

Renesas Standard SRAM Product Outline

May 6, 2021

Standard Products Department 2
Standard Products Business Division,
IoT & Infrastructure Business Unit,
Renesas Electronics Corporation

SRAM-2021-E-0506-1

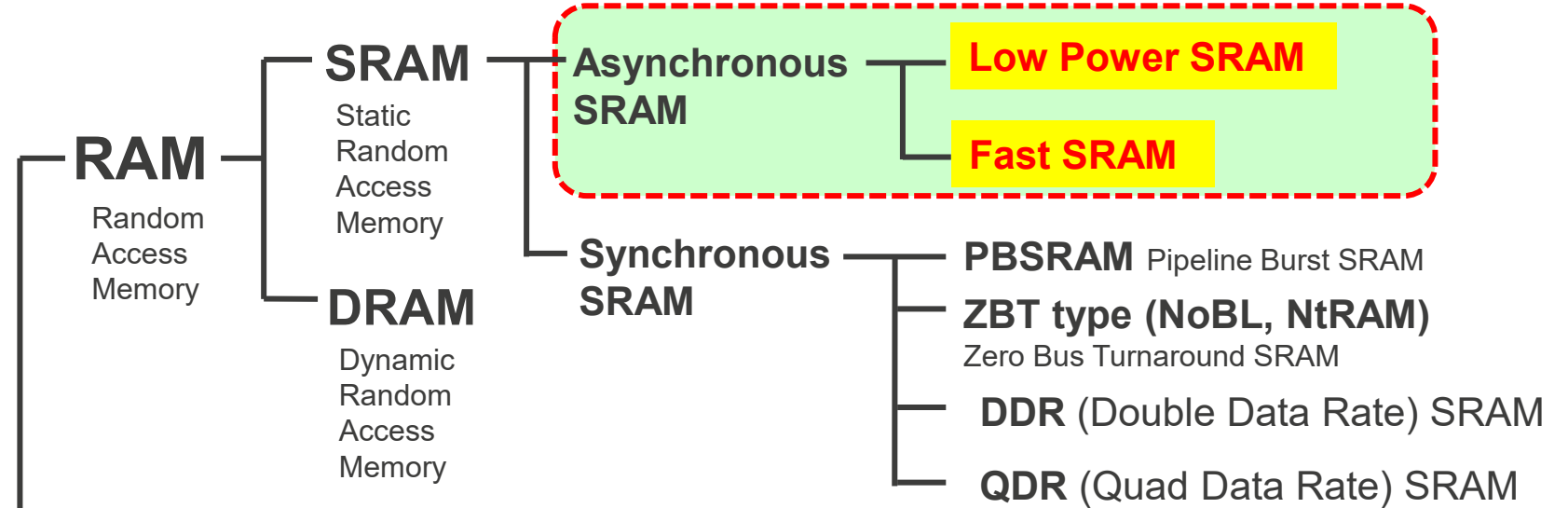
Types of Standard Memory

Supported by "Standard Products Department 2"

(not include Specialty Memory and MRAM)

