

256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit (x8) Many-Time Programmable Flash SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020



Data Sheet

FEATURES:

- **Organized as 32K x8 / 64K x8 / 128K x8 / 256K x8**
- **4.5-5.5V Read Operation**
- **Superior Reliability**
 - Endurance: At least 1000 Cycles
 - Greater than 100 years Data Retention
- **Low Power Consumption**
 - Active Current: 20 mA (typical)
 - Standby Current: 10 μ A (typical)
- **Fast Read Access Time**
 - 70 ns
 - 90 ns
- **Fast Byte-Program Operation**
 - Byte-Program Time: 20 μ s (typical)
 - Chip Program Time:
 - 0.7 seconds (typical) for SST27SF256
 - 1.4 seconds (typical) for SST27SF512
 - 2.8 seconds (typical) for SST27SF010
 - 5.6 seconds (typical) for SST27SF020
- **Electrical Erase Using Programmer**
 - Does not require UV source
 - Chip-Erase Time: 100 ms (typical)
- **TTL I/O Compatibility**
- **JEDEC Standard Byte-wide EPROM Pinouts**
- **Packages Available**
 - 32-pin PLCC
 - 32-pin TSOP (8mm x 14mm)
 - 28-pin PDIP for SST27SF256/512
 - 32-pin PDIP for SST27SF010/020

PRODUCT DESCRIPTION

The SST27SF256/512/010/020 are a 32K x8 / 64K x8 / 128K x8 / 256K x8 CMOS, Many-Time Programmable (MTP) low cost flash, manufactured with SST's proprietary, high performance SuperFlash technology. The split-gate cell design and thick oxide tunneling injector attain better reliability and manufacturability compared with alternate approaches. These MTP devices can be electrically erased and programmed at least 1000 times using an external programmer with a 12 volt power supply. They have to be erased prior to programming. These devices conform to JEDEC standard pinouts for byte-wide memories.

Featuring high performance Byte-Program, the SST27SF256/512/010/020 provide a Byte-Program time of 20 μ s. Designed, manufactured, and tested for a wide spectrum of applications, these devices are offered with an endurance of at least 1000 cycles. Data retention is rated at greater than 100 years.

The SST27SF256/512/010/020 are suited for applications that require infrequent writes and low power nonvolatile storage. These devices will improve flexibility, efficiency, and performance while matching the low cost in nonvolatile applications that currently use UV-EPROMs, OTPs, and mask ROMs.

To meet surface mount and conventional through hole requirements, the SST27SF256/512 are offered in 32-pin PLCC, 32-pin TSOP, and 28-pin PDIP packages. The SST27SF010/020 are offered in 32-pin PDIP, 32-pin PLCC and 32-pin TSOP packages. See Figures 1, 2, and 3 for pinouts.

Device Operation

The SST27SF256/512/010/020 are a low cost flash solution that can be used to replace existing UV-EPROM, OTP, and mask ROM sockets. These devices are functionally (read and program) and pin compatible with industry standard EPROM products. In addition to EPROM functionality, these devices also support electrical erase operation via an external programmer. They do not require a UV source to erase, and therefore the packages do not have a window.

Read

The Read operation of the SST27SF256/512/010/020 is controlled by CE# and OE#. Both CE# and OE# have to be low for the system to obtain data from the outputs. Once the address is stable, the address access time is equal to the delay from CE# to output (T_{CE}). Data is available at the output after a delay of T_{OE} from the falling edge of OE#, assuming that CE# pin has been low and the addresses have been stable for at least $T_{CE} - T_{OE}$. When the CE# pin is high, the chip is deselected and a typical standby current of 10 μ A is consumed. OE# is the output control and is used to gate data from the output pins. The data bus is in high impedance state when either CE# or OE# is high.

Byte-Program Operation

The SST27SF256/512/010/020 are programmed by using an external programmer. The programming mode for SST27SF256/010/020 is activated by asserting 12V (\pm 5%)



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on V_{PP} pin, $V_{DD} = 5V (\pm 5\%)$, V_{IL} on CE# pin, and V_{IH} on OE# pin. The programming mode for SST27SF512 is activated by asserting 12V ($\pm 5\%$) on OE#/ V_{PP} pin, $V_{DD} = 5V (\pm 5\%)$, and V_{IL} on CE# pin. These devices are programmed byte-by-byte with the desired data at the desired address using a single pulse (CE# pin low for SST27SF256/512 and PGM# pin low for SST27SF010/020) of 20 μs . Using the MTP programming algorithm, the Byte-Programming process continues byte-by-byte until the entire chip has been programmed.

Chip-Erase Operation

The only way to change a data from a "0" to "1" is by electrical erase that changes every bit in the device to "1". Unlike traditional EPROMs, which use UV light to do the Chip-Erase, the SST27SF256/512/010/020 uses an electrical Chip-Erase operation. This saves a significant amount of time (about 30 minutes for each Erase operation). The entire chip can be erased in a single pulse of 100 ms (CE# pin low for SST27SF256/512 and PGM# pin for SST27SF010/020). In order to activate the Erase mode for SST27SF256/010/020, the 12V ($\pm 5\%$) is applied to V_{PP} and A_9 pins, $V_{DD} = 5V (\pm 5\%)$, V_{IL} on CE# pin, and V_{IH} on OE# pin. In order to activate Erase mode for SST27SF512, the 12V ($\pm 5\%$) is applied to OE#/ V_{PP} and A_9 pins, $V_{DD} = 5V (\pm 5\%)$, and V_{IL} on CE# pin. All other address and data pins are "don't care". The falling edge of CE# (PGM# for SST27SF010/020) will start the Chip-Erase operation. Once the chip has been erased, all bytes must be verified for FFH. Refer to Figures 13, 14, and 15 for the flowcharts.

Product Identification Mode

The Product Identification mode identifies the devices as the SST27SF256, SST27SF512, SST27SF010 and SST27SF020 and manufacturer as SST. This mode may be accessed by the hardware method. To activate this mode for SST27SF256/010/020, the programming equipment must force V_H (12V $\pm 5\%$) on address A_9 with V_{PP} pin at V_{DD} (5V $\pm 10\%$) or V_{SS} . To activate this mode for SST27SF512, the programming equipment must force V_H (12V $\pm 5\%$) on address A_9 with OE#/ V_{PP} pin at V_{IL} . Two identifier bytes may then be sequenced from the device outputs by toggling address line A_0 . For details, see Tables 3, 4, and 5 for hardware operation.

TABLE 1: PRODUCT IDENTIFICATION

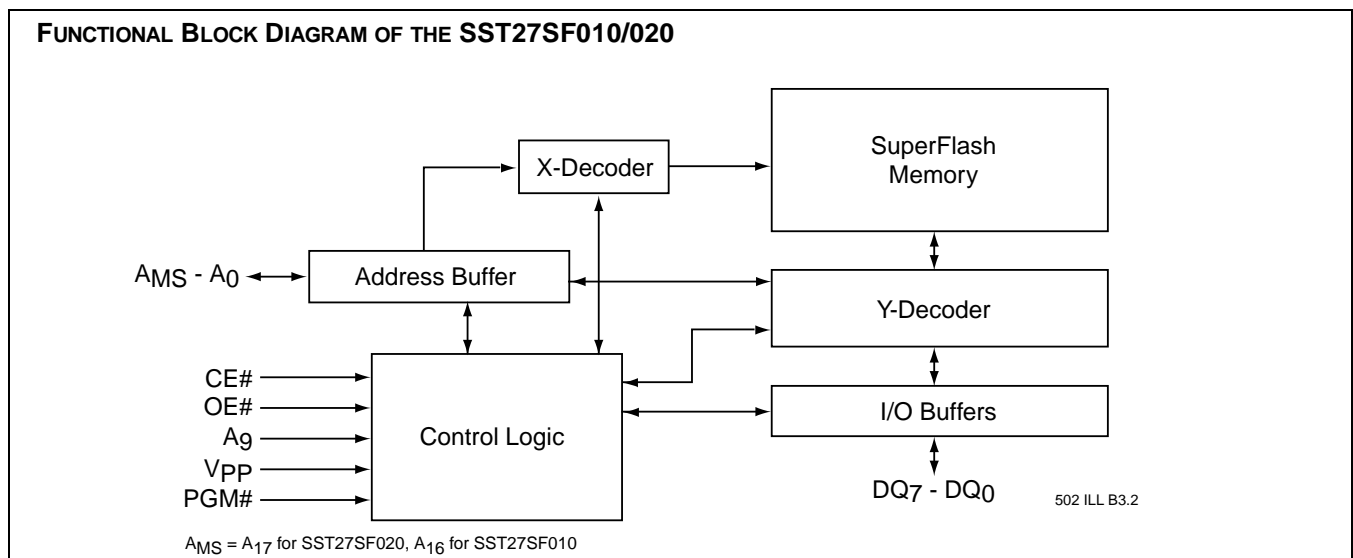
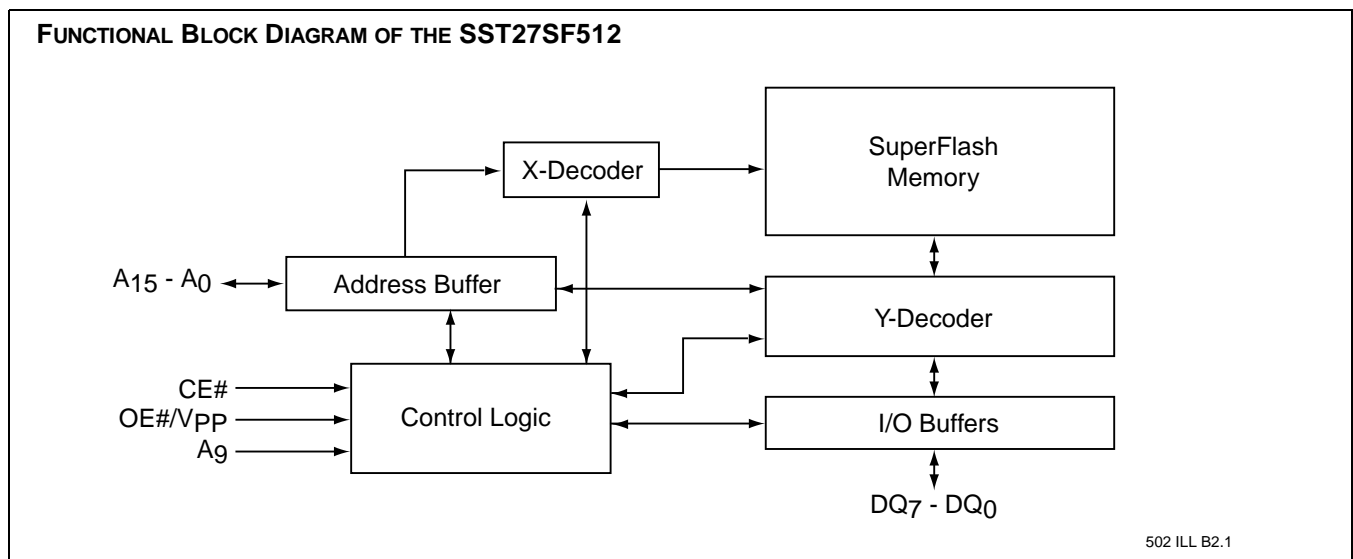
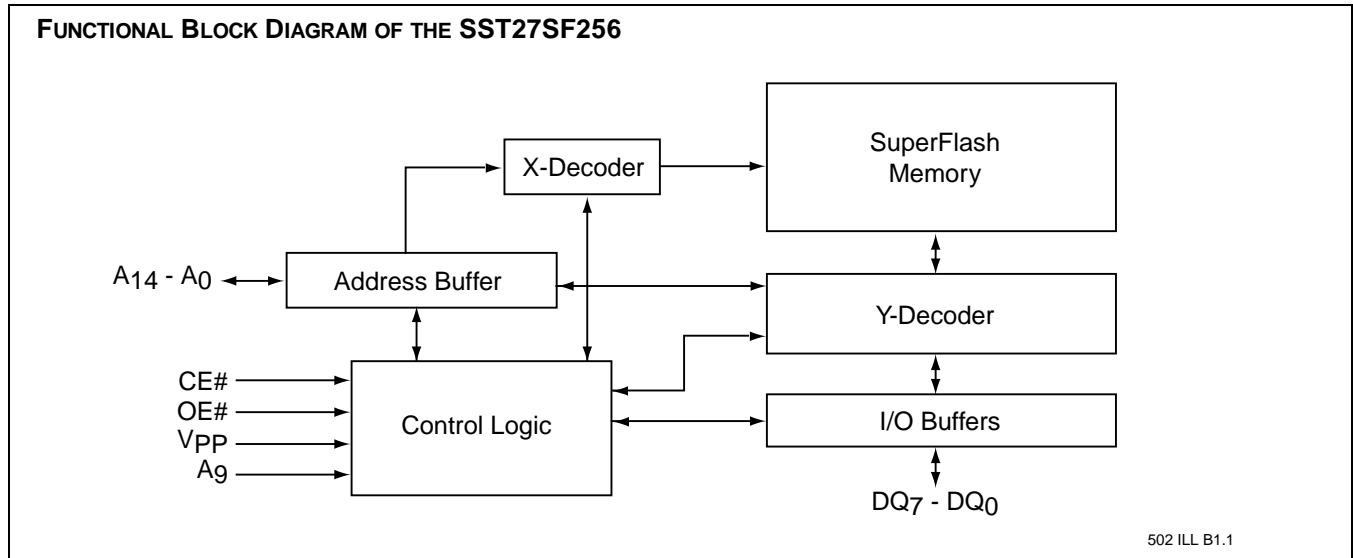
| | Address | Data |
|-------------------|---------|------|
| Manufacturer's ID | 0000H | BFH |
| Device ID | | |
| SST27SF256 | 0001H | A3H |
| SST27SF512 | 0001H | A4H |
| SST27SF010 | 0001H | A5H |
| SST27SF020 | 0001H | A6H |

