

**MICROCHIP****SST26VF064B/SST26VF064BA**

2.5V/3.0V 64-Mbit Serial Quad I/O™ (SQI™) Flash Memory

Features

- Single Voltage Read and Write Operations:
 - 2.7V-3.6V or 2.3V-3.6V
- Serial Interface Architecture:
 - Nibble-wide multiplexed I/O's with SPI-like serial command structure
 - Mode 0 and Mode 3
 - x1/x2/x4 Serial Peripheral Interface (SPI) Protocol
- High-Speed Clock Frequency:
 - 2.7V-3.6V: 104 MHz maximum
 - 2.3V-3.6V: 80 MHz maximum
- Burst Modes:
 - Continuous linear burst
 - 8/16/32/64-byte linear burst with wrap-around
- Superior Reliability:
 - Endurance: 100,000 Cycles (minimum)
 - Greater than 100 years data retention
- Low-Power Consumption:
 - Active Read current: 15 mA (typical @ 104 MHz)
 - Standby Current: 15 μ A (typical)
- Fast Erase Time:
 - Sector/Block Erase: 18 ms (typical), 25 ms (maximum)
 - Chip Erase: 35 ms (typical), 50 ms (maximum)
- Page Program:
 - 256-bytes per page in x1 or x4 mode
- End-of-Write Detection:
 - Software polling the BUSY bit in STATUS register
- Flexible Erase Capability:
 - Uniform 4-Kbyte sectors
 - Four 8-Kbyte top and bottom parameter overlay blocks
 - One 32-Kbyte top and bottom overlay block
 - Uniform 64-Kbyte overlay blocks
- Write Suspend:
 - Suspend Program or Erase operation to access another block/sector
- Software Reset (RST) mode

- Software Protection:
 - Individual Block Write Protection with permanent lock-down capability
 - 64-Kbyte blocks, two 32-Kbyte blocks and eight 8-Kbyte parameter blocks
 - Read protection on top and bottom 8-Kbyte parameter blocks
- Security ID:
 - One-Time-Programmable (OTP) 2-Kbyte, Secure ID
 - 64-bit unique, factory pre-programmed identifier
 - User-programmable area
- Temperature Range:
 - Industrial: -40°C to +85°C
 - Industrial Plus: -40°C to +105°C
- Automotive AEC-Q100 Grade 2 and Grade 3
- All devices are RoHS compliant

Packages Available

- 8-lead SOIJ (5.28 mm)
- 16-lead SOIC (7.50 mm)
- 24-ball TBGA (6 mm x 8 mm)
- 8-contact WDFN (6 mm x 5 mm)
- 8-contact WDFN (6 mm x 8 mm)

Product Description

The Serial Quad I/O™ (SQI™) family of Flash-memory devices features a six-wire, 4-bit I/O interface that allows for low-power, high-performance operation in a low pin-count package. SST26VF064B/064BA also support full command-set compatibility to traditional Serial Peripheral Interface (SPI) protocol. System designs using SQI Flash devices occupy less board space and ultimately lower system costs.

All members of the 26 Series, SQI family are manufactured with proprietary, high-performance CMOS SuperFlash® technology. The split-gate cell design and thick-oxide tunneling injector attain better reliability and manufacturability compared with alternate approaches.

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SST26VF064B/064BA significantly improve performance and reliability, while lowering power consumption. These devices write (Program or Erase) with a single power supply of 2.3V-3.6V. The total energy consumed is a function of the applied voltage, current, and time of application. Since for any given voltage range, the SuperFlash technology uses less current to program and has a shorter erase time, the total energy consumed during any Erase or Program operation is less than alternative Flash memory technologies.

Two configurations are available upon order. SST26VF064B default at power-up has the WP# and HOLD# pins enabled, and the SIO2 and SIO3 pins disabled, to initiate SPI-protocol operations. SST26VF064BA default at power-up has the WP# and HOLD# pins disabled, and the SIO2 and SIO3 pins enabled, to initiate Quad I/O operations. See [Section 4.5.8 "I/O Configuration \(IOC\)"](#) for more information about configuring WP#/HOLD# and SIO3/SIO4 pins. See [Figure](#) for pin assignments.

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An errata sheet, describing minor operational differences from the data sheet and recommended workarounds, may exist for current devices. As device/documentation issues become known to us, we will publish an errata sheet. The errata will specify the revision of silicon and revision of document to which it applies.

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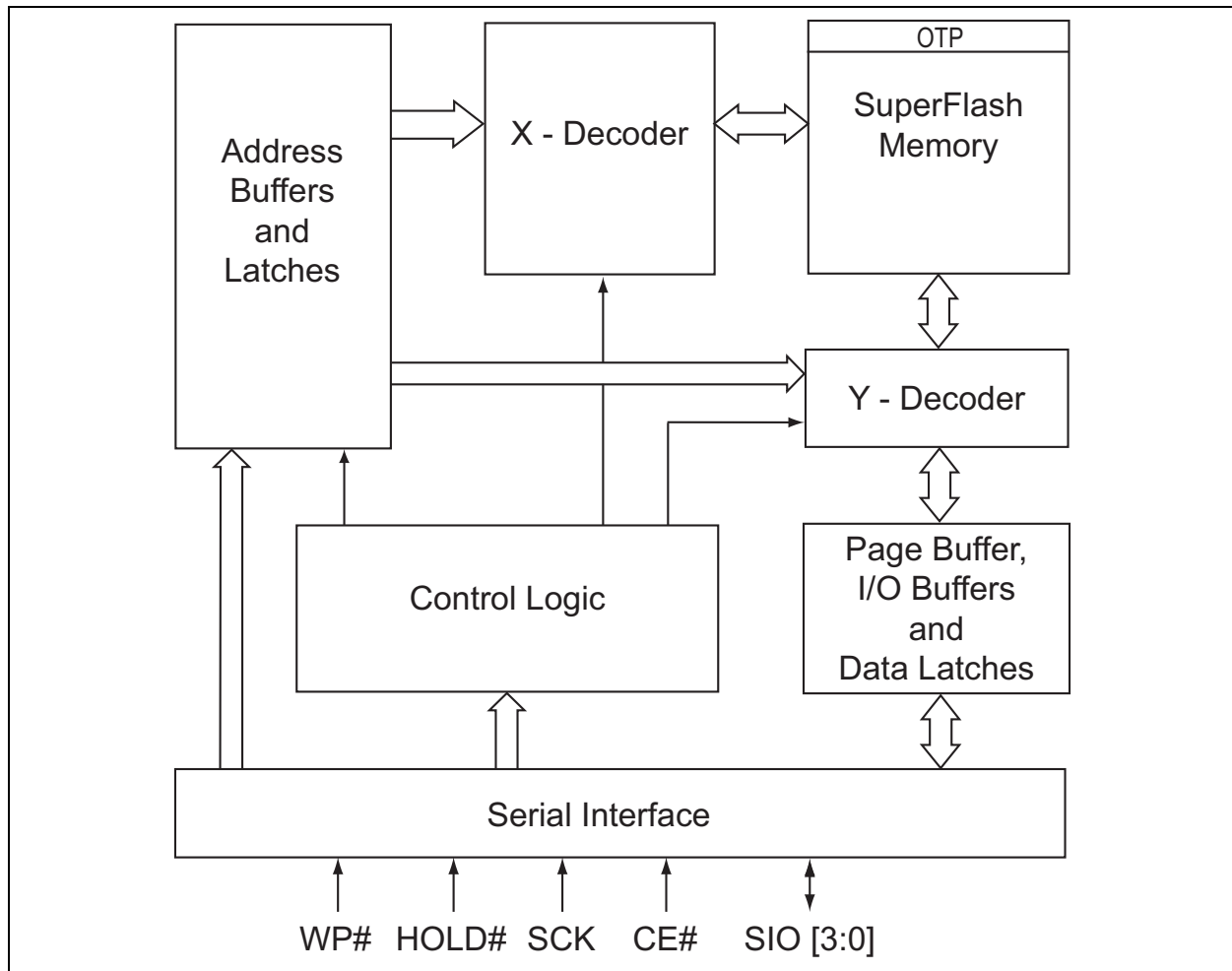
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1.0 BLOCK DIAGRAM

FIGURE 1-1: FUNCTIONAL BLOCK DIAGRAM



SST26VF064B/SST26VF064BA

2.0 PIN DESCRIPTION

FIGURE 2-1: PIN DESCRIPTION

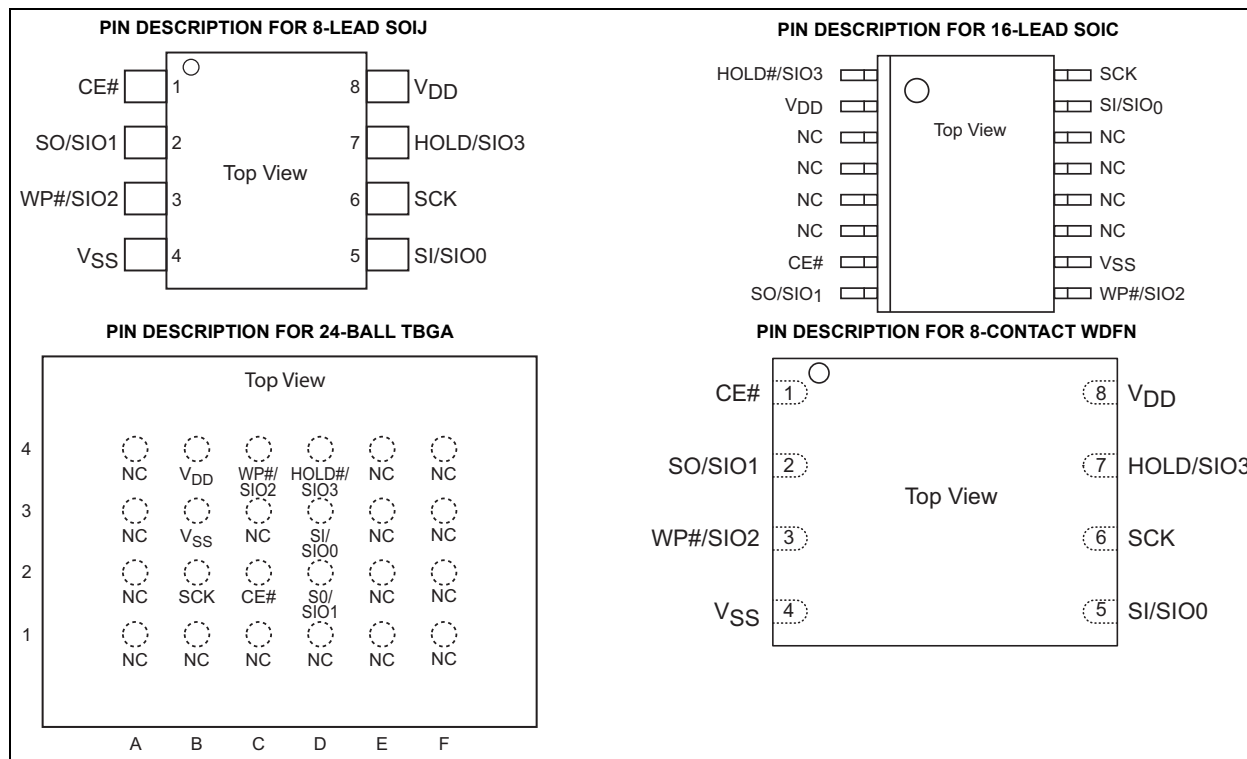


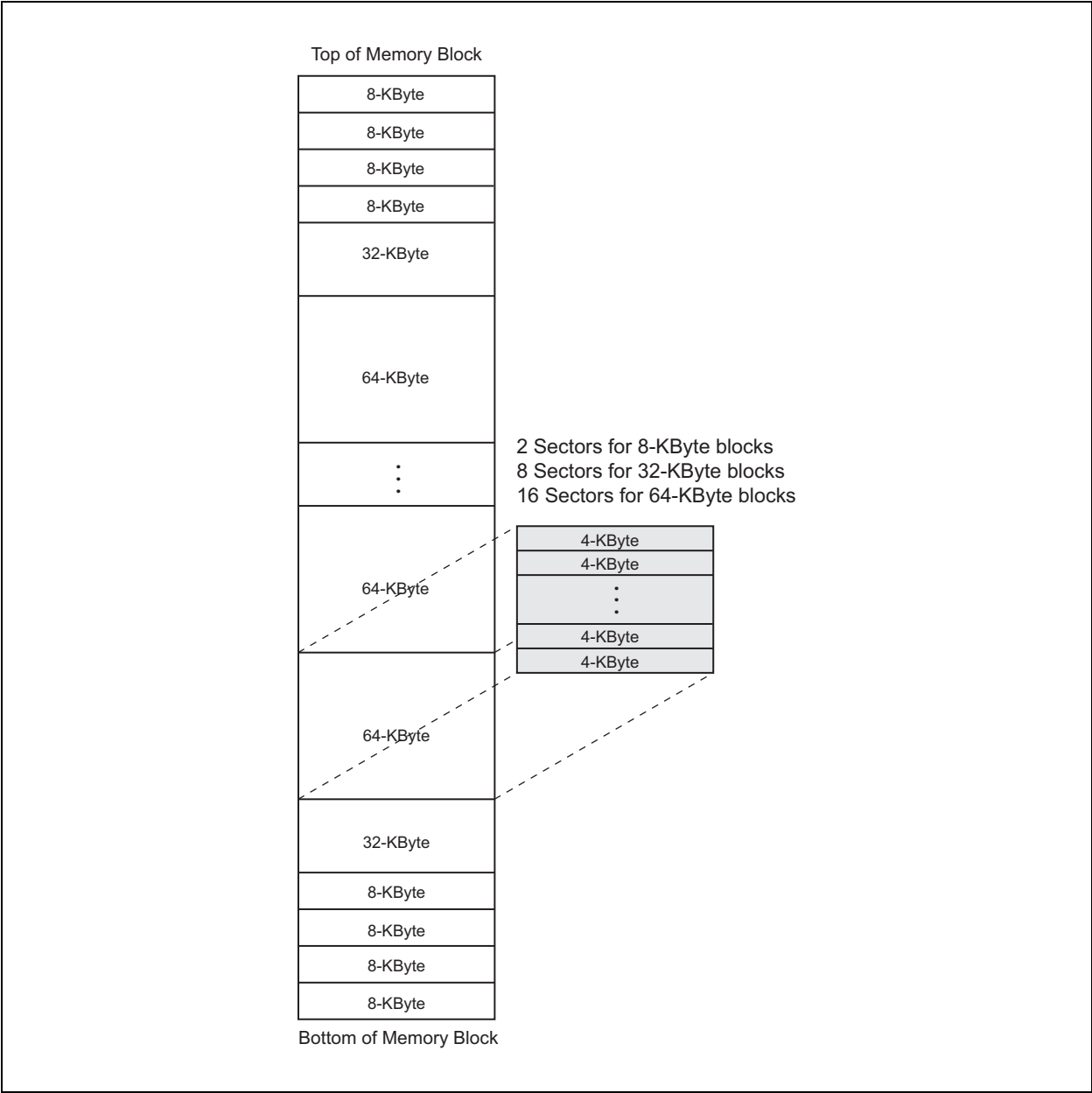
TABLE 2-1: PIN DESCRIPTION

| Symbol | Pin Name | Functions |
|----------|---------------------------------|--|
| SCK | Serial Clock | Provide the timing of the serial interface. Commands, addresses, or input data are latched on the rising edge of the clock input, while output data are shifted out on the falling edge of the clock input. |
| SIO[3:0] | Serial Data Input/Output | Transfer commands, addresses, or data serially into the device or data out of the device. Inputs are latched on the rising edge of the serial clock. Data are shifted out on the falling edge of the serial clock. The Enable Quad I/O (EQIO) command instruction configures these pins for Quad I/O mode. |
| SI | Serial Data Input for SPI mode | Transfer commands, addresses or data serially into the device. Inputs are latched on the rising edge of the serial clock. SI is the default state after a Power-on Reset. |
| SO | Serial Data Output for SPI mode | Transfer data serially out of the device. Data are shifted out on the falling edge of the serial clock. SO is the default state after a Power-on Reset. |
| CE# | Chip Enable | The device is enabled by a high to low transition on CE#. CE# must remain low for the duration of any command sequence; or in the case of write operations, for the command/data input sequence. |
| WP# | Write Protect | The WP# is used in conjunction with the WPEN and IOC bits in the Configuration register to prohibit write operations to the Block Protection register. This pin only works in SPI, single-bit and dual-bit Read mode. |
| HOLD# | Hold | Temporarily stops serial communication with the SPI Flash memory while the device is selected. This pin only works in SPI, single-bit and dual-bit Read mode and must be tied high when not in use. |
| VDD | Power Supply | Provide power supply voltage. |
| Vss | Ground | |

3.0 MEMORY ORGANIZATION

The SST26VF064B/064BA SMI memory array is organized in uniform, 4-Kbyte erasable sectors with the following erasable blocks: eight 8-Kbyte parameter, two 32-Kbyte overlay and one hundred twenty-six 64-Kbyte overlay blocks (See [Figure 3-1](#)).

FIGURE 3-1: MEMORY MAP



SST26VF064B/SST26VF064BA

4.0 DEVICE OPERATION

SST26VF064B/064BA support both Serial Peripheral Interface (SPI) bus protocol and a 4-bit multiplexed SQI bus protocol. To provide backward compatibility to traditional SPI Serial Flash devices, the device's initial state after a Power-on Reset is SPI mode which supports multi-I/O (x1/x2/x4) Read/Write commands. A command instruction configures the device to SQI mode. The dataflow in the SQI mode is similar to the SPI mode, except it uses four multiplexed I/O signals for command, address and data sequence.

SQI Flash Memory supports both Mode 0 (0, 0) and Mode 3 (1, 1) bus operations. The difference between the two modes is the state of the SCK signal when the bus host is in stand-by mode and no data are being transferred. The SCK signal is low for Mode 0 and SCK signal is high for Mode 3. For both modes, the Serial Data I/O (SIO[3:0]) is sampled at the rising edge of the SCK clock signal for input and driven after the falling edge of the SCK clock signal for output. The traditional SPI protocol uses separate input (SI) and output (SO) data signals as shown in Figure 4-1. The SQI protocol uses four multiplexed signals, SIO[3:0], for both data in and data out, as shown in Figure 4-2. This means the SQI protocol quadruples the traditional bus transfer speed at the same clock frequency, without the need for more pins on the package.

FIGURE 4-1: SPI PROTOCOL (TRADITIONAL 25 SERIES SPI DEVICE)

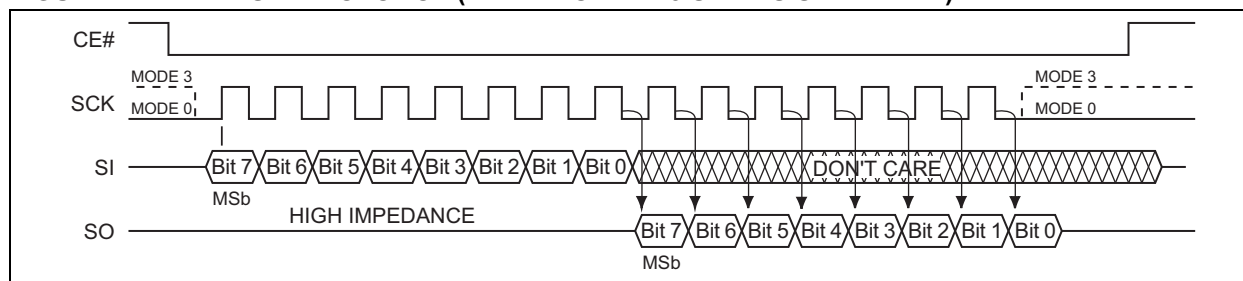
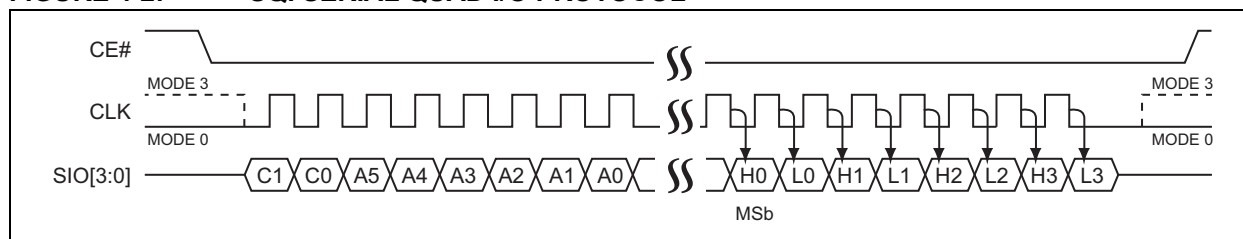


FIGURE 4-2: SQI SERIAL QUAD I/O PROTOCOL



4.1 Device Protection

SST26VF064B/064BA offer a flexible memory protection scheme that allows the protection state of each individual block to be controlled separately. In addition, the Write Protection Lock-Down register prevents any change of the lock status during device operation. To avoid inadvertent writes during power-up, the device is write-protected by default after a Power-on Reset cycle. A Global Block Protection Unlock command offers a single command cycle that unlocks the entire memory array for faster manufacturing throughput.

For extra protection, there is an additional nonvolatile register that can permanently write-protect the Block Protection register bits for each individual block. Each of the corresponding lock-down bits are One-Time-Programmable (OTP)—once written, they cannot be erased. Data that had been previously programmed into these blocks cannot be altered by programming or erase and are not reversible.

4.1.1 INDIVIDUAL BLOCK PROTECTION

SST26VF064B/064BA have a Block Protection register which provides a software mechanism to write lock the individual memory blocks and write lock and/or read lock, the individual parameter blocks. The Block Protection register is 144-bit wide: two bits each for the eight 8 Kbyte parameter blocks (write lock and read lock) and one bit each for the remaining 32 Kbyte and 64 Kbyte overlay blocks (write lock). See [Table 5-6](#) for address range protected per register bit.

Each bit in the Block Protection register (BPR) can be written to a '1' (protected) or '0' (unprotected). For the parameter blocks, the Most Significant bit (MSb) is for read lock and the Least Significant bit (LSb) is for write lock. Read locking the parameter blocks provides additional security for sensitive data after retrieval (e.g., after initial boot). If a block is read locked all reads to the block return data 00H.

The Write Block Protection Register command is a two-cycle command which requires that Write-Enable (WREN) is executed prior to the Write Block Protection Register command. The Global Block Protection Unlock command clears all write protection bits in the Block Protection register.

4.1.2 WRITE PROTECTION LOCK-DOWN (VOLATILE)

To prevent changes to the Block Protection register, use the Lock-Down Block Protection Register (LBPR) command to enable Write Protection Lock-Down. Once Write Protection Lock-Down is enabled, the Block Protection register can not be changed. To avoid inadvertent lock-down, the WREN command must be executed prior to the LBPR command.

To reset Write Protection Lock-Down, performing a power cycle on the device is required. The Write Protection Lock-Down status may be read from the STATUS register.

4.1.3 WRITE LOCK LOCK-DOWN (NONVOLATILE)

The nonvolatile Write Lock Lock-Down register is an alternate register that permanently prevents changes to the block-protect bits. The nonvolatile Write Lock Lock-Down register (nVWLDR) is 136-bit wide per device: one bit each for the eight 8 Kbyte parameter blocks and one bit each for the remaining 32 Kbyte and 64 Kbyte overlay blocks. See [Table 5-6](#) for address range protected per register bit.

Writing '1' to any or all of the nVWLDR bits disables the change mechanism for the corresponding write lock bit in the BPR and permanently sets this bit to a '1' (protected) state. After this change, both bits will be set to '1', regardless of the data entered in subsequent writes to either the nVWLDR or the BPR. Subsequent writes to the nVWLDR can only alter available locations that have not been previously written to a '1'. This method provides write protection for the corresponding memory-array block by protecting it from future program or erase operations.

Writing a '0' in any location in the nVWLDR has no effect on either the nVWLDR or the corresponding write lock bit in the BPR.

Note that if the Block Protection register had been previously locked down, see [Section 4.1.2 "Write Protection Lock-Down \(Volatile\)"](#), the device must be power cycled before using the nVWLDR. If the Block Protection register is locked down and the Write nVWLDR command is accessed, the command will be ignored.

4.2 Hardware Write Protection

The hardware Write Protection pin (WP#) is used in conjunction with the WPEN and IOC bits in the Configuration register to prohibit write operations to the Block Protection and Configuration registers. The WP# pin function only works in SPI single-bit and dual-bit read mode when the IOC bit in the Configuration register is set to '0'.

The WP# pin function is disabled when the WPEN bit in the configuration register is '0'. This allows installation of the SST26VF064B/064BA in a system with a grounded WP# pin while still enabling Write to the Block Protection register. The Lock-Down function of the Block Protection Register supersedes the WP# pin. See [Table 4-1](#) for Write Protection Lock-Down states.

The factory default setting at power-up of the WPEN bit is '0', disabling the Write Protect function of the WP# after power-up. WPEN is a nonvolatile bit; once the bit is set to '1', the Write Protect function of the WP# pin continues to be enabled after power-up. The WP# pin only protects the Block Protection Register and Configuration Register from changes. Therefore, if the WP# pin is set to low before or after a Program or Erase command, or while an internal Write is in progress, it will have no effect on the Write command.

The IOC bit takes priority over the WPEN bit in the configuration register. When the IOC bit is '1', the function of the WP# pin is disabled and the WPEN bit serves no function. When the IOC bit is '0' and WPEN is '1', setting the WP# pin active-low prohibits Write operations to the Block Protection Register.

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TABLE 4-1: WRITE PROTECTION LOCK-DOWN STATES

| WP# | IOC | WPEN | WPLD | Execute WBPR Instruction | Configuration Register |
|-----|------------------|------------------|------|--------------------------|------------------------|
| L | 0 | 1 | 1 | Not Allowed | Protected |
| L | 0 | 0 | 1 | Not Allowed | Writable |
| L | 0 | 1 | 0 | Not Allowed | Protected |
| L | 0 ⁽¹⁾ | 0 ⁽²⁾ | 0 | Allowed | Writable |
| H | 0 | X | 1 | Not Allowed | Writable |
| H | 0 | X | 0 | Allowed | Writable |
| X | 1 | X | 1 | Not Allowed | Writable |
| X | 1 ⁽³⁾ | 0 ⁽²⁾ | 0 | Allowed | Writable |

Note 1: Default at power-up Register settings for SST26VF064B

2: Factory default setting is '0'. This is a nonvolatile bit; default at power-up is the value set prior to power-down.

3: Default at power-up Register settings for SST26VF064BA

4.3 Security ID

SST26VF064B/064BA offer a 2-Kbyte Security ID (Sec ID) feature. The Security ID space is divided into two parts – one factory-programmed, 64-bit segment and one user-programmable segment. The factory-programmed segment is programmed during manufacturing with a unique number and cannot be changed. The user-programmable segment is left unprogrammed for the customer to program as desired.

Use the Program Security ID (PSID) command to program the Security ID using the address shown in [Table 5-5](#). The Security ID can be locked using the Lockout Security ID (LSID) command. This prevents any future write operations to the Security ID.

The factory-programmed portion of the Security ID can't be programmed by the user; neither the factory-programmed nor user-programmable areas can be erased.

4.4 Hold Operation

The HOLD# pin pauses active serial sequences without resetting the clocking sequence. **This pin is active after every power up and only operates during SPI single-bit and dual-bit modes.** Two factory configurations are available: SST26VF064B ships with the IOC bit set to '0' and the HOLD# pin function enabled; SST26VF064BA ships with the IOC bit set to '1' and the HOLD# pin function disabled. The HOLD# pin is always disabled in SQI mode and only works in SPI single-bit and dual-bit read mode.

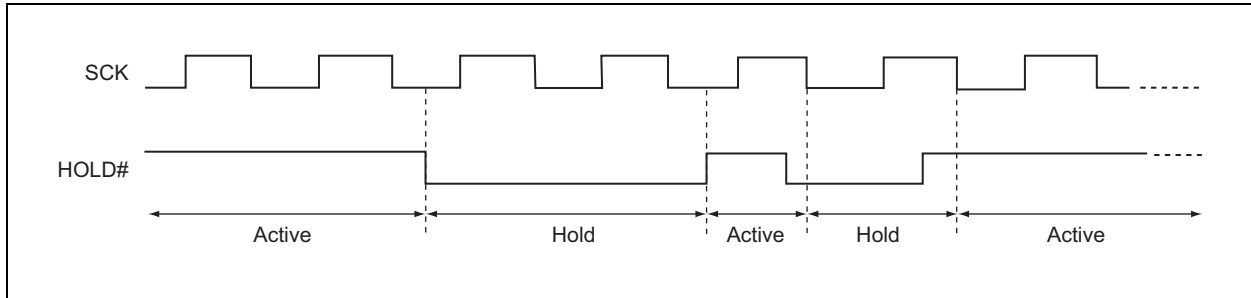
To activate the Hold mode, CE# must be in active-low state. The Hold mode begins when the SCK active-low state coincides with the falling edge of the HOLD# signal. The Hold mode ends when the HOLD# signal's rising edge coincides with the SCK active-low state.

If the falling edge of the HOLD# signal does not coincide with the SCK active-low state, then the device enters Hold mode when the SCK next reaches the active-low state. Similarly, if the rising edge of the HOLD# signal does not coincide with the SCK active-low state, then the device exits Hold mode when the SCK next reaches the active-low state (See [Figure 4-3](#)).

Once the device enters Hold mode, SO will be in high impedance state while SI and SCK can be VIL or VIH.

If CE# is driven active-high during a Hold condition, it resets the internal logic of the device. As long as HOLD# signal is low, the memory remains in the Hold condition. To resume communication with the device, HOLD# must be driven active-high and CE# must be driven active-low.

FIGURE 4-3: HOLD CONDITION WAVEFORM



SST26VF064B/SST26VF064BA

4.5 STATUS Register

The STATUS register is a read-only register that provides the following status information: whether the Flash memory array is available for any Read or Write operation, if the device is write-enabled, whether an erase or program operation is suspended and if the Block Protection register and/or Security ID are locked down. During an internal Erase or Program operation, the STATUS register may be read to determine the completion of an operation in progress. [Table 4-2](#) describes the function of each bit in the STATUS register.

TABLE 4-2: STATUS REGISTER

| Bit | Name | Function | Default at Power-up | Read/Write (R/W) |
|-----|--------------------|---|---------------------|------------------|
| 0 | BUSY | Write operation status 1 = Internal Write operation is in progress 0 = No internal Write operation is in progress | 0 | R |
| 1 | WEL | Write-Enable Latch status 1 = Device is write-enabled 0 = Device is not write-enabled | 0 | R |
| 2 | WSE | Write Suspend Erase status 1 = Erase suspended 0 = Erase is not suspended | 0 | R |
| 3 | WSP | Write Suspend Program status 1 = Program suspended 0 = Program is not suspended | 0 | R |
| 4 | WPLD | Write Protection Lock-Down status 1 = Write Protection Lock-Down enabled 0 = Write Protection Lock-Down disabled | 0 | R |
| 5 | SEC ⁽¹⁾ | Security ID status 1 = Security ID space locked 0 = Security ID space not locked | 0 ⁽¹⁾ | R |
| 6 | RES | Reserved for future use | 0 | R |
| 7 | BUSY | Write operation status 1 = Internal Write operation is in progress 0 = No internal Write operation is in progress | 0 | R |

Note 1: The Security ID status will always be '1' at power-up after a successful execution of the Lockout Security ID instruction, otherwise default at power-up is '0'.

4.5.1 WRITE ENABLE LATCH (WEL)

The Write Enable Latch (WEL) bit indicates the status of the internal memory's Write Enable Latch. If the WEL bit is set to '1', the device is write enabled. If the bit is set to '0' (reset), the device is not write enabled and does not accept any memory Program or Erase, Protection Register Write, or Lock-Down commands. The Write Enable Latch bit is automatically reset under the following conditions:

- Power-up
- Reset
- Write Disable (WRDI) instruction
- Page Program instruction completion
- Sector Erase instruction completion
- Block Erase instruction completion
- Chip Erase instruction completion
- Write Block Protection register instruction
- Lock-Down Block Protection register instruction
- Program Security ID instruction completion
- Lockout Security ID instruction completion
- Write Suspend instruction
- SPI Quad Page program instruction completion
- Write STATUS Register

4.5.2 WRITE SUSPEND ERASE STATUS (WSE)

The Write Suspend Erase status (WSE) indicates when an Erase operation has been suspended. The WSE bit is '1' after the host issues a suspend command during an Erase operation. Once the suspended Erase resumes, the WSE bit is reset to '0'.

4.5.3 WRITE SUSPEND PROGRAM STATUS (WSP)

The Write Suspend Program status (WSP) bit indicates when a Program operation has been suspended. The WSP is '1' after the host issues a suspend command during the Program operation. Once the suspended Program resumes, the WSP bit is reset to '0'.

4.5.4 WRITE PROTECTION LOCK-DOWN STATUS (WPLD)

The Write Protection Lock-Down status (WPLD) bit indicates when the Block Protection register is locked-down to prevent changes to the protection settings. The WPLD is '1' after the host issues a Lock-Down Block Protection command. After a power cycle, the WPLD bit is reset to '0'.

4.5.5 SECURITY ID STATUS (SEC)

The Security ID Status (SEC) bit indicates when the Security ID space is locked to prevent a Write command. The SEC is '1' after the host issues a Lockout SID command. Once the host issues a Lockout SID command, the SEC bit can never be reset to '0'.

4.5.6 BUSY

The Busy bit determines whether there is an internal Erase or Program operation in progress. If the BUSY bit is '1', the device is busy with an internal Erase or Program operation. If the bit is '0', no Erase or Program operation is in progress.

4.5.7 CONFIGURATION REGISTER

The Configuration register is a Read/Write register that stores a variety of configuration information. See [Table 4-3](#) for the function of each bit in the register.

SST26VF064B/SST26VF064BA

TABLE 4-3: CONFIGURATION REGISTER

| Bit | Name | Function | Default at Power-up | Read/Write (R/W) |
|-----|------|---|---------------------|------------------|
| 0 | RES | Reserved | 0 | R |
| 1 | IOC | I/O Configuration for SPI Mode 1 = WP# and HOLD# pins disabled 0 = WP# and HOLD# pins enabled | 0 ⁽¹⁾ | R/W |
| 2 | RES | Reserved | 0 | R |
| 3 | BPNV | Block Protection Volatility State 1 = No memory block has been permanently locked 0 = Any block has been permanently locked | 1 | R |
| 4 | RES | Reserved | 0 | R |
| 5 | RES | Reserved | 0 | R |
| 6 | RES | Reserved | 0 | R |
| 7 | WPEN | Write Protection Pin (WP#) Enable 1 = WP# enabled 0 = WP# disabled | 0 ⁽²⁾ | R/W |

Note 1: SST26VF064B default at Power-up is '0'
SST26VF064BA default at Power-up is '1'

2: Factory default setting. This is a nonvolatile bit; default at power-up will be the setting prior to power-down.

