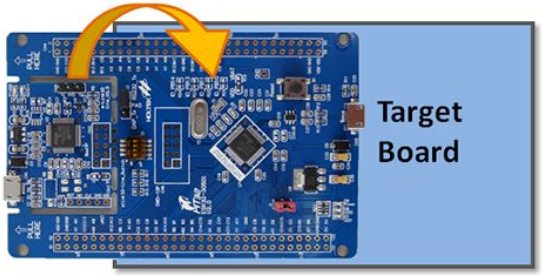




KEIL An ARM® Company

IAR SYSTEMS

Evaluate



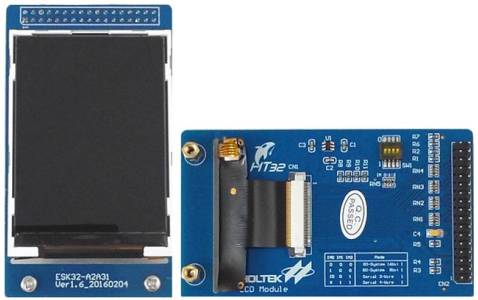
Develop

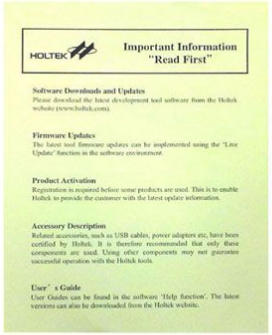
Debugger

SWD

Any Board with a SWD-10P Connector

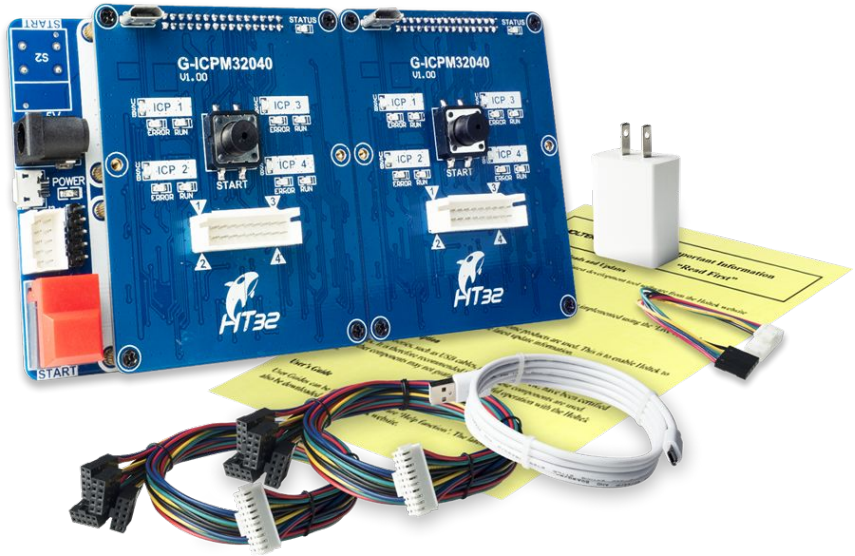
Kits de desarrollo





Debuggers

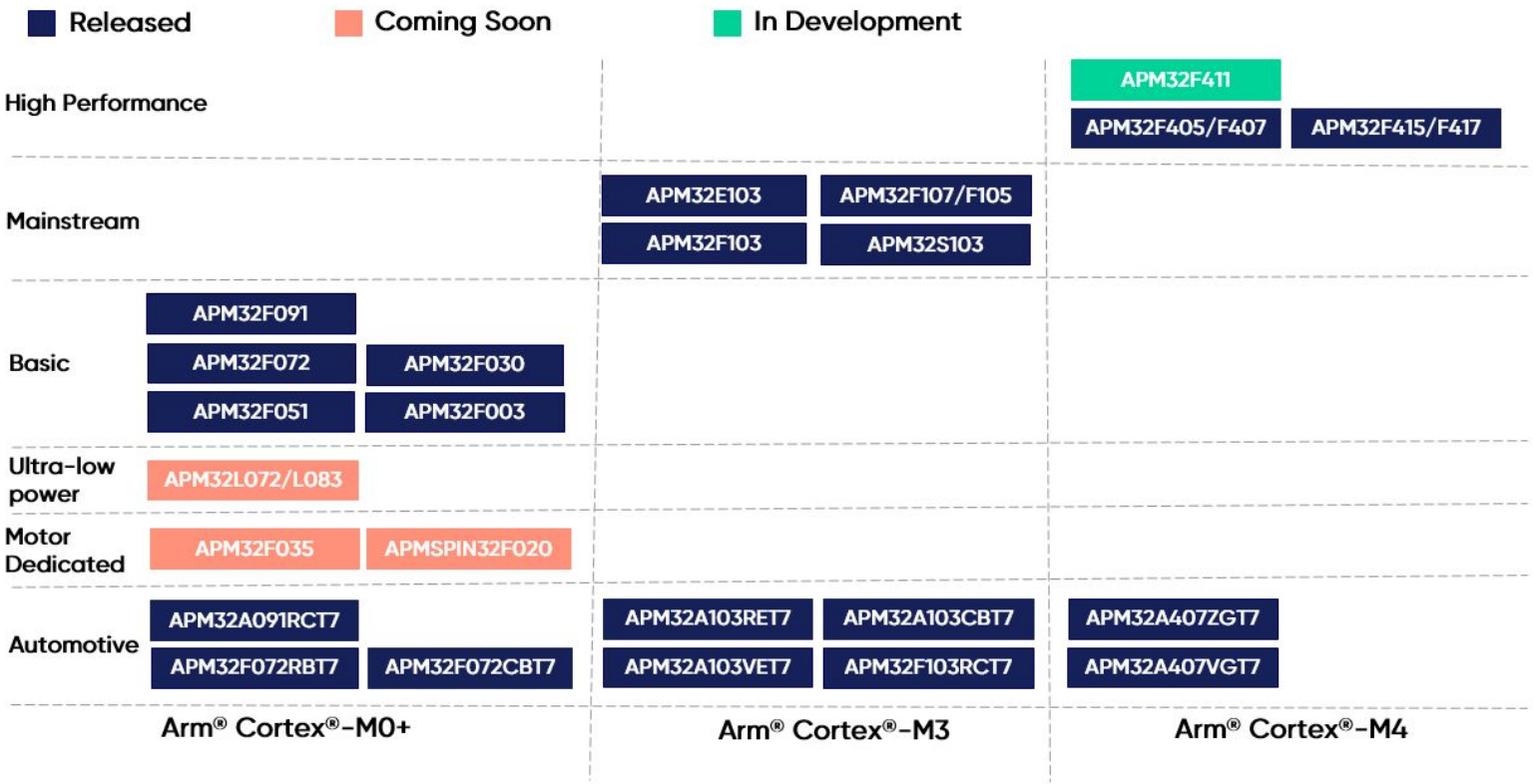
Programadores



MCU de 32 bits de propósito general de Grado Industrial

La serie APM32 de MCU de grado industrial es altamente compatible, altamente aceptada por los clientes.

