



Application Note

EON EN25F16

VS

MXIC MX25L1605D

Specification Comparison



1. INTRODUCTION

The application note introduces how to implement a system design from MXIC MX25L1605D Flash to Eon EN25F16 Flash.

2. GENERAL FUNCTION COMPARISON TABLE:

2.1 The following table highlights the major features of these two devices.

Features	EN25F16	MX25L1605D
Voltage Range	2.7 ~ 3.6	2.7 ~ 3.6
Pin to Pin Compatible (standard SPI mode)	8-pins SOP 150mil 8-pins SOP 200mil 8 contact VDFN 8-pins DIP	8-pins SOP 150mil 8-pins SOP 200mil 8-land WSON (6mmx5mm) 8-pins DIP
SPI frequency (standard mode)	100MHz	86MHz
Secured Silicon Sector Region	128 Byte	512 bit
Sector Architecture	Uniform 512 Sectors of 4 K byte 32 Blocks of 64 K byte	Uniform 512 Sectors of 4 K byte 32 Blocks of 64 K byte
SPI mode	Mode 0 / Mode 3	Mode 0 / Mode 3
Minimum Endurance Cycle	100K	100K
Package	8-pins SOP 150mil 8-pins SOP 200mil 8 contact VDFN 8-pins DIP	8-pins SOP 150mil 8-pins SOP 200mil 16-pins SOP 300mil 8-land WSON (6mmx5mm) 8-land USON (4mmx4mm) 8-pins DIP



3. HARDWARE CONSIDERATIONS

3.1 I_{CC} comparison

Current	EN25F16	MX25L1605D	Unit
	Max (@ 100MHz)	Max (@ 86MHz)	
Read I _{CC3}	25	25	mA
Page Program (PP) I _{CC4}	28	20	mA
Sector Erase (SE) I _{CC6}	25	20	mA
Standby I _{CC1}	20	20	μA

3.2 Pin Configuration (8-pin package)

Pin number	EN25F16	MX25L1605D
Pin1	CS#	CS#
Pin2	DO	SO / SIO1
Pin3	WP#	WP# / ACC
Pin4	VSS	GND
Pin5	DI	SI / SIO0
Pin6	CLK	SCLK
Pin7	HOLD#	HOLD#
Pin8	VCC	VCC

Note:

1. Eon EN25F16 Flash can support the general standard SPI mode but don't support the acceleration (ACC) pin function.
2. For the general standard SPI mode, Eon EN25F16 Flash is the same as MXIC MX25L1605D Flash if customer don't use the accelerated (ACC) pin function.



4. SOFTWARE CONSIDERATIONS

4.1 Manufacturer, Memory Type & Device Identification (M7~M0: manufacture ID, D15~ID0: memory type, ID7~ID0: memory density) comparison.

For EN25F16

OP Code	(M7-M0)	(ID15-ID0)	(ID7-ID0)
ABh			14h
90h	1Ch		14h
9Fh	1Ch	3115h	

For MX25L1605D

Additional Features Part Name	Identifier			
	Device ID (command: AB hex)	Device ID (command: 90 hex)	Device ID (command: EF hex)	RDID (command: 9F hex)
MX25L1605D	14 (hex)	C2 14 (hex) (if ADD=0)	C2 14 (hex) (if ADD=0)	C2 20 15 (hex)



4.2. Instruction Set Comparison

4.2.1 Different Block Protection Area

EN25F16 :

Status Register Content			Memory Content			
BP2 Bit	BP1 Bit	BP0 Bit	Protect Areas	Addresses	Density(KB)	Portion
0	0	0	None	None	None	None
0	0	1	Block 0 to 30	000000h-1EFFFFh	1984KB	Lower 31/32
0	1	0	Block 0 to 29	000000h-1DFFFFh	1920KB	Lower 30/32
0	1	1	Block 0 to 27	000000h-1BFFFFh	1792KB	Lower 28/32
1	0	0	Block 0 to 23	000000h-17FFFFh	1536KB	Lower 24/32
1	0	1	Block 0 to 15	000000h-0FFFFFFh	1024KB	Lower 16/32
1	1	0	All	000000h-1FFFFFFh	2048KB	All
1	1	1	All	000000h-1FFFFFFh	2048KB	All

MX25L1605D :

Status bit				Protect Level
BP3	BP2	BP1	BP0	16Mb
0	0	0	0	0 (none)
0	0	0	1	1 (1block, block 31th)
0	0	1	0	2 (2blocks, block 30th-31th)
0	0	1	1	3 (4blocks, block 28th-31th)
0	1	0	0	4 (8blocks, block 24th-31th)
0	1	0	1	5 (16blocks, block 16th-31th)
0	1	1	0	6 (32blocks, all)
0	1	1	1	7 (32blocks, all)
1	0	0	0	8 (32blocks, all)
1	0	0	1	9 (32blocks, all)
1	0	1	0	10 (16blocks, block 0th-15th)
1	0	1	1	11 (24blocks, block 0th-23th)
1	1	0	0	12 (28blocks, block 0th-27th)
1	1	0	1	13 (30blocks, block 0th-29th)
1	1	1	0	14 (31blocks, block 0th-30th)
1	1	1	1	15 (32blocks, all)



4.2.2 Different RDSR bit definition

EN25F16 :

S5 and S6 are reserved.

