



Technical Note

Comparing Micron N25Q and SST SST26WF Flash Devices

Introduction

The purpose of this technical note is to compare features of the Micron® N25Q (32Mb or 64Mb) and SST SST26WF Flash memory devices. Features compared include memory architecture, package options, signal descriptions, command sets, electrical specifications, and device identification.



Memory Array Architecture

N25Q Features	SST26WF Features
Program 1 to 256 bytes	Program 1 to 256 bytes
Uniform sector erase (64KB)	Uniform 4KB sectors
Uniform subsector erase (4KB)	Four 8KB top and bottom parameter overlay blocks
	Two 32KB top and bottom overlay blocks
	Uniform 64KB overlay blocks

Package Configurations

Table 1: Package Configurations

Package	N25Q		SST26WF	
	32Mb	64Mb	32Mb	64Mb
VDFPN8 (8mm x 6mm MLP8)	Yes	Yes	–	N/A
TBGA24 (6mm x 8mm)	Yes	Yes	–	N/A
VDFPN8 (6mm x 5mm MLP)	Yes	Yes	Yes	N/A
SO16 (300 mils body width)	Yes	Yes	–	N/A
SO8W (SO8 208 mils body width)	Yes	Yes	Yes	N/A
UDFPN8 (4mm x 3mm MLP)	Yes	–	–	N/A
SO8N (SO8 150 mils body width)	Yes	–	–	N/A

Signal Descriptions

Table 2: Signal Descriptions

N25Q Signal	SST26WF Signal	Type	Description
C	SCK	Input	Serial clock
DQ0	SIO[0]	Input or I/O	Serial data input or I/O
DQ1	SIO[0]	Output or I/O	Serial data output or I/O
S#	CE#	Input	Chip select
W/V _{pp} /DQ2	SIO[2]	Input or I/O	Write protect/enhanced program supply voltage/additional data I/O
HOLD#/DQ3	SIO[3]	Input or I/O	HOLD or I/O
V _{CC}	V _{DD}	Power	Supply voltage
V _{SS}	V _{SS}	Ground	Ground

- Notes:
1. During quad I/O operation, the SST26WF must submit ENABLE QUAD I/O command for quad I/O functionality.
 2. During quad I/O operation, N25Q must set a bit (VCR or NVCR) for quad I/O functionality; during that time, the W and HOLD signals are functional. The W and HOLD signals lose functionality only when quad I/O operations are in progress (QUAD OUTPUT FAST READ, QUAD I/O FAST READ, and QUAD INPUT FAST PROGRAM).

Commands

Table 3: Supported Command Set

Command Name	Command Code (Setup/Confirm) N25Q	Command Code (Setup/Confirm) SST26WF	Notes
READ			
READ	03h	03h	
FAST READ	0Bh	0Bh	
DUAL OUTPUT FAST READ	3Bh	N/A	1
DUAL INPUT/OUTPUT FAST READ	BB	N/A	1
QUAD OUTPUT FAST READ	6Bh	N/A	1
QUAD INPUT/OUTPUT FAST READ	EBh	N/A	1
READ DEVICE ID	9Fh/9Eh	9Fh	2
PROGRAM			
PAGE PROGRAM	02h	02h	
DUAL INPUT FAST PROGRAM	A2h	N/A	1
QUAD INPUT FAST PROGRAM	32h	N/A	1
ERASE			
BULK ERASE	C7h	C7h	
SECTOR ERASE – 64KB	D8h	D8h	
SUBSECTOR ERASE – 4KB	20h	20h	
SUSPEND			
PROGRAM/ERASE SUSPEND	75h	B0h	
PROGRAM/ERASE RESUME	7Ah	30h	
DEEP POWER-DOWN			
DEEP POWER-DOWN	B9h	N/A	1, 3, 4
RELEASE FROM DEEP POWER-DOWN	ABh	N/A	1, 3, 4, 5

- Notes:
1. Not supported on the SST26WF.
 2. 9Eh not supported on the SST26WF.
 3. Only available on the 1.8V N25Q, not on the 3V N25Q.
 4. Commands are used to place the N25Q device in low power consumption mode, but are not supported on the SST26WF.
 5. The ABh command in the N25Q family is available, but means RELEASE FROM DEEP POWER-DOWN (for 1.8V products).

READ Commands

The READ command set for the N25Q and SST26WF devices is identical, and each device follows the standard three address byte protocol.

The SST26WF has a fixed dummy cycle read, but the N25Q dummy cycles can be configured and controlled in the nonvolatile configuration register (NVCR), bits 12 to 15, or in the volatile configuration register (VCR), bits 7 to 4.



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The SST26WF and N25Q manufacturer ID, memory type, and memory capacity can be read out by issuing a 9Fh command. N25Q will output the same data when the 9Eh command is issued; the SST26WF does not support the 9Eh command.