- Basado en núcleos ARM® Cortex®-M0+/M3/M4
- Bajo consumo, alto rendimiento, alta integración, reemplazo rápido, estable y confiable
- Certificación IEC 61508 y AEC-Q100
- Temperaturas de funcionamiento entre -40°C y 105°C
- ESD>8KV, adaptado a los exigentes requisitos de entornos de trabajo
- Control de calidad del ciclo de vida completo, alta consistencia y fiabilidad


Released
Coming Soon
In Development
High Performance
APM32F411
APM32F405/F407
APM32F415/F417
Mainstream
APM32E103
APM32F107/F105
APM32F103
APM32S103
Basic
APM32F091
APM32F072
APM32F030
APM32F051
APM32F003
Ultra-low power
APM32L072/L083
Motor Dedicated
APM32F035
APMSPIN32F020
Automotive
APM32A091RCT7
APM32F072RBT7
APM32F072CBT7
APM32A103RET7
APM32A103CBT7
APM32A103VET7
APM32F103RCT7
APM32A407ZGT7
APM32A407VGT7
Arm® Cortex®-M0+
Arm® Cortex®-M3
Arm® Cortex®-M4

Reemplazo directo en algunas de las líneas de una de las familias más conocidas de microcontroladores, la STM32

life.augmented

STM32**F0**, STM32**F1**, STM32**F4**

MCU ARM Cortex M0+

APM32F091xBxC

- Basados en el núcleo ARM® Cortex®-M0+
- Compatible con memoria flash hasta 256 KB
- Múltiples interfaces de comunicación (I2C, SPI, I2S)
- Hasta 8 funciones de comunicación mejoradas USART
- HDMI CEC y Funciones táctiles capacitivas TSC integradas
- Compatible con el protocolo CAN comunicaciones
- Periféricos Analógicos, como ADC, DAC o comparador analógico programable

- System
  - ARM® Cortex® -M0+
  - Frequency 48MHz
  - Built in RTC
  - Built in 5/7 channel DMA
- Memory
  - Flash: 128~256KB
  - SRAM: 32KB
- Power Consumption
  - Supply voltage：2.0V~3.6V
  - Support programmable voltage monitor
  - Support sleep, stop, standby modes
- Timer
  - 16/32-bit universal timer: 5/1
  - 16-bit advanced timer: 1
  - 16-bit basic timer: 2
  - Watchdog timer: 2
  - 24-bit SysTick: 1
- Analog peripherals
  - 12-bit ADC: 1; external channel: 16
  - 12-bit DAC: 1; channel: 2
  - Programmable analog comparator: 2
  - HDMI CEC: 24
- I/O
  - At most 88 I/O
  - Be mapped to external interrupt vector
  - Up to 69 I/Os that tolerate 5V input
- Security
  - 96-bit unique identity
  - CRC cells
- Debug Mode
  - SWD
- Peripheral
  - USART: 8
  - I2C: 2
  - SPI: 2
  - I2S: 2
  - CAN: 1
  - HDMI CEC
- Package
  - LQFP48/64/100
  - QFN48

MCU ARM Cortex M3

APM32F103xC

- Basados en el núcleo ARM® Cortex®-M3
- Frecuencia de 96MHz y 256KB de memoria flash
- 2 CAN integrados, compatible con las especificaciones 2.0A y 2.0B, con velocidad de comunicación de hasta 1 Mbit/s
- Temperatura de funcionamiento de -40°C a 105°C
- Periféricos Analógicos, como ADC, DAC o sensor de temperatura interno
- Múltiples interfaces de comunicación (I2C, SPI, I2S, UART, USART)

- System
  - ARM® Cortex®-M3
  - Frequency 96MHz
  - Support FPU Temperature range: -40°C~+105°C
- Memory
  - Flash:256
  - SRAM:64KB
- Power Consumption
  - Supply voltage: 2.0V~3.6V
  - Built in programmable voltage monitor
  - Support sleep, stop and standby modes
  - V_{BAT} supports RTC and backup register power supply
- Timer
  - 16-bit universal timer:4
  - 16-bit advanced timer:2
  - 16-bit basic timer:2
  - Watchdog timer:2
  - SysTick:1
- Analog peripherals
  - 12-bit ADC:3,external channels:16
  - 12-bit DAC:2
  - Internal Temperature Sensor: 1
- I/O
  - At most 80 I/O
  - All I/O are mapped to external interrupt vectors
  - Up to 60 I/O that tolerate 5V signal input
- Security
  - 96-bit non-rewriteable unique identity
  - Support CRC cells
- Debug Mode
  - SWD
  - JTAG
- Peripheral
  - USART : :3
  - UART : :2
  - I^2C:2
  - I^2S:2
  - SPI:3
  - CAN:2
  - USBD:1
  - Support using both USB and CAN interfaces
- Package
  - LQFP48/64/100

MCU ARM Cortex M4

APM32F405/407

- Basados en el núcleo ARM® Cortex®-M4
- Frecuencia hasta 168MHz y 1MB de memoria flash
- Admite instrucciones de procesamiento DSP mejoradas y FPU individuales.
- Interfaz OTG de alta velocidad con chip integrado
- Se agregan SM3, SM4 y otros algoritmos de encriptación para garantizar la seguridad de los datos y la información de manera efectiva
- Múltiples interfaces de comunicación (I2C, SPI, I2S, UART, USART, CAN, SDIO, EMMC…)

