SUPPLEMENT

Am29F010B

Data Sheet Supplement for PROM Programmer Manufacturers

This supplement is for use with the Am29F010B data sheet, publication number 22286. This document describes how to implement sector protection and sector unprotection functions on the device using standard PROM programming equipment.

Before performing sector protection or unprotection, it may be desirable to detect the manufacturer or device ID code from the flash device. To achieve this, the address bits and control signals should be should be set as described in the "Autoselect Codes" table on page 2. The desired ID code will appear on the output bits DQ7–DQ0.

AMD normally ships flash devices with all sectors unprotected. However, AMD offers factory programming and sector protection through the ExpressFlash™ service. For more information on this service, refer to the latest data book, log onto the AMD web site at http://www.amd.com/products/nvd/overview/17125.html, or contact an AMD sales office.

SECTOR PROTECTION

The hardware sector protection feature disables both program and erase operations in any number of sectors. Figure 1 on page 3 shows the algorithm for sector protection. Figure 2 on page 4 shows the waveforms. Notice in Figure 2 that the sector addresses must be held constant during the WE# pulse, which initiates the sector protection process. The sector address on A16–A14 defines which sector is being protected. Any address bit specified in Figures 1 and 2 must be set as described. Any unspecified address bit is a don't care. After a time out period, OE# should be returned to V_{CC}, and the protection for that sector must be verified by performing a read operation. An output of 01h on DQ7–DQ0 confirms the sector protection. The loopback on the left of the algorithm allows for additional attempts to achieve sector protection. The loopback on the right of the algorithm provides for protecting additional sectors. When all sectors have been protected as desired, remove V_{ID} prior to removing V_{CC} from the device.

SECTOR UNPROTECTION

The hardware sector unprotection feature re-enables program and erase operations in any previously protected sector. Figure 3 on page 5 shows the algorithm. Figure 4 on page 6 shows the waveforms.

Note that before any sector can be unprotected, **all sectors** must be first protected using the procedure described in the "Sector Protection" section. Any address bits specified in Figures 3 and 4 must be set as described. Any unspecified address bit is a don't care. After a time out period, V_{IL} should be asserted on both OE# and CE#, and the unprotection for that sector must be verified by reading the data on DQ7–DQ0. The loopback on the right of the algorithm allows for additional attempts to achieve sector unprotection. An output of 00h confirms the sector unprotection. Note that this algorithm unprotects all sectors. Remove V_{ID} prior to removing V_{CC} from the device.

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DC CHARACTERISTICS (TTL AND CMOS)

Parameter Symbol	Parameter Description	Test Conditions	Min	Max	Unit
V_{ID}	Voltage for Autoselect and Sector Protection	V_{CC} = 5 V	11.5	12.5	V
V_{IH}	Input High Voltage		2.0	V_{CC} + 0.5 V	V
V_{IL}	Input Low Voltage		–0.5	0.8	V
V_{CC}	Device Power		4.75	5.25	V
I_{LIT}	High Voltage Input Load Current	V_{CC}=V_{CCmax}, A9, OE# = 12.5 V		50	µA

AC CHARACTERISTICS

Sector Protect/Unprotect Timing Operations

Parameter Symbol Standard	Description		All Speed Options	Unit
t_{ACC}	Address To Output Delay (Note 1)	Max	120	ns
t_{OE}	Output Enable to Output Delay (Note 1)	Max	50	ns
t_{VT}	Voltage Transition Time (Note 2)	Min	500	ns
t_{WPP1}	Write Pulse Width (Note 3)	Min	100	µs
t_{WPP2}	Write Pulse Width (Note 4)	Min	10	ms
t_{OESP}	OE# Setup Time to WE# Active (Note 2)	Min	4	µs
t_{CSP}	CE# Setup Time to WE# Active (Note 2)	Min	4	µs
t_{ST}	Voltage Setup Time	Min	4	µs

Notes:

1. *If higher performance specifications for t_{ACC} and t_{OE} are required, refer to the Read Operations table in the AC Specifications section of the Am29F010B data sheet.*
2. *Not 100% tested.*
3. *These timings are for Sector Protect operation.*
4. *These timings are for Sector Unprotect operation.*

