AN213

Migrating from FM24C04A to FM24C04B

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Associated Project: No
Associated Part Family: FM24C04A, FM24C04B
Software Version: None
Related Documents: For a complete list, click here

AN213 discusses the key differences that need to be considered when migrating from FM24C04A to FM24C04B. FM24C04A is now obsolete and this application note explains how FM24C04B is a replacement for FM24C04A.

Introduction

FM24C04B, a 4-Kbit I^2C F-RAM™, is a replacement device for FM24C04A, 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 FM24C04A to FM24C04B.

Drop-In Replacement or Not?

For most designs, FM24C04B is a drop-in replacement for FM24C04A. 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 FM24C04B. Additionally, FM24C04B datasheet adds a power-up and power-down ramp rate specification of 30 µs / V and a power-up to first-access specification of 1 ms.

Table 1 shows the compatibility chart of FM24C04A and FM24C04B. For a detailed comparison, see Table 3.

Table 1. Compatibility Chart

FM24C04A Feature or Spec	Is FM24C04B 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 FM24C04B ordering part numbers that correspond to the now obsolete FM24C04A ordering part numbers.

Table 2. Recommended Ordering Part Numbers for Migration

FM24C04A		FM24C04B		Comments
Ordering Part Number	Status	Ordering Part Number	Status	
FM24C04A-G	Obsolete	FM24C04B-G	In production	No hardware or software change is required
FM24C04A-GTR		FM24C04B-GTR		

Comparison of FM24C04A and FM24C04B

Table 3 gives a detailed comparison of the two devices.

Table 3. Detailed Comparison

	FM24C04A	FM24C04B	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 ºC to +85 ºC	–40 ºC to +85 ºC	Identical
Operating Voltage Range	4.5 V to 5.5 V	4.5 V to 5.5 V	Identical
Active Supply Current	150 µA @ 100 kHz 1000 µA @ 1 MHz	100 µA @ 100 kHz 400 µA @ 1 MHz	FM24C04B offers lower active current at all clock rates
Standby Current	10 µA	10 µA	Identical
Read / Write Function	-	-	Identical 1-byte addressing, Identical Slave IDs, Identical device select bits
Clock Frequency	1 MHz	1 MHz	Identical
Data Retention	45 years (+85 ºC)	10 years (+85 ºC) 38 years (+75 ºC) 151 years (+65 ºC)	Data retention is lower
Endurance (Write/Read Cycles)	1E+12	1E+14	FM24C04B has better endurance
V_{DD} Power-Up Ramp Rate (t_{VR})	-	30 µs / V	Power-up ramp rate should be slower than 30 µs / V for FM24C04B
V_{DD} Power-Down Ramp Rate (t_{VF})	-	30 µs / V	Power-down ramp rate should be slower than 30 µs / V for FM24C04B
Power-Up to First Access (t_{PU})	-	1 ms	After power-up, the first access of FM24C04B should be after 1 ms

Critical Considerations

You should consider all the parameter differences mentioned in Table 3 during the migration to FM24C04B. 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 FM24C04B device. Ensure that the power-up and power-down ramp rates are slower than 30 µs / V in your system.

Power-Up to First Access

Power-up to first access specification is added in FM24C04B device. Ensure that the FM24C04B device is accessed only after 1 ms from power-up.

Summary

AN213 discussed the differences between FM24C04A and FM24C04B that need to be considered during migration to the FM24C04B.

Related Documents

Datasheet

FM24C04B: 4-Kbit (512 × 8) Serial (I^2C) F-RAM datasheet

Document History

Document Title: Migrating from FM24C04A to FM24C04B - AN213

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Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	3944550	GVCH	03/26/2013	New Spec.
*A	4278231	MEDU	03/05/2014	Updated to Cypress Template. Added data retention spec to FM24C04B at 85 ºC. Updated "Power-up to First Access" for FM24C04B from 10 ms to 1 ms. Updated "V_{DD} Power-down Ramp Rate" for FM24C04B from 100 µs / V to 30 µs / V. Removed V_{IH}(max) spec from Table 2.
*B	4498651	GVCH	09/15/2014	Changed title from “Differences between FM24C04A and FM24C04B” to “Migrating from FM24C04A to FM24C04B.” Updated abstract. Added “Ordering Part Numbers” section. Added title for Table 3. Added “Related Documents” section.

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