

Migrating from FM25H20 to FM25V20A

Author: Girija V Chougala

Associated Part Family: FM25H20, FM25V20A

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

AN92577 compares the key features of the FM25H20 and FM25V20A devices. FM25H20 is now obsolete. This application note explains how FM25V20A is a replacement for FM25H20.

1 Introduction

The FM25V20A, a 2-Mb Serial (SPI) F-RAM™, is a replacement device for FM25H20, which is now obsolete. For most designs, the FM25V20A device can be considered a superset of the FM25H20. The two devices are identical in terms of pinout, package composition and dimensions, and read/write functionality. This application note compares the key features of the two devices and shows how FM25V20A is a replacement for FM25H20.

2 Device Compatibility

From a software point of view, the two devices are identical. From a hardware point of view, they are identical for the SOIC package, but the DFN package requires a change in the PCB assembly process. In both the FM25H20 and FM25V20A, the EXPOSED PAD of the DFN package is not connected to the die and must be left floating (in other words, no connect in the schematic design). Also, in FM25V20A, the EXPOSED PAD must not be soldered on the PCB. FM25H20 does not share this restriction. Refer to [Critical Considerations](#) for more details on the DFN package assembly requirement.

The FM25V20A provides a lower active current and standby current and adds features such as operation down to 2.0 V and Device ID.

[Table 1](#) shows a compatibility chart for FM25H20 and FM25V20A. For a detailed comparison, see [Table 3](#).

Table 1. Compatibility Chart

FM25H20 Feature or Spec	Is FM25V20A compatible?
Package	Yes
Pinout	Yes
Package Footprint	Yes*
Temperature Range	Yes
Operating Voltage	Yes
Operating Current	Yes
Standby Current	Yes
Read/Write Function	Yes
Timing/Frequency	Yes
Data Retention	Yes
Endurance	Yes

* Packages are footprint compatible but DFN package requires change in the PCB assembly process. Refer to [Critical Considerations](#) for more details.

3 Ordering Part Numbers

Table 2 gives the recommended FM25V20A ordering part numbers that correspond to the FM25H20 ordering part numbers.

Table 2. Recommended Ordering Part Numbers for Migration

FM25H20		FM25V20A		Comments
Ordering Part Number	Status	Ordering Part Number	Status	
FM25H20-G	Obsolete	FM25V20A-G	Production	Hardware change not required. System firmware update is required if you wish to use the additional Device ID feature supported in FM25V20A.
FM25H20-GTR		FM25V20A-GTR		
FM25H20-DG		FM25V20A-DG		Hardware change is required in the PCB assembly process. System firmware update is required if you wish to use the additional Device ID feature supported in FM25V20A.
FM25H20-DGTR		FM25V20A-DGTR		

4 Detailed Comparison of FM25H20 and FM25V20A

Table 3 gives a detailed comparison of the two devices.

Table 3. Detailed Comparison

Features or Specs	FM25H20	FM25V20A	Comments
Package Types	-G, -DG	-G, -DG	Identical "Green" (RoHS) packages
Pinout/Package Outlines	SOIC-8, DFN-8	SOIC-8, DFN-8	Identical DFN and wide SOIC (208 mils) packages
Package Footprint	SOIC-8	SOIC-8	Identical
	DFN-8	DFN-8	The EXPOSED PAD in FM25V20A must not be soldered on the PCB. Refer to DFN Package Assembly Requirement for more details.
Temperature Range	-40 °C to +85 °C	-40 °C to +85 °C	Identical
Operating Voltage Range	2.7 V to 3.6 V	2.0 V to 3.6 V	FM25V20A has a low-voltage operation.
Active Supply Current	1.0 mA @ 1 MHz 10.0 mA @ 40 MHz	300 µA @ 1 MHz 3.0 mA @ 40 MHz	FM25V20A offers lower active current.
Standby Current	270 µA @ 85 °C	250 µA @ 85 °C	FM25V20A has lower standby current.
Sleep Mode Current	8 µA	8 µA	Identical
Output LOW Voltage (V _{OL})	0.4 V @ I _{OL} = 1.6 mA	0.4 V @ I _{OL} = 2 mA	FM25V20 has better output LOW specification.
Read/Write Function	-	-	Identical 2-byte addressing, identical opcodes
Clock Frequency	40 MHz	40 MHz	Identical
Data Retention	10 years (+85 °C) 38 years (+75 °C) 151 years (+65 °C)	10 years (+85 °C) 38 years (+75 °C) 151 years (+65 °C)	Identical
Endurance (Write/Read Cycles)	1E+14	1E+14	Identical
V _{DD} Power-Up Ramp Rate (t _{VR})	50 µs/V	50 µs/V	Identical
V _{DD} Power-Down Ramp Rate (t _{VF})	100 µs/V	100 µs/V	Identical
Power Up to First Access (t _{PU})	1 ms	1 ms	Identical
Device ID Feature	-	Yes	Additional feature in FM25V20A

6 Summary

This application note compared the key features of the FM25H20 and FM25V20A in detail and explained how FM25V20A is a replacement for FM25H20.

7 Related Documents

7.1 Datasheets

- [FM25H20: 2-Mbit \(256 K × 8\) Serial \(SPI\) F-RAM datasheet](#)
- [FM25V20A: 2-Mbit \(256 K × 8\) Serial \(SPI\) F-RAM datasheet](#)

7.2 Application Note

- [AN304 – SPI Guide for F-RAM](#)

Document History

Document Title: AN92577 - Migrating from FM25H20 to FM25V20A

Document Number: 001-92577

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	4481550	GVCH	08/22/2014	New Application Note
*A	4812765	GVCH	06/26/2015	FM25H20 part status changed from "Not Recommended For New Designs" to "Obsolete". FM25V20A part status changed from "Sample" to "In-Production". Updated Device Compatibility . Updated Table 1 through Table 3 for DFN package compatibility. Added Critical Considerations .
*B	5836765	HARA	08/16/2017	Updated logo and copyright.

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198 Champion Court
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