

Differences in FM25L512 and FM25V05

Applies to 512Kb SPI F-RAM Devices



DESCRIPTION

This document points out the differences the FM25L512 and FM25V05 F-RAM devices. For most designs, the FM25V05 device can be considered a superset of the FM25L512. The two devices are identical in terms of pinout, package dimensions and composition, and read/write functionality. In terms of speed, both operate up to 20MHz but the FM25V05 allows read/write operations up to 40MHz. It also adds a sleep mode feature which effectively lowers the standby/idle current to 8 μ A.

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 the FM25V05's higher standby current and the SOIC package. The FM25V05 adds many features: operates to down to 2.0V, sleep mode capability, Device ID feature, and higher speed capability. The summary table below highlights the differences.

COMPATIBILITY CHART

FM25L512 Feature or Spec	... is FM25V05 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

* PCB footprint is compatible

DETAILED COMPARISON TABLE

Differences are highlighted in yellow.

	<u>FM25L512</u>	<u>FM25V05</u>	<u>Comments</u>
Package Types	-DG	-G	DFN vs SOIC, but are footprint compatible (5x6mm DFN)
Package Outlines	TDFN-8	SOIC-8	Same outline and board footprint
Pinout	-	-	Same
Temperature Range	-40C to +85C	-40C to +85C	Same
Operating Voltage Range	2.7 to 3.6V	2.0 to 3.6V	FM25V05 allows operation down to 2V
Active Supply Current	600 μ A @ 1MHz 12.0mA @ 20MHz	300 μ A @ 1MHz 3.0mA @ 40MHz	The 25V05 offers lower active current even at low freq.
Standby Current	20 μ A	150 μ A	FM25V05 has higher I_{SB} .
Sleep Mode Current	-	8 μ A	FM25V05 offers a sleep mode which reduces the "idle" current
Read/Write Function	-	-	Same 2-byte addressing, same op-codes
Clock Freq	20 MHz	40 MHz	FM25V05 offers higher speed
Data Retention	10 yrs	10 yrs	Same
Endurance	Unlimited	1E+14	FM25V05 is unlimited at 20MHz (85 yrs for a 64-byte loop)
OTHER			
V_{DD} Rise/Fall Time	50 μ s/V, 100 μ s/V	50 μ s/V, 100 μ s/V	Same
t_{PU} Power Up Time	10 ms	0.25 ms	FM25V05 faster to first access
/HOLD pin pullup	-	Internal pullup	Most systems tie /HOLD to V _{DD} but this should be checked in your design.
Device ID Feature	-	Yes	