TOSHIBA
Leading Innovation

FAB_BENAND_1405

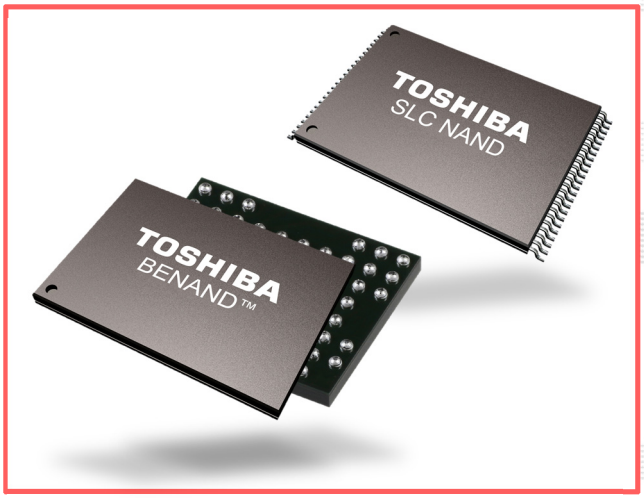
NAND FLASH MEMORY

SLC NAND & BENAND™

Reliability and Performance

Toshiba's advanced Flash Memory technology offers SLC NAND providing best in class endurance and data retention for sensitive or frequently used data in a system. 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 BENAND™ removes the burden of error correction code (ECC) from the host processor by offering ECC embedded in the hardware while keeping the same specification, high reliability and performance as a raw SLC.



APPLICATIONS

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

INVENTOR OF FLASH MEMORY

FEATURES

- **SLC NAND 24nm**
  - 1Gbit – 128Gbit
  - Extended temperature range
  - TSOP and BGA package
- **BENAND™ 24nm**
  - **➔Built in ECC SLC NAND**
  - 1Gbit – 8Gbit
  - On chip H/W ECC
  - Same reliability and performance as to raw SLC
  - Same Hardware interface and package as raw SLC

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 variation for reduced board space
- With BENAND™ 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
- Using **Toshiba** BENAND™ it is possible to utilize the latest 24nm SLC NAND flash technology even if the existing platform cannot support higher bit ECC. **No hardware or software change necessary.**

SPECIFICATIONS

Product / Features	SLC NAND	BENAND™ (SLC+ECC)
Density	1Gbit – 128Gbit	1Gbit – 8Gbit
Technology	24nm	
ECC (Error Correction Code)	Required on Host Side	Embedded on Memory Chip
Temperature	-40°C to 85°C 0°C to 70°C	
Package	TSOP and BGA	

