

TriCor SSD Products

SATA SSD Products

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2.5" SSDs



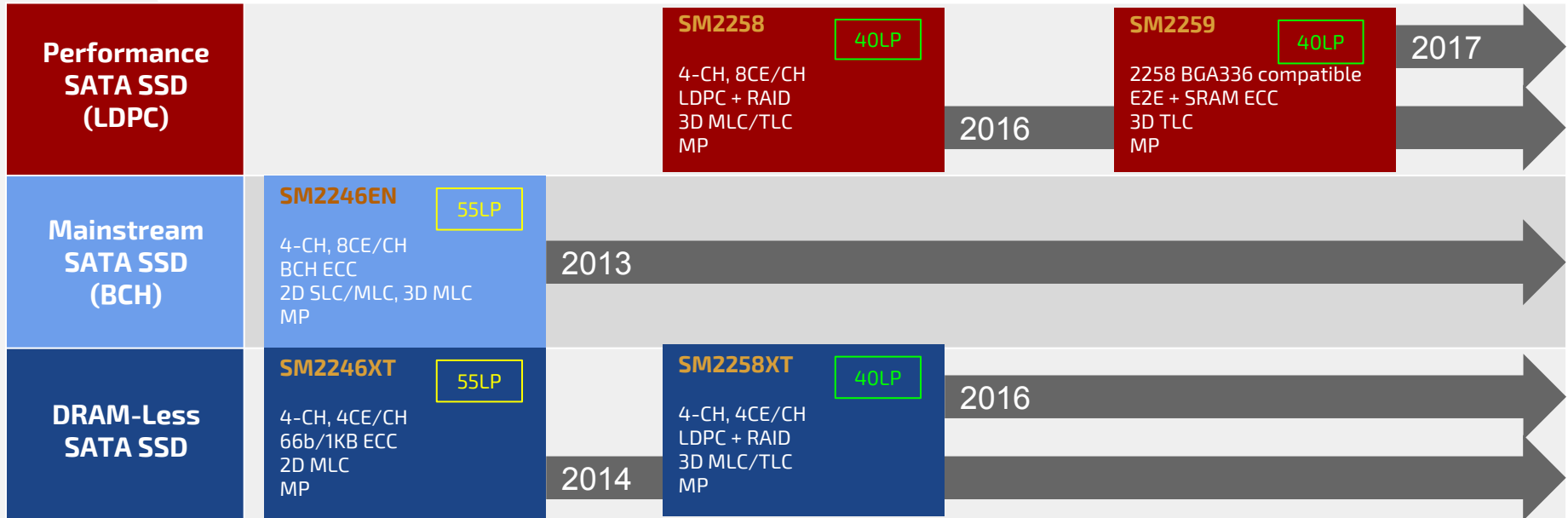
M.2 SATA & PCIe SSDs



mSATA & Half Slim SSDs



SATA SSD Controller Roadmap



SSD SATA Controller Features

P/Ns	External DRAM Needed			No External DRAM	
	SM2246EN	SM2258	SM2259	SM2246XT	SM2258XT
Host I/F	SATA 6Gb/s, ATA CS 3.2				
Processor	ARC				
Flash CH	4				
# of CE	32 CE				
Max ECC	66b/1KB	LDPC + RAID	LDPC + RAID	66b/1KB	LDPC + RAID
EZE + SRAM ECC	-	-	Yes	-	-
Ext DRAM	DDR3, DDR3L			Not Required	
Flash I/F	Toggle 1.0, ONFi 2.0	Toggle 2.0, ONFi 3.0	Toggle 3.0, ONFi 4.0	Toggle 1.0, ONFi 2.0	Toggle 2.0, ONFi 3.0
NAND IO Power	3.3V / 1.8V		1.8V / 1.2V	3.3V / 1.8V	
AES / TCG Opal	AES-128/256 / Opal 2.0			Not Supported	
Max Density	2TB			512GB	1TB
NAND Support	2D SLC/MLC/3D MLC	3D MLC/TLC	3D TLC	2D MLC	3D MLC/TLC
Seq Performance	520MB / 460MB	550MB / 520MB		520MB / 460MB	520MB / 490MB
Schedule	MP	MP	MP	MP	MP