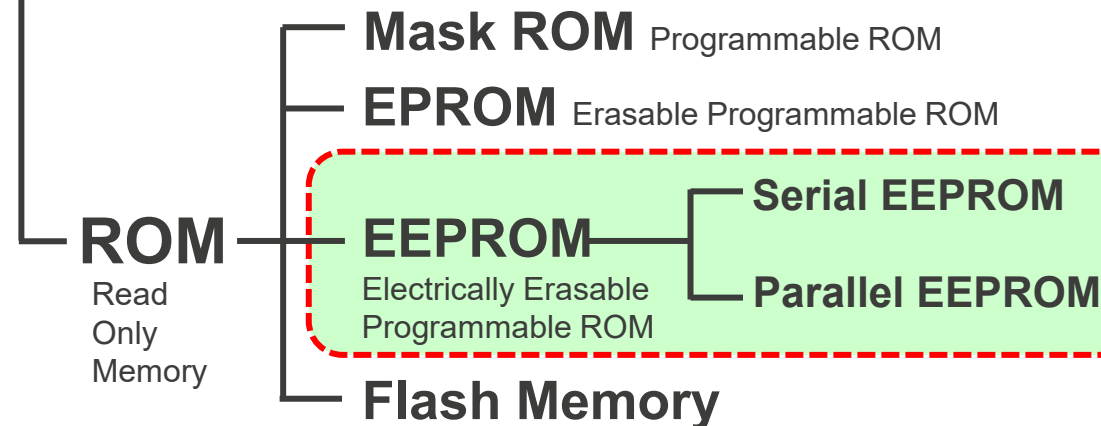
Volatile memory

- Memory contents are lost after power off.
- Possible to construct a non-volatile memory with use of batteries.



Non-volatile memory

- Memory contents are maintained even after power off.
- Limited number of write cycles for electrically rewritable products



Memory Products Portfolio

✓ “One-Renesas” provides optimum memory solutions to various application fields.

Types of Memory	Products	Offered by
Asynchronous Low Power SRAM	■ (5V, 3V) 256Kb, 1Mb, 4Mb ■ (3V) 2Mb, 8Mb, 16Mb, 32Mb, 64Mb	
Asynchronous Fast SRAM	■ (5V, 3.3V) 4Mb ■ (5V), 16Kb, 64Kb ■ (5V, 3.3V) 256Kb, 1Mb ■ (3.3V) 4Mb	
Synchronous SRAM	■ Pipeline Burst / Flow-through 1Mb, 2Mb (x32), 4Mb, 9Mb (x18, x36) ■ Zero Bus Turnaround (ZBT) 4Mb, 9Mb, 18Mb (x18,x36)	
Specialty Memory	■ Multi-port Memory ■ FIFO	
MRAM	■ Q-SPI (up to 108MHz): 4Mb, 8Mb, 16Mb	
EEPROM	■ Serial I/F: I2C / SPI, 1.8 ~ 5.5V 2Kb, 4Kb, 8Kb, 16Kb, 32Kb, 64Kb, 128Kb, 256Kb, 512Kb ■ Parallel I/F: 1.8 ~ 5.5V 64Kb, 256Kb, 1Mb	

Covered by
This
Material

Advantages: Renesas Standard SRAM

Features

■ High Reliability

- ❑ Excellent soft error immunity without embedded ECC
- ❑ Latch-up free memory cell structure

■ Stable supply and long-term support

- ❑ Covered by PLP: Product Longevity Program

■ Wide line-up to support all applications

- ❑ Memory density: Lineup from 256Kb to 64Mb
- ❑ Supply voltage: 3V / 5V (continued support of 5V parts)
- ❑ Package: Varied package lineup



Applications

■ Industrial

- ❑ Factory automation, computerized numerical control, programmable logic controller, vending machine, ticket gate, automated teller machine, etc.

■ Communication

- ❑ Router, switch, base station, etc.

■ Social infrastructure

- ❑ Elevator system, transportation system, railway system, traffic signal system, smart grid devices, etc.

■ Office automation

- ❑ Multi-function printer, etc.

■ Consumer

- ❑ Gaming machine, musical instrument, calculator, etc.

■ Car accessories (non-driveline devices)

- ❑ ETC, digital tachometer, etc.

