

AN322

Migrating from Grade 1 version of FM25L04 to Grade 1 version of FM25L04B

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Associated Project: No

Associated Part Family: FM25L04-GA, FM25L04B-GA

Software Version: None

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

AN322 discusses the key differences that need to be considered when migrating from Grade 1 version of FM25L04 to Grade 1 version of FM25L04B. FM25L04 is now obsolete and this application note explains how FM25L04B is a replacement for FM25L04.

Introduction

FM25L04B-GA, a 4-Kbit SPI Grade 1 F-RAM™, is a replacement device for FM25L04-GA, which is now obsolete. The two devices are identical in terms of package, pinout, DC / AC parameters, and read / write functionality. This application note discusses the key differences between the two devices that need to be considered when migrating from FM25L04-GA to FM25L04B-GA.

Drop-In Replacement or Not?

From a software point of view, the two devices are identical. Both devices are read/write compatible and use the same one-byte address. From a hardware point of view, the key differences between the two devices are the higher standby current and lower operating current of FM25L04B-GA.

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

Table 1. Compatibility Chart

FM25L04-GA Feature or Spec	Is FM25L04B-GA compatible?
Package	Yes
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 FM25L04B-GA ordering part numbers that correspond to the now obsolete FM25L04-GA ordering part numbers.

Table 2. Recommended Ordering Part Numbers for Migration

FM25L04-GA		FM25L04B-GA		Comments
Ordering Part Number	Status	Ordering Part Number	Status	
FM25L04-GA	Obsolete	FM25L04B-GA	In production	No hardware or software change is required
FM25L04-GATR		FM25L04B-GATR		

Comparison of FM25L04 and FM25L04B

Table 3 gives a detailed comparison of the two devices.

Table 3. Detailed Comparison

	FM25L04-GA	FM25L04B-GA	Comments
Package Types	-GA	-GA	Identical "green" SOIC package
Package Outlines	SOIC-8	SOIC-8	Identical outline and board footprint
Pinout	-	-	Identical
Temperature Range	-40 °C to +125 °C	-40 °C to +125 °C	Identical
Operating Voltage Range	3.0 V to 3.6 V	3.0 V to 3.6 V	Identical
Active Supply Current	250 µA @ 1 MHz 2.2 mA @ 10 MHz	200 µA @ 1 MHz 2.0 mA @ 10 MHz	FM25L04B-GA offers lower active current
Standby Current	1 µA (+85 °C) 15 µA (+125 °C)	6 µA (+85 °C) 20 µA (+125 °C)	FM25L04B-GA has higher standby current
Read / Write Function	-	-	Identical one-byte addressing, Identical op-codes
Clock Frequency	10 MHz	10 MHz	Identical
AC Timing Parameters	-	-	All specification limits are the Identical
Data Retention	9000 hours (+125 °C) after 17 years (+55 °C)	11000 hours (+125 °C) 11 years (+105 °C) 121 years (+85 °C)	FM25L04B-GA offers better data retention
Endurance (Write/Read Cycles)	Unlimited	1E+13	FM25L04B-GA's endurance is large enough to be considered as unlimited for all practical applications. For a 64-byte loop, at 10 MHz, FM25L04B-GA's endurance is 17 years.
V_{DD} Power-Up Ramp Rate (t_{VR})	50 µs / V	30 µs / V	Improved power-up ramp rate in FM25L04B-GA
V_{DD} Power-Down Ramp Rate (t_{VF})	100 µs / V	20 µs / V	Improved power-down ramp rate in FM25L04B-GA
Power-Up to First Access (t_{PU})	-	1 ms	After power-up, the first access of FM25L04B-GA should be after 1 ms

Critical Considerations

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

Power-Up to First Access

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

Summary

AN322 discussed the differences between the Grade 1 versions of FM25L04 and FM25L04B that need to be considered during migration to the FM25L04B.



Related Documents

Datasheet

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

Application Note

[AN304 – SPI GUIDE FOR F-RAM](#)

Document History

Document Title: Migrating from Grade 1 version of FM25L04 to Grade 1 version of FM25L04B - AN322

Document Number: 001-86845

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	3944550	GVCH	03/26/2013	New Spec.
*A	4279208	MEDU	03/05/2014	Updated to Cypress Template. Updated data retention for FM25L04B-GA. Updated "V _{DD} Power-Down Ramp Rate" for FM25L04B-GA from 100 µs / V to 20 µs / V. Updated "Power-Up to First Access" for FM25L04B-GA from 10 ms to 1 ms.
*B	4498656	GVCH	09/23/2014	Changed title from "Differences between Grade 1 versions of FM25L04 and FM25L04B" to "Migrating from Grade 1 version of FM25L04 to Grade 1 version of FM25L04B." Updated abstract. Added " Ordering Part Numbers " section. Added title for Table 3 . Added " Related Documents " section.



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