

AN318

Migrating from FM25L16 to FM25L16B

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Associated Project: No

Associated Part Family: FM25L16, FM25L16B

Software Version: None

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

AN318 discusses the key differences that need to be considered when migrating from FM25L16 to FM25L16B. FM25L16 is now obsolete and this application note explains how FM25L16B is a replacement for FM25L16.

Introduction

FM25L16B, a 16-Kbit SPI F-RAM™, is a replacement device for FM25L16, which is now obsolete. The two devices are identical in terms of pinouts and read/write functionality. In terms of speed, FM25L16 operates up to 18 MHz and FM25L16B operates up to 20 MHz. This application note discusses the key differences between the two devices that need to be considered when migrating from FM25L16 to FM25L16B.

Drop-In Replacement or Not?

From a software point of view, the two devices are identical. The two devices are read/write compatible. Both devices use the same two-byte address. From a hardware point of view the key differences are the higher standby current of the FM25L16B and the TDFN package dimensions.

[Table 1](#) shows the compatibility chart of FM25L16 and FM25L16B. For a detailed comparison, see [Table 3](#).

Table 1. Compatibility Chart

FM25L16 Feature or Spec	Is FM25L16B compatible?
Package	Yes (SOIC) No (TDFN)
Pinout	Yes
Temperature Range	Yes
Operating Voltage	Yes
Operating Current	Yes
Standby Current	No
Read / Write Function	Yes
Timing / Frequency	Yes
Data Retention	Yes
Endurance	Yes

Ordering Part Numbers

[Table 2](#) gives the recommended FM25L16B ordering part numbers that correspond to the now obsolete FM25L16 ordering part numbers.

Table 2. Recommended Ordering Part Numbers for Migration

FM25L16		FM25L04B		Comments
Ordering Part Number	Status	Ordering Part Number	Status	
FM25L16 -G	Obsolete	FM25L16B -G	In production	No hardware or software change is required
FM25L16-GTR		FM25L16B -GTR		
FM25L16-DG		FM25L16B -DG		No software change. Hardware change is required.
FM25L16-DGTR		FM25L16B -DGTR		

Comparison of FM25L16 and FM25L16B

Table 3 gives a detailed comparison of the two devices.

Table 3. Detailed Comparison

	FM25L16	FM25L16B	Comments
Package Types	-G, -DG	-G, -DG	Identical “green” SOIC package but different “Green” TDFN package
Package Outlines	SOIC-8, TDFN-8 (3 mm x 6.4 mm)	SOIC-8, TDFN-8 (4 mm x 4.5 mm)	Identical outlines and board footprints for SOIC but different for TDFN
Pinout	-	-	Identical
Temperature Range	-40 °C to +85 °C	-40 °C to +85 °C	Identical
Operating Voltage Range	2.7 V to 3.6 V	2.7 V to 3.6 V	Identical
Active Supply Current	300 μ A @ 1 MHz 5.5 mA @ 18 MHz	200 μ A @ 1 MHz 3.0 mA @ 20 MHz	FM25L16B offers lower active current
Standby Current	1 μ A	6 μ A (max) 3 μ A (typical)	FM25L16B has higher standby current
Read / Write Function	-	-	Identical 2-byte addressing, Identical op-codes
Clock Frequency	18 MHz	20 MHz	Improved speed in FM25L16B
Data Retention	45 years (+85 °C)	10 years (+85 °C) 38 years (+75 °C) 151 years (+65 °C)	Data retention is lower
Endurance (Write/Read Cycles)	Unlimited	1E+14	FM25L16B is virtually unlimited at 20 MHz (85 years for a 64-byte loop)
V _{DD} Power-Up Ramp Rate (t _{VR})	50 μ s / V	30 μ s / V	Improved power-up ramp rate in FM25L16B
V _{DD} Power-Down Ramp Rate (t _{VF})	100 μ s / V	30 μ s / V	Improved power-down ramp rate in FM25L16B
Power-Up to First Access (t _{PU})	1 ms	1 ms	Identical

Critical Considerations

You should consider all the parameter differences mentioned in Table 3 during the migration to FM25L16B. This section discusses the critical differences. System designers should also review the [datasheet](#) when migrating to the new part.

Package Outline

Both FM25L16 and FM25L16B devices are offered in SOIC and TDFN packages. While the SOIC package dimensions are the same, there is a difference in TDFN package dimensions. The package dimensions of FM25L16 are 3 mm x 6.4 mm and that of FM25L16B are 4 mm x 4.5 mm.

Summary

AN318 discussed the differences between FM25L16 and FM25L16B that need to be considered during migration to the FM25L16B.

Related Documents

Datasheet

[FM25L16B: 16-Kbit \(2 K × 8\) Serial \(SPI\) F-RAM datasheet](#)

Application Note

[AN304 – SPI GUIDE FOR F-RAM](#)

Document History

Document Title: Migrating from FM25L16 to FM25L16B - AN318

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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	<p>Updated to Cypress Template.</p> <p>Updated max operating range from 3.65 V to 3.6 V.</p> <p>Updated clock frequency for FM25L16 from 20 MHz to 18 MHz.</p> <p>Updated "V_{DD} Power-Down Ramp Rate" for FM25L16B from 100 μs / V to 30 μs / V.</p> <p>Updated "Power-Up to First Access" for FM25L16B from 10 ms to 1 ms.</p> <p>Added "Power-Up to First Access", "V_{DD} Power-Up Ramp Rate", "V_{DD} Power-Down Ramp Rate" for FM25L16.</p>
*B	4498653	GVCH	09/22/2014	<p>Changed title from "Differences between FM25L16 and FM25L16B" to "Migrating from FM25L16 to FM25L16B."</p> <p>Updated abstract.</p> <p>Added "Ordering Part Numbers" section.</p> <p>Added title for Table 3.</p> <p>Added "Related Documents" section.</p>

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