
A Scalable Next-Generation NOR type Flash

- Market requires More Features in Flash-

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Market requires More Features in Flash

For Example:

Advanced
Vehicle Systems

Electrically Robust Storage

High Speed Data Transaction

High Density Program Storage

Industrial
IoT

XIP Memory with Data Storage

Shut-Down Store Memory

High Reliable Program Storage

More
Wearables

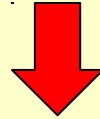
High Density XIP Memory

Hybrid Storage for Data & Prog.

New Flash with

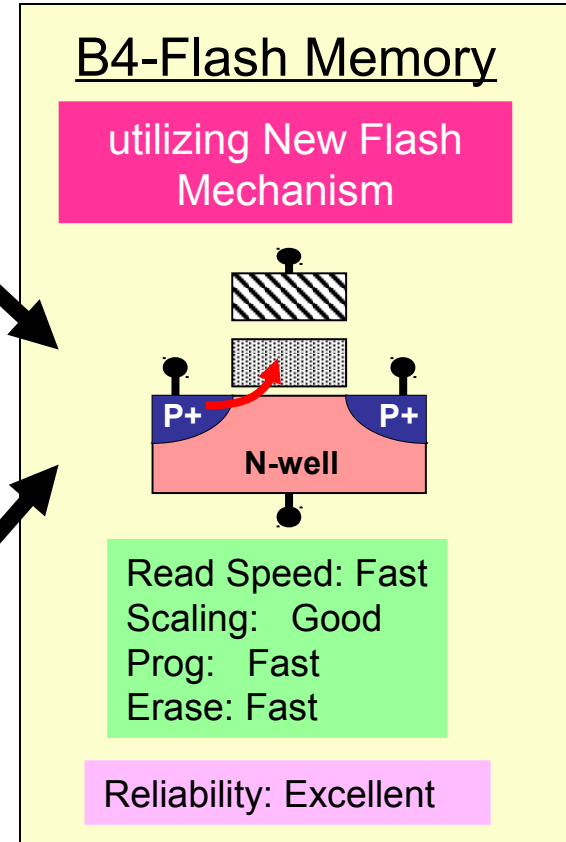
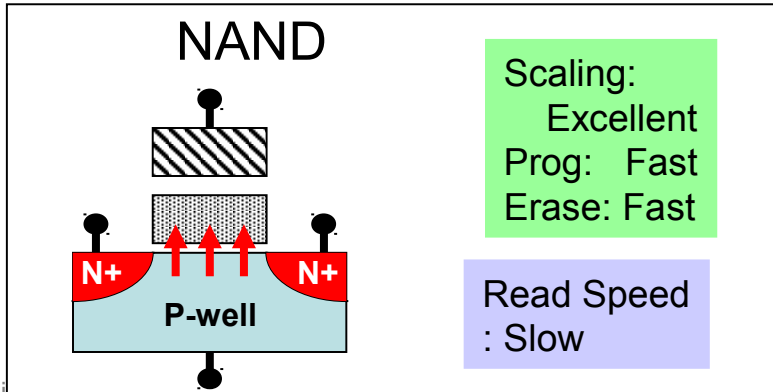
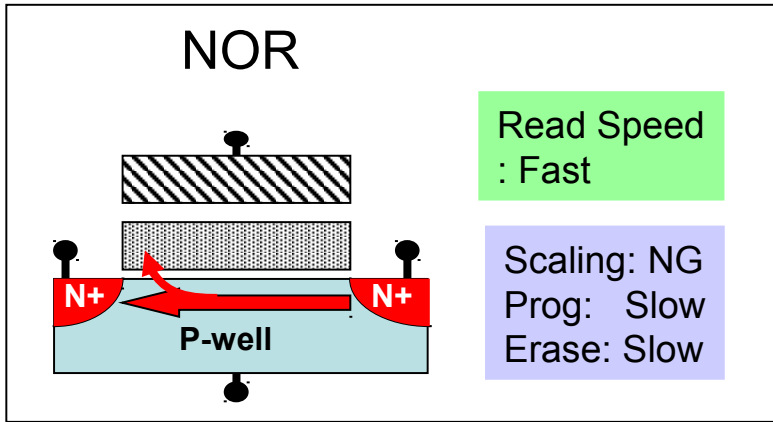
- Fast Read
- Fast Write
- High Reliability
- High Density