AUTOSELECT CODES

Type	CE#	OE#	WE#	A16–A14	A9	A6	A1	A0	DQ7–DQ0
Manufacturer ID	V_{IL}	V_{IL}	V_{IH}	X	V_{ID}	V_{IL}	V_{IL}	V_{IL}	01h
Device ID: Am29F010B	V_{IL}	V_{IL}	V_{IH}	X	V_{ID}	V_{IL}	V_{IL}	V_{IH}	20h
Verify Sector Protection	V_{IL}	V_{IL}	V_{IH}	Sector Addresses*	V_{ID}	V_{IL}	V_{IH}	V_{IL}	01h
Verify Sector Unprotection						V_{IH}			00h

** Refer to the Am29F010B datasheet for sector address tables.*

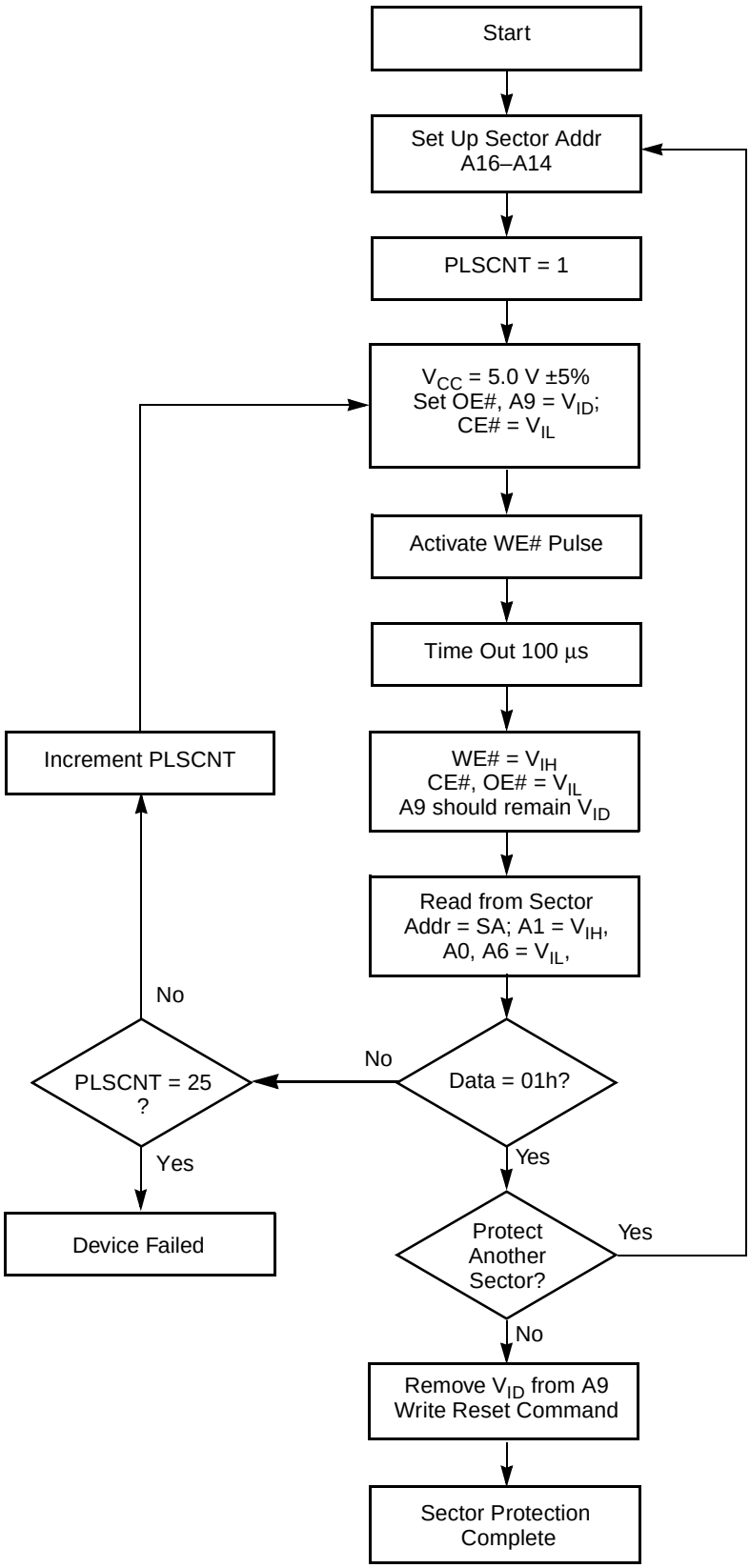

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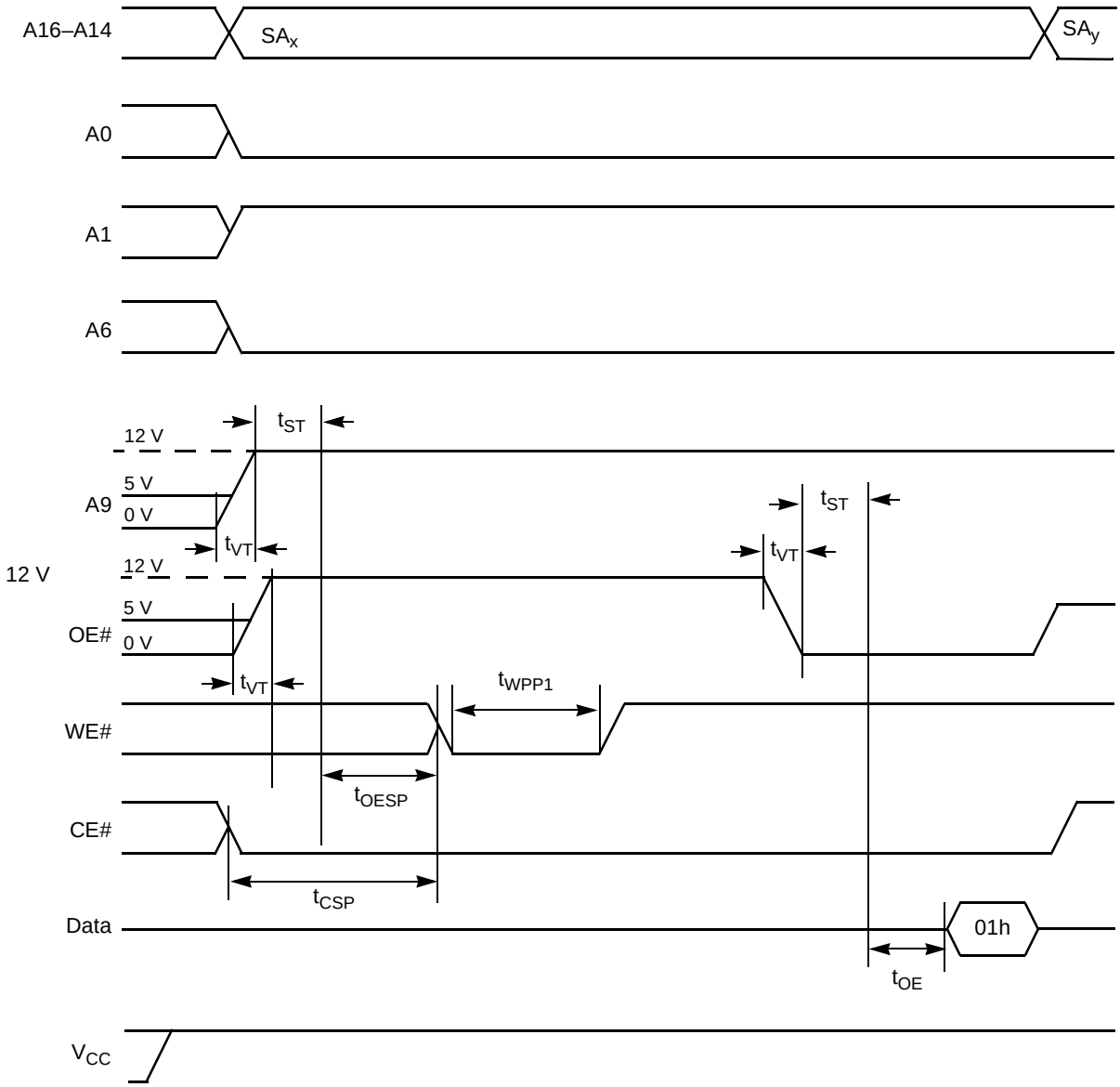
Figure 1. Sector Protection Algorithm



