WT MICROELECTRONICS 文曄科技

IMX28系列处理器介绍

FAE---李庆谊

WT—上海

2011-04-5

目录

- i.MX28系列处理器主要推荐型号和资源
- 全部i.MX系列处理器Roadmap
- Freescale的芯片生命周期 --- 符合汽车，医疗，工控需求
- i.MX287 处理器性能简介
- i.MX28处理器 集成PMU的特点
- i.MX28处理器 集成PMU的系统构架图
- i.MX28处理器 存储器的支持
- i.MX28处理器 丰富的外部接口
- i.MX28处理器 的优势
- i.MX28评估板 简介
- i.MX28资料下载方法
- i.MX28主要目标市场应用
- i.MX28典型应用 --- 重症病人监控仪（医疗仪器）
- i.MX28 软件资源和lisence问题

i.MX28 系列处理器 主要推荐型号 和 资源

Feature	i.MX283	i.MX286	i.MX287
On-chip RAM	128KB	128KB	128KB
Memory Interface	NAND Flash, DDR2, mDDR, LV-DDR2	NAND Flash, DDR2, mDDR, LV-DDR2	NAND Flash, DDR2, mDDR, LV-DDR2
LCD Interface	Yes	Yes	Yes
Touchscreen	Yes	Yes	Yes
Ethernet	x1	x1	x2
L2 Switch	-	-	Yes
CAN	-	x2	x2
12-bit ADC	x8	x8	x8
High Speed ADC	x1	x1	x1
USB2.0	OTG HS with HS PHY x1 HS Host with HS PHY x1	OTG HS with HS PHY x1 HS Host with HS PHY x1	OTG HS with HS PHY x1 HS Host with HS PHY x1
SDIO*	x3	x3	x4
SPI*	x3	x3	x4
UART*	x6	x6	x6
PWM*	x8	x8	x8
S/PDIF Tx	-	Y	Y
Package	14x14 0.8mm 289 BGA	14x14 0.8mm 289 BGA	14x14 0.8mm 289 BGA

全部i.MX系列处理器的Roadmap

ICs Available
In Development
Concept

High-end Navigation
High-end Speech Recognition
HD Video Decode
Multiple Displays

Entry to Mid-level Navigation
Advanced Audio Connectivity
Mid-Level Voice Recognition
Sophisticated GUI

Audio Connectivity
GUI Support
Bluetooth Hands-free, A2DP

i.MX516
- 720p Video Dec

i.MX514
- Cortex A8, 600MHz
- OpenGL ES 2.0
- OpenVG 1.1
- mDDR/DDR2 200
- USB Phy

i.MX356
- OpenVG 1.1

i.MX355
- WVGA
- Camera Input

i.MX351
- ARM1136, 532MHz
- 2xCAN, MLB, Audio
- DDR2, USB Phy x2

i.MX255
- WVGA Touchscreen
- Camera

i.MX251
- ARM926, 400MHz
- 2xCAN, Ethernet
- USB Phy, Audio, DDR2

i.MX536
- 1080p Video Decode

i.MX534
- OpenGL ES 2.0
- OpenVG 1.1

i.MX531
- Cortex A8, 800MHz
- DDR2/DDR3 400
- SATA 1.5 Gbps
- USB Phy x2
- Ethernet 1588
- CAN x2, MLB

i.MX287
- WVGA Touchscreen
- Camera

i.MX286
- ARM926, 450MHz
- 1588 Ethernet, switch
- Integrated PMIC

i.MX61x
- 2-Core Cortex A9
- 1GHz per Core
- LP/LV DDR2 and DDR3 533
- OpenGL ES 2.0
- OpenVG, OpenCL
- Dual 1080p Decode
- SATA 3Gbps

i.MX63x
- 4-Core Cortex A9
- 1GHz per Core
- DDR2/DDR3 533
- OpenGL ES 2.0
- OpenVG, OpenCL
- Dual 1080p Decode
- Ethernet AVB
- MOST 150
- USB 3
- On chip power management

Left Edge = Samples

2011 2012 2013

Freescale的芯片生命周期计划---符合 汽车，医疗，工控的需求

Freescale Product Longevity Statement

Freescale Semiconductor provides a product longevity program for the market segments we serve. For the automotive and medical segments, Freescale will make a broad range of devices available for a minimum period of 15 years. For all other market segments in which Freescale participates, Freescale will make a broad range of devices available for a minimum period of 10 years.