4.5.8 I/O CONFIGURATION (IOC)

The I/O Configuration (IOC) bit re-configures the I/O pins. The IOC bit is set by writing a '1' to bit 1 of the Configuration register. When IOC bit is '0' the WP# pin and HOLD# pin are enabled (SPI or Dual Configuration setup). When IOC bit is set to '1', the SIO2 pin and SIO3 pin are enabled (SPI Quad I/O Configuration setup). The IOC bit must be set to '1' before issuing the following SPI commands: SQOR (6BH), SQIOR (EBH), RBSPi (ECH) and SPI Quad page program (32H). Without setting the IOC bit to '1', those SPI commands are not valid. The I/O configuration bit does not apply when in SQL mode. The default at power-up for SST26VF064B is '0' and for SST26VF064BA is '1'.

4.5.9 BLOCK PROTECTION VOLATILITY STATE (BPNV)

The Block Protection Volatility State bit indicates whether any block has been permanently locked with the nVWLDR. When no bits in the nVWLDR have been set, the BPNV is '1'; this is the default state from the factory. When one or more bits in the nVWLDR are set to '1', the BPNV bit will also be '0' from that point forward, even after power-up.

4.5.10 WRITE PROTECT ENABLE (WPEN)

The Write Protect Enable (WPEN) bit is a nonvolatile bit that enables the WP# pin.

The Write Protect (WP#) pin and the Write Protect Enable (WPEN) bit control the programmable hardware write-protect feature. Setting the WP# pin to low and the WPEN bit to '1', enables Hardware write protection. To disable Hardware write protection, set either the WP# pin to high or the WPEN bit to '0'. There is latency associated with writing to the WPEN bit. Poll the BUSY bit in the STATUS register, or wait TWPEN, for the completion of the internal, self-timed Write operation. When the chip is hardware write protected, only Write operations to Block Protection and Configuration registers are disabled. See [Section 4.2 "Hardware Write Protection"](#) and [Table 4-1](#) for more information about the functionality of the WPEN bit.

SST26VF064B/SST26VF064BA

5.0 INSTRUCTIONS

Instructions are used to read, write (erase and program) and configure the SST26VF064B/064BA. The complete list of the instructions is provided in [Table 5-1](#).

TABLE 5-1: DEVICE OPERATION INSTRUCTIONS FOR SST26VF064B/064BA

| Instruction | Description | Command Cycle ⁽¹⁾ | Mode | | Address Cycle(s) ^(2,3) | Dummy Cycle(s) ⁽³⁾ | Data Cycle(s) ⁽³⁾ | Maximum Frequency ⁽⁴⁾ |
|-----------------------|-----------------------------|------------------------------|------|-----|-----------------------------------|-------------------------------|------------------------------|----------------------------------|
| | | | SPI | SQI | | | | |
| Configuration | | | | | | | | |
| NOP | No Operation | 00H | X | X | 0 | 0 | 0 | 104 MHz/ 80 MHz |
| RSTEN | Reset Enable | 66H | X | X | 0 | 0 | 0 | |
| RST ⁽⁵⁾ | Reset Memory | 99H | X | X | 0 | 0 | 0 | |
| EQIO | Enable Quad I/O | 38H | X | | 0 | 0 | 0 | |
| RSTQIO ⁽⁶⁾ | Reset Quad I/O | FFH | X | X | 0 | 0 | 0 | |
| RDSR | Read STATUS Register | 05H | X | | 0 | 0 | 1 to ∞ | |
| | | | | X | 0 | 1 | 1 to ∞ | |
| WRSR | Write STATUS Register | 01H | X | X | 0 | 0 | 2 | |
| RDCR | Read Configuration Register | 35H | X | | 0 | 0 | 1 to ∞ | |
| | | | | X | 0 | 1 | 1 to ∞ | |
| Read | | | | | | | | |
| Read | Read Memory | 03H | X | | 3 | 0 | 1 to ∞ | 40 MHz |
| High-Speed Read | Read Memory at Higher Speed | 0BH | | X | 3 | 3 | 1 to ∞ | 104 MHz/ 80 MHz |
| | | | X | | 3 | 1 | 1 to ∞ | |
| SQOR ⁽⁷⁾ | SPI Quad Output Read | 6BH | X | | 3 | 1 | 1 to ∞ | |
| SQIOR ⁽⁸⁾ | SPI Quad I/O Read | EBH | X | | 3 | 3 | 1 to ∞ | |
| SDOR ⁽⁹⁾ | SPI Dual Output Read | 3BH | X | | 3 | 1 | 1 to ∞ | 80 MHz |
| SDIOR ⁽¹⁰⁾ | SPI Dual I/O Read | BBH | X | | 3 | 1 | 1 to ∞ | |

- Note 1:** Command cycle is two clock periods in SQI mode and eight clock periods in SPI mode.
- 2:** Address bits above the most significant bit of each density can be V_{IL} or V_{IH}.
- 3:** Address, Dummy/Mode bits and Data cycles are two clock periods in SQI and eight clock periods in SPI mode.
- 4:** The max frequency for all instructions is up to 104 MHz from 2.7V-3.6V and up to 80 MHz from 2.3V-3.6V unless otherwise noted.
- 5:** RST command only executed if RSTEN command is executed first. Any intervening command will disable Reset.
- 6:** Device accepts eight-clock command in SPI mode, or two-clock command in SQI mode.
- 7:** Data cycles are two clock periods. IOC bit must be set to '1' before issuing the command.
- 8:** Address, Dummy/Mode bits and data cycles are two clock periods. IOC bit must be set to '1' before issuing the command.
- 9:** Data cycles are four clock periods.
- 10:** Address, Dummy/Mode bits and Data cycles are four clock periods.
- 11:** Sector Addresses: Use AMS-A12, remaining address are don't care, but must be set to V_{IL} or V_{IH}.
- 12:** Blocks are 64 Kbyte, 32 Kbyte, or 8 Kbyte, depending on location. Block Erase Address: AMS-A16 for 64 Kbyte; AMS-A15 for 32 Kbyte; AMS-A13 for 8 Kbyte. Remaining addresses are don't care, but must be set to V_{IL} or V_{IH}.

SST26VF064B/SST26VF064BA

TABLE 5-1: DEVICE OPERATION INSTRUCTIONS FOR SST26VF064B/064BA (CONTINUED)

| Instruction | Description | Command Cycle ⁽¹⁾ | Mode | | Address Cycle(s) ^(2,3) | Dummy Cycle(s) ⁽³⁾ | Data Cycle(s) ⁽³⁾ | Maximum Frequency ⁽⁴⁾ |
|----------------------------|--|------------------------------|------|-----|-----------------------------------|-------------------------------|------------------------------|----------------------------------|
| | | | SPI | SQL | | | | |
| SB | Set Burst Length | C0H | X | X | 0 | 0 | 1 | 104 MHz/ 80 MHz |
| RBSQI | SQL Read Burst with Wrap | 0CH | | X | 3 | 3 | n to ∞ | |
| RBSPI ⁽⁸⁾ | SPI Read Burst with Wrap | ECH | X | | 3 | 3 | n to ∞ | |
| Identification | | | | | | | | |
| JEDEC-ID | JEDEC-ID Read | 9FH | X | | 0 | 0 | 3 to ∞ | 104 MHz/ 80 MHz |
| Quad J-ID | Quad I/O J-ID Read | AFH | | X | 0 | 1 | 3 to ∞ | |
| SFDP | Serial Flash Discoverable Parameters | 5AH | X | | 3 | 1 | 1 to ∞ | |
| Write | | | | | | | | |
| WREN | Write Enable | 06H | X | X | 0 | 0 | 0 | 104 MHz/ 80 MHz |
| WRDI | Write Disable | 04H | X | X | 0 | 0 | 0 | |
| SE ⁽¹¹⁾ | Erase 4 Kbytes of Memory Array | 20H | X | X | 3 | 0 | 0 | |
| BE ⁽¹²⁾ | Erase 64, 32 or 8 Kbytes of Memory Array | D8H | X | X | 3 | 0 | 0 | |
| CE | Erase Full Array | C7H | X | X | 0 | 0 | 0 | |
| PP | Page Program | 02H | X | X | 3 | 0 | 1 to 256 | |
| SPI Quad PP ⁽⁷⁾ | SQL Quad Page Program | 32H | X | | 3 | 0 | 1 to 256 | 104 MHz/ 80 MHz |
| WRSU | Suspends Program/Erase | B0H | X | X | 0 | 0 | 0 | |
| WRRE | Resumes Program/Erase | 30H | X | X | 0 | 0 | 0 | |

- Note 1:** Command cycle is two clock periods in SQL mode and eight clock periods in SPI mode.
- 2:** Address bits above the most significant bit of each density can be VIL or VIH.
- 3:** Address, Dummy/Mode bits and Data cycles are two clock periods in SQL and eight clock periods in SPI mode.
- 4:** The max frequency for all instructions is up to 104 MHz from 2.7V-3.6V and up to 80 MHz from 2.3V-3.6V unless otherwise noted.
- 5:** RST command only executed if RSTEN command is executed first. Any intervening command will disable Reset.
- 6:** Device accepts eight-clock command in SPI mode, or two-clock command in SQL mode.
- 7:** Data cycles are two clock periods. IOC bit must be set to '1' before issuing the command.
- 8:** Address, Dummy/Mode bits and data cycles are two clock periods. IOC bit must be set to '1' before issuing the command.
- 9:** Data cycles are four clock periods.
- 10:** Address, Dummy/Mode bits and Data cycles are four clock periods.
- 11:** Sector Addresses: Use AMS-A12, remaining address are don't care, but must be set to VIL or VIH.
- 12:** Blocks are 64 Kbyte, 32 Kbyte, or 8 Kbyte, depending on location. Block Erase Address: AMS-A16 for 64 Kbyte; AMS-A15 for 32 Kbyte; AMS-A13 for 8 Kbyte. Remaining addresses are don't care, but must be set to VIL or VIH.

SST26VF064B/SST26VF064BA

TABLE 5-1: DEVICE OPERATION INSTRUCTIONS FOR SST26VF064B/064BA (CONTINUED)

| Instruction | Description | Command Cycle ⁽¹⁾ | Mode | | Address Cycle(s) ^(2,3) | Dummy Cycle(s) ⁽³⁾ | Data Cycle(s) ⁽³⁾ | Maximum Frequency ⁽⁴⁾ |
|-------------|--------------------------------------|------------------------------|------|-----|-----------------------------------|-------------------------------|------------------------------|----------------------------------|
| | | | SPI | SQI | | | | |
| Protection | | | | | | | | |
| RBPR | Read Block Protection Register | 72H | X | | 0 | 0 | 1 to 18 | 104 MHz/ 80 MHz |
| | | | | X | 0 | 1 | 1 to 18 | |
| WBPR | Write Block Protection Register | 42H | X | X | 0 | 0 | 1 to 18 | |
| LBPR | Lock-Down Block Protection Register | 8DH | X | X | 0 | 0 | 0 | |
| nVWLDR | Nonvolatile Write Lock-Down Register | E8H | X | X | 0 | 0 | 1 to 18 | |
| ULBPR | Global Block Protection Unlock | 98H | X | X | 0 | 0 | 0 | |
| RSID | Read Security ID | 88H | X | | 2 | 1 | 1 to 2048 | |
| | | | | X | 2 | 3 | 1 to 2048 | |
| PSID | Program User Security ID area | A5H | X | X | 2 | 0 | 1 to 256 | |
| LSID | Lockout Security ID Programming | 85H | X | X | 0 | 0 | 0 | |

- Note 1:** Command cycle is two clock periods in SQI mode and eight clock periods in SPI mode.
- 2:** Address bits above the most significant bit of each density can be V_{IL} or V_{IH}.
- 3:** Address, Dummy/Mode bits and Data cycles are two clock periods in SQI and eight clock periods in SPI mode.
- 4:** The max frequency for all instructions is up to 104 MHz from 2.7V-3.6V and up to 80 MHz from 2.3V-3.6V unless otherwise noted.
- 5:** RST command only executed if RSTEN command is executed first. Any intervening command will disable Reset.
- 6:** Device accepts eight-clock command in SPI mode, or two-clock command in SQI mode.
- 7:** Data cycles are two clock periods. IOC bit must be set to '1' before issuing the command.
- 8:** Address, Dummy/Mode bits and data cycles are two clock periods. IOC bit must be set to '1' before issuing the command.
- 9:** Data cycles are four clock periods.
- 10:** Address, Dummy/Mode bits and Data cycles are four clock periods.
- 11:** Sector Addresses: Use AMS-A12, remaining address are don't care, but must be set to V_{IL} or V_{IH}.
- 12:** Blocks are 64 Kbyte, 32 Kbyte, or 8 Kbyte, depending on location. Block Erase Address: AMS-A16 for 64 Kbyte; AMS-A15 for 32 Kbyte; AMS-A13 for 8 Kbyte. Remaining addresses are don't care, but must be set to V_{IL} or V_{IH}.

SST26VF064B/SST26VF064BA

5.1 No Operation (NOP)

The No Operation command only cancels a Reset Enable command. NOP has no impact on any other command.

5.2 Reset Enable (RSTEN) and Reset (RST)

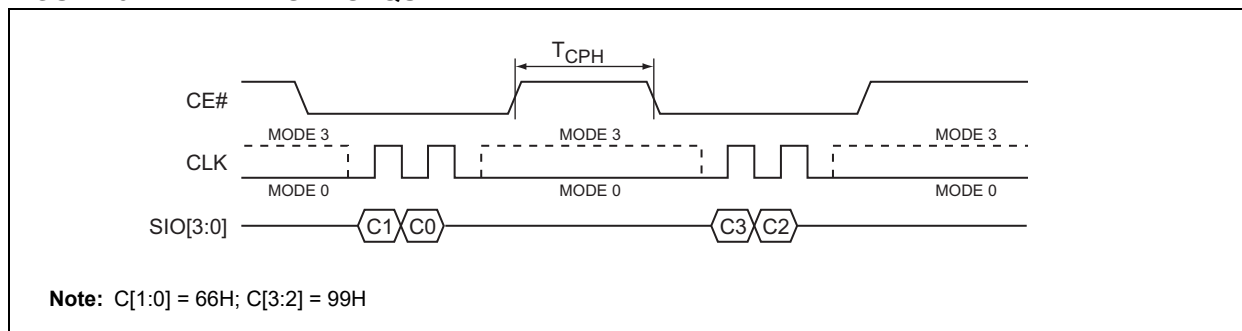
The Reset operation is used as a system (software) reset that puts the device in normal operating Ready mode. This operation consists of two commands: Reset Enable (RSTEN) followed by Reset (RST).

To reset the SST26VF064B/064BA, the host drives CE# low, sends the Reset Enable command (66H) and drives CE# high. Next, the host drives CE# low again, sends the Reset command (99H) and drives CE# high (see [Figure 5-1](#)).

The Reset operation requires the Reset Enable command followed by the Reset command. Any command other than the Reset command after the Reset Enable command will disable the Reset Enable.

Once the Reset Enable and Reset commands are successfully executed, the device returns to normal operation Read mode and then does the following: resets the protocol to SPI mode, resets the burst length to 8 bytes, clears all the bits, except for bit 4 (WPLD) and bit 5 (SEC), in the STATUS register to their default states and clears bit 1 (IOC) in the Configuration register to its default state. A device reset during an active Program or Erase operation aborts the operation, which can cause the data of the targeted address range to be corrupted or lost. Depending on the prior operation, the reset timing may vary. Recovery from a Write operation requires more latency time than recovery from other operations. See [Table 8-2](#) for Rest timing parameters.

FIGURE 5-1: RESET SEQUENCE

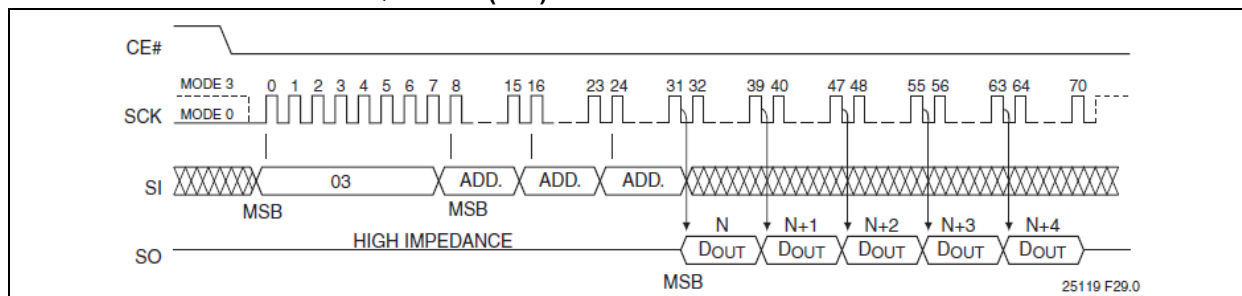


5.3 Read (40 MHz)

The Read instruction, 03H, is supported in SPI bus protocol only with clock frequencies up to 40 MHz. This command is not supported in SQI bus protocol. The device outputs the data starting from the specified address location, then continuously streams the data output through all addresses until terminated by a low-to-high transition on CE#. The internal address pointer will automatically increment until the highest memory address is reached. Once the highest memory address is reached, the address pointer will automatically return to the beginning (wrap-around) of the address space.

Initiate the Read instruction by executing an 8-bit command, 03H, followed by address bits A[23:0]. CE# must remain active-low for the duration of the Read cycle. See [Figure 5-2](#) for Read Sequence.

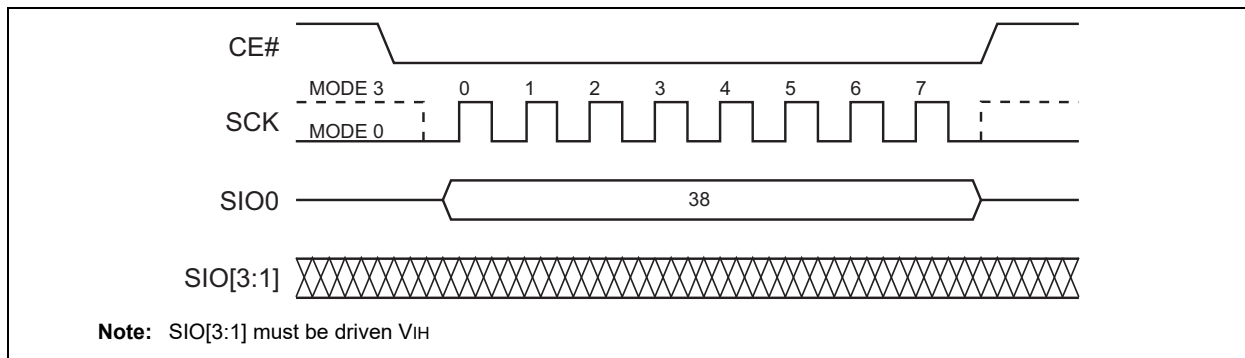
FIGURE 5-2: READ SEQUENCE (SPI)



5.4 Enable Quad I/O (EQIO)

The Enable Quad I/O (EQIO) instruction, 38H, enables the Flash device for SQI bus operation. Upon completion of the instruction, all instructions thereafter are expected to be 4-bit multiplexed input/output (SQI mode) until a power cycle or a “Reset Quad I/O instruction” is executed (See [Figure 5-3](#)).

FIGURE 5-3: ENABLE QUAD I/O SEQUENCE



5.5 Reset Quad I/O (RSTQIO)

The Reset Quad I/O instruction, FFH, resets the device to 1-bit SPI protocol operation or exits the Set Mode configuration during a read sequence. This command allows the Flash device to return to the default I/O state (SPI) without a power cycle and executes in either 1-bit or 4-bit mode. If the device is in the Set Mode configuration, while in SQI High-Speed Read mode, the RSTQIO command will only return the device to a state where it can accept new command instruction. An additional RSTQIO is required to reset the device to SPI mode.

To execute a Reset Quad I/O operation, the host drives CE# low, sends the Reset Quad I/O command cycle (FFH) then, drives CE# high. Execute the instruction in either SPI (8 clocks) or SQI (2 clocks) command cycles. For SPI, SIO[3:1] are don't care for this command, but should be driven to V_{IH} or V_{IL} (See [Figure 5-4](#) and [Figure 5-5](#)).

FIGURE 5-4: RESET QUAD I/O SEQUENCE (SPI)

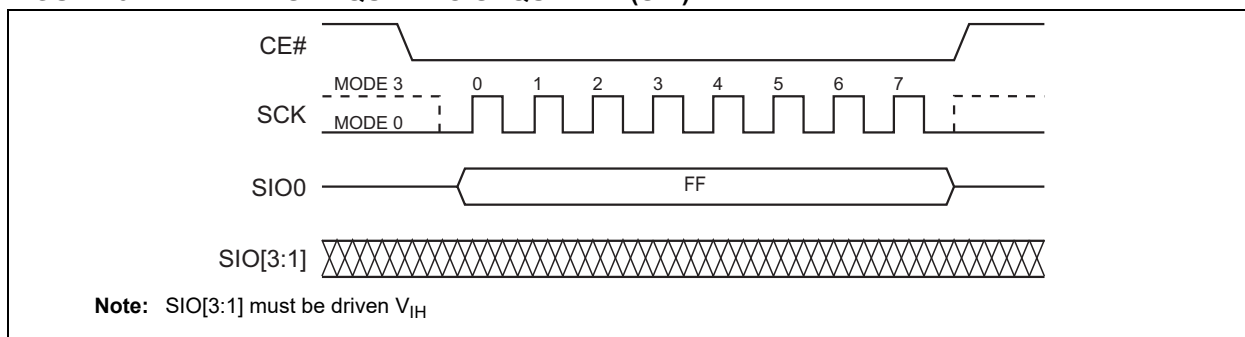
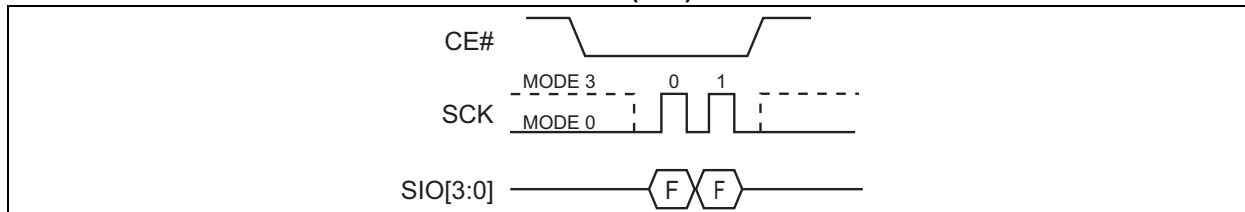


FIGURE 5-5: RESET QUAD I/O SEQUENCE (SQI)



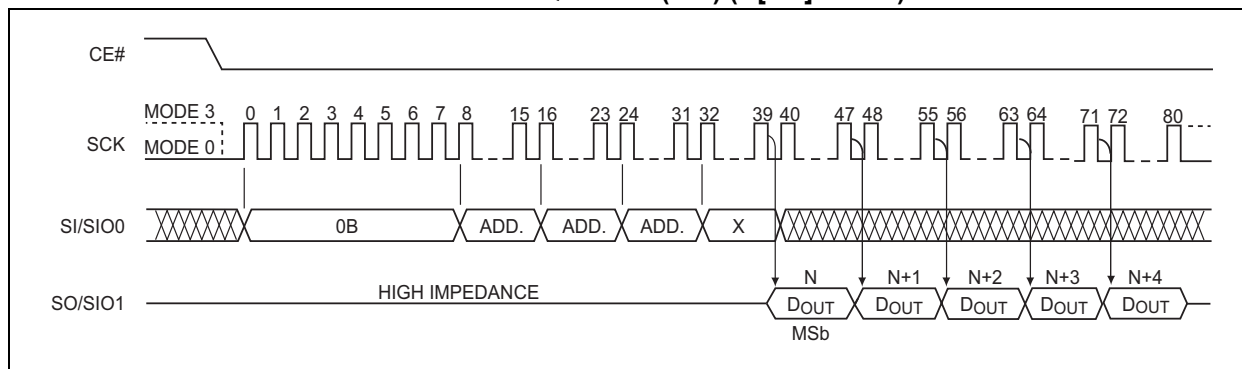
SST26VF064B/SST26VF064BA

5.6 High-Speed Read

The High-Speed Read instruction, 0BH, is supported in both SPI bus protocol and SQI protocol. This instruction supports frequencies of up to 104 MHz from 2.7V-3.6V and up to 80 MHz from 2.3V-3.6V. On power-up, the device is set to use SPI.

Initiate High-Speed Read by executing an 8-bit command, 0BH, followed by address bits A[23:0] and a dummy byte. CE# must remain active-low for the duration of the High-Speed Read cycle. See Figure 5-6 for the High-Speed Read sequence for SPI bus protocol.

FIGURE 5-6: HIGH-SPEED READ SEQUENCE (SPI) (C[1:0] = 0BH)



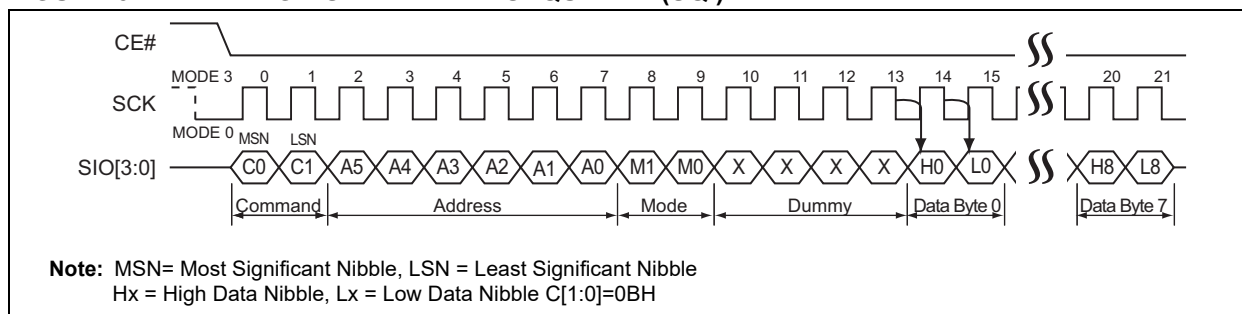
In SQI protocol, the host drives CE# low then send the Read command cycle command, 0BH, followed by three address cycles, a Set Mode Configuration cycle, and two dummy cycles. Each cycle is two nibbles (clocks) long, most significant nibble first.

After the dummy cycles, the device outputs data on the falling edge of the SCK signal starting from the specified address location. The device continually streams data output through all addresses until terminated by a low-to-high transition on CE#. The internal address pointer automatically increments until the highest memory address is reached, at which point the address pointer returns to address location 000000H. During this operation, blocks that are read locked will output data 00H.

The Set Mode Configuration bit M[7:0] indicates if the next instruction cycle is another SQI High-Speed Read command. When M[7:0] = AXH, the device expects the next continuous instruction to be another Read command, 0BH, and does not require the op-code to be entered again. The host may initiate the next Read cycle by driving CE# low, then sending the four-bits input for address A[23:0], followed by the Set Mode configuration bits M[7:0] and two dummy cycles. After the two dummy cycles, the device outputs the data starting from the specified address location. There are no restrictions on address location access.

When M[7:0] is any value other than AXH, the device expects the next instruction initiated to be a command instruction. To reset/exit the Set Mode configuration, execute the Reset Quad I/O command, FFH. While in the Set Mode configuration, the RSTQIO command will only return the device to a state where it can accept new command instruction. An additional RSTQIO is required to reset the device to SPI mode. See Figure 5-10 for the SPI Quad I/O Mode Read sequence when M[7:0] = AXH.

FIGURE 5-7: HIGH-SPEED READ SEQUENCE (SQI)

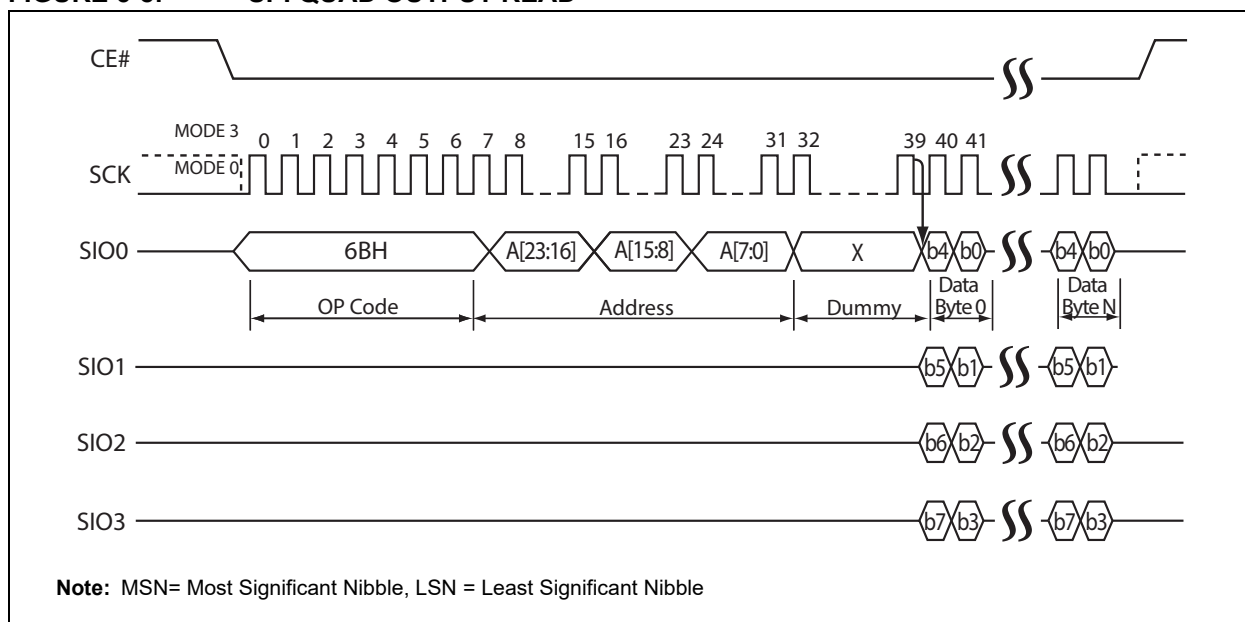


5.7 SPI Quad-Output Read

The SPI Quad-Output Read instruction supports frequencies of up to 104 MHz from 2.7V-3.6V and up to 80 MHz from 2.3V-3.6V. SST26VF064B requires the IOC bit in the configuration register to be set to '1' prior to executing the command. Initiate SPI Quad-Output Read by executing an 8-bit command, 6BH, followed by address bits A[23:0] and a dummy byte. CE# must remain active-low for the duration of the SPI Quad Mode Read. See Figure 5-8 for the SPI Quad Output Read sequence.

Following the dummy byte, the device outputs data from SIO[3:0] starting from the specified address location. The device continually streams data output through all addresses until terminated by a low-to-high transition on CE#. The internal address pointer automatically increments until the highest memory address is reached, at which point the address pointer returns to the beginning of the address space.

FIGURE 5-8: SPI QUAD OUTPUT READ



SST26VF064B/SST26VF064BA

5.8 SPI Quad I/O Read

The SPI Quad I/O Read (SQIOR) instruction supports frequencies of up to 104 MHz from 2.7V-3.6V and up to 80 MHz from 2.3V-3.6V. SST26VF064B requires the IOC bit in the configuration register to be set to '1' prior to executing the command. Initiate SQIOR by executing an 8-bit command, EBH. The device then switches to 4-bit I/O mode for address bits A[23:0], followed by the Set Mode configuration bits M[7:0] and two dummy bytes. CE# must remain active-low for the duration of the SPI Quad I/O Read. See Figure 5-9 for the SPI Quad I/O Read sequence.

Following the dummy bytes, the device outputs data from the specified address location. The device continually streams data output through all addresses until terminated by a low-to-high transition on CE#. The internal address pointer automatically increments until the highest memory address is reached, at which point the address pointer returns to the beginning of the address space.

The Set Mode Configuration bit M[7:0] indicates if the next instruction cycle is another SPI Quad I/O Read command. When M[7:0] = AXH, the device expects the next continuous instruction to be another Read command, EBH, and does not require the op-code to be entered again. The host may set the next SQIOR cycle by driving CE# low, then sending the four-bit wide input for address A[23:0], followed by the Set Mode configuration bits M[7:0] and two dummy cycles. After the two dummy cycles, the device outputs the data starting from the specified address location. There are no restrictions on address location access.

When M[7:0] is any value other than AXH, the device expects the next instruction initiated to be a command instruction. To reset/exit the Set Mode configuration, execute the Reset Quad I/O command, FFH. See Figure 5-10 for the SPI Quad I/O Mode Read sequence when M[7:0] = AXH.

