

AN13592

i.MX RT1040和i.MX RT1060X的应用提示

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应用笔记

文档信息

信息	内容
关键词	RT1060X、FlexSPI、125C
摘要	本文档重点介绍i.MX RT1040和i.MX RT1050之间以及i.MX RT1060和i.MX RT1060X之间的差异。同时还补充一些应用要点。



1 介绍

i.MX RT1040和i.MX RT1060X是i.MX RT系列的新成员。它们采用恩智浦的先进技术来实现 Arm Cortex-M7内核，将工业级质量扩展到了Tj 125 °C。为了提供高CPU性能和最佳实时响应，其商业级质量规格保持了高达600 MHz的运行速度，而在扩展工业级质量规格下可达528 MHz。

此外，这些新产品还提供了更多的封装选项。如需了解详细信息，请参阅“数据手册”中的封装部分。

本文档重点介绍i.MX RT1040和i.MX RT1050之间以及i.MX RT1060和i.MX RT1060X之间的差异。同时还补充了一些应用要点。

2 i.MX RT1040和i.MX RT1050的比较

[表1](#)列出了i.MX RT1040和i.MX RT1050之间的主要区别。总体而言，i.MX RT1040虽然减少了一些功能，但提供了更高的Tj温度并增加了一个FlexSPI接口。

表1. i.MX RT1040和i.MX RT1050的比较

	i.MX RT1040	i.MX RT1050
GPIO数量	108	124
CAN-FD	Y	—
CSI	—	Y
KPP	—	Y
CCM_CLK1_P/N	—	Y
ACMP输出引脚	—	Y
FlexSPI	2	1
LPSPI	3	4
Tj (工业)	125 °C	105 °C
封装	BGA169	BGA196

3 i.MX RT1040低成本电路板设计

i.MX RT1040优化了焊球的布局 (ball map)，采用MAPBGA169，0.8 mm间距，11 × 11 mm机械封装。要通过采用两层PCB设计来节省电路板成本，请注意以下设计要点。

- 前两行的信号可以直接在顶层扇出。其他信号可以使用过孔在底层扇出。电源和地引脚分布在第三行。它可以直接使用过孔在底层扇出，如[图1](#)所示。

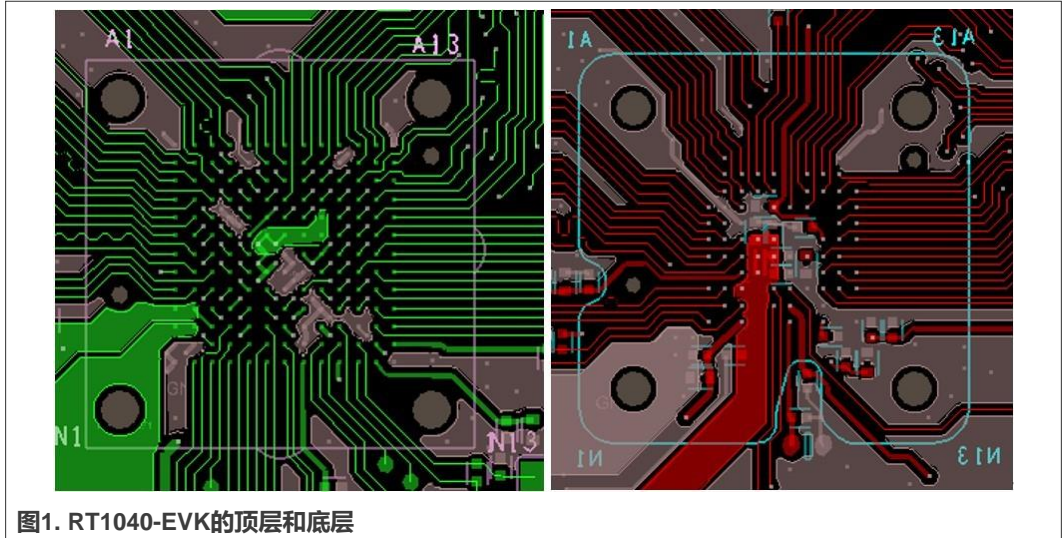


图1. RT1040-EVK的顶层和底层

2. USB信号引脚放置在第一行，并走线到连接器。保持USB_P/N直接相连，不要改变层数。差分对的默认阻抗为90 Ω。
3. 24 MHz和32.768 KHz的时钟放置在第一行，采用长度较短的走线连接到晶振。
4. 封装上的引脚间距为0.8 mm，因此过孔可以是常规镀孔、18mil圆形焊盘和8mil钻孔，以满足各种PCB制造商的能力/要求。
5. 双层板的阻抗要求是很难控制的。为了确保有足够的阻抗，请为高速信号放置串行电阻和较短的截线。此电阻值可以根据EMC的测试结果进行调整。例如，对SDRAM信号使用47 Ω的串行电阻。
6. 大多数器件都放置在顶层，底层作为地参考层。它必须尽可能地铺满GND铜皮。特别是在芯片和电源之间，需要足够的接地回路。
7. 对于靠近接地过孔或解耦电容的时钟和敏感信号，应布置层数的变化。

