

## Migrating from FM25V02/FM25V01 to CY15B256Q/CY15B128Q Automotive F-RAM™

Author: Girija Chougala

Associated Part Family: FM25V02, FM25V01, CY15B256Q, CY15B128Q

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

AN98047 discusses the key differences that need to be considered when migrating from FM25V02/FM25V01 to CY15B256Q/CY15B128Q Automotive F-RAM. FM25V02/FM25V01 is now “Not Recommended for New Designs”; this application note explains how CY15B256Q/CY15B128Q is a replacement for FM25V02/FM25V01.

### 1 Introduction

CY15B256Q/CY15B128Q, a 256-Kbit/128-Kbit Automotive SPI F-RAM™, is a replacement device for FM25V02/FM25V01, which is now “Not Recommended for New Designs”. The two devices are identical in terms of pinout, package composition and dimensions, and read/write functionality. This application note discusses the key differences between the two devices that need to be considered when migrating from FM25V02/FM25V01 to CY15B256Q/CY15B128Q.

### 2 Device Compatibility

From a hardware point of view, the two devices are identical. From a software point of view, the two devices are identical except for the Device ID. Refer to the [Critical Considerations](#) section for more details.

[Table 1](#) shows the compatibility chart of FM25V02/FM25V01 and CY15B256Q/CY15B128Q. For a detailed comparison, see [Table 3](#).

Table 1. Compatibility Chart

FM25V02/FM25V01 Feature or Spec	Is CY15B256Q/CY15B128Q 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	Yes
Endurance	Yes

### 3 Ordering Part Numbers

Table 2 lists the recommended CY15B256Q/CY15B128Q ordering part numbers that correspond to the FM25V02/FM25V01 (Not Recommended for New Designs) ordering part numbers.

Table 2. Recommended Ordering Part Numbers for Migration

FM25V02/FM25V01		CY15B256Q/CY15B128Q		Comments
Ordering Part Number	Status	Ordering Part Number	Status	
FM25V02-G	Not Recommended for New Designs	CY15B256Q-SXA	In production	No hardware change but software changes are required.
FM25V02-GTR		CY15B256Q -SXAT		
FM25V01-G		CY15B128Q -SXA		
FM25V01-GTR		CY15B128Q -SXAT		

### 4 Comparison of FM25V02/FM25V01 and CY15B256Q/CY15B128Q

Table 3 provides a detailed comparison of the two devices.

Table 3. Detailed Comparison Table

	FM25V02/FM25V01	CY15B256Q/CY15B128Q	Comments
Package Types	-G	-G	Identical "green (RoHS)" packages
Pinout/Package Outlines	SOIC-8	SOIC-8	Identical pinout, outline and board footprint
Temperature Range	−40 °C to +85 °C	−40 °C to +85 °C	Identical
Operating Voltage Range	2.0 V to 3.6 V	2.0 V to 3.6 V	Identical
Active Supply Current	0.22 mA @ 1 MHz 2.5 mA @ 40 MHz	0.22 mA @ 1 MHz 2.5 mA @ 40 MHz	Identical
Standby Current	150 µA @ 85 °C	150 µA @ 85 °C	Identical
Sleep Current	8 µA @ 85 °C	8 µA @ 85 °C	Identical
Read / Write Function	—	—	Identical 2-byte addressing, Identical opcodes
Clock Frequency	40 MHz	40 MHz	Identical
Data Retention	10 years (+85 °C) 38 years (+75 °C) 151 years (+65 °C)	10 years (+85 °C) 38 years (+75 °C) 151 years (+65 °C)	Identical
Endurance (Write/Read Cycles)	1E+14	1E+14	Identical
Power-Up to First Access (t <sub>PU</sub> )	250 µs	250 µs	Identical
Device ID	7F7F7F7F7F7FC22100h (FM25V01) 7F7F7F7F7F7FC22200h (FM25V02)	7F7F7F7F7F7FC22188h (CY15B128Q) 7F7F7F7F7F7FC22288h (CY15B256Q)	Different. Refer to "Critical Considerations" for more details.
Clock HIGH time (t <sub>CH</sub> )	20 ns	18 ns	CY15B256Q/CY15B128Q has better spec
Clock LOW time (t <sub>CL</sub> )	20 ns	18 ns	CY15B256Q/CY15B128Q has better spec
Output data valid time (t <sub>ODV</sub> )	18 ns	16 ns	CY15B256Q/CY15B128Q has better spec

## 5 Critical Considerations

You should consider all the parameter differences mentioned in [Table 3](#) during the migration to CY15B256Q/CY15B128Q. This section discusses the critical differences. System designers should also review the datasheet when migrating to the new part.

### 5.1 Device ID Feature

The CY15B256Q/CY15B128Q and FM25V02/FM25V01 incorporate a 9-byte read-only Device ID to identify the product uniquely. The Device ID allows the host to determine the manufacturer, product density, and product revision. [Table 4](#) gives a Device ID of FM25V02/FM25V01 and CY15B256Q/CY15B128Q. A system software update is required to use this feature when migrating to the CY15B256Q/CY15B128Q.

Table 4. Device ID

Device ID <sup>[Note]</sup>	
FM25V01	CY15B128Q
7F7F7F7F7F7FC22100h	7F7F7F7F7F7FC22188h
FM25V02	CY15B256Q
7F7F7F7F7F7FC22200h	7F7F7F7F7F7FC22288h

**Note:** Device ID difference highlighted in red color.

## 6 Summary

AN98047 discussed the differences between FM25V02/FM25V01 and CY15B256Q/CY15B128Q that need to be considered during migration to the CY15B256Q/CY15B128Q.

