Migrating from FM24CL32 to FM24CL64B

About this document

Scope and purpose

AN217 discusses the key differences that need to be considered when migrating from FM24CL32 to FM24CL64B. FM24CL32 is now obsolete and this application note explains how FM24CL64B is a replacement for FM24CL32.

Associated part family

FM24CL32, FM24CL64B

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1 Introduction

FM24CL64B, a 64-Kbit I^2C F-RAM, is a replacement device for the FM24CL32, a 32-Kbit I^2C F-RAM, which is now obsolete. The two devices are identical in terms of pinout, package composition and dimensions, Write Protection operation, and address pin functionality. This application note discusses the key differences between the two devices that need to be considered when migrating from FM24CL32 to FM24CL64B.

2 Backward compatible

For all designs, FM24C16B is a drop-in replacement for FM24C16A. 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 FM24C16B. Additionally, FM24C16B 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.

From a software point of view, the two devices are compatible. Aside from the additional address bit to access twice the memory, the two devices are read / write compatible. Both devices use the same two-byte address. Remember that the 64-Kbit device address wraps at 0x1FFF while the 32-Kbit wraps at 0x0FFF. For systems that use a single FM24CL32 device, the transition to the FM24CL64B could be as straightforward as changing your firmware to hold the address bit A12 LOW during SRAM read/writes. For systems that use two FM24CL32s, firmware needs to be modified to use the address bit A12 to access the full 64-Kbit memory. A memory write sequence for the FM24CL64B device is shown in Figure 1.

For all applications, the FM24CL64B device can be considered a superset of the FM24CL32. The FM24CL64B datasheet adds improved power-up and power-down ramp rate specifications of 30 µs / V and a power-up to first access specification of 1 ms.

Table 1 shows the compatibility chart of FM24CL32 and FM24CL64B. For a detailed comparison, see Table 3.

Table 1 Compatibility chart

FM24CL32 feature or spec	Is FM24CL64B 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

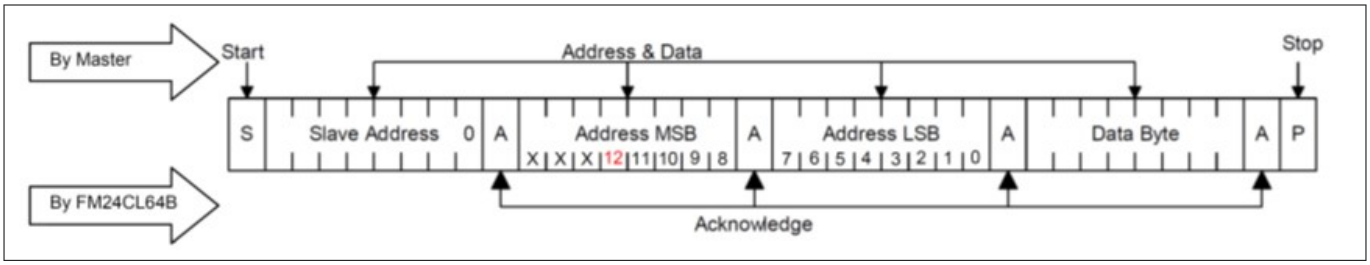


Figure 1 FM24CL64B write sequence

3 Ordering part numbers

Table 2 gives the recommended FM24CL64B ordering part numbers that correspond to the now obsolete FM24CL32 ordering part numbers.

Table 2 Recommended ordering part numbers for migration

FM24CL32		FM24CL64B		Comments
Ordering part number	**Status**	**Ordering part number**	**Status**	
FM24CL32-G	Obsolete	FM24CL64B-G	In production	No hardware change is required. Software change is required (refer to the Backward compatible section for details).
FM24CL32-GTR		FM24CL64B-GTR		

4 Comparison of FM24CL32 and FM24CL64B

Table 3 gives a detailed comparison of the two devices.

Table 3 Detailed comparison

	FM24CL32	FM24CL64B	Comments
Package types	-G	-G, -DG	Identical “green” SOIC package. FM24CL64B is also offered in “green” TDFN package.
Package outlines	SOIC-8	SOIC-8, TDFN-8	Identical outline and board footprint for SOIC. FM24CL64B is also offered in TDFN package.
Pinout	-	-	Identical
Temperature range	–40°C to +85°C	–40°C to +85°C	Identical
Operating voltage range	2.7 V to 3.6 V	2.7 V to 3.65 V	Compatible
Active supply current	70 µA @ 100 kHz 250 µA @ 400 kHz 600 µA @ 1 MHz	100 µA @ 100 kHz 170 µA @ 400 kHz 300 µA @ 1 MHz	FM24CL64B offers lower active current at frequencies of 400 kHz and above
Standby current	12 µA	6 µA	FM24CL64B has lower standby current
Read / Write function	-	-	Identical 2-byte addressing, Identical Slave IDs, Identical device select bits, A12 must be low
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	FM24CL64B’s endurance is large enough to be considered as unlimited for all practical applications. For a 64-byte loop, at 1 MHz, FM24CL64B’s endurance is 1700 years.
V_{DD} Power-Up Ramp Rate (t_{VR})	50 µs / V	30 µs / V	Improved specification in FM24CL64B
V_{DD} Power-Down Ramp Rate (t_{VF})	100 µs / V	30 µs / V	Improved specification in FM24CL64B
Power-up to first access (t_{PU})	5 ms	1 ms	Faster power-up to first access in FM24CL64B

5 Critical considerations

You should consider all the parameter differences mentioned in Table 3 during the migration to FM24CL64B. This section discusses the critical differences. System designers should also review the datasheet when migrating to the new part.

6 Read / Write function

The FM24CL64B device has an extra address bit, A12, to support the additional 32-Kbit memory when compared to the FM24CL32. Setting A12 to a 0 level will address the 32-Kbits of your current FM24CL32 application. Setting A12 to a 1 level will address the additional 32-Kbits of the FM24CL64B. Note that roll over will not happen at 0x0FFF in FM24CL64B; instead it will roll over at 0x1FFF.

7 Summary

AN217 discussed the differences between FM24CL64B and FM24CL32 that need to be considered during migration to the FM24CL64B.

Related documents

Datasheet

FM24CL64B: 64-Kbit (8 K × 8) Serial (I^2C) F-RAM datasheet

Revision history

Document version	Date of release	Description of changes
**	2013-03-26	New spec.
*A	2014-03-07	• Updated to Cypress Template. • Updated Active Supply Current for FM24CL64B from “70 µA @ 100 kHz, 400 µA @ 1 MHz” to “75 µA @ 100 kHz, 450 µA @ 1 MHz”. • Added data retention spec to FM24CL64B at 85 °C. Updated "Power-up to First Access" for FM24CL64B from 10 ms to 1 ms. • Updated "V_{DD} Power-down Ramp Rate" for FM24CL64B from 100 µs / V to 30 µs / V. • Removed V_{IH}(max) spec from Table 2.
*B	2014-09-15	• Changed title from “Differences between FM24CL32 and FM24CL64B” to “Migrating from FM24CL32 to FM24CL64B.” • Updated abstract. Added “Ordering Part Numbers” section. • Added title for Table 3. • Added “Related Documents” section.
*C	2026-07-16	Template update; no content update

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