SATA SSD Controllers Roadmap

- Mass Production
- In Development

Segment	Q3 2017	Q4 2017	Q1 2018	Q2 2018	Q3 2018
Performance	S10 - 8CH, 55nm SATA III 15nm MLC Up to 2TB				
Mainstream	S10 - 8CH, 55nm SATA III 15nm / 3D TLC Up to 2TB		TBA		
Value	S11T - 2CH 40nm, SATA III DRAM-L 15nm/3D MLC/TLC Up to 1TB				TBA

SATA Controller Specifications

	PS3110-S10	PS3110-S11T	TBA	TBA
Interface	SATA Gen III	SATA Gen III	SATA Gen III	SATA Gen III
Process	UMC 55nm	UMC 40nm	TBD	TBD
Status	MP	MP	TBD	TBD
DRAM	DDR3/DDR3L	DRAM-Less	TBD	TBD
Channel	8	2	TBD	TBD
Performance	550/530 MB/s 100K/90K IOPS	550/500 MB/s 95K/85K IOPS	TBD	TBD
ECC	BCH120	LDPC	TBD	TBD
CE No.	32 (up to 2TB)	16 (up to 1TB)	TBD	TBD
Flash	2D MLC/TLC 3D TLC	2D MLC/TLC 3D MLC/TLC	TBD	TBD
Security	TCG/OPAL	N/A	TBD	TBD

SATA SSD Competitive Landscape

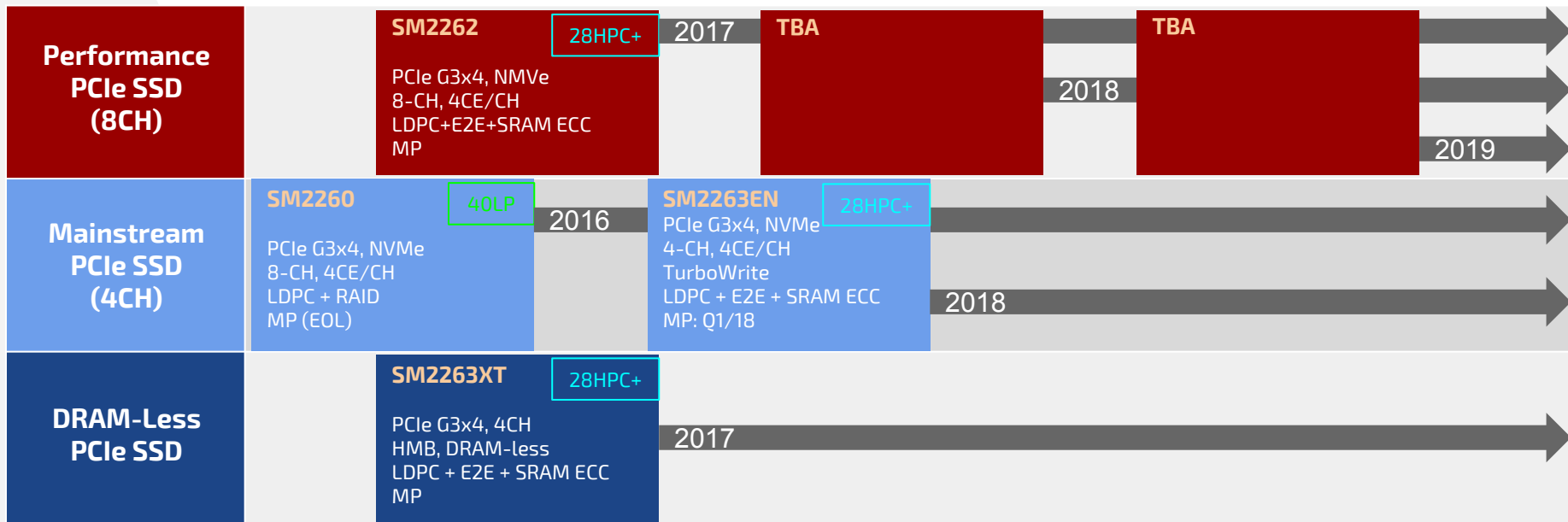
	SAMSUNG	SANDISK/WD	MICRON	INTEL
Performance ----- SM2258 + 3D MLC SM2246EN + 2D MLC S10 + 2D MLC	850 PRO	Extreme PRO	M600	730
Mainstream ----- SM2246EN + 2D TLC S10 + 2D TLC SM2258 + 3D TLC S10 + 3D TLC	850 EVO	Ultra II	MX300	545S
Value ----- SM2258XT + 3D TLC S11T + 2D TLC S11T + 3D TLC	750 EVO	SSD Plus	BX200	N/A

