

## AN320

### Migrating from FM25256B to FM25W256

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**Associated Project: No**

**Associated Part Family: FM25256B, FM25W256**

**Software Version: None**

**Related Documents: For a complete list, [click here](#)**

AN320 discusses the key differences that need to be considered when migrating from FM25256B to FM25W256. FM25256B is now obsolete and this application note explains how FM25W256 is a replacement for FM25256B.

### Introduction

FM25W256, a 256-Kbit SPI F-RAM™, is a replacement device for FM25256B, which is now obsolete. The two devices are identical in terms of pinout, package composition and dimensions, read/write functionality, Write Protect operation, and address pin functionality. This application note discusses the key differences between the two devices that need to be considered when migrating from FM25256B to FM25W256.

### Drop-In Replacement or Not?

From a software point of view, the two devices are identical. From a hardware point of view the key differences are the lower active and standby currents in FM25W256.

There is a potential issue when replacing an FM25256B in a 5 V system with an FM25W256. The FM25W256 operates down to 2.7 V and will provide read and write accesses down to this voltage. If the system controller does unpredictable things at  $V_{DD}$  levels below 4 V (which is the FM25256B  $V_{DD}(\text{min})$  spec) and has relied on the undocumented lockout feature that the FM25256B provides, then the system designer must investigate this as a potential problem. Otherwise the controller could potentially overwrite data unintentionally in the FM25W256 at voltages below the  $V_{DD}(\text{min})$  specification of FM25256B.

Table 1 shows the compatibility chart of FM25256B and FM25W256. For a detailed comparison, see Table 3.

Table 1. Compatibility Chart

FM25256B Feature or Spec	Is FM25W256 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	Yes
Endurance	Yes

## Ordering Part Numbers

Table 2 gives the recommended FM25W256 ordering part numbers that correspond to the now obsolete FM25256B ordering part numbers.

Table 2. Recommended Ordering Part Numbers for Migration

FM25256B		FM25W256		Comments
Ordering Part Number	Status	Ordering Part Number	Status	
FM25256B -G	Obsolete	FM25W256 -G	In production	No hardware or software change is required
FM25256B -GTR		FM25W256 -GTR		

## Comparison of FM25256B and FM25W256

Table 3 gives a detailed comparison of the two devices.

Table 3. Detailed Comparison

	FM25256B	FM25W256	Comments
Package Types	-G	-G	Identical "green" SOIC package
Package Outlines	SOIC-8	SOIC-8	Identical outline and board footprint
Pinout	-	-	Identical
Temperature Range	-40 °C to +85 °C	-40 °C to +85 °C	Identical
Operating Voltage Range	4.0 V to 5.5 V	2.7 V to 5.5 V	FM25W256 has a wider operating voltage range
Active Supply Current	750 $\mu$ A @ 1 MHz 15 mA @ 20 MHz	250 $\mu$ A @ 1 MHz 2 mA @ 20 MHz	FM25W256 offers lower active current at all frequencies
Standby Current	150 $\mu$ A	30 $\mu$ A	FM25W256 has lower standby current
Read / Write Function	-	-	Identical 2-byte addressing, Identical op-codes, Identical status register
Clock Frequency	20 MHz	20 MHz	Identical
Data Retention	10 years (+85 °C)	10 years (+85 °C) 38 years (+75 °C) 151 years (+65 °C)	Identical
Endurance (Write/Read Cycles)	1E+14	1E+14	Identical
V <sub>DD</sub> Power-Up Ramp Rate (t <sub>VR</sub> )	50 $\mu$ s / V	30 $\mu$ s / V	Improved power-up ramp rate in FM25W256
V <sub>DD</sub> Power-Down Ramp Rate (t <sub>VF</sub> )	50 $\mu$ s / V (V <sub>DD</sub> $\geq$ 2 V) 1 ms / V (V <sub>DD</sub> < 2 V)	30 $\mu$ s / V	Improved power-down ramp rate in FM25W256
Power-Up to First Access (t <sub>PU</sub> )	10 ms	1 ms	Faster first access in FM25W256

## Critical Considerations

You should consider all the parameter differences mentioned in Table 3 during the migration to FM25W256. This section discusses the critical differences. From the table, it can be inferred that FM25W256 is better than FM25256B in all parameters. Note that the FM25W256 allows read / write operation up to 2.7 V while the FM25256B is guaranteed to work up to 4 V. System designers should also review the [datasheet](#) when migrating to the new part.

## Summary

AN320 discussed the differences between FM25256B and FM25W256 that need to be considered during migration to the FM25W256.

## Related Documents

### Datasheet

[FM25W256: 256-Kbit \(32 K × 8\) Serial \(SPI\) F-RAM datasheet](#)

### Application Note

[AN304 – SPI GUIDE FOR F-RAM](#)

## Document History

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Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	3944550	GVCH	03/26/2013	New Spec.
*A	4279018	MEDU	02/12/2014	Updated to Cypress Template. Updated the "V <sub>DD</sub> Power-Down Ramp Rate" for FM25W256 from 100 μs / V to 30 μs / V.
*B	4498653	GVCH	09/22/2014	Changed title from "Differences between FM25256B and FM25W256" to "Migrating from FM25256B to FM25W256." Updated abstract. Added " <a href="#">Ordering Part Numbers</a> " section. Added title for <a href="#">Table 3</a> . Added " <a href="#">Related Documents</a> " section.

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