Life cycles for participating Freescale products will begin at the time of product launch and will include the standard Freescale end-of-life notification policy (one-year notice for placement of final orders and an additional year until the last ship date). Freescale will manage the program through our own factories, outside foundries and other manufacturing resources. If it becomes necessary to transfer the production of a participating product to an alternate manufacturing facility, Freescale will re-qualify that product. These actions demonstrate our intention to provide supply stability to our customers.

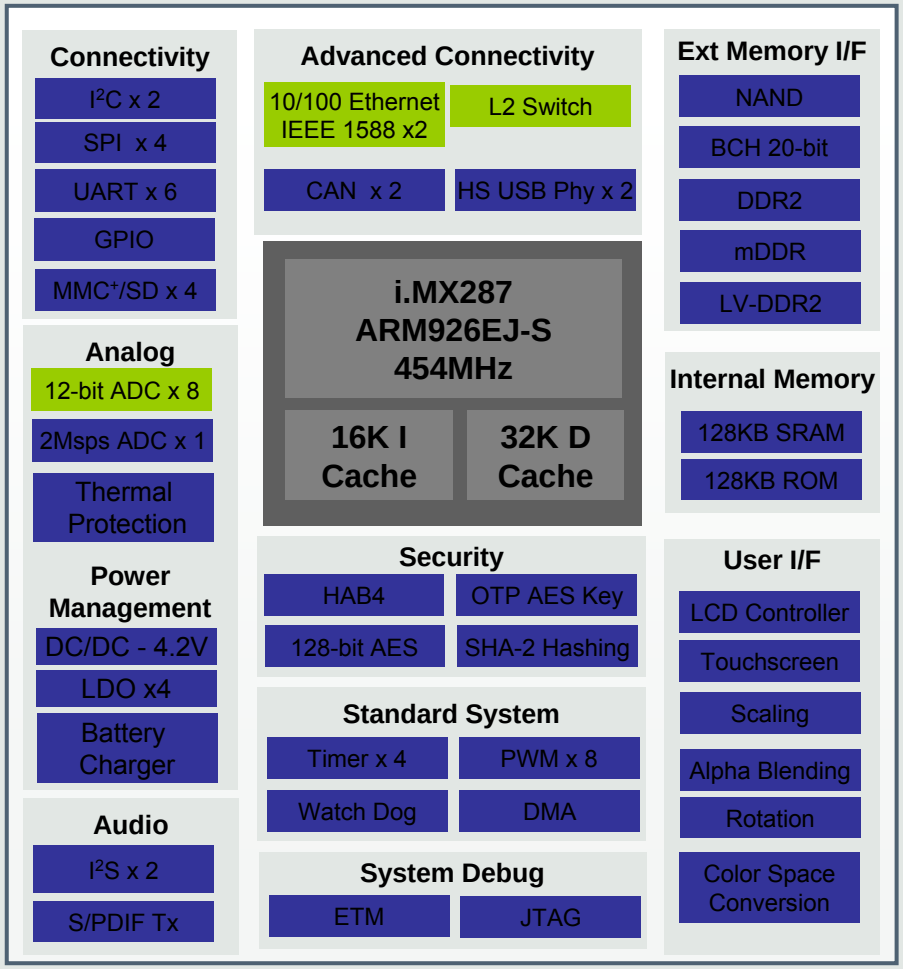
Products included in the Freescale product longevity program:

Search/Filter: i.mx

Category	Family	10-Year	15-Year	Product Launch
Applications Processor	i.MX Family	i.MX31	-	2005–06
Applications Processor	i.MX Family	i.MX27	-	2007–06
Applications Processor	i.MX Family	i.MX51	-	2009–11
Applications Processor	i.MX Family	-	i.MX35	2008–10
Applications Processor	i.MX Family	-	i.MX25	2009–06
Applications Processor	i.MX Family	i.MX233	-	2009–08