S7		S6	S5	S4	S3	S2	S1	S0
SRP Status Register Protect	OTP_LOCK bit (note 1)	Reserved bits	Reserved bits	BP2 (Block Protected bits)	BP1 (Block Protected bits)	BP0 (Block Protected bits)	WEL (Write Enable Latch)	WIP (Write In Progress bit)
1 = status register write disable	1 = OTP sector is protected			(note 2)	(note 2)	(note 2)	1 = write enable 0 = not write enable	1 = write operation 0 = not in write operation
Non-volatile bit				Non-volatile bit	Non-volatile bit	Non-volatile bit	volatile bit	volatile bit

MX25L1605D :

Bit 5 is used for BP3 (level of protected block).

Bit 6 is used for continuously program mode status.

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
SRWD (status register write protect)	Continuously program mode (CP mode)	BP3 (level of protected block)	BP2 (level of protected block)	BP1 (level of protected block)	BP0 (level of protected block)	WEL (write enable latch)	WIP (write in progress bit)
1 = status register write disable	0 = normal program mode 1 = CP mode(default 0)	(note1)	(note1)	(note1)	(note1)	1 = write enable 0 = not write enable	1 = write operation 0 = not in write operation
Non- volatile bit	volatile bit	Non- volatile bit	Non- volatile bit	Non- volatile bit	Non- volatile bit	volatile bit	volatile bit

note1: see the table "Protected Area Sizes"

4.2.3 Security Register Definition

EN25F16: No support.

MX25L1605D : Support.

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
x	x	x	x	x	x	LDSO (indicate if lock-down)	Secured OTP indicator bit
reserved	reserved	reserved	reserved	reserved	reserved	0 = not lock- down 1 = lock-down (cannot program/erase OTP)	0 = non- factory lock 1 = factory lock
volatile bit	volatile bit	volatile bit	volatile bit	volatile bit	volatile bit	non-volatile bit	non-volatile bit

4.2.4 2READ (2 x I/O) read commands

EN25F16: No support.

MX25L1605D : Support. (BBh)



4.2.5 CP (Continuously Program mode) command

EN25F16: No support.

MX25L1605D : Support. (ADh)

4.2.6 RES (Read electronic ID) command

EN25F16: No support.

MX25L1605D : Support. (ABh)

4.2.7 REMS2 (Read ID for 2x I/O mode) command

EN25F16: No support.

MX25L1605D : Support. (EFh)

4.2.8 Enter Secured OTP command

EN25F16: Support. (3Ah)

MX25L1605D : Support. (B1h)

4.2.9 Exit Secured OTP command

EN25F16: Support. (04h)

MX25L1605D : Support. (C1h)

4.2.10 Secured OTP Addresses

EN25F16:

Sector	Sector Size	Address Range
511	128 byte	1FF000 – 1FF07Fh

Note: The OTP sector is mapping to sector 511

MX25L1605D :

Address range	Size	Standard Factory Lock	Customer Lock
xxxx00~xxxx0F	128-bit	ESN (electrical serial number)	Determined by customer
xxxx10~xxxx3F	384-bit	N/A	



4.2.11 RDSCUR (Read Security register) command

EN25F16: No support.

MX25L1605D : Support. (2Bh)

4.2.12 WRSCUR (Write Security register) command

EN25F16: No support.

MX25L1605D : Support. (2Fh)

4.2.13 ESRY (Enable SO to output RY/BY#) command

EN25F16: No support.

MX25L1605D : Support. (70h)

4.2.14 DSRY (Disable SO to output RY/BY#) command

EN25F16: No support.

MX25L1605D : Support. (80h)



5. PERFORMANCE DIFFERENCES

5.1 ERASE AND PROGRAM PERFORMANCE

The erasing and programming performance comparison.

Parameter	EN25F16		MX25L1605D		Unit
	Typ	Max	Typ	Max	
Block Erase Time	0.4	2	0.7	2	sec
Sector Erase Time	0.09	0.3	0.06	0.3	sec
Chip (Bulk) Erase Time	7	35	14	30	sec
Page Programming Time	1.3	5	1.4	5	ms

5.2 KEY AC PARAMETER PERFORMANCE

Parameter	EN25F16	MX25L1605D
tCH (serial clock high time)	Min @ 4ns	Min @ 5.5ns
tCL (serial clock low time)	Min @ 4ns	Min @ 5.5ns
tCLCH(serial clock rise time)	Min @ 0.1V / ns	Min @ 0.1V / ns
tCLCL(serial clock fall time)	Min @ 0.1V / ns	Min @ 0.1V / ns
tCHSH(CS# active setup / hold time)	Min@ 5ns	Min @ 5ns
tSHSL(CS# high time)	Min @ 100ns	Min @ 40ns
tDSU(Data in setup time)	Min @ 2ns	Min @ 2ns
tDH(Data in hold time)	Min @ 5ns	Min @ 5ns



Eon Silicon Solution Inc.

Revisions List

Revision No	Description	Date
A	Initial Release	2010/01/11