- System
  - Arm® Cortex® -M4
  - Working frequency up to 168MHz
  - Support single FPU
  - Support DSP instruction
- Memory
  - Flash: 1MB
  - SRAM: 192KB
  - SDRAM: 2MB(optional)
  - Support external memory extension
- Power Consumption
  - V_{DD}/V_{DDA}: 1.8V~3.6V
  - Backup domain power V_{BAT}: 1.65~3.6V
  - Support power-on and power-down reset
  - Support PVD
- Timer
  - 16/32-bit universal timer: 8/2
  - 16-bit advanced timer: 2
  - 16-bit basic timer: 2
  - Watchdog timer: 2
  - 24-bit system timer: 1
- Analog Peripherals
  - 12-bit ADC: 3, External channel: 24
  - 12-bit DAC: 2
- I/O
  - Up to 140 I/Os
  - Map to external interrupt vectors
- Security
  - (APM32F407)BN/SM2/SM3/SM4
- Debug Mode
  - SWD
  - JTAG
- Peripherals
  - U(S)ART: 6
  - I^2C : 3
  - SPI : 3
  - I^2S: 2
  - DCMI: 1
  - USB OTG: 3
  - CAN: 2
  - SDIO: 1
  - Ethernet: 1
  - EMMC: 1
  - Support SDRAM
- Package
  - LQFP64/100/144/176

Documentación, herramientas y kits de desarrollo

Documents

- **APM32 series User Manual**
- APM32 **series** Data sheet
- **Difference Manual**
- **Application Note**
- **FAQ Document**
- **APM32 MINI board**
  - **MINI board user manual**
  - **MINI board Schematic document**

◆Demo code

APM32FXXX_SDK software package demo code

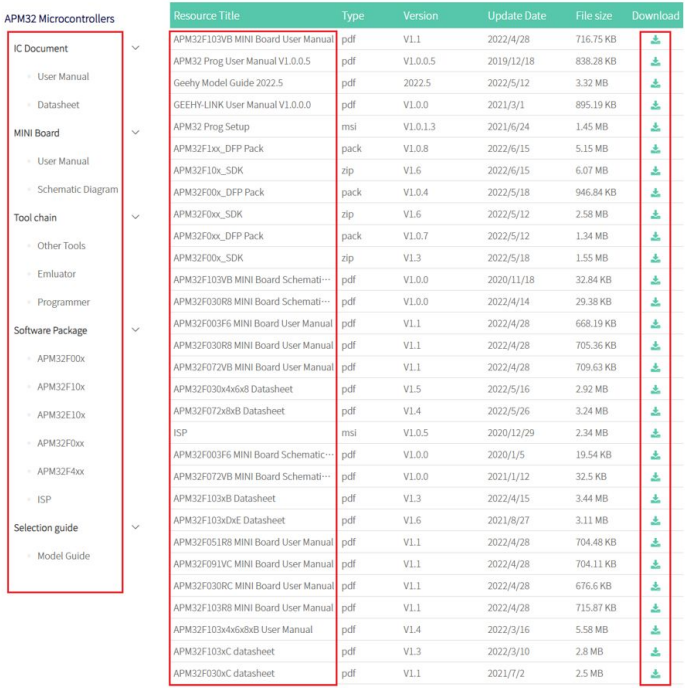
◆emulator and programming tool

Geehy-LINK、APM32 PROG and user manual

DFU ISP Programming software tool

Uart ISP Multiport Programming software tool

Documentación, herramientas y kits de desarrollo



APM32 Microcontrollers

- IC Document
  - User Manual
  - Datasheet
- MINI Board
  - User Manual
  - Schematic Diagram
- Tool chain
  - Other Tools
  - Emluator
  - Programmer
- Software Package
  - APM32F00x
  - APM32F10x
  - APM32E10x
  - APM32F0xx
  - APM32F4xx
  - ISP
- Selection guide
  - Model Guide

Resource Title	Type	Version	Update Date	File size	Download
APM32F103VB MINI Board User Manual	pdf	V1.1	2022/4/28	716.75 KB	
APM32 Prog User Manual V1.0.0.5	pdf	V1.0.0.5	2019/12/18	838.28 KB	
Geehy Model Guide 2022.5	pdf	2022.5	2022/5/12	3.32 MB	
GEEHY-LINK User Manual V1.0.0.0	pdf	V1.0.0	2021/3/1	895.19 KB	
APM32 Prog Setup	msi	V1.0.1.3	2021/6/24	1.45 MB	
APM32F1xx_DFP Pack	pack	V1.0.8	2022/6/15	5.15 MB	
APM32F10x_SDK	zip	V1.6	2022/6/15	6.07 MB	
APM32F00x_DFP Pack	pack	V1.0.4	2022/5/18	946.84 KB	
APM32F0xx_SDK	zip	V1.6	2022/5/12	2.58 MB	
APM32F0xx_DFP Pack	pack	V1.0.7	2022/5/12	1.34 MB	
APM32F00x_SDK	zip	V1.3	2022/5/18	1.55 MB	
APM32F103VB MINI Board Schemati···	pdf	V1.0.0	2020/11/18	32.84 KB	
APM32F030R8 MINI Board Schemati···	pdf	V1.0.0	2022/4/14	29.38 KB	
APM32F003F6 MINI Board User Manual	pdf	V1.1	2022/4/28	668.19 KB	
APM32F030R8 MINI Board User Manual	pdf	V1.1	2022/4/28	705.36 KB	
APM32F072VB MINI Board User Manual	pdf	V1.1	2022/4/28	709.63 KB	
APM32F030x4x6x8 Datasheet	pdf	V1.5	2022/5/16	2.92 MB	
APM32F072x8xB Datasheet	pdf	V1.4	2022/5/26	3.24 MB	
ISP	msi	V1.0.5	2020/12/29	2.34 MB	
APM32F003F6 MINI Board Schematic···	pdf	V1.0.0	2020/1/5	19.54 KB	
APM32F072VB MINI Board Schemati···	pdf	V1.0.0	2021/1/12	32.5 KB	
APM32F103xB Datasheet	pdf	V1.3	2022/4/15	3.44 MB	
APM32F103xDxE Datasheet	pdf	V1.6	2021/8/27	3.11 MB	
APM32F051R8 MINI Board User Manual	pdf	V1.1	2022/4/28	704.48 KB	
APM32F091VC MINI Board User Manual	pdf	V1.1	2022/4/28	704.11 KB	
APM32F030RC MINI Board User Manual	pdf	V1.1	2022/4/28	676.6 KB	
APM32F103R8 MINI Board User Manual	pdf	V1.1	2022/4/28	715.87 KB	
APM32F103x4x6x8xB User Manual	pdf	V1.4	2022/3/16	5.58 MB	
APM32F103xC datasheet	pdf	V1.3	2022/3/10	2.8 MB	
APM32F030xC datasheet	pdf	V1.1	2021/7/2	2.5 MB	

