MR SEMI
美|仁|半|导|体

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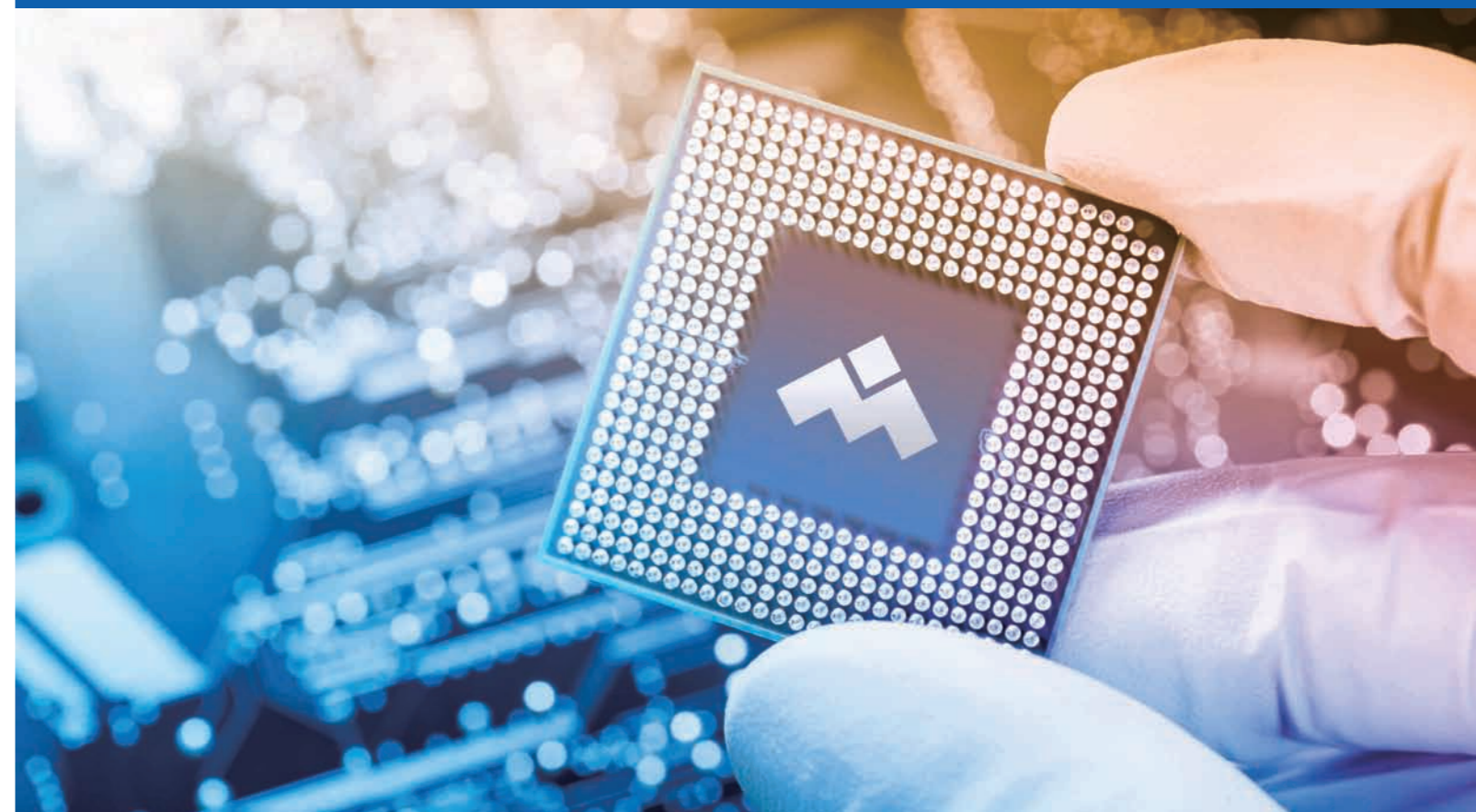
2021
芯 片 产 品 手 册
IC PRODUCT MANUAL

让家家户户都有美仁芯
Have MR Chip in Every Home

家电，是人们美好生活的助手。
它提供的便捷、舒适，让我们有更多空间去享受生活。
而今，建立在诸多家电技术解决方案的基础上，
我们不断创新，从"芯"开始，
让家电更加高效、节能、可靠、智能，
让生活更加美好。

世界顶级的半导体专家已汇聚"美仁"，
以创新的精神、卓越的科技，
让家家户户都有美仁芯，
与您共同创造美好生活。

Household appliances help mankind to have a better life.
They provide convenience and comfort,
allowing us more space to enjoy life.
Now, building on the foundation of countless technology
solutions for the home appliances,
we continue to innovate, with the "Chip",
to attain greater efficiency, energy-saving, reliability, and
intelligence in our home appliances,
to better a better life.