all in one



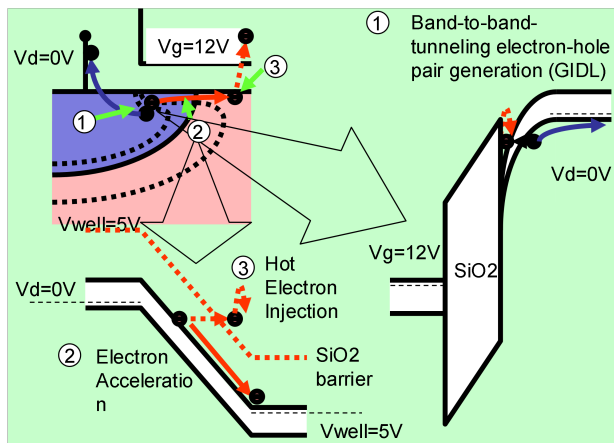
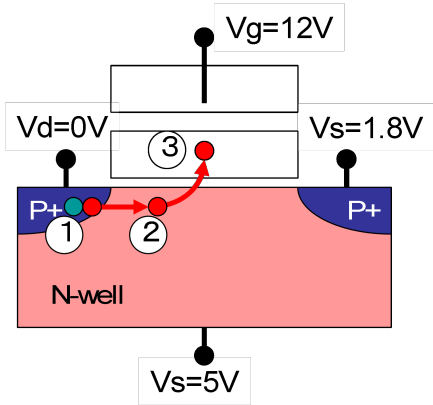
**NEXT
GENERATION
NOR**

B4-Flash is the Innovation of Flash Physics

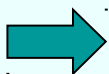


B4-Flash based on the new Flash Mechanism

Back Bias assisted Band to Band tunneling (B4) - Hot Electron Injection



B4-HE injection + Pch MOS transistor memory cell

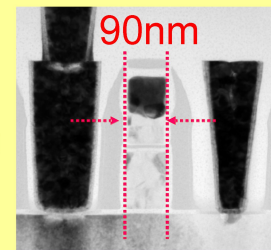
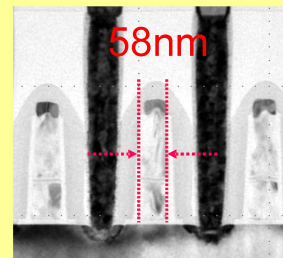


- Fastest Re-writable and Highly Scalable NOR Flash
- High Endurance to 100K E/W and Excellent Retention of 20years after 100K E/W