FIGURE 5-9: SPI QUAD I/O READ SEQUENCE

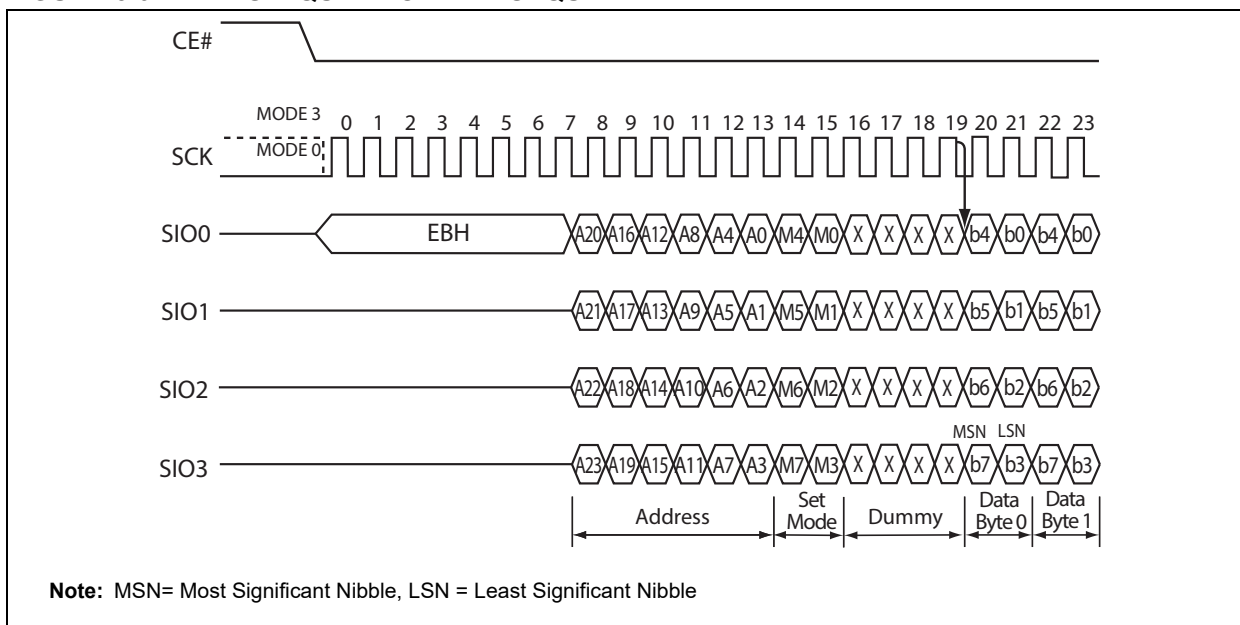
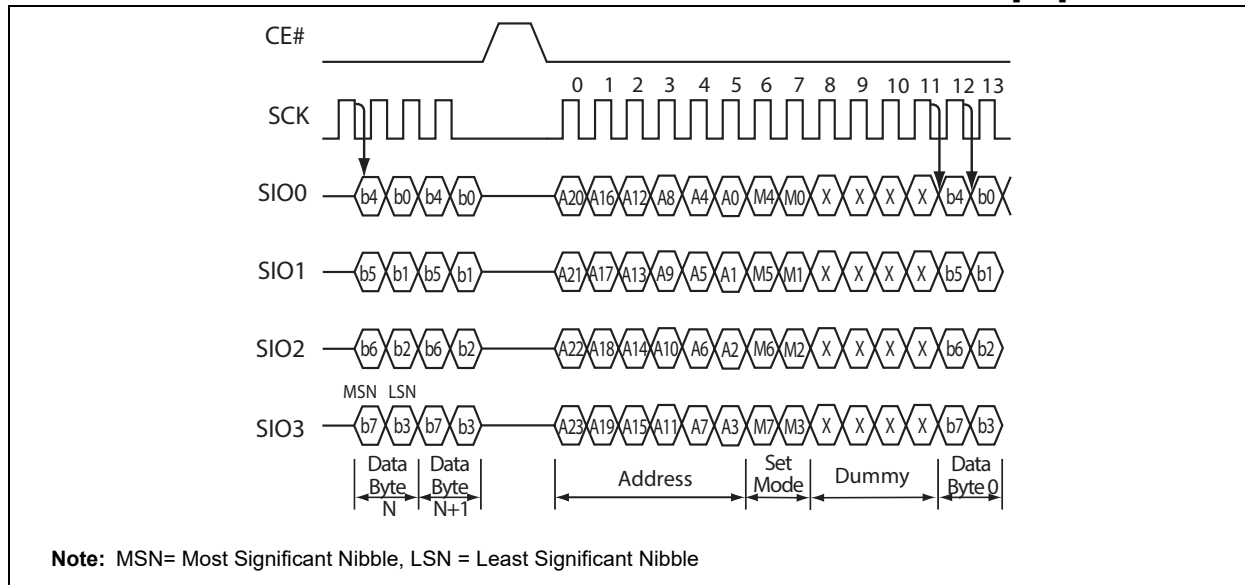


FIGURE 5-10: BACK-TO-BACK SPI QUAD I/O READ SEQUENCES WHEN M[7:0] = AXH



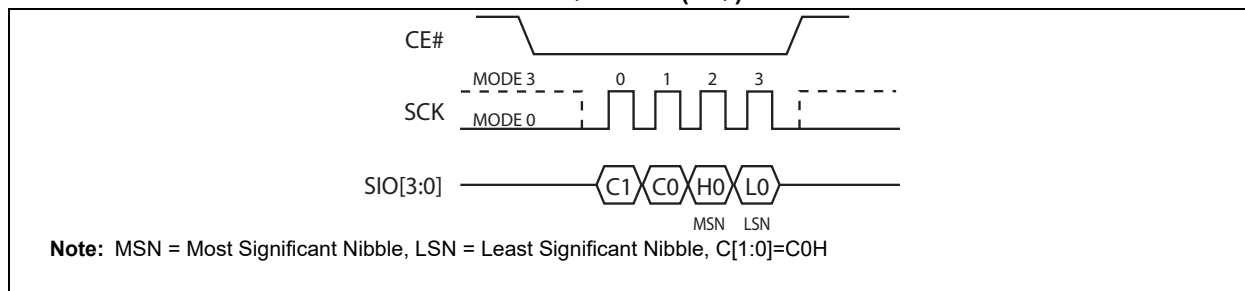
5.9 Set Burst

The Set Burst command specifies the number of bytes to be output during a Read Burst command before the device wraps around. It supports both SPI and SQI protocols. To set the burst length the host drives CE# low, sends the Set Burst command cycle (C0H) and one data cycle, then drives CE# high. After power-up or reset, the burst length is set to eight bytes (00H). See [Table 5-2](#) for burst length data and [Figure 5-11](#) and [Figure 5-12](#) for the sequences.

TABLE 5-2: BURST LENGTH DATA

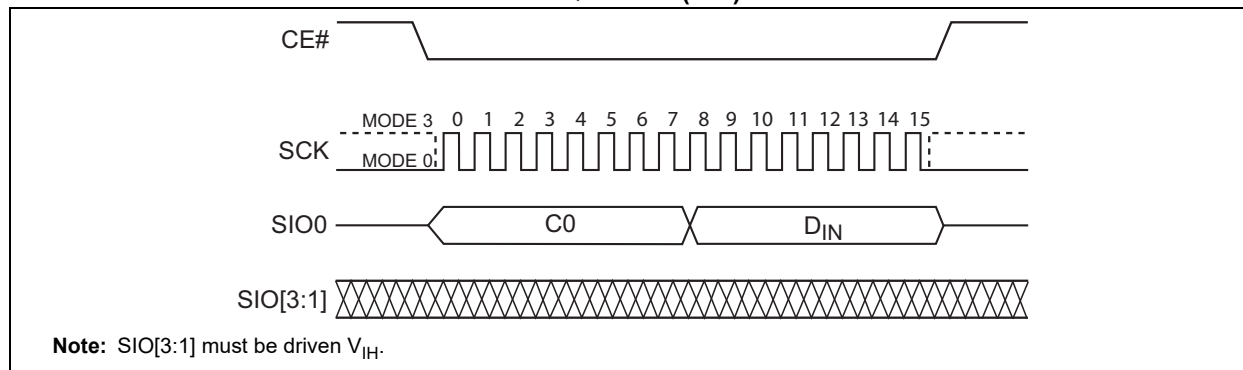
| Burst Length | High Nibble (H0) | Low Nibble (L0) |
|--------------|------------------|-----------------|
| 8 Bytes | 0h | 0h |
| 16 Bytes | 0h | 1h |
| 32 Bytes | 0h | 2h |
| 64 Bytes | 0h | 3h |

FIGURE 5-11: SET BURST LENGTH SEQUENCE (SQI)



SST26VF064B/SST26VF064BA

FIGURE 5-12: SET BURST LENGTH SEQUENCE (SPI)



5.10 SQI Read Burst with Wrap (RBSQI)

SQI Read Burst with wrap is similar to High-Speed Read in SQI mode, except data will output continuously within the burst length until a low-to-high transition on CE#. To execute a SQI Read Burst operation, drive CE# low then send the Read Burst command cycle (0CH), followed by three address cycles and then three dummy cycles. Each cycle is two nibbles (clocks) long, most significant nibble first.

After the dummy cycles, the device outputs data on the falling edge of the SCK signal starting from the specified address location. The data output stream is continuous through all addresses until terminated by a low-to-high transition on CE#.

During RBSQI, the internal address pointer automatically increments until the last byte of the burst is reached, then it wraps around to the first byte of the burst. All bursts are aligned to addresses within the burst length (See Table 5-3). For example, if the burst length is eight bytes and the start address is 06h, the burst sequence would be: 06h, 07h, 00h, 01h, 02h, 03h, 04h, 05h, 06h, etc. The pattern repeats until the command is terminated by a low-to-high transition on CE#.

During this operation, blocks that are read locked will output data 00H.

5.11 SPI Read Burst with Wrap (RBSPI)

SPI Read Burst with Wrap (RBSPI) is similar to SPI Quad I/O Read except the data will output continuously within the burst length until a low-to-high transition on CE#. To execute a SPI Read Burst with Wrap operation, drive CE# low, then send the Read Burst command cycle (ECH), followed by three address cycles and then three dummy cycles.

After the dummy cycle, the device outputs data on the falling edge of the SCK signal starting from the specified address location. The data output stream is continuous through all addresses until terminated by a low-to-high transition on CE#.

During RBSPI, the internal address pointer automatically increments until the last byte of the burst is reached, then it wraps around to the first byte of the burst. All bursts are aligned to addresses within the burst length (See Table 5-3). For example, if the burst length is eight bytes and the start address is 06h, the burst sequence would be: 06h, 07h, 00h, 01h, 02h, 03h, 04h, 05h, 06h, etc. The pattern repeats until the command is terminated by a low-to-high transition on CE#.

During this operation, blocks that are read locked will output data 00H.

TABLE 5-3: BURST ADDRESS RANGES

| Burst Length | Burst Address Ranges |
|--------------|-----------------------------------|
| 8-Bytes | 00-07H, 08-0FH, 10-17H, 18-1FH... |
| 16-Bytes | 00-0FH, 10-1FH, 20-2FH, 30-3FH... |
| 32-Bytes | 00-1FH, 20-3FH, 40-5FH, 60-7FH... |
| 64-Bytes | 00-3FH, 40-7FH, 80-BFH, C0-FFH |

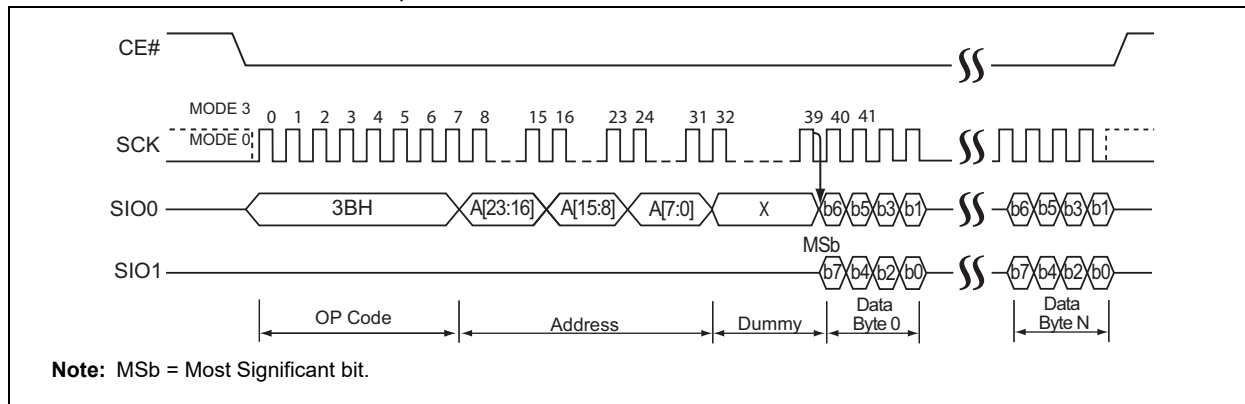
0

5.12 SPI Dual-Output Read

The SPI Dual-Output Read instruction supports frequencies of up to 104 MHz from 2.7V-3.6V and up to 80 MHz from 2.3V-3.6V. Initiate SPI Dual-Output Read by executing an 8-bit command, 3BH, followed by address bits A[23:0] and a dummy byte. CE# must remain active-low for the duration of the SPI Dual-Output Read operation. See Figure 5-13 for the SPI Quad Output Read sequence.

Following the dummy byte, the SST26VF064B/064BA outputs data from SIO[1:0] starting from the specified address location. The device continually streams data output through all addresses until terminated by a low-to-high transition on CE#. The internal address pointer automatically increments until the highest memory address is reached, at which point the address pointer returns to the beginning of the address space.

FIGURE 5-13: FAST READ, DUAL-OUTPUT SEQUENCE



5.13 SPI Dual I/O Read

The SPI Dual I/O Read (SDIOR) instruction supports up to 80 MHz frequency. Initiate SDIOR by executing an 8-bit command, BBH. The device then switches to 2-bit I/O mode for address bits A[23:0], followed by the Set Mode configuration bits M[7:0]. CE# must remain active-low for the duration of the SPI Dual I/O Read. See Figure 5-14 for the SPI Dual I/O Read sequence.

Following the Set Mode configuration bits, the SST26VF064B/064BA outputs data from the specified address location. The device continually streams data output through all addresses until terminated by a low-to-high transition on CE#. The internal address pointer automatically increments until the highest memory address is reached, at which point the address pointer returns to the beginning of the address space.

The Set Mode Configuration bit M[7:0] indicates if the next instruction cycle is another SPI Dual I/O Read command. When M[7:0] = AXH, the device expects the next continuous instruction to be another SDIOR command, BBH, and does not require the op-code to be entered again. The host may set the next SDIOR cycle by driving CE# low, then sending the two-bit wide input for address A[23:0], followed by the Set Mode configuration bits M[7:0]. After the Set Mode configuration bits, the device outputs the data starting from the specified address location. There are no restrictions on address location access.

When M[7:0] is any value other than AXH, the device expects the next instruction initiated to be a command instruction. To reset/exit the Set Mode configuration, execute the Reset Quad I/O command, FFH. See Figure 5-15 for the SPI Dual I/O Read sequence when M[7:0] = AXH.

SST26VF064B/SST26VF064BA

FIGURE 5-14: SPI DUAL I/O READ SEQUENCE

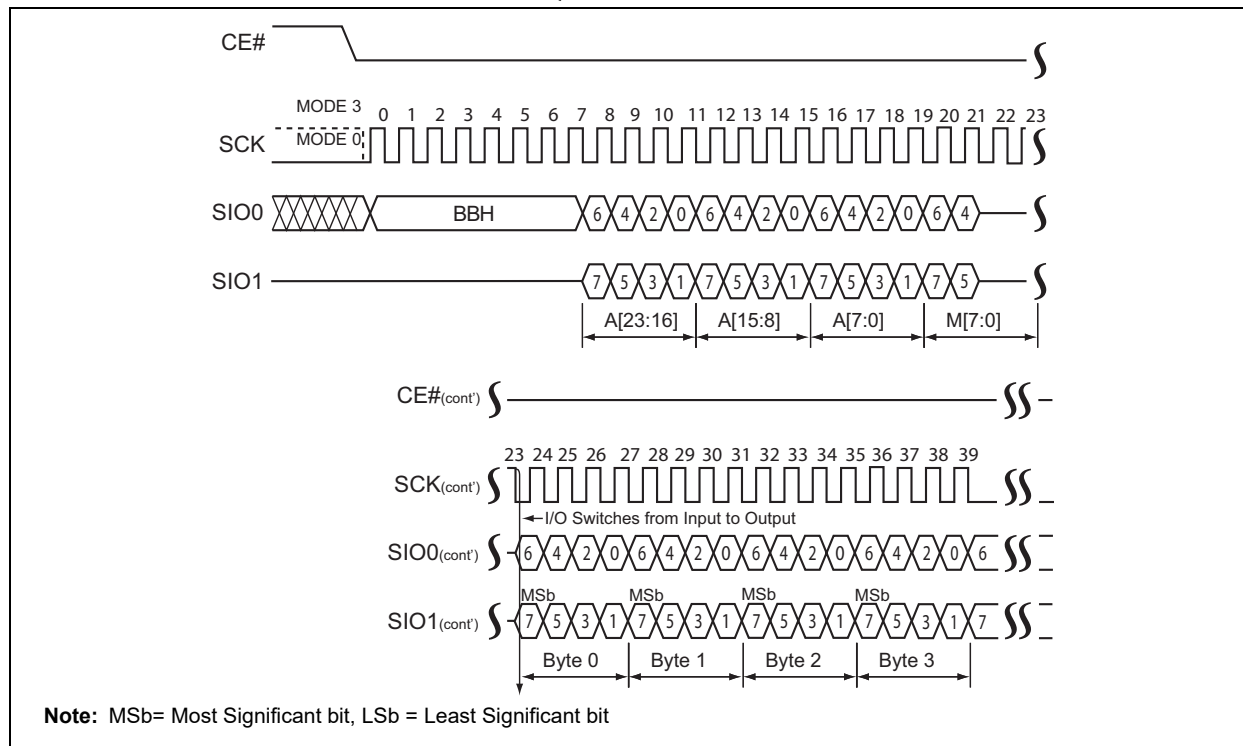
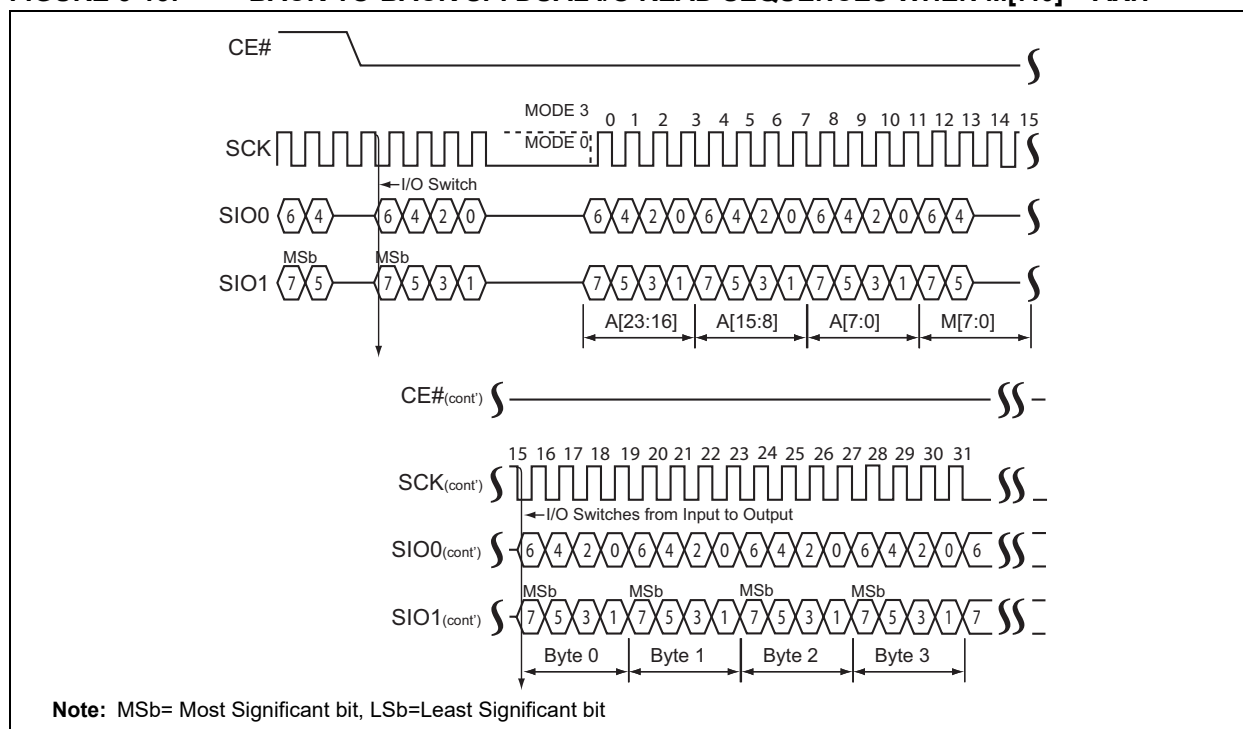


FIGURE 5-15: BACK-TO-BACK SPI DUAL I/O READ SEQUENCES WHEN M[7:0] = AXH



SST26VF064B/SST26VF064BA

5.14 JEDEC-ID Read (SPI Protocol)

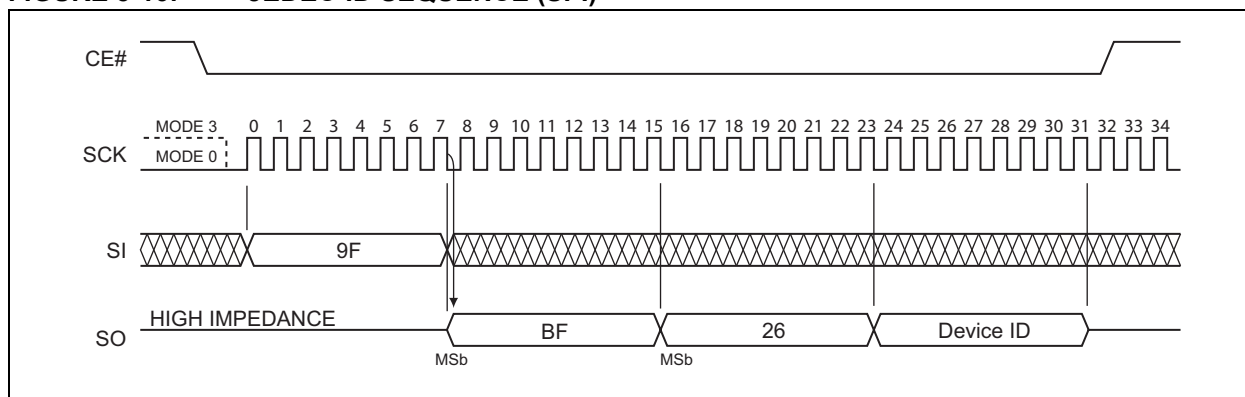
Using traditional SPI protocol, the JEDEC-ID Read instruction identifies the device as SST26VF064B/064BA and the manufacturer as Microchip®. To execute a JEDEC-ID operation the host drives CE# low then sends the JEDEC-ID command cycle (9FH). The device outputs three bytes of data: manufacturer, device type and device ID (See Table 5-4). See Figure 5-16 for instruction sequence.

Immediately following the command cycle, SST26VF064B/064BA output data on the falling edge of the SCK signal. The data output stream is continuous until terminated by a low-to-high transition on CE#. The device outputs three bytes of data: manufacturer, device type and device ID (See Table 5-4). See Figure 5-16 for instruction sequence.

TABLE 5-4: DEVICE ID DATA OUTPUT

| Product | Manufacturer ID (Byte 1) | Device ID | |
|-------------------|--------------------------|----------------------|--------------------|
| | | Device Type (Byte 2) | Device ID (Byte 3) |
| SST26VF064B/064BA | BFH | 26H | 43H |

FIGURE 5-16: JEDEC-ID SEQUENCE (SPI)

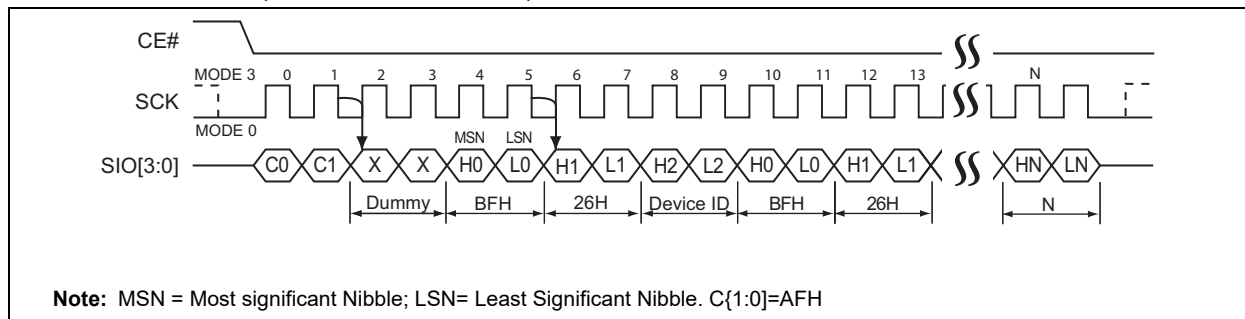


5.15 Read Quad J-ID Read (SQI Protocol)

The Read Quad J-ID Read instruction identifies the device as SST26VF064B/064BA and manufacturer as Microchip. To execute a Quad J-ID operation the host drives CE# low and then sends the Quad J-ID command cycle (AFH). Each cycle is two nibbles (clocks) long, most significant nibble first.

Immediately following the command cycle and one dummy cycle, SST26VF064B/064BA output data on the falling edge of the SCK signal. The data output stream is continuous until terminated by a low-to-high transition of CE#. The device outputs three bytes of data: manufacturer, device type and device ID. (See Table 5-4). See Figure 5-17 for instruction sequence.

FIGURE 5-17: QUAD J-ID READ SEQUENCE

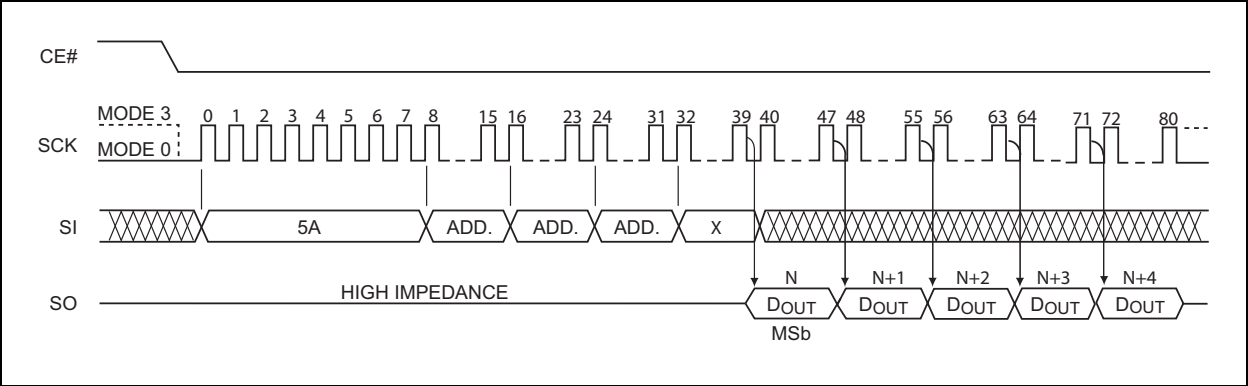


5.16 Serial Flash Discoverable Parameters (SFDP)

The Serial Flash Discoverable Parameters (SFDP) contain information describing the characteristics of the device. This allows device-independent, JEDEC ID-independent, and forward/backward compatible software support for all future Serial Flash device families. See Table 11-1 for address and data values.

Initiate SFDP by executing an 8-bit command, 5AH, followed by address bits A[23-0] and a dummy byte. CE# must remain active-low for the duration of the SFDP cycle. For the SFDP sequence (See Figure 5-18).

FIGURE 5-18: SERIAL FLASH DISCOVERABLE PARAMETERS SEQUENCE



5.17 Sector Erase

The Sector Erase instruction clears all bits in the selected 4 Kbyte sector to '1', but it does not change a protected memory area. Prior to any write operation, the Write-Enable (WREN) instruction must be executed.

To execute a Sector Erase operation, the host drives CE# low, then sends the Sector Erase command cycle (20H) and three address cycles and then drives CE# high. Address bits [AMS:A12] (AMS = Most Significant Address) determine the sector address (SAx); the remaining address bits can be VIL or VIH. To identify the completion of the internal, self-timed, Write operation, poll the BUSY bit in the STATUS register, or wait TSE. See Figure 5-19 and Figure 5-20 for the Sector Erase sequence.

FIGURE 5-19: 4 KBYTE SECTOR ERASE SEQUENCE– SQI MODE

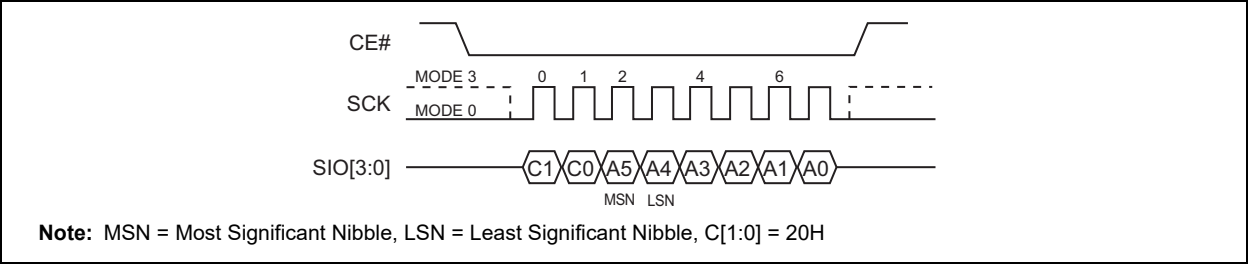
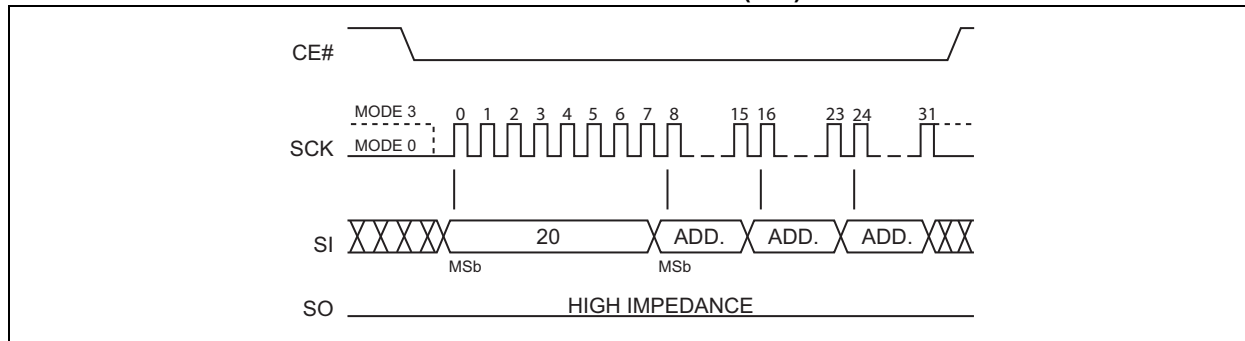


FIGURE 5-20: 4 KBYTE SECTOR ERASE SEQUENCE (SPI)



5.18 Block Erase

The Block Erase instruction clears all bits in the selected block to '1'. Block sizes can be 8 Kbyte, 32 Kbyte or 64 Kbyte depending on address, see [Figure 3-1](#), Memory Map, for details. A Block Erase instruction applied to a protected memory area will be ignored. Prior to any write operation, execute the `WREN` instruction. Keep CE# active-low for the duration of any command sequence.

To execute a Block Erase operation, the host drives CE# low then sends the Block Erase command cycle (D8H), three address cycles, then drives CE# high. Address bits AMS-A13 determine the block address (BAx); the remaining address bits can be VIL or VIH. For 32-Kbyte blocks, A14:A13 can be VIL or VIH; for 64-Kbyte blocks, A15:A13 can be VIL or VIH. Poll the BUSY bit in the STATUS register, or wait TBE, for the completion of the internal, self-timed, Block Erase operation. See [Figure 5-21](#) and [Figure 5-22](#) for the Block Erase sequence.

FIGURE 5-21: BLOCK ERASE SEQUENCE (SQI)

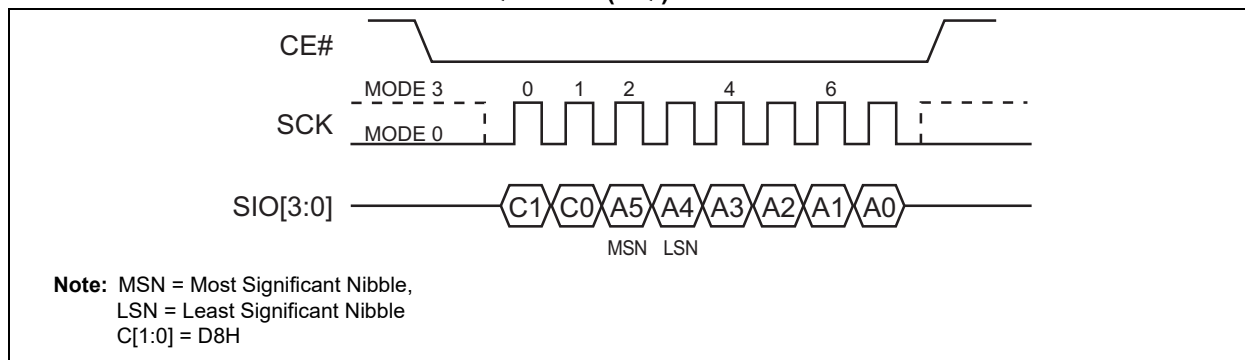
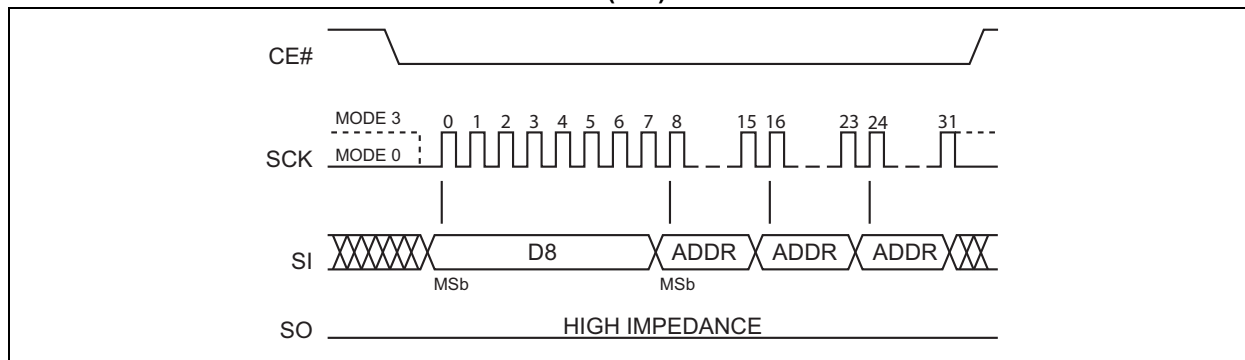


FIGURE 5-22: BLOCK ERASE SEQUENCE (SPI)



5.19 Chip Erase

The Chip Erase instruction clears all bits in the device to '1.' The Chip Erase instruction is ignored if any of the memory area is protected. Prior to any write operation, execute the `WREN` instruction.

To execute a Chip Erase operation, the host drives `CE#` low, sends the Chip Erase command cycle (`C7H`), then drives `CE#` high. Poll the `BUSY` bit in the `STATUS` register, or wait `TsCE` for the completion of the internal, self-timed, Write operation. See [Figure 5-23](#) and [Figure 5-24](#) for the Chip Erase sequence.

