

Application Note AN404-A1

# Dialog 1Mbit Products Overview

May 2021

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## 1 Revision History

Version	Date	Description
A1	5/2021	Initial release

## 2 Dialog 1Mbit Products Overview

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

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. Finally it has a very fast erase of 8ms typical from page erase to full chip erase.

The AT25EU0011A is ideal for battery powered system, because batteries have finite energy stored in them. The fast erase times and low erase and program power enables lowest energy usage to be achieved.

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

Table 1: 1Mbit 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	Sampling	1.65V to 3.6V	Single/Dual/Quad

### 3 Feature Comparison

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

Table 2: 1Mbit 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 sector #	32	32	32	32
Page Size (Bytes)	256	256	256	256
Total Page #	512	512	512	512
Erase Block Size	64KB / 32KB	64KB / 32KB	64KB / 32KB	64KB / 32KB
Erase Sector Size	4KB	4KB	4KB	4KB
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	Yes
Operating Voltage Range (V)	1.65 – 3.6	2.3 – 3.6	1.65 – 3.6	1.65 – 3.6
Operating Temperature	-40 to 85	-40 to 85	-40 to 85	-40 to 85
Endurance (1)	100K	100K	100K	10K
Data Retention	20yr	20yr	20yr	20yr

Tested per JEDEC47 Non-Volatile Memory Cycling Endurance Standard

## 4 Command Set (Opcode) Comparison

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

Table 3: 1Mbit Products Command Set Comparison

	AT25DF011	AT25DN011	AT25XE011	AT25EU0011A
<b>System Commands</b>				
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
<b>Read Commands</b>				
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
<b>Write Commands</b>				
Write Enable	06h	06h	06h	06h
Volatile Status Reg Write Enable				50h
Write Disable	04h	04h	04h	04h
<b>Program Commands</b>				
Page Program	02h	02h	02h	02h
<b>Erase Commands</b>				
Page Erase (256B)	81h	81h	81h	81h/DBh
Sector 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
<b>Security Commands</b>				
Program OTP Security Register	9Bh	9Bh	9Bh	42h
Erase OTP Security Register				44h
Read OTP Security Register	77h	77h	77h	48h
<b>Suspend/Resume Commands</b>				
Program/Erase Suspend				75h
Program/Erase Resume				7Ah
<b>Status Register Commands</b>				

	AT25DF011	AT25DN011	AT25XE011	AT25EU0011A
Read Status Register 1	05h	05h	05h	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
<b>Device ID Information</b>				
Resume from DPD and read ID				ABh
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
<b>OTP Commands</b>				
Erase Security Registers				44h
Program Security Registers				42h
Read Security Registers/Unique ID				48h
Read Unique ID number				4Bh

## 5 Device ID Comparison

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

Table 4: 2Mbit Products Device ID Comparison

	AT25DF011	AT25DN011	AT25XE011	AT25EU0011A
<b>Device ID commands</b>				
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



## 6 Status Register Comparison

Table 5 shows the comparisons in Status Register definitions and access method for all 1Mbit products.

Table 5: 1Mbit Products Status Register 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: 1Mbit 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
Status Register 2	7	BPL	BPL	BPL	SRP0
	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
Status Register 3	6	Reserved	Reserved	Reserved	CMP
	7	Reserved	Reserved	Reserved	SUS
	0				Reserved
	1				Reserved
	2				Reserved
	3				Reserved
	4				Reserved
	5				Reserved
	6				Reserved
	7				HOLD/RST

## 7 SFDP Table Comparison

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

## 8 Packaging Options

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

Table 7: 1Mbit Products Packaging Options

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

## Status Definitions

Status	Definition
DRAFT	The content of this document is under review and subject to formal approval, which may result in modifications or additions.
APPROVED or unmarked	The content of this document has been approved for publication.

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