

Application Note AN405-A1

Dialog 2Mbit Products Overview

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1 Revision History

Version	Date	Description
A1	5/2021	Initial release

2 Dialog 2Mbit Products Overview

This document describes 2Mbit products available from Dialog Serial Flash Memory family.

The AT25EU0021A 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 AT25EU0021A 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 2Mbit products in more detail.

Table 1: 2Mbit Products Overview

Family	Part Number	Product Status	Nominal System Voltage	SPI Support
DF	AT25DF021A	Mass Production	1.65V to 3.6V	Single/Dual
XE	AT25XE021A	Mass Production	1.65V to 3.6V	Single/Dual
XV	AT25XV021A	Mass Production	1.65V to 4.4V	Single/Dual
EU	AT25EU0021A	Sampling	1.65V to 3.6V	Single/Dual/Quad

3 Feature Comparison

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

Table 2: 2Mbit Products Feature Comparison

	AT25DF021A	AT25XE021A	AT25XV021A	AT25EU0021A
Total Memory (Bits)	2Mbit	2Mbit	2Mbit	2Mbit
Total Memory (Bytes)	256KB	256KB	256KB	256KB
Total 64KB block #	4	4	4	4
Total 32KB block #	8	8	8	8
Total 4KB sector #	64	64	64	64
Page Size (Bytes)	256	256	256	256
Total Page #	1024	1024	1024	1024
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	1.65 – 3.6	1.65 – 4.4	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 2Mbit products.

Table 3: 2Mbit Products Command Set Comparison

	AT25DF021A	AT25XE021A	AT25XV021A	AT25EU0021A
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	25h	25h	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
Sequential Program Mode	ADh/AFh	ADh/AFh	ADh/AFh	
Dual Page Program	A2h	A2h	A2h	A2h
Quad Page Program (1-1-4)				32h
Erase Commands				
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	C7h/60h	C7h/60h	C7h/60h
Protection Commands				
Protect Sector	36h	36h	36h	
Unprotect Sector	39h	39h	39h	
Read Sector Protection Registers	3Ch	3Ch	3Ch	
Security Commands				

	AT25DF021A	AT25XE021A	AT25XV021A	AT25EU0021A
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	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
Device ID Information				
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
OTP Commands				
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

	AT25DF021A	AT25XE021A	AT25XV021A	AT25EU0021A
Device ID commands				
Release Power-down / Read ID [ABh]				11h
Manufacturer and Device ID Single I/O [90h]				1Fh, 11h
Manufacturer and Device ID Dual I/O [92h]				1Fh, 11h
Manufacturer and Device ID Quad I/O [94h]				1Fh, 11h
Read JEDEC ID [9Fh]	1Fh, 43h, 01h	1Fh, 43h, 01h	1Fh, 43h, 01h	1Fh, 11h, 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 2Mbit products.

Table 5: 2Mbit Products Status Register Comparison

	AT25DF021A	AT25XE021A	AT25XV021A	AT25EU0021A
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: 2Mbit Products Status Register Bit Level Comparison

		AT25DF021A	AT25XE021A	AT25XV021A	AT25EU0021A
Status Register 1	0	RDY/BSY	RDY/BSY	RDY/BSY	RDY/BSY
	1	WEL	WEL	WEL	WEL
	2	SWP0	SWP0	SWP0	BP0
	3	SWP1	SWP1	SWP1	BP1
	4	WPP	WPP	WPP	BP2
	5	EPE	EPE	EPE	BP3
	6	SPM	SPM	SPM	BP4
	7	SRPL	SRPL	SRPL	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

7 SFDP Table Comparison

The AT25EU0021A 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 2Mbit products. Contact Dialog for questions regarding packaging options.

Table 7: 2Mbit Products Packaging Options

	AT25DF021A	AT25XE021A	AT25XV021A	AT25EU0021A
8-pin SOIC (0.150" narrow body)	Yes	Yes	Yes	Yes
8-pad 5 x 6 mm UDFN	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.