FIGURE 5-23: CHIP ERASE SEQUENCE (SQU)

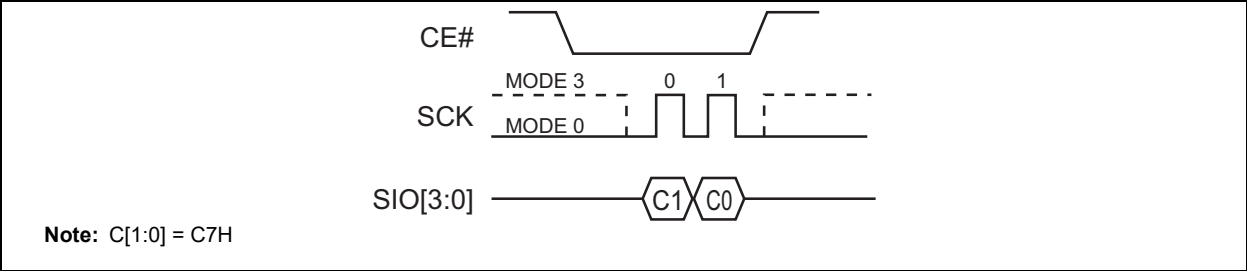
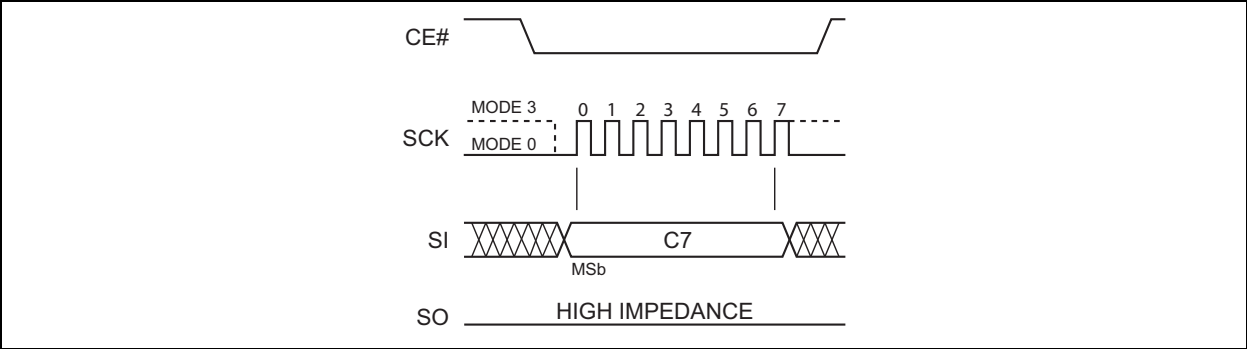


FIGURE 5-24: CHIP ERASE SEQUENCE (SPI)



5.20 Page Program

The Page Program instruction programs up to 256 bytes of data in the memory and supports both SPI and SQI protocols. The data for the selected page address must be in the erased state (FFH) before initiating the Page Program operation. A Page Program applied to a protected memory area will be ignored. Prior to the program operation, execute the **WREN** instruction.

To execute a Page Program operation, the host drives **CE#** low then sends the Page Program command cycle (02H), three address cycles followed by the data to be programmed, then drives **CE#** high. The programmed data must be between 1 to 256 bytes and in whole-Byte increments; sending less than a full Byte will cause the partial-Byte to be ignored. Poll the **BUSY** bit in the **STATUS** register, or wait **TPP**, for the completion of the internal, self-timed, Write operation. See [Figure 5-25](#) and [Figure 5-26](#) for the Page Program sequence.

When executing Page Program, the memory range for the SST26VF064B/064BA is divided into 256-byte page boundaries. The device handles shifting of more than 256 bytes of data by maintaining the last 256 bytes of data as the correct data to be programmed. If the target address for the Page Program instruction is not the beginning of the page boundary (**A[7:0]** are not all zero) and the number of bytes of data input exceeds or overlaps the end of the address of the page boundary, the excess data input wrap around and will be programmed at the start of that target page.

FIGURE 5-25: PAGE PROGRAM SEQUENCE (SQI)

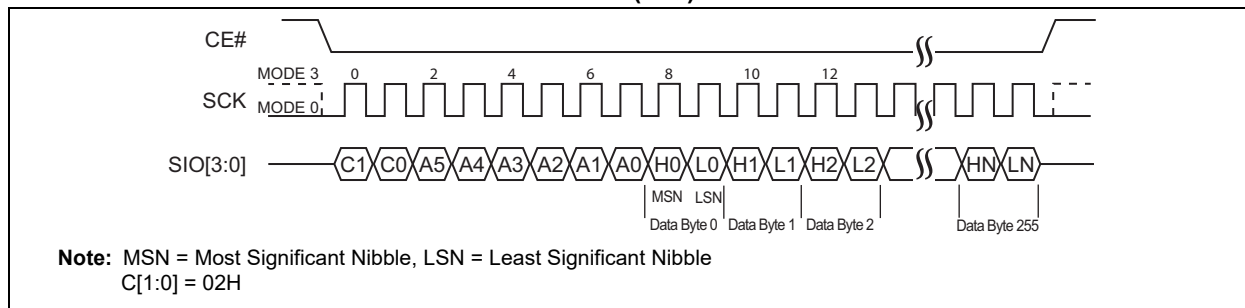
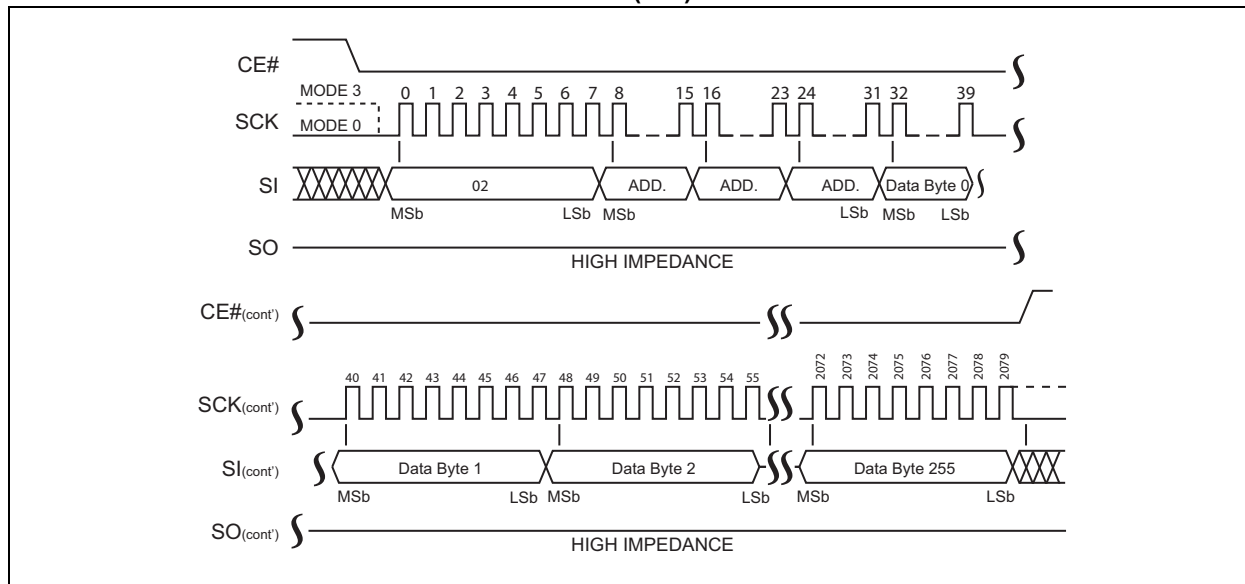


FIGURE 5-26: PAGE PROGRAM SEQUENCE (SPI)



range for the GGTZ0V1 00+D/00+D/A is divided into

To execute a SPI Quad Page Program operation, the host drives CE# low then sends the SPI Quad Page Program command cycle (32H), three address cycles followed by the data to be programmed, then drives CE# high. The programmed data must be between 1 to 256 Bytes and in whole-Byte increments. The command cycle is eight clocks long, the address and data cycles are each two clocks long, most significant bit first. Poll the BUSY bit in the STATUS register, or wait TPP for the completion of the internal, self-timed, Write operation (See [Figure 5-27](#)).

When executing SPI Quad Page Program, the memory range for the SST26VF064B/064BA is divided into 256 Byte page boundaries. The device handles shifting of more than 256 Bytes of data by maintaining the last 256 Bytes of data as the correct data to be programmed. If the target address for the SPI Quad Page Program instruction is not the beginning of the page boundary (A[7:0] are not all zero) and the of bytes of data input exceeds or overlaps the end of the address of the page boundary, the excess data inputs wrap around and will be programmed at the start of that target page.

If an operation is already suspended, the device will

Only one write operation can be suspended at a time; if an operation is already suspended, the device will ignore the Write Suspend command. Write Suspend during Chip Erase is ignored; Chip Erase is not a valid command while a write is suspended. The Write Resume command is ignored until any write operation (Program or Erase) initiated during the Write Suspend is complete. The device requires a minimum of 500 μ s between each Write Suspend command.

5.23 Write Suspend During Sector Erase or Block Erase

Issuing a Write Suspend instruction during Sector Erase or Block Erase allows the host to program or read any sector that was not being erased. The device will ignore any programming commands pointing to the suspended sector(s). Any attempt to read from the suspended sector(s) will output unknown data because the Sector Erase or Block Erase will be incomplete.

To execute a Write Suspend operation, the host drives CE# low, sends the Write Suspend command cycle (B0H), then drives CE# high. The STATUS register indicates that the erase has been suspended by changing the WSE bit from '0' to '1,' but the device will not accept another command until it is ready. To determine when the device will accept a new command, poll the BUSY bit in the STATUS register or wait Tws.

5.24 Write Suspend During Page Programming or SPI Quad Page Programming

Issuing a Write Suspend instruction during Page Programming allows the host to erase or read any sector that is not being programmed. Erase commands pointing to the suspended sector(s) will be ignored. Any attempt to read from the suspended page will output unknown data because the program will be incomplete.

To execute a Write Suspend operation, the host drives CE# low, sends the Write Suspend command cycle (B0H), then drives CE# high. The STATUS register indicates that the programming has been suspended by changing the WSP bit from '0' to '1,' but the device will not accept another command until it is ready. To determine when the device will accept a new command, poll the BUSY bit in the STATUS register or wait Tws.

5.25 Write-Resume

Write-Resume restarts a Write command that was suspended and changes the suspend status bit in the STATUS register (WSE or WSP) back to '0'.

To execute a Write-Resume operation, the host drives CE# low, sends the Write Resume command cycle (30H), then drives CE# high. To determine if the internal, self-timed Write operation completed, poll the BUSY bit in the STATUS register, or wait the specified time TSE, TBE or TPP for Sector Erase, Block Erase, or Page Programming, respectively. The total write time before suspend and after resume will not exceed the uninterrupted write times TSE, TBE or TPP.

5.26 Read Security ID

The Read Security ID operation is supported in both SPI and SQI modes. To execute a Read Security ID (SID) operation in SPI mode, the host drives CE# low, sends the Read Security ID command cycle (88H), two address cycles and then one dummy cycle. To execute a Read Security ID operation in SQI mode, the host drives CE# low and then sends the Read Security ID command, two address cycles and three dummy cycles.

After the dummy cycles, the device outputs data on the falling edge of the SCK signal, starting from the specified address location. The data output stream is continuous through all SID addresses until terminated by a low-to-high transition on CE#. See [Table 5-5](#) for the Security ID address range.

5.27 Program Security ID

The Program Security ID instruction programs one to 2040 bytes of data in the user-programmable, Security ID space. This Security ID space is One-Time-Programmable (OTP). The device ignores a Program Security ID instruction pointing to an invalid or protected address (See [Table 5-5](#)). Prior to the program operation, execute WREN.

To execute a Program SID operation, the host drives CE# low, sends the Program Security ID command cycle (A5H), two address cycles, the data to be programmed, then drives CE# high. The programmed data must be between 1 to 256 bytes and in whole-Byte increments.

The device handles shifting of more than 256 bytes of data by maintaining the last 256 bytes of data as the correct data to be programmed. If the target address for the Program Security ID instruction is not the beginning of the page boundary and the number of data input exceeds or overlaps the end of the address of the page boundary, the excess data input wrap around and will be programmed at the start of that target page.

The Program Security ID operation is supported in both SPI and SQI mode. To determine the completion of the internal, self-timed Program SID operation, poll the BUSY bit in the software STATUS register, or wait TPSID for the completion of the internal self-timed Program Security ID operation.

SST26VF064B/SST26VF064BA

TABLE 5-5: PROGRAM SECURITY ID

| Program Security ID | Address Range |
|-------------------------------------|---------------|
| Unique ID Pre-Programmed at factory | 0000–0007H |
| User Programmable | 0008H–07FFH |

5.28 Lockout Security ID

The Lockout Security ID instruction prevents any future changes to the Security ID and is supported in both SPI and SQI modes. Prior to the operation, execute `WREN`.

To execute a Lockout SID, the host drives `CE#` low, sends the Lockout Security ID command cycle (85H), then drives `CE#` high. Poll the `BUSY` bit in the software STATUS register, or wait `TPSID`, for the completion of the Lockout Security ID operation.

5.29 Read Status Register (RDSR) and Read-Configuration Register (RDCR)

The Read STATUS Register (`RDSR`) and Read-Configuration Register (`RDCR`) commands output the contents of the STATUS and Configuration registers. These commands function in both SPI and SQI modes. The STATUS register may be read at any time, even during a Write operation. When a Write is in progress, poll the `BUSY` bit before sending any new commands to assure that the new commands are properly received by the device.

To Read the STATUS or Configuration registers, the host drives `CE#` low, then sends the Read-STATUS-Register command cycle (05H) or the Read Configuration Register command (35H). A dummy cycle is required in SQI mode. Immediately after the command cycle, the device outputs data on the falling edge of the `SCK` signal. The data output stream continues until terminated by a low-to-high transition on `CE#`. See Figure 5-28 and Figure 5-29 for the instruction sequence.

FIGURE 5-28: READ-STATUS-REGISTER AND READ-CONFIGURATION REGISTER SEQUENCE (SQI)

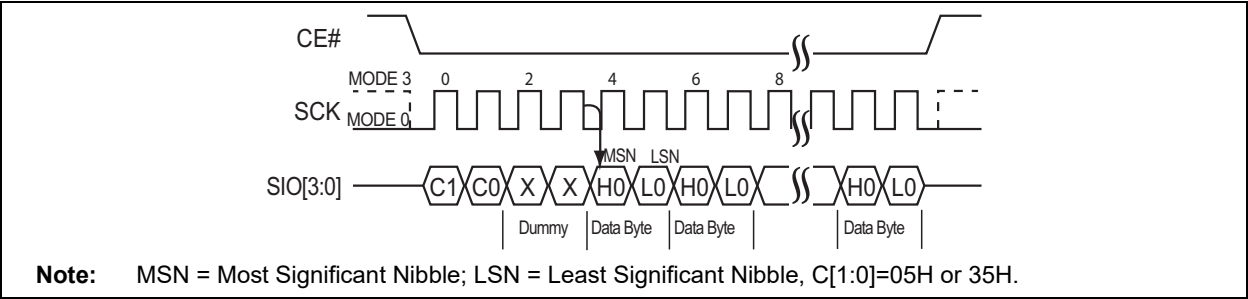
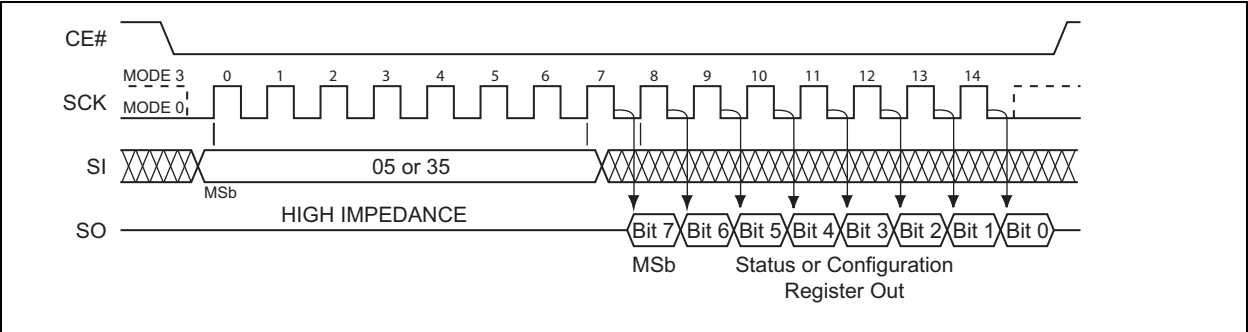


FIGURE 5-29: READ-STATUS-REGISTER AND READ-CONFIGURATION REGISTER SEQUENCE (SPI)



5.30 Write Status Register (WRSR)

The Write STATUS Register (WRSR) command writes new values to the Configuration register. To execute a Write STATUS Register operation, the host drives CE# low, then sends the Write STATUS Register command cycle (01H), two cycles of data and then drives CE# high. Values in the second data cycle will be accepted by the device (See Figure 5-30 and Figure 5-31).

FIGURE 5-30: WRITE STATUS REGISTER SEQUENCE (SQI)

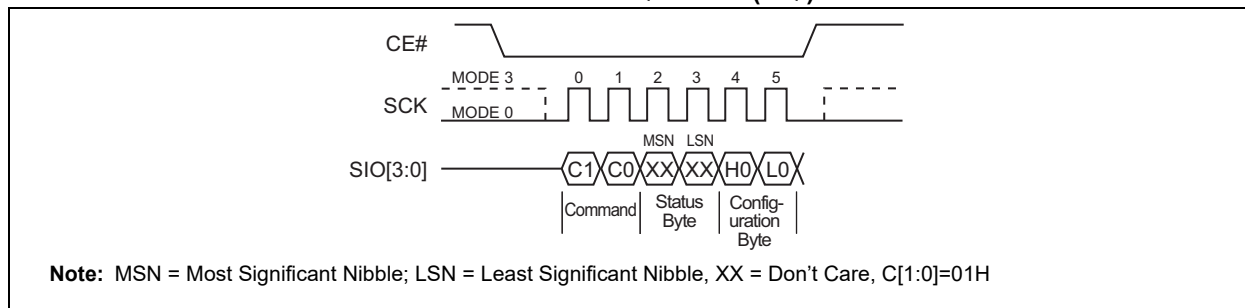
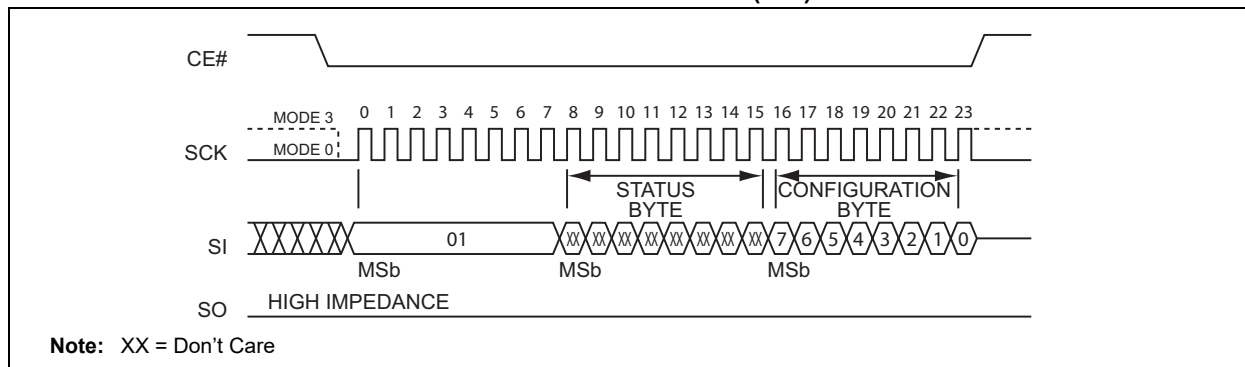


FIGURE 5-31: WRITE STATUS REGISTER SEQUENCE (SPI)



5.31 Write-Enable (WREN)

The Write Enable (WREN) instruction sets the Write-Enable-Latch bit in the STATUS register to '1,' allowing Write operations to occur. The WREN instruction must be executed prior to any of the following operations: Sector Erase, Block Erase, Chip Erase, Page Program, Program Security ID, Lockout Security ID, Write Block Protection Register, Lock-Down Block Protection Register, Nonvolatile Write Lock Lock-Down Register, SPI Quad Page program and Write-STATUS Register. To execute a Write Enable the host drives CE# low then sends the Write Enable command cycle (06H) then drives CE# high. See Figure 5-32 and Figure 5-33 for the WREN instruction sequence.

FIGURE 5-32: WRITE-ENABLE SEQUENCE (SQI)

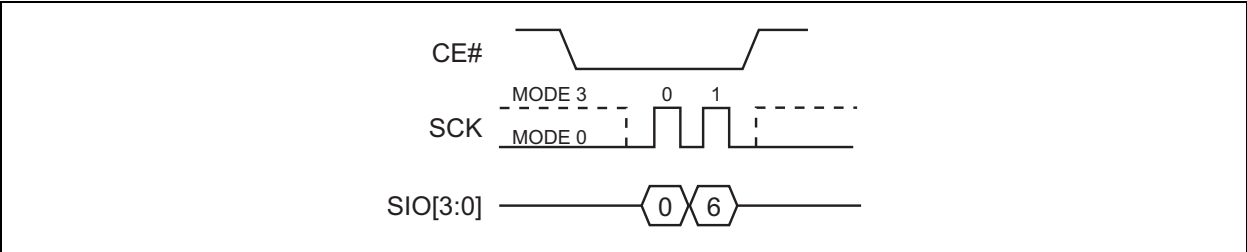
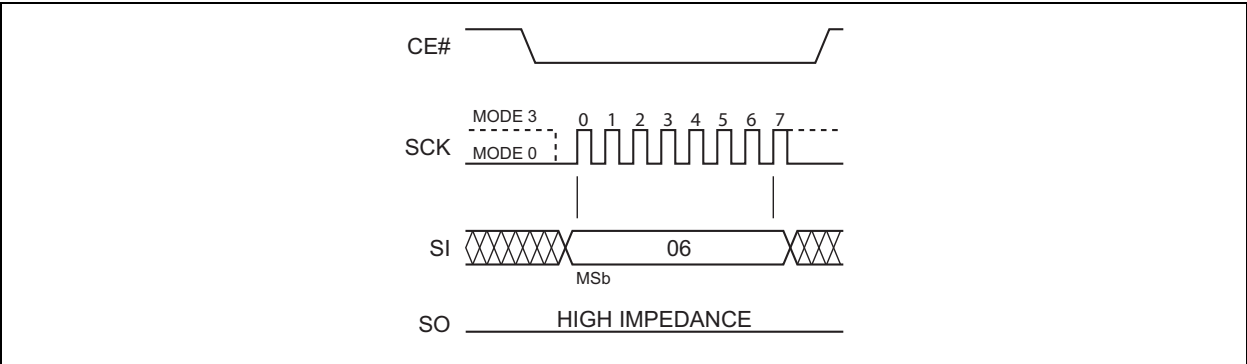


FIGURE 5-33: WRITE-ENABLE SEQUENCE (SPI)



5.32 Write Disable (WRDI)

The Write Disable (WRDI) instruction sets the Write-Enable-Latch bit in the STATUS register to '0,' preventing Write operations. The WRDI instruction is ignored during any internal write operations. Any Write operation started before executing WRDI will complete. Drive CE# high before executing WRDI.

To execute a Write Disable, the host drives CE# low, sends the Write Disable command cycle (04H), then drives CE# high (See [Figure 5-34](#) and [Figure 5-35](#)).

FIGURE 5-34: WRITE DISABLE (WRDI) SEQUENCE (SQI)

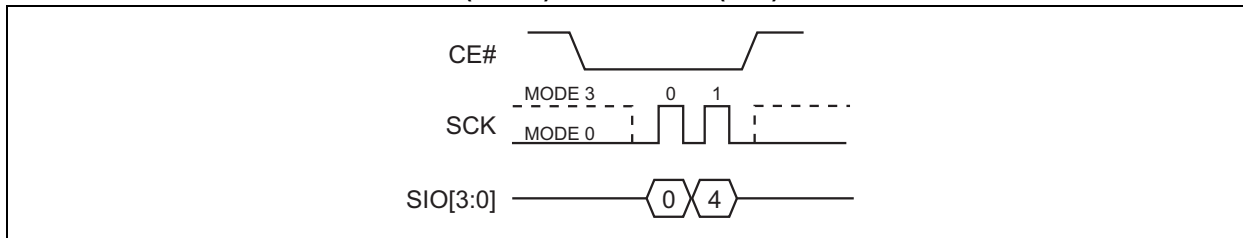
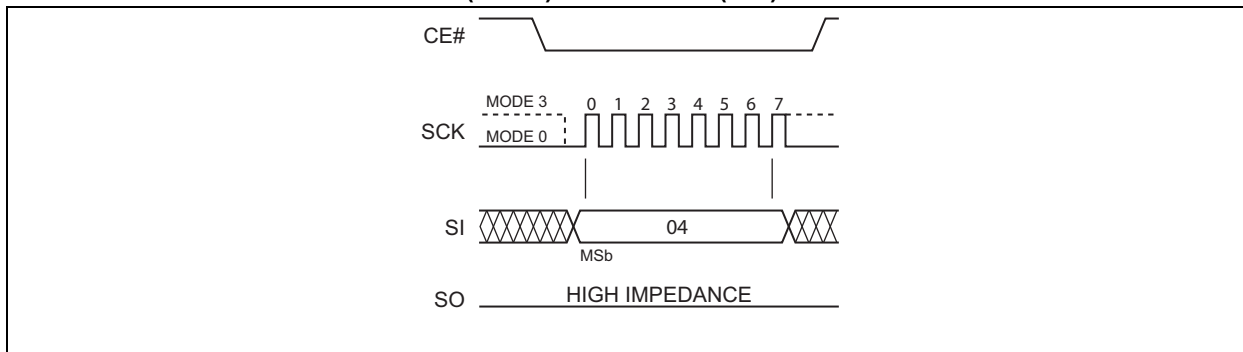


FIGURE 5-35: WRITE-DISABLE (WRDI) SEQUENCE (SPI)



5.33 Read Block Protection Register (RBPR)

The Read Block Protection Register instruction outputs the Block Protection register data which determines the protection status. To execute a Read Block Protection Register operation, the host drives CE# low and then sends the Read Block Protection Register command cycle (72H). A dummy cycle is required in SQI mode.

After the command cycle, the device outputs data on the falling edge of the SCK signal starting with the most significant bit(s). See Table 5-6 for definitions of each bit in the Block Protection register. The RBPR command does not wrap around. After all data has been output, the device will output 0H until terminated by a low-to-high transition on CE#.

FIGURE 5-36: READ BLOCK PROTECTION REGISTER SEQUENCE (SQI)

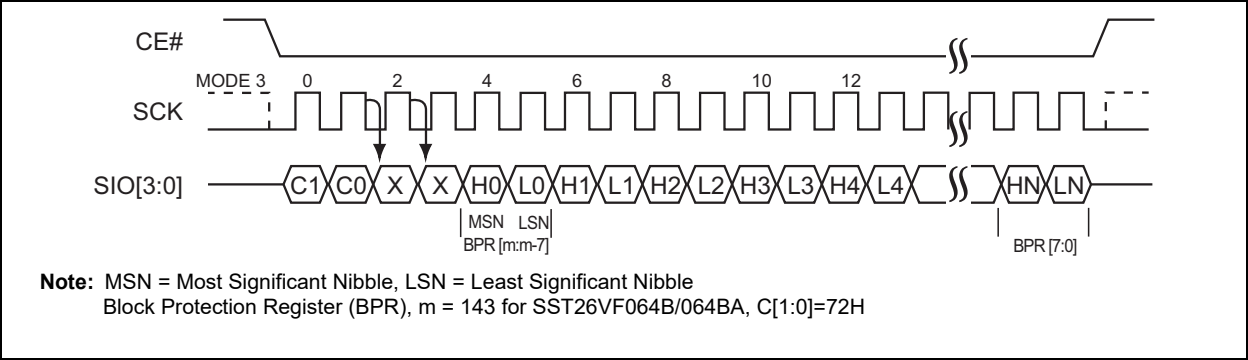
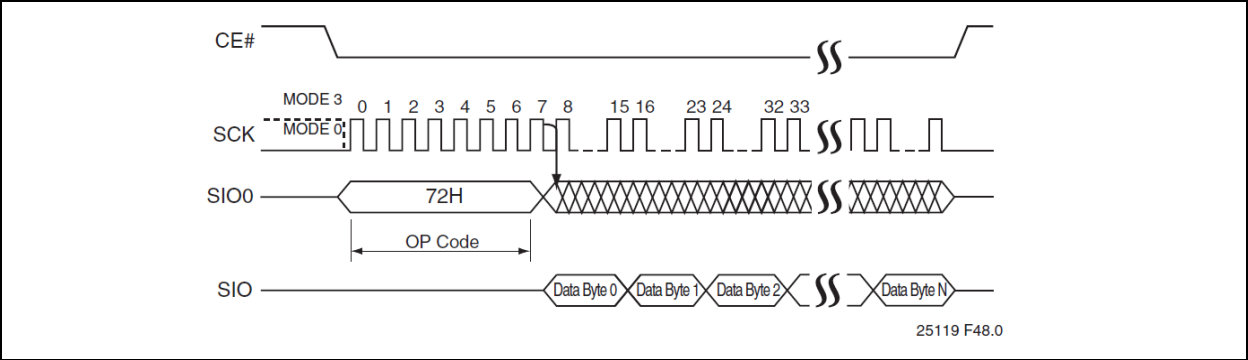


FIGURE 5-37: READ BLOCK PROTECTION REGISTER SEQUENCE (SPI)



5.34 Write Block Protection Register (WBPR)

The Write Block Protection Register (WBPR) command changes the Block Protection register data to indicate the protection status. Execute **WREN** before executing WBPR.

To execute a Write Block Protection Register operation the host drives CE# low, sends the Write Block Protection Register command cycle (42H), sends 18 cycles of data and finally drives CE# high. Data input must be Most Significant bit(s) first. See [Table 5-6](#) for definitions of each bit in the Block Protection register (See [Figure 5-38](#) and [Figure 5-39](#)).

FIGURE 5-38: WRITE BLOCK PROTECTION REGISTER SEQUENCE (SQI)

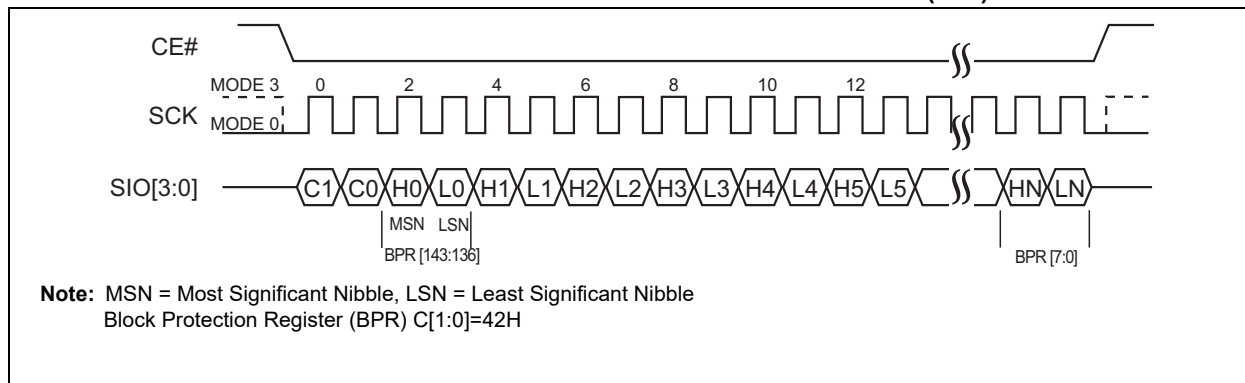
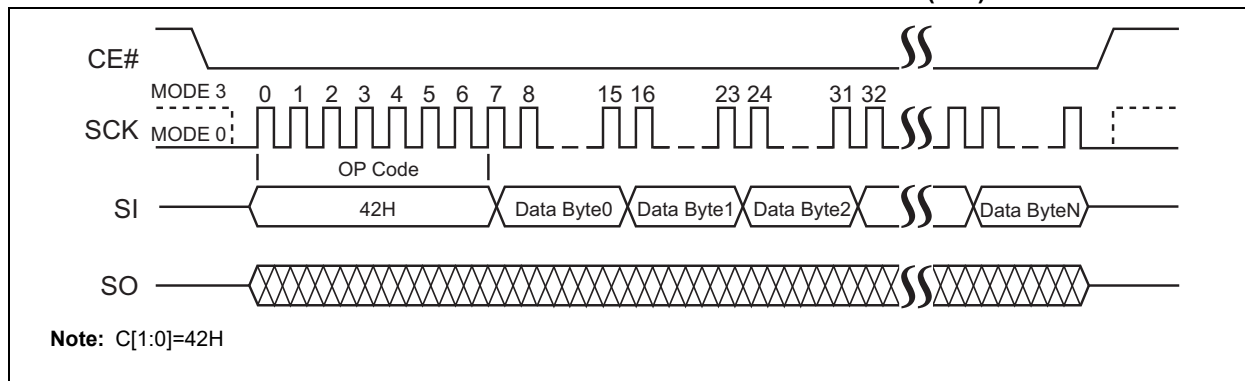


FIGURE 5-39: WRITE BLOCK PROTECTION REGISTER SEQUENCE (SPI)



5.35 Lock-Down Block Protection Register (LBPR)

The Lock-Down Block Protection Register instruction prevents changes to the Block Protection register during device operation. Lock-Down resets after power cycling; this allows the Block Protection register to be changed. Execute `WREN` before initiating the Lock-Down Block Protection Register instruction.

To execute a Lock-Down Block Protection Register, the host drives CE# low, then sends the Lock-Down Block Protection Register command cycle (8DH), then drives CE# high.

FIGURE 5-40: LOCK-DOWN BLOCK PROTECTION REGISTER (SQI)

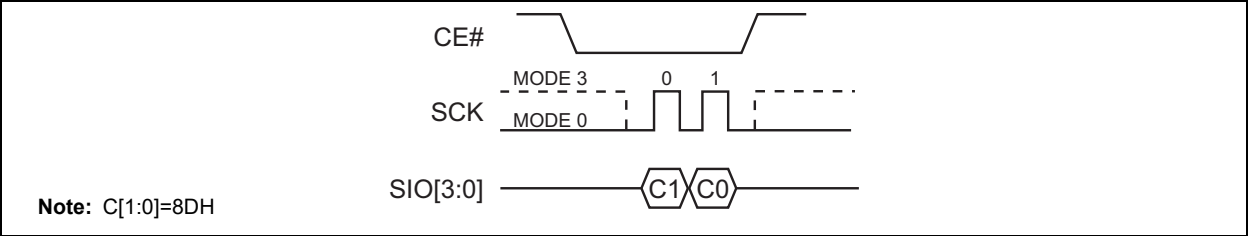
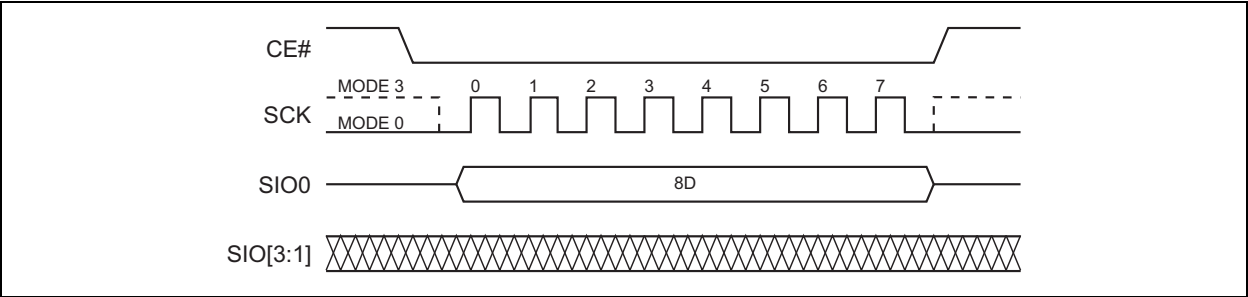


FIGURE 5-41: LOCK-DOWN BLOCK PROTECTION REGISTER (SPI)



5.36 Nonvolatile Write Lock Lock-Down Register (nVWLDR)

The Nonvolatile Write Lock Lock-Down Register (nVWLDR) instruction controls the ability to change the write lock bits in the Block Protection register. Execute WREN before initiating the nVWLDR instruction.

