

**GigaDevice Semiconductor Inc.**

**从 GD32E230 系列移植到 GD32E235 系列**

**应用笔记**

**AN169**

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## 1. 前言

GD32E235xx 系列器件是一款基于 ARM®Cortex®-M23 内核的新型 32 位通用微控制器。它与 GD32E230xx 系列在资源上相似度非常高，本应用笔记旨在帮助您快速将应用程序从 GD32E230xx 系列微控制器移植到 GD32E235xx 系列微控制器。

为了更好的利用本应用笔记中的信息，您需要从官网 [www.GD32MCU.com](http://www.GD32MCU.com) 下载 GD32 各系列微控制器资料，如 Datasheet、用户手册、官方例程及各种开发工具等。

## 2. 引脚兼容性

GD32E235xx 系列芯片与 GD32E230xx 系列芯片在相同封装下引脚的分配和定义是完全一样的。

### 3. 内部资源兼容性

GD32E235xx 与 GD32E230xx 相同后缀的型号内部资源是一致的，除此之外 GD32E235 还增加了 FLASH 容量为 128KB，RAM 容量为 16KB 的芯片型号：GD32E235xB。如[表 3-1. GD32E235xB 设备功能和外设列表](#)所示。

表 3-1. GD32E235xB 设备功能和外设列表

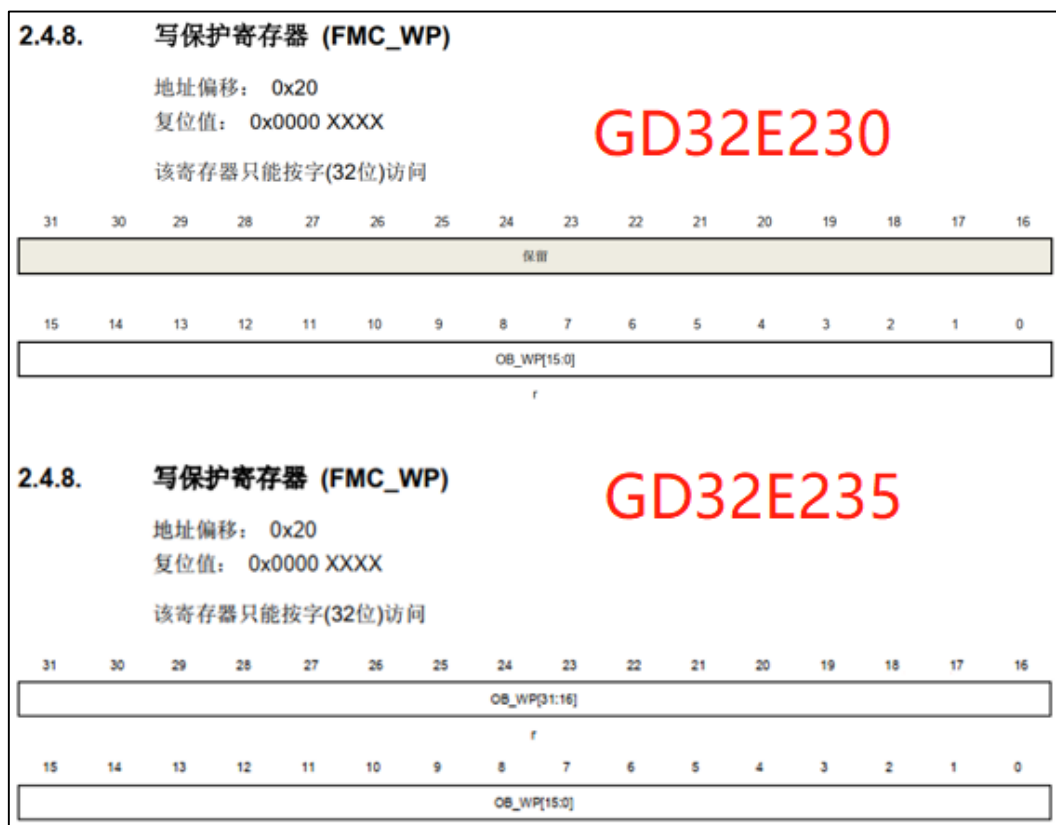
Part Number		GD32E235xx		
		KBU6	KBT6	CBT6
FLASH(KB)		128 <sup>(1)</sup>	128 <sup>(1)</sup>	128 <sup>(1)</sup>
SRAM(KB)		16 <sup>(1)</sup>	16 <sup>(1)</sup>	16 <sup>(1)</sup>
Timers	General timer(16bit)	5 (2, 13-16)	5 (2, 13-16)	5 (2, 13-16)
	Advanced timer(16bit)	1 (0)	1 (0)	1 (0)
	SysTick	1	1	1
	Basic timer(16bit)	1 (5)	1 (5)	1 (5)
	Watchdog	2	2	2
	RTC	1	1	1
Connectivity	USART	2 (0-1)	2 (0-1)	2 (0-1)
	I2C	2 (0-1)	2 (0-1)	2 (0-1)
	SPI/I2S	2/1 (0-1)/(0)	2/1 (0-1)/(0)	2/1 (0-1)/(0)
GPIO		27	25	39
CMP		1	1	1
EXTI		16	16	16
ADC	Units	1	1	1
	Channels (External)	10	10	10
	Channels (Internal)	2	2	2
Package		QFN32	LQFP32	LQFP48

注意：（1）此三个新增的型号，与相同封装的 GD32E230x8 型号对比，除了 FLASH 容量大小与 SRAM 容量大小的区别外，其他资源都是相同的。

## 4. 程序移植

由上节可知 GD32E235xB 的 FLASH 容量大小更大，GD32E235xx 与 GD32E230xx 的写保护寄存器（FMC\_WP）的位数有差异。如 [图 4-1. GD32E230xx 与 GD32E235xx 设备间写保护寄存器（FMC\\_WP）差异对比](#)所示。

图 4-1. GD32E230xx 与 GD32E235xx 设备间写保护寄存器（FMC\_WP）差异对比



新版本的固件库 GD32E23x\_Firmware\_Library(2.0.0 及以上版本)为了兼容 GD32E235xB，对“gd32e23x\_fmc.h”、“gd32e23x\_fmc.c”两个文档做了修改。如 [图 4-2. “gd32e23x\\_fmc.h”文档差异图示](#)所示，详细的函数可查阅“gd32e23x\_fmc.c”文档。

图 4-2. “gd32e23x\_fmc.h”文档差异图示

<pre>/* FMC_WP */ #define FMC_WP_WP          BITS(0,15)  /* enable option byte write protection (OB_WP) */ fmc_state_enum ob_write_protection_enable(uint16_t ob_wp);  /* get the FMC option byte write protection */ uint16_t ob_write_protection_get(void);</pre> <p>旧版本固件库</p>	<pre>/* FMC_WP */ #define FMC_WP_WP          BITS(0,31)  /* enable option byte write protection (OB_WP) */ fmc_state_enum ob_write_protection_enable(uint32_t ob_wp);  /* get the FMC option byte write protection */ uint32_t ob_write_protection_get(void);</pre> <p>适配GD32E235芯片固件库</p>
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当需要从 GD32E230xx 移植到 GD32E235xx 或者是从 GD32E235xx 移植到 GD32E230xx 的时候，需要注意 flash 大小是否能兼容，并且要修改“gd32e23x\_fmc.h”、“gd32e23x\_fmc.c”两个文档。



## 5. 版本历史

表 5-1. 版本历史

版本号	描述	日期
1.0	首次发布	2023 年 8 月 15 日

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