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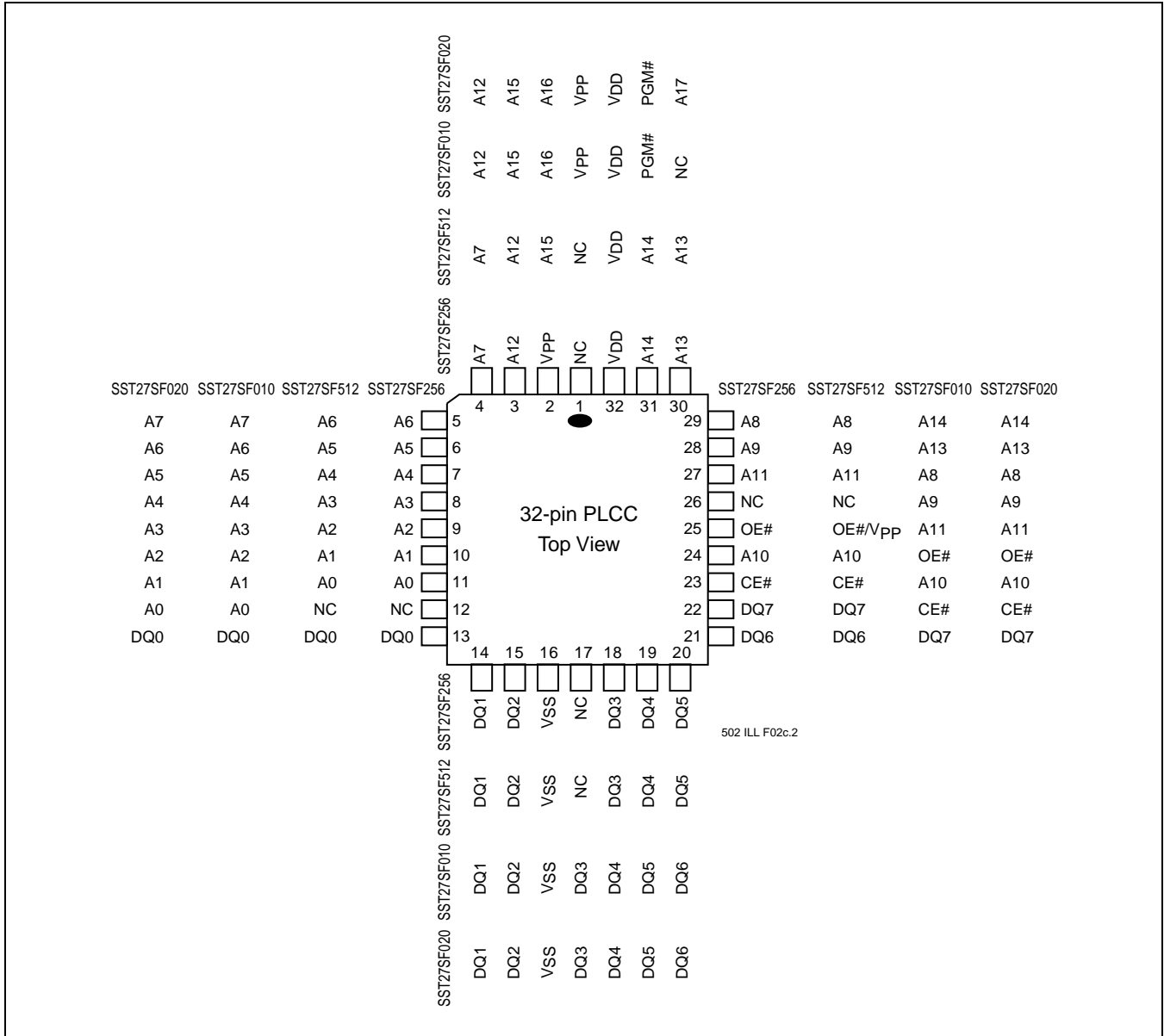


FIGURE 1: PIN ASSIGNMENTS FOR 32-PIN PLCC



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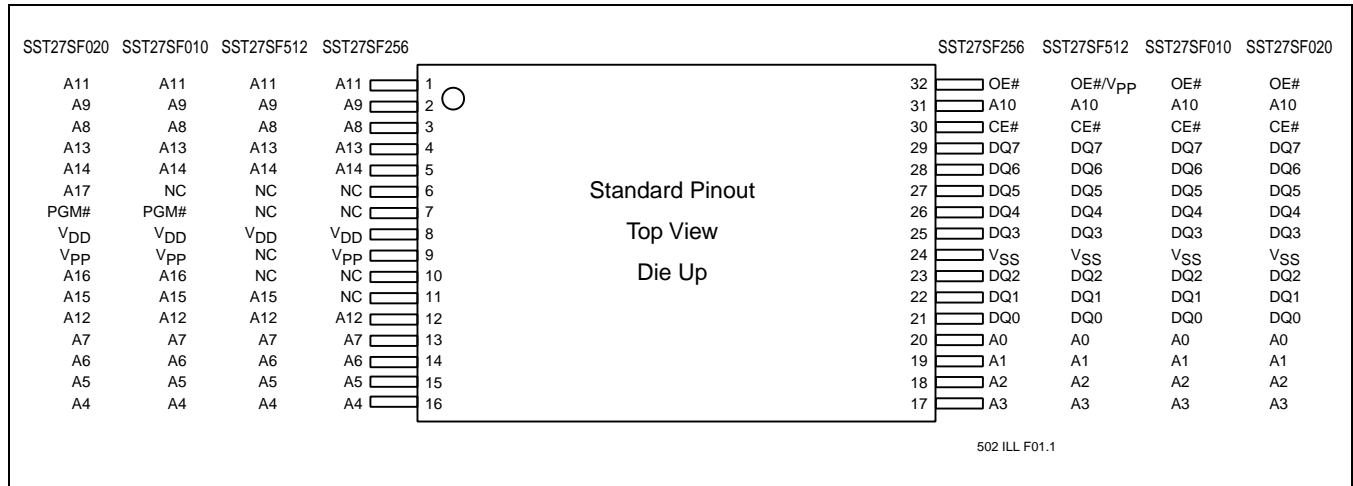


FIGURE 2: PIN ASSIGNMENTS FOR 32-PIN TSOP (8MM X 14MM)

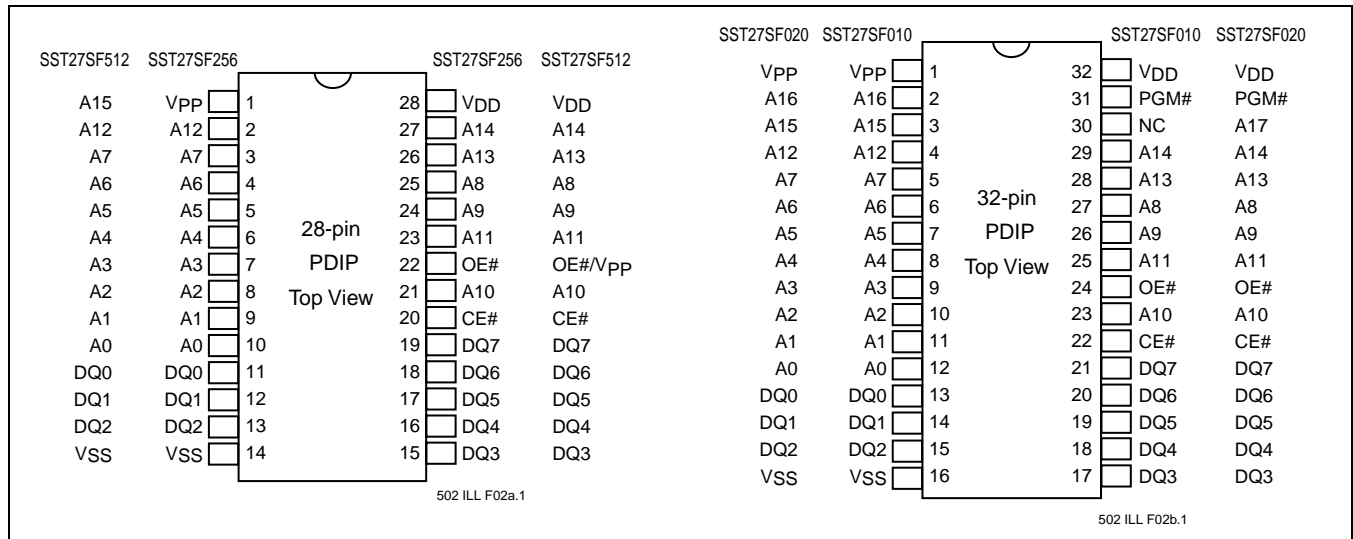


FIGURE 3: PIN ASSIGNMENTS FOR 28-PIN AND 32-PIN PDIP



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TABLE 2: PIN DESCRIPTION

| Symbol | Pin Name | Functions |
|----------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| $A_{MS}^1-A_0$ | Address Inputs | To provide memory addresses |
| DQ ₇ -DQ ₀ | Data Input/output | To output data during Read cycles and receive input data during Program cycles The outputs are in tri-state when OE# or CE# is high. |
| CE# | Chip Enable | To activate the device when CE# is low |
| OE# | Output Enable | For SST27SF256/010/020, to gate the data output buffers during Read operation |
| OE#/V _{PP} | Output Enable/V _{PP} | For SST27SF512, to gate the data output buffers during Read operation and high voltage pin during Chip-Erase and programming operation |
| V _{PP} | Power Supply for Program or Erase | For SST27SF256/010/020, high voltage pin during Chip-Erase and programming operation 12V ($\pm 5\%$) |
| V _{DD} | Power Supply | To provide 5.0V supply ($\pm 10\%$) |
| V _{SS} | Ground | |
| NC | No Connection | Unconnected pins. |

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1. A_{MS} = Most significant address

A_{MS} = A₁₄ for SST27SF256, A₁₅ for SST27SF512, A₁₆ for SST27SF010, and A₁₇ for SST27SF020



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TABLE 3: OPERATION MODES SELECTION FOR SST27SF256

| Mode | CE# | OE# | V _{PP} | A ₉ | DQ | Address |
|------------------------|-----------------|-----------------|------------------------------------|-----------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Read | V _{IL} | V _{IL} | V _{DD} or V _{SS} | A _{IN} | D _{OUT} | A _{IN} |
| Output Disable | V _{IL} | V _{IH} | V _{DD} or V _{SS} | X | High Z | X |
| Byte-Program | V _{IL} | V _{IH} | V _{PPH} | A _{IN} | D _{IN} | A _{IN} |
| Standby | V _{IH} | X | V _{DD} or V _{SS} | X | High Z | X |
| Chip-Erase | V _{IL} | V _{IH} | V _{PPH} | V _H | High Z | X |
| Program/Erase Inhibit | V _{IH} | X | V _{PPH} | X | High Z | X |
| Product Identification | V _{IL} | V _{IL} | V _{DD} or V _{SS} | V _H | Manufacturer's ID (BFH) Device ID (A3H) | A ₁₄ - A ₁ = V _{IL} , A ₀ = V _{IL} A ₁₄ - A ₁ = V _{IL} , A ₀ = V _{IH} |

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Note: X = V_{IL} or V_{IH}
V_{PPH} = 12V±5%, V_H = 12V±5%

TABLE 4: OPERATION MODES SELECTION FOR SST27SF512

| Mode | CE# | OE#/V _{PP} | A ₉ | DQ | Address |
|------------------------|-----------------|---------------------|-----------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Read | V _{IL} | V _{IL} | A _{IN} | D _{OUT} | A _{IN} |
| Output Disable | V _{IL} | V _{IH} | X | High Z | X |
| Program | V _{IL} | V _{PPH} | A _{IN} | D _{IN} | A _{IN} |
| Standby | V _{IH} | X | X | High Z | X |
| Chip-Erase | V _{IL} | V _{PPH} | V _H | High Z | X |
| Program/Erase Inhibit | V _{IH} | V _{PPH} | X | High Z | X |
| Product Identification | V _{IL} | V _{IL} | V _H | Manufacturer's ID (BFH) Device ID (A4H) | A ₁₅ - A ₁ = V _{IL} , A ₀ = V _{IL} A ₁₅ - A ₁ = V _{IL} , A ₀ = V _{IH} |