The world's top semiconductor experts have converged at MR,
with innovative spirit and technology excellency,
to have MR chips in every home.
MR and you, we create the better life.

目录 CONTENTS

公司简介
Company Profile

让家家户户都有美仁芯
Have MR Chip in Every Home

上海美仁半导体有限公司成立于2018年12月，总部位于临港松江科技绿洲园区，是一家专注于工业半导体开发和销售的集成电路设计企业。公司目前的主要产品是覆盖家电芯片全品类的四个产品系列，包括MCU、功率芯片、电源芯片和IOT芯片等。在满足客户对高抗干扰能力、高可靠性和高性价比的芯片需求基础上，美仁将致力于提供基于物联网的全屋智能整体解决方案。

Established in December 2018, MR Semiconductor Ltd. (hereinafter MR Semi) is located in Lingang Songjiang Science and Technology Oasis Park, Songjiang District, Shanghai China. The firm is an IC design company specializing in developing industrial semiconductor. MR Semi focuses on providing strong anti-interference, highly reliable and cost-effective IC for home appliance industry. Currently there are four product series including MCU , IPM, PMIC and IoT related IC. The company commits to provide not only chips but total IC solution for smart home in the near future.

公司成立
Establishing Time

2018年12月29日
上海注册
Registered in Shanghai on December 29, 2018

无晶圆半导体公司
A Fabless Semiconductor Company

专注于工业半导体
的开发和销售
Specializing in the development and sales of industrial semiconductors

管理和技术团队
Management and Technical Team

世界顶级半导体公司工作
经验的管理和技术专家
Management and Technical Experts With Working Experience in the World's Top Semiconductor Companies

公司的核心团队拥有平均20年以上的世界顶级半导体公司的开发和运营经验，保障了公司产品开发的顺利实施和在技术上的领先地位。公司产品全部拥有自主知识产权，目前已获得20项集成电路布图设计登记证书。

MR's core team have an average of 20+ years of experience in development and operation with the world's top semiconductor companies, ensuring the smooth implementation of product development and technological leadership. MR holds proprietary intellectual property rights for all its products, and has obtained 20 certificates of ownership for layout designs of integrated circuits.

研发创新
R&D Innovation

世界顶级半导体公司工作经验的管理和技术专家，

按国际通行的高科技创业公司模式由高管和技术团队独立运作，

行业经验丰富、结构层次合理的团队为现实和未来打下坚实基础

Management and technical Experts with working experience in the world's top semiconductor companies, operated independently by senior executives and technical teams according to the internationally accepted high−tech start−up company mode.Team with rich industry experience and reasonable structure, laying a solid foundation for the present and the future.

创始团队
Founding Team

博士2人，硕士1人，行业经验20年以上，硅谷工作经验10年以上，30余项美国专利

1 Ph.D degree, 2 master's degree, 20+ years of experience in the field, 10+ years working experience with Silicon Valley and 30+ patents registered in USA
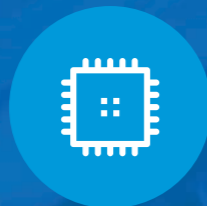
芯片设计
Chip Design Team

硕士占比70%，
行业经验15年以上，10人

70% master's degree, 15+ years of experience in the field:10

产品运营
Product Operation Team

硕士占比33%，
行业经验10年以上，15人

33% master's degree, 10+ years of experience in the field:15

公司建立了高端的芯片检测实验室

完备的实验设备和经验丰富的测试工程师

MR has established a high-end chip testing laboratory well equipped with complete experimental equipment and experienced test engineers.

