

AN317

Migrating from FM25L04 to FM25L04B

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Associated Project: No

Associated Part Family: FM25L04, FM25L04B

Software Version: None

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

AN317 discusses the key differences that need to be considered when migrating from FM25L04 to FM25L04B. FM25L04 is now obsolete and this application note explains how FM25L04B is a replacement for FM25L04.

Introduction

FM25L04B, a 4-Kbit SPI F-RAM™, is a replacement device for the FM25L04, which is now obsolete. The two devices are identical in terms of pinouts and read / write functionality. In terms of speed, FM25L04 operates up to 14 MHz and FM25L04B operates up to 20 MHz. This application note discusses the key differences between the two devices that need to be considered when migrating from FM25L04 to FM25L04B.

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 one-byte address. From a hardware point of view the key differences are the higher standby current of the FM25L04B and the TDFN package dimensions.

[Table 1](#) shows the compatibility chart of FM25L04 and FM25L04B. For a detailed comparison, see [Table 3](#).

Table 1. Compatibility Chart

FM25L04 Feature or Spec	Is FM25L04B 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	Refer to Table 3
Endurance	Yes

Ordering Part Numbers

[Table 2](#) gives the recommended FM25L04B ordering part numbers that correspond to the now obsolete FM25L04 ordering part numbers.

Table 2. Recommended Ordering Part Numbers for Migration

FM25L04		FM25L04B		Comments
Ordering Part Number	Status	Ordering Part Number	Status	
FM25L04-G	Obsolete	FM25L04B -G	In production	No hardware or software change is required
FM25L04-GTR		FM25L04B -GTR		
FM25L04-DG		FM25L04B -DG		No software change. Hardware change is required .
FM25L04-DGTR		FM25L04B -DGTR		

Comparison of FM25L04 and FM25L04B

Table 3 gives a detailed comparison of the two devices.

Table 3. Detailed Comparison

	FM25L04	FM25L04B	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	170 μ A @ 1 MHz 3.0 mA @ 14 MHz	200 μ A @ 1 MHz 3.0 mA @ 20 MHz	
Standby Current	1 μ A	6 μ A (max) 3 μ A (typical)	FM25L04B has higher standby current
Read / Write Function	-	-	Identical 1-byte addressing, Identical op-codes
Clock Frequency	14 MHz	20 MHz	Improved speed in FM25L04B
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	FM25L04B 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 FM25L04B
V_{DD} Power-Down Ramp Rate (t_{VF})	100 μ s / V	30 μ s / V	Improved power-down ramp rate in FM25L04B
Power-Up to First Access (t_{PU})	-	1 ms	After power-up, the first access of FM25L04B should be after 1 ms

Critical Considerations

You should consider all the parameter differences mentioned in Table 3 during the migration to FM25L04B. This section discusses the critical differences. System designers should also review the [datasheet](#) when migrating to the new part.

Package Outline

Both FM25L04 and FM25L04B 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 FM25L04 are 3 mm x 6.4 mm and that of FM25L04B are 4 mm x 4.5 mm.

Power-Up to First Access

Power-up to first access specification is added in FM25L04B device. Ensure that the FM25L04B device is accessed only after 1 ms from power-up.

Summary

AN317 discussed the differences between FM25L04 and FM25L04B that need to be considered during replacement to the FM25L04B.

Related Documents

Datasheet

[FM25L04B: 4-Kbit \(512 × 8\) Serial \(SPI\) F-RAM datasheet](#)

Application Note

[AN304 – SPI GUIDE FOR F-RAM](#)

Document History

Document Title: Migrating from FM25L04 to FM25L04B - AN317

Document Number: 001-86840

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 max operating range from 3.65 V to 3.6 V. Updated clock frequency for FM25L04 from 20 MHz to 14 MHz. Updated "V _{DD} Power-Down Ramp Rate" for FM25L04B from 100 μs / V to 30 μs / V. Updated "Power-Up to First Access" for FM25L04B from 10 ms to 1 ms.
*B	4498653	GVCH	09/22/2014	Changed title from "Differences between FM25L04 and FM25L04B" to "Migrating from FM25L04 to FM25L04B." Updated abstract. Added " Ordering Part Numbers " section. Added title for Table 3 . Added " Related Documents " section.

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