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Note: X = V_{IL} or V_{IH}
V_{PPH} = 12V±5%, V_H = 12V±5%

TABLE 5: OPERATION MODES SELECTION FOR SST27SF010/020

| Mode | CE# | OE# | PGM# | A ₉ | V _{PP} | DQ | Address |
|------------------------|-----------------|-----------------|-----------------|-----------------|------------------------------------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Read | V _{IL} | V _{IL} | X | A _{IN} | V _{DD} or V _{SS} | D _{OUT} | A _{IN} |
| Output Disable | V _{IL} | V _{IH} | X | X | V _{DD} or V _{SS} | High Z | A _{IN} |
| Program | V _{IL} | V _{IH} | V _{IL} | A _{IN} | V _{PPH} | D _{IN} | A _{IN} |
| Standby | V _{IH} | X | X | X | V _{DD} or V _{SS} | High Z | X |
| Chip-Erase | V _{IL} | V _{IH} | V _{IL} | V _H | V _{PPH} | High Z | X |
| Program/Erase Inhibit | V _{IH} | X | X | X | V _{PPH} | High Z | X |
| Product Identification | V _{IL} | V _{IL} | X | V _H | V _{DD} or V _{SS} | Manufacturer's ID (BFH) Device ID ¹ | A _{MS} ² - A ₁ = V _{IL} , A ₀ = V _{IL} A _{MS} ² - A ₁ = V _{IL} , A ₀ = V _{IH} |

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1. Device ID = A5H for SST27SF010 and A6H for SST27SF020
2. A_{MS} = Most significant address
A_{MS} = A₁₆ for SST27SF010 and A₁₇ for SST27SF020

Note: X = V_{IL} or V_{IH}
V_{PPH} = 12V±5%, V_H = 12V±5%



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Absolute Maximum Stress Ratings (Applied conditions greater than those listed under “Absolute Maximum Stress Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these conditions or conditions greater than those defined in the operational sections of this data sheet is not implied. Exposure to absolute maximum stress rating conditions may affect device reliability.)

| | |
|-------------------------------------------------------------------------|------------------------|
| Temperature Under Bias | -55°C to +125°C |
| Storage Temperature | -65°C to +150°C |
| D. C. Voltage on Any Pin to Ground Potential | -0.5V to $V_{DD}+0.5V$ |
| Transient Voltage (<20 ns) on Any Pin to Ground Potential | -1.0V to $V_{DD}+1.0V$ |
| Voltage on A_9 and V_{PP} Pin to Ground Potential | -0.5V to 14.0V |
| Package Power Dissipation Capability ($T_a = 25^\circ\text{C}$) | 1.0W |
| Through Hold Lead Soldering Temperature (10 Seconds) | 300°C |
| Surface Mount Lead Soldering Temperature (3 Seconds) | 240°C |
| Output Short Circuit Current ¹ | 100 mA |

1. Outputs shorted for no more than one second. No more than one output shorted at a time.

OPERATING RANGE

| Range | Ambient Temp | V_{DD} | V_{PP} |
|------------|--------------|----------|----------|
| Commercial | 0°C to +70°C | 5.0V±10% | 12V±5% |

AC CONDITIONS OF TEST

| | |
|----------------------------|--------------------------|
| Input Rise/Fall Time | 10 ns |
| Output Load | $C_L = 100$ pF for 90 ns |
| Output Load | $C_L = 30$ pF for 70 ns |
| See Figures 11 and 12 | |

TABLE 6: READ MODE DC OPERATING CHARACTERISTICS FOR SST27SF256/512/010/020
 $V_{DD} = 5.0V \pm 10\%$, $V_{PP} = V_{DD}$ OR V_{SS} ($T_a = 0^\circ\text{C}$ to +70°C (Commercial))

| Symbol | Parameter | Limits | | | Test Conditions |
|-----------|---------------------------------------|--------|--------------|---------------|----------------------------------------------------------------------------------------------------------------------------------|
| | | Min | Max | Units | |
| I_{DD} | V_{DD} Read Current | | 30 | mA | Address input= V_{IL}/V_{IH} at $f=1/T_{RC}$ Min $V_{DD}=V_{DD}$ Max |
| I_{PPR} | V_{PP} Read Current | | 100 | μA | CE#=#OE#= V_{IL} , all I/Os open Address input= V_{IL}/V_{IH} at $f=1/T_{RC}$ Min $V_{DD}=V_{DD}$ Max, $V_{PP}=V_{DD}$ |
| I_{SB1} | Standby V_{DD} Current (TTL input) | | 3 | mA | CE#= V_{IH} , $V_{DD}=V_{DD}$ Max |
| I_{SB2} | Standby V_{DD} Current (CMOS input) | | 100 | μA | CE#= $V_{DD}-0.3$ $V_{DD}=V_{DD}$ Max |
| I_{LI} | Input Leakage Current | | 1 | μA | $V_{IN}=\text{GND}$ to V_{DD} , $V_{DD}=V_{DD}$ Max |
| I_{LO} | Output Leakage Current | | 10 | μA | $V_{OUT}=\text{GND}$ to V_{DD} , $V_{DD}=V_{DD}$ Max |
| V_{IL} | Input Low Voltage | | 0.8 | V | $V_{DD}=V_{DD}$ Min |
| V_{IH} | Input High Voltage | 2.0 | $V_{DD}+0.5$ | V | $V_{DD}=V_{DD}$ Max |
| V_{OL} | Output Low Voltage | | 0.2 | V | $I_{OL}=2.1$ mA, $V_{DD}=V_{DD}$ Min |
| V_{OH} | Output High Voltage | 2.4 | | V | $I_{OH}=-400$ μA , $V_{DD}=V_{DD}$ Min |
| I_H | Supervoltage Current for A_9 | | 100 | μA | CE#=#OE#= V_{IL} , $A_9=V_H$ Max |

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TABLE 7: PROGRAM/ERASE DC OPERATING CHARACTERISTICS FOR SST27SF256
 $V_{DD}=5.0V\pm 10\%$, $V_{PP}=V_{PPH}$ ($T_a=25^\circ C\pm 5^\circ C$)

| Symbol | Parameter | Limits | | | Test Conditions |
|-----------|-----------------------------------|--------|------|---------|---------------------------------------------------------------------------|
| | | Min | Max | Units | |
| I_{DD} | V_{DD} Erase or Program Current | | 30 | mA | $CE\#=V_{IL}$, $OE\#=V_{IH}$, $V_{PP}=12V\pm 5\%$, $V_{DD}=V_{DD}$ Max |
| I_{PP} | V_{PP} Erase or Program Current | | 1 | mA | $CE\#=V_{IL}$, $OE\#=V_{IH}$, $V_{PP}=12V\pm 5\%$, $V_{DD}=V_{DD}$ Max |
| I_{LI} | Input Leakage Current | | 1 | μA | $V_{IN}=GND$ to V_{DD} , $V_{DD}=V_{DD}$ Max |
| I_{LO} | Output Leakage Current | | 1 | μA | $V_{OUT}=GND$ to V_{DD} , $V_{DD}=V_{DD}$ Max |
| V_H | Supervoltage for A_9 | 11.4 | 12.6 | V | $CE\#=OE\#=V_{IL}$, |
| I_H | Supervoltage Current for A_9 | | 100 | μA | $CE\#=OE\#=V_{IL}$, $A_9=V_H$ Max |
| V_{PPH} | High Voltage for V_{PP} Pin | 11.4 | 12.6 | V | |

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TABLE 8: PROGRAM/ERASE DC OPERATING CHARACTERISTICS FOR SST27SF512
 $V_{DD}=5.0V\pm 10\%$, $V_{PP}=V_{PPH}$ ($T_a=25^\circ C\pm 5^\circ C$)

| Symbol | Parameter | Limits | | | Test Conditions |
|-----------|------------------------------------|--------|------|---------|----------------------------------------------------------------|
| | | Min | Max | Units | |
| I_{DD} | V_{DD} Erase or Program Current | | 30 | mA | $CE\#=V_{IL}$, $OE\#/V_{PP}=12V\pm 5\%$, $V_{DD}=V_{DD}$ Max |
| I_{PP} | V_{PP} Erase or Program Current | | 1 | mA | $CE\#=V_{IL}$, $OE\#/V_{PP}=12V\pm 5\%$, $V_{DD}=V_{DD}$ Max |
| I_{LI} | Input Leakage Current | | 1 | μA | $V_{IN}=GND$ to V_{DD} , $V_{DD}=V_{DD}$ Max |
| I_{LO} | Output Leakage Current | | 1 | μA | $V_{OUT}=GND$ to V_{DD} , $V_{DD}=V_{DD}$ Max |
| V_H | Supervoltage for A_9 | 11.4 | 12.6 | V | $CE\#=OE\#/V_{PP}=V_{IL}$, |
| I_H | Supervoltage Current for A_9 | | 100 | μA | $CE\#=OE\#/V_{PP}=V_{IL}$, $A_9=V_H$ Max |
| V_{PPH} | High Voltage for $OE\#/V_{PP}$ Pin | 11.4 | 12.6 | V | |

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TABLE 9: PROGRAM/ERASE DC OPERATING CHARACTERISTICS FOR SST27SF010/020
 $V_{DD}=5.0V\pm 10\%$, $V_{PP}=V_{PPH}$ ($T_a=25^\circ C\pm 5^\circ C$)

| Symbol | Parameter | Limits | | | Test Conditions |
|-----------|-----------------------------------|--------|------|---------|---------------------------------------------------------------------------------|
| | | Min | Max | Units | |
| I_{DD} | V_{DD} Erase or Program Current | | 30 | mA | $CE\#=PGM\#=V_{IL}$, $OE\#=V_{IH}$, $V_{PP}=12V\pm 5\%$, $V_{DD}=V_{DD}$ Max |
| I_{PP} | V_{PP} Erase or Program Current | | 1 | mA | $CE\#=PGM\#=V_{IL}$, $OE\#=V_{IH}$, $V_{PP}=12V\pm 5\%$, $V_{DD}=V_{DD}$ Max |
| I_{LI} | Input Leakage Current | | 1 | μA | $V_{IN}=GND$ to V_{DD} , $V_{DD}=V_{DD}$ Max |
| I_{LO} | Output Leakage Current | | 1 | μA | $V_{OUT}=GND$ to V_{DD} , $V_{DD}=V_{DD}$ Max |
| V_H | Supervoltage for A_9 | 11.4 | 12.6 | V | $CE\#=OE\#=V_{IL}$, |
| I_H | Supervoltage Current for A_9 | | 100 | μA | $CE\#=OE\#=V_{IL}$, $A_9=V_H$ Max |
| V_{PPH} | High Voltage for V_{PP} Pin | 11.4 | 12.6 | V | |

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TABLE 10: RECOMMENDED SYSTEM POWER-UP TIMINGS

| Symbol | Parameter | Minimum | Units |
|------------------------------------|-----------------------------|---------|-------|
| T _{PU-READ} ¹ | Power-up to Read Operation | 100 | μs |
| T _{PU-WRITE} ¹ | Power-up to Write Operation | 100 | μs |

T10.1 502

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

TABLE 11: CAPACITANCE (Ta = 25°C, f=1 Mhz, other pins open)

| Parameter | Description | Test Condition | Maximum |
|-------------------------------|---------------------|-----------------------|---------|
| C _{I/O} ¹ | I/O Pin Capacitance | V _{I/O} = 0V | 12 pF |
| C _{IN} ¹ | Input Capacitance | V _{IN} = 0V | 6 pF |

T11.0 502

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

TABLE 12: RELIABILITY CHARACTERISTICS

| Symbol | Parameter | Minimum Specification | Units | Test Method |
|-------------------------------|----------------|-----------------------|--------|---------------------|
| N _{END} ¹ | Endurance | 1000 | Cycles | JEDEC Standard A117 |
| T _{DR} ¹ | Data Retention | 100 | Years | JEDEC Standard A103 |
| I _{LTH} ¹ | Latch Up | 100 | mA | JEDEC Standard 78 |

T12.2 502

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

AC CHARACTERISTICS

TABLE 13: READ CYCLE TIMING PARAMETERS V_{DD} = 5.0V±10% (Ta = 0°C to +70°C (Commercial))

| Symbol | Parameter | SST27SF256-70 SST27SF512-70 SST27SF010-70 SST27SF020-70 | | SST27SF256-90 SST27SF512-90 SST27SF010-90 SST27SF020-90 | | Units |
|-------------------------------|---------------------------------|------------------------------------------------------------------|-----|------------------------------------------------------------------|-----|-------|
| | | Min | Max | Min | Max | |
| T _{RC} | Read Cycle Time | 70 | | 90 | | ns |
| T _{CE} | Chip Enable Access Time | | 70 | | 90 | ns |
| T _{AA} | Address Access Time | | 70 | | 90 | ns |
| T _{OE} | Output Enable Access Time | | 35 | | 45 | ns |
| T _{CLZ} ¹ | CE# Low to Active Output | 0 | | 0 | | ns |
| T _{OLZ} ¹ | OE# Low to Active Output | 0 | | 0 | | ns |
| T _{CHZ} ¹ | CE# High to High-Z Output | | 25 | | 30 | ns |
| T _{OHZ} ¹ | OE# High to High-Z Output | | 25 | | 30 | ns |
| T _{OH} ¹ | Output Hold from Address Change | 0 | | 0 | | ns |

