

AN405

Comparison between F-RAM I²C Processor Companion Devices

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Associated Project: No

Associated Part Family: FM31256, FM3164, FM31278, FM31276, FM31L278, FM31L276

Software Version: None

Related Application Notes: None

AN405 discusses the key differences between the F-RAM I²C processor companion devices FM31256 / FM3164 / FM31278 / FM31276 / FM31L278 / FM31L276.

Description

The FM31256 and the FM3164 are the wide operating voltage F-RAM I²C processor companion devices. The FM31278 and the FM31276 are 5 V devices while the FM31L278 and the FM31L276 are the 3 V devices. This application note discusses the key differences between the F-RAM I²C processor companion devices FM31256 / FM3164 / FM31278 / FM31276 / FM31L278 / FM31L276.

Compatibility

From the software point of view these families are compatible. From the hardware point of view, the families are similar in many ways; however there are a few key differences. The FM31256 / FM3164 devices operate over a wide voltage range of 2.7 V to 5.5 V. The FM31278 / FM31276 and FM31L278 / FM31L276 are split into 5 V and 3 V versions, respectively. The interface features are the same between the devices. The key differences are in operating voltage range, trickle charger currents, and RTC crystal as shown in [Table 1](#).

Table 1. Comparison between F-RAM I²C processor companion devices

	Wide Operating Voltage Family	5V Family	3V Family	Comments
	FM31256 / FM3164	FM31278 / FM31276	FM31L278 / FM31L276	
Density	256-Kbit / 64-Kbit	256-Kbit / 64-Kbit	256-Kbit / 64-Kbit	
Operating Voltage Range	2.7 V to 5.5 V	4.0 V to 5.5 V	2.7 V to 3.6 V	
Voltage Detect Trip Points	2.6 V, 2.9 V, 3.9 V, 4.4 V	3.9 V, 4.4 V	2.6 V, 2.9 V	FM31256 / FM3164 have two VTP bits in Register 0Bh (Table 2) while the FM31278 / FM31276 / FM31L278 / FM31L276 devices have one VTP bit (Table 3)
RTC Crystal Load Capacitance	6 pF	12.5 pF		12.5 pF is a more commonly available crystal
Trickle Charger (min - max range)	5 μA - 25 μA	50 μA - 120 μA, FC=0 200 μA - 2500 μA, FC=1		Increased current on standard setting. Additional Fast Charge mode is available in FM31278 / FM31276 / FM31L278 / FM31L276 devices (Register 0Bh, bit 5 shown in Table 3)

Operating Voltage Range

The FM31256 / FM3164 devices operate from 2.7 V to 5.5 V and require 2 bits to select one of four VTP trip points, namely, 2.6 V, 2.9 V, 3.9 V and 4.4 V. [Table 2](#) gives the Register 0Bh for FM31256 / FM3164. The FM31278 / FM31276 devices operate from 4.0 V to 5.5 V and require only one bit to detect one of two VTP trip points, namely, 3.9 V and 4.4 V. Similarly the FM31L278 / FM31L276 devices operate from 2.7 V to 3.6 V and also require only one bit to select one of two VTP trip points, namely, 2.6 V and 2.9 V. [Table 3](#) gives the Register 0Bh for FM31278 / FM31276 / FM31L278 / FM31L276.

Table 2. Register 0Bh in FM31256 / FM3164

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
SNL	-	-	WP1	WP0	VBC	VTP1	VTP0

Table 3. Register 0Bh in FM31278 / FM31276 / FM31L278 / FM31L276

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
SNL	-	FC	WP1	WP0	VBC	-	VTP

Trickle Charger Current

The FM31278 / FM31276 / FM31L278 / FM31L276 have a higher trickle charger current for the base setting (FC = 0) compared to the FM31256 / FM3164 devices. They also have a new Fast Charge mode (FC = 1) that is user-selectable. This Fast Charge mode allows supercapacitor to be charged typically ten times faster than the base setting (FC = 0).

RTC Crystal

The FM31278 / FM31276 / FM31L278 / FM31L276 devices require use of a 12.5 pF crystal, while FM31256 / FM3164 devices require use of a 6 pF crystal.

All other specifications are the same among the processor companion devices. However system designers are recommended to review the detailed datasheets when using a new part.

Conclusion

AN405 discusses the key differences between the F-RAM I²C processor companion devices FM31256 / FM3164 / FM31278 / FM31276 / FM31L278 / FM31L276.



Document History

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