

AN216

Differences between FM24C256 and FM24W256

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Associated Project: No
Associated Part Family: FM24C256, FM24W256
Software Version: None
Related Application Notes: None

AN216 discusses the key differences which need to be considered when migrating from FM24C256 to FM24W256.

Description

The FM24W256, a 256-Kbit serial I²C wide voltage F-RAM, is a replacement device for FM24C256; FM24C256 is now obsolete. The two devices are identical in terms of pinout, package dimensions and composition, read/write functionality, Write Protect operation, and address pin functionality. This application note discusses the key differences between the two devices which need to be considered when migrating from FM24C256 to FM24W256.

Drop-In Replacement or Not?

From a software point of view, the two devices are identical. From a hardware point of view the key difference is the lower active and standby currents in FM24W256. Additionally, FM24W256 datasheet adds power-up and power-down ramp rate specifications of 30 $\mu\text{s} / \text{V}$ and a first access time (after power-up) specification of 1 ms.

A compatibility chart for the two devices is given in [Table 1](#). A detailed comparison is shown in [Table 2](#).

Table 1. Compatibility Chart

FM24C256 Feature or Spec	Is FM24W256 compatible?
Package	Yes
Pinout	Yes
Temperature Range	Yes
Operating Voltage	Yes
Operating Current	Yes
Standby Current	Yes
Read / Write Function	Yes
Timing / Frequency	Yes
Data Retention	Refer to Table 2
Endurance	Yes

Table 2. Detailed Comparison

	FM24C256	FM24W256	Comments
Package Types	-G (Wide SOIC-8)	-EG (Wide SOIC-8) -G (SOIC-8)	Same, "green" wide SOIC package. The FM24W256 is also offered in "green" standard SOIC-8 package.
Package Outlines	Wide SOIC-8	Wide SOIC-8, SOIC-8	Same outline and board footprint. Along with wide package, the FM24W256 is offered in standard SOIC-8 package.
Pinout	-	-	Same
Temperature Range	-40 °C to +85 °C	-40 °C to +85 °C	Same
Operating Voltage Range	4.5 V to 5.5 V	2.7 V to 5.5 V	FM24W256 has a wider operating voltage range
Active Supply Current	200 μA @ 100 kHz 1200 μA @ 1 MHz	100 μA @ 100 kHz 400 μA @ 1 MHz	FM24W256 offers lower active current at all clock rates

	FM24C256	FM24W256	Comments
Standby Current	100 μ A	30 μ A	FM24W256 offers lower standby current
Read / Write Function	-	-	Same 2-byte addressing, same Slave IDs, same device select bits
Clock Frequency	1 MHz	1 MHz	Same
Data Retention	45 years (+85 °C)	10 years (+85 °C) 38 years (+75 °C)	
Endurance	1E+10	1E+14	FM24W256 has better endurance
V _{DD} Power-Up Ramp Rate (t _{VR})	-	30 μ s / V	Power-up ramp rate should be slower than 30 μ s / V for FM24W256
V _{DD} Power-Down Ramp Rate (t _{VF})	-	30 μ s / V	Power-down ramp rate should be slower than 30 μ s / V for FM24W256
Power-Up to First Access (t _{PU})	-	1 ms	After power-up, the first access of FM24W256 should be after 1 ms

Critical Considerations

All the parameter differences in [Table 2](#) should be considered during the migration to FM24W256. The critical differences are discussed in this section. System designers are also recommended to review the detailed datasheets when migrating to the new part.

Package Types

Both the FM24C256 and the FM24W256 are offered in wide SOIC-8 packages. However there is a change in the package type. Package type -EG now represents wide SOIC-8 package and -G represents standard SOIC-8 package in FM24W256. Hence FM24W256's -EG will be the drop in replacement for FM24C256's -G package type.

V_{DD} Ramp Rate

V_{DD} power-up and power-down ramp rate specifications are added in FM24W256 device. Ensure that the power-up and power-down ramp rates are slower than 30 μ s / V in your system.

Power-Up to First Access

Power-up to first access specification is added in FM24W256 device. Ensure that the FM24W256 device is accessed only after 1 ms from power-up.

Conclusion

AN216 discusses the differences between FM24C256 and FM24W256 which need to be considered during migration.

Document History

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Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	3944550	GVCH	03/26/2013	New Spec.
*A	4281483	MEDU	03/07/2014	<p>Updated to Cypress Template.</p> <p>Added data retention spec to FM24W256 at 85 °C.</p> <p>Updated "Power-up to First Access" for FM24W256 from 10 ms to 1 ms.</p> <p>Updated "V_{DD} Power-down Ramp Rate" for FM24W256 from 100 μs / V to 30 μs / V.</p> <p>Removed V_{IH(max)}, Input / Output leakage current and Input Resistance spec from Table 2.</p>

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