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**Spec No:** 001-86833

**Spec Title:** DIFFERENCES BETWEEN FM25H20 AND  
FM25V20 - AN310

**Sunset Owner:** Girija Chougala (GVCH)

**Replaced by:** NONE

## AN310

### Differences between FM25H20 and FM25V20

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**Associated Project: No**

**Associated Part Family: FM25H20, FM25V20**

**Software Version: None**

**Related Application Notes: None**

AN310 discusses the key differences which need to be considered when migrating from FM25H20 to FM25V20.

### Description

The FM25V20, a 2-Mbit Serial SPI F-RAM, is a replacement device for FM25H20; FM25H20 is an old part which is not recommended for new designs. For most designs, the FM25V20 device can be considered as a superset of the FM25H20. The two devices are identical in terms of pinout, package dimensions and composition, and read/write functionality. This application note discusses the key differences between the two devices which need to be considered when migrating from FM25H20 to FM25V20.

### Drop-In Replacement or Not?

From a software point of view, the two devices are identical. From a hardware point of view, the key differences between the two devices are lower active and standby currents in FM25V20. The FM25V20 also adds features like operation down to 2.0 V and Device ID.

A compatibility chart for the two devices is given in [Table 1](#). A detailed comparison is shown in [Table 2](#).

Table 1. Compatibility Chart

FM25H20 Feature or Spec	Is FM25V20 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	Yes
Endurance	Yes

Table 2. Detailed Comparison Table

	FM25H20	FM25V20	Comments
<b>Package Types</b>	-G, -DG	-G, -DG	Same "Green" packages
<b>Pinout</b>	SOIC-8, TDFN-8	SOIC-8, TDFN-8	Same TDFN and wide SOIC (208 Mils) packages
<b>Temperature Range</b>	-40 °C to +85 °C	-40 °C to +85 °C	Same
<b>Operating Voltage Range</b>	2.7 V to 3.6 V	2.0 V to 3.6 V	FM25V20 allows operation down to 2.0 V
<b>Active Supply Current</b>	1.0 mA @ 1 MHz 10.0 mA @ 40 MHz	300 µA @ 1 MHz 3.0 mA @ 40 MHz	FM25V20 offers lower active current even at low frequency
<b>Standby Current</b>	270 µA @ 85 °C	250 µA @ 85 °C	FM25V20 has a slightly lower standby current
<b>Sleep Mode Current</b>	8 µA	8 µA	Same. During wake-up from sleep mode, the device has a recovery time of 450 µs.

	FM25H20	FM25V20	Comments
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	-	-	Same 2-byte addressing, same op-codes
Clock Frequency	40 MHz	40 MHz	Same
Data Retention	10 years (+85 °C)	10 years (+85 °C)	Same
Endurance	1E+14	1E+14	Same
$V_{DD}$ Power-Up Ramp Rate ( $t_{VR}$ )	50 $\mu$ s / V	50 $\mu$ s / V	Same
$V_{DD}$ Power-Down Ramp Rate ( $t_{VF}$ )	100 $\mu$ s / V	100 $\mu$ s / V	Same
Power-Up to First Access ( $t_{PU}$ )	1 ms	1 ms	Same
Device ID Feature	-	Yes	

### Critical Considerations

All the parameter differences in Table 2 should be considered during the migration to FM25V20. From the table, it can be seen that FM25V20 is a superset of FM25H20. System designers are recommended to review the detailed datasheets when migrating to the new part.

### Conclusion

AN310 discusses the differences between FM25H20 and FM25V20 which need to be considered during migration.

## Document History

Document Title: Differences between FM25H20 and FM25V20 - AN310

Document Number: 001-86833

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	3944550	GVCH	03/26/2013	New Spec.
*A	4278908	MEDU	03/07/2014	Updated to Cypress Template.
*B	4817236	GVCH	06/30/2015	Obsolete document.

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