SA_x = Sector Address for initial sector
SA_y = Sector Address for next sector

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Figure 2. AC Waveforms for Sector Protection

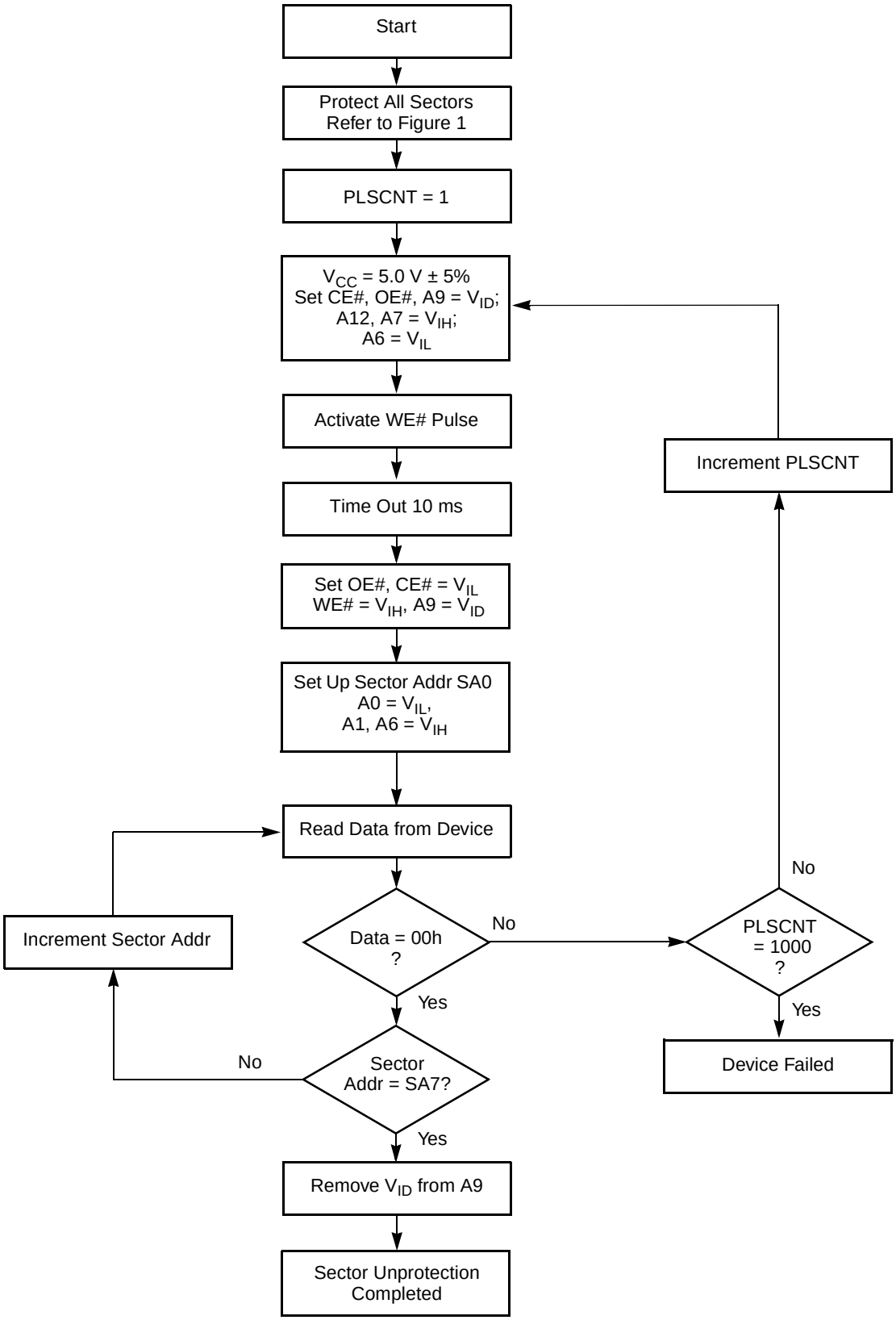

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Figure 3. Sector Unprotect Algorithm

