



## Technical Note TN-111

# Effect of Excessive Number of CS Toggle Operations for AT25SF641 and AT25QF641

This publication contains proprietary information which is subject to change without notice and is supplied "as is", without any warranty of any kind.

### Revision History

Revision Number	Date	Tasks
A	08/2019	Initial Release



## Effect of Excessive Number of CS Toggle Operations on AT25SF641 and AT25QF641

The purpose of this document is to describe the possible undesirable side-effects of excessive number of CS toggle on Adesto AT25SF641 and AT25QF641 Flash devices.

The descriptions included in this document pertain to Adesto AT25SF641 and AT25QF641 devices only. No other devices are affected by this phenomenon.

The document also provides good design techniques and recommendation for extending the lifetime of the device, under high-stress conditions, such as unusually high number of CS toggles.

For further details about the commands, timing and other limitations please refer to the device datasheet.

The number of read operations is practically unlimited, provided the number of CS toggle cycles remains under 3.65 billion over 10 years. This corresponds to about 1,000,000 CS toggles a day.

Each time the CS signal goes active (logical LOW) certain configuration cells are exercised for active device operation. Excessive configurations can progressively disturb these cells and may result in incorrect read operation of the Flash memory.

Once CS is active, there are no limitations on how many bytes of data is being read from the device.

With consideration to the above, to extend the lifetime of the device to beyond 10 years, it is important to keep the number of CS toggle below 1,000,000 cycles a day. This can be achieved, by:

- Reducing the number of memory accesses
- Minimizing the number of CS toggle, but reading larger sections of the memory at once, rather than accessing the memory frequently and reading small chunks of data