To execute nVWLDR, the host drives CE# low, then sends the nVWLDR command cycle (E8H), followed by 18 cycles of data and then drives CE# high.

After CE# goes high, the nonvolatile bits are programmed and the programming time-out must complete before any additional commands, other than Read STATUS Register, can be entered. Poll the BUSY bit in the STATUS register, or wait TPP, for the completion of the internal, self-timed, Write operation. Data inputs must be Most Significant bit(s) (MSb) first.

FIGURE 5-42: WRITE LOCK LOCK-DOWN REGISTER SEQUENCE (SQI)

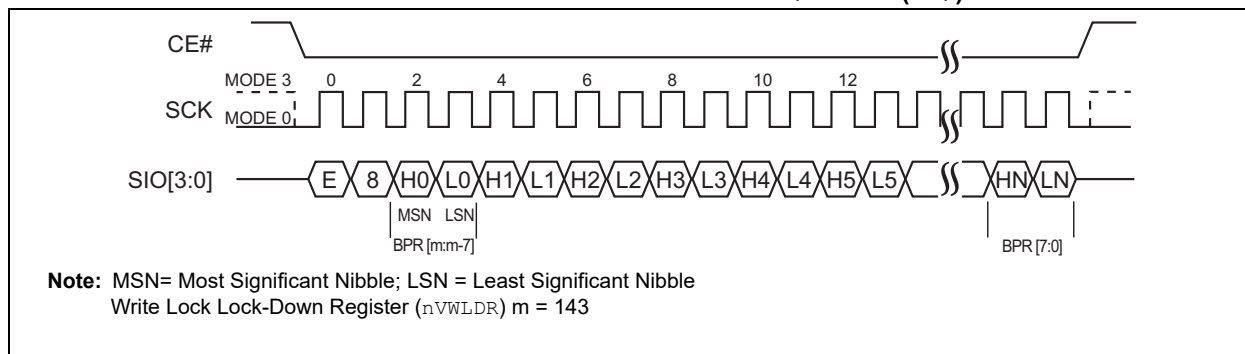
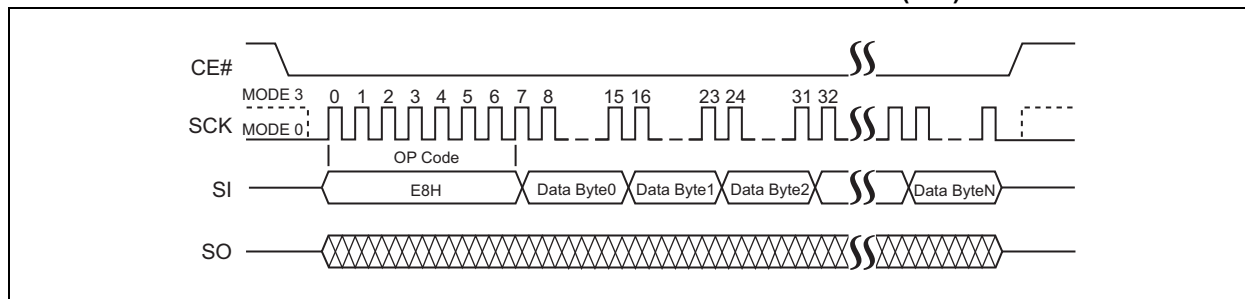


FIGURE 5-43: WRITE LOCK LOCK-DOWN REGISTER SEQUENCE (SPI)



5.37 Global Block Protection Unlock (ULBPR)

The Global Block Protection Unlock (ULBPR) instruction clears all write protection bits in the Block Protection register, except for those bits that have been locked down with the nVWLDR command. Execute WREN before initiating the ULBPR instruction.

To execute a ULBPR instruction, the host drives CE# low, then sends the ULBPR command cycle (98H) and then drives CE# high.

FIGURE 5-44: GLOBAL BLOCK PROTECTION UNLOCK (SQI)

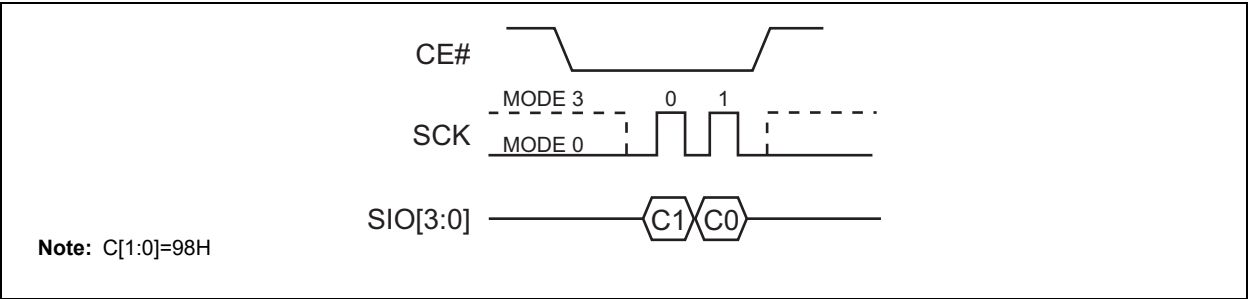
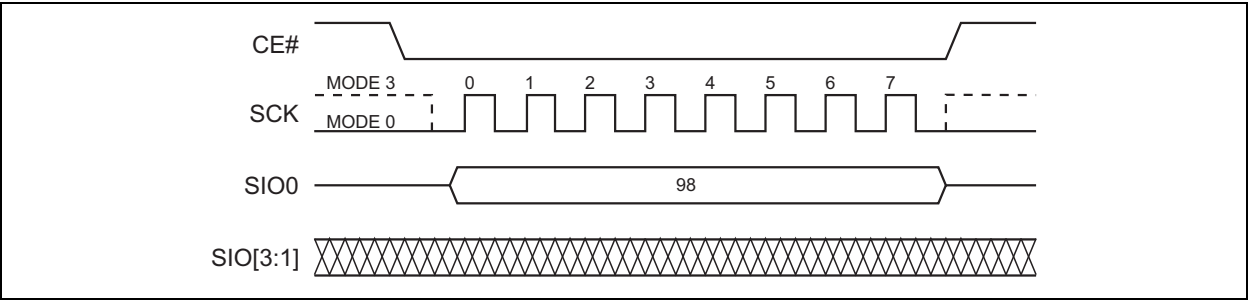


FIGURE 5-45: GLOBAL BLOCK PROTECTION UNLOCK (SPI)



SST26VF064B/SST26VF064BA

TABLE 5-6: BLOCK PROTECTION REGISTER FOR SST26VF064B/064BA (1 OF 4)⁽¹⁾

| BPR Bits | | Address Range | Protected Block Size |
|-----------|----------------------------------|--------------------|----------------------|
| Read Lock | Write Lock/nVWLDR ⁽²⁾ | | |
| 143 | 142 | 7FE000H - 7FFFFFFH | 8 Kbyte |
| 141 | 140 | 7FC000H - 7DFFFFH | 8 Kbyte |
| 139 | 138 | 7FA000H - 7FBFFFH | 8 Kbyte |
| 137 | 136 | 7F8000H - 7F9FFFH | 8 Kbyte |
| 135 | 134 | 006000H - 007FFFH | 8 Kbyte |
| 133 | 132 | 004000H - 005FFFH | 8 Kbyte |
| 131 | 130 | 002000H - 003FFFH | 8 Kbyte |
| 129 | 128 | 000000H - 001FFFH | 8 Kbyte |
| | 127 | 7F0000H - 7F7FFFH | 32 Kbyte |
| | 126 | 008000H - 00FFFFH | 32 Kbyte |
| | 125 | 7E0000H - 7EFFFFH | 64 Kbyte |
| | 124 | 7D0000H - 7DFFFFH | 64 Kbyte |
| | 123 | 7C0000H - 7CFFFFH | 64 Kbyte |
| | 122 | 7B0000H - 7BFFFFH | 64 Kbyte |
| | 121 | 7A0000H - 7AFFFFH | 64 Kbyte |
| | 120 | 790000H - 79FFFFH | 64 Kbyte |
| | 119 | 780000H - 78FFFFH | 64 Kbyte |
| | 118 | 770000H - 77FFFFH | 64 Kbyte |
| | 117 | 760000H - 76FFFFH | 64 Kbyte |
| | 116 | 750000H - 75FFFFH | 64 Kbyte |
| | 115 | 740000H - 74FFFFH | 64 Kbyte |
| | 114 | 730000H - 73FFFFH | 64 Kbyte |
| | 113 | 720000H - 72FFFFH | 64 Kbyte |
| | 112 | 710000H - 71FFFFH | 64 Kbyte |
| | 111 | 700000H - 70FFFFH | 64 Kbyte |
| | 110 | 6F0000H - 6FFFFFFH | 64 Kbyte |
| | 109 | 6E0000H - 6EFFFFH | 64 Kbyte |
| | 108 | 6D0000H - 6DFFFFH | 64 Kbyte |
| | 107 | 6C0000H - 6CFFFFH | 64 Kbyte |
| | 106 | 6B0000H - 6BFFFFH | 64 Kbyte |
| | 105 | 6A0000H - 6AFFFFH | 64 Kbyte |
| | 104 | 690000H - 69FFFFH | 64 Kbyte |
| | 103 | 680000H - 68FFFFH | 64 Kbyte |
| | 102 | 670000H - 67FFFFH | 64 Kbyte |
| | 101 | 660000H - 66FFFFH | 64 Kbyte |
| | 100 | 650000H - 65FFFFH | 64 Kbyte |
| | 99 | 640000H - 64FFFFH | 64 Kbyte |
| | 98 | 630000H - 63FFFFH | 64 Kbyte |
| | 97 | 620000H - 62FFFFH | 64 Kbyte |

Note 1: The default state after a Power-on Reset is write-protected BPR[143:0] = 5555 FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF

2: nVWLDR bits are One-Time-Programmable. Once a nVWLDR bit is set, the protection state of that particular block is permanently write locked.

SST26VF064B/SST26VF064BA

TABLE 5-6: BLOCK PROTECTION REGISTER FOR SST26VF064B/064BA (CONTINUED) (2 OF 4)⁽¹⁾

| BPR Bits | | Address Range | Protected Block Size |
|-----------|----------------------------------|-------------------|----------------------|
| Read Lock | Write Lock/nVWLDR ⁽²⁾ | | |
| | 96 | 610000H - 61FFFFH | 64 Kbyte |
| | 95 | 600000H - 60FFFFH | 64 Kbyte |
| | 94 | 5F0000H - 5FFFFFH | 64 Kbyte |
| | 93 | 5E0000H - 5EFFFFH | 64 Kbyte |
| | 92 | 5D0000H - 5DFFFFH | 64 Kbyte |
| | 91 | 5C0000H - 5CFFFFH | 64 Kbyte |
| | 90 | 5B0000H - 5BFFFFH | 64 Kbyte |
| | 89 | 5A0000H - 5AFFFFH | 64 Kbyte |
| | 88 | 590000H - 59FFFFH | 64 Kbyte |
| | 87 | 580000H - 58FFFFH | 64 Kbyte |
| | 86 | 570000H - 57FFFFH | 64 Kbyte |
| | 85 | 560000H - 56FFFFH | 64 Kbyte |
| | 84 | 550000H - 55FFFFH | 64 Kbyte |
| | 83 | 540000H - 54FFFFH | 64 Kbyte |
| | 82 | 530000H - 53FFFFH | 64 Kbyte |
| | 81 | 520000H - 52FFFFH | 64 Kbyte |
| | 80 | 510000H - 51FFFFH | 64 Kbyte |
| | 79 | 500000H - 50FFFFH | 64 Kbyte |
| | 78 | 4F0000H - 4FFFFFH | 64 Kbyte |
| | 77 | 4E0000H - 4EFFFFH | 64 Kbyte |
| | 76 | 4D0000H - 4DFFFFH | 64 Kbyte |
| | 75 | 4C0000H - 4CFFFFH | 64 Kbyte |
| | 74 | 4B0000H - 4BFFFFH | 64 Kbyte |
| | 73 | 4A0000H - 4AFFFFH | 64 Kbyte |
| | 72 | 490000H - 49FFFFH | 64 Kbyte |
| | 71 | 480000H - 48FFFFH | 64 Kbyte |
| | 70 | 470000H - 47FFFFH | 64 Kbyte |
| | 69 | 460000H - 46FFFFH | 64 Kbyte |
| | 68 | 450000H - 45FFFFH | 64 Kbyte |
| | 67 | 440000H - 44FFFFH | 64 Kbyte |
| | 66 | 430000H - 43FFFFH | 64 Kbyte |
| | 65 | 420000H - 42FFFFH | 64 Kbyte |
| | 64 | 410000H - 41FFFFH | 64 Kbyte |
| | 63 | 400000H - 40FFFFH | 64 Kbyte |
| | 62 | 3F0000H - 3FFFFFH | 64 Kbyte |
| | 61 | 3E0000H - 3EFFFFH | 64 Kbyte |
| | 60 | 3D0000H - 3DFFFFH | 64 Kbyte |
| | 59 | 3C0000H - 3CFFFFH | 64 Kbyte |
| | 58 | 3B0000H - 3BFFFFH | 64 Kbyte |

Note 1: The default state after a Power-on Reset is write-protected BPR[143:0] = 5555 FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF

2: nVWLDR bits are One-Time-Programmable. Once a nVWLDR bit is set, the protection state of that particular block is permanently write locked.

SST26VF064B/SST26VF064BA

TABLE 5-6: BLOCK PROTECTION REGISTER FOR SST26VF064B/064BA (CONTINUED) (3 OF 4)⁽¹⁾

| BPR Bits | | Address Range | Protected Block Size |
|-----------|----------------------------------|-------------------|----------------------|
| Read Lock | Write Lock/nVWLDR ⁽²⁾ | | |
| | 57 | 3A0000H - 3AFFFFH | 64 Kbyte |
| | 56 | 390000H - 39FFFFH | 64 Kbyte |
| | 55 | 380000H - 38FFFFH | 64 Kbyte |
| | 54 | 370000H - 37FFFFH | 64 Kbyte |
| | 53 | 360000H - 36FFFFH | 64 Kbyte |
| | 52 | 350000H - 35FFFFH | 64 Kbyte |
| | 51 | 340000H - 34FFFFH | 64 Kbyte |
| | 50 | 330000H - 33FFFFH | 64 Kbyte |
| | 49 | 320000H - 32FFFFH | 64 Kbyte |
| | 48 | 310000H - 31FFFFH | 64 Kbyte |
| | 47 | 300000H - 30FFFFH | 64 Kbyte |
| | 46 | 2F0000H - 2FFFFFH | 64 Kbyte |
| | 45 | 2E0000H - 2EFFFFH | 64 Kbyte |
| | 44 | 2D0000H - 2DFFFFH | 64 Kbyte |
| | 43 | 2C0000H - 2CFFFFH | 64 Kbyte |
| | 42 | 2B0000H - 2BFFFFH | 64 Kbyte |
| | 41 | 2A0000H - 2AFFFFH | 64 Kbyte |
| | 40 | 290000H - 29FFFFH | 64 Kbyte |
| | 39 | 280000H - 28FFFFH | 64 Kbyte |
| | 38 | 270000H - 27FFFFH | 64 Kbyte |
| | 37 | 260000H - 26FFFFH | 64 Kbyte |
| | 36 | 250000H - 25FFFFH | 64 Kbyte |
| | 35 | 240000H - 24FFFFH | 64 Kbyte |
| | 34 | 230000H - 23FFFFH | 64 Kbyte |
| | 33 | 220000H - 22FFFFH | 64 Kbyte |
| | 32 | 210000H - 21FFFFH | 64 Kbyte |
| | 31 | 200000H - 20FFFFH | 64 Kbyte |
| | 30 | 1F0000H - 1FFFFFH | 64 Kbyte |
| | 29 | 1E0000H - 1EFFFFH | 64 Kbyte |
| | 28 | 1D0000H - 1DFFFFH | 64 Kbyte |
| | 27 | 1C0000H - 1CFFFFH | 64 Kbyte |
| | 26 | 1B0000H - 1BFFFFH | 64 Kbyte |
| | 25 | 1A0000H - 1AFFFFH | 64 Kbyte |
| | 24 | 190000H - 19FFFFH | 64 Kbyte |
| | 23 | 180000H - 18FFFFH | 64 Kbyte |
| | 22 | 170000H - 17FFFFH | 64 Kbyte |
| | 21 | 160000H - 16FFFFH | 64 Kbyte |
| | 20 | 150000H - 15FFFFH | 64 Kbyte |
| | 19 | 140000H - 14FFFFH | 64 Kbyte |

Note 1: The default state after a Power-on Reset is write-protected BPR[143:0] = 5555 FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF

2: nVWLDR bits are One-Time-Programmable. Once a nVWLDR bit is set, the protection state of that particular block is permanently write locked.

SST26VF064B/SST26VF064BA

TABLE 5-6: BLOCK PROTECTION REGISTER FOR SST26VF064B/064BA (CONTINUED) (4 OF 4)⁽¹⁾

| BPR Bits | | Address Range | Protected Block Size |
|-----------|----------------------------------|-------------------|----------------------|
| Read Lock | Write Lock/nVWLDR ⁽²⁾ | | |
| | 18 | 130000H - 13FFFFH | 64 Kbyte |
| | 17 | 120000H - 12FFFFH | 64 Kbyte |
| | 16 | 110000H - 11FFFFH | 64 Kbyte |
| | 15 | 100000H - 10FFFFH | 64 Kbyte |
| | 14 | 0F0000H - 0FFFFFH | 64 Kbyte |
| | 13 | 0E0000H - 0EFFFFH | 64 Kbyte |
| | 12 | 0D0000H - 0DFFFFH | 64 Kbyte |
| | 11 | 0C0000H - 0CFFFFH | 64 Kbyte |
| | 10 | 0B0000H - 0BFFFFH | 64 Kbyte |
| | 9 | 0A0000H - 0AFFFFH | 64 Kbyte |
| | 8 | 090000H - 09FFFFH | 64 Kbyte |
| | 7 | 080000H - 08FFFFH | 64 Kbyte |
| | 6 | 070000H - 07FFFFH | 64 Kbyte |
| | 5 | 060000H - 06FFFFH | 64 Kbyte |
| | 4 | 050000H - 05FFFFH | 64 Kbyte |
| | 3 | 040000H - 04FFFFH | 64 Kbyte |
| | 2 | 030000H - 03FFFFH | 64 Kbyte |
| | 1 | 020000H - 02FFFFH | 64 Kbyte |
| | 0 | 010000H - 01FFFFH | 64 Kbyte |

Note 1: The default state after a Power-on Reset is write-protected BPR[143:0] = 5555 FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF

2: nVWLDR bits are One-Time-Programmable. Once a nVWLDR bit is set, the protection state of that particular block is permanently write locked.

6.0 ELECTRICAL SPECIFICATIONS

Absolute Maximum Stress Ratings^(†)

| | |
|---|--------------------------------|
| Temperature under bias | -55°C to +125°C |
| Storage temperature | -65°C to +150°C |
| DC voltage on any pin to ground potential | -0.5V to V _{DD} +0.5V |
| Transient voltage (<20 ns) on any pin to ground potential | -2.0V to V _{DD} +2.0V |
| Package power dissipation capability (T _A = +25°C) | 1.0W |
| Surface mount solder reflow temperature | +260°C for 10 seconds |
| Output short circuit current ⁽¹⁾ | 50 mA |

† **NOTICE:** Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational listings of this specification is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

Note 1: Output shorted for no more than one second. No more than one output shorted at a time.

TABLE 6-1: OPERATING RANGE

| Range | Ambient Temperature | V _{DD} |
|-----------------|---------------------|-----------------|
| Industrial | -40°C to +85°C | 2.3V-3.6V |
| Industrial Plus | -40°C to +105°C | |

TABLE 6-2: AC CONDITIONS OF TEST⁽¹⁾

| Input Rise/Fall Time | Output Load |
|----------------------|-------------|
| 3 ns | CL = 30 pF |

Note 1: (See Figure 8-5).

6.1 Power-Up Specifications

All functionalities and DC specifications are specified for a V_{DD} ramp rate of greater than 1V per 100 ms (0V to 3.0V in less than 300 ms). See Table 6-3 and Figure 6-1 for more information.

When V_{DD} drops from the operating voltage to below the minimum V_{DD} threshold at power-down, all operations are disabled and the device does not respond to commands. Data corruption may result if a power-down occurs while a Write-Registers, program, or erase operation is in progress (See Figure 6-2).

TABLE 6-3: RECOMMENDED SYSTEM POWER-UP/DOWN TIMINGS

| Symbol | Parameter | Minimum | Maximum | Units | Condition |
|--------------------------|--|---------|---------|-------|----------------|
| TPU-READ ⁽¹⁾ | V _{DD} Min to Read Operation | 100 | | μs | |
| TPU-WRITE ⁽¹⁾ | V _{DD} Min to Write Operation | 100 | | μs | |
| TPD ⁽¹⁾ | Power-down Duration | 100 | | ms | |
| VOFF | V _{DD} off time | | 0.3 | V | 0V recommended |

Note 1: This parameter is measured only for initial qualification and after a design or process change that could affect this parameter.

SST26VF064B/SST26VF064BA

FIGURE 6-1: POWER-UP TIMING DIAGRAM

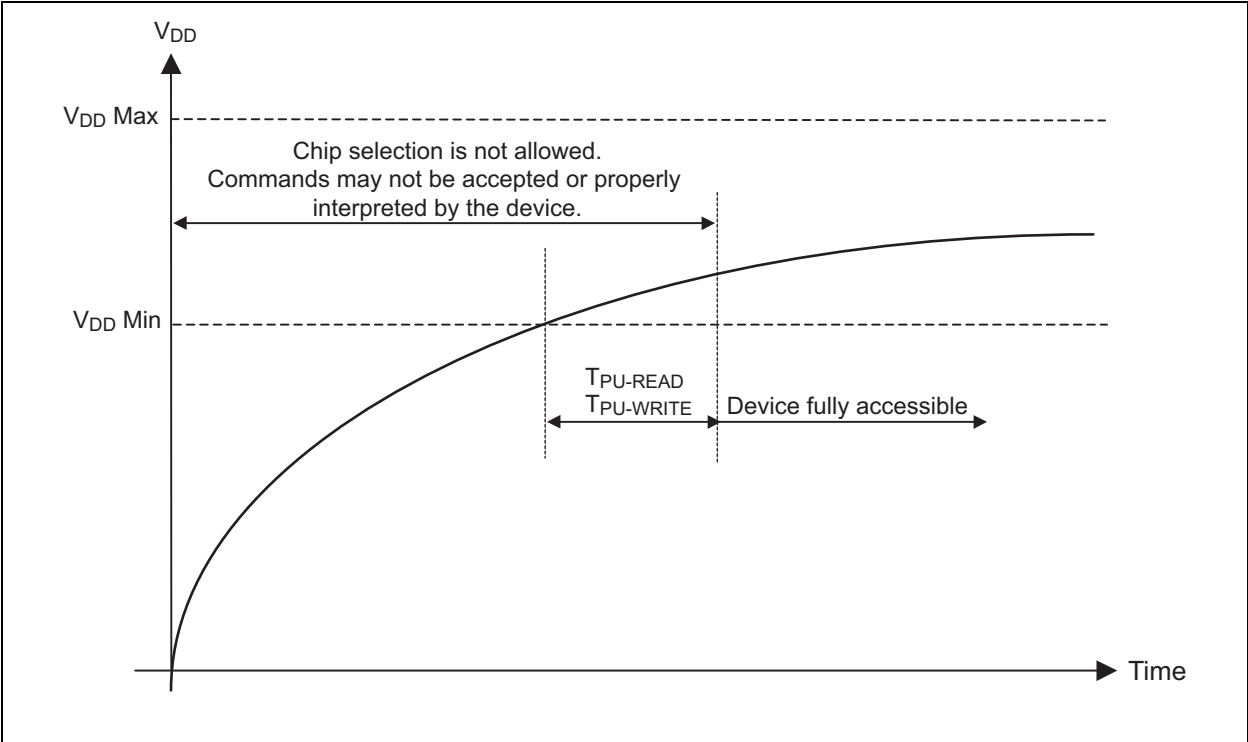
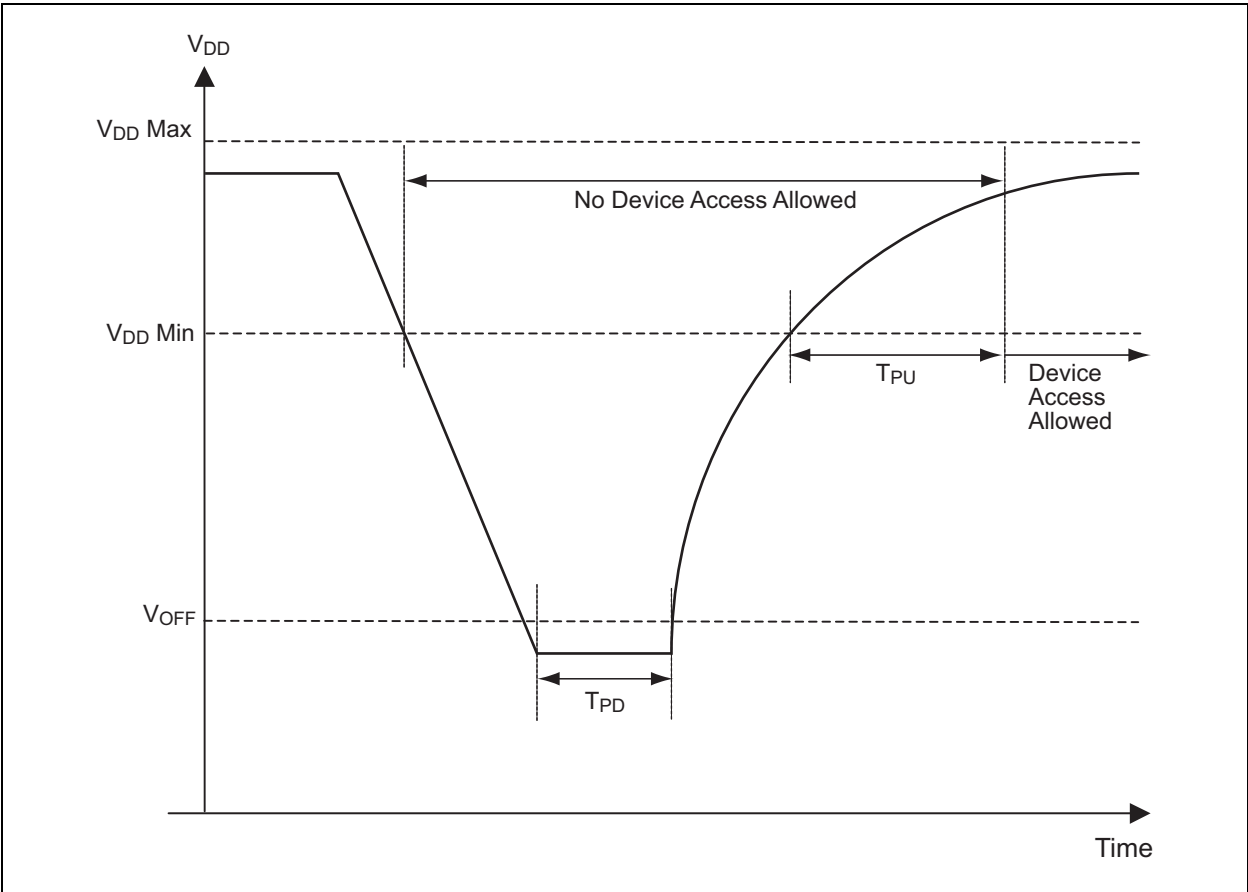


FIGURE 6-2: POWER-DOWN AND VOLTAGE DROP DIAGRAM



SST26VF064B/SST26VF064BA

7.0 DC CHARACTERISTICS

TABLE 7-1: DC OPERATING CHARACTERISTICS ($V_{DD} = 2.3V - 3.6V$)

| Symbol | Parameter | Limits | | | | Test Conditions |
|--------|---------------------------|----------------|---------|---------|---------|---|
| | | Minimum | Typical | Maximum | Units | |
| IDDR1 | Read Current | | 8 | 15 | mA | $V_{DD} = V_{DD} \text{ Max}$, $CE\# = 0.1 V_{DD}/0.9 V_{DD}@40 \text{ MHz}$, $SO = \text{open}$ |
| IDDR2 | Read Current | | | 20 | mA | $V_{DD} = V_{DD} \text{ Max}$, $CE\# = 0.1 V_{DD}/0.9 V_{DD}@104 \text{ MHz}$, $SO = \text{open}$ |
| IDDW | Program and Erase Current | | | 25 | mA | $V_{DD} \text{ Max}$ |
| ISB | Standby Current | | 15 | 45 | μA | $CE\# = V_{DD}$, $V_{IN} = V_{DD}$ or V_{SS} |
| ILI | Input Leakage Current | | | 2 | μA | $V_{IN} = GND$ to V_{DD} , $V_{DD} = V_{DD} \text{ Max}$ |
| ILO | Output Leakage Current | | | 2 | μA | $V_{OUT} = GND$ to V_{DD} , $V_{DD} = V_{DD} \text{ Max}$ |
| VIL | Input Low Voltage | | | 0.8 | V | $V_{DD} = V_{DD} \text{ Min}$ |
| VIH | Input High Voltage | $0.7 V_{DD}$ | | | V | $V_{DD} = V_{DD} \text{ Max}$ |
| VOL | Output Low Voltage | | | 0.2 | V | $I_{OL} = 100 \mu A$, $V_{DD} = V_{DD} \text{ Min}$ |
| VOH | Output High Voltage | $V_{DD} - 0.2$ | | | V | $I_{OH} = -100 \mu A$, $V_{DD} = V_{DD} \text{ Min}$ |

TABLE 7-2: CAPACITANCE ($T_A = +25^\circ C$, $F = 1 \text{ MHz}$, OTHER PINS OPEN)

| Parameter | Description | Test Condition | Maximum |
|-----------------|------------------------|----------------|---------|
| $C_{OUT}^{(1)}$ | Output Pin Capacitance | $V_{OUT} = 0V$ | 8 pF |
| $C_{IN}^{(1)}$ | Input Capacitance | $V_{IN} = 0V$ | 6 pF |

Note 1: This parameter is measured only for initial qualification and after a design or process change that could affect this parameter.

TABLE 7-3: RELIABILITY CHARACTERISTICS

| Symbol | Parameter | Minimum Specification | Units | Test Method |
|-----------------|----------------|-----------------------|--------|---------------------|
| $N_{END}^{(1)}$ | Endurance | 100,000 | Cycles | JEDEC Standard A117 |
| $T_{DR}^{(1)}$ | Data Retention | 100 | Years | JEDEC Standard A103 |
| $ILTH^{(1)}$ | Latch Up | $100 + I_{DD}$ | mA | JEDEC Standard 78 |

Note 1: This parameter is measured only for initial qualification and after a design or process change that could affect this parameter.

TABLE 7-4: WRITE TIMING PARAMETERS ($V_{DD} = 2.3V - 3.6V$)

| Symbol | Parameter | Minimum | Maximum | Units |
|-------------|-------------------------------------|---------|---------|---------|
| TSE | Sector Erase | | 25 | ms |
| TBE | Block Erase | | 25 | ms |
| TSCE | Chip Erase | | 50 | ms |
| $TPP^{(1)}$ | Page Program | | 1.5 | ms |
| TPSID | Program Security-ID | | 1.5 | ms |
| TWS | Write-Suspend Latency | | 25 | μs |
| T_{WPEN} | Write Protection Enable Bit Latency | | 25 | ms |

Note 1: Estimate for typical conditions less than 256 bytes: Programming Time (μs) = $55 + (3.75 \times \# \text{ of bytes})$

SST26VF064B/SST26VF064BA

8.0 AC CHARACTERISTICS

TABLE 8-1: AC OPERATING CHARACTERISTICS (V_{DD}⁽¹⁾ = 2.3V - 3.6V)

| Symbol | Parameter | Limits - 40 MHz | | Limits - 80 MHz | | Limits - 104 MHz | | Units |
|----------------------|------------------------------------|-----------------|--------------------|-----------------|--------------------|------------------|--------------------|-------|
| | | Min | Max | Min | Max | Min | Max | |
| FCLK | Serial Clock Frequency | | 40 | | 80 | | 104 | MHz |
| TCLK | Serial Clock Period | | 25 | | 12.5 | | 9.6 | ns |
| TSCKH | Serial Clock High Time | 11 | | 5.5 | | 4.5 | | ns |
| TSCKL | Serial Clock Low Time | 11 | | 5.5 | | 4.5 | | ns |
| TSCKR ⁽²⁾ | Serial Clock Rise Time (slew rate) | 0.1 | | 0.1 | | 0.1 | | V/ns |
| TSCKF ⁽²⁾ | Serial Clock Fall Time (slew rate) | 0.1 | | 0.1 | | 0.1 | | V/ns |
| TCES ⁽³⁾ | CE# Active Setup Time | 8 | | 5 | | 5 | | ns |
| TCEH ⁽³⁾ | CE# Active Hold Time | 8 | | 5 | | 5 | | ns |
| TCHS ⁽³⁾ | CE# Not Active Setup Time | 8 | | 5 | | 5 | | ns |
| TCHH ⁽³⁾ | CE# Not Active Hold Time | 8 | | 5 | | 5 | | ns |
| TCPH | CE# High Time | 25 | | 12.5 | | 12 | | ns |
| TCHZ | CE# High to High-Z Output | | 19 | | 12.5 | | 12 | ns |
| TCLZ | SCK Low to Low-Z Output | 0 | | 0 | | 0 | | ns |
| THLS | HOLD# Low Setup Time | 8 | | 5 | | 5 | | ns |
| THHS | HOLD# High Setup Time | 8 | | 5 | | 5 | | ns |
| THLH | HOLD# Low Hold Time | 8 | | 5 | | 5 | | ns |
| THHH | HOLD# High Hold Time | 8 | | 5 | | 5 | | ns |
| THZ | HOLD# Low-to-High-Z Output | | 8 | | 8 | | 8 | ns |
| TLZ | HOLD# High-to-Low-Z Output | | 8 | | 8 | | 8 | ns |
| TDS | Data In Setup Time | 3 | | 3 | | 3 | | ns |
| TDH | Data In Hold Time | 4 | | 4 | | 4 | | ns |
| TOH | Output Hold from SCK Change | 0 | | 0 | | 0 | | ns |
| TV | Output Valid from SCK | | 8/5 ⁽⁴⁾ | | 8/5 ⁽⁴⁾ | | 8/5 ⁽⁴⁾ | ns |

Note 1: Maximum operating frequency for 2.7V-3.6V is 104 MHz and for 2.3V-3.6V is 80 MHz

2: Maximum Rise and Fall time may be limited by TSCKH and TSCKL requirements

3: Relative to SCK.