## 7 Related Documents

### Datasheets

- [CY15B256Q: 256-Kbit \(32K × 8\) Automotive Serial \(SPI\) F-RAM](#)
- [CY15B128Q: 128-Kbit \(16K × 8\) Automotive Serial \(SPI\) F-RAM](#)

### Application Note

- [AN304 – SPI GUIDE FOR F-RAM](#)

## Document History

Document Title: AN98047 - Migrating from FM25V02/FM25V01 to CY15B256Q/CY15B128Q Automotive F-RAM™

Document Number: 001-98047

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	4800997	GVCH	06/17/2015	New application note
*A	5623862	GVCH	02/08/2017	Updated "Device Compatibility". Updated <a href="#">Table 3</a> : Changed "Power-Up to First Access (t <sub>PU</sub> )" parameter spec value from 1 ms to 250 μs for FM25V02A part. Critical Considerations section: Removed "Power-Up to First Access (t <sub>PU</sub> )" description (not applicable). Updated to new template.
*B	5848708	HARA	08/17/2017	Updated logo and copyright.

## Worldwide Sales and Design Support

Cypress maintains a worldwide network of offices, solution centers, manufacturer's representatives, and distributors. To find the office closest to you, visit us at [Cypress Locations](#).

## Products

ARM® Cortex® Microcontrollers	<a href="http://cypress.com/arm">cypress.com/arm</a>
Automotive	<a href="http://cypress.com/automotive">cypress.com/automotive</a>
Clocks & Buffers	<a href="http://cypress.com/clocks">cypress.com/clocks</a>
Interface	<a href="http://cypress.com/interface">cypress.com/interface</a>
Internet of Things	<a href="http://cypress.com/iot">cypress.com/iot</a>
Memory	<a href="http://cypress.com/memory">cypress.com/memory</a>
Microcontrollers	<a href="http://cypress.com/mcu">cypress.com/mcu</a>
PSoC	<a href="http://cypress.com/psoc">cypress.com/psoc</a>
Power Management ICs	<a href="http://cypress.com/pmic">cypress.com/pmic</a>
Touch Sensing	<a href="http://cypress.com/touch">cypress.com/touch</a>
USB Controllers	<a href="http://cypress.com/usb">cypress.com/usb</a>
Wireless Connectivity	<a href="http://cypress.com/wireless">cypress.com/wireless</a>

## PSoC® Solutions

[PSoC 1](#) | [PSoC 3](#) | [PSoC 4](#) | [PSoC 5LP](#) | [PSoC 6](#)

## Cypress Developer Community

[Forums](#) | [WICED IOT Forums](#) | [Projects](#) | [Videos](#) | [Blogs](#) | [Training](#) | [Components](#)

## Technical Support

[cypress.com/support](http://cypress.com/support)



Cypress Semiconductor  
198 Champion Court  
San Jose, CA 95134-1709

© Cypress Semiconductor Corporation, 2015-2017. This document is the property of Cypress Semiconductor Corporation and its subsidiaries, including Spansion LLC ("Cypress"). This document, including any software or firmware included or referenced in this document ("Software"), is owned by Cypress under the intellectual property laws and treaties of the United States and other countries worldwide. Cypress reserves all rights under such laws and treaties and does not, except as specifically stated in this paragraph, grant any license under its patents, copyrights, trademarks, or other intellectual property rights. If the Software is not accompanied by a license agreement and you do not otherwise have a written agreement with Cypress governing the use of the Software, then Cypress hereby grants you a personal, non-exclusive, nontransferable license (without the right to sublicense) (1) under its copyright rights in the Software (a) for Software provided in source code form, to modify and reproduce the Software solely for use with Cypress hardware products, only internally within your organization, and (b) to distribute the Software in binary code form externally to end users (either directly or indirectly through resellers and distributors), solely for use on Cypress hardware product units, and (2) under those claims of Cypress's patents that are infringed by the Software (as provided by Cypress, unmodified) to make, use, distribute, and import the Software solely for use with Cypress hardware products. Any other use, reproduction, modification, translation, or compilation of the Software is prohibited.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS DOCUMENT OR ANY SOFTWARE OR ACCOMPANYING HARDWARE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. To the extent permitted by applicable law, Cypress reserves the right to make changes to this document without further notice. Cypress does not assume any liability arising out of the application or use of any product or circuit described in this document. Any information provided in this document, including any sample design information or programming code, is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. Cypress products are not designed, intended, or authorized for use as critical components in systems designed or intended for the operation of weapons, weapons systems, nuclear installations, life-support devices or systems, other medical devices or systems (including resuscitation equipment and surgical implants), pollution control or hazardous substances management, or other uses where the failure of the device or system could cause personal injury, death, or property damage ("Unintended Uses"). A critical component is any component of a device or system whose failure to perform can be reasonably expected to cause the failure of the device or system, or to affect its safety or effectiveness. Cypress is not liable, in whole or in part, and you shall and hereby do release Cypress from any claim, damage, or other liability arising from or related to all Unintended Uses of Cypress products. You shall indemnify and hold Cypress harmless from and against all claims, costs, damages, and other liabilities, including claims for personal injury or death, arising from or related to any Unintended Uses of Cypress products.

Cypress, the Cypress logo, Spansion, the Spansion logo, and combinations thereof, WICED, PSoC, CapSense, EZ-USB, F-RAM, and Traveo are trademarks or registered trademarks of Cypress in the United States and other countries. For a more complete list of Cypress trademarks, visit [cypress.com](http://cypress.com). Other names and brands may be claimed as property of their respective owners.