Enterprise SATA SSD Specifications

	PS3110-S10DC Read Intensive	PS3110-S10DC Mixed Workload
Interface	SATA Gen III	SATA Gen III
Status	MP	MP
DRAM	2X DDR3/DDR3L	2X DDR3/DDR3L
Capacity	240GB, 480GB, 960GB, 1920GB	400GB, 800GB, 1600GB
Form Factor	2.5" 7mm	2.5" 7mm
Performance	Seq R/W: 425/400 MB/s (Sustained) Ran R/W: 85K/10K IOPS (Sustained)	Seq R/W: 425/400 MB/s (Sustained) Ran R/W: 85K/30K IOPS (Sustained)
Features	E2EDPP RAID ECC	E2EDPP RAID ECC pFail
Security	AES256/TCG OPAL	AES256/TCG OPAL

PCIe SSD Products

PCIe NVMe SSD Controller Roadmap



PCIe NVMe SSD Controller Features

P/Ns	External DRAM Needed			No External DRAM
	SM2260	SM2262	SM2263EN	SM2263XT
Host I/F	PCIe G3x4, NVMe 1.2			PCIe G3x2, NVMe 1.2
Processor	2x Core ARM Cortex			
Flash CH	8		4	
# of CE	32 CE		16CE	
Max ECC	2KB LDPC + RAID			
E2E + SRAM ECC	-	Yes		
Ext DRAM	DDR3, DDR3L, LPDDR2	DDR3, DDR4, LPDDR3		Not Required
Flash I/F	Toggle 3.0, ONFi 4.0			
NAND IO Power	1.8V / 1.2V			
AES / TCG Opal	AES-128/256 / Opal 2.0			Not Supported
Max Density	2TB		1TB	
NAND Support	3D MLC/TLC	3D TLC	3D TLC/QLC	3D TLC
Seq Performance	2100MB/1000MB	3200MB/2800MB	1800MB/1600MB	1700MB/1500MB
Schedule	MP (EOL)	MP	MP Q1/2018	MP

PCIe SSD Controllers Roadmap

■ Mass Production
■ In Development

Segment	Q3 2017	Q4 2017	Q1 2018	Q2 2018	Q3 2018
Performance	E7 - 8CH, 28nm PCIe Gen3x4 NVMe 15nm MLC Up to 2TB		TBA		
Mainstream	E8 - 4CH, 40nm PCIe Gen 3x2 NVMe 3D TLC Up to 2TB				
Value		TBA		TBA	

