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Technical Change Notice (TCN)

Purpose:

Due to the evolution of NAND flash generation, Toshiba 43nm SLC will be phased in to replace Samsung 42nm SLC. In order for better understanding about the changes, the following contents will be focused on:

- Technical comparison between Toshiba 43nm and Samsung 42nm based on the *component level* and *SSD level*.

Samsung EOL Parts

Capacity	Flash Vendor	P/Ns
1Gb	**Samsung 2K/42nm**	**K9F1G08U0D-PC(I)B0**
2Gb	**Samsung 2K/42nm**	**K9F2G08U0C-PC(I)B0**
4Gb	**Samsung 2K/42nm**	**K9F4G08U0D-SC(I)B0**
8Gb	**Samsung 2K/42nm**	**K9K8G08U0D-SC(I)B0**
16Gb	**Samsung 2K/42nm**	**K9WAG08U1D-SC(I)B0**

New Flash Successor

Capacity	Flash Vendor	P/Ns
1Gb	**Toshiba 2K/43nm**	**TC58NVG0S3ETA00**
2Gb	**Toshiba 2K/43nm**	**TC58NVG1S3ETA00**
4Gb	**Toshiba 2K/43nm**	**TC58NVG2S3ETA00**
8Gb	**Toshiba 4K/43nm**	**TC58DVG3S0ETA00**
16Gb	**Toshiba 4K/43nm**	**TC58DVG4S0ETA20**

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Component Level

Key Parameters in Design & Feature Specification

The following contents are the comparison tables between Samsung 42nm and Toshiba 43nm in 1G / 2G / 4G /8G / 16G bit NAND flash.

<1G bit SLC>

Item		42nm	43nm
Die Capacity		1Gb	1Gb
Page Size		2 KB	2 KB
Block Size		128 KB	128 KB
Operating Characteristics	Read	Max 35mA	Max 30mA
	Program		
	Erase		
P/E Endurance		100K cycle	60K cycle
tR (max)		40 us	30 us
tPROG (typical)		250us	300 us
tBERS (typical)		2 ms	2.5 ms

<2G bit SLC>

Item		42nm	43nm
Die Capacity		2Gb	2Gb
Page Size		2 KB	2 KB
Block Size		128 KB	128 KB
Operating Characteristics	Read	Max 35mA	Max 30mA
	Program		
	Erase		
P/E Endurance		100K cycle	60K cycle
tR (max)		40 us	30 us
tPROG (typical)		250 us	300 us
tBERS (typical)		2 ms	2.5 ms

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<4G bitSLC>

Item		42nm	43nm
Die Capacity		4Gb	4Gb
Page Size		2 KB	2 KB
Block Size		128 KB	128 KB
Operating Characteristics	Read	Max 35mA	Max 30mA
	Program		
	Erase		
P/E Endurance		100K cycle	60K cycle
tR (max)		40 us	30 us
tPROG (typical)		250 us	300 us
tBERS (typical)		2 ms	2.5 ms

<8G bitSLC>

Item		42nm	43nm
Die Capacity		8Gb	8Gb
Page Size		2 KB	4 KB
Block Size		128 KB	256 KB
Operating Characteristics	Read	Max 35mA	Max 30mA
	Program		
	Erase		
P/E Endurance		100K cycle	60K cycle
tR (max)		40 us	30 us
tPROG (typical)		250 us	400 us
tBERS (typical)		2 ms	3 ms

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<16G bitSLC>

Item		42nm	43nm
Die Capacity		16Gb	16Gb
Page Size		2 KB	4 KB
Block Size		128 KB	256 KB
Operating Characteristics	**Read**	Max 35mA	Max 30mA
	Program		
	Erase		
P/E Endurance		100K cycle	60K cycle
tR (max)		40 us	30 us
tPROG (typical)		250 us	400 us
tBERS (typical)		2 ms	3 ms

Summary

When the NAND has changed from Samsung 42nm SLC to Toshiba 43nm SLC, there are the changes on cell and chip size:

1G bit, 4G bit and 2G bit

- The operating characteristics with 5mA decreased
- The P/E cycle with 40K cycles decreased (flash vendor guaranty)
- The Read time with 10us decreased
- The Page Program time with 50us increased
- The Block Erase time with 0.5ms increased

8G bit and 16G bit

- The Page Size change from 2KB to 4KB
- The Block Size change from 128KB to 256KB
- The operating characteristics with 5mA decreased
- The P/E cycle with 40K cycles decreased (flash vendor guaranty)
- The Read time with 10us decreased
- The Page Program time with 150us increased
- The Block Erase time with 1ms increased

On the SSD level, there will be no impacts and controller firmware support is compatible with these changes.