Comparison of MX25U8033E and MX25U8035/MX25U8035E

1. Introduction

This application note compares MX25U8033E and MX25U8035/MX25U8035E. The document does not provide detailed information on individual devices, but highlights the similarities and differences between them. The comparison covers the general features, performance, command set and device ID.

In comparison with MX25U8035, MX25U8033E supports more functions such as

- SFDP
- Individual Block/Sector Protect
- Non-Volatile Block Protection Bits
- Quad I/O Page Program
- Higher speed Normal Read and Fast Read

In comparison with MX25U8035E, MX25U8033E is a compact edition flash that remove some features. However, it supports new functions such as

- SFDP *
- Hold# pin
- Higher speed Normal Read

* MX25U8035E will also support SFDP in the future.

The information provided is based on the data available at the time. MX25U8033E, MX25U8035 and MX25U8035E datasheets may override this application note if there is a different description for the same specifications in the datasheets.

Please refer to the contents and comparison tables below for more details.

2. General Features

2-1. Feature Comparison

Except the new features described in the introduction, MX25U8033E is a compact edition flash that remove some features for easy operation.

In comparison with MX25U8035, MX25U8033E does not have RESET# pin function and does not support CP (Continuous Program) mode.

In comparison with MX25U8035E, MX25U8033E does not support Software Reset, QPI mode, Burst Read, Program Suspend/Resume, Erase Suspend/Resume, Set Burst Length and W4READ (Quad I/O Read with 4 dummy cycles). Clock frequency of Fast Read application for MX25U8033E is 80MHz.

The SFDP is one of the new features of the MX25U8033E, which provides a consistent method of describing the features and functional capabilities of this Serial Flash device. User or host system can read the SFDP to understand the capabilities of the MX25U8033E for more efficient control. SFDP is a standard of JEDEC, JESD216 for serial flash. It is similiar to JEDEC Standard, JESD68 on CFI (Common Flash Interface) for Parallel Flash.

For the difference between these products, please check the comparison tables below for details.

Table 2-1. Feature Comparison

Part Number	MX25U8035	MX25U8035E	MX25U8033E
Voltage	1.65V -- 2.0V	1.65V -- 2.0V	1.65V -- 2.0V
Density	8Mb	8Mb	8Mb
Package	150mil 8-SOP 6x5mm 8-WSON 4x4mm 8-USON	150mil 8-SOP 200mil 8-SOP 6x5mm 8-WSON 4x4mm 8-USON	150mil 8-SOP 200mil 8-SOP 6x5mm 8-WSON 4x4mm 8-USON
Block	32KB & 64KB	32KB & 64KB	32KB & 64KB
Input/Output	x1, x2, x4	x1, x2, x4	x1, x2, x4
OTP Block Size	512bit	4Kbit	4Kbit
Hold# pin	Yes	--	Yes
RESET# pin	Yes (Share the same pin with Hold#, default RESET#)	--	--
Software Reset	--	Yes	--
Clock rate (Fast Read)	1 I/O: 40MHz 2 I/O: 40MHz 4 I/O: 33MHz	1 I/O: 104MHz 2 I/O: 84MHz 4 I/O: 104MHz	1 I/O: 80MHz 2 I/O: 80MHz 4 I/O: 70MHz
Clock rate (Normal Read)	25MHz	33 MHz	50MHz
QPI Mode	--	Yes	--
Burst Read	--	Yes	--
Program/Erase Suspend/Resume	--	Yes	--
Block Protection Bits: BP0~BP3	Volatile	Non-Volatile	Non-Volatile
Individual Block/ Sector Protect	--	Yes	Yes
Set Burst Length (SBL)	--	Yes	--
Word Read Quad I/O (W4READ)	--	Yes	--
CP (Continuous Program mode)	Yes	--	--

2-2. Performance Comparison

Table below is the comparison of new product and the former products.