i.MX287 处理器性能简介

- **Key Features and Advantages**
  - 454MHz ARM926EJ-S core w/ 32KB Cache
  - PMU with high efficiency on-chip DC/DC, supports Li-Ion batteries
  - 10/100 Dual IEEE 1588 Ethernet with RMII support and L2 Switch
  - Dual CAN interfaces
  - LCD Controller with Touchscreen
  - NAND support – SLC/MLC and eMMC 4.4 managed
  - Hardware BCH (up to 20-bit correction)
  - 200 MHz 16-bit DDR2, LV-DDR2, mDDR external memory support
  - Dual High speed USB with embedded PHY
  - 8 General purpose 12-bit ADC channels and single 2 Msps ADC channel
  - LCD Controller with Touchscreen
  - Temperature sensor for thermal protection
  - Multiple connectivity ports (UARTs, SSP, SDIO, SPI, I2C, I2S)
  - 3.3V I/O, 10 year lifetime (Industrial)
- **Package and Temperature**
  - 289 BGA 14x14mm .8mm
  - -40C to +85C (Industrial)
- **Availability:**
  - Alpha Samples: Now
  - Production: early Oct 2010 (consumer), end Oct 2010 (industrial)

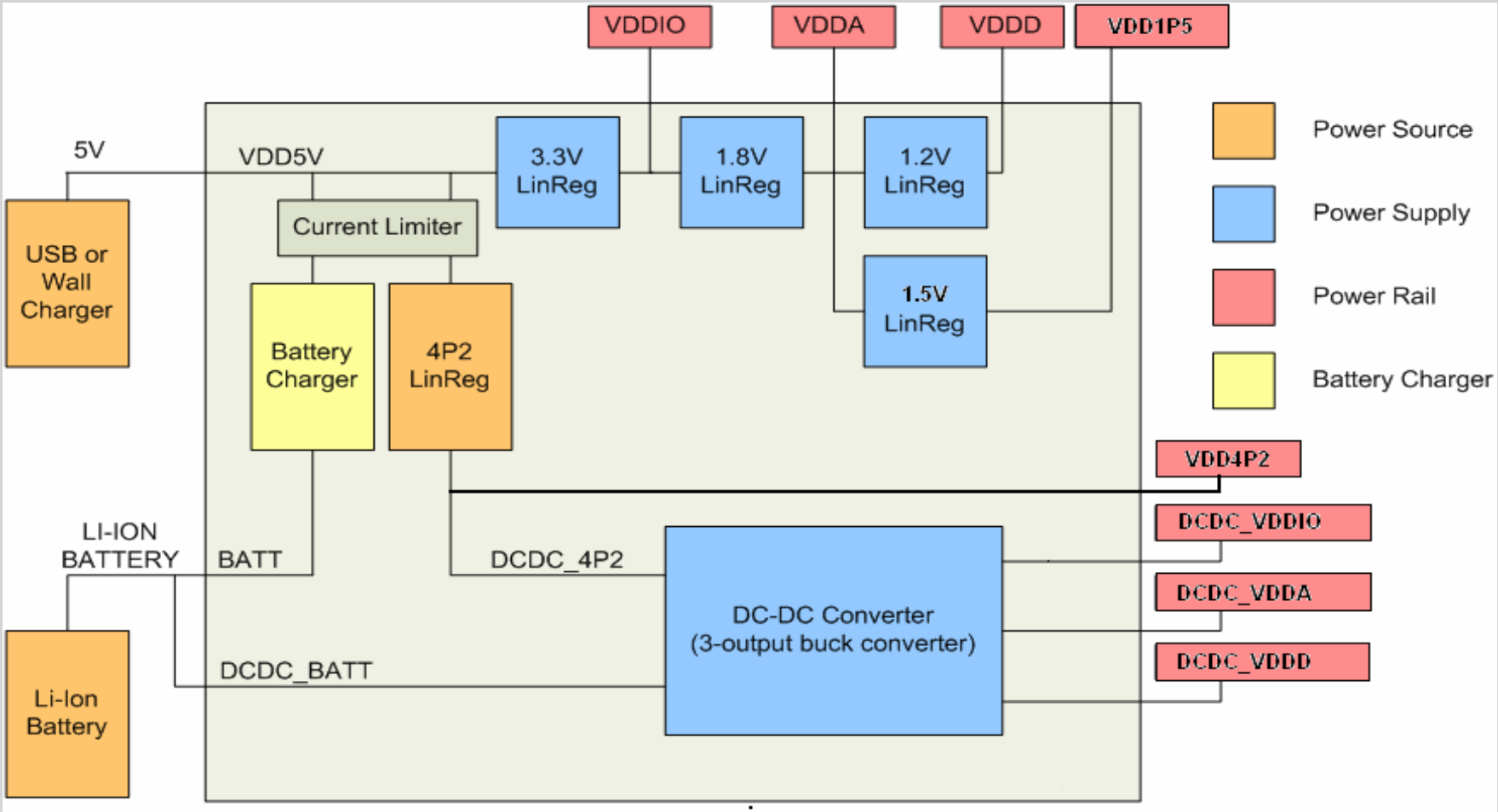


WT MICROELECTRONICS 文曄科技

i.MX28处理器 集成PMU的特点

- 独立的DC-DC电源 和 线性电源，为外部提供更多的电源需求
  - Powers digital blocks and components such as system clocks
  - Powers analog components and 1.8V DDR2
  - Powers I/O peripherals like NAND flash and SD/MMC cards
  - Powers 1.5V LV-DDR2
- 多种类型的电源输入
