

AN210

Migrating from FM24CL04 to FM24CL04B

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Associated Project: No

Associated Part Family: FM24CL04, FM24CL04B

Software Version: None

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

AN210 discusses the key differences that need to be considered when migrating from FM24CL04 to FM24CL04B. FM24CL04 is now obsolete and this application note explains how FM24CL04B is a replacement for FM24CL04.

Introduction

FM24CL04B, a 4-Kbit I²C F-RAM™, is a replacement device for FM24CL04, 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 FM24CL04 to FM24CL04B.

Drop-In Replacement or Not?

For most designs, FM24CL04B is a drop-in replacement for FM24CL04. From a software point of view, the two devices are identical. From a hardware point of view, FM24CL04B has slightly higher standby current compared to FM24CL04. Additionally, FM24CL04B 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 FM24CL04 and FM24CL04B. For a detailed comparison, see Table 3.

Table 1. Compatibility Chart

FM24CL04 Feature or Spec	Is FM24CL04B 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	Refer to Table 3
Endurance	Yes

Ordering Part Numbers

Table 2 gives the recommended FM24CL04B ordering part numbers that correspond to the now obsolete FM24CL04 ordering part numbers.

Table 2. Recommended Ordering Part Numbers for Migration

FM24CL04		FM24CL04B		Comments
Ordering Part Number	Status	Ordering Part Number	Status	
FM24CL04-G	Obsolete	FM24CL04B-G	In production	No hardware or software change is required
FM24CL04-GTR		FM24CL04B-GTR		

Comparison of FM24CL04 and FM24CL04B

Table 3 gives a detailed comparison of the two devices.

Table 3. Detailed Comparison

	FM24CL04	FM24CL04B	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 °C to +85 °C	-40 °C to +85 °C	Identical
Operating Voltage Range	2.7 V to 3.65 V	2.7 V to 3.65 V	Identical
Active Supply Current	75 μ A @ 100 kHz 300 μ A @ 1 MHz	100 μ A @ 100 kHz 300 μ A @ 1 MHz	The FM24CL04B offers same active current at 1 MHz
Standby Current	1 μ A (max)	6 μ A (max) 3 μ A (typical)	FM24CL04B has higher standby current
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 °C)	10 years (+85 °C) 38 years (+75 °C) 151 years (+65 °C)	Data retention is lower
Endurance (Write/Read Cycles)	Unlimited	1E+14	FM24CL04B's endurance is virtually unlimited for all practical purposes. At 1 MHz, for a 64-byte loop, the endurance is 1700 years.
V _{DD} Power-Up Ramp Rate (t _{VR})	-	30 μ s / V	Power-up ramp rate should be slower than 30 μ s / V for FM24CL04B
V _{DD} Power-Down Ramp Rate (t _{VF})	-	30 μ s / V	Power-down ramp rate should be slower than 30 μ s / V for FM24CL04B
Power-Up to First Access (t _{PU})	-	1 ms	After power-up, the first access of FM24CL04B should be after 1 ms

Critical Considerations

You should consider all the parameter differences mentioned in Table 3 during the migration to FM24CL04B. 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 FM24CL04B device. Ensure that the power-up and power-down ramp rates are slower than 30 μ s / V in your system.

Power-Up to First Access

Power-up to first access specification is added in FM24CL04B device. Ensure that the FM24CL04B device is accessed only after 1 ms from power-up.

Summary

AN210 discussed the differences between FM24CL04 and FM24CL04B that need to be considered during migration to the FM24CL04B.

Related Documents

Datasheet

[FM24CL04B: 4-Kbit \(512 × 8\) Serial \(I²C\) F-RAM datasheet](#)

Document History

Document Title: Migrating from FM24CL04 to FM24CL04B - AN210

Document Number: 001-86816

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	3944550	GVCH	03/26/2013	New Spec.
*A	4278231	MEDU	02/11/2014	<p>Updated to Cypress Template.</p> <p>Updated Active Supply Current for FM24CL04 from "70 μA @ 100 kHz, 400 μA @ 1 MHz" to "75 μA @ 100 kHz, 300 μA @ 1 MHz".</p> <p>Added data retention spec to FM24CL04B at 85 °C.</p> <p>Updated "Power-up to First Access" for FM24CL04B from 10 ms to 1 ms.</p> <p>Updated "V_{DD} Power-down Ramp Rate" for FM24CL04B from 100 μs / V to 30 μs / V.</p> <p>Removed $V_{IH(max)}$ spec from Table 2.</p>
*B	4498650	GVCH	09/10/2014	<p>Changed title from "Differences between FM24CL04 and FM24CL04B" to "Migrating from FM24CL04 to FM24CL04B."</p> <p>Updated abstract.</p> <p>Added "Ordering Part Numbers" section.</p> <p>Added title for Table 3.</p> <p>Added "Related Documents" section.</p>

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