



Application Note

EON EN25Q16

VS

SST SST25VF016B

Specification Comparison



Eon Silicon Solution Inc.

1. INTRODUCTION

The application note introduces how to implement a system design from SST SST25VF016B Flash to Eon EN25Q16 Flash.

2. GENERAL FUNCTION COMPARISON TABLE:

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

Features	EN25Q16	SST25VF016B
Voltage Range	2.7 ~ 3.6	2.7 ~ 3.6
Pin to Pin Compatible (standard mode)	8-pins SOP 200mil 8 contact VDFN (Except pin 7: HOLD#)	8-pins SOIC 200mil 8 contact WSON (6mmx5mm)
SPI frequency (standard / dual / quad / mode)	100MHz (standard mode) 80MHz @ dual & quad mode	50MHz / 75MHz @ standard mode
Secured Silicon Sector Region	128 Byte	N/A
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 SOIC 200mil 8 contact WSON (6mmx5mm)



3. HARDWARE CONSIDERATIONS

3.1 I_{CC} comparison

Current	EN25Q16	SST25VF016B	Unit
	Max	Max	
Read I _{CC3}	25 @ 100MHz 20 @ 80MHz	15 @ 50MHz	mA
Page Program (PP) I _{CC4}	28	30	mA
Sector Erase (SE) I _{CC6}	25	30	mA
Standby I _{CC1}	20	20	μA

3.2 Pin Configuration (8-pin package)

Pin number	EN25Q16	SST25VF016B
Pin1	CS#	CE#
Pin2	DO (DQ1)	SO
Pin3	WP# (DQ2)	WP#
Pin4	VSS	VSS
Pin5	DI (DQ0)	SI
Pin6	CLK	CLK
Pin7	NC (DQ3)	HOLD#
Pin8	VCC	VDD

Note:

1. If customers don't use HOLD# pin function on SST25VF016B, which can be replaced by EN25Q16 in standard SPI mode.
2. SST25VF016B can support general standard SPI mode.
3. EN25Q16 can support general standard / dual / quad SPI mode.
(Need specific SPI controller)



4. SOFTWARE CONSIDERATIONS

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

For EN25Q16

OP Code	(M7-M0)	(ID15-ID0)	(ID7-ID0)
ABh			14h
90h	1Ch		14h
9Fh	1Ch	3015h	

For SST25VF016B

OP code: 9Fh

Manufacturer's ID	Device ID	
	Memory Type	Memory Capacity
Byte1	Byte 2	Byte 3
BFH	25H	41H

OP code: 90h or ABh

	Address	Data
Manufacturer's ID	00000H	BFH
Device ID SST25VF016B	00001H	41H



4.2. Instruction Set Comparison

4.2.1 Different Block Protection Area

EN25Q16 :

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

SST25VF016B :

Protection Level	Status Register Bit ²				Protected Memory Address
	BP3	BP2	BP1	BP0	16 Mbit
None	X	0	0	0	None
Upper 1/32	X	0	0	1	1F0000H-1FFFFFFH
Upper 1/16	X	0	1	0	1E0000H-1FFFFFFH
Upper 1/8	X	0	1	1	1C0000H-1FFFFFFH
Upper 1/4	X	1	0	0	180000H-1FFFFFFH
Upper 1/2	X	1	0	1	100000H-1FFFFFFH
All Blocks	X	1	1	0	000000H-1FFFFFFH
All Blocks	X	1	1	1	000000H-1FFFFFFH

4.2.2 Different RDSR bit definition

EN25Q16 :

S5, S6 are reserved bits, S7 are SRP bit and OTP_LOCK bit (in OTP mode).

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

Note

- In OTP mode, SRP bit is served as OTP_LOCK bit.
- See the table "Protected Area Sizes Sector Organization".



SST25VF016B :

Bit 5 is BP3, Bit 6 is AAI and Bit 7 is BPL.

Bit	Name	Function	Default at Power-up	Read/Write
0	BUSY	1 = Internal Write operation is in progress 0 = No internal Write operation is in progress	0	R
1	WEL	1 = Device is memory Write enabled 0 = Device is not memory Write enabled	0	R
2	BP0	Indicate current level of block write protection (See Table 4)	1	R/W
3	BP1	Indicate current level of block write protection (See Table 4)	1	R/W
4	BP2	Indicate current level of block write protection (See Table 4)	1	R/W
5	BP3	Indicate current level of block write protection (See Table 4)	0	R/W
6	AAI	Auto Address Increment Programming status 1 = AAI programming mode 0 = Byte-Program mode	0	R
7	BPL	1 = BP3, BP2, BP1, BP0 are read-only bits 0 = BP3, BP2, BP1, BP0 are read/writable	0	R/W

4.2.3 Different block erase command

EN25Q16 : Only support D8h command. (for 64K byte)

SST25VF016B : Support 52h (for 32K byte) and D8h commands. (for 64K Byte)

4.2.4 Dual Output FAST_READ (3Bh) commands

EN25Q16 : Support.

SST25VF016B : No support.

4.2.5 Dual Input / Output FAST_READ (BBh) commands

EN25Q16 : Support.

SST25VF016B : No support.

4.2.6 Quad Input / Output FAST_READ (EBh) commands

EN25Q16 : Support.

SST25VF016B : No support.



4.2.7 Enter OTP Mode (3Ah) commands

EN25Q16 : Support.

OTP Sector Address

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

Note: The OTP sector is mapping to sector 511

SST25VF016B : No support.

4.2.8 AAI-Word Programm command

EN25Q16: No support.

SST25VF016B : Support. (ADh)

4.2.9 Enable SO to output RY/BY# during AAI programming command

EN25Q16: No support.

SST25VF016B : Support. (70h)

4.2.10 Disable SO to output RY/BY# during AAI programming command

EN25Q16: No support.

SST25VF016B : Support. (80h)

4.2.11 Enable Write Status Register command

EN25Q16: No support.

SST25VF016B : Support. (50h)



5. PERFORMANCE DIFFERENCES

5.1 ERASE AND PROGRAM PERFORMANCE

The erasing and programming performance comparison.

Parameter	EN25Q16		SST25VF016B		Unit
	Typ	Max	Typ	Max	
4 KB Sector Erase Time	0.09	0.3	N/A	0.025	sec
64KB Block Erase Time	0.4	2	N/A	0.025	sec
Chip (Bulk) Erase Time	12	35	N/A	0.05	sec
Page Programming Time	1.3	5	N/A	2.04	ms

5.2 KEY AC PARAMETER PERFORMANCE

Parameter	EN25Q16	SST25VF016B
tCH (serial clock high time)	Min @ 4ns	Min @ 9ns
tCL (serial clock low time)	Min @ 4ns	Min @ 9ns
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 @ 15ns for Read Min @ 50ns for Write	Min @ 50ns
tDSU(Data in setup time)	Min @ 2ns	Min @ 2ns
tDH(Data in hold time)	Min @ 5ns	Min @ 5ns



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Revisions List

Revision No	Description	Date
A	Initial Release	2010/01/19