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



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TABLE 14: PROGRAM/ERASE CYCLE TIMING PARAMETERS FOR SST27SF256

| Symbol | Parameter | Min | Max | Units |
|------------------|--------------------------------------------------|-----|-----|-------|
| T _{AS} | Address Setup Time | 1 | | μs |
| T _{AH} | Address Hold Time | 1 | | μs |
| T _{PRT} | V _{PP} Pulse Rise Time | 50 | | ns |
| T _{VPS} | V _{PP} Setup Time | 1 | | μs |
| T _{VPH} | V _{PP} Hold Time | 1 | | μs |
| T _{PW} | CE# Program Pulse Width | 20 | 30 | μs |
| T _{EW} | CE# Erase Pulse Width | 100 | 500 | ms |
| T _{DS} | Data Setup Time | 1 | | μs |
| T _{DH} | Data Hold Time | 1 | | μs |
| T _{VR} | V _{PP} and A ₉ Recovery Time | 1 | | μs |
| T _{ART} | A ₉ Rise Time to 12V during Erase | 50 | | ns |
| T _{A9S} | A ₉ Setup Time during Erase | 1 | | μs |
| T _{A9H} | A ₉ Hold Time during Erase | 1 | | μs |

T14.0 502

TABLE 15: PROGRAM/ERASE CYCLE TIMING PARAMETERS FOR SST27SF512

| Symbol | Parameter | Min | Max | Units |
|------------------|------------------------------------------------------|-----|-----|-------|
| T _{AS} | Address Setup Time | 1 | | μs |
| T _{AH} | Address Hold Time | 1 | | μs |
| T _{PRT} | OE#/V _{PP} Pulse Rise Time | 50 | | ns |
| T _{VPS} | OE#/V _{PP} Setup Time | 1 | | μs |
| T _{VPH} | OE#/V _{PP} Hold Time | 1 | | μs |
| T _{PW} | CE# Program Pulse Width | 20 | 30 | μs |
| T _{EW} | CE# Erase Pulse Width | 100 | 500 | ms |
| T _{DS} | Data Setup Time | 1 | | μs |
| T _{DH} | Data Hold Time | 1 | | μs |
| T _{VR} | OE#/V _{PP} and A ₉ Recovery Time | 1 | | μs |
| T _{ART} | A ₉ Rise Time to 12V during Erase | 50 | | ns |
| T _{A9S} | A ₉ Setup Time during Erase | 1 | | μs |
| T _{A9H} | A ₉ Hold Time during Erase | 1 | | μs |

T15.0 502

TABLE 16: PROGRAM/ERASE CYCLE TIMING PARAMETERS FOR SST27SF010/020

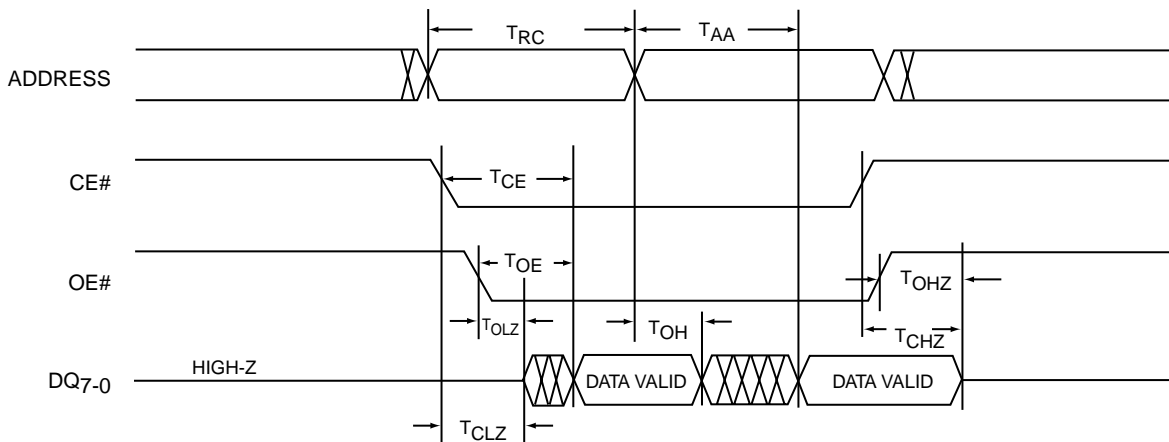
| Symbol | Parameter | Min | Max | Units |
|------------------|----------------------------------------------|-----|-----|-------|
| T _{CES} | CE# Setup Time | 1 | | μs |
| T _{CEH} | CE# Hold Time | 1 | | μs |
| T _{AS} | Address Setup Time | 1 | | μs |
| T _{AH} | Address Hold Time | 1 | | μs |
| T _{PRT} | V _{PP} Pulse Rise Time | 50 | | ns |
| T _{VPS} | V _{PP} Setup Time | 1 | | μs |
| T _{VPH} | V _{PP} Hold Time | 1 | | μs |
| T _{PW} | PGM# Program Pulse Width | 20 | 30 | μs |
| T _{EW} | PGM# Erase Pulse Width | 100 | 500 | ms |
| T _{DS} | Data Setup Time | 1 | | μs |
| T _{DH} | Data Hold Time | 1 | | μs |
| T _{VR} | A ₉ Recovery Time for Erase | 1 | | μs |
| T _{ART} | A ₉ Rise Time to 12V during Erase | 50 | | ns |
| T _{A9S} | A ₉ Setup Time during Erase | 1 | | μs |
| T _{A9H} | A ₉ Hold Time during Erase | 1 | | μs |

T16.0 502



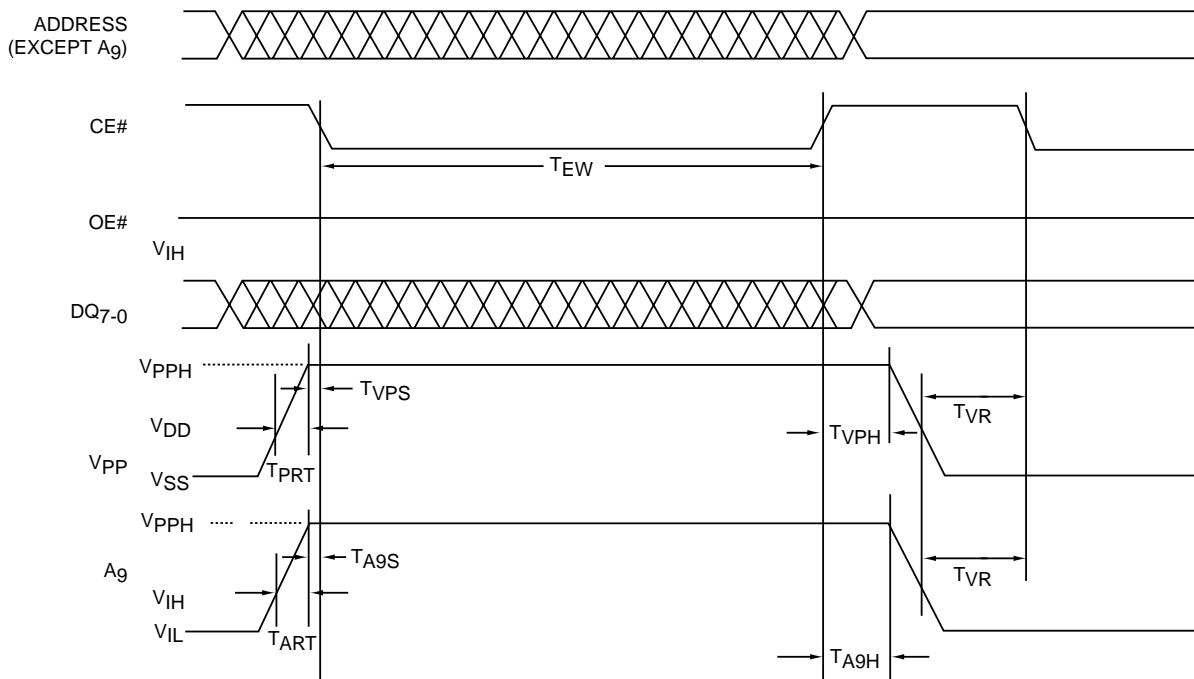
256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020

Data Sheet



502 ILL F03.0

FIGURE 4: READ CYCLE TIMING DIAGRAM FOR SST27SF256/512/010/020



502 ILL F04a.1

FIGURE 5: CHIP-ERASE TIMING DIAGRAM FOR SST27SF256

256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash
SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020



