Renesas 1-Mbit Products Overview

This document describes 1-Mbit products available from Renesas Serial Flash Memory family.

Contents

1. Renesas 1-Mbit Products Overview 1
2. Feature Comparison 2
3. Command Set (Opcode) Comparison 3
4. Device ID Comparison 5
5. Status Register Comparison 6
6. SFDP Table Comparison 7
7. Packaging Options 8
8. Revision History 9

1. Renesas 1-Mbit Products Overview

The AT25EU0011A is a low power low energy memory. It incorporates features geared towards energy savings such as page erase, low power read, low power erase and low power program. Additionally, it has very fast page, block, and full chip erase times of 8 ms typical.

The AT25EU0011A is ideal for battery powered systems, because batteries have finite energy stored in them. The fast erase times, as well as low erase and program power enables the lowest energy usage.

This document compares the differences between the 1-Mbit products in more detail.

Table 1: 1-Mbit Products Overview

Family	Part Number	Product Status	Nominal System Voltage	SPI Support
DF	AT25DF011	Mass Production	1.65V to 3.6V	Single/Dual
DN	AT25DN011	Mass Production	2.3V to 3.6V	Single/Dual
XE	AT25XE011	Mass Production	1.65V to 3.6V	Single/Dual
EU	AT25EU0011A	Mass Production	1.65V to 3.6V	Single/Dual/Quad

2. Feature Comparison

Table 2 describes major feature differences between the 1-Mbit products.

Table 2: 1-Mbit Products Feature Comparison

	AT25DF011	AT25DN011	AT25XE011	AT25EU0011A
Total Memory (Bits)	1Mbit	1Mbit	1Mbit	1Mbit
Total Memory (Bytes)	128KB	128KB	128KB	128KB
Total 64KB block #	2	2	2	2
Total 32KB block #	4	4	4	4
Total 4KB block #	32	32	32	32
Page Size (Bytes)	256	256	256	256
Total Page #	512	512	512	512
Erase Block Size	4 kB / 32 kB / 64 kB	4 kB / 32 kB / 64 kB	4 kB / 32 kB / 64 kB	4 kB / 32 kB / 64 kB
Erase Page Size	256 byte	256 byte	256 byte	256 byte
OTP Organization	2 x 64 byte	2 x 64 byte	2 x 64 byte	3 x 512 byte
UID Register Size	No	No	No	128 bit
SFDP Table	No	No	No	Yes
Active Interrupt	Yes	Yes	Yes	Yes
Single SPI (1-1-1) 03/0B	Yes	Yes	Yes	Yes
Dual Read (1-1-2) 3B	Yes	Yes	Yes	Yes
Dual I/O (1-2-2) BB	No	No	No	Yes
Quad Read (1-1-4) 6B	No	No	No	Yes
Quad I/O (1-4-4, 0-4-4) EB [XiP]	No	No	No	Yes
JEDEC Hardware Reset	No	No	No	No
Operating Voltage Range (V)	1.65 – 3.6	2.3 – 3.6	1.65 – 3.6	1.65 – 3.6
Operating Temperature (^{o}C)	-40 to 85	-40 to 85	-40 to 85	-40 to 85
Endurance (1)	100K	100K	100K	10K
Data Retention	20yr	20yr	20yr	20yr

1. Tested per JEDEC47 Non-Volatile Memory Cycling Endurance Standard

3. Command Set (Opcode) Comparison

Table 3 shows the comparisons in Command Set or Opcode for all 1-Mbit products.

Table 3: 1-Mbit Products Command Set Comparison

	AT25DF011	AT25DN011	AT25XE011	AT25EU0011A
System Commands				
Enable Reset				66h
Reset Device	F0h	F0h	F0h	99h
Deep Power-down	B9h	B9h	B9h	B9h
Release/Resume from Deep Power-down	ABh	ABh	ABh	ABh
Ultra-Deep Power-down	79h	79h	79h	
Active Status Interrupt				25h
Read Commands				
Normal Read Data	03h	03h	03h	03h
Fast Read	0Bh	0Bh	0Bh	0Bh
Dual Output Fast Read	3Bh	3Bh	3Bh	3Bh
Dual I/O Fast Read				BBh
Quad Output Fast Read				6Bh
Quad I/O Fast Read				EBh
Quad I/O Fast Read (Continuous Mode)				EBh
Set Burst with Wrap				77h
Write Commands				
Write Enable	06h	06h	06h	06h
Volatile Status Reg Write Enable				50h
Write Disable	04h	04h	04h	04h
Program Commands				
Page Program	02h	02h	02h	02h
Erase Commands				
Page Erase (256B)	81h	81h	81h	81h/DBh
Block Erase (4KB)	20h	20h	20h	20h
Block Erase (32KB)	52h	52h	52h	52h
Block Erase (64KB)	D8h	D8h	D8h	D8h
Chip Erase	C7h/60h/62h	C7h/60h/62h	C7h/60h/62h	C7h/60h
Security Commands				
Program OTP Security Register	9Bh	9Bh	9Bh	42h
Erase OTP Security Register				44h
Read OTP Security Register	77h	77h	77h	48h
Suspend/Resume Commands				
Program/Erase Suspend				75h
Program/Erase Resume				7Ah
Status Register Commands				
Read Status Register 1	05h (1)	05h (1)	05h (1)	05h
Read Status Register 2				35h
Read Status Register 3				15h
Write Status Register 1	01h	01h	01h	01h
Write Status Register 2	31h	31h	31h	31h
Write Status Register 3				11h
Device ID Information				
Resume from DPD and read ID				ABh

	AT25DF011	AT25DN011	AT25XE011	AT25EU0011A
Manuf/Device ID				90h
Manuf/Device ID Dual I/O				92h
Manuf/Device ID Quad I/O				94h
Read JEDEC ID	9Fh	9Fh	9Fh	9Fh
Read Serial Flash Discoverable Parameter				5Ah
OTP Commands				
Erase Security Registers				44h
Program Security Registers				42h
Read Security Registers/Unique ID				48h
Read Unique ID number				4Bh

1. A single 05h command will sequentially read both Status Register 1 and Status Register 2.

4. Device ID Comparison

All 2-Mbit products have a different device ID to allow identification by the host system.

