

## Migrating from FM24C64 to FM24C64B

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**Associated Project: No**

**Associated Part Family: FM24C64, FM24C64B**

**Software Version: None**

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

AN215 discusses the key differences that need to be considered when migrating from FM24C64 to FM24C64B.

### Introduction

FM24C64B, a 64-Kbit I<sup>2</sup>C F-RAM™, is a replacement device for FM24C64, which is now obsolete. The two devices are identical in terms of pinout, package composition and dimensions, read/write functionality, and address pin functionality. This application note discusses the key differences between the two devices that need to be considered when migrating from FM24C64 to FM24C64B.

### Drop-In Replacement or Not?

From a software point of view, the two devices are identical except for the write protect (WP) function. Customers that used the WP pin on the FM24C64 should carefully read the [Write Protect Feature](#) section.

From a hardware point of view, the key difference between the devices is the lower active current in FM24C64B. Additionally, the FM24C64B datasheet adds a power-up and power-down ramp rate specification of 30 μs/V and a power-up to first access specification of 10 ms.

### Ordering Part Numbers

[Table 2](#) provides the recommended FM24C64B ordering part numbers that correspond to the now obsolete FM24C64 ordering part numbers.

Table 2. Recommended Ordering Part Numbers for Migration

Obsolete Ordering Part Number (FM24C64)	Recommended Ordering Part Number (FM24C64B)	Comments
FM24C64-G	FM24C64B-G	No hardware change. System firmware change is required if write protect feature is used in the current application (refer to the <a href="#">Write Protect Feature</a> section for details).
FM24C64-GTR	FM24C64B-GTR	

A compatibility chart for the two devices is given in [Table 1](#). For a detailed comparison, see [Table 3](#).

Table 1. Compatibility Chart

FM24C64 Feature or Spec	Is FM24C64B compatible?
Package	Yes
Pinout	Yes
Temperature Range	Yes
Operating Voltage	Yes
Operating Current	Yes
Standby Current	Yes
Read/Write Function	Yes
Write Protect Feature	Refer to <a href="#">Table 3</a>
Timing/Frequency	Yes
Data Retention	Refer to <a href="#">Table 3</a>
Endurance	Yes

## Comparison of FM24C64 and FM24C64B

From the hardware and software point of view, FM24C64B is a superset of FM24C64. FM24C64B has improved DC specifications compared to FM24C64. [Table 3](#) gives a detailed comparison of the two devices.

Table 3. Detailed Comparison

Parameter	FM24C64	FM24C64B	Comments
Package Type	-G	-G	Same "green" SOIC package
Package Outline	SOIC-8	SOIC-8	Same outline and board footprint
Pinout	–	–	Same
Temperature Range	–40 °C to +85 °C	–40 °C to +85 °C	Same
Operating Voltage Range	4.5 V to 5.5 V	4.5 V to 5.5 V	Same
Active Supply Current	150 $\mu$ A @ 100 kHz 1200 $\mu$ A @ 1 MHz	100 $\mu$ A @ 100 kHz 400 $\mu$ A @ 1 MHz	FM24C64B offers lower active current at all clock rates.
Standby Current	10 $\mu$ A	10 $\mu$ A	Same
Read/Write Function	–	–	Same 2-byte addressing, slave IDs, device select bits
Write Protect Feature	Upper quadrant of memory	Full memory	Different. FM24C64B protects full memory compared to the upper quadrant (upper one-fourth) of the memory in FM24C64.
Clock Frequency	1 MHz	1 MHz	Same
Data Retention	45 years (+85 °C)	10 years (+85 °C) 38 years (+75 °C) 151 years (+65 °C)	Data retention is lower.
Endurance	1E + 12	1E + 14	FM24C64B has better endurance.
V <sub>DD</sub> Power-Up Ramp Rate (t <sub>VR</sub> )	–	30 $\mu$ s/V	Power-up ramp rate should be slower than 30 $\mu$ s/V for FM24C64B.
V <sub>DD</sub> Power-Down Ramp Rate (t <sub>VF</sub> )	–	30 $\mu$ s/V	Power-down ramp rate should be slower than 30 $\mu$ s/V for FM24C64B.
Power-Up to First Access (t <sub>PU</sub> )	–	10 ms	After power-up, the first access of FM24C64B should be after 10 ms.

## Critical Considerations

You should consider all the parameter differences mentioned in [Table 3](#) during the migration to FM24C64B. This section discusses the critical differences. System designers should also review the [datasheet](#) when migrating to the new part.

### Write Protect Feature

When the WP (Write Protect) input pin is held HIGH (WP = 1), the FM24C64B protects the full memory, whereas the FM24C64 protects only the upper quadrant (one-fourth of memory: address 1800h to 1FFFh). If the write protect function was used on the FM24C64 such that writes to the unprotected address quadrants were made while WP = 1, then you will need to make system firmware changes to accommodate this change.

### V<sub>DD</sub> Ramp Rate

V<sub>DD</sub> power-up and power-down ramp rate specifications are added in the FM24C64B device. Ensure that the power-up and power-down ramp rates are slower than 30  $\mu$ s/V in your system.

## Power-Up to First Access

The power-up to first access specification is added in the FM24C64B device. Ensure that the FM24C64B device is accessed only after 10 ms from power-up.

## Summary

AN215 discussed the differences between FM24C64 and FM24C64B that need to be considered during migration to the FM24C64B device.

## Related Documents

### Datasheet

- [FM24C64B: 64-Kbit \(8 K × 8\) Serial \(I<sup>2</sup>C\) F-RAM datasheet](#)

### Application Note

- [AN304 – SPI GUIDE FOR F-RAM](#)

## Document History

Document Title: Migrating from FM24C64 to FM24C64B - AN215

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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 FM24C64 from "1000 <math>\mu</math>A @ 1 MHz" to "1200 <math>\mu</math>A @ 1 MHz."</p> <p>Added data retention specification to FM24C64B at 85 °C.</p> <p>Updated endurance for FM24C64B from 1E+12 to 1E+14.</p> <p>Updated "V<sub>DD</sub> Power-Down Ramp Rate" for FM24C64B from 100 <math>\mu</math>s / V to 30 <math>\mu</math>s / V.</p> <p>Removed V<sub>IH</sub> (max) specification from Table 2.</p>
*B	4462206	GVCH	07/31/2014	<p>Changed title from "Differences between FM24C64 and FM24C64B" to "Migrating from FM24C64 to FM24C64B."</p> <p>Added "<a href="#">Write Protect Feature</a>" details.</p> <p>Added "<a href="#">Ordering Part Numbers</a>" section.</p> <p>Added title and description for <a href="#">Table 3</a>.</p> <p>Added "<a href="#">Related Documents</a>" section.</p>

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