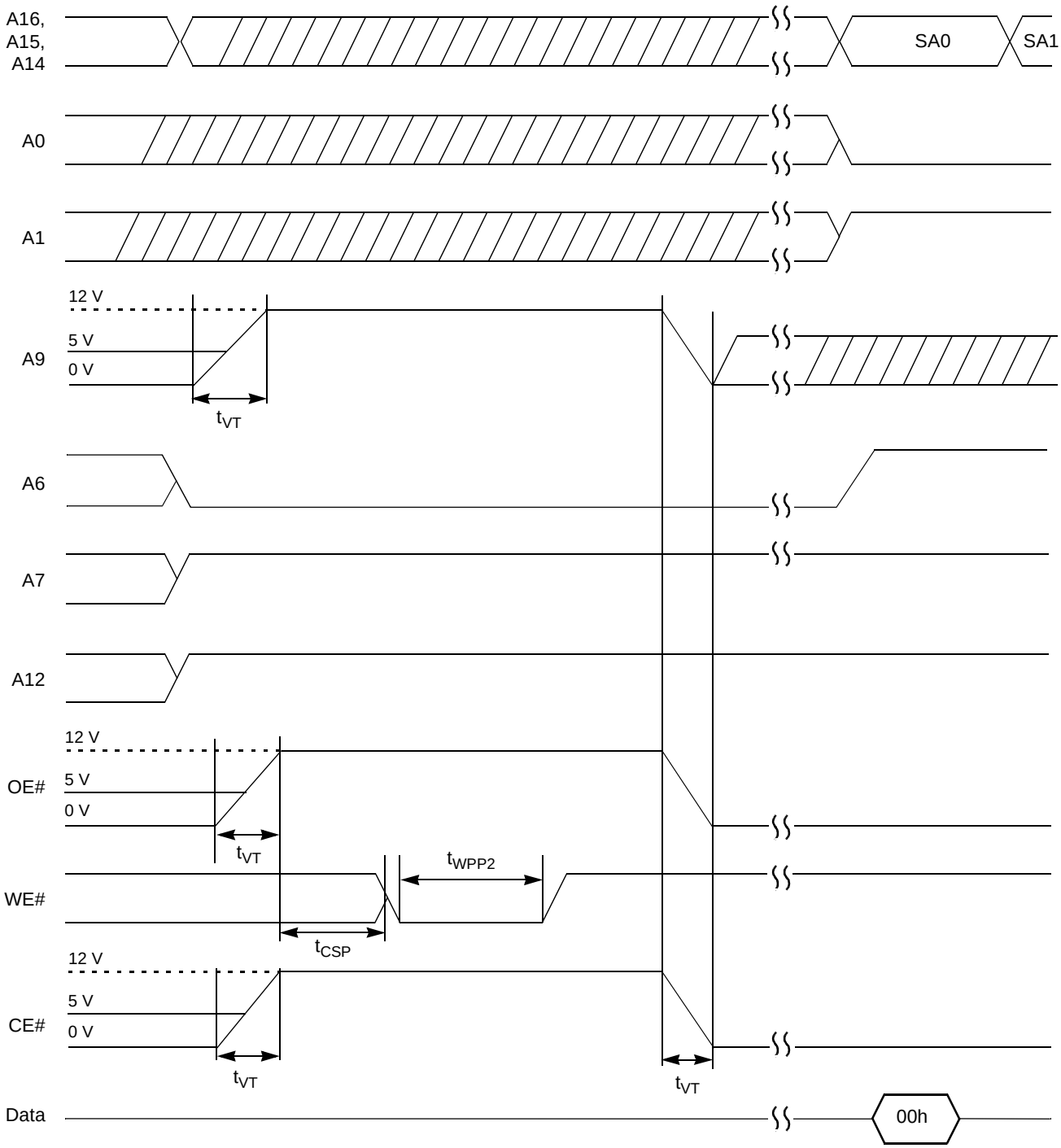

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Figure 4. AC Waveforms for Sector Unprotect