

AN315

Migrating from FM25C160 to FM25C160B

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Associated Project: No

Associated Part Family: FM25C160, FM25C160B

Software Version: None

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

AN315 discusses the key differences that need to be considered when migrating from FM25C160 to FM25C160B. FM25C160 is now obsolete and this application note explains how FM25C160B is a replacement for FM25C160.

Introduction

FM25C160B, a 16-Kbit SPI F-RAM™, is a replacement device for FM25C160, which is now obsolete. The two devices are identical in terms of pinouts and read/write functionality. In terms of speed, both operate up to 20 MHz and have the same timing specifications. This application note discusses the key differences between the two devices that need to be considered when migrating from FM25C160 to FM25C160B.

Drop-In Replacement or Not?

For most designs, FM25C160B is a drop-in replacement for FM25C160. From a software point of view, the two devices are identical. From a hardware point of view the key difference is the lower active current in FM25C160B. Additionally, FM25C160B datasheet adds a power-up and power-down ramp rate specification of 30 $\mu\text{s} / \text{V}$ and a power-up to first-access specification of 1 ms.

[Table 1](#) shows the compatibility chart of FM25C160 and FM25C160B. For a detailed comparison, see [Table 3](#).

Table 1. Compatibility Chart

FM25C160 Feature or Spec	Is FM25C160B 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	Refer to Table 3
Endurance	Yes

Ordering Part Numbers

[Table 2](#) gives the recommended FM25C160B ordering part numbers that correspond to the now obsolete FM25C160 ordering part numbers.

Table 2. Recommended Ordering Part Numbers for Migration

FM25C160		FM25C160B		Comments
Ordering Part Number	Status	Ordering Part Number	Status	
FM25C160-G	Obsolete	FM25C160B-G	In production	No hardware or software change is required
FM25C160-GTR		FM25C160B-GTR		

Comparison of FM25C160 and FM25C160B

Table 3 gives a detailed comparison of the two devices.

Table 3. Detailed Comparison

	FM25C160	FM25C160B	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	4.5 V to 5.5 V	4.5 V to 5.5 V	Identical
Active Supply Current	400 μ A @ 1 MHz 8.0 mA @ 20 MHz	250 μ A @ 1 MHz 4.0 mA @ 20 MHz	FM25C160B offers lower active current
Standby Current	10 μ A	10 μ A	Identical
Read / Write Function	-	-	Identical 2-byte addressing, Identical op-codes
Clock Frequency	20 MHz	20 MHz	Identical
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)	1E+12	1E+14	FM25C160B has better endurance
V _{DD} Power-Up Ramp Rate (t _{VR})	-	30 μ s / V	Power-up ramp rate should be slower than 30 μ s / V for FM25C160B
V _{DD} Power-Down Ramp Rate (t _{VF})	-	30 μ s / V	Power-down ramp rate should be slower than 30 μ s / V for FM25C160B
Power-Up to First Access (t _{PU})	-	1 ms	After power-up, the first access of FM25C160B should be after 1 ms

Critical Considerations

You should consider all the parameter differences mentioned in Table 3 during the migration to FM25C160B. This section discusses the critical differences. System designers should also review the [datasheet](#) when migrating to the new part.

V_{DD} Ramp Rate

V_{DD} power-up and power-down ramp rate specifications are added in FM25C160B device. Ensure that the power-up and power-down ramp rates are slower than 30 μ s / V in your system.

Power-Up to First Access

Power-up to first access specification is added in FM25C160B device. Ensure that the FM25C160B device is accessed only after 1 ms from power-up.

Summary

AN315 discussed the differences between FM25C160 and FM25C160B that need to be considered during migration to the FM25C160B.

Related Documents

Datasheet

[FM25C160B: 16-Kbit \(2 K × 8\) Serial \(SPI\) F-RAM datasheet](#)

Application Note

[AN304 – SPI GUIDE FOR F-RAM](#)

Document History

Document Title: Migrating from FM25C160 to FM25C160B - AN315

Document Number: 001-86837

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	3944550	GVCH	03/26/2013	New Spec.
*A	4278908	MEDU	03/05/2014	Updated to Cypress Template. Updated Endurance for FM25C160B from E+12 to E+14. Updated "V _{DD} Power-Down Ramp Rate" for FM25C160B from 100 μs / V to 30 μs / V. Updated "Power-Up to First Access" for FM25C160B from 10 ms to 1 ms.
*B	4498652	GVCH	09/19/2014	Changed title from "Differences between FM25C160 and FM25C160B" to "Migrating from FM25C160 to FM25160B." Updated abstract. Added " Ordering Part Numbers " section. Added title for Table 3 . Added " Related Documents " section.

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