



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 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.

FEATURES

- **SLC NAND 24nm**
 - 1 Gbit – 128 Gbit
 - Extended temperature range
 - TSOP and BGA package
- **BENAND™ 24nm Built in ECC SLC NAND**
 - 1 Gbit – 8 Gbit
 - 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 available to reduce board space by 48 % (up to 8 Gbit)
- With BENAND™ no ECC operation is required on the host side
- Produced in the world's largest, leading edge technology flash factory

CAPACITIES



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 change necessary.**

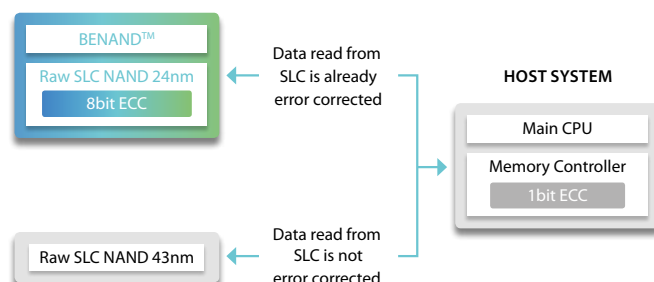
APPLICATIONS

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

SPECIFICATIONS

FEATURES	SLC NAND	BENAND™ (SLC+ECC)
Density	1 Gbit – 128 Gbit	1 Gbit – 8 Gbit
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	

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



SLC NAND – PRODUCT LIST

DENSITY	PART NUMBER	TECHN.	PAGE SIZE	VCC	ECC	TEMPERATURE	PACKAGE
1 Gbit	TC58NVG0S3HTA00	24nm	(2048+128) x 8 bit	3.3V	8bit/512B	0 °C to 70 °C	48TSOP 12 x 20
	TC58NVG0S3HBAI4		(2048+128) x 8 bit	1.8V		-40 °C to 85 °C	63BGA 9 x 11
	TC58NVG0S3HTA10		(2048+128) x 8 bit	3.3V		-40 °C to 85 °C	48TSOP 12 x 20
	TC58NVG0S3HBAI4		(2048+128) x 8 bit	3.3V		-40 °C to 85 °C	63BGA 9 x 11
	TC58NYG0S3HBAI6		(2048+128) x 8 bit	1.8V		-40 °C to 85 °C	67BGA 6.5 x 8
	TC58NVG0S3HBAI6		(2048+128) x 8 bit	3.3V		-40 °C to 85 °C	67BGA 6.5 x 8
2 Gbit	TC58NVG1S3HTA00	24nm	(2048+128) x 8 bit	3.3V	8bit/512B	0 °C to 70 °C	48TSOP 12 x 20
	TC58NYG1S3HBAI4		(2048+128) x 8 bit	1.8V		-40 °C to 85 °C	63BGA 9 x 11
	TC58NVG1S3HTA10		(2048+128) x 8 bit	3.3V		-40 °C to 85 °C	48TSOP 12 x 20
	TC58NVG1S3HBAI4		(2048+128) x 8 bit	3.3V		-40 °C to 85 °C	63BGA 9 x 11
	TC58NYG1S3HBAI6		(2048+128) x 8 bit	1.8V		-40 °C to 85 °C	67BGA 6.5 x 8
	TC58NVG1S3HBAI6		(2048+128) x 8 bit	3.3V		-40 °C to 85 °C	67BGA 6.5 x 8
4 Gbit	TH58NVG2S3HTA00	24nm	(2048+128) x 8 bit	3.3V	8bit/512B	0 °C to 70 °C	48TSOP 12 x 20
	TC58NVG2S0HTA00		(4096+256) x 8 bit	3.3V		0 °C to 70 °C	48TSOP 12 x 20
	TC58NVG2S0HTA10		(4096+256) x 8 bit	3.3V		-40 °C to 85 °C	48TSOP 12 x 20
	TH58NVG2S3HTA10		(2048+128) x 8 bit	3.3V		-40 °C to 85 °C	48TSOP 12 x 20
	TH58NVG2S3HBAI4		(2048+128) x 8 bit	3.3V		-40 °C to 85 °C	63BGA 9 x 11
	TH58NYG2S3HBAI4		(2048+128) x 8 bit	1.8V		-40 °C to 85 °C	63BGA 9 x 11
	TC58NVG2S0HBAI4		(4096+256) x 8 bit	3.3V		-40 °C to 85 °C	63BGA 9 x 11
	TC58NYG2S0HBAI4		(4096+256) x 8 bit	1.8V		-40 °C to 85 °C	63BGA 9 x 11
	TC58NVG2S0HBAI6		(4096+256) x 8 bit	3.3V		-40 °C to 85 °C	67BGA 6.5 x 8
	TC58NYG2S0HBAI6		(4096+256) x 8 bit	1.8V		-40 °C to 85 °C	67BGA 6.5 x 8
8 Gbit	TH58NVG3S0HTA00	24nm	(4096+256) x 8 bit	3.3V	8bit/512B	0 °C to 70 °C	48TSOP 12 x 20
	TH58NVG3S0HBAI4		(4096+256) x 8 bit	3.3V		-40 °C to 85 °C	63BGA 9 x 11
	TH58NYG3S0HBAI4		(4096+256) x 8 bit	1.8V		-40 °C to 85 °C	63BGA 9 x 11
	TH58NVG3S0HTA10		(4096+256) x 8 bit	3.3V		-40 °C to 85 °C	48TSOP 12 x 20
	TH58NVG3S0HBAI6		(4096+256) x 8 bit	3.3V		-40 °C to 85 °C	67BGA 6.5 x 8
	TH58NYG3S0HBAI6		(4096+256) x 8 bit	1.8V		-40 °C to 85 °C	67BGA 6.5 x 8
16 Gbit	TH58NVG4S0HTA20	24nm	(4096+256) x 8 bit	3.3V	8bit/512B	0 °C to 70 °C	48TSOP 12 x 20
	TH58NVG4S0HTAK0		(4096+256) x 8 bit	3.3V		-40 °C to 85 °C	48TSOP 12 x 20
32 Gbit	TC58NVG5H2HTA00	24nm	(8192+1024) x 8 bit	3.3V	24bit/1024B	0 °C to 70 °C	48TSOP 12 x 20
	TC58NVG5H2HTA10		(8192+1024) x 8 bit	3.3V		-40 °C to 85 °C	48TSOP 12 x 20
64 Gbit	TH58NVG6H2HTAK0	24nm	(8192+1024) x 8 bit	3.3V	24bit/1024B	-40 °C to 85 °C	48TSOP 12 x 20
	TH58NVG7H2HTA20		(8192+1024) x 8 bit	3.3V		0 °C to 70 °C	48TSOP 12 x 20