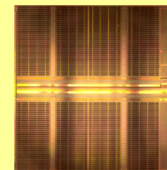
B4-Flash

58nm

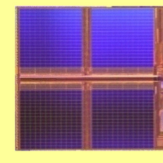
90nm



58nm
Flash



4Gb/2Gb



1Gb/512Mb

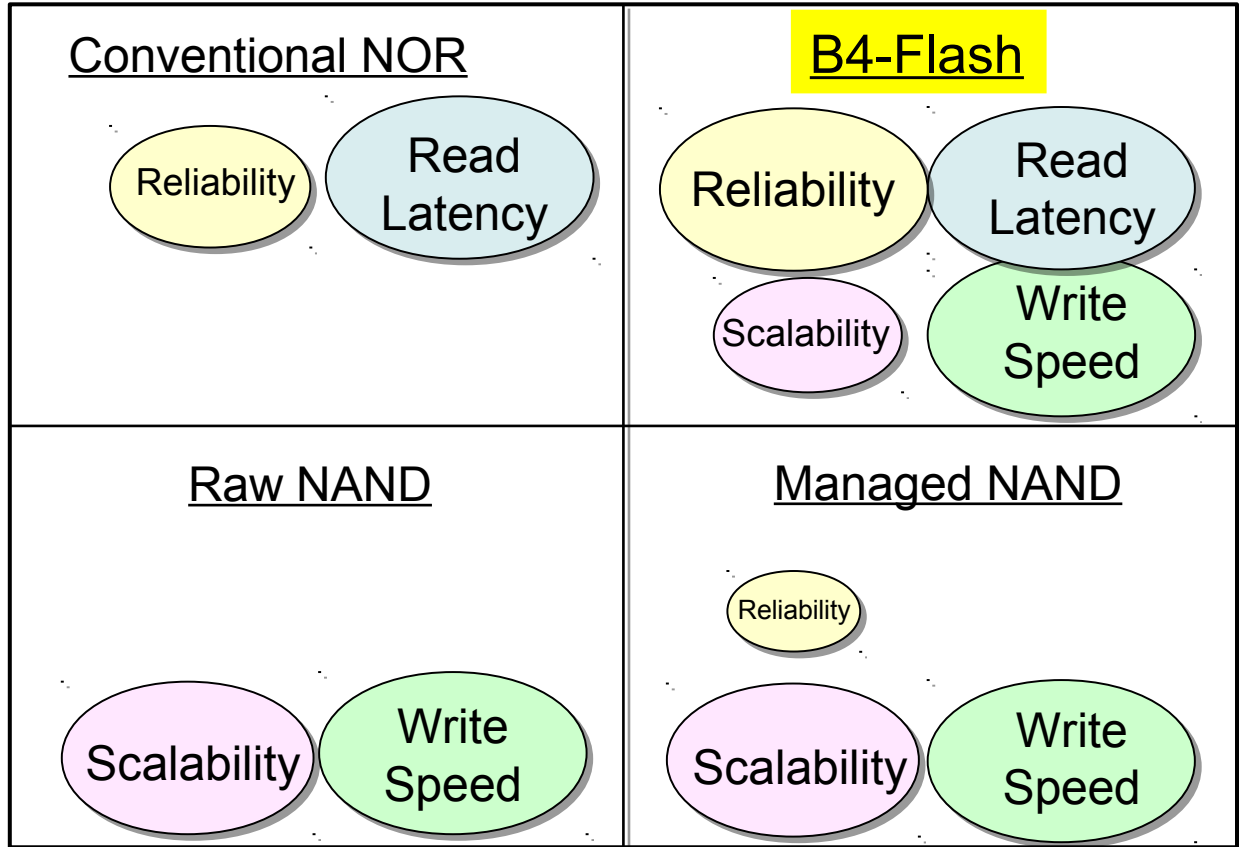


256Mb
/128Mb