IDE

IDE

RT-Thread

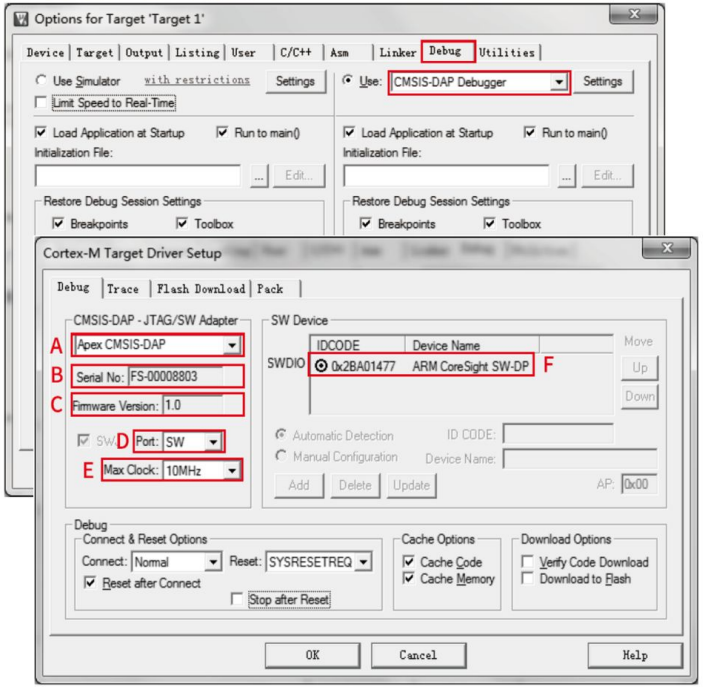
IAR SYSTEMS

arm KEIL

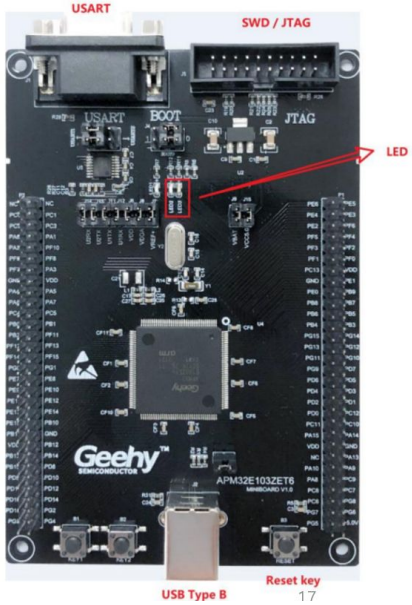
Emulation Tool

SEGGER J-Link CERTIFIED

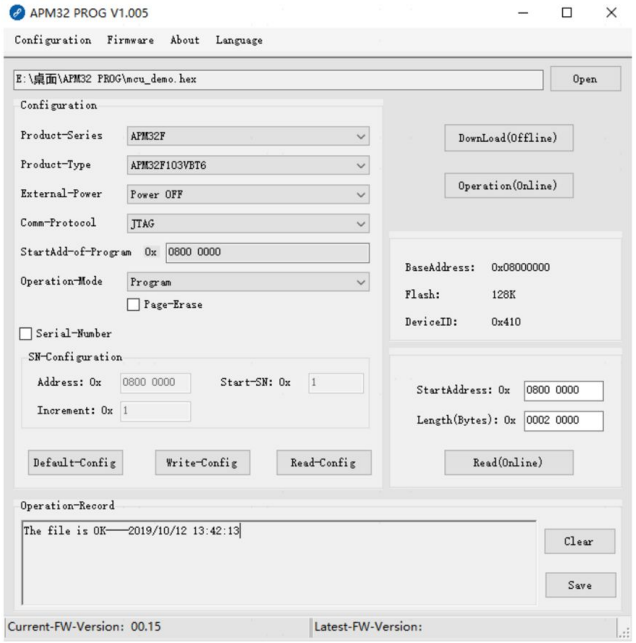
Documentación, herramientas y kits de desarrollo



Geehy Link



Documentación, herramientas y kits de desarrollo



APM32 PROG

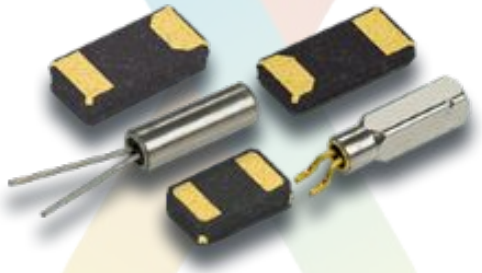
Interface

ARM JTAG Protocol

VTref	1	2	NC
nTRST	3	4	GND
TDI	5	6	GND
TMS	7	8	GND
TCK	9	10	GND
RTCK	11	12	GND
TDO	13	14	GND
RESET	15	16	GND
DBGRQ	17	18	GND
5V-Supply	19	20	GND

ARM SWD Protocol

VTref	1	2	NC
Not used	3	4	GND
Not used	5	6	GND
SWDIO	7	8	GND
SWCLK	9	10	GND
Not used	11	12	GND
SWO	13	14	GND
RESET	15	16	GND
Not used	17	18	GND
5V-Supply	19	20	GND



Control del tiempo y frecuencia

Introducción

Micro Crystal AG

- Empresa del Grupo Swatch, afincada en Suiza y fundada en 1978.
- Fabricante líder de cristales de cuarzo en miniatura (32 kHz a 250 MHz), relojes en tiempo real (RTC), osciladores y OCXO.
- Sus productos se pueden encontrar en los principales fabricantes mundiales de dispositivos portátiles, IoT, dispositivos móviles, productos de consumo, ordenadores, electrónica de automóviles, relojes, controles industriales, así como dispositivos médicos implantables y otras aplicaciones de productos de alta confiabilidad.
- Micro Crystal AG brinda un soporte a sus clientes desde el diseño hasta la producción en masa.