Data Sheet

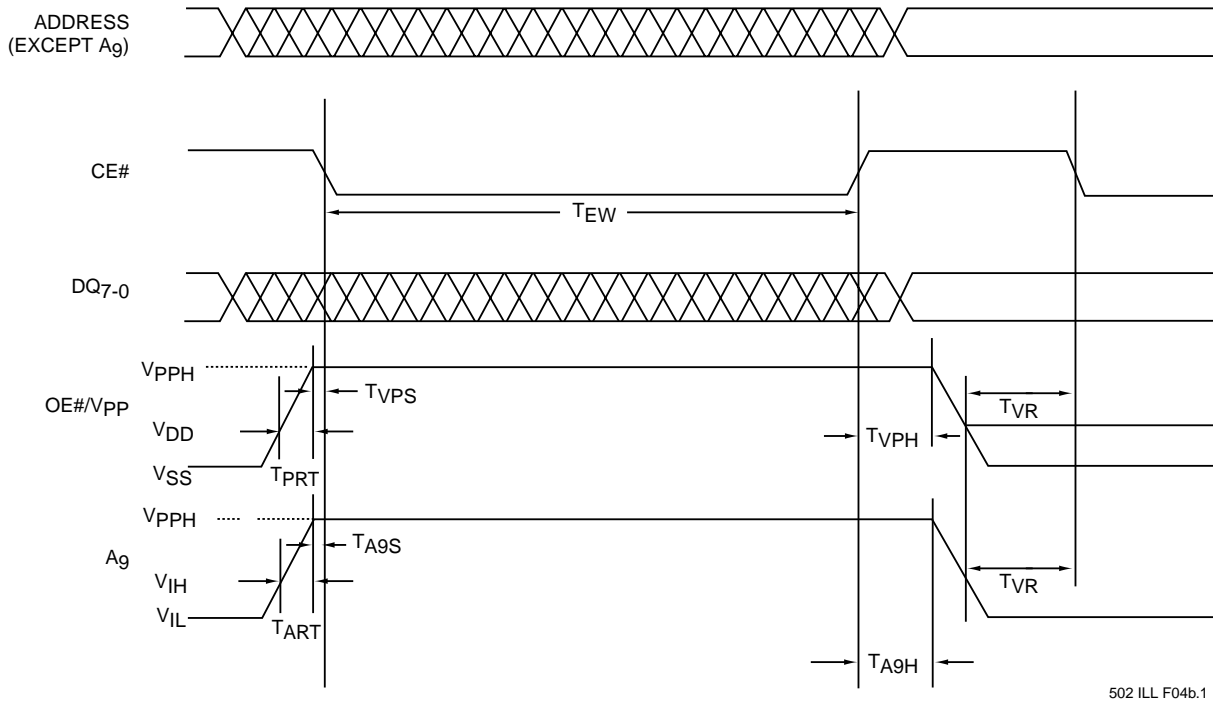


FIGURE 6: READ CYCLE TIMING DIAGRAM FOR SST27SF512

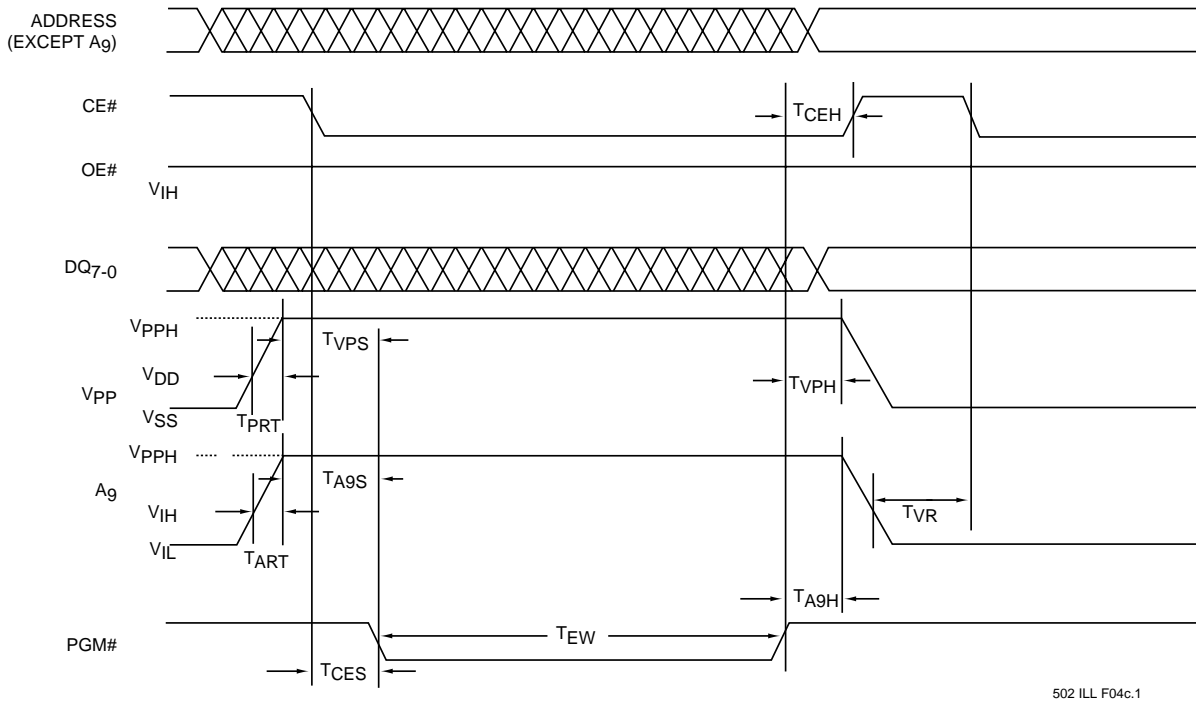


FIGURE 7: CHIP-ERASE TIMING DIAGRAM FOR SST27SF010/020



256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020

Data Sheet

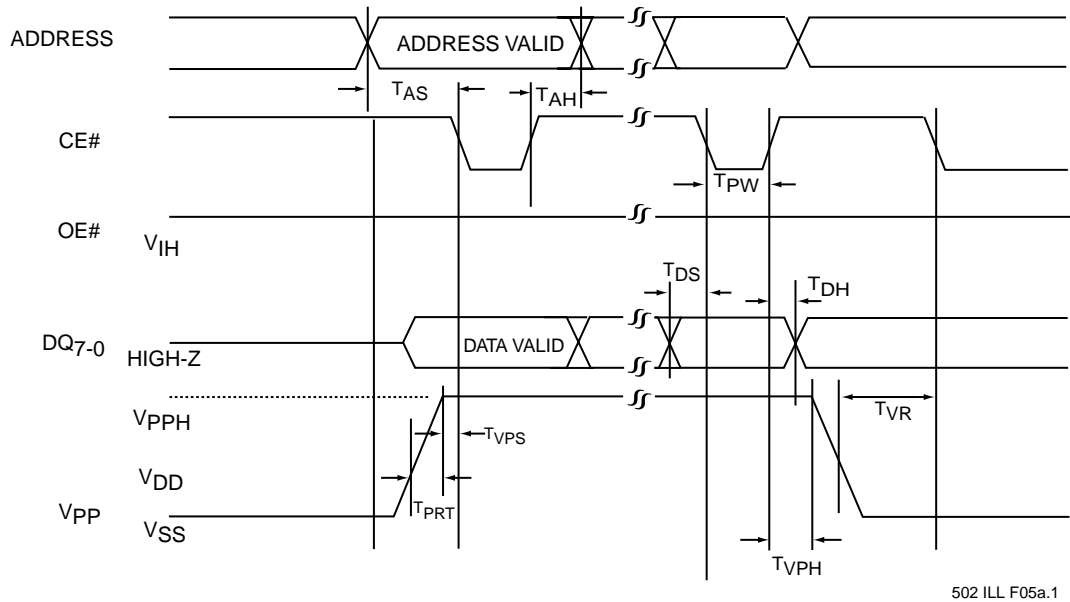


FIGURE 8: BYTE-PROGRAM TIMING DIAGRAM FOR SST27SF256

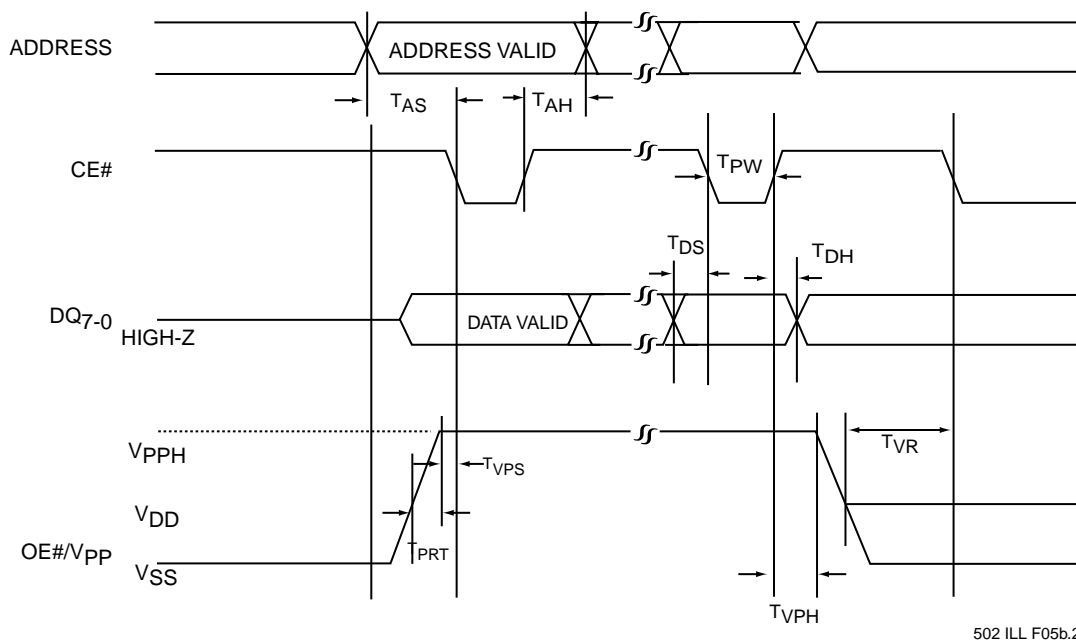
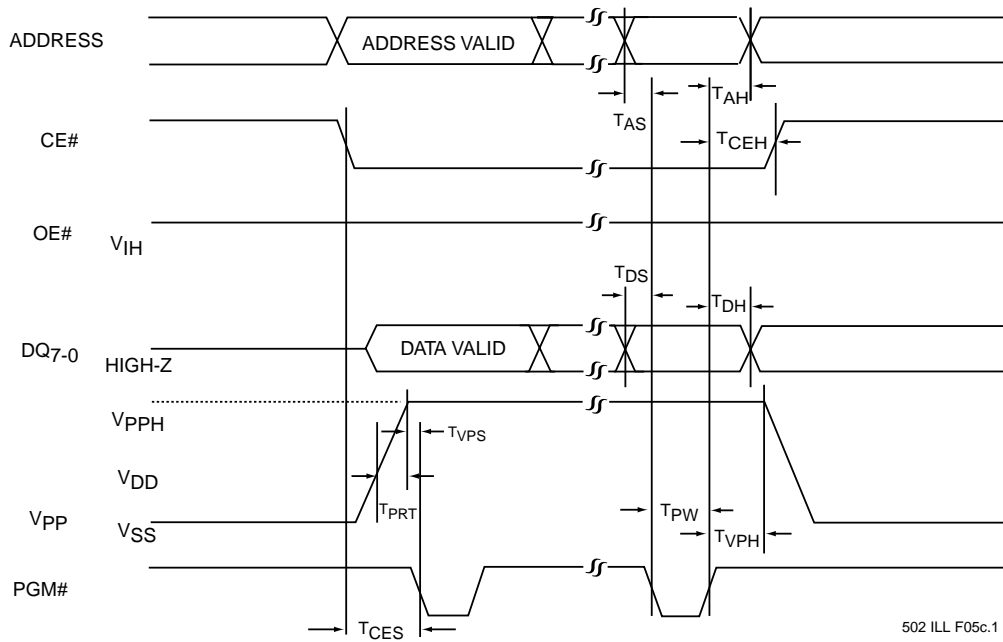


FIGURE 9: BYTE-PROGRAM TIMING DIAGRAM FOR SST27SF512

256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash
SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020



Data Sheet



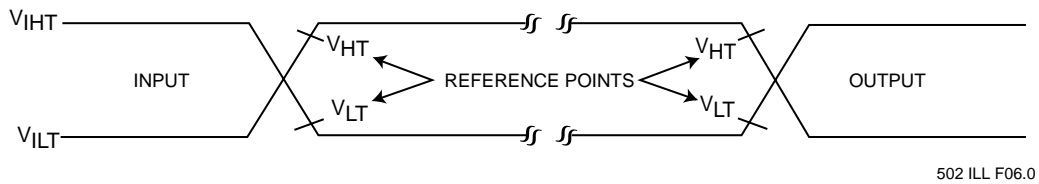
502 ILL F05c.1

FIGURE 10: BYTE-PROGRAM TIMING DIAGRAM FOR SST27SF010/020



256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020

Data Sheet



AC test inputs are driven at V_{IHT} (2.4 V) for a logic "1" and V_{ILT} (0.4 V) for a logic "0". Measurement reference points for inputs and outputs are V_{HT} (2.0 V) and V_{LT} (0.8 V). Input rise and fall times (10% \leftrightarrow 90%) are <10 ns.

Note: V_{HT} - V_{HIGH} Test
 V_{LT} - V_{LOW} Test
 V_{IHT} - $V_{INPUT HIGH}$ Test
 V_{ILT} - $V_{INPUT LOW}$ Test

FIGURE 11: AC INPUT/OUTPUT REFERENCE WAVEFORMS

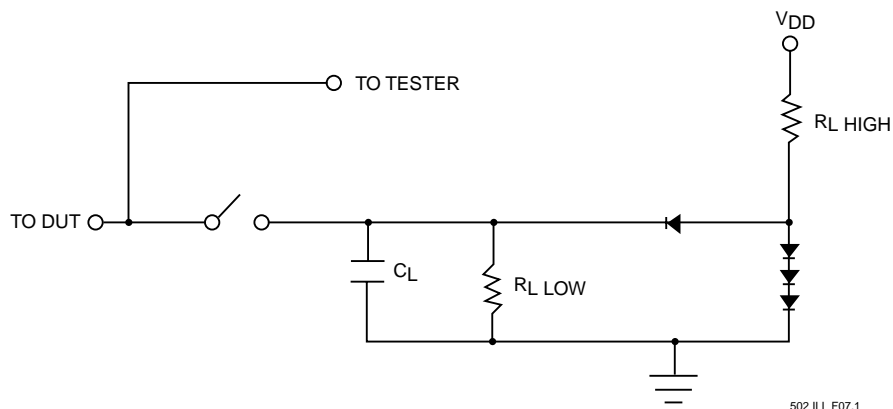
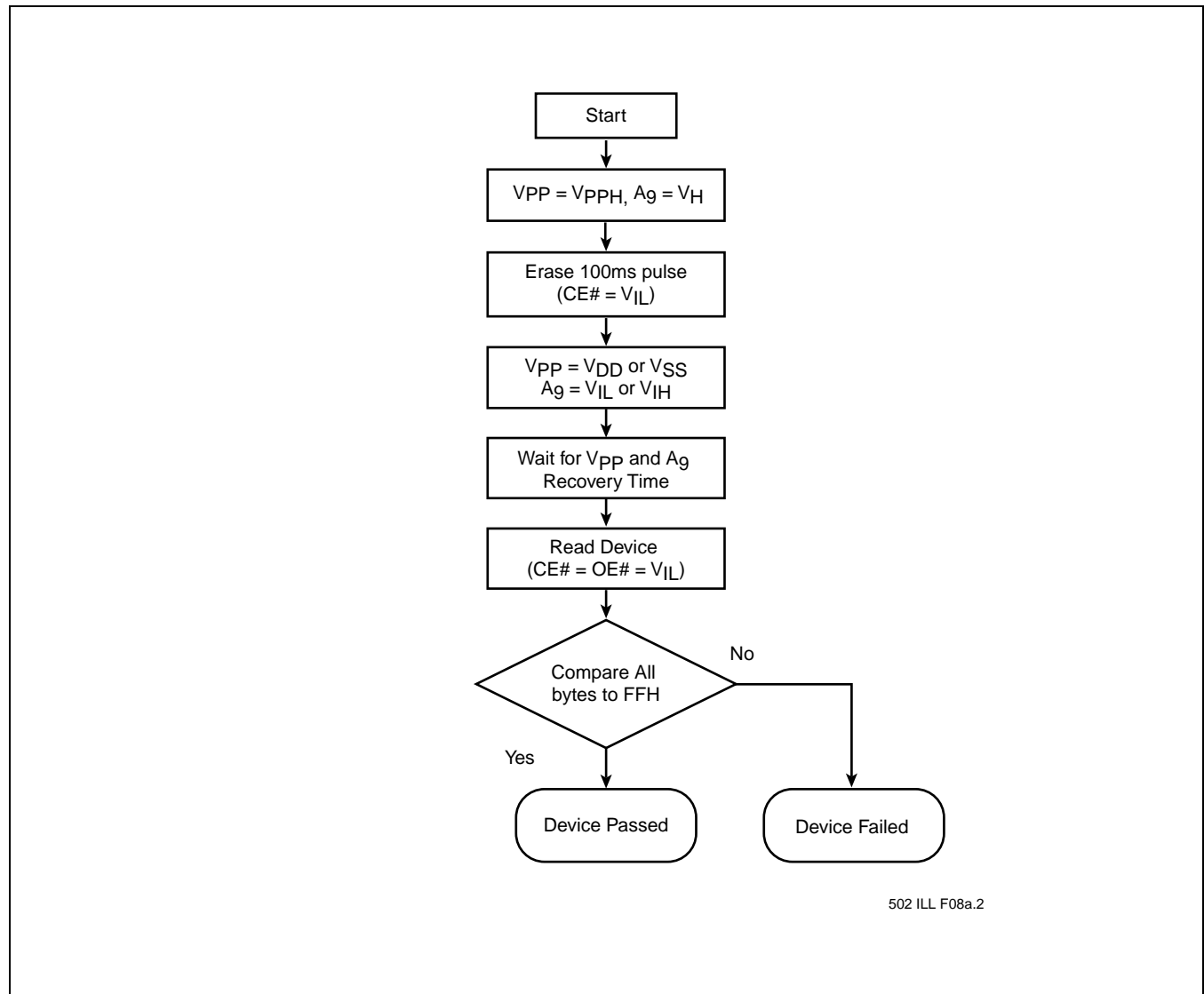


