AN206

Migrating from FM24L256 to FM24V02

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Associated Project: No
Associated Part Family: FM24L256, FM24V02
Software Version: None
Related Documents: For a complete list, click here

AN206 discusses the key differences that need to be considered when migrating from FM24L256 to FM24V02. FM24L256 is now obsolete and this application note explains how FM24V02 is a replacement for FM24L256.

Introduction

FM24V02, a 256-Kbit I^2C F-RAM™, is a replacement device for FM24L256, which is now obsolete. The two devices are identical in terms of pinout, package composition and dimensions, read/write functionality, Write Protect operation, and address pin functionality. This application note discusses the key differences between the two devices that need to be considered when migrating from FM24L256 to FM24V02.

Drop-In Replacement or Not?

For most designs, FM24L256 is a drop-in replacement for FM24V02. From a software point of view, the two devices are identical. From a hardware point of view, FM24V02 has higher standby current. The FM24V02 adds many features like operation down to 2.0 V, sleep mode capability and Device ID feature. The FM24V02 incorporates a HS-mode that allows read/write operations up to 3.4 MHz. The sleep mode feature effectively lowers the standby/idle current to 8 µA.

Table 1 shows the compatibility chart of FM24L256 and FM24V02. For a detailed comparison, see Table 3.

Table 1. Compatibility Chart

FM24L256 Feature or Spec	Is FM24V02 compatible?
Package	Yes
Pinout	Yes
Temperature Range	Yes
Operating Voltage	Yes
Operating Current	Yes
Standby Current	No
Read / Write Function	Yes
Timing / Frequency	Yes
Data Retention	Yes
Endurance	Yes

Ordering Part Numbers

Table 2 gives the recommended FM24V02 ordering part numbers that correspond to the now obsolete FM24L256 ordering part numbers.

Table 2. Recommended Ordering Part Numbers for Migration

FM24L256		FM24V02		Comments
Ordering Part Number	Status	Ordering Part Number	Status	
FM24L256-G	Obsolete	FM24V02-G	In production	No hardware or software change is required. System software update is required if you wish to use the additional Device ID feature supported in FM24V02.
FM24L256-GTR		FM24V02-GTR		

Comparison of FM24L256 and FM24V02

Table 3 gives a detailed comparison of the two devices.

Table 3. Detailed Comparison

	FM24L256	FM24V02	Comments
Package Types	-G	-G	Identical, “green” SOIC
Package Outlines	SOIC-8	SOIC-8	Identical outline and board footprint
Pinout	-	-	Identical
Temperature Range	–40 ºC to +85 ºC	–40 ºC to +85 ºC	Identical
Operating Voltage Range	2.7 V to 3.6 V	2.0 V to 3.6 V	FM24V02 allows operation down to 2.0 V
Active Supply Current	70 µA @ 100 kHz 600 µA @ 1 MHz	175 µA @ 100 kHz 400 µA @ 1 MHz	FM24V02 offers lower active current at 1 MHz.
Standby Current	12 µA	150 µA	FM24V02 has higher standby current
Sleep Mode Current	-	8 µA	FM24V02 offers a sleep mode which can be used to reduce the standby/idle current. During wake-up from sleep mode, the device has a recovery time of 400 µs.
Output LOW Voltage (V_{OL})	0.4 V @ I_{OL} = 3 mA	0.4 V @ I_{OL} = 2 mA	FM24L256 has better output LOW specification
Read / Write Function	-	-	Identical 2-byte addressing, Identical Slave IDs, Identical device select bits
Clock Frequency	1 MHz	1 MHz	Identical
Data Retention	10 years (+85 ºC)	10 years (+85 ºC) 38 years (+75 ºC) 151 years (+65 ºC)	Identical
Endurance (Write/Read Cycles)	Unlimited	1E+14	FM24V02’s endurance is large enough to be considered as unlimited for all practical applications. For a 64-byte loop at 1 MHz, FM24V02’s endurance is 1700 years.
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})	5 ms	0.25 ms	FM24V02 is faster to first access
HS-mode Clock Frequency	-	3.4 MHz	FM24V02 supports higher clock frequency of 3.4 MHz through a new command
Device ID Feature	-	Yes	Additional feature in FM25V02

Critical Considerations

You should consider all the parameter differences mentioned in Table 3 during the migration to FM24V02. This section discusses the critical differences. System designers should also review the datasheet when migrating to the new part.

Standby Current / Sleep Mode Current

The FM24V02 has higher standby current of 150 µA compared to 12 µA of FM24L256. But FM24V02 offers an additional sleep mode feature which can be used to reduce the standby/idle current. The sleep mode current is as low as 8 µA. Note that during wake-up from sleep mode, the device needs a recovery time of 400 µs.

New Feature

This section discusses the additional Device ID feature supported in FM25V02. System designers should also review the datasheet for more details on the device ID feature.

Device ID Feature

The FM25V02 incorporates a 9-byte read only Device ID (004200h) to identify the product uniquely. The Device ID allows the host to determine the manufacturer, product density, and product revision. System firmware update is required when you wish to use this feature in FM25V02.

Summary

AN206 discussed the differences between FM24L256 and FM24V02 that need to be considered during migration to the FM24V02.

Related Documents

Datasheet

FM24V02: 256-Kbit (32 K × 8) Serial (I^2C) F-RAM datasheet

Document History

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Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	3944550	GVCH	03/26/2013	New Spec.
*A	4281483	MEDU	03/05/2014	Updated to Cypress Template. Removed V_{IH}(max) specification from Table 2.
*B	4498650	GVCH	09/10/2014	Changed title from “Differences between FM24L256 and FM24V02” to “Migrating from FM24L256 to FM24V02.” Updated abstract. Added “Ordering Part Numbers” section. Added title for Table 3. Added “New Feature” section. Added “Related Documents” section.

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