Guideline for Reading Status Bit

October 21, 2004

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Status Bit Read Issue

❑ Introduce

Samsung's Nor Flash Memory provide to indicate the status of operation in the bank where a program or erase operation is in progresses.

To check whether the operation (Erase or Program) is completed or not in Nor Flash Memory , user should read the status bits through data bus [D7, D6, D5, D3, and D2]. The status bits indicate the processing or complete of a operation by toggling or Polling bit.

❑ How to check the Status Bits

- Address must include bank address being executed internal routine operation
- The status is indicated by raising the device status flag via corresponding DQ pins.
- The status read is supported in burst mode and asynchronous mode.

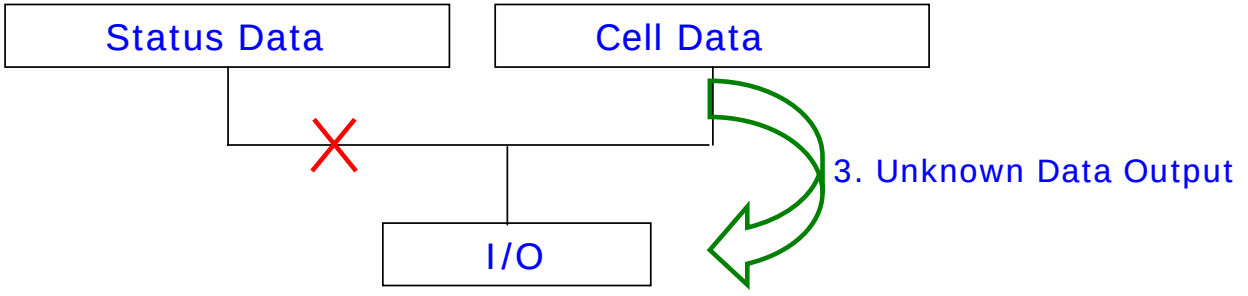
❑ Sequence of Reading Status bits

- The status bits which indicate the status of operation can be read during /CE & /OE keep low after operation is started by D7,D6,D5,D3 and D2.
- The status bits are changed by toggling of /CE and /OE signals.
- If operation is completed during /CE & /OE keep low, on the data bus the status bits are changed with unknown data, not cell data. The real cell data can be read after /CE and /OE are toggled.
- To define correctly operation is completed or not (to read status signal or real cell data), user have to check the data TWICE.

Status Bit Read Issue

◆ Internal Operation of Status Data and Cell Data

1. Status Data Output
2. Program operation complete internally



When internal operation (Program or Erase) completes.
Status data path is closed. And Data path is open

4. True Data Output : True data sensing starts by /OE or /CE Toggling after internal operation done.

Example

- 44h : 0 1 0 0 0 1 0 0 : Status data
- 3Fh : 0 0 1 0 1 1 1 1 : Undefined data
- F9h : 1 1 1 1 1 0 0 1 : True data - **DQ6 is still toggling, but you should check it twice (Refer to next page algorithm)**