FIGURE 12: A TEST LOAD EXAMPLE



256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020

Data Sheet



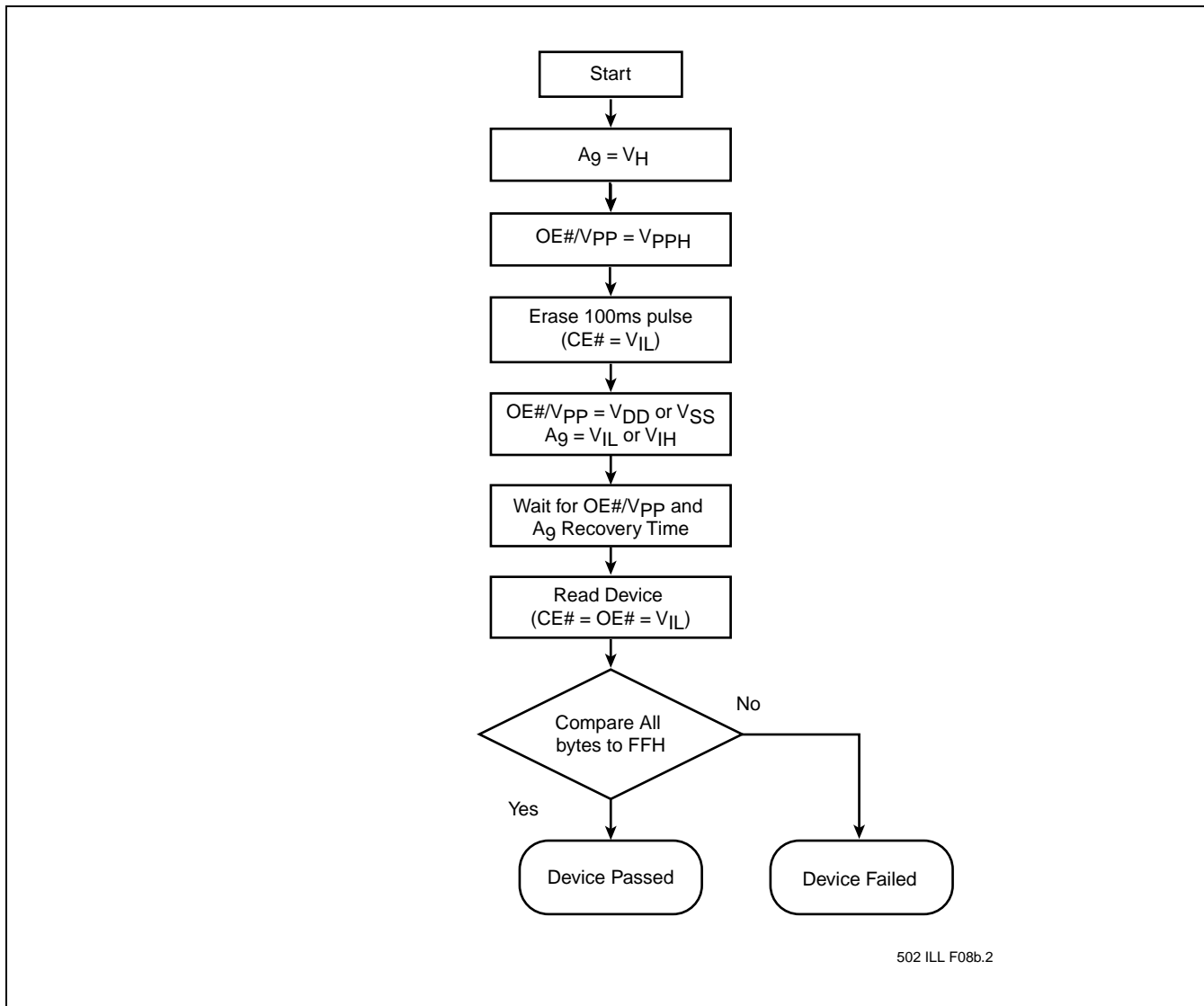
502 ILL F08a.2

FIGURE 13: CHIP-ERASE ALGORITHM FOR SST27SF256



256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash
SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020

Data Sheet



502 ILL F08b.2

FIGURE 14: CHIP-ERASE ALGORITHM FOR SST27SF512



256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash
SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020

Data Sheet

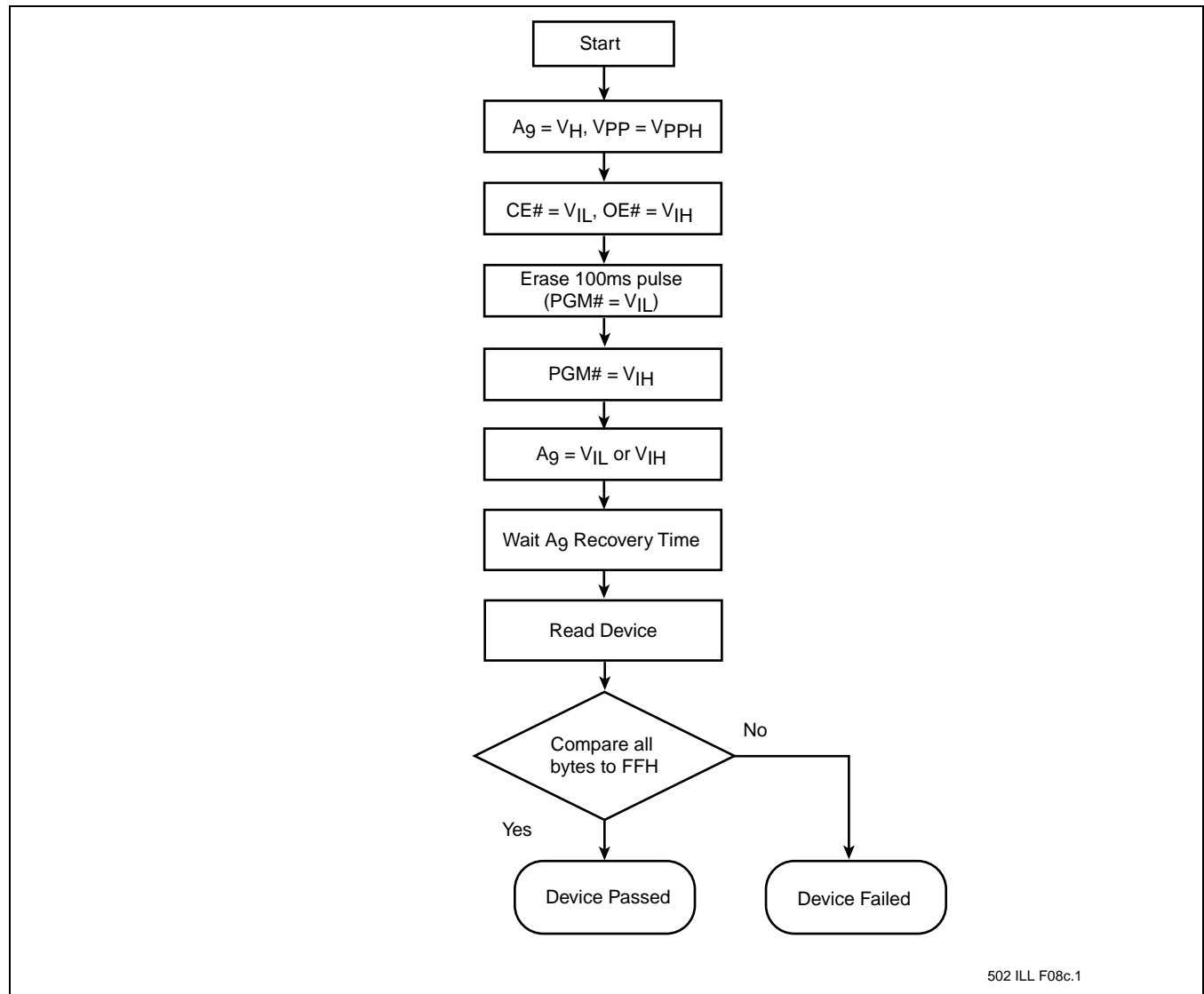
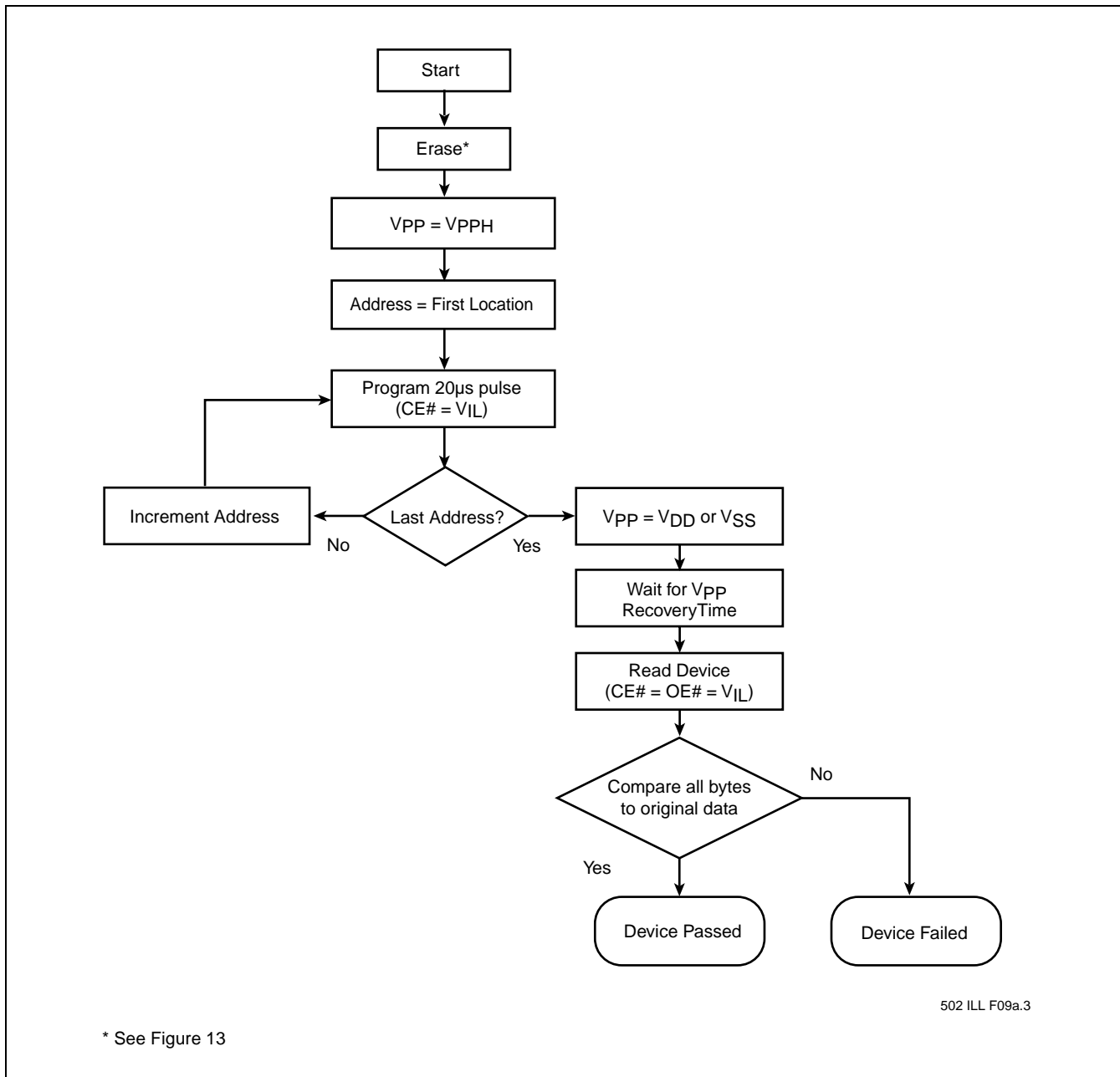