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SLC NAND – PRODUCT LIST

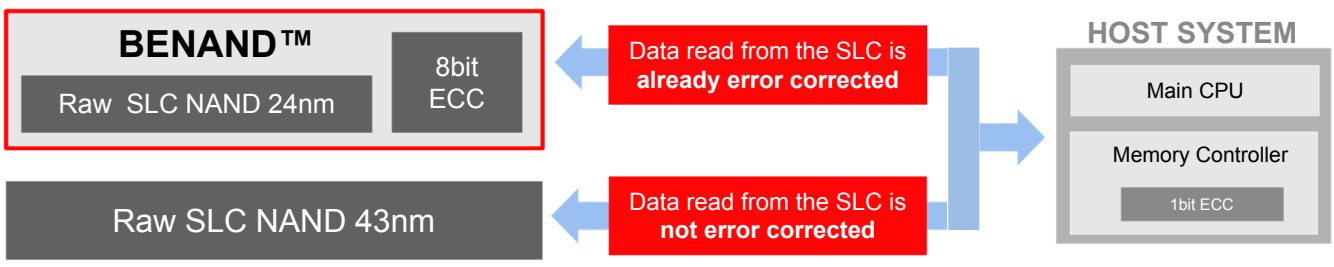
Density	Part Number	Techn.	Page Size	Vcc	ECC	Temperature	Package
1Gbit	TC58NVG0S3HTA00	24nm	(2048+128)x8 bit	3.3V	8bit/512B	0°C to 70°C	48TSOP 12x20
	TC58NYG0S3HBAI4	24nm	(2048+128)x8 bit	1.8V	8bit/512B	-40°C to 85°C	63BGA 9x11
	TC58NVG0S3HTAI0	24nm	(2048+128)x8 bit	3.3V	8bit/512B	-40°C to 85°C	48TSOP 12x20
	TC58NVG0S3HBAI4	24nm	(2048+128)x8 bit	3.3V	8bit/512B	-40°C to 85°C	63BGA 9x11
2Gbit	TC58NVG1S3HTA00	24nm	(2048+128)x8 bit	3.3V	8bit/512B	0°C to 70°C	48TSOP 12x20
	TC58NYG1S3HBAI4	24nm	(2048+128)x8 bit	1.8V	8bit/512B	-40°C to 85°C	63BGA 9x11
	TC58NVG1S3HTAI0	24nm	(2048+128)x8 bit	3.3V	8bit/512B	-40°C to 85°C	48TSOP 12x20
	TC58NVG1S3HBAI4	24nm	(2048+128)x8 bit	3.3V	8bit/512B	-40°C to 85°C	63BGA 9x11
4Gbit	TH58NVG2S3HTA00	24nm	(2048+128)x8 bit	3.3V	8bit/512B	0°C to 70°C	48TSOP 12x20
	TC58NVG2S0HTA00	24nm	(4096+256)x8 bit	3.3V	8bit/512B	0°C to 70°C	48TSOP 12x20
	TC58NVG2S0HTAI0	24nm	(4096+256)x8 bit	3.3V	8bit/512B	-40°C to 85°C	48TSOP 12x20
	TH58NVG2S3HTAI0	24nm	(2048+128)x8 bit	3.3V	8bit/512B	-40°C to 85°C	48TSOP 12x20
	TH58NVG2S3HBAI4	24nm	(2048+128)x8 bit	3.3V	8bit/512B	-40°C to 85°C	63BGA 9x11
	TH58NYG2S3HBAI4	24nm	(2048+128)x8 bit	1.8V	8bit/512B	-40°C to 85°C	63BGA 9x11
	TC58NVG2S0HBAI4	24nm	(4096+256)x8 bit	3.3V	8bit/512B	-40°C to 85°C	63BGA 9x11
	TC58NYG2S0HBAI4	24nm	(4096+256)x8 bit	1.8V	8bit/512B	-40°C to 85°C	63BGA 9x11
8Gbit	TH58NVG3S0HTA00	24nm	(4096+256)x8 bit	3.3V	8bit/512B	0°C to 70°C	48TSOP 12x20
	TH58NVG3S0HBAI4	24nm	(4096+256)x8 bit	3.3V	8bit/512B	-40°C to 85°C	63BGA 9x11
	TH58NYG3S0HBAI4	24nm	(4096+256)x8 bit	1.8V	8bit/512B	-40°C to 85°C	63BGA 9x11
	TH58NVG3S0HTAI0	24nm	(4096+256)x8 bit	3.3V	8bit/512B	-40°C to 85°C	48TSOP 12x20
16Gbit	TH58NVG4S0FTA20	32nm	(4096+232)x8 bit	3.3V	4bit/512B	0°C to 70°C	48TSOP 12x20
	TH58NYG4S0FBAID	32nm	(4096+232)x8 bit	1.8V	4bit/512B	-40°C to 85°C	63BGA 10x11
	TH58NVG4S0FTAK0	32nm	(4096+232)x8 bit	3.3V	4bit/512B	-40°C to 85°C	48TSOP 12x20
	TH58NVG4S0FBAID	32nm	(4096+232)x8 bit	3.3V	4bit/512B	-40°C to 85°C	63BGA 10x11
32Gbit	TH58NVG5S0FTA20	32nm	(4096+232)x8 bit	3.3V	4bit/512B	0°C to 70°C	48TSOP 12x20
	TH58NVG5S0FTAK0	32nm	(4096+232)x8 bit	3.3V	4bit/512B	-40°C to 85°C	48TSOP 12x20
64Gbit	TH58NVG6H2HTAK0	24nm	(8192+1024)x8 bit	3.3V	24bit/1024B	-40°C to 85°C	48TSOP 12x20
128Gbit	TH58NVG7H2HTA20	24nm	(8192+1024)x8 bit	3.3V	24bit/1024B	0°C to 70°C	48TSOP 12x20