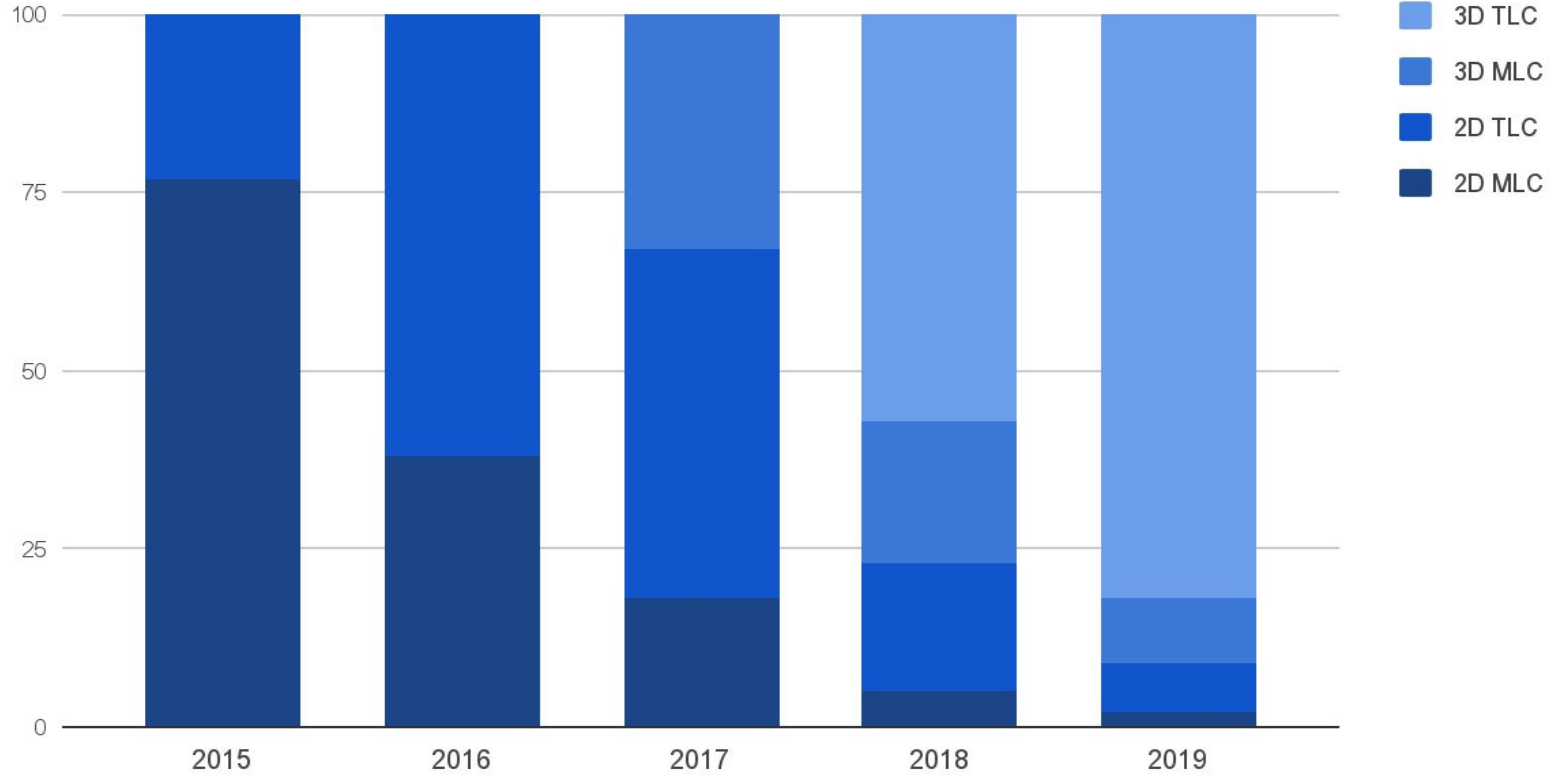
PCIe Controller Specifications

	PS5007-E7	PS5008-E8	TBA	TBA	TBA
Interface	Gen3x4 NVMe	Gen3x4 NVMe	Gen3x4 NVMe	Gen3x4 NVMe	Gen3x4 NVMe
Process	TSMC 28nm	UMC 40nm	TBD	TBD	TBD
Status	MP	MP	TBD	TBD	TBD
DRAM	DDR3/DDR3L	DDR3/DDR3L	TBD	TBD	TBD
Channel	8	4	TBD	TBD	TBD
Performance	2700/1500 MB/s 300K/250K IOPS	1600/1100 MB/s 240K/185K IOPS	TBD	TBD	TBD
ECC	BCH120	StrongECC	TBD	TBD	TBD
CE No.	64 (up to 2TB)	32 (up to 2TB)	TBD	TBD	TBD
Flash	2D MLC	2D TLC 3D TLC	TBD	TBD	TBD
Security	TCG/OPAL	TCG/Opal/Pyrite	TBD	TBD	TBD

