

## AN326

### Migrating from Grade 1 version of FM25CL64 to Grade 1 version of FM25CL64B

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**Associated Project:** No

**Associated Part Family:** FM25CL64-GA, FM25CL64B-GA

**Software Version:** None

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

AN326 discusses the key differences that need to be considered when migrating from Grade 1 version of FM25CL64 to Grade 1 version of FM25CL64B. FM25CL64 is now obsolete and this application note explains how FM25CL64B is a replacement for FM25CL64.

## Introduction

FM25CL64B-GA, a 64-Kbit SPI Grade 1 F-RAM™, is a replacement device for FM25CL64-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 FM25CL64-GA to FM25CL64B-GA.

## Drop-In Replacement or Not?

From a software point of view, the two devices are identical. Both the devices are read/write compatible and use the same two-byte address. From a hardware point of view, the key difference between the two devices is the FM25CL64B-GA's lower operating current and higher standby current. Additionally, FM25CL64B-GA datasheet adds a power-up ramp rate, power-down ramp rate and first-access time specification.

[Table 1](#) shows the compatibility chart of FM25CL64-GA and FM25CL64B-GA. For a detailed comparison, see [Table 3](#).

Table 1. Compatibility Chart

FM25CL64-GA Feature or Spec	Is FM25CL64B-GA compatible
Package	Yes
Pinout	Yes
Temperature Range	Yes
Operating Voltage	Yes
Operating Current	Yes
Standby Current	No
R/W Function	Yes
Timing/Freq	Yes
Data Retention	Yes
Endurance	Yes

## Ordering Part Numbers

[Table 2](#) gives the recommended FM25CL64B-GA ordering part numbers that correspond to the now obsolete FM25CL64-GA ordering part numbers.

Table 2. Recommended Ordering Part Numbers for Migration

FM25CL64-GA		FM25CL64B-GA		Comments
Ordering Part Number	Status	Ordering Part Number	Status	
FM25CL64-GA	Obsolete	FM25CL64B-GA	In production	No hardware or software change is required
FM25CL64-GATR		FM25CL64B-GATR		

## Comparison of FM25CL64 and FM25CL64B

Table 3 gives a detailed comparison of the two devices.

Table 3. Detailed Comparison

	FM25CL64-GA	FM25CL64B-GA	Comments
<b>Package Types</b>	-GA	-GA	Identical "green" SOIC package
<b>Package Outlines</b>	SOIC-8	SOIC-8	Identical outline and board footprint
<b>Pinout</b>	-	-	Identical
<b>Temperature Range</b>	-40 °C to +125 °C	-40 °C to +125 °C	Identical
<b>Operating Voltage Range</b>	3.0 V to 3.6 V	3.0 V to 3.6 V	Identical
<b>Active Supply Current</b>	450 $\mu$ A @ 1 MHz 7.0 mA @ 16 MHz	300 $\mu$ A @ 1 MHz 3.0 mA @ 16 MHz	FM25CL64B-GA offers lower active current.
<b>Standby Current</b>	1 $\mu$ A (+85 °C) 15 $\mu$ A (+125 °C)	6 $\mu$ A (+85 °C) 20 $\mu$ A (+125 °C)	FM25CL64B-GA has higher standby current
<b>Read / Write Function</b>	-	-	Identical 2-byte addressing, Identical op-codes
<b>Clock Frequency</b>	16 MHz	16 MHz	Identical
<b>AC Timing Parameters</b>	-	-	All specification limits are the Identical
<b>Data Retention</b>	9000 hrs (+125 °C) after 17 yrs (+55 °C)	11000 hrs (+125 °C) 11 yrs (+105 °C) 121 yrs (+85 °C)	FM25CL64B-GA offers better data retention
<b>Endurance (Write/Read Cycles)</b>	Unlimited	1E+13	FM25CL64B-GA's endurance is large enough to be considered as unlimited for all practical applications. For a 64-byte loop, at 10 MHz, FM25CL64B-GA's endurance is 17 years.
<b>V<sub>DD</sub> Power-Up Ramp Rate (t<sub>VR</sub>)</b>	-	30 $\mu$ s / V	Power-up ramp rate should be slower than 30 $\mu$ s / V for FM25CL64B-GA
<b>V<sub>DD</sub> Power-Down Ramp Rate (t<sub>VF</sub>)</b>	-	20 $\mu$ s / V	Power-down ramp rate should be slower than 20 $\mu$ s / V for FM25CL64B-GA
<b>Power-Up to First Access (t<sub>PU</sub>)</b>	-	1 ms	After power-up, the first access of FM25CL64B-GA should be after 1 ms

## Critical Considerations

You should consider all the parameter differences mentioned in Table 3 during the migration to FM25CL64B-GA. This section discusses the critical differences. System designers should also review the [datasheet](#) when migrating to the new part.

### V<sub>DD</sub> Ramp Rate

V<sub>DD</sub> power-up and power-down ramp rate specifications are added in FM25CL64B-GA device. Ensure that the power-up ramp rate is slower than 30  $\mu$ s / V and power-down ramp rate is slower than 20  $\mu$ s / V in your system.

### Power-Up to First Access

Power-up to first access specification is added in FM25CL64B-GA device. Ensure that the FM25CL64B-GA device is accessed only after 1 ms from power-up.

## Summary

AN326 discussed the differences between the Grade 1 versions of FM25CL64 and FM25CL64B that need to be considered during migration to the FM25CL64B.



## Related Documents

### Datasheet

[FM25CL64B: 64-Kbit \(8 K × 8\) Serial \(SPI\) Automotive F-RAM datasheet](#)

### Application Note

[AN304 – SPI GUIDE FOR F-RAM](#)

## Document History

Document Title: Migrating from Grade 1 version of FM25CL64 to Grade 1 version of FM25CL64B - AN326

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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 FM25640B-GA. Updated "V <sub>DD</sub> Power-Down Ramp Rate" for FM25CL64B-GA from 100 µs / V to 20 µs / V. Updated "Power-Up to First Access" for FM25CL64B-GA from 10 ms to 1 ms.
*B	4498656	GVCH	09/23/2014	Changed title from "Differences between Grade 1 versions of FM25CL64 and FM25CL64B" to "Migrating from Grade 1 version of FM25CL64 to Grade 1 version of FM25CL64B." 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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