B4-Flash achieves the scalable NOR with fast re-write capability and excellent reliability.

B4-Flash as Next Generation NOR

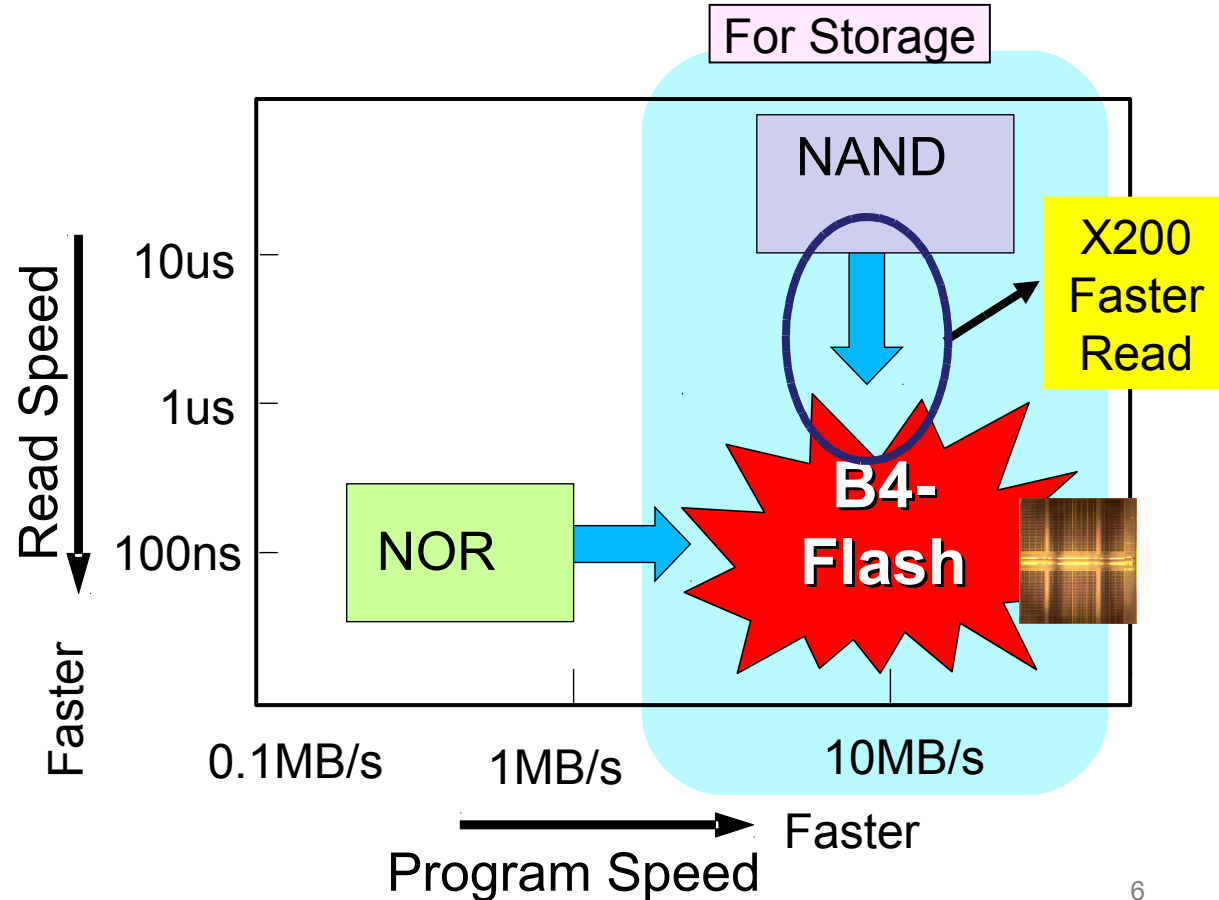
- B4-Flash is the Next Generation NOR.
- It can offer new features