BENAND™ – PRODUCT LIST

Density	Part Number	Techn.	Page Size	Vcc	ECC	Temperature	Package
1Gbit	TC58BVG0S3HTA00	24nm	(2048+64)x8 bit	3.3V	internal ECC	0°C to 70°C	48TSOP 12x20
	TC58BYG0S3HBAI4	24nm	(2048+64)x8 bit	1.8V	internal ECC	-40°C to 85°C	63BGA 9x11
	TC58BVG0S3HTAI0	24nm	(2048+64)x8 bit	3.3V	internal ECC	-40°C to 85°C	48TSOP 12x20
	TC58BVG0S3HBAI4	24nm	(2048+64)x8 bit	3.3V	internal ECC	-40°C to 85°C	63BGA 9x11
2Gbit	TC58BVG1S3HTA00	24nm	(2048+64)x8 bit	3.3V	internal ECC	0°C to 70°C	48TSOP 12x20
	TC58BYG1S3HBAI4	24nm	(2048+64)x8 bit	1.8V	internal ECC	-40°C to 85°C	63BGA 9x11
	TC58BVG1S3HTAI0	24nm	(2048+64)x8 bit	3.3V	internal ECC	-40°C to 85°C	48TSOP 12x20
	TC58BVG1S3HBAI4	24nm	(2048+64)x8 bit	3.3V	internal ECC	-40°C to 85°C	63BGA 9x11
4Gbit	TH58BVG2S3HTA00	24nm	(2048+64)x8 bit	3.3V	internal ECC	0°C to 70°C	48TSOP 12x20
	TC58BVG2S0HTA00	24nm	(4096+128)x 8 bit	3.3V	internal ECC	0°C to 70°C	48TSOP 12x20
	TH58BYG2S3HBAI4	24nm	(2048+64)x8 bit	1.8V	internal ECC	-40°C to 85°C	63BGA 9x11
	TC58BYG2S0HBAI4	24nm	(4096+128)x 8 bit	1.8V	internal ECC	-40°C to 85°C	63BGA 9x11
	TH58BVG2S3HTAI0	24nm	(2048+64)x8 bit	3.3V	internal ECC	-40°C to 85°C	48TSOP 12x20
	TC58BVG2S0HTAI0	24nm	(4096+128) x 8 bit	3.3V	internal ECC	-40°C to 85°C	48TSOP 12x20
	TC58BVG2S0HBAI4	24nm	(4096+128)x 8 bit	3.3V	internal ECC	-40°C to 85°C	63BGA 9x11
8Gbit	TH58BVG3S0HTA00	24nm	(4096+128)x 8 bit	3.3V	internal ECC	0°C to 70°C	48TSOP 12x20
	TH58BYG3S0HBAI4	24nm	(4096+128)x 8 bit	1.8V	internal ECC	-40°C to 85°C	63BGA 9x11
	TH58BVG3S0HTAI0	24nm	(4096+128)x 8 bit	3.3V	internal ECC	-40°C to 85°C	48TSOP 12x20
	TH58BVG3S0HBAI4	24nm	(4096+128)x 8 bit	3.3V	internal ECC	-40°C to 85°C	63BGA 9x11

*Valid Q22014

BENAND™ – SLC WITH EMBEDDED ECC FOR BOM REDUCTION AND SYSTEM FLEXIBILITY



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