主要设备
Main equipment

专用ATE测试机 Automatic test equipment	高低温柜 Temperature test chamber	高精度示波器 High precision oscilloscope	高精度信号发生器 High precision signal generator	电磁兼容测试仪 EMC tester
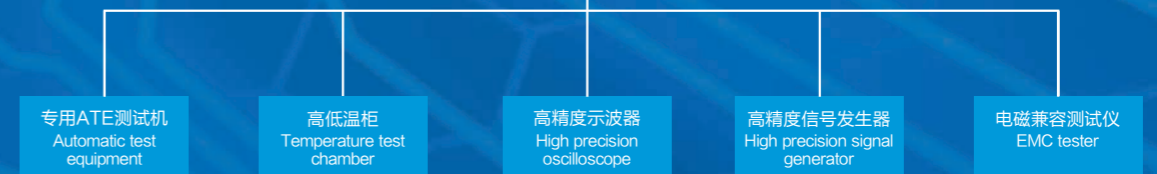
技术优势
Technical Advantages

为白电定制的芯片，更高更快更强
Chips customized for major appliance, more reliable, faster and stronger

团队拥有平均20年的世界顶级半导体公司的开发和运营经验，对半导体行业有深刻理解，保证技术上的领先地位，开发"先进、可靠、安全、高性价比"的高品质产品，为客户提供卓越服务。

Team members have 20+years working Experience in the world's top semiconductor companies and profound understanding of semiconductor industry.To develop "advanced, reliable, safe and cost-effective" high-quality products, providing excellent services to customers.

- 反复快速启动的可靠性高
- 内嵌SRAM自检 (BIST)
  任意多项式CRC校验
- 使用可靠性能最好的SST
  的eflash
- Repeated quick start.Built-in
- SRAM test (BIST) Arbitrary
  polynomial CRC validation.Using
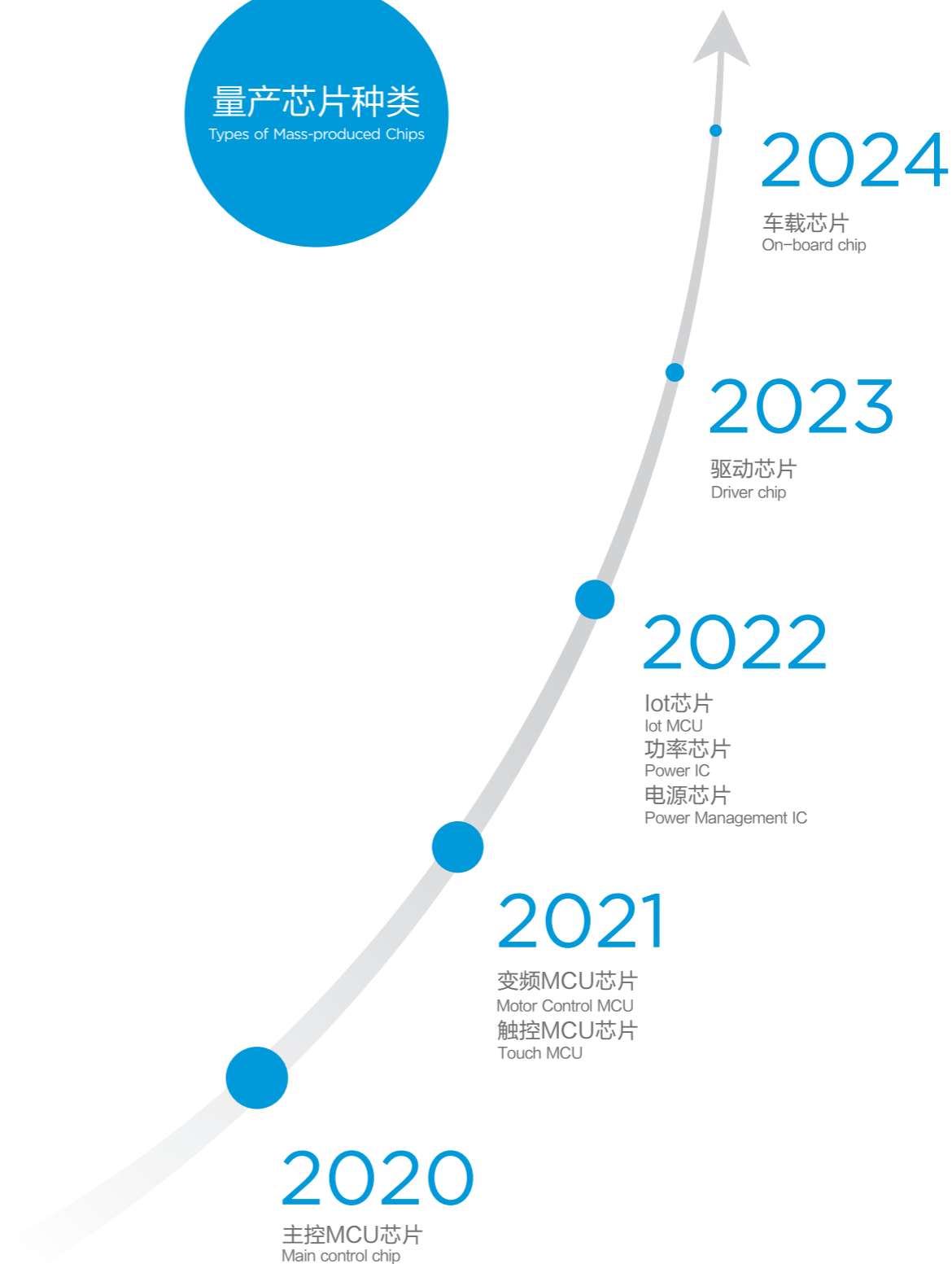 the best reliable performance of
- SST eflash.

