AN405

Comparison between F-RAM I²C Processor Companion Devices

Author: Harsha Medu

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 I^2C processor companion devices FM31256 / FM3164 / FM31278 / FM31276 / FM31L278 / FM31L276.

Document History

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