A COMPANY OF THE SWATCH GROUP

Wi2Wi

- Fundada en 2004 con sede en EEUU.
- Diseñador, integrador y fabricante global de soluciones de tecnología inalámbrica para una amplia gama de mercados globales.
- Soluciones de conectividad inalámbrica, y tras la adquisición de Precision Devices Inc. (PDI), ofrece productos de control de frecuencia, así como filtros de RF y microondas para aviónica, espacio, militar, defensa, infraestructura, industrial, automoción, medicina, comunicaciones, Internet de las cosas (IoT), dispositivos de navegación personal y aplicaciones de consumo.
- Wi2Wi ofrece una amplia gama de productos de soluciones "listas para usar" y personalizadas, aprovechando su tecnología junto con asociaciones globales de primer nivel con empresas líderes en la industria del silicio y la cadena de suministro para servir a muchas de las empresas más grandes e innovadoras del mundo.

pdi
PRECISION DEVICES

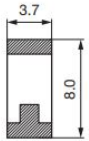
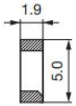
Soluciones de *timing*

Cristales kHz

Applications

- IoT
- Computing
- Automotive
- Wireless Units
- Smart Metering
- Industrial Control
- Embedded Modules
- GPS and Navigation
- Tablets, Smart Phones
- Security and Access Control
- Wearables, Portable Devices
- Remote Keyless Entry Systems
- High Temperature Range Designs
- Ultra Small Size Devices, Smart Cards
- Healthcare, Medical and Medical Implantable

kHz Tuning Fork Crystals in Ceramic Packages

Crystal Type		30.0 kHz to 2'000 kHz Tuning Fork Crystals						Units
Product Type		CC1V-T1A	CC4V-T1A	CM7V-T1A	CM7V-T1A low ESR	CM8V-T1A	CM9V-T1A	
Dimensions (l x w x h)		8.0 x 3.7 x 1.75	5.0 x 1.9 x 0.90	3.2 x 1.5 x 0.65	3.2 x 1.5 x 0.65	2.0 x 1.2 x 0.60	1.6 x 1.0 x 0.50	mm
RoHS, Pb lead-free, REACH				 h = 0.35 on request		 h = 0.35 on request	 h = 0.35 on request	mm
3D PCB Symbol, Footprint & 3D Model available on product pages on website		 h = 1.75	 h = 0.90	 h = 0.65	 h = 0.65	 h = 0.60	 h = 0.50	mm
Lid Material		Ceramic	Ceramic	Metal	Metal	Metal	Metal	
Operating Temp. Range TA		-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	°C
Operating Temp. Range TB	1)	-40 to +125	-40 to +125	-40 to +125	-40 to +125	-40 to +125	-40 to +125	°C

Frequency	F_L	32.768	32.768	32.768	32.768	32.768	32.768	kHz
Standard Load Capacitance	2) C_L	9 / 12.5	6 / 7 / 9 / 12.5	6 / 7 / 9 / 12.5	6 / 7 / 9 / 12.5	4 / 7 / 9 / 12.5	4 / 7 / 9 / 12.5	pF
Frequency Tolerance @ 25°C	3) ΔF/F	±20	±20	±20	±20	±20	±20	ppm
Series Resistance typ./max.	R_S	40 / 60	50 / 65	50 / 70	40 / 50	55 / 70	60 / 75	kΩ
Motional Capacitance typ.	C_1	2.0	2.1	3.7	4.7	4.7	6.3	fF
Static Capacitance typ.	C_0	1.6	1.2	1.2	1.3	1.2	1.4	pF
Drive Level max.	P	1.0	1.0	1.0	1.0	0.5	0.5	µW
Aging max. 1st Year @ 25°C	ΔF/F	±3	±3	±3	±3	±3	±3	ppm
Turnover Temperature	T_0	25 ±5	25 ±5	25 ±5	25 ±5	25 ±5	25 ±5	°C
Frequency vs. Temperature	ΔF/F	-0.035 ppm/°C² (T-T_0)² ±10%						ppm

Osciladores kHz

Applications

Lowest current, smallest package and high accuracy make Micro Crystal's oscillators ideal for:

- IoT
- Smart Pens
- Industrial Computing
- Wearables and Activity Bands
- Automotive, Driver Assistance
- Driving Recorders, Camera Systems
- Navigation and Emergency Call Systems
- Bluetooth Low Energy (BLE) Applications
- Tire Pressure Monitoring Systems (TPMS)
- Healthcare, Medical and Medical Implantable

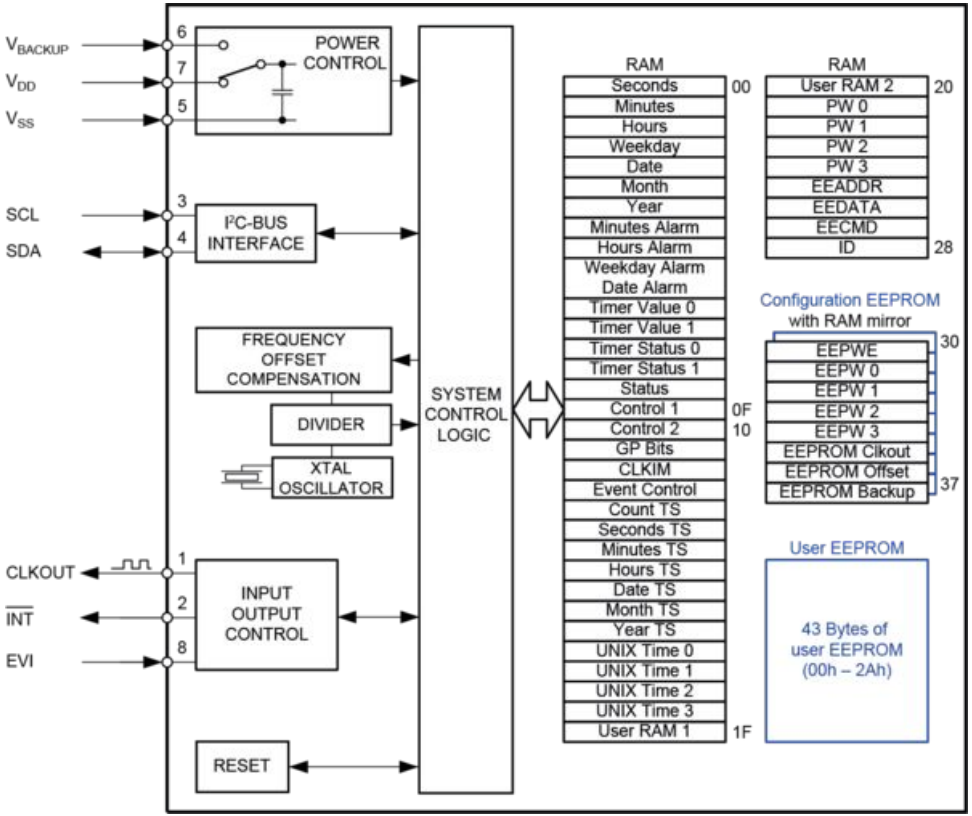
Low Frequency Oscillators in Ceramic Packages