Status Bit Read Issue

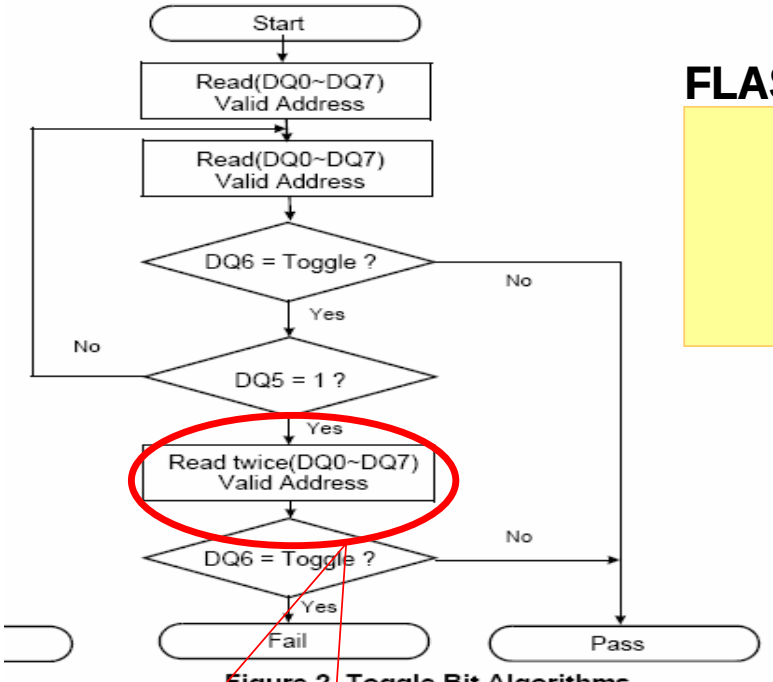


Figure 2. Toggle Bit Algorithms

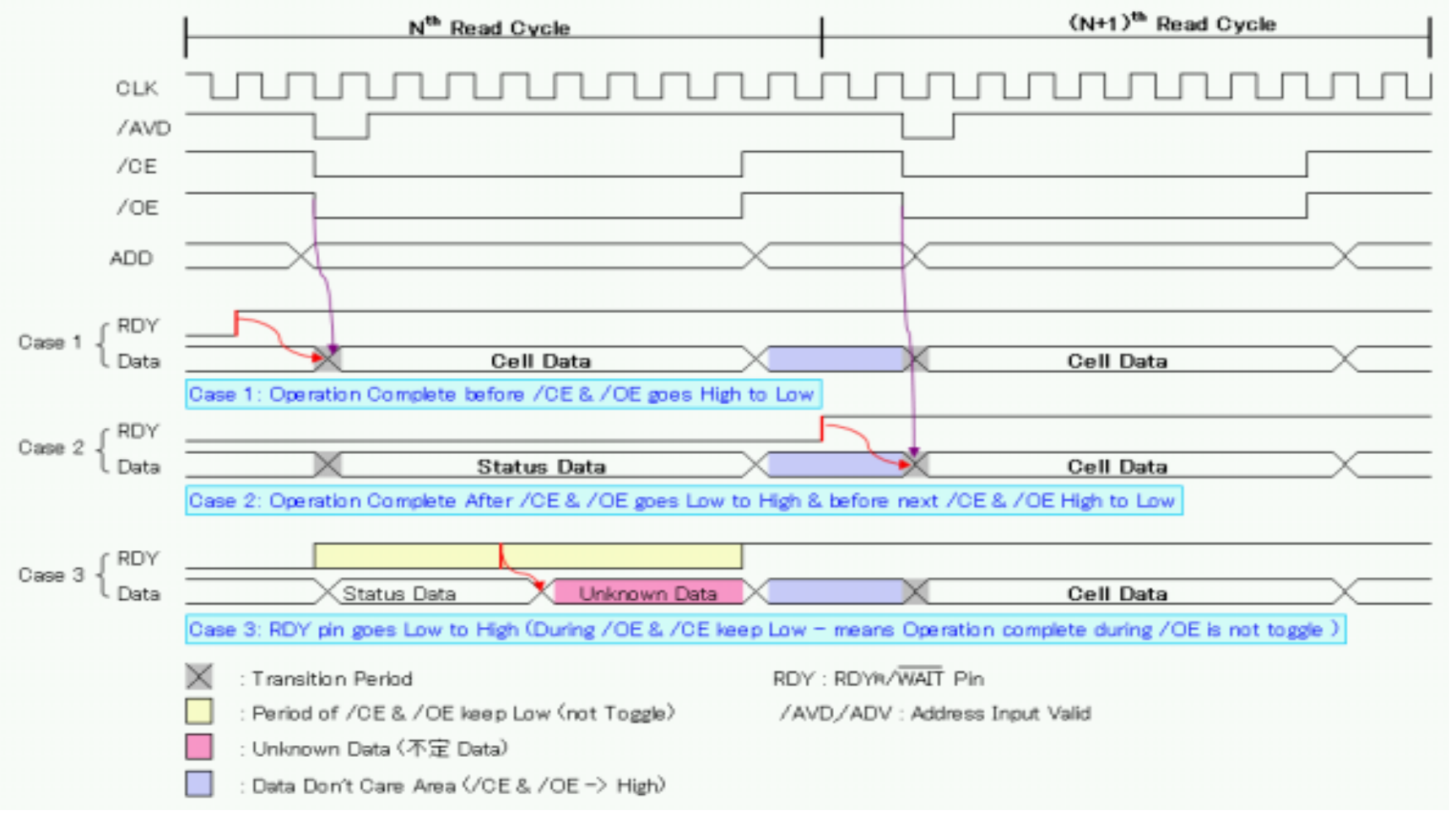
Read twice for DQ6 toggling bit check, if DQ5=1

FLASH MEMORY STATUS FLAGS

Undefined data can be read when the operation is completed during OE low. Undefined data , however, means that operation is completed. Refer to the toggle bit algorithm flow chart.

Status Bit Read Issue

◆ Nor Unknown Data Issue



Status Bit Read Issue

◆ Nor Unknown Data Issue

Case 1 & 2) Erase or Program Operation complete during /CE and /OE keep high (not checking the status bit), at the next Cycle(N+1)th , the Cell data could be read.

Case 3) Erase or Program operation completed during /CE and /OE keep low (checking the status bit), the output data could be changed from the status data to the undefined data at the Cycle Nth . The real Cell data could be read at the next Cycle(N+1)th. To read the real Cell data, Users have to check the status data TWICE as written at the spec.