- 安全时钟，符合安规需求
- 用户代码双重保护
- 启动代码无风险在线升级，
  预防更新过程掉电
- Safety clock meets safety
  requirements.Double protection of
- user code.Risk-free online update of
- startup code, preventing power loss
  during update.

可靠性
Reliability

安全性
Safety

技术优势
Technology

适配性
Adaptability

高性价比
Cost-effective

- 高速12位ADC，支持多种触发模式，
  符合各种应用场景
- 所有GPIO均可映射为外部中断，所有
  GPIO均可唤醒芯片，支持多种开发场景
- High-speed 12-bit ADC, supporting
  multiple trigger modes, suitable for various
  application scenarios.All GPIO can be
- mapped as external interrupts and wake
  up chips to support various development
  scenarios.

- 内建高精度时钟，可不需要晶振，减少
  外部器件
- 创新的电容触控算法，不需要外挂大电容
- 精选制造工艺，提高性能，降低成本，
  避免风险
- Built-in high-precision clock,
  eliminating crystal oscillator and reducing
  external apparatus.
- Innovative capacitance touch algorithm,
  eliminating external large capacitors.
- Selective manufacturing process,
  improving performance,
  reducing costs and avoiding risks.

产品路径规划
Road Map
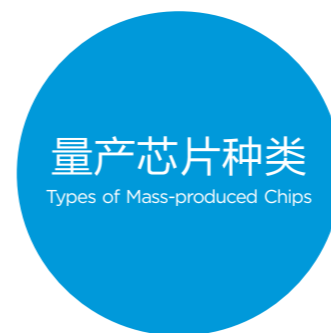
量产芯片种类
Types of Mass-produced Chips

2024
车载芯片
On-board chip

2023
驱动芯片
Driver chip

2022
Iot芯片
Iot MCU
功率芯片
Power IC
电源芯片
Power Management IC

2021
变频MCU芯片
Motor Control MCU
触控MCU芯片
Touch MCU

2020
主控MCU芯片
Main control chip

主控芯片
Main Control Chip

空调
Air conditioner

冰箱
Refrigerator

洗衣机
Washing machine

小家电
Small domestic appliance

> 启明系列
> Venus Series

产品特点：

- 内置32bit Cortex-M0
- LQFP-64/44/32封装
- 256K flash空间
- 9通道12-bit SAR ADC
- CPU最高主频可配为32MHz
- 支持多资源外设UART，SPI，I2C
- 高可靠性，EFT和动态ESD大于4KV

Features:

- Built-in, 32-bit, Cortex-M0
- LQFP-64/44/32 package
- 256K flash space
- 9-channel, 12-bit SAR ADC
- 32MHz (Max.) CPU freqeuncy
- Supporting multi-resource peripherals, such as UART, SPI, I2C
- High reliability, EFT and dynamic ESD greater than 4KV