  - Li-Ion batteries (2.9V – 4.2V)
  - Direct power from 5V source (USB, wall power or other source)
  - Internal 4.2V power source generated from 5V source
- Battery charging capability
  - Allows battery to be fully charged while device is in use
  - Current and voltage sensors allows firmware to monitor the voltage and current into the battery to determine “charged” status
- On-chip silicon speed and temp sensors
  - Hardware thermal protection and shutdown circuitry

i.MX28处理器 集成PMU的系统构架图



Notes:

1. DCDC_VDDIO connected to VDDIO on PCB
2. DCDC_VDDA connected to VDDA on PCB
3. DCDC_VDDD connected to VDDD on PCB

i.MX28处理器 存储器的支持

- 更多种类的 DDR支持
  - Supports 8-bank DDR2, mDDR, LV-DDR2
  - 200MHz, 16-bit wide data bus
- Flash 的支持
  - Raw SLC NAND
  - Raw MLC NAND
  - Managed NAND – eMMC 4.4, LBA
  - SPI NOR Flash or Parallel NOR via LCDIF
  - Supports up to four NAND Flash devices
- 良好的 ECC支持
  - 20bit ECC raw nand support
- 片内 集成128K的 SRAM
  - Ideal for low-power LCD refresh
  - Improve algorithmic performance

i.MX28处理器 丰富的外部接口

- USB-HOST接口
- IIC接口，可接EEPROM,音频codec，外部传感器等。
- 4通道 Timer接口
- 6通道PWM输出
- 实时时钟RTC模块
- 最多6个串口，5个3.25Mbsp高速串口，1个115Kbps 调试串口
- IIS接口，可输出数字音频信号
- 12bit低精度ADC，可用作 电池电量检测 功能
- 电阻式触摸屏接口，同时支持4线电阻触摸屏和5线电阻触摸屏
- SDIO接口，可外扩SD卡，或者链接wifi模块
- 时钟信号源输出，最高可达50Mhz的时钟输出能力