Table 4: 2-Mbit Products Device ID Comparison

	AT25DF011	AT25DN011	AT25XE011	AT25EU0011A
Device ID commands				
Release Power-down / Read ID [ABh]				10h
Manufacturer and Device ID Single I/O [90h]				1Fh, 10h
Manufacturer and Device ID Dual I/O [92h]				1Fh, 10h
Manufacturer and Device ID Quad I/O [94h]				1Fh, 10h
Read JEDEC ID [9Fh]	1Fh, 42h, 00h	1Fh, 42h, 00h	1Fh, 42h, 00h	1Fh, 10h, 01h
Read SFDP [5Ah]	No	No	No	Yes

5. Status Register Comparison

Table 5: 1-Mbit Products Status Register Read/Write Command Comparison

	AT25DF011	AT25DN011	AT25XE011	AT25EU0011A
Read Status Register 1	05h	05h	05h	05h
Read Status Register 2	05h	05h	05h	35h
Read Status Register 3				15h
Write Status Register 1	01h	01h	01h	01h
Write Status Register 2	31h	31h	31h	31h
Write Status Register 3				11h

Table 6: 1-Mbit Products Status Register Bit Level Comparison

		AT25DF011	AT25DN011	AT25XE011	AT25EU0011A
Status Register 1	0	RDY/BSY	RDY/BSY	RDY/BSY	RDY/BSY
	1	WEL	WEL	WEL	WEL
	2	BP0	BP0	BP0	BP0
	3	Reserved	Reserved	Reserved	BP1
	4	WPP	WPP	WPP	BP2
	5	EPE	EPE	EPE	BP3
	6	Reserved	Reserved	Reserved	BP4
	7	BPL	BPL	BPL	SRP0
Status Register 2	0	RDY/BSY	RDY/BSY	RDY/BSY	SRP1
	1	Reserved	Reserved	Reserved	QE
	2	Reserved	Reserved	Reserved	Reserved
	3	Reserved	Reserved	Reserved	LB1
	4	RSTE	RSTE	RSTE	LB2
	5	Reserved	Reserved	Reserved	LB3
	6	Reserved	Reserved	Reserved	CMP
	7	Reserved	Reserved	Reserved	SUS
Status Register 3	0				Reserved
	1				Reserved
	2				Reserved
	3				Reserved
	4				Reserved
	5				Reserved
	6				Reserved
	7				HOLD/RST

6. SFDP Table Comparison

The AT25EU0011A contains an SFDP (Serial Flash Discoverable Parameters) table. Contact Renesas for detailed SFDP table documents.

7. Packaging Options

Table 7 provides the current packaging options available for all 1-Mbit products. Contact Renesas for questions regarding packaging options.

Table 7: 1-Mbit Products Packaging Options

	AT25DF011	AT25DN011	AT25XE011	AT25EU0011A
8-pin SOIC (0.150" narrow body)	Yes	Yes	Yes	Yes
8-pad 2 x 3 mm DFN	Yes	Yes	Yes	Yes
8-pin TSSOP	Yes	Yes	Yes	
8-ball WLCSP	Yes		Yes	

8. Revision History

Revision	Date	Description
A1	5 / 2021	Initial release.
A2	11 / 2025	Applied latest corporate template to document. Changed ‘UDFN’ to ‘DFN.’ Changed ‘Sector’ to ‘Block.’ Updated wording in Section 1 ‘Renesas 1-Mbit Products Overview.’ Updated EU family product status from “Sampling” to “Mass Production” in Table 1 ‘1-Mbit Products Overview.’ Updated Table 2 ‘1-Mbit Products Feature Comparison.’ Added footnote to Table 3 ‘1-Mbit Products Command Set Comparison.’ Removed text under Section 5 and updated heading of Table 5 to ‘1-Mbit Products Status Register Read/Write Comparison.’

IMPORTANT NOTICE AND DISCLAIMER

RENESAS ELECTRONICS CORPORATION AND ITS SUBSIDIARIES (“RENESAS”) PROVIDES TECHNICAL SPECIFICATIONS AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OF THIRD-PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for developers who are designing with Renesas products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. Renesas grants you permission to use these resources only to develop an application that uses Renesas products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Renesas intellectual property or to any third-party intellectual property. Renesas disclaims responsibility for, and you will fully indemnify Renesas and its representatives against, any claims, damages, costs, losses, or liabilities arising from your use of these resources. Renesas' products are provided only subject to Renesas' Terms and Conditions of Sale or other applicable terms agreed to in writing. No use of any Renesas resources expands or otherwise alters any applicable warranties or warranty disclaimers for these products.

(Disclaimer Rev.1.01)

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

Contact Information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit www.renesas.com/contact-us/.

Trademarks

Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.