Product Type	OM-xxxx-C7	OV-xxxx-C7	OM-xxxx-C8	OM-xxxx-C9
Dimensions (l × w × h) mm	3.2 x 1.5 x 0.70	3.2 x 1.5 x 1.0	2.0 x 1.2 x 0.70	1.6 x 1.0 x 0.60
RoHS compliant, Pb lead-free, REACH				
3D PCB Symbol, Footprint & 3D Model available on product pages on website	 h = 0.70	 h = 1.0	 h = 0.70	 h = 0.60
Lid Material	Metal	Ceramic	Metal	Metal

32.768 kHz Oscillators										
Product Type	Dimensions (l × w × h) mm	Frequency kHz	ΔF/F @ 25°C ppm	Supply V_{DD} V	Current I_{DD} nA	T_{OP} °C	Duty Cycle %	CLKOE Input	Δf/V ppm/V	Aging 1Y @ 25°C ppm
OM-7604-C7	3.2 x 1.5 x 0.70	32.768	±20 [1]	1.2 to 5.5	300	-40 to +125	40 to 60	✓	±1.5	±3.0
OV-7604-C7	3.2 x 1.5 x 1.0	32.768	±20 [1]	1.2 to 5.5	300	-40 to +125	40 to 60	✓	±1.5	±3.0
OM-7605-C8	2.0 x 1.2 x 0.70	32.768	±20 [1]	1.6 to 5.5	450	-40 to +125	40 to 60	✓	±3.0	±3.0
OM-7605-C9	1.6 x 1.0 x 0.60	32.768	±20 [1]	1.6 to 5.5	450	-40 to +125	40 to 60	✓	±3.0	±3.0
100.000 kHz Oscillators										
OM-0100-C7	3.2 x 1.5 x 0.70	100.000	±20 [1]	1.2 to 5.5	650	-40 to +85	40 to 60	✓	±1.5	±3.0
OM-0100-C8	2.0 x 1.2 x 0.70	100.000	±100 [1]	1.6 to 5.5	550	-40 to +85	40 to 60	✓	±3.0	±3.0

Real-Time Clock (RTC)

- Los módulos de reloj en tiempo real (RTC) combinan un XTAL de 32,768 kHz con un oscilador basado en CMOS y RTC IC dentro de un encapsulado cerámico SMD en miniatura.
- EEPROM incorporada
- Consumo de energía ultrabajo: 45nA
- Alta precisión: ± 1 ppm, ± 0,09 s/día
- Encapsulado más pequeño: 3,2 x 1,5 x 0,8 mm
- Rango de temperatura ampliado hasta +125 °C, incluido AEC-Q200



Product Type	Interface	Features	IDD @ 3 V	Time Accuracy @ 25°C	Temp. Comp. -40 / 85°C	VDD min	VDD max	TMAX [°C]	Temp. Readback	Clock Out	Battery Switch	Battery Charge	Charge Pump	Time Stamp	Alarm	Timer	Event Input	Unix Time	Offset Comp	RAM [Bytes]	EEPROM [Bytes]
New RV-3032-C7	I²C		160 nA		±2.5 ppm	1.3 V	5.5 V	+85	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	16	32
New RV-5028-C7	I²C		45 nA	±1 ppm		1.1 V	5.5 V	+85		✓	✓	✓		✓	✓	✓	✓	✓	✓	2	43
RV-3028-C7	I²C		45 nA	±1 ppm		1.1 V	5.5 V	+85		✓	✓	✓		✓	✓	✓	✓	✓	✓	2	43
RV-8803-C7	I²C		240 nA		±3 ppm	1.5 V	5.5 V	+105		✓				✓	✓	✓	✓		✓	1	
RV-8263-C7	I²C		190 nA	±20 ppm		0.9 V	5.5 V	+85		✓					✓	✓			✓	1	
RV-4162-C7	I²C		350 nA	±20 ppm		1.0 V	4.4 V	+85		✓					✓				✓		
RV-8523-C3	I²C		130 nA	±20 ppm		1.2 V	5.5 V	+85		✓	✓				✓	✓			✓		
RV-8564-C3	I²C		250 nA	±20 ppm		1.2 V	5.5 V	+85		✓					✓	✓					
RV-8564-C2	I²C		250 nA	±20 ppm		1.2 V	5.5 V	+85		✓					✓	✓					
RV-3129-C3	I²C		800 nA		±6 ppm	1.3 V	5.5 V	+125	✓	✓	✓	✓			✓	✓				8	2
RV-8063-C7	SPI		190 nA	±20 ppm		0.9 V	5.5 V	+85		✓					✓	✓			✓	1	
RV-2123-C2	SPI		130 nA	±20 ppm		1.1 V	5.5 V	+85		✓					✓	✓			✓		
RV-3149-C3	SPI		800 nA		±6 ppm	1.3 V	5.5 V	+125	✓	✓	✓	✓			✓	✓				8	2

Package

Standard Features
Small Package
Medical Implantable
High Accuracy
Low Power

Osciladores y cristales MHz

- **Micro Crystal AG:**
  - Las unidades de cristal de cuarzo AT-Cut estándar de 8 a 30 MHz y los cristales Mesa invertidos de alta frecuencia fundamental (HFF) de 50 a 250 MHz funcionan en modo fundamental.
  - AT-cut y HFF están disponibles en paquetes de cerámica en miniatura de bajo perfil que soportan altas temperaturas, alta resistencia a golpes y vibraciones, son ideales para entornos hostiles y aplicaciones de alta confiabilidad.
- **Wi2Wi:**
  - Osciladores de reloj de cristal de cuarzo estándar y personalizados.
  - Distintos tipos de señal de salida CMOS, TTL, HCMOS, ACMOS, LVPECL, LVDS, y HCSL
  - Distintos tipos de encapsulados y opciones herméticamente selladas.