4: 30 pF/10 pF

SST26VF064B/SST26VF064BA

FIGURE 8-1: HOLD TIMING DIAGRAM

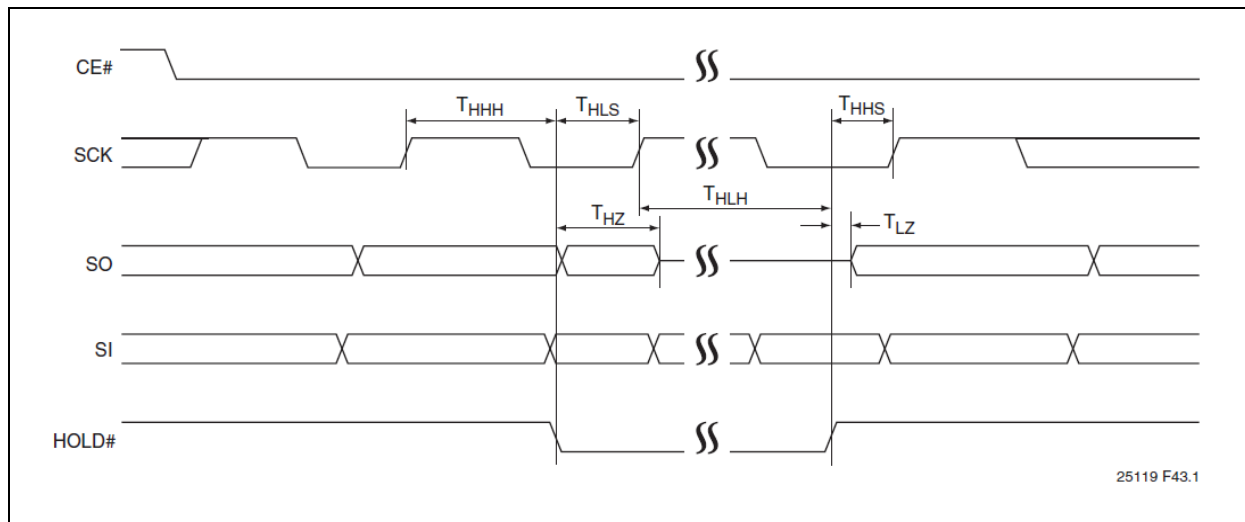


FIGURE 8-2: SERIAL INPUT TIMING DIAGRAM

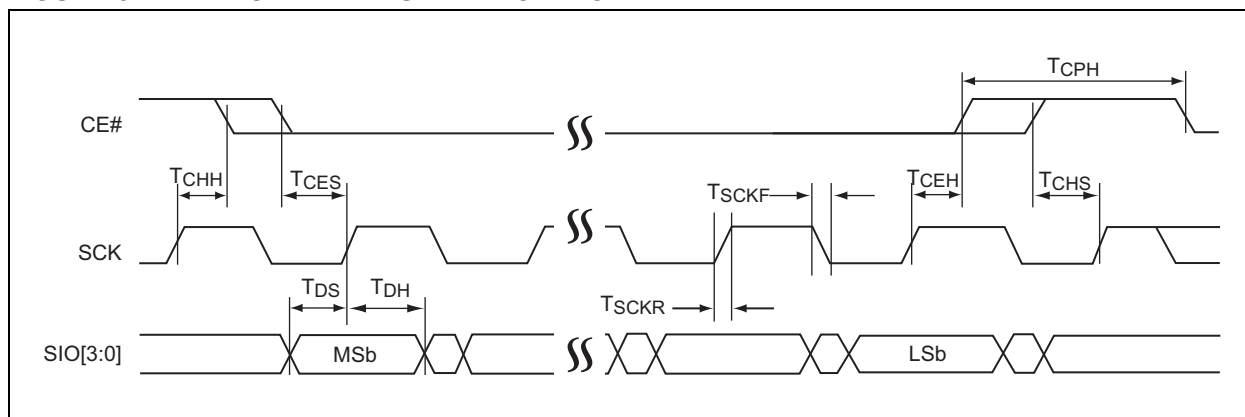


FIGURE 8-3: SERIAL OUTPUT TIMING DIAGRAM

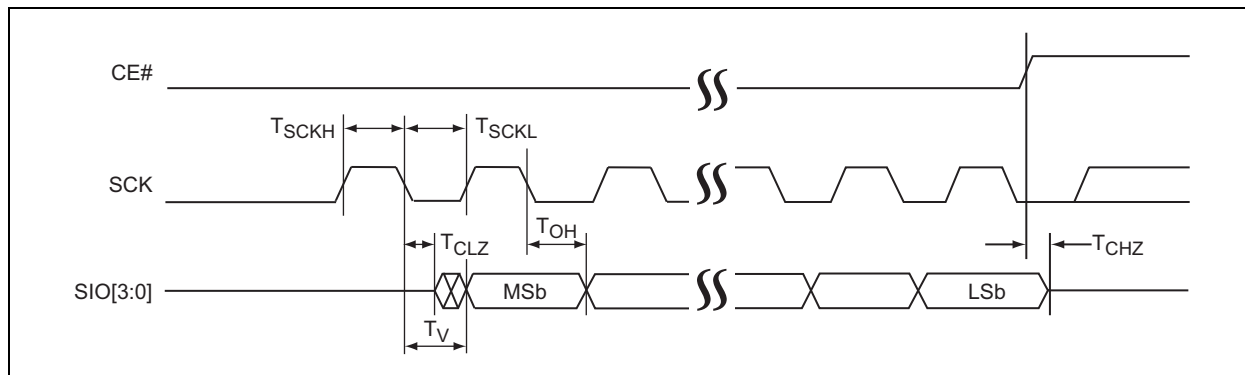


TABLE 8-2: RESET TIMING PARAMETERS

| TR(I) | Parameter | Minimum | Maximum | Units |
|-------|--|---------|---------|-------|
| TR(O) | Reset to Read (non-data operation) | | 20 | ns |
| TR(P) | Reset Recovery from Program or Suspend | | 100 | μs |
| TR(E) | Reset Recovery from Erase | | 1 | ms |

SST26VF064B/SST26VF064BA

FIGURE 8-4: RESET TIMING DIAGRAM

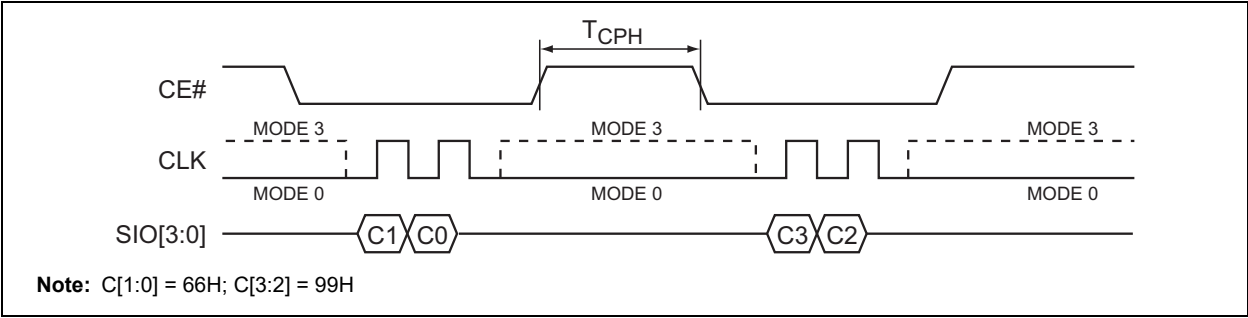
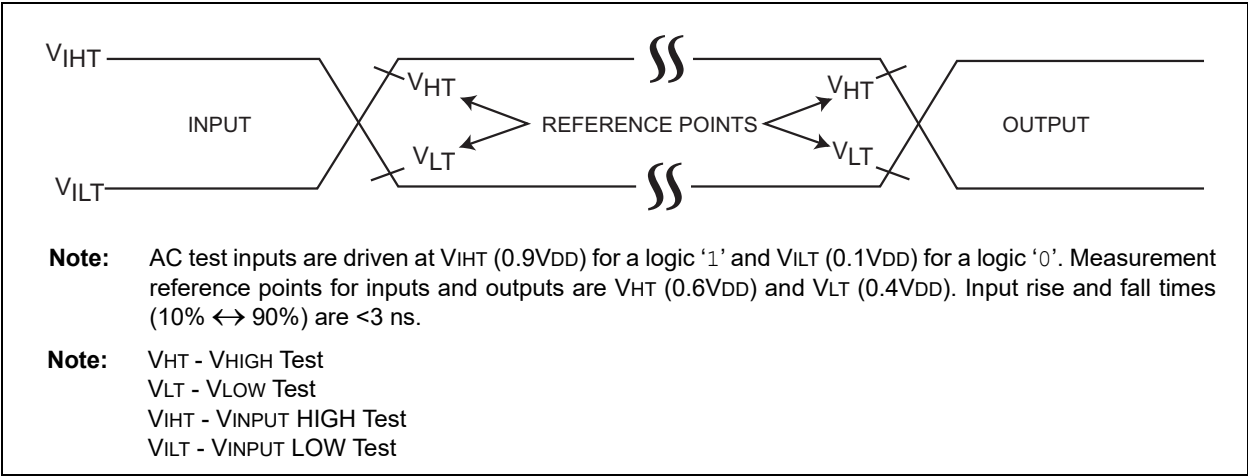


FIGURE 8-5: AC INPUT/OUTPUT REFERENCE WAVEFORMS

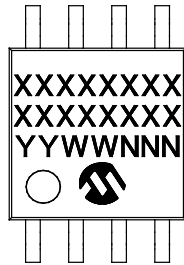


SST26VF064B/SST26VF064BA

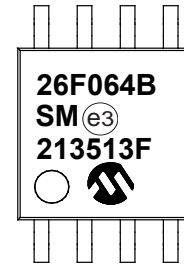
9.0 PACKAGING INFORMATION

9.1 Package Marking

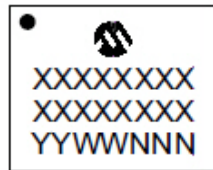
8-Lead SOIJ (5.28 mm)



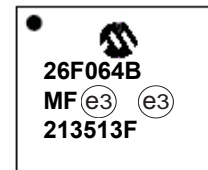
Example



8-Lead WDFN (5x6 mm)



Example



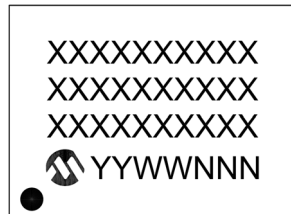
8-Lead WDFN (6x8 mm)



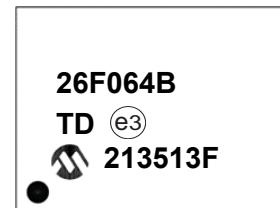
Example



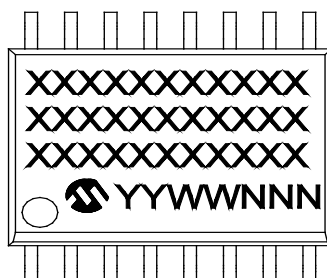
24-Ball TBGA (6x8 mm)



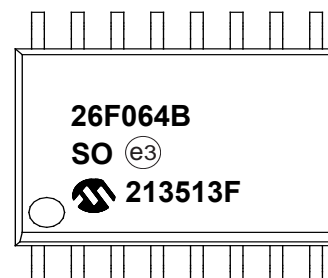
Example



16-Lead SOIC (7.50 mm)



Example



Continued

SST26VF064B/SST26VF064BA

| Part Number | 1 st Line Marking Codes | | | |
|--------------|------------------------------------|---------|---------|---------|
| | SOIJ | WDFN | TBGA | SOIC |
| SST26VF064B | 26F064B | 26F064B | 26F064B | 26F064B |
| SST26VF064BA | 26F064B | 26F064B | 26F064B | 26F064B |

Legend: XX...X Part number or part number code
Y Year code (last digit of calendar year)
YY Year code (last 2 digits of calendar year)
WW Week code (week of January 1 is week '01')
NNN Alphanumeric traceability code (2 characters for small packages)
Ⓔ3 Pb-free JEDEC[®] designator for Matte Tin (Sn)

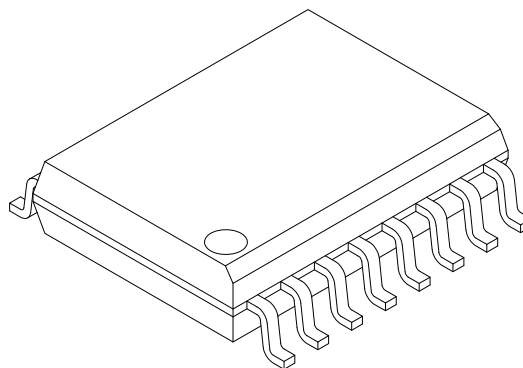
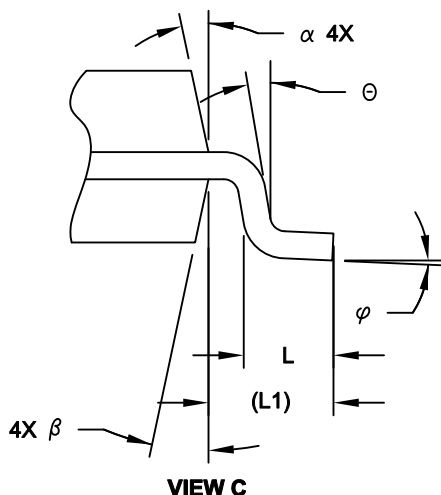
Note: For very small packages with no room for the Pb-free JEDEC[®] designator Ⓔ3, the marking will only appear on the outer carton or reel label.

Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information.

SST26VF064B/SST26VF064BA

16-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



| Units | | MILLIMETERS | | |
|--------------------------|----|-------------|-----|------|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | 16 | | |
| Pitch | e | 1.27 BSC | | |
| Overall Height | A | - | - | 2.65 |
| Molded Package Thickness | A2 | 2.05 | - | - |
| Standoff § | A1 | 0.10 | - | 0.30 |
| Overall Width | E | 10.30 BSC | | |
| Molded Package Width | E1 | 7.50 BSC | | |
| Overall Length | D | 10.30 BSC | | |
| Chamfer (Optional) | h | 0.25 | - | 0.75 |
| Foot Length | L | 0.40 | - | 1.27 |
| Footprint | L1 | 1.40 REF | | |
| Lead Angle | Θ | 0° | - | - |
| Foot Angle | φ | 0° | - | 8° |
| Lead Thickness | c | 0.20 | - | 0.33 |
| Lead Width | b | 0.31 | - | 0.51 |
| Mold Draft Angle Top | α | 5° | - | 15° |
| Mold Draft Angle Bottom | β | 5° | - | 15° |

Notes:

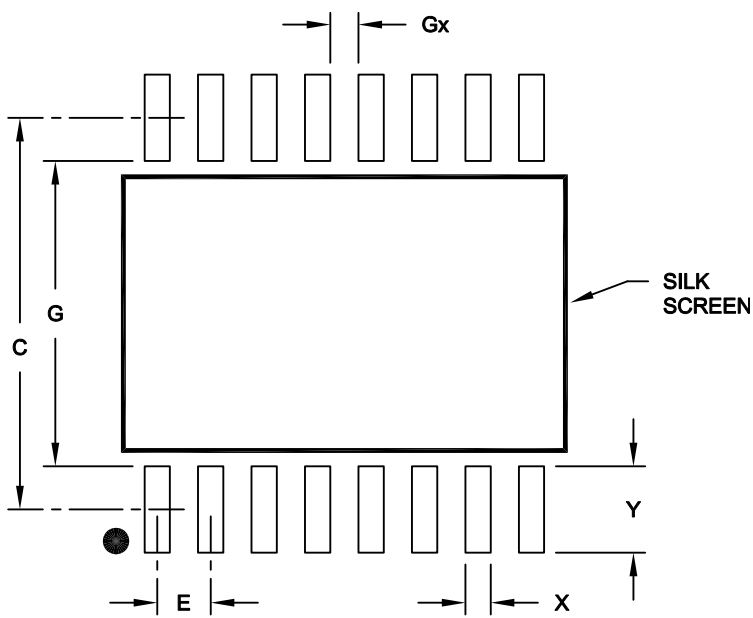
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.
- Datums A & B to be determined at Datum H.

Microchip Technology Drawing C04-102C Sheet 2 of 2

SST26VF064B/SST26VF064BA

16-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|-----------------------|----|-------------|------|------|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | 1.27 BSC | | |
| Contact Pad Spacing | C | | 9.30 | |
| Contact Pad Width | X | | | 0.60 |
| Contact Pad Length | Y | | | 2.05 |
| Distance Between Pads | Gx | 0.67 | | |
| Distance Between Pads | G | 7.25 | | |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

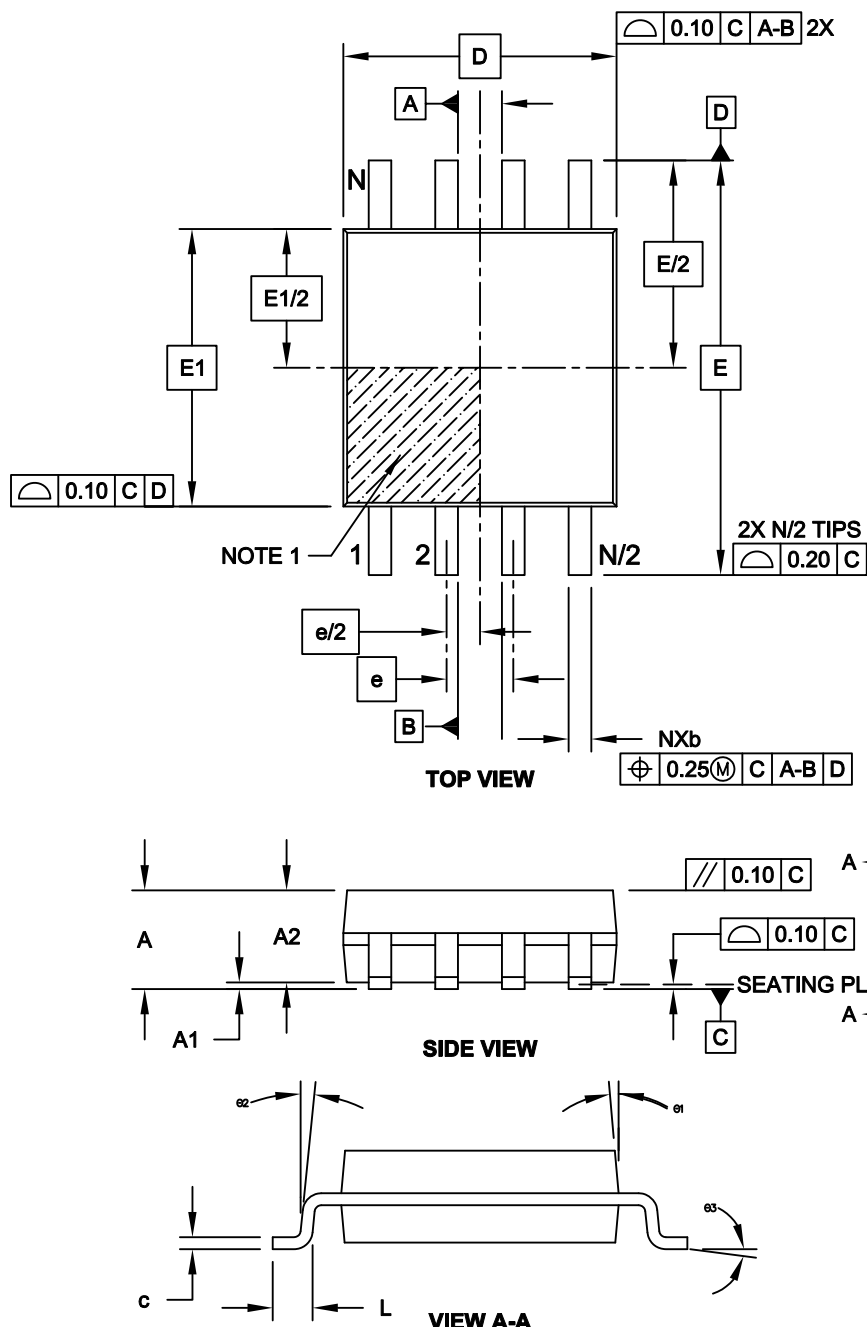
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2102A

SST26VF064B/SST26VF064BA

8-Lead Plastic Small Outline (SM) - Medium, 5.28 mm Body [SOIJ]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

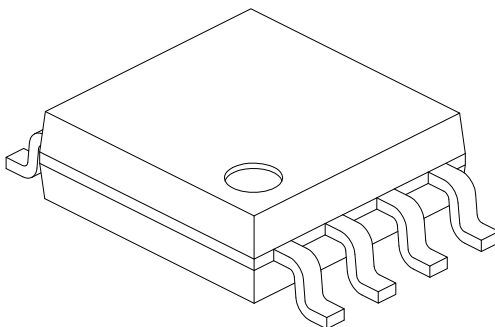


Microchip Technology Drawing C04-056C Sheet 1 of 2

SST26VF064B/SST26VF064BA

8-Lead Plastic Small Outline (SM) - Medium, 5.28 mm Body [SOIJ]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



| Dimension Limits | Units | MILLIMETERS | | |
|--------------------------|-------|-------------|-----|------|
| | | MIN | NOM | MAX |
| Number of Pins | N | 8 | | |
| Pitch | e | 1.27 BSC | | |
| Overall Height | A | 1.77 | - | 2.03 |
| Standoff § | A1 | 0.05 | | 0.25 |
| Molded Package Thickness | A2 | 1.75 | - | 1.98 |
| Overall Width | E | 7.94 BSC | | |
| Molded Package Width | E1 | 5.25 BSC | | |
| Overall Length | D | 5.26 BSC | | |
| Foot Length | L | 0.51 | - | 0.76 |
| Lead Thickness | c | 0.15 | - | 0.25 |
| Lead Width | b | 0.36 | - | 0.51 |
| Mold Draft Angle | Ø1 | - | - | 15° |
| Lead Angle | Ø2 | 0° | - | 8° |
| Foot Angle | Ø3 | 0° | - | 8° |

Notes:

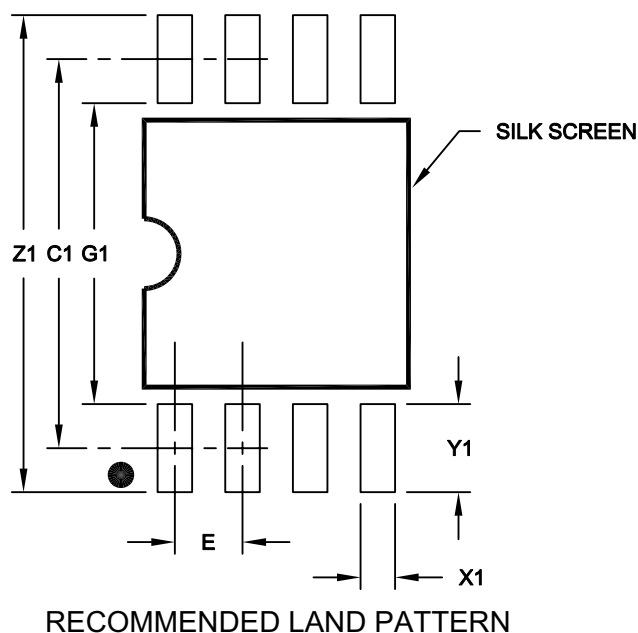
1. SOIJ, JEITA/EIAJ Standard, Formerly called SOIC
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25mm per side.

Microchip Technology Drawing No. C04-056C Sheet 2 of 2

SST26VF064B/SST26VF064BA

8-Lead Plastic Small Outline (SM) - Medium, 5.28 mm Body [SOIJ]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



| Dimension Limits | Units | MILLIMETERS | | |
|-------------------------|-------|-------------|------|------|
| | | MIN | NOM | MAX |
| Contact Pitch | E | 1.27 BSC | | |
| Overall Width | Z1 | | | 9.00 |
| Contact Pad Spacing | C1 | | 7.30 | |
| Contact Pad Width (X8) | X1 | | | 0.65 |
| Contact Pad Length (X8) | Y1 | | | 1.70 |
| Distance Between Pads | G1 | 5.60 | | |
| Distance Between Pads | G | 0.62 | | |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

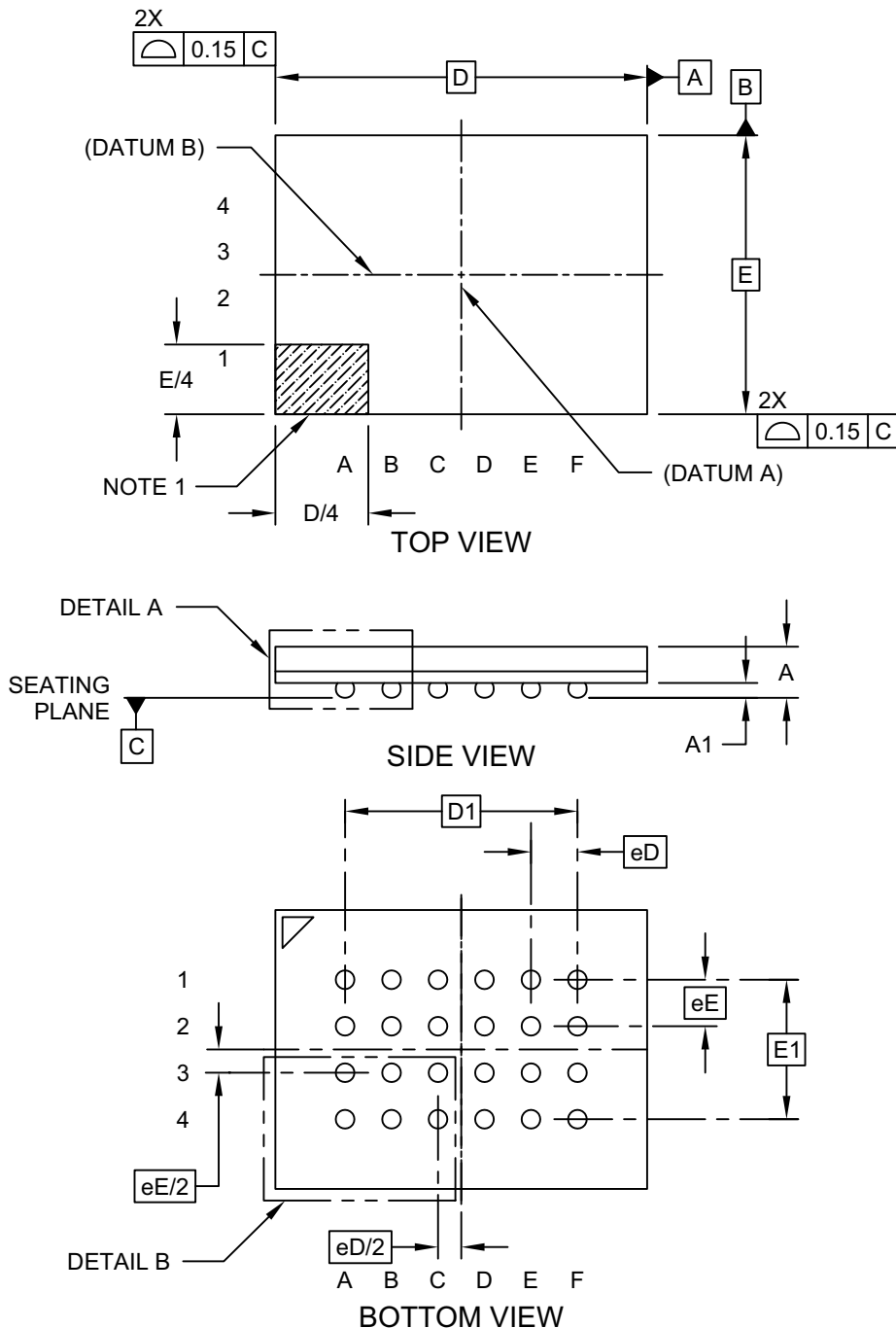
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2056C

SST26VF064B/SST26VF064BA

24-Ball Thin Profile Ball Grid Array (TD) - 6x8 mm Body [TBGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

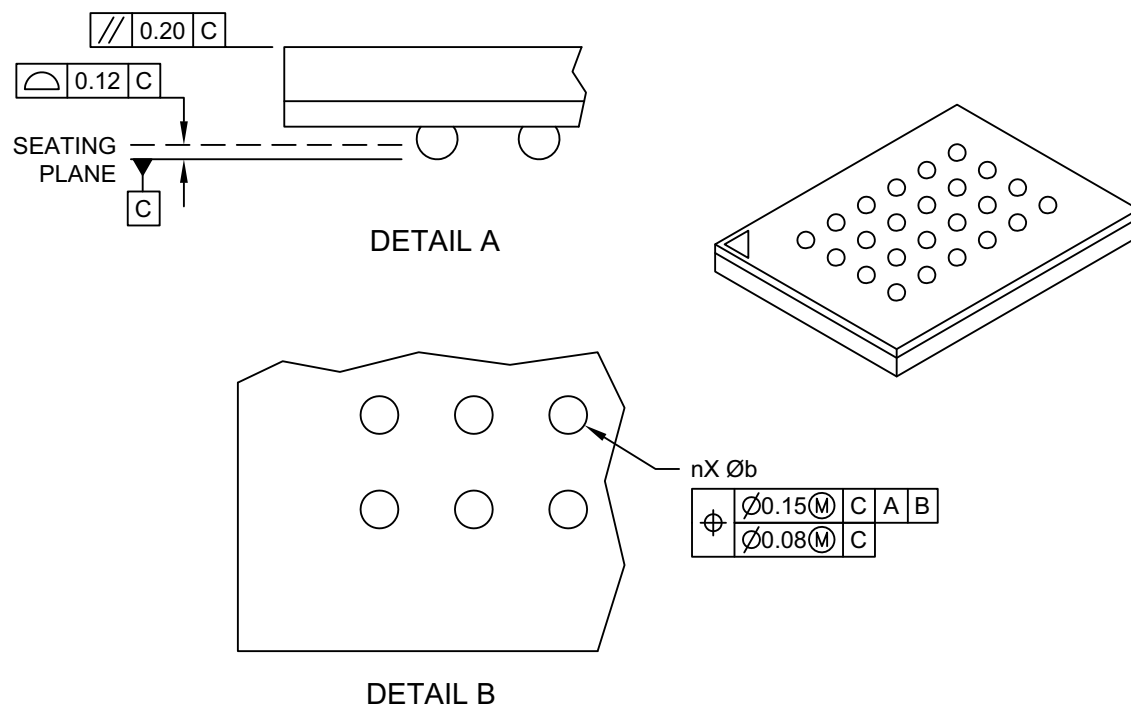


Microchip Technology Drawing C04-199B Sheet 1 of 2

SST26VF064B/SST26VF064BA

24-Ball Thin Profile Ball Grid Array (TD) - 6x8 mm Body [TBGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



| Units | | MILLIMETERS | | |
|-----------------------------|----|-------------|------|------|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Solder Balls | n | 24 | | |
| Solder Ball X-Pitch | eD | 1.00 BSC | | |
| Solder Ball Y-Pitch | eE | 1.00 BSC | | |
| Overall Height | A | 1.00 | 1.10 | 1.20 |
| Ball Height | A1 | 0.27 | 0.32 | 0.37 |
| Overall Length | D | 8.00 BSC | | |
| Overall Solder Ball Y-Pitch | D1 | 5.00 BSC | | |
| Overall Width | E | 6.00 BSC | | |
| Overall Solder Ball Y-Pitch | E1 | 3.00 BSC | | |
| Solder Ball Width | b | 0.35 | 0.40 | 0.45 |

Notes:

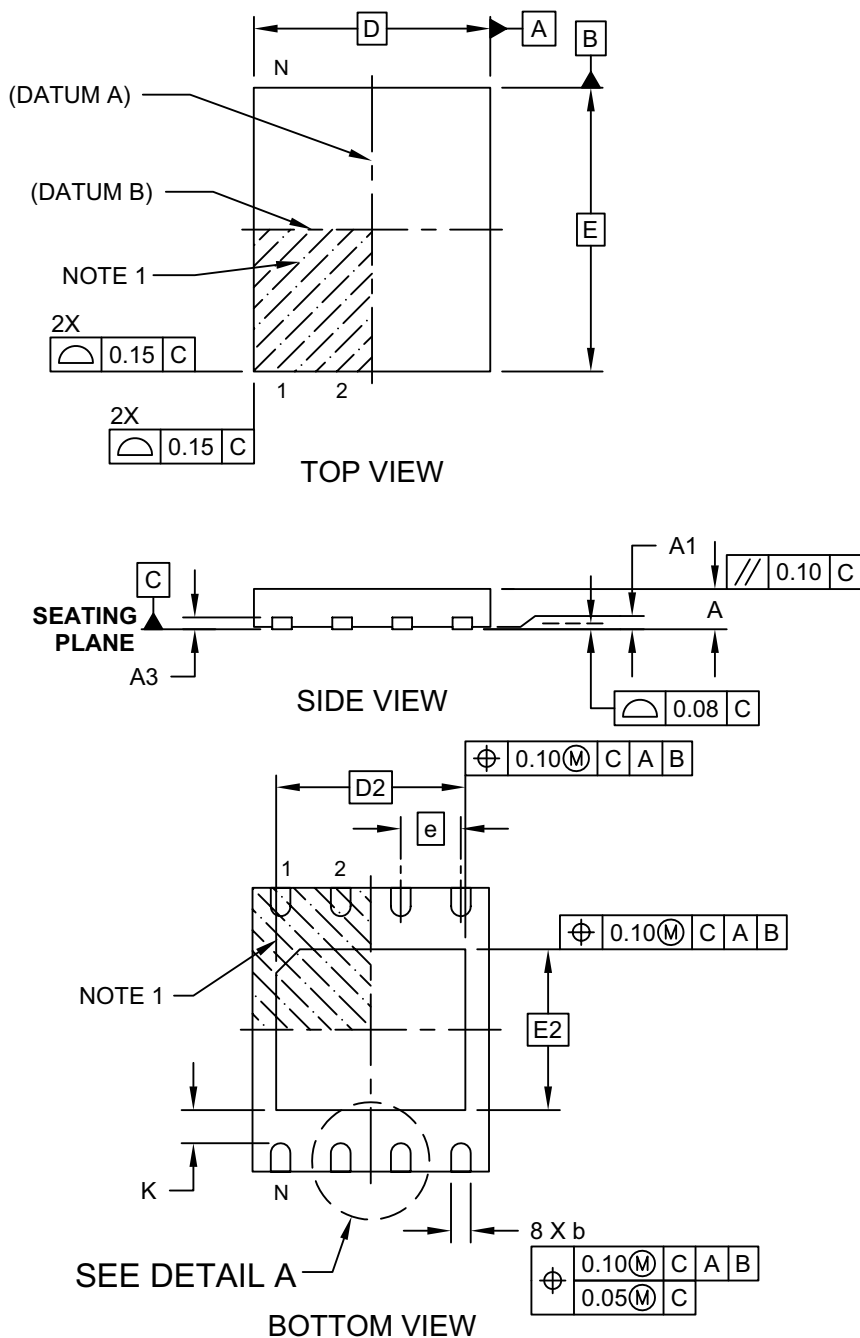
- Ball A1 visual index feature may vary, but must be located within the hatched area.
- Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.
- Ball interface to package body: 0.32mm nominal diameter.