BENAND™ – PRODUCT LIST

DENSITY	PART NUMBER	TECHN.	PAGE SIZE	VCC	ECC	TEMPERATURE	PACKAGE
1 Gbit	TC58BYG0S3HTA00	24nm	(2048+64) x 8 bit	3.3V	internal ECC	0 °C to 70 °C	48TSOP 12 x 20
	TC58BYG0S3HBAI4		(2048+64) x 8 bit	1.8V		-40 °C to 85 °C	63BGA 9 x 11
	TC58BYG0S3HTA10		(2048+64) x 8 bit	3.3V		-40 °C to 85 °C	48TSOP 12 x 20
	TC58BYG0S3HBAI4		(2048+64) x 8 bit	3.3V		-40 °C to 85 °C	63BGA 9 x 11
	TC58BYG0S3HBAI6		(2048+64) x 8 bit	1.8V		-40 °C to 85 °C	67BGA 6.5 x 8
	TC58BYG0S3HBAI6		(2048+64) x 8 bit	3.3V		-40 °C to 85 °C	67BGA 6.5 x 8
2 Gbit	TC58BYG1S3HTA00	24nm	(2048+64) x 8 bit	3.3V	internal ECC	0 °C to 70 °C	48TSOP 12 x 20
	TC58BYG1S3HBAI4		(2048+64) x 8 bit	1.8V		-40 °C to 85 °C	63BGA 9 x 11
	TC58BYG1S3HTA10		(2048+64) x 8 bit	3.3V		-40 °C to 85 °C	48TSOP 12 x 20
	TC58BYG1S3HBAI4		(2048+64) x 8 bit	3.3V		-40 °C to 85 °C	63BGA 9 x 11
	TC58BYG1S3HBAI6		(2048+64) x 8 bit	1.8V		-40 °C to 85 °C	67BGA 6.5 x 8
	TC58BYG1S3HBAI6		(2048+64) x 8 bit	3.3V		-40 °C to 85 °C	67BGA 6.5 x 8
4 Gbit	TH58BYG2S3HTA00	24nm	(2048+64) x 8 bit	3.3V	internal ECC	0 °C to 70 °C	48TSOP 12 x 20
	TC58BYG2S0HTA00		(4096+128) x 8 bit	3.3V		0 °C to 70 °C	48TSOP 12 x 20
	TC58BYG2S0HTA10		(4096+128) x 8 bit	3.3V		-40 °C to 85 °C	48TSOP 12 x 20
	TH58BYG2S3HTA10		(2048+64) x 8 bit	3.3V		-40 °C to 85 °C	48TSOP 12 x 20
	TH58BYG2S3HBAI4		(2048+64) x 8 bit	3.3V		-40 °C to 85 °C	63BGA 9 x 11
	TH58BYG2S3HBAI4		(2048+64) x 8 bit	1.8V		-40 °C to 85 °C	63BGA 9 x 11
	TC58BYG2S0HBAI4		(4096+128) x 8 bit	3.3V		-40 °C to 85 °C	63BGA 9 x 11
	TC58BYG2S0HBAI4		(4096+128) x 8 bit	1.8V		-40 °C to 85 °C	63BGA 9 x 11
	TC58BYG2S0HBAI6		(4096+128) x 8 bit	3.3V		-40 °C to 85 °C	67BGA 6.5 x 8
	TC58BYG2S0HBAI6		(4096+128) x 8 bit	1.8V		-40 °C to 85 °C	67BGA 6.5 x 8
8 Gbit	TH58BYG3S0HTA00	24nm	(4096+128) x 8 bit	3.3V	internal ECC	0 °C to 70 °C	48TSOP 12 x 20
	TH58BYG3S0HBAI4		(4096+128) x 8 bit	1.8V		-40 °C to 85 °C	63BGA 9 x 11
	TH58BYG3S0HTA10		(4096+128) x 8 bit	3.3V		-40 °C to 85 °C	48TSOP 12 x 20
	TH58BYG3S0HBAI4		(4096+128) x 8 bit	3.3V		-40 °C to 85 °C	63BGA 9 x 11
	TH58BYG3S0HBAI6		(4096+128) x 8 bit	3.3V		-40 °C to 85 °C	67BGA 6.5 x 8
	TH58BYG3S0HBAI6		(4096+128) x 8 bit	1.8V		-40 °C to 85 °C	67BGA 6.5 x 8