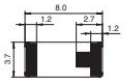
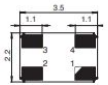
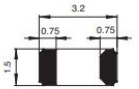
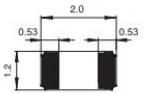
Osciladores y cristales MHz

Applications

Customer-specific applications such as:

- Filters
- Telemetry
- Animal Tracking
- Optical Network
- Avionics / Aerospace
- Radio Communication
- TCXO, VCTCXO, VCXO
- Downhole and Well Drilling
- Healthcare, Medical and Medical Implantable

SMD Ceramic AT-CUT Crystals 100% Lead Free

Type CC1A / F	Type CC2A	Type CC6A / F	Type CC7A	Type CC8A / CM8A
Package 8.0 x 3.7 mm	Package 5.0 x 3.2 mm	Package 3.5 x 2.2 mm	Package 3.2 x1.5 mm	Package 2.0 x 1.2 mm
		 4 or 2 pads		 2 or 4 pads
 h = 1.75 mm	 h = 1.2 mm	 h = 1.0 mm	 h = 0.75 mm	 h = 0.60 mm

Standard (Fundamental Mode)							
Product Type	Number of pads	Frequency MHz	Temp. Range °C	R_S typ. in Ω @ Fmin - Fmax	C_1 typ. in fF @ Fmin - Fmax	C_0 typ. in pF @ Fmin - Fmax	Key Features / Applications
CC1A-T1A	2	8 - 30	-55 to +125	60 - 30	4 - 11	2.0 - 4.0	
CC1F-T1A	2	30 - 250	-55 to +125	35 - 15	4 - 7	2.0 - 4.0	Inverted mesa crystal
CC2A-T1A	2	12 - 70	-55 to +125	60 - 10	3 - 12	2.0 - 5.0	
CC6A-T1D	4	16 - 70	-55 to +125	60 - 20	2 - 5	1.5 - 3.0	
CC6F-T1A	2	70 - 250	-55 to +125	30 - 15	5 - 6	2.4 - 3.2	Inverted mesa crystal
CC6F-T1A F	2	70 - 200	-55 to +125	35 - 15	3 - 3	2.4 - 3.2	Inverted mesa crystal Filter applications - low spurious
CC7A-T1A	2	20 - 50	-55 to +125	40 - 25	2 - 2	0.7 - 0.7	
CC8A-T1A	2	24 - 50	-55 to +125	40 - 20	1 - 1	0.7 - 0.7	Smallest package
CM8A-T1D	4	24 - 50	-55 to +125	40 - 20	1 - 1	0.7 - 0.7	Smallest package
CC7A-T1A Medical	2	14 - 50	0 to +55	60 - 25	2 - 2	0.7 - 0.7	Medical implantable
CC8A-T1A Medical	2	24 - 50	0 to +55	40 - 20	1 - 1	0.7 - 0.7	Medical implantable

High Temperature / High Shock and Vibration Resistant (Fundamental Mode)							
CC1A-T1A H	2	8 - 24	-55 to +200	100 - 50	4 - 9	2.0 - 3.2	Harsh Environment
CC2A-T1A H	2	14 - 40	-55 to +200	70 - 40	5 - 10	2.5 - 4.0	Harsh Environment
CC6A-T1D H	4	16 - 40	-55 to +200	80 - 50	2 - 4	1.5 - 2.5	Harsh Environment

Osciladores y cristales MHz

Nominal Frequency : Specified in kHz or MHz

Output = (TTL,CMOS, DUAL OUTPUT,HCMOS,TCXO,VCXO,TCVCXO,ECL)

Tolerance = +/- 10-100ppm, or 1-2.5ppm or Special.

Operating Temp.= 0 to 70C,-20 to 70C, -30 to 80C, -40 to 85C, -55 to 125C, 0 to 50C, -30 to 60C, -30 to 75C, -55 to 170C, -20 to 185C, Ect.

Frequency/Temperature Stability : Typically ±25 ppm over -20 to +70ºC or similar.

Package/Package size : Cut, Gull Wing SMD, Tape & Reel.

Storage Temp. Range.

Type/Series	Image	Package	Output	Frequency Range	Dimensions
LV5		SMD Seam Welded	LVDS	40MHz to 200MHz	5.00mm x 3.20mm x 1.20mm
LV7		SMD Seam Welded	LVDS	40MHz to 200MHz	7.0mm x 5.0mm x 1.8mm
O08		DIP8	TTL/CMOS LVCMOS	30KHz to 200MHz	13.2mm x 13.2mm x 5.6mm
O14		DIP14	TTL/CMOS LVCMOS	30KHz to 200MHz	20.4mm x 12.8mm x 5.08mm
FC7		SMD Seam Weld	LVCMOS LVDS LVPECL	10MHz to 1GHz	7.0mm x5.0mm x1.8mm
JC7		J Lead Gull Wing Thru Hole	TTL/CMOS LVCMOS HCMOS	30KHz - 200MHz	7.0mm x 5.0mm x 1.6mm
JL9		Ceramic J-Lead	TTL/CMOS LVCMOS HCMOS	30KHz - 200MHz	14mm x 9mm x 4.7 mm
JL4		Ceramic J-Lead	TTL/CMOS LVCMOS	30KHz - 200MHz	8.9mm x 7.4mm x 4.3 mm

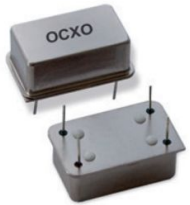
Filtros de Cristal

Package	Image	Frequency Range	Thru-Hole/SMD	Discrete/Monolithic	Operating Temperature	Poles	Lead Free
FP		10.7MHz to 200MHz	Both	Both	-55 to +125°C	6	Yes
HA		10.7MHz to 200MHz	PTH	Both	-55 to +125°C	2	Yes
HA x 2		10.7MHz to 200MHz	PTH	Both	-55 to +125°C	4	Yes
S1		10.7MHz to 200MHz	SMD	Monolithic	-55 to +125°C	4	Yes
S2		10.7MHz to 200MHz	SMD	Monolithic	-55 to +125°C	4	Yes
S3		10.7MHz to 200MHz	SMD	Monolithic	-55 to +125°C	6	Yes

TCXO / VCXO / TCVCXO / OCXO y osciladores QPL

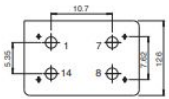
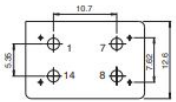
- TCXO (Oscilador de Cristal con Compensación de Temperatura)
  - Compensa automáticamente el oscilador generando un voltaje para corregir la variación de la frecuencia sobre la temperatura
- VCXO (Oscilador de Cristal Controlados por Voltaje)
  - Permite al usuario ajustar manualmente un voltaje de control para compensar todas las inestabilidades en la frecuencia de salida
- TCVCXO (Oscilador de Cristal Compensado por Temperatura y Controlado por Voltaje)
  - Combinación del TCXO y VCXO y ayudan a proporcionar una frecuencia muy estable y un ajuste manual de otros impactos de inestabilidad
- OCXO (Oscilador de Cristal Controlado por Horno)
  - Utiliza una cámara de temperatura controlada para mantener el cristal de cuarzo a una temperatura constante, con el fin de evitar cambios en la frecuencia debido a variaciones en la temperatura ambiente.