Microchip Technology Drawing C04-199B Sheet 2 of :

SST26VF064B/SST26VF064BA

8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body [TDFN-S]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

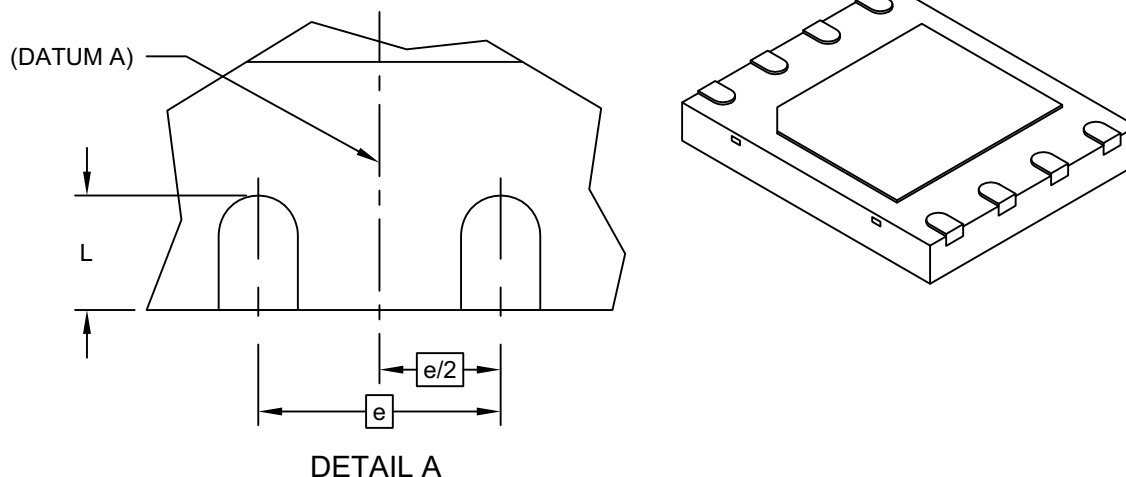


Microchip Technology Drawing C04-210B Sheet 1 of 2

SST26VF064B/SST26VF064BA

8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body [TDFN-S]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



| Units | | MILLIMETERS | | |
|-------------------------|----|-------------|------|------|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Terminals | N | 8 | | |
| Pitch | e | 1.27 BSC | | |
| Overall Height | A | 0.70 | 0.75 | 0.80 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Terminal Thickness | A3 | 0.20 REF | | |
| Overall Width | D | 5.00 BSC | | |
| Exposed Pad Width | D2 | 4.00 BSC | | |
| Overall Length | E | 6.00 BSC | | |
| Exposed Pad Length | E2 | 3.40 BSC | | |
| Terminal Width | b | 0.35 | 0.42 | 0.48 |
| Terminal Length | L | 0.50 | 0.60 | 0.70 |
| Terminal-to-Exposed-Pad | K | 0.20 | - | - |

Notes:

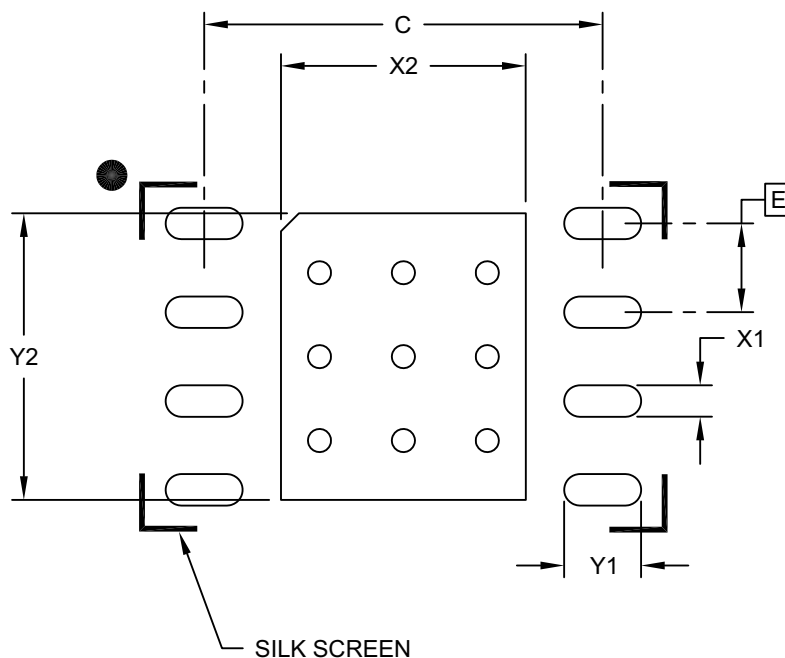
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package is saw singulated
- Dimensioning and tolerancing per ASME Y14.5M
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-210B Sheet 2 of 2

SST26VF064B/SST26VF064BA

8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body [TDFN-S]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|----------------------------|----|-------------|------|------|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | 1.27 BSC | | |
| Optional Center Pad Width | X2 | | | 3.50 |
| Optional Center Pad Length | Y2 | | | 4.10 |
| Contact Pad Spacing | C | | 5.70 | |
| Contact Pad Width (X20) | X1 | | | 0.45 |
| Contact Pad Length (X20) | Y1 | | | 1.10 |

Notes:

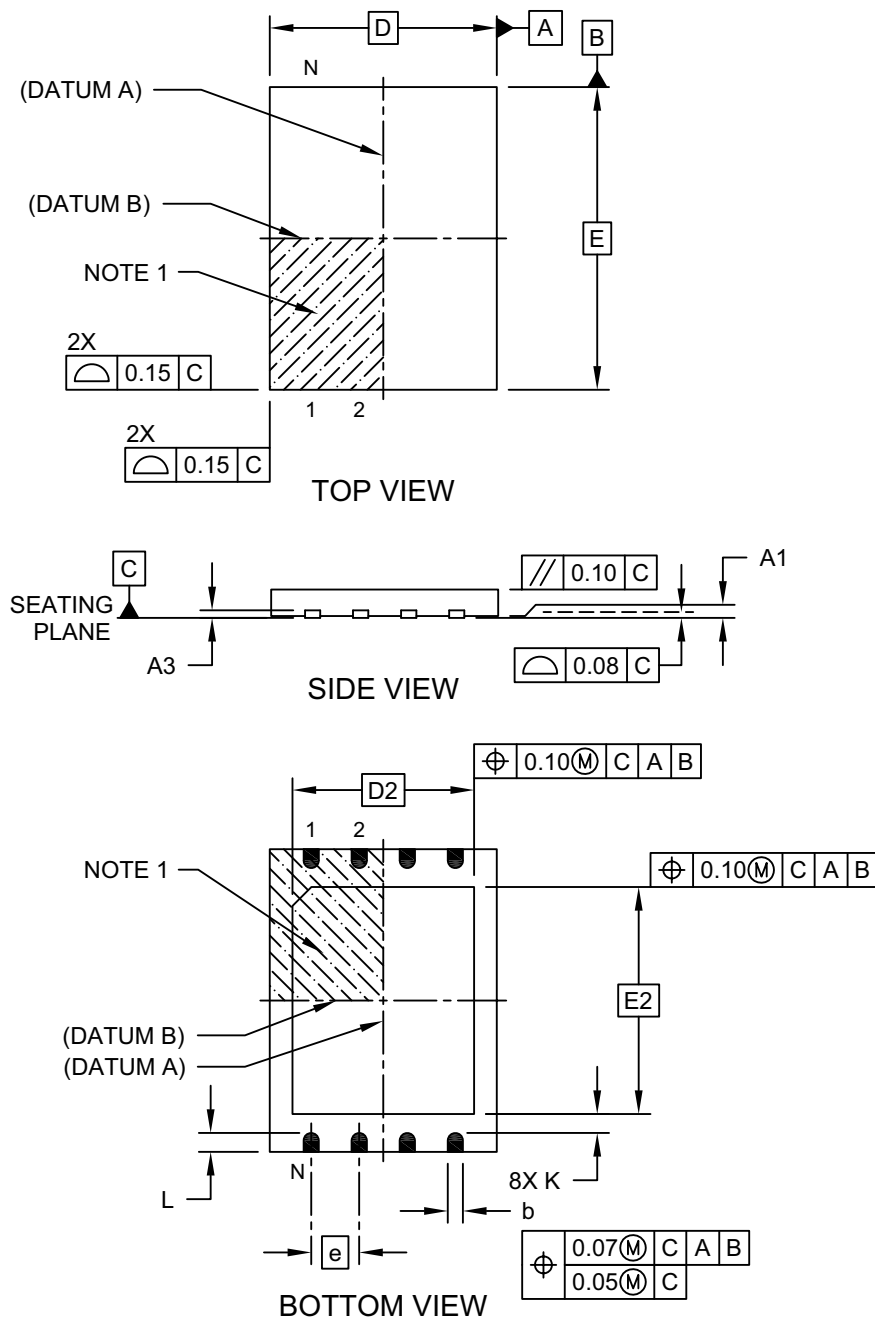
- Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.
- For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2210A

SST26VF064B/SST26VF064BA

8-Lead Very, Very Thin Small Outline No-Lead (MN) - 6x8 mm Body [WDFN] (Also Called WSON)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

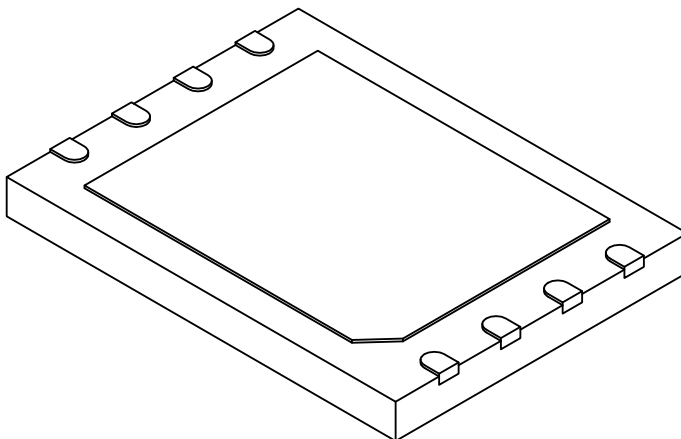


Microchip Technology Drawing C04-172A Sheet 1 of 2

SST26VF064B/SST26VF064BA

8-Lead Very, Very Thin Small Outline No-Lead (MN) - 6x8 mm Body [WDFN] (Also Called WSON)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



| Units | | MILLIMETERS | | |
|-------------------------|----|-------------|------|------|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Terminals | N | 8 | | |
| Pitch | e | 1.27 BSC | | |
| Overall Height | A | 0.70 | 0.75 | 0.80 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Terminal Thickness | A3 | 0.20 REF | | |
| Overall Width | E | 8.00 BSC | | |
| Exposed Pad Width | E2 | 6.00 BSC | | |
| Overall Length | D | 6.00 BSC | | |
| Exposed Pad Length | D2 | 4.80 BSC | | |
| Terminal Width | b | 0.35 | 0.40 | 0.45 |
| Terminal Length | L | 0.45 | 0.50 | 0.55 |
| Terminal-to-Exposed-Pad | K | 0.20 | - | - |

Notes:

1. Terminal 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

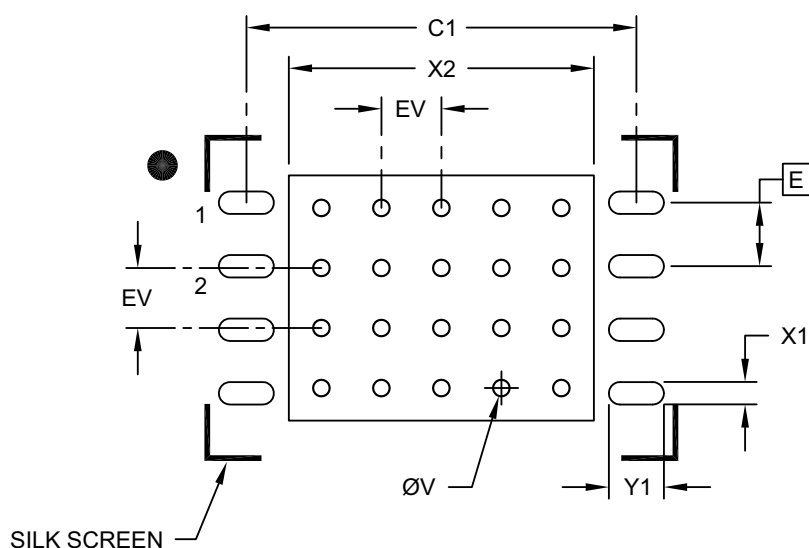
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-172A Sheet 2 of 2

SST26VF064B/SST26VF064BA

8-Lead Very, Very Thin Small Outline No-Lead (MN) - 6x8 mm Body [WDFN] (Also Called WSON)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|----------------------------|----|-------------|------|------|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | 1.27 BSC | | |
| Optional Center Pad Width | X2 | | | 6.10 |
| Optional Center Pad Length | Y2 | | | 4.90 |
| Contact Pad Spacing | C1 | | 7.80 | |
| Contact Pad Width (X8) | X1 | | | 0.45 |
| Contact Pad Length (X8) | Y1 | | | 0.95 |
| Thermal Via Diameter | V | | 0.33 | |
| Thermal Via Pitch | EV | | 1.20 | |

Notes:

- Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
- For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2172A

10.0 REVISION HISTORY

Revision K (March 2022)

Added Automotive PIS; Minor updates throughout the document to improve readability.

Revision J (May 2019)

Corrected SDIOR Maximum Frequency value in Table 5-1.

Revision H (October 2018)

Added Automotive AECQ-100 information.

Revision G (September 2015)

Added 2.3V-3.6V information throughout; Added Extended temperature range; Updated "Product Description".

Revision F (February 2015)

Revised "Product Description"; Added footnote to Table 7-4; Added information for "MN" package 8-WDFN; Added Part Markings; Updated Package definitions for "Product Identification System (Non-automotive)".

Revision E (April 2014)

Updated "SPI Dual I/O Read"; Significantly revised Table 13-1.

Revision D (September 2013)

Updated "Product Identification System (Non-automotive)"; Updated package description for MF package from WSON to WDFN.

Revision C (April 2013)

Updated document to new format; Revised CPNs to reflect the new package codes; Updated package drawings to the new format; Revised "Hardware Write Protection", "Write-Suspend and Write-Resume", and "Lock-Down Block Protection Register (LBPR)"; Updated "Power-Up Specifications".

Revision B (June 2012)

Revised figures 5-8-5-10, figures 5-13-5-15, figures 5-25- 5-28, figures 5-36-5-39, and figures 5-42-5-43; Updated the SFDP Table: Table 13-1.

Revised A (March 2012)

Initial release of data sheet

SST26VF064B/SST26VF064BA

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SST26VF064B/SST26VF064BA

PRODUCT IDENTIFICATION SYSTEM (NON-AUTOMOTIVE)

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.

| <u>PART NO.</u> | | | <u>X⁽¹⁾</u> | - | <u>XXX</u> | <u>X</u> | / | <u>XX</u> |
|---|-------------------------|---------------------|------------------------|---------|------------|----------|---|-----------|
| Device | Tape and Reel Indicator | Operating Frequency | Temperature | Package | | | | |
| <div><div>Device: SST26VF064B = 64-Mbit, 2.5V/3.0V, SQI Flash Memory WP#/Hold# pin Enable at power-up SST26VF064BA = 64-Mbit, 2.5V/3.0V, SQI Flash Memory WP#/Hold# pin Disable at power-up</div><div>Tape and Reel Indicator⁽¹⁾: T = Tape and Reel (blank) = Tube or Tray</div><div>Operating Frequency: 104 = 104 MHz</div><div>Temperature: I = -40°C to +85°C V = -40°C to +105°C</div><div>Package: MF = WDFN (6mm x 5mm Body), 8-lead MN = WDFN (6mm x 8mm Body), 8-lead SM = SOIJ (5.28 mm Body), 8-lead SO = SOIC (7.50 mm Body), 16-lead TD = TBGA(>1mm pitch, <1.2mmheight, 6mm x 8 mm Body), 24-lead</div></div> | | | | | | | | |
| <div>Valid Combinations: SST26VF064B-104I/MF SST26VF064BT-104I/MF SST26VF064BA-104I/MF SST26VF064BAT-104I/MF SST26VF064B-104V/MF SST26VF064BT-104V/MF SST26VF064B-104I/MN SST26VF064BT-104I/MN SST26VF064B-104V/MN SST26VF064BT-104V/MN SST26VF064B-104I/SM SST26VF064BT-104I/SM SST26VF064BA-104I/SM SST26VF064BAT-104I/SM SST26VF064B-104V/SM SST26VF064BT-104V/SM SST26VF064B-104I/SO SST26VF064BT-104I/SO SST26VF064BA-104I/SO SST26VF064BAT-104I/SO SST26VF064B-104V/SO SST26VF064BT-104V/SO SST26VF064B-104I/TD SST26VF064BT-104I/TD</div> | | | | | | | | |
| <div>Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option.</div> | | | | | | | | |

SST26VF064B/SST26VF064BA

PRODUCT IDENTIFICATION SYSTEM (AUTOMOTIVE)

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.

| PART NO. | | X ⁽¹⁾ | - | XXX | X | / | XX | XXX ^(2,3) | Valid Combinations: SST26VF064B-104V/SM70SVAO SST26VF064BT-104V/SM70SVAO SST26VF064B-104V/MF70SVAO SST26VF064BT-104V/MF70SVAO |
|---|-------------------------|------------------|---|---------------------|-------------|---|---------|----------------------|---|
| Device | Tape and Reel Indicator | | | Operating Frequency | Temperature | | Package | Variant | |
| Device: SST26VF064B = 64-Mbit, 2.5V/3.0V, SQI Flash Memory WP#/Hold# pin Enable at power-up | | | | | | | | | |
| Tape and Reel Indicator⁽¹⁾: T = Tape and Reel (blank) = Tube or Tray | | | | | | | | | |
| Operating Frequency: 104 = 104 MHz | | | | | | | | | |
| Temperature: V = -40°C to +105°C (AEC-Q100 Grade 2) | | | | | | | | | |
| Package: MF = WDFN (6mm x 5mm Body), 8-lead SM = SOIJ (5.28 mm Body), 8-lead | | | | | | | | | |
| Variant^(2, 3): 70SVAO = Standard Automotive, 70S Process 70SVXX = Customer Specific Automotive, 70S Process | | | | | | | | | |
| Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option. | | | | | | | | | |
| 2: The VAO/VXX automotive variants have been designed, manufactured, tested and qualified in accordance with AEC-Q100 requirements for automotive applications. | | | | | | | | | |
| 3: For customers requesting a PPAP, a customer-specific part number will be generated and and provided. A PPAP is not provided for VAO part numbers. | | | | | | | | | |

SST26VF064B/SST26VF064BA

11.0 APPENDIX

TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (1 OF 16)

| Address | Bit Address | Data | Comments |
|--|-------------|------|---|
| SFDP Header | | | |
| SFDP Header: 1 st DWORD | | | |
| 00H | A7:A0 | 53H | SFDP Signature SFDP Signature = 50444653H |
| 01H | A15:A8 | 46H | |
| 02H | A23:A16 | 44H | |
| 03H | A31:A24 | 50H | |
| SFDP Header: 2 nd DWORD | | | |
| 04H | A7:A0 | 06H | SFDP Minor Revision Number |
| 05H | A15:A8 | 01H | SFDP Major Revision Number |
| 06H | A23:A16 | 02H | Number of Parameter Headers (NPH) = 3 |
| 07H | A31:A24 | FFH | Unused. Contains FF and can not be changed. |
| Parameter Headers | | | |
| JEDEC Flash Parameter Header: 1 st DWORD | | | |
| 08H | A7:A0 | 00H | Parameter ID Least Significant bit (LSb) Number. When this field is set to 00H, it indicates a JEDEC-specified header. For vendor-specified headers, this field must be set to the vendor's manufacturer ID. |
| 09H | A15:A8 | 06H | Parameter Table Minor Revision Number Minor revisions are either clarifications or changes that add parameters in existing Reserved locations. Minor revisions do NOT change overall structure of SFDP. Minor Revision starts at 00H. |
| 0AH | A23:A16 | 01H | Parameter Table Major Revision Number Major revisions are changes that reorganize or add parameters to locations that are NOT currently Reserved. Major revisions would require code (BIOS/firmware) or hardware change to get previously defined discoverable parameters. Major Revision starts at 01H. |
| 0BH | A31:A24 | 10H | Parameter Table Length Number of DWORDs that are in the Parameter table. |
| JEDEC Flash Parameter Header: 2 nd DWORD | | | |
| 0CH | A7:A0 | 30H | Parameter Table Pointer (PTP) A 24-bit address that specifies the start of this header's Parameter table in the SFDP structure. The address must be DWORD-aligned. |
| 0DH | A15:A8 | 00H | |
| 0EH | A23:A16 | 00H | |
| 0FH | A31:A24 | FFH | Parameter ID Most Significant Bit (MSB) Number |
| JEDEC Sector Map Parameter Header: 3 rd DWORD | | | |
| 10H | A7:A0 | 81H | Parameter ID LSb Number. Sector map, function-specific table is assigned 81H. |
| 11H | A15:A8 | 00H | Parameter Table Minor Revision Number Minor revisions are either clarifications or changes that add parameters in existing Reserved locations. Minor revisions do NOT change overall structure of SFDP. Minor Revision starts at 00H. |
| 12H | A23:A16 | 01H | Parameter Table Major Revision Number Major revisions are changes that reorganize or add parameters to locations that are NOT currently Reserved. Major revisions would require code (BIOS/firmware) or hardware change to get previously defined discoverable parameters. Major Revision starts at 01H. |

SST26VF064B/SST26VF064BA

TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (2 OF 16)

| Address | Bit Address | Data | Comments |
|--|-------------|------|--|
| 13H | A31:A24 | 06H | Parameter Table Length Number of DWORDs that are in the Parameter table. |
| JEDEC Sector Map Parameter Header: 4th DWORD | | | |
| 14H | A7:A0 | 00H | Parameter Table Pointer (PTP) This 24-bit address specifies the start of this header's Parameter Table in the SFDP structure. The address must be DWORD-aligned. |
| 15H | A15:A8 | 01H | |
| 16H | A23:A16 | 00H | |
| 17H | A31:A24 | FFH | Parameter ID MSB Number |
| Microchip (Vendor) Parameter Header: 5th DWORD | | | |
| 18H | A7:A0 | BFH | ID Number Manufacture ID (vendor specified header) |
| 19H | A15:A8 | 00H | Parameter Table Minor Revision Number |
| 1AH | A23:A16 | 01H | Parameter Table major Revision Number , Revision 1.0 |
| 1BH | A31:A24 | 18H | Parameter Table Length , 24 Double Words |
| Microchip (Vendor) Parameter Header: 6th DWORD | | | |
| 1CH | A7:A0 | 00H | Parameter Table Pointer (PTP) This 24-bit address specifies the start of this header's Parameter Table in the SFDP structure. The address must be DWORD-aligned. |
| 1DH | A15:A8 | 02H | |
| 1EH | A23:A16 | 00H | |
| 1FH | A31:A24 | 01H | Used to indicate bank number (vendor specific) |
| JEDEC Flash Parameter Table | | | |
| JEDEC Flash Parameter Table: 1st DWORD | | | |
| 30H | A1:A0 | FDH | Block/Sector Erase Sizes 00: Reserved 01: 4-Kbyte Erase 10: Reserved 11: Use this setting only if the 4-Kbyte erase is unavailable. |
| | A2 | | Write Granularity 0: Single-byte programmable devices or buffer programmable devices with buffer is less than 64 bytes (32 Words). 1: For buffer programmable devices when the buffer size is 64 bytes (32 Words) or larger. |
| | A3 | | Volatile STATUS Register 0: Target Flash has nonvolatile STATUS bit. Write/Erase commands do not require STATUS register to be written on every power-on. 1: Target Flash volatile STATUS bits |
| | A4 | | Write Enable Opcode Select for Writing to Volatile STATUS Register 0: 0x50. Enables a STATUS register write when bit 3 is set to '1'. 1: 0x06 Enables a STATUS register write when bit 3 is set to '1'. |
| | A7:A5 | | Unused. Contains 111b and can not be changed |
| 31H | A15:A8 | 20H | 4-Kbyte Erase Opcode |

SST26VF064B/SST26VF064BA

TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (3 OF 16)

| Address | Bit Address | Data | Comments |
|--|-------------|------|---|
| 32H | A16 | F1H | Supports (1-1-2) Fast Read 0: (1-1-2) Fast Read NOT supported 1: (1-1-2) Fast Read supported |
| | A18:A17 | | Address Bytes Number of bytes used in addressing Flash array read, write and erase. 00: 3-Byte only addressing 01: 3- or 4-Byte addressing (e.g. defaults to 3-Byte mode; enters 4-Byte mode on command) 10: 4-Byte only addressing 11: Reserved |
| | A19 | | Supports Double Transfer Rate (DTR) Clocking Indicates the device supports some type of double transfer rate clocking. 0: DTR NOT supported 1: DTR Clocking supported |
| | A20 | | Supports (1-2-2) Fast Read Device supports single input opcode, dual input address, and dual output data Fast Read. 0: (1-2-2) Fast Read NOT supported. 1: (1-2-2) Fast Read supported. |
| | A21 | | Supports (1-4-4) Fast Read Device supports single input opcode, quad input address, and quad output data Fast Read 0: (1-4-4) Fast Read NOT supported. 1: (1-4-4) Fast Read supported. |
| | A22 | | Supports (1-1-4) Fast Read Device supports single input opcode & address and quad output data Fast Read. 0: (1-1-4) Fast Read NOT supported. 1: (1-1-4) Fast Read supported. |
| | A23 | | Unused. Contains '1' can not be changed. |
| 33H | A31:A24 | FFH | Unused. Contains FF can not be changed |
| JEDEC Flash Parameter Table: 2nd DWORD | | | |
| 34H | A7:A0 | FFH | Flash Memory Density SST26VF064B/064BA = 03FFFFFFH |
| 35H | A15:A8 | FFH | |
| 36H | A23:A16 | FFH | |
| 37H | A31:A24 | 03H | |
| JEDEC Flash Parameter Table: 3rd DWORD | | | |
| 38H | A4:A0 | 44H | (1-4-4) Fast Read Number of Wait states (dummy clocks) needed before valid output 00100b: 4 dummy clocks (16 dummy bits) are needed with a Quad Input Address Phase instruction. |
| | A7:A5 | | Quad Input Address Quad Output (1-4-4) Fast Read Number of Mode Bits 010b: 2 dummy clocks (8 mode bits) are needed with a single input opcode, quad input address and quad output data Fast Read Instruction. |
| 39H | A15:A8 | EBH | (1-4-4) Fast Read Opcode Opcode for single input opcode, quad input address, and quad output data Fast Read. |

SST26VF064B/SST26VF064BA

TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (4 OF 16)

| Address | Bit Address | Data | Comments |
|--|-------------|------|---|
| 3AH | A20:A16 | 08H | (1-1-4) Fast Read Number of Wait states (dummy clocks) needed before valid output 01000b: 8 dummy bits are needed with a single input opcode & address and quad output data Fast Read Instruction. |
| | A23:A21 | | (1-1-4) Fast Read Number of Mode Bits 000b: No mode bits are needed with a single input opcode & address and quad output data Fast Read Instruction. |
| 3BH | A31:A24 | 6BH | (1-1-4) Fast Read Opcode Opcode for single input opcode & address and quad output data Fast Read. |
| JEDEC Flash Parameter Table: 4th DWORD | | | |
| 3CH | A4:A0 | 08H | (1-1-2) Fast Read Number of Wait states (dummy clocks) needed before valid output 01000b: 8 dummy clocks are needed with a single input opcode, address and dual output data fast read instruction. |
| | A7:A5 | | (1-1-2) Fast Read Number of Mode Bits 000b: No mode bits are needed with a single input opcode & address and quad output data Fast Read Instruction. |
| 3DH | A15:A8 | 3BH | (1-1-2) Fast Read Opcode Opcode for single input opcode& address and dual output data Fast Read. |
| 3EH | A20:A16 | 80H | (1-2-2) Fast Read Number of Wait states (dummy clocks) needed before valid output 00000b: 0 clocks of dummy cycle. |
| | A23:A21 | | (1-2-2) Fast Read Number of Mode Bits (in clocks) 100b: 4 clocks of mode bits are needed. |
| 3FH | A31:A24 | BBH | (1-2-2) Fast Read Opcode Opcode for single input opcode, dual input address, and dual output data Fast Read. |
| JEDEC Flash Parameter Table: 5th DWORD | | | |
| 40H | A0 | FEH | Supports (2-2-2) Fast Read Device supports dual input opcode& address and dual output data Fast Read. 0: (2-2-2) Fast Read NOT supported. 1: (2-2-2) Fast Read supported. |
| | A3:A1 | | Reserved. Bits default to all 1's. |
| | A4 | | Supports (4-4-4) Fast Read Device supports Quad input opcode & address and quad output data Fast Read. 0: (4-4-4) Fast Read NOT supported. 1: (4-4-4) Fast Read supported. |
| | A7:A5 | | Reserved. Bits default to all 1's. |
| 41H | A15:A8 | FFH | Reserved. Bits default to all 1's. |
| 42H | A23:A16 | FFH | Reserved. Bits default to all 1's. |
| 43H | A31:A24 | FFH | Reserved. Bits default to all 1's. |

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TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (5 OF 16)

| Address | Bit Address | Data | Comments |
|--|-------------|------|---|
| JEDEC Flash Parameter Table: 6th DWORD | | | |
| 44H | A7:A0 | FFH | Reserved. Bits default to all 1's. |
| 45H | A15:A8 | FFH | Reserved. Bits default to all 1's. |
| 46H | A20:A16 | 00H | (2-2-2) Fast Read Number of Wait states (dummy clocks) needed before valid output 00000b: No dummy bit is needed |
| | A23:A21 | | (2-2-2) Fast Read Number of Mode Bits 000b: No mode bits are needed |
| 47H | A31:A24 | FFH | (2-2-2) Fast Read Opcode Opcode for dual input opcode& address and dual output data Fast Read. (not supported) |
| JEDEC Flash Parameter Table: 7th DWORD | | | |
| 48H | A7:A0 | FFH | Reserved. Bits default to all 1's. |
| 49H | A15:A8 | FFH | Reserved. Bits default to all 1's. |
| 4AH | A20:A16 | 44H | (4-4-4) Fast Read Number of Wait states (dummy clocks) needed before valid output 00100b: 4 clocks dummy are needed with a quad input opcode & address and quad output data Fast Read Instruction |
| | A23:A21 | | (4-4-4) Fast Read Number of Mode Bits 010b: 2 clocks mode bits are needed with a quad input opcode & address and quad output data Fast Read Instruction |
| 4BH | A31:A24 | 0BH | (4-4-4) Fast Read Opcode Opcode for quad input opcode/address, quad output data Fast Read |
| JEDEC Flash Parameter Table: 8th DWORD | | | |
| 4CH | A7:A0 | 0CH | Sector Type 1 Size 4-Kbyte, Sector/block size = 2 ^N bytes |
| 4DH | A15:A8 | 20H | Sector Type 1 Opcode Opcode used to erase the number of bytes specified by Sector Type 1 Size |
| 4EH | A23:A16 | 0DH | Sector Type 2 Size 8-Kbyte, Sector/block size = 2 ^N bytes |
| 4FH | A31:A24 | D8H | Sector Type 2 Opcode Opcode used to erase the number of bytes specified by Sector Type 2 Size |
| JEDEC Flash Parameter Table: 9th DWORD | | | |
| 50H | A7:A0 | 0FH | Sector Type 3 Size 32-Kbyte, Sector/block size = 2 ^N bytes |
| 51H | A15:A8 | D8H | Sector Type 3 Opcode Opcode used to erase the number of bytes specified by Sector Type 3 Size |
| 52H | A23:A16 | 10H | Sector Type 4 Size 64-Kbyte, Sector/block size = 2 ^N bytes |
| 53H | A31:A24 | D8H | Sector Type 4 Opcode Opcode used to erase the number of bytes specified by Sector Type 4 Size |

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TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (6 OF 16)

| Address | Bit Address | Data | Comments |
|---|-------------|------|---|
| JEDEC Flash Parameter Table: 10 th DWORD | | | |
| 54H | A3:A0 | 20H | Multiplier from typical erase time to maximum erase time Maximum time = 2*(count + 1)*Typical erase time Count = 0 A3:A0 = 0000b |
| | A7:A4 | | Erase Type 1 Erase, Typical time Typical Time = (count +1)*units 1 ms to 32 ms, 16 ms to 512 ms, 128 ms to 4096 ms, 1 s to 32 s A10:A9 units (00b:1 ms, 01b: 16 ms, 10b:128 ms, 11b:1 s) A8:A4 count = 18 = 10010b A10:A9 unit = 1 ms = 00b |
| 55H | A10:A8 | 91H | A10:A8 = 001b |
| | A15:A11 | | Erase Type 2 Erase, Typical time Typical time = (count+1)*units 1 ms to 32 ms, 16 ms to 512 ms, 128 ms to 4096 ms, 1 s to 32 s A17:A16 units (00b:1 ms, 01b:16 ms, 10b:128 ms, 11b:1 s) A15:A11 count = 18 =10010b A17:A16 unit = 1 ms =00b |
| 56H | A17:A16 | 48H | A17:A16 = 00b |
| | A23:A18 | | Erase Type 3 Erase, Typical time Typical time = (count+1)*units 1 ms to 32 ms, 16 ms to 512 ms, 128 ms to 4096 ms, 1 s to 32 s A24:A23 units (00b: 1 ms, 01b: 16 ms, 10b:128 ms, 11b:1 s) A22:A18 count = 18 = 10010b A24:A23 unit = 1 ms = 00b |
| 57H | A24 | 24H | A24 = 0b |
| | A31:A25 | | Erase Type 4 Erase, Typical time Typical time = (count+1)*units 1 ms to 32 ms, 16 ms to 512 ms, 128 ms to 4096 ms, 1 s to 32 s A31:A30 units (00b: 1 ms, 01b: 16 ms, 10b:128 ms, 11b:1 s) A29:A25 count = 18 = 10010b A31:A30 unit = 1 ms = 00b |
| JEDEC Flash Parameter Table: 11 th DWORD | | | |
| 58H | A3:A0 | 80H | Multiplier from Typical Program Time to Maximum Program Time Maximum time = 2*(count +1)*Typical program time. Count =0 A3:A0 = 0000b |
| | A7:A4 | | Page Size Page size = 2 ^N bytes. N = 8 A7:A4 = 1000b |