4 i.MX RT1060和i.MX RT060X的比较

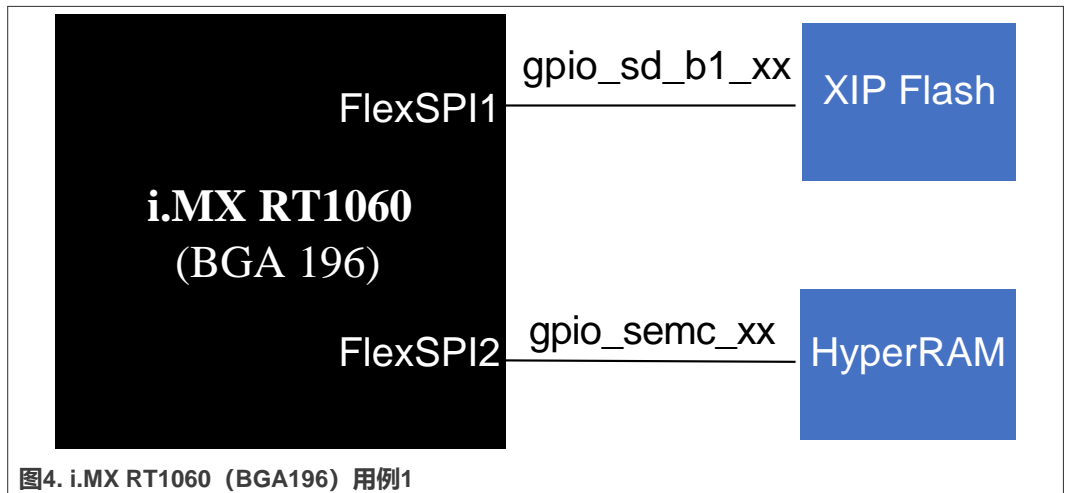
图1列出了i.MX RT1060X和i.MX RT1060之间的主要区别。总体而言，与i.MX RT1060相比，i.MX RT060X具有FlexSPI2专用接口、更多的GPIO引脚和更高的Tj。

表2. i.MX RT1060与i.MX RT060X的比较

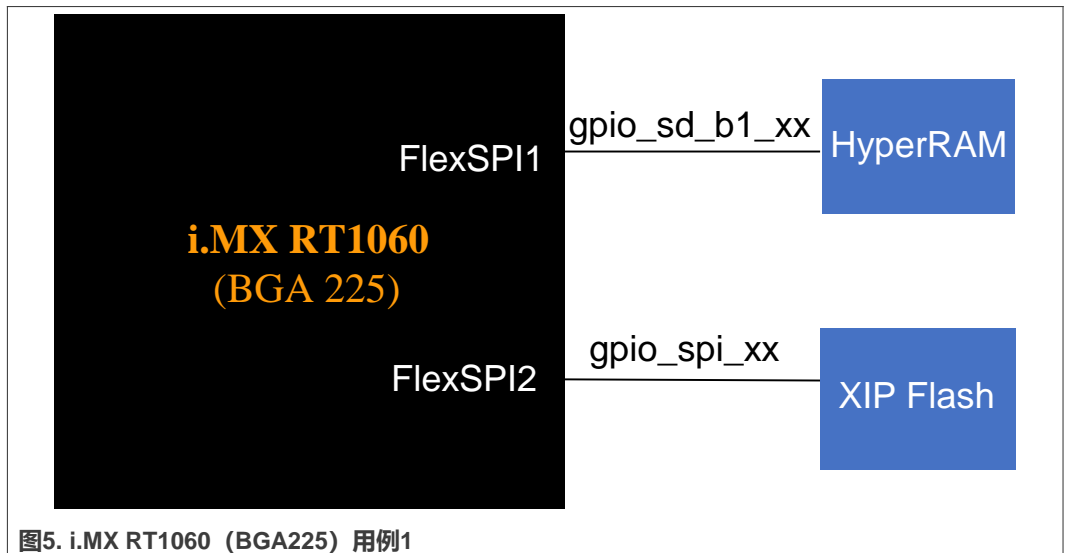
	i.MX RT1060	i.MX RT1060X
FlexSPI2专用接口	—	Y
GPIO数量	124	146
Tj (工业级)	105 °C	125 °C
封装	BGA 196	BGA 225

7 RT1060和RT1060x的用例比较

- i.MX RT1060系列扩展——FLEXSPI用例示例1
 - **i.MX RT1060 (BGA196)** 仅限于通过gpio_sd_xx (FlexSPI1) 使用XIP Flash, 并且只能通过gpio_semc_xx (FlexSPI2) 扩展133 MHz HyperRAM, 因为它无法通过gpio_semc_xx使用FlexSPI启动。
 - 注意:** 要从FlexSPI2启动, 请将fuse0x6d0[20]设置为1。



