# TOSHIBA
Leading Innovation >>>

> SERIAL NAND
SLC NAND with SPI Interface

NAND FLASH MEMORY

Toshiba's advanced Flash Memory technology offers SLC NAND providing best in class endurance and data retention for sensitive or frequently used data. For long lasting products or systems working with extremely high data throughput between the host and the memory, Toshiba SLC is the optimal solution.

Toshiba's new line-up of 24nm based Serial NAND flash memory products are compatible with the widely used Serial Peripheral Interface (SPI) giving users access to an SLC NAND flash memory with a low pin count, small package and large capacity.
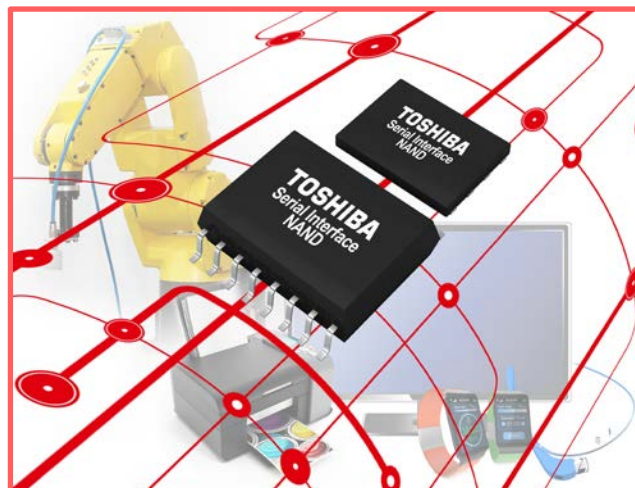
> APPLICATIONS

- Industrial Applications
- Consumer Electronics
- Multimedia Applications
- Smart Metering & Intelligent Lighting

INVENTOR OF FLASH MEMORY

> FEATURES

- Cost efficient 24nm SLC
- 1Gbit, 2Gbit and 4Gbit
- Compatible to SPI Standard
- Extended temperature range
- SOP and WSON package
- On chip hardware ECC which can be turned off/on
- Unique Bit flip report function
- Data protection feature
- High speed sequential read mode

> ADVANTAGES

- Broad line up to cover customers demand for different densities
- Leading edge 24nm Technology for cost optimization
- Long data retention or extreme write/erase performance
- Small package for reduced board space
- Standardized high speed serial interface (SPI)
- No ECC operation is required on the host side
- Produced in the world's largest, leading edge technology flash factory

> BENEFITS

- Optimal storage solution for long lasting storage of significant data or very frequently changed data
- Reduced BOM cost due to latest 24nm production technology
- Supports smaller board size e.g. for mobile devices
- Host can control the device by only 6 pin
- Cost and performance optimized as host does not have to include ECC function for memory management
- Hosts which supports no parallel NAND interface, but common SPI can now utilize SLC NAND

> SPECIFICATIONS

Features	Serial NAND
Density	1Gbit, 2Gbit & 4Gbit
Technology	24nm SLC
Interface	Serial Peripheral Interface (SPI)
ECC (Error Correction Code)	Embedded on Memory Chip
Temperature	-40°C to 85°C
Package	16 pin SOP and 8 pin WSON (BGA under development)

SERIAL NAND – PRODUCT LIST

Density	Part Number	Page Size	Vcc	Temperature	Package
1Gbit	TC58CVG0S3HRAIF	(2048+64)x8 bit	3.3V	-40°C to 85°C	8WSON 6x8
	TC58CVG0S3HQAIE	(2048+64)x8 bit	3.3V	-40°C to 85°C	16SOP 10.3x7.5
	TC58CYG0S3HRAIF	(2048+64)x8 bit	1.8V	-40°C to 85°C	8WSON 6x8
	TC58CYG0S3HQAIE	(2048+64)x8 bit	1.8V	-40°C to 85°C	16SOP 10.3x7.5
2Gbit	TC58CVG1S3HRAIF	(2048+64)x8 bit	3.3V	-40°C to 85°C	8WSON 6x8
	TC58CVG1S3HQAIE	(2048+64)x8 bit	3.3V	-40°C to 85°C	16SOP 10.3x7.5
	TC58CYG1S3HRAIF	(2048+64)x8 bit	1.8V	-40°C to 85°C	8WSON 6x8
	TC58CYG1S3HQAIE	(2048+64)x8 bit	1.8V	-40°C to 85°C	16SOP 10.3x7.5
4Gbit	TC58CVG2S0HRAIF	(4096+128)x8 bit	3.3V	-40°C to 85°C	8WSON 6x8
	TC58CVG2S0HQAIE	(4096+128)x8 bit	3.3V	-40°C to 85°C	16SOP 10.3x7.5
	TC58CYG2S0HRAIF	(4096+128)x8 bit	1.8V	-40°C to 85°C	8WSON 6x8
	TC58CYG2S0HQAIE	(4096+128)x8 bit	1.8V	-40°C to 85°C	16SOP 10.3x7.5

Valid Q1 2016
All Serial NAND Memory uses Toshiba's 24nm technology and features internal ECC.

ENHANCED FEATURES

Embedded ECC	The Serial NAND has an integrated 8Bit ECC, which can be turned off on demand
Bit Flip Management	The Serial NAND has bit flip count report function. Designer are able to develop more safely system. Internal ECC H/W reports the bit flip count of the each sector.
Block Protection	The developer can protect the last 128 blocks, and protection is permanent setting. The program and erase operation to the protected block are ignored. The designer can realize more secure system.
Serial Peripheral Interphase (SPI)	SPI (x1, x2, x4) Clock Frequency: up to 104MHz
High Speed Sequential Read Mode	In the sequential read, the developer can read the data fast even by using normal read command sequence. No need to modify the software to use this function.

SERIAL NAND – SLC WITH ECC AND SPI INTERFACE

SCLK
SI/SO0
SI/SO1
CS#
HOLD#/SO3
WP#/SO2

SPI INTERFACE

ECC

SLC NAND

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