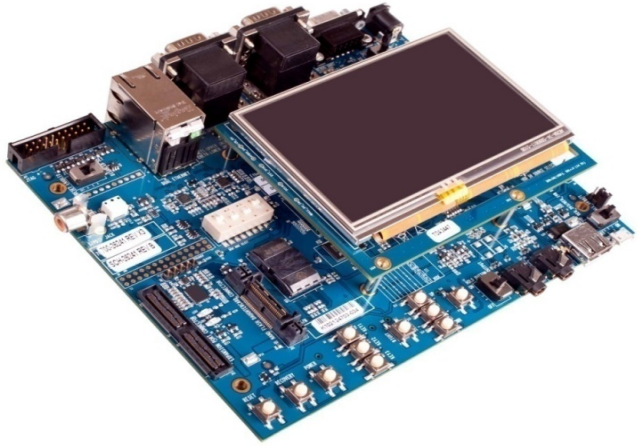
IMX28处理器的优势

- 双网口，为更多的设备提供 以太网的 路由驳接 功能。
- 双CAN总线接口，为最终产品 提供 CAN总线的 网关。
- 自身集成PMU，为客户进降低了 电源部分的 系统复杂度。
- 有800×600的液晶屏分辨率，可以满足大部分的 工业HMI控制需求。
- 有电池管理和低功耗模块特性，可以做手持设备。
- 存储器和内存 支持的种类多，覆盖了目前全部的 存储器种类，最终产品的需求可以 深度定制 并选择。
- 由于集成度高，可以为客户 降低成本。
- 集成多路ADC模块，可完成基础的模拟信号控制和采集功能。
- 软件资源丰富，已经提供完整的linux，wince的SDK软件包，且完全免费
- 各种驱动实例，完全免费。
- 10年不停产计划，为工业客户提供时间保证。

i.MX28 评估板 (EVK)

Price. Performance. Personality.

CPU	Debug	Peripherals
• i.MX28 Applications Processor (289 BGA) • DDR2 • NAND FLASH • SPI Flash footprint • ETM Support • DC/DC Converter components • Li-Ion battery connector	• Debug Serial Port • JTAG • Reset, Interrupt, boot switches • Debug display/LED's • Power Source	• WVGA Touchscreen LCD Display (add-on module) • SD/MMC Card Slot • Dual USB Host/Device connector • CAN connector • Dual Ethernet with Switch for testing of features and throughput • Navigation keys • Line input, headphone output (jack)



MCIMX28EVK	i.MX28 Evaluation Kit	MSRP $399
MCIMX28LCD	4.3" WVGA 触摸屏+液晶屏	MSRP $199

Software:
windowCE
Linux

IMX28资料下载方法

- 首先进入如下链接地址
  http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=i.MX287
- 然后根据实际需求，选择需要下载的资料。
  主要是参考 DOC和Software&tools里面的资料。

i.MX28主要目标市场

- 双以太网应用
  - 家庭网关
  - 简易网关
- 工业控制HMI
  - 有网络应用需求
  - 有CAN总线的运用需求
  - 有触摸屏的需求
- 双CAN总线应用
  - CAN总线 网关
  - CAN总线监控设备
- 消费类产品
  - 有以太网需求
  - 有LCD需求
  - 有电池需求

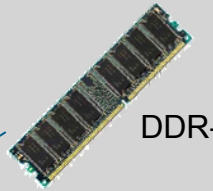
IMX28的典型应用 --- 重症病人监护仪

以太网口

Wifi无线
网适配器

NAND
FLASH

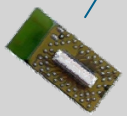
体温，心跳，
血压…传感器



DDR-2

蓝牙模块

433频段
模块



液晶屏 显示

病人病情
资料记录
备份

Li电池

Standard Connectivity
- I²C x 2
- SPI x 4
- UART x 6
- GPIO
- 12-bit ADC x 8
- 2Msps ADC x 1

Advanced Connectivity
- 10/100 Ethernet IEEE 1588 x2
- CAN x 2
- L2 Switch
- HS USB Phy x 2

Ext Memory I/F
- NAND
- BCH 20-bit
- ECC8
- DDR2
- mDDR
- LV-DDR2

i.MX287
ARM926EJ-S
454MHz
- 16K I Cache
- 32K D Cache

Ext Storage
- MMC+/SD x 4

Internal Memory
- 128KB SRAM
- 64KB ROM

Power Management
- DC/DC - 4.2V
- LDO x4
- Battery Charger

Security
- HAB4
- OTP AES Key
- 128-bit AES
- SHA-2 Hashing

User I/F
- LCD Controller
- Touchscreen
- Scaling
- Alpha Blending
- Rotation
- Color Space Conversion

Standard System
- Timer x 4
- PWM x 6
- Watch Dog
- SDMA

Audio
- I²S x 2
- S/PDIF Tx

System Debug
- ETM
- JTAG

i.MX28x系统的软件SDK资源和lisence问题

- Wince
  - 不需要向第三方付费，代码由freescale免费提供（Boot，BSP，codec解码器，演示用demo code）
- Linux
  - 不需要向第三方付费，代码由freescale免费提供（Boot，BSP，codec解码器，演示用demo code）
- **某些特殊解码器**
  - 具体详情，请咨询 文晔的 FAE。

Thank You !