FIGURE 15: CHIP-ERASE ALGORITHM FOR SST27SF010/020



256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020

Data Sheet



* See Figure 13

502 ILL F09a.3

FIGURE 16: BYTE-PROGRAM ALGORITHM FOR SST27SF256



256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash
SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020

Data Sheet

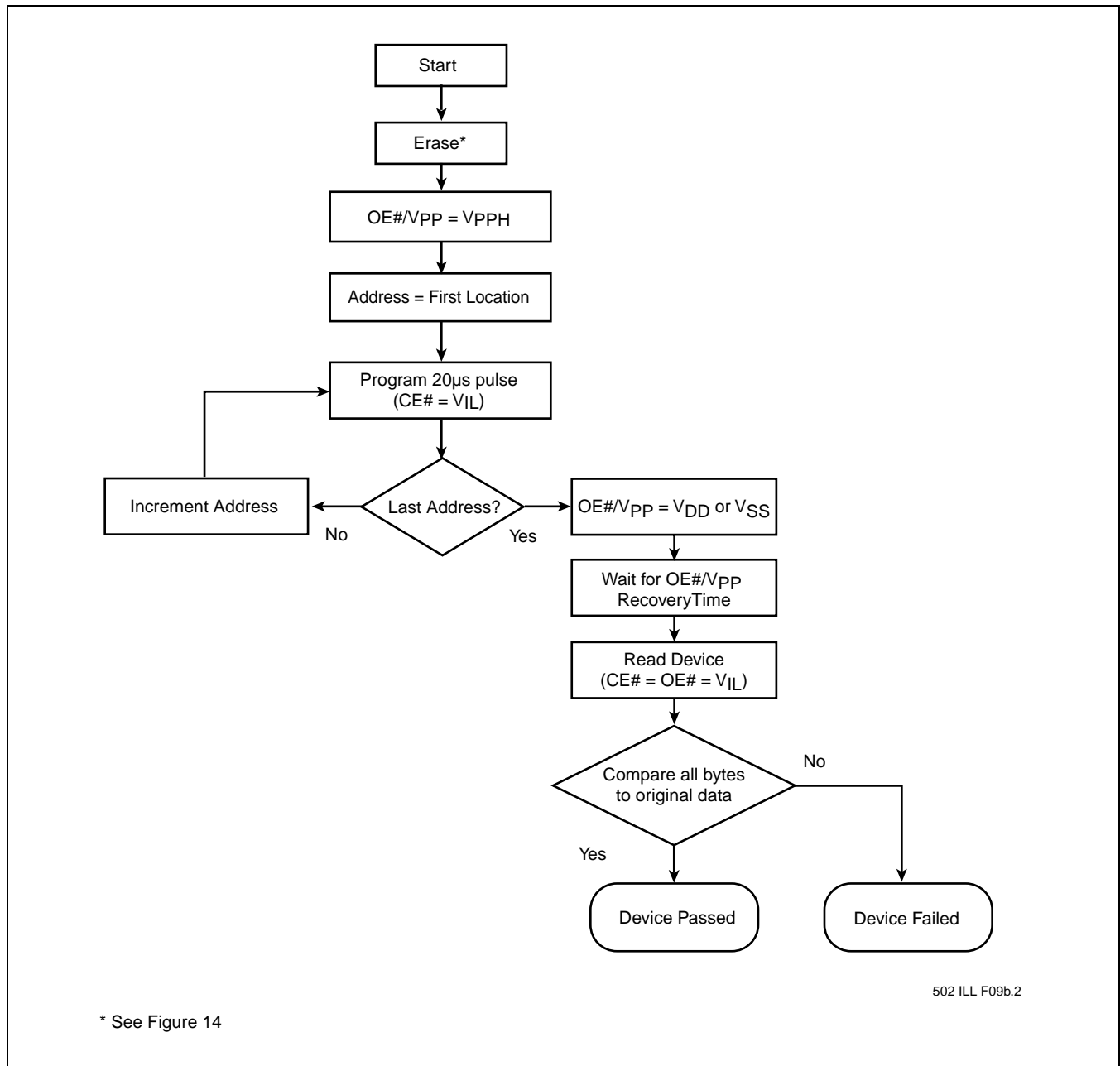


FIGURE 17: BYTE-PROGRAM ALGORITHM FOR SST27SF512



256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020

Data Sheet

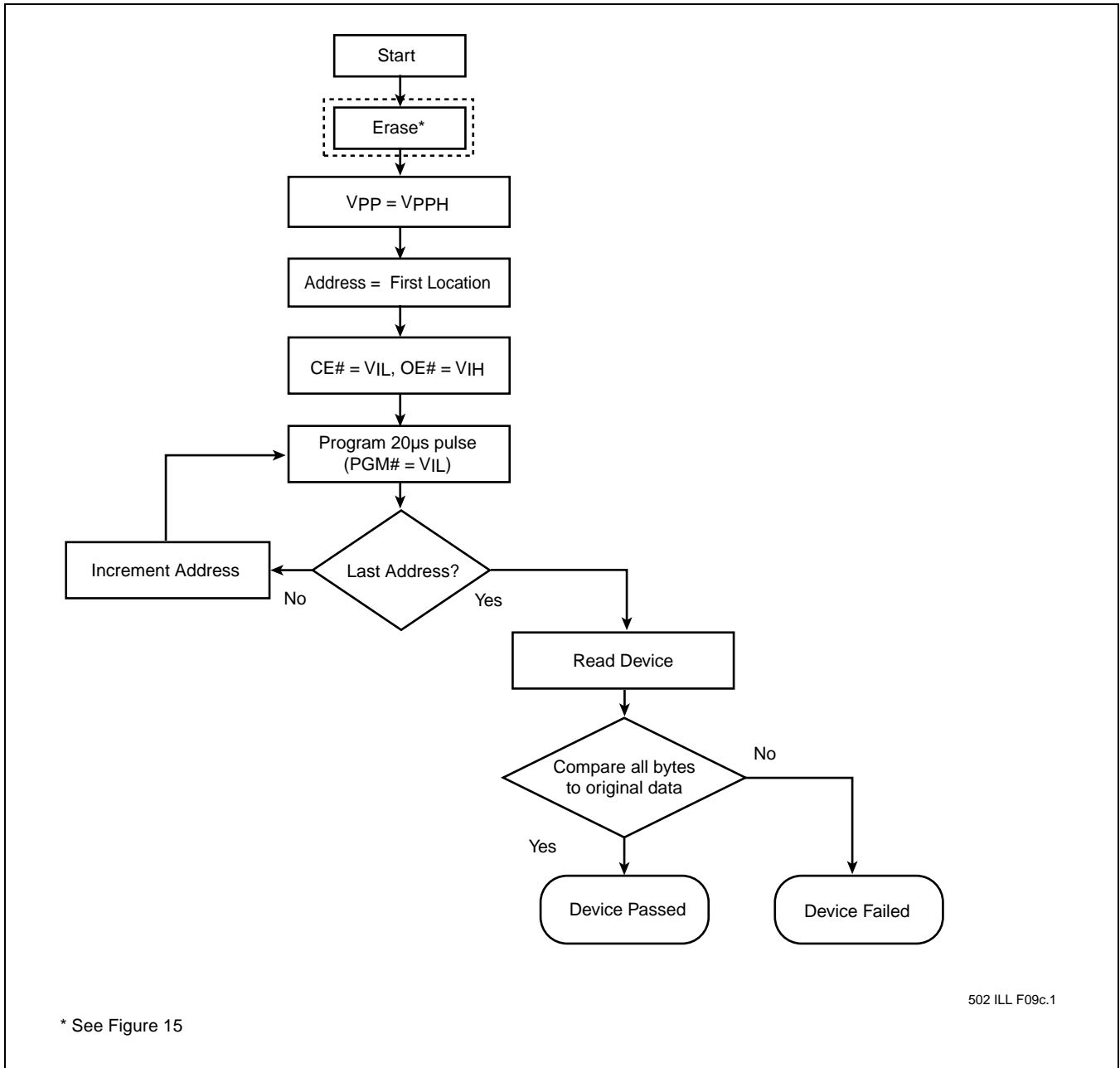
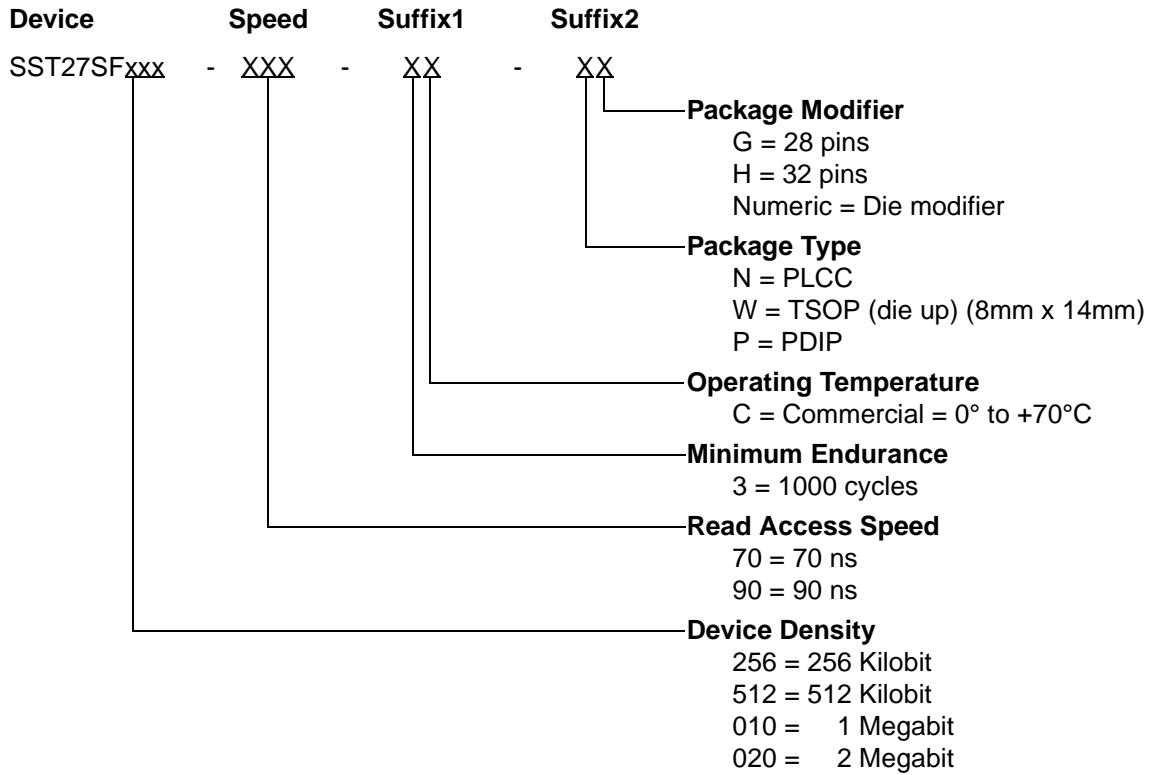


FIGURE 18: BYTE-PROGRAM ALGORITHM FOR SST27SF010/020



256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020

Data Sheet





256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020

Data Sheet

Valid combinations for SST27SF256

| | | |
|---------------------|---------------------|---------------------|
| SST27SF256-70-3C-NH | SST27SF256-70-3C-WH | SST27SF256-70-3C-PG |
| SST27SF256-90-3C-NH | SST27SF256-90-3C-WH | SST27SF256-90-3C-PG |

Valid combinations for SST27SF512

| | | |
|---------------------|---------------------|---------------------|
| SST27SF512-70-3C-NH | SST27SF512-70-3C-WH | SST27SF512-70-3C-PG |
| SST27SF512-90-3C-NH | SST27SF512-90-3C-WH | SST27SF512-90-3C-PG |

Valid combinations for SST27SF010

| | | |
|---------------------|---------------------|---------------------|
| SST27SF010-70-3C-NH | SST27SF010-70-3C-WH | SST27SF010-70-3C-PH |
| SST27SF010-90-3C-NH | SST27SF010-90-3C-WH | SST27SF010-90-3C-PH |

Valid combinations for SST27SF020

| | | |
|---------------------|---------------------|---------------------|
| SST27SF020-70-3C-NH | SST27SF020-70-3C-WH | SST27SF020-70-3C-PH |
| SST27SF020-90-3C-NH | SST27SF020-90-3C-WH | SST27SF020-90-3C-PH |