TCXO / VCXO / TCVCXO / OCXO y osciladores QPL



Type/ Series	Image	Package	Output	Frequency Range	Dimensions	Features
TV02		SMD Seam Welded	Clipped Sine	10MHz to 52MHz	2.5 x 2.0 x 0.8mm	Small Footprint 1.8 to 3.3 V supply available
TV03		SMD Seam Welded	Clipped Sine	10MHz to 52MHz	3.2 x 2.5 x 1.0mm	Small Footprint 1.8 to 3.3 V supply available
TV05		SMD Seam Welded	TTL/CMOS LVCMOS Clipped Sine	10MHz to 52MHz	5.0 x 3.2 x 1.5mm	5V Available Multiple Output Types
TV07		SMD Seam Welded	TTL/CMOS LVCMOS Clipped Sine	8MHz to 52MHz	7.0 x 5.0 x 2.3mm	5V Available Multiple Output Types
TC02		SMD Seam Welded	Clipped Sine	10MHz to 52MHz	2.5 x 2.0 x .9mm	Small Footprint 1.8 to 3.3 Vsupply available
TC03		SMD Seam Welded	Clipped Sine	10MHz to 52MHz	3.2 x 2.5 x 1.0mm	Small Footprint 1.8 to 3.3 Vsupply available

TCXO / VCXO / TCVCXO / OCXO y osciladores QPL

OCXOs DIL-14 Package RoHS	
Type SCOCXO	Type OCXO
Package DIL-14 20.2 x 12.6 mm	Package DIL-14 20.2 x 12.6 mm
	
 h = 7.8 mm	 h = 7.8 mm

Standard							
Product Type	Package size	Frequency (MHz)	Supply Voltage	Temperature Range	Output	Frequency Stability	Key Features / Applications
SCOCXOL	DIL-14	Up to 54	3.3 / 5.0 V	-55 to +85°C	HCMOS	From ±25 ppb	High Stability, Ultra Fast Warm-up, Ultra Low Power
SCOCXO	DIL-14	Up to 120	3.3 / 5.0 V	-55 to +85°C	HCMOS	From ±25 ppb	High Stability, Low Phase Noise
SCOCXOS	DIL-14	Up to 120	3.3 / 5.0 V	-55 to +85°C	Sine Wave	From ±25 ppb	High Stability, Low Phase Noise
OCXOVT-SAR	DIL-14	Up to 40	5.0 V	-40 to +55°C	Sine Wave	±3 ppb / 50 s	Cospas-Sarsat
OCXOS	DIL-14	Up to 54	3.3 / 5.0 V	-55 to +85°C	Sine Wave	From ±75 ppb	
OCXO	DIL-14	Up to 54	3.3 / 5.0 V	-55 to +85°C	HCMOS	From ±75 ppb	

TCXO / VCXO / TCVCXO / OCXO y osciladores QPL

- Osciladores QPL (Qualified Product List):
  - Osciladores que cumplen el estándar MIL-PRF-55310.
  - Diseñados para aplicaciones en las áreas militar, espacial y de aviónica.
  - Productos resistentes, robustos y confiables.
  - Rango de temperatura de -55 °C a 125 °C.
  - Distintos encapsulados de metal y cerámica sellados herméticamente.
  - Distintas salidas, incluidas CMOS, HCMOS, ACMOS y TTL.
  - Personalización de frecuencia.

Type/Series	Image	Package	Output	Frequency Range	Dimensions
MIL-55310/08		Thru-Hole	TTL	750kHz to 50MHz	0.887L x 0.540W x 0.200H in
MIL-55310/09		Thru-Hole	TTL	750kHz to 60MHz	0.410D x 0.300H in
MIL-55310/14		Thru-Hole	TTL	750kHz to 25MHz	0.887L x 0.540W x 0.200H in
MIL-55310/16		Thru-Hole	TTL	750kHz to 60MHz	0.887L x 0.540W x 0.200H in 0.887L x 0.540W x 0.265H in
MIL-55310/17		Thru-Hole	TTL	12MHz to 50MHz	0.887L x 0.540W x 0.200H in
MIL-55310/18		Thru-Hole	CMOS	0.1Hz to 15MHz	0.887L x 0.540W x 0.200H in
MIL-55310/19		SMD	TTL	1MHZ to 60MHZ	0.480L x 0.480W x 0.085H in
MIL-55310/21		Flat Pack	TTL	1MHZ to 60MHZ	0.650L x 0.650W x 0.120H in

TCXO / VCXO / TCVCXO / OCXO y osciladores QPL

- Osciladores para espacio:
  - Diseñados para aplicaciones en las espacial y de aviónica.
  - Rendimiento y funcionalidad en el entorno extremo del espacio.
  - Productos resistentes, robustos y confiables.
  - De 750KHz hasta 850MHz.
  - Rango de temperatura de -55 °C a 125 °C.
  - Distintas salidas, incluidas CMOS, LVCMOS, LVDS y en LVPCEL.
  - Personalización de frecuencia, la estabilidad, el voltaje de suministro, salida.

Type/Series	Image	Package	Output	Frequency Range	Dimensions
FP1		Flat Pack	CMOS LVCMOS LVDS LVPECL	750KHz to 850MHz	25.35 x 35.31 x 5.33mm
FP2		Flat Pack	CMOS LVCMOS LVDS LVPECL	750KHz to 800MHz	16.51 x 16.51 x 4.5mm
FP4		Flat Pack	CMOS LVCMOS LVDS LVPECL	750KHz to 800MHz	20.6 x 20.6 x 10.49mm
FP6		Flat Pack	CMOS LVCMOS LVDS LVPECL	750KHz to 800MHz	24.4 x 25.4 x 4.45mm
JS4		J Lead Gull Wing Thru Hole	LVCMOS	750KHz to 200MHz	0.9 x 7.4 x 4.3mm

Muchas gracias