PCIe SSD Competitive Landscape

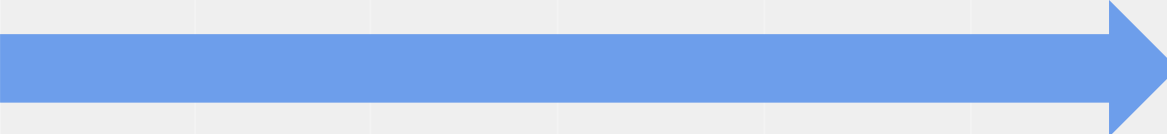

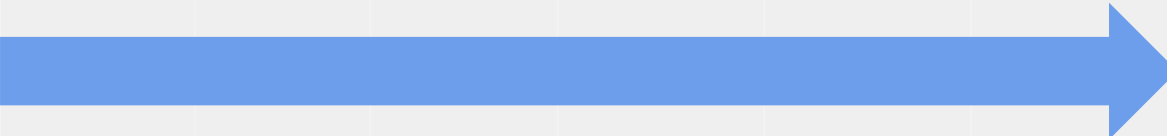
	SAMSUNG	SANDISK/WD	MICRON	INTEL
Performance ----- SM2260 + 3D MLC SM2262 + 3D MLC E7 + 2D MLC	960 PRO	N/A	N/A	750
Mainstream ----- SM2263EN + 3D TLC E8 + 2D TLC E8 + 3D TLC	960 EVO	WD Black	N/A	600P
Value ----- SM2263XT + 3D TLC	N/A	N/A	N/A	N/A

NAND Architecture Trend in SSDs



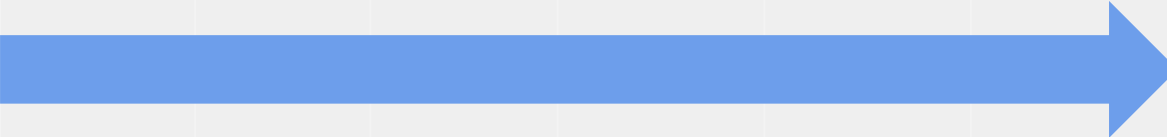

Roadmap SATA III – MLC

 Mass Production

Series	Technology	1H 2018	2H 2018	1H 2019	2H 2019	1H 2020	2H 2020
2.5" SATA 256GB ~ 2TB	Gen2 3D MLC Micron/Intel						
mSATA 64GB ~ 960GB	Gen2 3D MLC Micron/Intel						
M.2 256GB ~ 960GB	Gen2 3D MLC Micron/Intel						

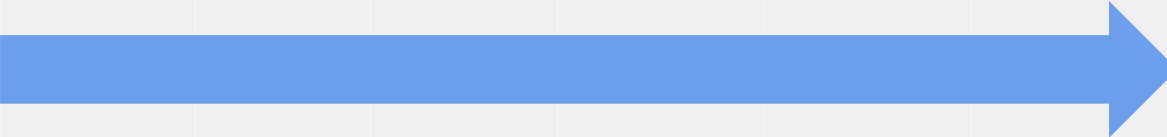
Roadmap PCIe – MLC

 Mass Production

Series	Technology	1H 2018	2H 2018	1H 2019	2H 2019	1H 2020	2H 2020
M.2 PCIe 64GB ~ 1TB	Gen2 3D MLC Micron/Intel						
U.2 2.5" 128GB ~ 2TB	Gen2 3D MLC Micron/Intel						

Roadmap PCIe – TLC

 Mass Production

Series	Technology	1H 2018	2H 2018	1H 2019	2H 2019	1H 2020	2H 2020
M.2 PCIe 64GB ~ 1TB	Gen2 3D TLC Micron/Intel						
U.2 2.5" 128GB ~ 1TB	Gen2 3D TLC Micron/Intel	