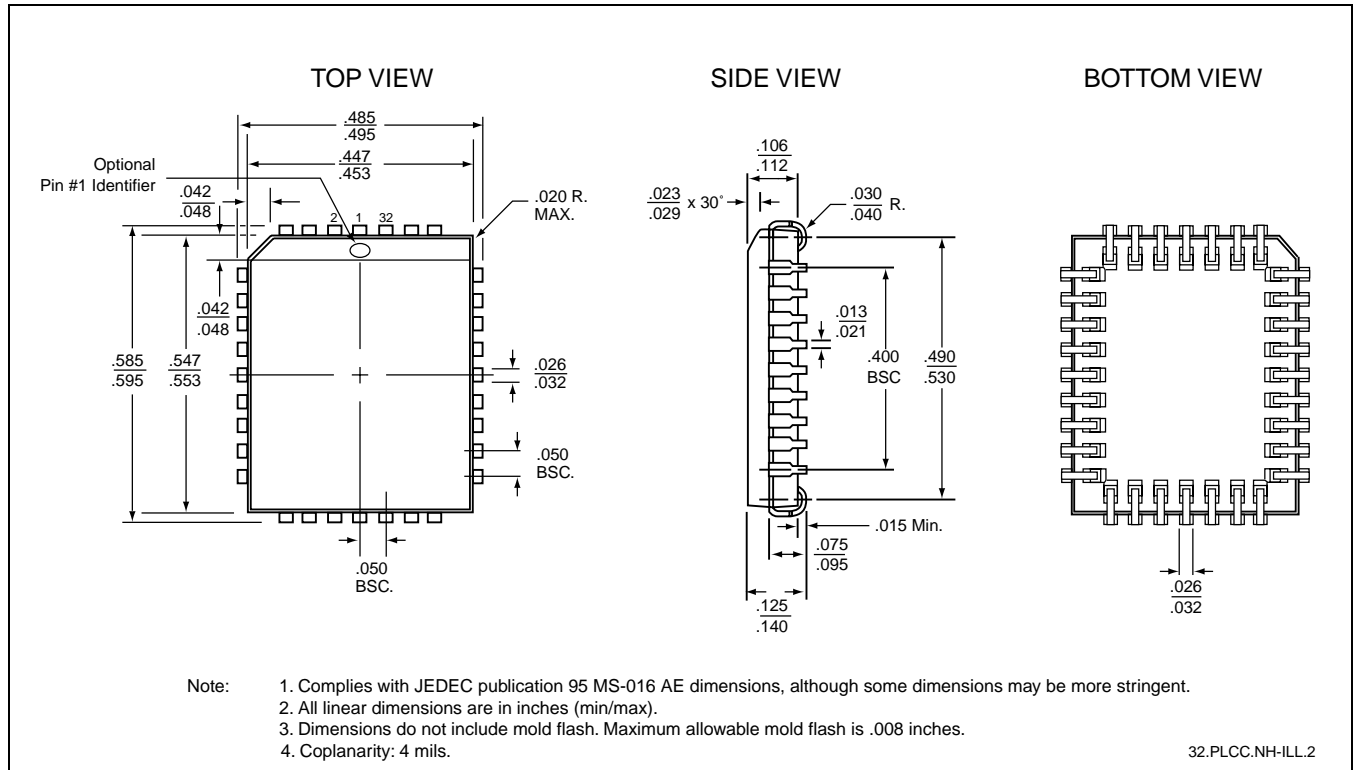
Example: Valid combinations are those products in mass production or will be in mass production. Consult your SST sales representative to confirm availability of valid combinations and to determine availability of new combinations.



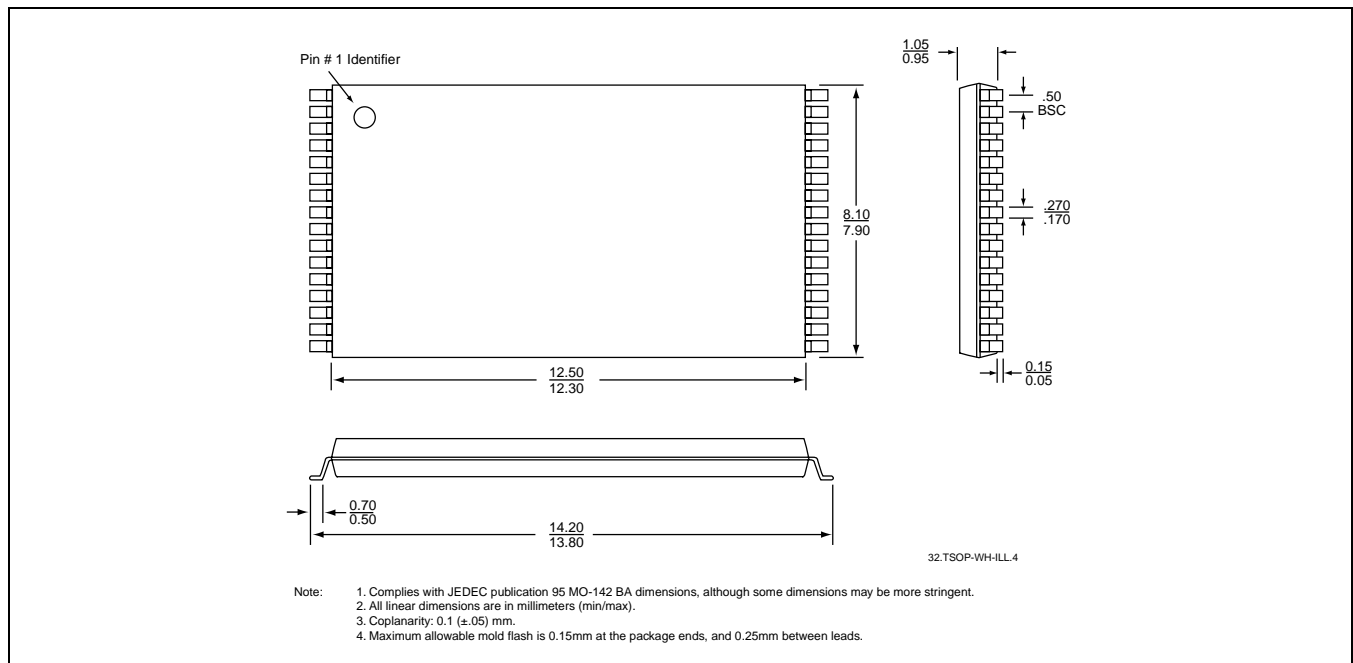
256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash
SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020

Data Sheet

PACKAGING DIAGRAMS



32-PIN PLASTIC LEAD CHIP CARRIER (PLCC)
SST PACKAGE CODE: NH

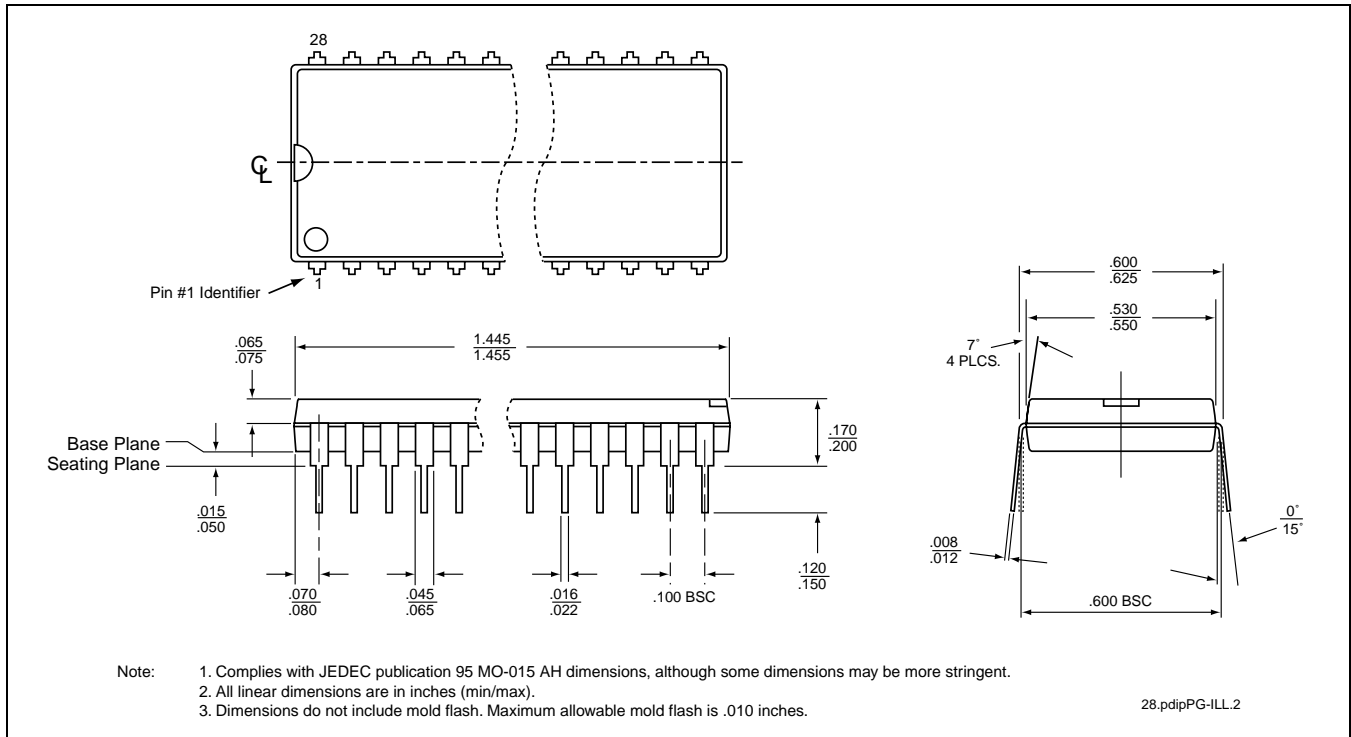


32-PIN THIN SMALL OUTLINE PACKAGE (TSOP) 8MM X 14MM
SST PACKAGE CODE: WH



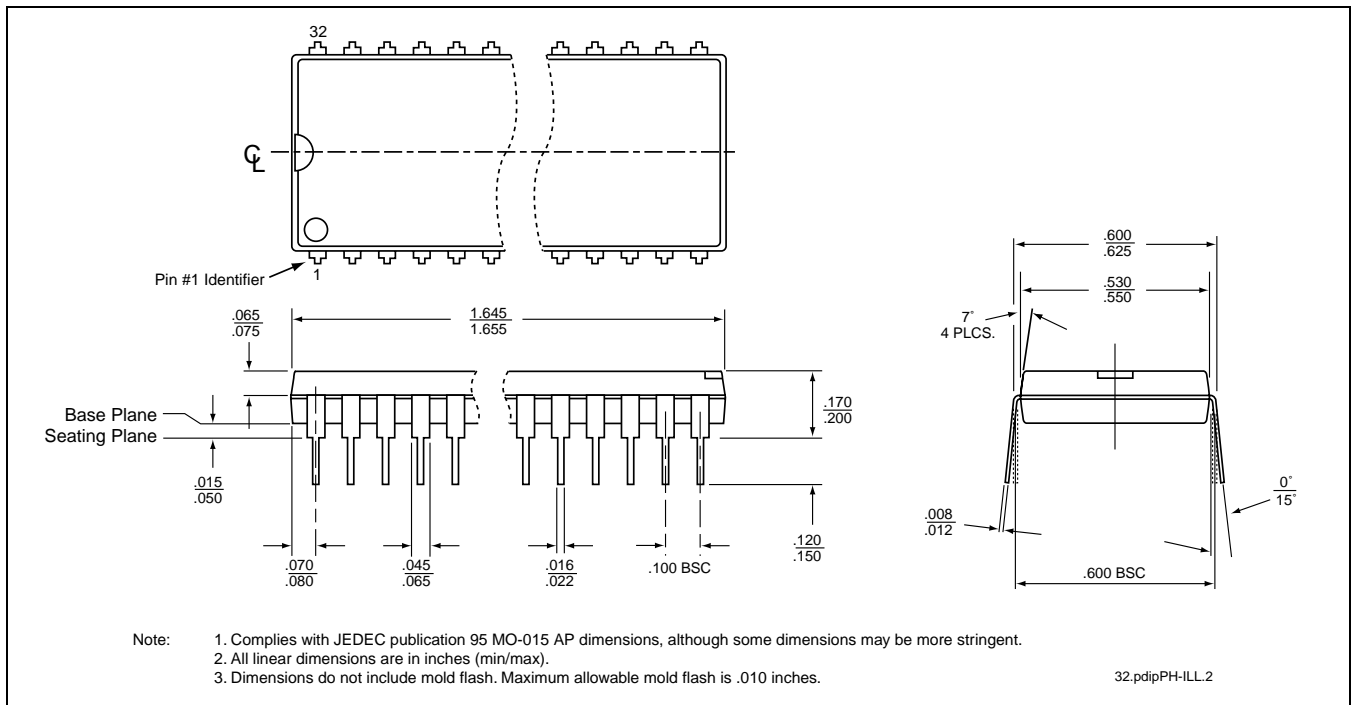
256 Kbit / 512 Kbit / 1 Mbit / 2 Mbit Multi-Purpose Flash SST27SF256 / SST27SF512 / SST27SF010 / SST27SF020

Data Sheet



28-PIN PLASTIC DUAL-IN-LINE PACKAGE (PDIP)

SST PACKAGE CODE: PG



32-PIN PLASTIC DUAL-IN-LINE PACKAGE (PDIP)

SST PACKAGE CODE: PH