B4-Flash includes both features of NOR and NAND

B4-Flash achieves

- 100ns NOR read speed
- NAND level re-write speed
- Simultaneously.

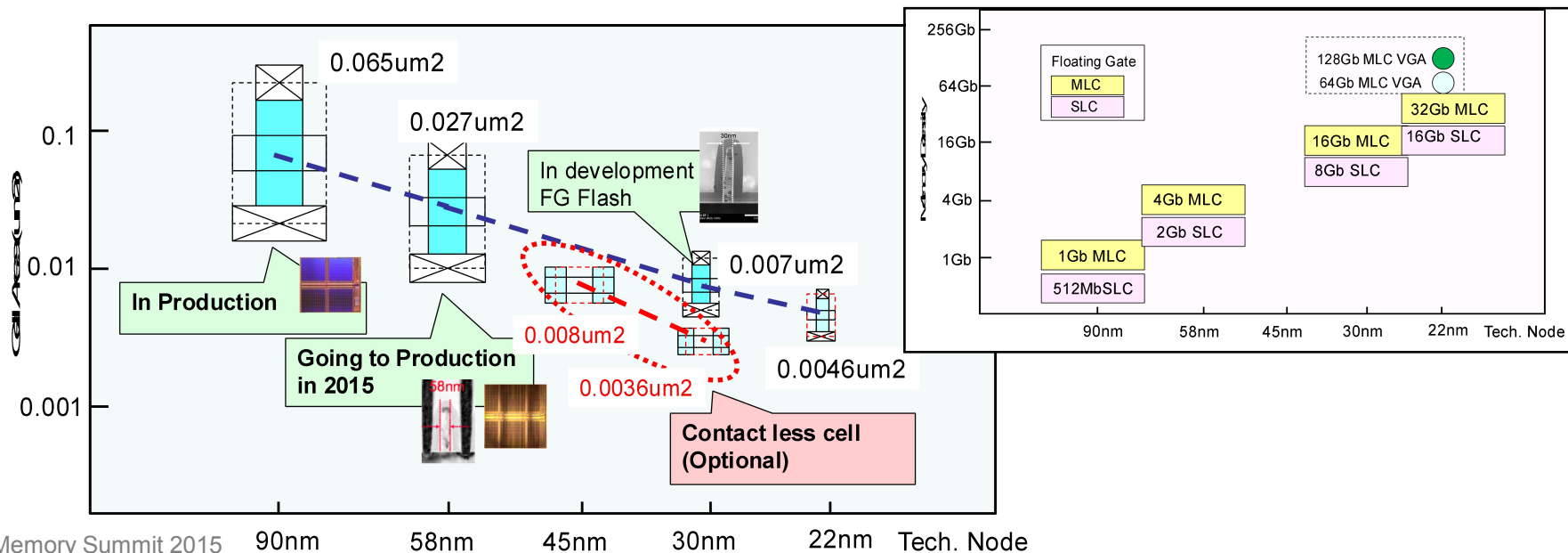


Main Features of Each Flash

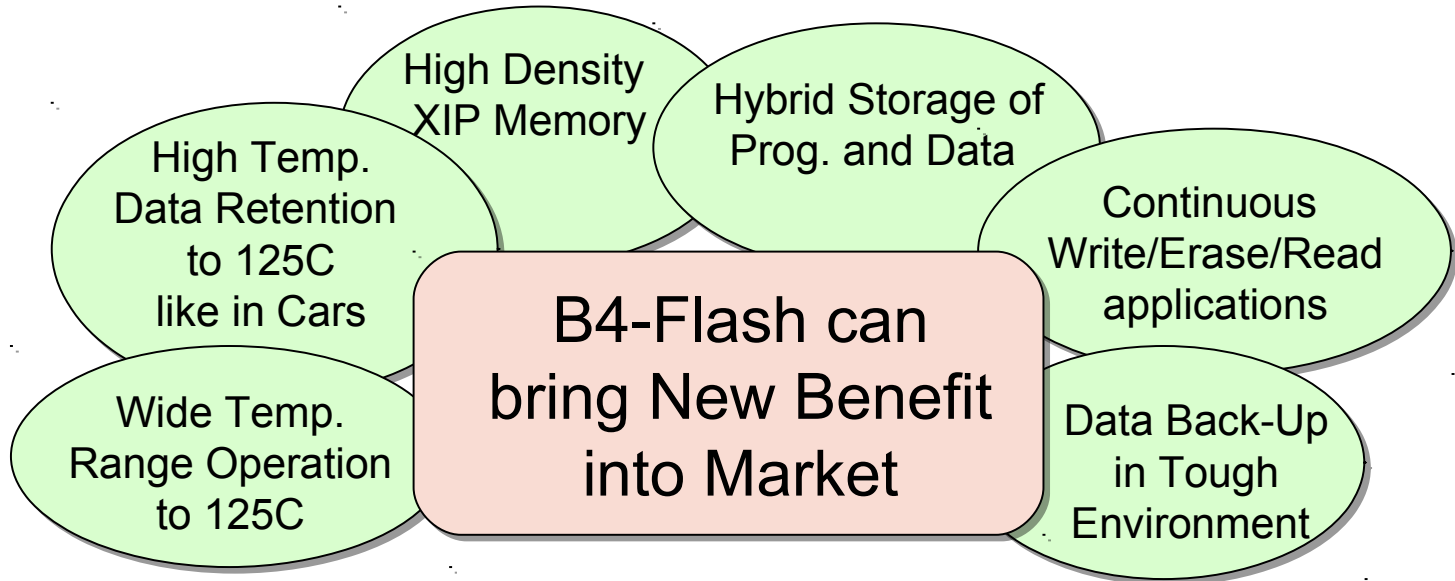
		B4-Flash			General NOR (128Mb-2Gb)	General NAND(SLC) (1Gb-4Gb)
		128Mb	512Mb	2Gb		
		90nm	90nm	58nm		
Performance	Read Latency	80ns	115ns	90ns	80-110ns	25us
	Page Write Latency	150us	150us	210us	200-300us	200-300us
	Read Page Size	32B	32B	32B	32B	512B-2KB
	Small Data Read Speed (32B)	84MB/s	57MB/s	102MB/s	50-100MB/s	<2MB/s
	Write Throughput	3.3MB/s	6.5MB/s	19MB/s	<2MB/s	5-15MB/s
	Erase Throughput	3.3MB/s	40MB/s	62MB/s	<1MB/s	30-250MB/s
Reliability	E/W cycles	100K	100K	100K	100K	100K
	Retention	20 yrs @125C after 100K E/W	20 yrs @125C after 100K E/W	20 yrs @125C after 100K E/W	10-20 yrs @55C-85C after 10K-100K E/W	10 yrs @55C-85C with ECC
	Read Cycles	10 billion after 100K E/W	10 billion after 100K E/W	100 billion after 100K E/W	(Product Life ?)	1 million

Scalability of B4-Flash

- ✓ Scaling Down to 20nm
- ✓ 8F2 must be maintained and 5-6 F2 can be challenged with much more precise technology
- ✓ MLC of B4-Flash has been already done in 90nm and 58nm
- ✓ Virtual Grand Array (VGA) will be the challenge for 4F2 SLC/2F2 MLC same as 2D NAND in future



What Benefit can B4-Flash bring into Market ?