- **i.MX RT1060 (BGA225)** 提供了通过gpio_sd_xx (FlexSPI1) 使用166 MHz HyperRAM和通过增加的gpio_spi_xx (FlexSPI2) 使用XIP Flash的选项。



- i.MX RT1060系列扩展——flexspi用例示例2
 - **i.MX RT1060 (BGA196)** 仅限于通过gpio_sd_b1_xx (FlexSPI1) 使用XIP flash, 并且只能扩展一个SD/SDIO器件, 因为SDHC2 PINMUX是与FlexSPI1复用的。

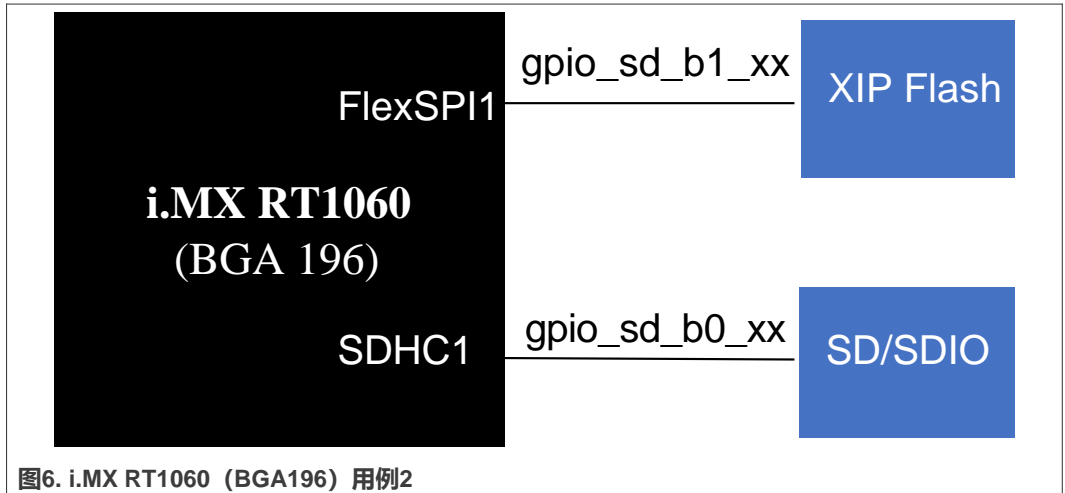


图6. i.MX RT1060 (BGA196) 用例2

– i.MX RT1060 (BGA225) 提供了通过增加的gpio_spi_xx (FlexSPI2) 使用XIP Flash 的选项，可以扩展两个SD卡/SDIO器件。

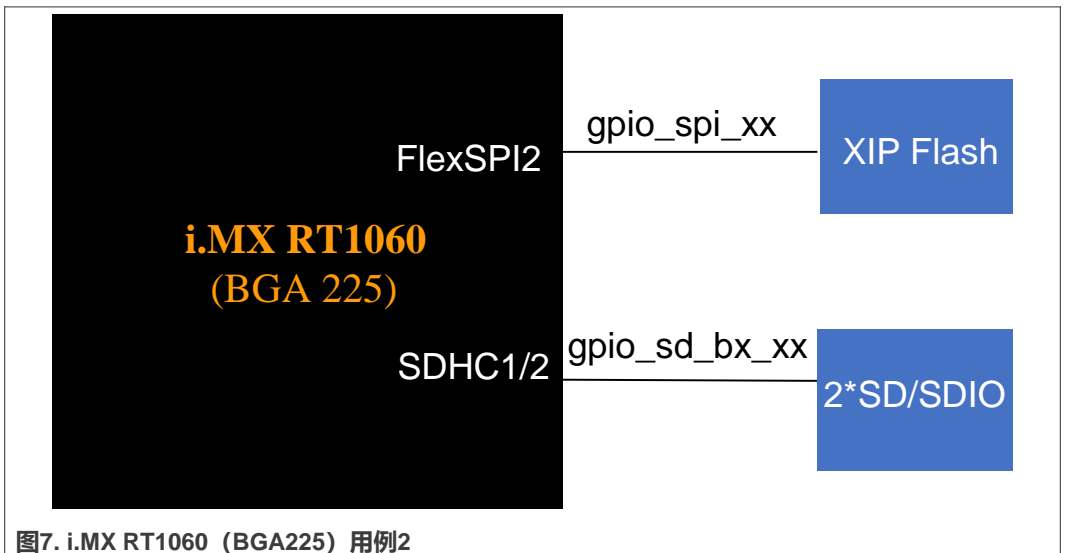


图7. i.MX RT1060 (BGA225) 用例2

8 修订历史

版本号	日期	说明
第1版	2022年10月19日	<ul style="list-style-type: none"> 更新了表1 在第6节添加了注释 在第7节添加了注释
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