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TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (7 OF 16)

| Address | Bit Address | Data | Comments |
|---|-------------|------|---|
| 59H | A13:A8 | 6FH | Page Program Typical time Program time = (count+1)*units A13 units (0b: 8 μs, 1b: 64 μs) A12:A8 count = 11 = 01111b A13 unit = 64 μs = 1b |
| | A15:A14 | | Byte Program Typical time, first byte Typical time = (count+1)*units A18 units (0b: 1 μs, 1b: 8 μs) A17:A14 count = 5 = 0101b A18 = 8 μs = 1b |
| 5AH | A18:A16 | 1DH | A18:A16 = 101b |
| | A23:A19 | | Byte Program Typical time, Additional Byte Typical time = (count+1)*units A23 units (0b: 1 μs , 1b: 8 μs) A22:A19 count = 3 = 0011b A23 = 1 μs = 0b |
| 5BH | A30:A:24 | 81H | Chip Erase Typical Time Typical time = (count+1)*units 16 ms to 512 ms, 256 ms to 8192 ms, 4 s to 128 s, 64 s to 2048 s A28:A24 count = 1 = 00001b A30:A29 units = 16 ms = 00b |
| | A31 | | Reserved A31 = 1b |
| JEDEC Flash Parameter Table: 12 th DWORD | | | |
| 5CH | A3:A0 | EDH | Prohibited Operations During Program Suspend xxx0b: May not initiate a new erase anywhere xxx1b:May not initiate a new erase in the program suspended page size xx0xb:May not initiate a new page program anywhere xx1xb: May not initiate a new page program in program suspended page size. x0xxb:Refer to the Data Sheet x1xxb: May not initiate a read in the program suspended page size 0xxxb: Additional erase or program restrictions apply 1xxxb: The erase and program restrictions in bits 1:0 are sufficient |
| | A7:A4 | | Prohibited Operation During Erase Suspend xxx0b: May not initiate a new erase anywhere xxx1b:May not initiate a new erase in the erase suspended page size xx0xb:May not initiate a new page program anywhere xx1xb: May not initiate a new page program in erase suspended erase type size. x0xxb:Refer to the Data Sheet x1xxb: May not initiate a read in the erase suspended page size 0xxxb: Additional erase or program restrictions apply 1xxxb: The erase and program restrictions in bits 5:4 are sufficient |

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TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (8 OF 16)

| Address | Bit Address | Data | Comments |
|---|-------------|------|--|
| 5DH | A8 | 0FH | Reserved = 1b |
| | A12:A9 | | Program Resume to Suspend Interval The device requires this typical amount of time to make progress on the program operation before allowing another suspend. Interval = 500 μs Program resume to suspend interval =(count+1)*64 μs A12:A9 = 7 = 0111b |
| | A15:A13 | | Suspend in-progress program max latency Maximum time required by the Flash device to suspend an in-progress program and be ready to accept another command which accesses the Flash array. Maximum latency = 25 μs program maximum latency =(count+1)*units units (00b:128 ns, 01b:1 μs, 10b:8 μs, 11b:64 μs) A17:A13 = count = 24 = 11000b A19:A18 = 1 μs =01b |
| 5EH | A19:A16 | 77H | 0111b |
| | A23:A20 | | Erase Resume to Suspend Interval The device requires this typical amount of time to make progress on the erase operation before allowing another suspend. Interval = 500 μs Erase resume to suspend interval =(count+1)*64 μs A23:A20 = 7 = 0111b |
| 5FH | A30:A24 | 38H | Suspend in-progress erase max latency Maximum time required by the Flash device to suspend an in-progress erase and be ready to accept another command which accesses the Flash array. Maximum latency = 25 μs Erase maximum latency =(count+1)*units units (00b:128 ns, 01b:1 μs, 10b:8 μs, 11b:64 μs) A28:A24 = count = 24 = 11000b A30:A29 = 1 μs =01b |
| | A31 | | Suspend/Resume supported 0:supported 1:not supported |
| JEDEC Flash Parameter Table: 13 th DWORD | | | |
| 60H | A7:A0 | 30H | Program Resume Instruction |
| 61H | A15:A8 | B0H | Program Suspend Instruction |
| 62H | A23:A16 | 30H | Resume Instruction |
| 63H | A31:A24 | B0H | Suspend Instruction |
| JEDEC Flash Parameter Table: 14 th DWORD | | | |
| 64H | A1:A0 | F7H | Reserved = 11b |
| | A7:A2 | | Status Register Polling Device Busy 111101b: Use of legacy polling is supported by reading the STATUS register with 05h instruction and checking WIP bit [0] (0=ready, 1=busy) |
| 65H | A14:A8 | FFH | Exit Deep Power-down to next operation delay |
| | A15 | | Exit Power-down Instruction |

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TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (9 OF 16)

| Address | Bit Address | Data | Comments |
|---|-------------|------|---|
| 66H | A22:A16 | FFH | Enter Power-down instruction |
| | A23 | | |
| 67H | A30:A24 | FFH | Deep Power-down Supported 0:supported 1:not supported |
| | A31 | | |
| JEDEC Flash Parameter Table: 15th DWORD | | | |
| 68H | A3:A0 | 29H | 4-4-4 mode disable sequences Xxx1b: issue FF instruction 1xxxb: issue the Soft Reset 66/99 sequence. |
| | A7:A4 | | 4-4-4 mode enable sequences X_xx1xb: issue instruction 38h |
| 69H | A8 | C2H | 4-4-4 mode enable sequences A8 = 0 |
| | A9 | | 0-4-4 mode supported 0:not supported 1:supported |
| | A15:A10 | | 0-4-4 Mode Exit Method X1_xxxx: Mode Bit[7:0] Not= AXh 1x_xxxx: Reserved = 1 |
| 6AH | A19:A16 | 5CH | 0-4-4 Mode Entry Method x1xxb: M[7:0] = AXh 1xxxb:Reserved =1 |
| | A22:A20 | | Quad Enable Requirements (QER) 101b: Quad Enable is bit 1 of the configuration register. |
| | A23 | | HOLD and Reset Disable 0:feature is not supported |
| 6BH | A31:A24 | FFH | Reserved bits = 0xFF |
| JEDEC Flash Parameter Table: 16th DWORD | | | |
| 6C | A6:A0 | F0H | Volatile or Non-Volatile Register and Write Enable Instructions for STATUS Register 1 Xx1_xxxxb: STATUS Register 1 contains a mix of volatile and non-volatile bits. The 06h instruction is used to enable writing to the register. X1x_xxxxb: Reserved = 1 1xx_xxxxb: Reserved = 1 |
| | A7 | | Reserved =1b |
| 6D | A13:A8 | 30H | Soft Reset and Rescue Sequence Support X1_xxxxb: reset enable instruction 66h is issued followed by reset instruction 99h. 1x_xxxxb: exit 0-4-4 mode is required prior to other reset sequences. |
| | A15:A14 | | Exit 4-Byte Addressing Not supported |
| 6E | A23:A16 | C0H | Exit 4-Byte Addressing Not supported A23 and A22 are Reserved bits which are = 1 |
| 6F | A31:A24 | 80H | Enter 4-Byte Addressing Not supported 1xxx_xxxx: Reserved = 1 |

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TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (10 OF 16)

| Address | Bit Address | Data | Comments |
|---|-------------|------|--|
| JEDEC Sector Map Parameter Table | | | |
| 100H | A7:A0 | FFH | Sector Map A7:A2 = Reserved = 111111b A1 = Descriptor Type = Map = 1b A0 = Last map = 1b |
| 101H | A15:A8 | 00H | Configuration ID = 00h |
| 102H | A23:A16 | 04H | Region Count = 5 Regions |
| 103H | A31:A24 | FFH | Reserved = FFh |
| 104H | A7:A0 | F3H | Region 0 supports 4Kbyte erase and 8Kbyte erase A3:A0 = 0011b A7:A4 = Reserved = 1111b |
| 105H | A15:A8 | 7FH | Region 0 Size 4 * 8 Kbytes = 32 Kbytes Count = 32 Kbytes/256 bytes = 128 Value = count -1 =127 A31:A8 = 00007Fh |
| 106H | A23:A16 | 00H | |
| 107H | A31:A24 | 00H | |
| 108H | A7:A0 | F5H | Region 1 supports 4Kbyte erase and 32Kbyte erase A3:A0 = 0101b A7:A4 = Reserved = 1111b |
| 109H | A15:A8 | 7FH | Region 1 size 1 * 32 Kbytes = 32 Kbytes Count = 32 Kbytes/256 bytes = 128 Value = count -1 =127 A31:A8 = 00007Fh |
| 10AH | A23:A16 | 00H | |
| 10BH | A31:A24 | 00H | |
| 10CH | A7:A0 | F9H | Region 2 supports 4-Kbyte erase and 64-Kbyte erase A3:A0 = 1001b A7:A4 = Reserved = 1111b |
| 10DH | A15:A8 | FFH | Region 2 size 126 * 64 Kbytes = 8064 Kbytes Count = 8064 Kbytes/256 bytes = 32256 Value = count -1 = 32255 A31:A8 = 007DFFh |
| 10EH | A23:A16 | 7DH | |
| 10FH | A31:A24 | 00H | |
| 110H | A7:A0 | F5H | Region 3 supports 4-Kbyte erase and 32-Kbyte erase A3:A0 = 0101b A7:A4 = Reserved = 1111b |
| 111H | A15:A8 | 7FH | Region 3 size 1 * 32 Kbytes = 32 Kbytes Count = 32 Kbytes/256 bytes= 128 Value = count -1 = 127 A31:A8 = 00007Fh |
| 112H | A23:A16 | 00H | |
| 113H | A31:A24 | 00H | |
| 114H | A7:A0 | F3H | Region 4 supports 4-Kbyte erase and 8-Kbyte erase A3:A0 = 0011b A7:A4 = Reserved = 1111b |

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TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (11 OF 16)

| Address | Bit Address | Data | Comments |
|---|-------------|------|--|
| 115H | A15:A8 | 7FH | Region 4 Size 4 * 8 Kbytes = 32 Kbytes Count = 32 Kbytes/256 bytes= 128 Value = count -1 = 127 A31:A8 = 00007Fh |
| 116H | A23:A16 | 00H | |
| 117H | A31:A24 | 00H | |
| SST26VF064B/064BA (Vendor) Parameter Table | | | |
| SST26VF064B/064BA Identification | | | |
| 200H | A7:A0 | BFH | Manufacturer ID |
| 201H | A15:A8 | 26H | Memory Type |
| 202H | A23:A16 | 43H | Device ID SST26VF064B/064BA=43H |
| 203H | A31:A24 | FFH | Reserved. Bits default to all 1's. |
| SST26VF064B/064BA Interface | | | |
| 204H | A2:A0 | B9H | Interfaces Supported 000: SPI only 001: Power up default is SPI; Quad can be enabled/disabled 010: Reserved • • • 111: Reserved |
| | A3 | | Supports Enable Quad 0: not supported 1: supported |
| | A6:A4 | | Supports Hold#/Reset# Function 000: Hold# 001: Reset# 010: HOLD/Reset# 011: Hold# & I/O when in SQUI(4-4-4), 1-4-4 or 1-1-4 Read |
| | A7 | | Supports Software Reset 0: not supported 1: supported |
| 205H | A8 | 5FH | Supports Quad Reset 0: not supported 1: supported |
| | A10:A9 | | Reserved. Bits default to all 1's |
| | A13:A11 | | Byte-Program or Page-Program (256 Bytes) 011: Byte Program/Page Program in SPI and Quad Page Program once Quad is enabled |
| | A14 | | Program-Erase Suspend Supported 0: Not Supported 1: Program/Erase Suspend Supported |
| | A15 | | Deep Power-Down Mode Supported 0: Not Supported 1: Deep Power-Down Mode Supported |

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TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (12 OF 16)

| Address | Bit Address | Data | Comments |
|---------|-------------|------|---|
| 206H | A16 | FDH | OTP Capable (Security ID) Supported 0: not supported 1: supported |
| | A17 | | Supports Block Group Protect 0: not supported 1: supported |
| | A18 | | Supports Independent Block Protect 0: not supported 1: supported |
| | A19 | | Supports Independent nonvolatile Lock (Block or Sector becomes OTP) 0: not supported 1: supported |
| | A23:A20 | | Reserved. Bits default to all 1's. |
| 207H | A31:A24 | FFH | Reserved. Bits default to all 1's. |
| 208H | A7:A0 | 30H | V_{DD} Minimum Supply Voltage |
| 209H | A15:A8 | F2H | 2.3V (F230H) |
| 20AH | A23:A16 | 60H | V_{DD} Maximum Supply Voltage |
| 20BH | A31:A24 | F3H | 3.6V (F360H) |
| 20CH | A7:A0 | 32H | Typical time out for Byte-Program: 50 μ s Typical time out for Byte Program is in μ s. Represented by conversion of the actual time from the decimal to hexadecimal number. |
| 20DH | A15:A8 | FFH | Reserved. Bits default to all 1's. |
| 20EH | A23:A16 | 0AH | Typical time out for page program: 1.0 ms (xxH*(0.1 ms)) |
| 20FH | A31:A24 | 12H | Typical time out for Sector Erase/Block Erase: 18 ms Typical time out for Sector/Block Erase is in ms. Represented by conversion of the actual time from the decimal to hexadecimal number. |
| 210H | A7:A0 | 23H | Typical time out for Chip Erase: 35 ms Typical time out for Chip Erase is in ms. Represented by conversion of the actual time from the decimal to hexadecimal number. |
| 211H | A15:A8 | 46H | Maximum time out for Byte-Program: 70 μ s Typical time out for Byte Program is in μ s. Represented by conversion of the actual time from the decimal to hexadecimal number. |
| 212H | A23:A16 | FFH | Reserved. Bits default to all 1's. |
| 213H | A31:A24 | 0FH | Maximum time out for Page-Program: 1.5 ms. Typical time out for Page Program in xxH * (0.1 ms) ms |
| 214H | A7:A0 | 19H | Maximum time out for Sector Erase/Block Erase: 25 ms. Maximum time out for Sector/Block Erase in ms |
| 215H | A15:A8 | 32H | Maximum time out for Chip Erase: 50 ms. Maximum time out for Chip Erase in ms. |
| 216H | A23:A16 | 0FH | Maximum time out for Program Security ID: 1.5 ms Max time out for Program Security ID in xxH*(0.1ms) ms |
| 217H | A31:A24 | 19H | Maximum time out for Write Protection Enable Latency: 25 ms Maximum time out for Write Protection Enable Latency is in ms. Represented by conversion of the actual time from the decimal to hexadecimal number. |
| 218H | A23:A16 | 19H | Maximum time Write Suspend Latency: 25 μ s Max time out for Write-Suspend Latency is in μ s. Represented by conversion of the actual time from the decimal to hexadecimal number. |

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TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (13 OF 16)

| Address | Bit Address | Data | Comments |
|-------------------------------|-------------|------|--|
| 219H | A31:A24 | FFH | Maximum time to Deep Power-Down 0FFH = Reserved |
| 21AH | A23:A16 | FFH | Maximum time out from Deep Power-Down mode to Standby mode 0FFH = Reserved |
| 21BH | A31:A24 | FFH | Reserved. Bits default to all 1's. |
| 21CH | A23:A16 | FFH | Reserved. Bits default to all 1's. |
| 21DH | A31:A24 | FFH | Reserved. Bits default to all 1's. |
| 21EH | A23:A16 | FFH | Reserved. Bits default to all 1's. |
| 21FH | A31:A24 | FFH | Reserved. Bits default to all 1's. |
| Supported Instructions | | | |
| 220H | A7:A0 | 00H | No Operation |
| 221H | A15:A8 | 66H | Reset Enable |
| 222H | A23:A16 | 99H | Reset Memory |
| 223H | A31:A24 | 38H | Enable Quad I/O |
| 224H | A7:A0 | FFH | Reset Quad I/O |
| 225H | A15:A8 | 05H | Read STATUS Register |
| 226H | A23:A16 | 01H | Write STATUS Register |
| 227H | A31:A24 | 35H | Read Configuration Register |
| 228H | A7:A0 | 06H | Write Enable |
| 229H | A15:A8 | 04H | Write Disable |
| 22AH | A23:A16 | 02H | Byte Program or Page Program |
| 22BH | A31:A24 | 32H | SPI Quad Page Program |
| 22CH | A7:A0 | B0H | Suspends Program/Erase |
| 22DH | A15:A8 | 30H | Resumes Program/Erase |
| 22EH | A23:A16 | 72H | Read Block Protection Register |
| 22FH | A31:A24 | 42H | Write Block Protection Register |
| 230H | A7:A0 | 8DH | Lock-Down Block Protection Register |
| 231H | A15:A8 | E8H | nonvolatile Write-Lock Down Register |
| 232H | A23:A16 | 98H | Global Block Protection Unlock |
| 233H | A31:A24 | 88H | Read Security ID |
| 234H | A7:A0 | A5H | Program User Security ID Area |
| 235H | A15:A8 | 85H | Lockout Security ID Programming |
| 236H | A23:A16 | C0H | Set Burst Length |
| 237H | A31:A24 | 9FH | JEDEC-ID |
| 238H | A7:A0 | AFH | Quad J-ID |
| 239H | A15:A8 | 5AH | SFDP |
| 23AH | A23:A16 | FFH | Deep Power-Down Mode FFH = Reserved |
| 23BH | A31:A24 | FFH | Release Deep Power-Down Mode FFH = Reserved |
| 23CH | A4:A0 | 06H | (1-4-4) SPI nB Burst with Wrap Number of Wait states (dummy clocks) needed before valid output 00110b: 6 clocks of dummy cycle |
| | A7:A5 | | (1-4-4) SPI nB Burst with Wrap Number of Mode Bits 000b: Set Mode bits are not supported |
| 23DH | A15:A8 | ECH | (1-4-4) SPI nB Burst with Wrap Opcode |

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TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (14 OF 16)

| Address | Bit Address | Data | Comments | | | | | | |
|---|---------------|------|---|-------------------|--|--|---------------|-------------------|---------------|
| 23EH | A20:A16 | 06H | (4-4-4) SQI nB Burst with Wrap Number of Wait states (dummy clocks) needed before valid output 00110b: 6 clocks of dummy cycle | | | | | | |
| | A23:A21 | | (4-4-4) SQI nB Burst with Wrap Number of Mode Bits 000b: Set Mode bits are not supported | | | | | | |
| 23FH | A31:A24 | 0CH | (4-4-4) SQI nB Burst with Wrap Opcode | | | | | | |
| 240H | A4:A0 | 00H | (1-1-1) Read Memory Number of Wait states (dummy clocks) needed before valid output 00000b: Wait states/dummy clocks are not supported. | | | | | | |
| | A7:A5 | | (1-1-1) Read Memory Number of Mode Bits 000b: Mode bits are not supported | | | | | | |
| 241H | A15:A8 | 03H | (1-1-1) Read Memory Opcode | | | | | | |
| 242H | A20:A16 | 08H | (1-1-1) Read Memory at Higher Speed Number of Wait states (dummy clocks) needed before valid output 01000: 8 clocks (8 bits) of dummy cycle | | | | | | |
| | A23:A21 | | (1-1-1) Read Memory at Higher Speed Number of Mode Bits 000b: Mode bits are not supported | | | | | | |
| 243H | A31:A24 | 0BH | (1-1-1) Read Memory at Higher Speed Opcode | | | | | | |
| 244H | A7:A0 | FFH | Reserved. Bits default to all 1's. | | | | | | |
| 245H | A15:A8 | FFH | Reserved. Bits default to all 1's. | | | | | | |
| 246H | A23:A16 | FFH | Reserved. Bits default to all 1's. | | | | | | |
| 247H | A31:A24 | FFH | Reserved. Bits default to all 1's. | | | | | | |
| Security ID | | | | | | | | | |
| 248H | A7:A0 | FFH | Security ID size in bytes Example: If the size is 2 Kbytes, this field would be 07FFH | | | | | | |
| 249H | A15:A8 | 07H | <table><tr><th colspan="2">Security ID Range</th></tr><tr><td>Unique ID (Pre-programmed at factory)</td><td>0000H - 0007H</td></tr><tr><td>User Programmable</td><td>0008H - 07FFH</td></tr></table> | Security ID Range | | Unique ID (Pre-programmed at factory) | 0000H - 0007H | User Programmable | 0008H - 07FFH |
| Security ID Range | | | | | | | | | |
| Unique ID (Pre-programmed at factory) | 0000H - 0007H | | | | | | | | |
| User Programmable | 0008H - 07FFH | | | | | | | | |
| 24AH | A23:A16 | FFH | Reserved. Bits default to all 1's. | | | | | | |
| 24BH | A31:A24 | FFH | Reserved. Bits default to all 1's. | | | | | | |
| Memory Organization/Block Protection Bit Mapping ⁽¹⁾ | | | | | | | | | |
| 24CH | A7:A0 | 02H | Section 1: Sector Type Number: Sector type in JEDEC Parameter Table (bottom, 8-Kbyte) | | | | | | |
| 24DH | A15:A8 | 02H | Section 1 Number of Sectors Four of 8-Kbytes block (2 ⁿ) | | | | | | |
| 24EH | A23:A16 | FFH | Section 1 Block Protection Bit Start ((2 ^m) + 1)+ c, c=FFH or -1, m= 7 for 64 Mb Address bits are Read Lock bit locations and Even Address bits are Write Lock bit locations. The Most Significant (left-most) bit indicates the sign of the integer; it is sometimes called the sign bit. If the sign bit is zero, then the number is greater than or equal to zero, or positive. If the sign bit is one then the number is less than zero or negative. | | | | | | |

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TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (15 OF 16)

| Address | Bit Address | Data | Comments |
|---------|-------------|------|--|
| 24FH | A31:A24 | 06H | Section 1 (bottom) Block Protection Bit End $((2^m) + 1) + c$, $c=06H$ or 6, $m=7$ for 64 Mb Address bits are Read Lock bit locations and Even Address bits are Write Lock bit locations. The Most Significant (left-most) bit indicates the sign of the integer; it is sometimes called the sign bit. If the sign bit is zero, then the number is greater than or equal to zero, or positive. If the sign bit is one then the number is less than zero or negative. |
| 250H | A7:A0 | 03H | Section 2: Sector Type Number Sector type in JEDEC Parameter Table (32-Kbyte Block) |
| 251H | A15:A8 | 00H | Section 2 Number of Sectors One of 32-Kbyte Block (2^n , $n=0$) |
| 252H | A23:A16 | FDH | Section 2 Block Protection Bit Start $((2^m) + 1) + c$, $c=FDH$ or -3, $m=7$ for 64 Mbyte The Most Significant (left-most) bit indicates the sign of the integer; it is sometimes called the sign bit. If the sign bit is zero, then the number is greater than or equal to zero, or positive. If the sign bit is one then the number is less than zero or negative. |
| 253H | A31:A24 | FDH | Section 2 Block Protection Bit End $((2^m) + 1) + c$, $c=FDH$ or -3, $m=7$ for 64 Mb The Most Significant (left-most) bit indicates the sign of the integer; it is sometimes called the sign bit. If the sign bit is zero, then the number is greater than or equal to zero, or positive. If the sign bit is one then the number is less than zero or negative. |
| 254H | A7:A0 | 04H | Section 3: Sector Type Number Sector type in JEDEC Parameter Table (64-Kbyte Block) |
| 255H | A15:A8 | 07H | Section 3 Number of Sectors 126 of 64-Kbyte Block (2^m-2 , $m=7$ for 64 Mbyte) |
| 256H | A23:A16 | 00H | Section 3 Block Protection Bit Start Section 3 Block Protection Bit starts at 00H |
| 257H | A31:A24 | FCH | Section 3 Block Protection Bit End $((2^m) + 1) + c$, $c=FCH$ or -4, $m=7$ for 64 Mb |
| 258H | A7:A0 | 03H | Section 4: Sector Type Number Sector type in JEDEC Parameter Table (32-Kbyte Block) |
| 259H | A15:A8 | 00H | Section 4 Number of Sectors One of 32-Kbyte Block (2^n , $n=0$) |
| 25AH | A23:A16 | FEH | Section 4 Block Protection Bit Start $((2^m) + 1) + c$, $c=FEH$ or -2, $m=7$ for 64 Mb The most significant (left-most) bit indicates the sign of the integer; it is sometimes called the sign bit. If the sign bit is zero, then the number is greater than or equal to zero, or positive. If the sign bit is one then the number is less than zero or negative. |
| 25BH | A31:A24 | FEH | Section 4 Block Protection Bit End $((2^m) + 1) + c$, $c=FEH$ or -2, $m=7$ for 64 Mb The Most Significant (left-most) bit indicates the sign of the integer; it is sometimes called the sign bit. If the sign bit is zero, then the number is greater than or equal to zero, or positive. If the sign bit is one then the number is less than zero or negative. |
| 25CH | A7:A0 | 02H | Section 5 Sector Type Number: Sector type in JEDEC Parameter Table (top, 8-KByte) |
| 25DH | A15:A8 | 02H | Section 5 Number of Sectors Four of 8-Kbyte block (2^n) |

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TABLE 11-1: SERIAL FLASH DISCOVERABLE PARAMETER (SFDP) (CONTINUED) (16 OF 16)

| Address | Bit Address | Data | Comments |
|---------|-------------|------|--|
| 25EH | A23:A16 | 07H | Section 5 Block Protection Bit Start (((2 ^m) + 1) + c, c=07H or 7, m= 7 for 64 Mb Address bits are Read Lock bit locations and Even Address bits are Write Lock bit locations. The Most Significant (left-most) bit indicates the sign of the integer; it is sometimes called the sign bit. If the sign bit is zero, then the number is greater than or equal to zero, or positive. If the sign bit is one then the number is less than zero or negative. |
| 25FH | A31:A24 | 0EH | Section 5 (Top) Block Protection Bit End (((2 ^m) + 1) + c, c=0EH or 14, m= 7 for 64 Mb, Address bits are Read Lock bit locations and Even Address bits are Write Lock bit locations. The most significant (left-most) bit indicates the sign of the integer; it is sometimes called the sign bit. If the sign bit is zero, then the number is greater than or equal to zero, or positive. If the sign bit is one then the number is less than zero or negative. |

Note 1: (See) [Section 11.1, Mapping Guidance Details](#) for more detailed mapping information

11.1 Mapping Guidance Details

The SFDP Memory Organization/Block Protection Bit Mapping defines the memory organization including uniform sector/block sizes and different contiguous

sectors/blocks sizes. In addition, this bit defines the number of these uniform and different sectors/blocks from address 000000H to the full range of Memory and the associated Block Locking Register bits of each sector/block.

Each major Section is defined as follows:

TABLE 11-2: SECTION DEFINITION

| | |
|-----------------|---|
| Major Section X | Section X: Sector Type Number |
| | Section X: Number of Sectors |
| | Section X: Block-Protection Register Bit Start Location |
| | Section X: Block-Protection Register Bit End Location |

A Major Section consists of Sector Type Number, Number of Sector of this type, and the Block-Protection Bit Start/End locations. This is tied directly to JEDEC Flash Parameter Table Sector Size Type (in 7th DWORD and 8th DWORD section). Note that the contiguous 4-Kbyte Sectors across the full memory range are not included on this section because they are not defined in the JEDEC Flash Parameter Table Sector Size Type section. Only the sectors/blocks that are dependently tied with the Block-Protection Register bits are defined. A major section is a partition of contiguous same-size sectors/blocks. There will be several Major Sections as you dissect across memory from 000000h to the full range. Similar sector/block size that re-appear may be defined as a different Major Section.

11.1.1 SECTOR TYPE NUMBER

Sector Type Number is the sector/block size typed defined in JEDEC Flash Parameter Table: SFDP address locations 4CH, 4EH, 50H, and 52H. For SFDP address location 4CH, which is Sector Type 1, the size is represented by 01H; SFDP address location 4EH, Sector Type 2, size is represented by 02H; SFDP address location 50H, Sector Type 3, size is represented by 03H; and SFDP address location 52H, Sector Type 4, size is represented by 04H. Contiguous Same Sector Type # Size can re-emerge across the memory range and this Sector Type # will indicate that it is a separate/independent Major Section from the previous contiguous sectors/blocks.

11.1.2 NUMBER OF SECTORS

Number of Sectors represents the number of contiguous sectors/blocks with similar size. A formula calculates the contiguous sectors/blocks with similar size. Given the sector/block size, type, and the number of sectors, the address range of these sectors/blocks can be determined along with specific Block Locking Register bits that control the read/write protection of each sectors/blocks.

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11.1.3 BLOCK PROTECTION REGISTER BIT START LOCATION (BPSL)

Block Protection Register Bit Start Location (BPSL) designates the start bit location in the Block Protection Register where the first sector/block of this Major Section begins. If the value of BPSL is 00H, this location is the 0 bit location. If the value is other than 0, then this value is a constant value adder (c) for a given formula, $(2^m + 1) + (c)$. See [Section 11.1.5 “Memory Configuration”](#).

From the initial location, there will be a bit location for every increment by 1 until it reaches the Block Protection Register Bit End Location (BPEL). This number range from BPSL to BPEL will correspond to, and be equal to, the number of sectors/blocks on this Major Section.

11.1.4 BLOCK PROTECTION REGISTER BIT END LOCATION (BPEL)

Block Protection Register Bit End Location designates the end bit location in the Block Protection Register bit where the last sector/block of this Major Section ends. The value in this field is a constant value adder (c) for a given formula or equation, $(2^m + 1) + (c)$. See [Section 11.1.5 “Memory Configuration”](#)

11.1.5 MEMORY CONFIGURATION

For the SST26VF064B/064BA family, the memory configuration is setup with different contiguous block sizes from bottom to the top of the memory. For example, starting from bottom of memory it has four 8-Kbyte blocks, one 32-Kbyte block, x number of 64-Kbyte blocks depending on memory size, then one 32-Kbyte block, and four 8-Kbyte block on the top of memory. (See) [Table 11-3](#).

TABLE 11-3: MEMORY BLOCK DIAGRAM REPRESENTATION

| | |
|--|---|
| 8-Kbyte Bottom Block (from 000000H) | Section 1: Sector Type Number |
| | Section 1: Number of Sectors |
| | Section 1: Block Protection Register Bit Start Location |
| | Section 1: Block Protection Register Bit End Location |
| 32-Kbyte | Section 2: Sector Type Number |
| | Section 2: Number of Sectors |
| | Section 2: Block Protection Register Bit Start Location |
| | Section 2: Block Protection Register Bit End Location |
| 64-Kbyte | Section 3: Sector Type Number |
| | Section 3: Number of Sectors |
| | Section 3: Block Protection Register Bit Start Location |
| | Section 3: Block Protection Register Bit End Location |
| 32-Kbyte | Section 4: Sector Type Number |
| | Section 4: Number of Sectors |
| | Section 4: Block Protection Register Bit Start Location |
| | Section 4: Block Protection Register Bit End Location |
| 8-Kbyte (Top Block) | Section 5: Sector Type Number |
| | Section 5: Number of Sectors |
| | Section 5: Block Protection Register Bit Start Location |
| | Section 5: Block Protection Register Bit End Location |

Classifying these sector/block sizes via the Sector Type derived from JEDEC Flash Parameter Table: SFDP address locations 4EH, 50H, and 52H is as follows:

- 8-Kbyte Blocks are classified as Sector Type 2 (@4EH of SFDP)
- 32-Kbyte Blocks are classified as Sector Type 3 (@50H of SFDP)
- 64-Kbyte Blocks are classified as Sector Type 4 (@52H of SFDP)

For the Number of Sectors associated with the contiguous sectors/blocks, a formula is used to determine the number of sectors/blocks of these Sector Types:

- 8-Kbyte Block (Type 2) is calculated by 2^n . n is a byte.
- 32-Kbyte Block (Type 3) is calculated by 2^n . n is a byte.

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- 64-Kbyte Block (Type 4) is calculated by $(2^m - 2)$. m can either be a 4, 5, 6, 7 or 8 depending on the memory size. This m field is going to be used for the 64-Kbyte Block Section and will also be used for the Block Protection Register Bit Location formula.

m will have a constant value for specific densities and is defined as:

- 8 Mbit = 4
- 16 Mbit = 5
- 32 Mbit = 6
- 64 Mbit = 7
- 128 Mbit = 8

Block Protect Register Start/End Bits are mapped in the $SEDP$ by using the formula $(2^m + 1) + (c)$. " m " is a constant value that represents the different densities from 8 Mbit to 128 Mbit (used also in the formula calculating number of 64-Kbyte Blocks above). The values that are going to be placed in the Block Protection Bit Start/End field table are the constant value adder (c) in the formula and are represented in two's complement except when the value is 00H. If the value is 00H, this location is the 0 bit location. If the value is other than 0, then this is a constant value adder (c) that will be used in the formula. The Most Significant (left most) bit (MSb) indicates the sign of the integer; it is sometimes called the sign bit. If the sign bit is zero, then the number is greater than or equal to zero, or positive. If the sign bit is one, then the number is less than zero, or negative.

See [Table 11-4](#) for an example of this formula.

TABLE 11-4: BPSL/BPEL EQUATION WITH ACTUAL CONSTANT ADDER DERIVED FROM THE FORMULA $(2^m + 1) + (C)$

| Block Size | 8 Mbit to 128 Mbit | Comments |
|-------------------------|---|--|
| 8-Kbyte (Type 2) Bottom | BPSL = $(2^m + 1) + 0FFH$ BPEL = $(2^m + 1) + 04H$ | 0FFH = -1; 06H = 6 Odd address bits are Read-Lock bit locations and even address bits are Write-Lock bit locations. |
| 32-Kbyte (Type 3) | BPSL = BPEL = $(2^m + 1) + 0FDH$ | 0FDH = -3 |
| 64-Kbyte (Type 4) | BPSL = 00H BPEL = $(2^m + 1) + 0FCH$ | 00H is Block-Protection Register bit 0 location; 0FCH = -4 |
| 32-Kbyte (Type 3) | BPSL = BPEL = $(2^m + 1) + 0FEH$ | 0FEH = -2 |
| 8-Kbyte (Type 2) Top | BPSL = $(2^m + 1) + 07H$ BPEL = $(2^m + 1) + 0EH$ | 07H = 7; 0EH = 14 Odd address bits are Read-Lock bit locations and even address bits are Write-Lock bit locations. |

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