Table 2-2: Performance Comparison

Parameter			MX25U8035	MX25U8035E	MX25U8033E
Clock High/ Low Time	tCH	Serial (fSCLK)	10ns(min.)	4.5ns(min.)	6ns(min.)
		Normal Read (fRSCLK)	16ns(min.)	15ns(min.)	9ns(min.)
		Others	12ns(min.)	N/A	7ns(min.)
	tCL	Serial (fSCLK)	10ns(min.)	4.5ns(min.)	6ns(min.)
		Normal Read (fRSCLK)	16ns(min.)	15ns(min.)	9ns(min.)
		Others	12ns(min.)	N/A	7ns(min.)
Program Time	Byte		30us (typ.); 300us (max.)	8us (typ.); 30us (max.)	15us(typ.); 30us(max.)
	Page		2ms (typ.); 7ms (max.)	1.2ms (typ.); 3ms (max.)	1.2ms(typ.); 3ms(max.)
Erase Time	Sector(4KB)		90ms (typ.); 2000ms (max.)	60ms (typ.); 200ms (max.)	60ms (typ.); 200ms (max.)
	Block(32KB)		800ms(typ.) 1600ms (max.)	250ms(typ.) 1000ms (max.)	250ms(typ.) 1000ms (max.)
	Block(64KB)		1.5s(typ.) 3s (max.)	0.5s(typ.) 2s (max.)	0.5s(typ.) 2s (max.)
	Chip		15s(typ.); 25s(max.)	5s(typ.); 10s(max.)	5s(typ.); 10s(max.)
Read ID	tRES1		8.8us(max.)	10us(max.)	10us(max.)
	tRES2		8.8us(max.)	10us(max.)	10us(max.)
CS# Deselect Time	tSHSL		30ns(min.)	Read = 12ns(min.); Write = 30ns(min.)	Read = 12ns(min.); Write = 30ns(min.)
CS# Active Setup Time	tSLCH		fRSCLK: 16ns; fTSCLK: 12ns fSCLK: 8ns	7ns(min.)	7ns(min.)
CS# Not Active Setup Time	tSHCH		10ns(min.)	7ns(min.)	7ns(min.)
CS# Active Hold Time	tCHSH		fRSCLK: 16ns fTSCLK: 12ns fSCLK: 8ns	5ns(min.)	5ns(min.)
CS# Not Active Hold Time	tCHSL		10ns(min.)	5ns(min.)	5ns(min.)
VCC Standby Current	ISB1		1uA (typ.); 5uA (max.)	30uA (typ.); 100uA (max.)	25uA (typ.); 35uA (max.)
Deep Power Down Current	ISB2		1uA (typ.); 5uA (max.)	5uA (typ.); 20uA (max.)	3uA (typ.); 8uA (max.)
Active Current	ICC1 (VCC Read)		12mA(max.) @40MHz 6mA(max.) @25MHz	20mA(max.) @104MHz 15mA(max.) @84MHz	12mA(max.) @80MHz 7mA(max.) @33MHz
	ICC2 (VCC PP)		22 mA(max.)	25 mA(max.)	25 mA(max.)
	ICC3 (VCC WRSR)		22 mA(max.)	20 mA(max.)	20 mA(max.)
	ICC4 (VCC SE/BE/BE32K)		22 mA(max.)	25 mA(max.)	25 mA(max.)
	ICC5 (VCC CE)		22 mA(max.)	25 mA(max.)	25 mA(max.)

3. Command Set Comparison

User has to check the differences in detail by comparison table below. For the details of command sets function, please refer to the datasheet of each product.

Table 3. Command Set Comparison

Command Type	Command	Description	MX25U8035	MX25U8035E	MX25U8033E
Read	RDSFDP	Read SFDP	--	--	5Ah
	W4READ	4x I/O read with 4 dummy cycles	--	E7h	--
	REMS	Read ID	90h	90h	90h
	REMS2	2x I/O REMS	EFh	--	EFh
	REMS4	4x I/O REMS	DFh	--	DFh
	QPIID	QPI ID Read	--	AFh	--
Program	CP	Continuous Program	ADh	--	--
Program/Erase	Suspend	Suspends Program/ Erase	--	B0h	--
	Resume	Resumes Program/ Erase	--	30h	--
SO output	ESRY	Enable SO to Output RY/BY#	70h	--	--
	DSRY	Disable SO to Output RY/BY#	80h	--	--
Block Lock	SBLK	Single Block Lock	--	36h	36h
	SBULK	Single Block Unlock Protection	--	39h	39h
	GBLK	Gang Block Lock	--	7Eh	7Eh
	GBULK	Gang Block Unlock	--	98h	98h
Block Protect	RDBLOCK	Read Block Lock Status	--	3Ch	3Ch
Reset	RSTEN	Reset Enable	--	66h	--
	RST	Reset Memory	--	99h	--
QPI Mode	EQIO	Enable Quad I/O	--	35h	--
	RSTQIO	Reset Quad I/O	--	F5h	--
Hold#	HDE	HOLD# Enable	AAh*	--	--**

Note:

** For MX25U8035, default funciton of RESET#/HOLD#/SIO3 pin is RESET#. Use this command to enable HOLD# funciton.*

***For MX25U8033E, default funciton of HOLD#/SIO3 pin is HOLD#. Extra command to enable HOLD# function is not required.*

4. Device ID Code Comparison

The following tables show that the Manufacturer and Device IDs have not changed.

Table 4-1: ID Code Comparison

Command Type	MX25U8035			MX25U8035E			MX25U8033E		
RDID/ (QPIID)	Manufac-tory ID	Type	Density	Manufac-tory ID	Type	Density	Manufac-tory ID	Type	Density
	C2	25	34	C2	25	34	C2	25	34
RES	Electronic ID			Electronic ID			Electronic ID		
	34			34			34		
REMS/ (REMS2, REMS4)	Manufactory ID		Device ID	Manufactory ID		Device ID	Manufactory ID		Device ID
	C2		34	C2		34	C2		34

5. References

The following datasheets were used for preparing this comparison note:

Datasheet	Location	Date Issued	Versions
MX25U8033E	Macronix Website	Nov. 09, 2011	1.0
MX25U8035E	Macronix Website	May. 20, 2011	1.1
MX25U8035	Macronix Website	Jul. 23, 2010	1.4

For more functional and parametric specifications, please refer to the datasheet on the Macronix Website at http://www.macronix.com/ and go to: Products/Flash Memory/Serial Flash.

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