Electrical Characteristics

Table 4: DC Current Characteristics

Parameter	Symbol	N25Q		SST26WF		Units
		Min	Max	Min	Max	
Standby current	I_{CC1}	–	100	–	25	μA
Operating current (FAST READ QUAD I/O)	I_{CC3}	–	20	–	18	mA
Operating current (PAGE PROGRAM)	I_{CC4}	–	20	–	26	mA
Operating current (ERASE)	I_{CC6}	–	20	–	25	mA

Table 5: DC Voltage Specifications

Parameter	Symbol	N25Q		SST26WF		Units
		Min	Max	Min	Max	
Input low voltage	V_{IL}	–0.5	$0.3 V_{CC}$	–	0.3	V
Input high voltage	V_{IH}	$0.7 V_{CC}$	$V_{CC} + 0.4$	$0.7 V_{DD}$	–	V
Output low voltage	V_{OL}	–	0.4	–	0.2	V
Output high voltage	V_{OH}	$V_{CC} - 0.2$	–	$V_{DD} - 0.2$	–	V



AC Characteristics

Table 6: AC Specifications

Parameter	Symbol	Alternate Symbol	N25Q		SST26WF		Units
			Min	Max	Min	Max	
Clock frequency (x1 FAST READ)	f _C	f _C	–	108	–	25	MHz
Clock frequency (x2, x4 FAST READ)	f _C	f _C	–	108	–	80	MHz
Clock frequency (READ)	f _R	f _R	–	54	–	40	MHz
S# active setup time	t ^{SLCH}	t ^{CSS}	4	–	6	–	ns
Data-in setup time	t ^{DVCH}	t ^{SU}	2	–	5	–	ns
Data-in hold time	t ^{CHDX}	t ^{DH}	3	–	5	–	ns
S# deselect time after correct READ (ARRAY READ to ARRAY READ)	t ^{SHSL}	t ^{CSH}	20	–	15	–	ns
S# deselect time after incorrect READ or different instruction (ERASE/PROGRAM to READ)	t ^{SHSL}	t ^{CSH}	50	–	50	–	ns
Output disable time (2.7–3.6V)	t ^{SHQZ}	t ^{DIS}	–	8	–	10	ns
Clock low to output valid (30pF)	t ^{CLQV}	t ^V	–	7	–	15	ns
Output hold time	t ^{CLQX}	t ^{HO}	1	–	2	–	ns
HOLD to output Low-Z	t ^{HHQX}	t ^{LZ}	–	8	N/A	N/A	ns
HOLD to output High-Z	t ^{HLQZ}	t ^{HZ}	–	8	N/A	N/A	ns

Note: 1. AC specifications compare the fastest versions available at the full voltage range (2.7–3.6V)

Program and Erase Specifications

Table 7: Program and Erase Specifications

Operation	N25Q				SST26WF				Unit
	32Mb		64Mb		32Mb		64Mb		
	Typ	Max	Typ	Max	Typ	Max	Typ	Max	
PAGE PROGRAM	0.5	5	0.5	5	1.5	–	N/A	N/A	ms
SUBSECTOR ERASE	0.3	3	0.3	3	N/A	N/A	N/A	N/A	s
SECTOR ERASE	0.7	3	0.7	3	0.25	2	N/A	N/A	s
BULK ERASE	30	60	60	120	0.5	256	N/A	N/A	s

Configuration and Memory Map

Table 8: Sectors and Subsectors by Density

Density		Sector	Subsector	Address Range			
64		127	2047	7FFFFh	7F000h		
			:	:	:		
			2032	7F0FFFh	7F0000h		
	32		63	1023	3FFFFh	3F000h	
				:	:	:	
				1008	3F0FFFh	3F0000h	
		0		0	15	0FFFFh	0F000h
					:	:	:
					4	04FFFh	04000h
					3	03FFFh	03000h
					2	02FFFh	02000h
					1	01FFFh	01000h
					0	00FFFh	00000h

Device Identification

Manufacturer identification is assigned by JEDEC. As a result, the N25Q and SST26WF devices have a different manufacturer ID and memory type codes. The memory capacity code is different because the SST26WF does not offer a 128Mb serial Flash device. Command 9Fh is used to read these codes in both devices.

N25Q has a unique ID (UID) composed of 17 read-only bytes, which contain the following data:

- The first byte is set to 10h.
- The next two bytes of extended device ID specify device configuration (top, bottom, or uniform architecture and hold or reset functionality).
- The next 14 bytes contain optional customized factory data. The customized factory data bytes are factory programmed.

Refer to the N25Q data sheet for more information.

Table 9: Read Identification Summary

Parameter	N25Q Code	SST26WF Code
Manufacturer ID	20h	BFh
Memory type	BAh	26h ¹
Device ID	N/A	22h

Table 9: Read Identification Summary (Continued)

Parameter	N25Q Code	SST26WF Code
Memory capacity	16h (32Mb), 17h (64Mb)	N/A

Note: 1. For 32Mb serial Flash device only.

Conclusion

Comparing the features of the Micron N25Q and SST SST26WF Flash memory devices enables users to migrate applications from the SST26WF to the N25Q.



Revision History

Rev. A – 10/10

- Initial release

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