Applications with the benefit of B4-Flash

ADAS, Navigation,
Data logger, Drive
Recorder,
Display

Fuel Cell
Vehicle

Industry
Equipment

Embedded Board,
PLC, POS, ATM

Automotive

**High
Reliability**

High Temperature
(125°C) operation
machine

FA Equipment, NC
machine, Logistic
System,
Measurement and
Analysis
Instrument, Medical
Equipment

Train Control
System

Cellphone
Base Station

**Fast
Read &
Write**

**High
Density
XIP NOR**

Broadcasting
System

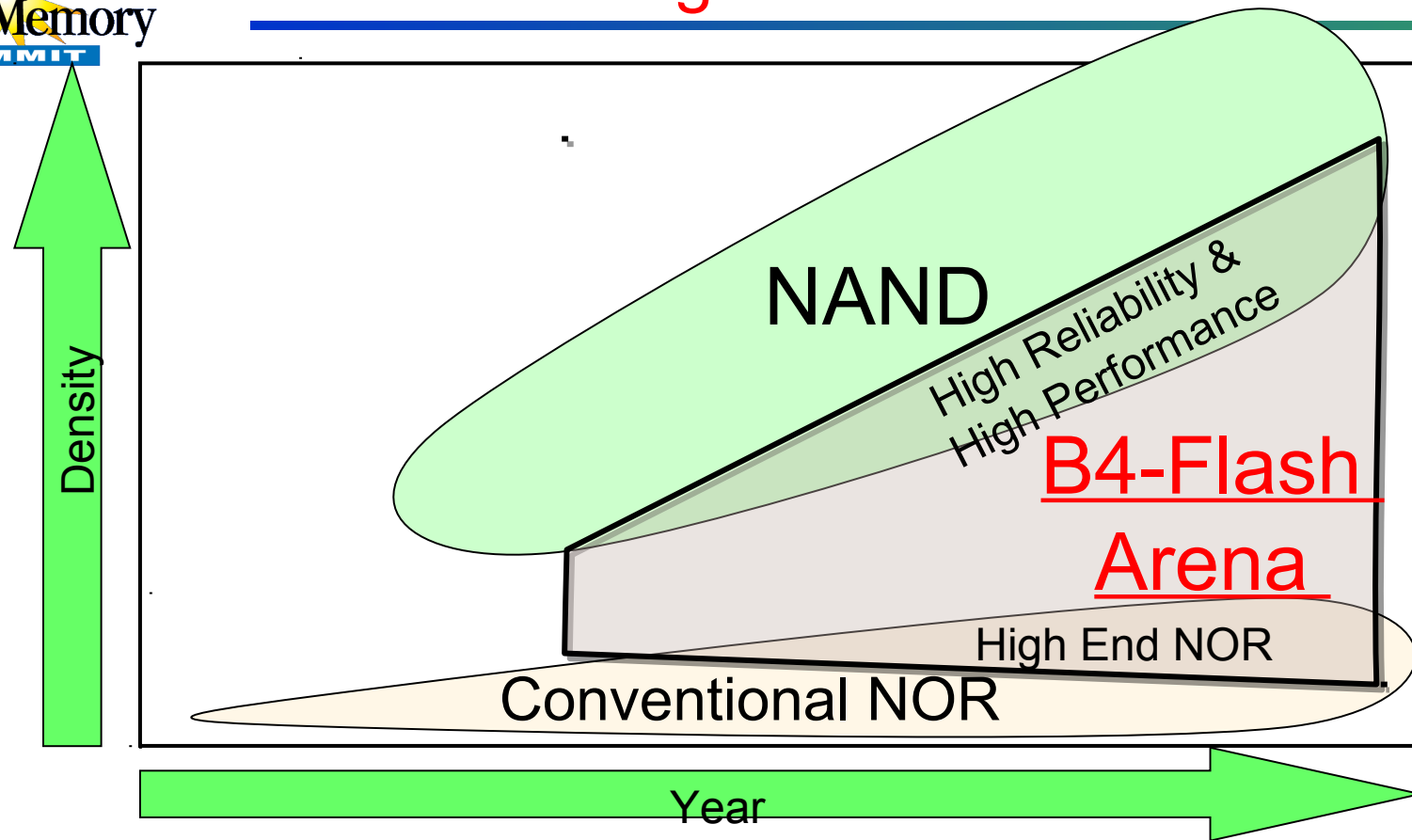
Smart Grid

Amusement
Equipment

Home Gateway

Others

Creating New Flash Arena



If you have any kind of interest in
B4-Flash, please let us know as;

Flash Memory Summit Booth; **#536**

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Web.; http://www.genusion.co.jp/index_e.html

Thank you for your attention!