产品应用：

- 适用于各品类家电主控芯片应用

Applications：

- Suitable for main control chips of various major appliances

型号 Model	MR88F001DI/064	MR88F001DI/044	MR88F001DI/032
内核 CPU	Cortex M0		
内核频率(MHz) CPU frequency (MHz)	32		
封装 Package	LQFP-64	LQFP-44	LQFP-32
FLASH(KB)	256		
SRAM(KB)	16		
IO	59	41	29
工作电压（V）Operating voltage (V)	2.4 - 5.5		
内置复位 Built-in reset	上电复位 软件复位 看门狗复位 外部复位	Power-on reset Software reset Watchdog reset External reset	
外振(MHZ) External crystal (MHZ)	4 - 32		
内置高频时钟(MHz) Built-in high frequency clock (MHz)	8/16/24/32		
内置低频时钟(kHZ) Built-in low frequency clock (kHZ)	32		
看门狗 Watchdog	1		
ADC	9 X 12 bit	9 X 12 bit	7 X 12 bit
DMA通道 DMA channel	8		
高级定时器 Advanced timer	1 x 16 bit		
通用定时器 Universal timer	4 x 16 bit		
低功耗定时器 Low power timer	1 x 32 bit		
蜂鸣器/基本定时器 Buzzer/basic timer	2 x 16 bit		
UART	4	4	3
I2C	2	1	2
SPI	2	2	2
LED驱动 LED driver	12 COM x 16 SEG	3 COM x 7 SEG	/
CRC	1		
调试口 Debug port	SWD		
典型运行功耗（uA/MHz）Typical operating power consumption (uA/MHz)	150		

主控芯片
Main Control Chip

空调
Air conditioner

冰箱
Refrigerator

洗衣机
Washing machine

小家电
Small domestic appliance

猎户系列
Orion Series

产品特点：

- 内置32bit Cortex-M0
- LQFP-44/32、QFN-48、TQFP-48、SOP-32/28、TSSOP28封装
- 128K flash空间
- 26通道12-bit SAR ADC
- CPU最高主频可配为48MHz
- 支持多资源外设UART，SPI，I2C
- 高可靠性，EFT和动态ESD大于4KV

Features:

- Built-in, 32-bit, Cortex-M0
- LQFP-44/32、QFN-48、TQFP-48、SOP-32/28、TSSOP28 package
- 128K flash space
- 26-channel, 12-bit SAR ADC
- 48MHz (Max.) CPU freqency
- Supporting multi-resource peripherals, such as UART, SPI, I2C
- High reliability, EFT and dynamic ESD greater than 4KV

产品应用：

- 适用于各品类家电主控芯片应用

Applications：

- Suitable for main control chips of various major appliances

型号 Model	MR88Fx02 系列		
内核 CPU	Cortex M0		
内核频率(MHz) CPU frequency (MHz)	32		
封装 Package	LQFP-44/32 SOP-32/28	QFN-48T TSSOP28	TQFP-48
FLASH(KB)	128		
SRAM(KB)	4		
IO	46		
工作电压（Ｖ） Operating voltage (V)	2.0 - 5.5		
内置复位 Built-in reset	上电复位　　软件复位　Power-on reset　Software reset 看门狗复位　外部复位　Watchdog reset　External reset		
外振高频(MHz) External High Frequency crystal (MHz)	1 - 16		
外振低频(KHz) External Low Frequency crystal (KHz)	32		
内置高频时钟(MHz) Built-in high frequency clock (MHz)	8/16/24/32		
内置低频时钟(kHZ) Built-in low frequency clock (kHZ)	32		
看门狗 Watchdog	1		
ADC	26 X 12 bit		
通用定时器 Universal timer	3 x 16 bit		
蜂鸣器/基本定时器 Buzzer/basic timer	2 x 16 bit		
时间定时器 Watch timer	1 x 20 bit		
UART	3		
I2C	1		
SPI	1		
LED驱动 LED driver	12 COM x 16 SEG		
LCD驱动 LCD driver	8COM x 24 SEG 4COM x 28 SEG	6COM x 26 SEG	
CRC	1		
调试口 Debug port	SWD/SWE		
典型运行功耗（uA/MHz） Typical operating power consumption (uA/MHz)	150		

触控芯片
Touch IC

空调
Air conditioner

冰箱
Refrigerator

洗衣机
Washing machine

小家电
Small domestic appliance

天琴系列
Lyra Series

产品特点：

- 内置32bit Cortex-M0
- LQFP-44封装
- 256K flash空间
- CPU最高主频可配为32MHz
- 支持多资源外设UART，SPI，I2C
- 高可靠性，EFT和动态ESD大于4KV
- 支持33路电容式触控

Features:

- Built-in, 32-bit, Cortex-M0
- LQFP-44 package
- 256K flash space
- 32MHz (Max.) CPU freqeuncy
- Supporting multi-resource peripherals, such as UART, SPI, I2C
- High reliability, EFT and dynamic ESD greater than 4KV
- Supporting 33-channel capacitive touch

产品应用：

- 适用于各大家电触控芯片应用

Applications:

- Suitable for Touch IC of various major appliances

型号 Model	MR86F001/044			
内核 CPU	Cortex M0			
内核频率(MHz) CPU frequency (MHz)	32			
封装 Package	LQFP-44			
FLASH(KB)	256			
SRAM(KB)	16			
IO	41			
工作电压（V）Operating voltage (V)	2.4 – 5.5			
内置复位 Built-in reset	上电复位	软件复位	Power-on reset	Software reset
	看门狗复位	外部复位	Watchdog reset	External reset
外振(MHZ) External crystal (MHZ)	4 – 32			
内置高频时钟(MHz) Built-in high frequency clock (MHz)	8/16/24/32			
内置低频时钟(kHZ) Built-in low frequency clock (kHZ)	32			
看门狗 Watchdog	1			
触摸（通道）Touch (channel)	23			
ADC	3 X 12 bit			
DMA通道 DMA channel	8			
高级定时器 Advanced timer	1 x 16 bit			
通用定时器 Universal timer	4 x 16 bit			
低功耗定时器 Low power timer	1 x 32 bit			
蜂鸣器/基本定时器 Buzzer/basic timer	2 x 16 bit			
UART	4			
I2C	2			
SPI	2			
LED驱动 LED driver	7 COM x 10 SEG			
CRC	1			
调试口 Debug port	SWD			
典型运行功耗（uA/MHz）Typical operating power consumption (uA/MHz)	150			

变频芯片
Motor Control MCU

空调
Air conditioner

冰箱
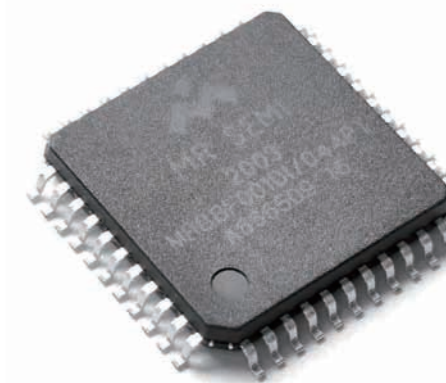Refrigerator

洗衣机
Washing machine

小家电
Small domestic appliance

开阳系列
Mizar Series

产品特点：

- 内置32bit Cortex M33
- LQFP-64封装
- 256K flash空间
- 16K SRAM
- 16K Code RAM (CRAM)
- 31通道12-bit SAR ADC
- CPU最高主频可配为160MHz
- 锁相环倍频
- 支持多资源外设UART，SPI，I2C
- 增强型PWM模块
- 高可靠性，EFT和动态ESD大于4KV

Features:

- Built-in, 32-bit, Cortex M33
- LQFP-64 package
- 256K Flash space
- 16K SRAM
- 16K Code RAM (CRAM)
- 31-channel, 12-bit SAR ADC
- 160MHz (Max.) CPU frequency
- Phase Locked Loop (PLL)
- Supporting multi-resource peripherals, such as UART, SPI, I2C
- Enhanced PWM module
- High reliability, EFT and dynamic ESD greater than 4KV

产品应用：

- 各种电机控制应用

Applications:

- Various motor control applications

型号 Model	MR82F001DI/064			
内核 CPU	Cortex M33			
内核频率(MHz) CPU frequency (MHz)	160			
封装 Package	LQFP-64			
FLASH(KB)	256			
SRAM(KB)	16 （SRAM）+ 16 (CRAM)			
IO	59			
工作电压（Ⅴ）Operating voltage (V)	2.7 - 5.5			
内置复位 Built-in reset	上电复位 软件复位 Power-on reset Software reset 看门狗复位 外部复位 Watchdog reset External reset			
外振(MHZ) External crystal (MHZ)	4 - 32			
内置高频时钟(MHz) Built-in high frequency clock (MHz)	8			
内置低频时钟(kHZ) Built-in low frequency clock (kHZ)	32			
看门狗 Watchdog	1			
触摸（通道）Touch (channel)	0			
ADC	6 X 12 bit, 12 x 12 bit, 13 x 12 bit			
DMA通道 DMA channel	8			
高级定时器 Advanced timer	2 x 16 bit			
通用定时器 Universal timer	6 x 16 bit			
低功耗定时器 Low power timer	1 x 32 bit			
UART	4			
I2C	2			
SPI	2			
运放 OPA	3			
比较器 Comp	3			
CRC	1			
调试口 Debug port	SWD			
典型运行功耗（uA/MHz ） Typical operating power consumption (uA/MHz)	150			