■ Medical / Healthcare

- ❑ Medical electronic devices



Renesas SRAM Product Roadmap

- ✓ Wide variety of low power SRAM product lineup 256Kb~64Mb
- ✓ New product: 0.11um 32Mb / 64Mb LP-SRAM now in Mass Production

 MP
  New product

As of May 2021

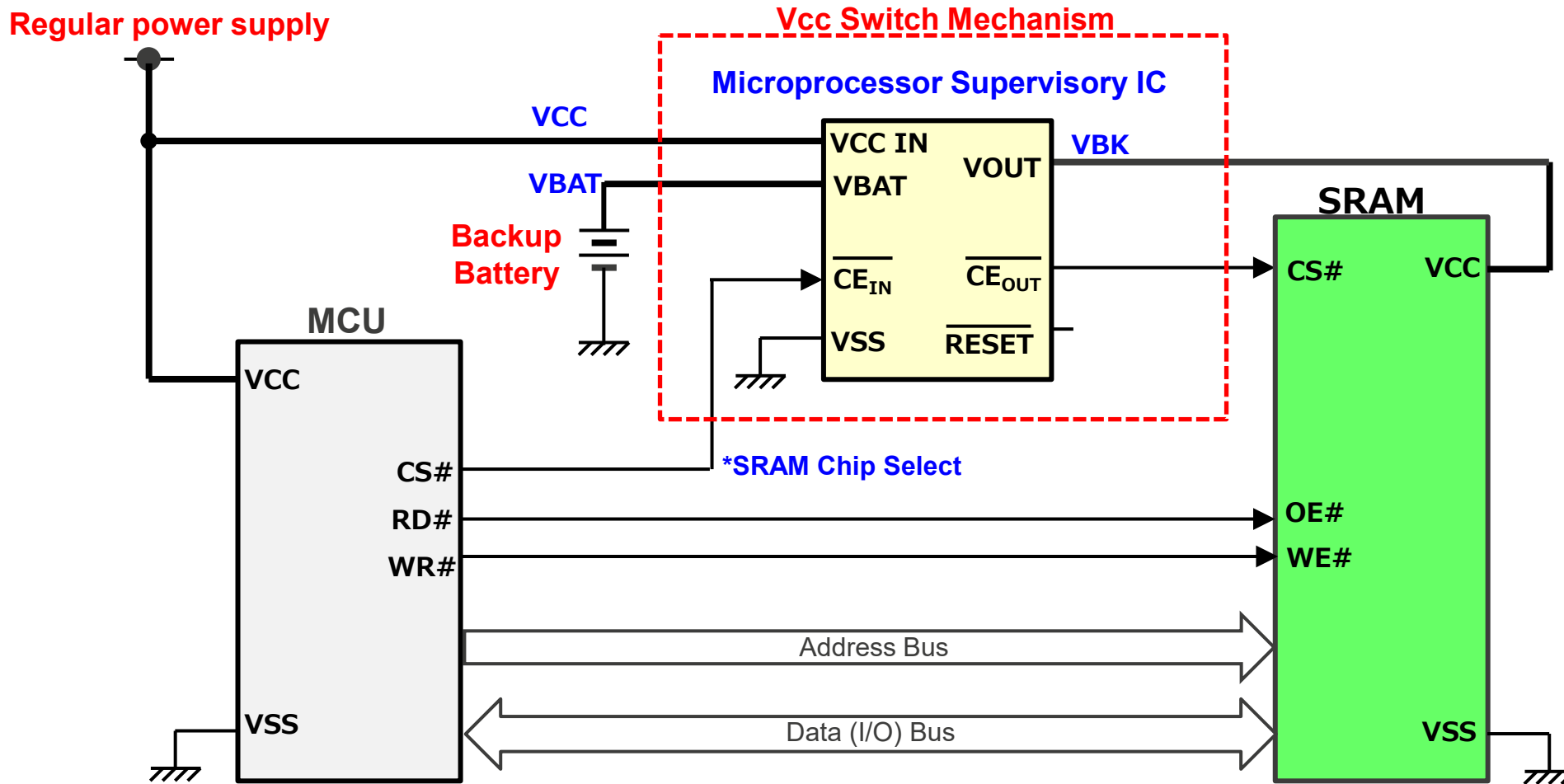
SRAM type	Density, Voltage	~2020	2021	2022	2023	2024	2025~
Asynchronous Low Power SRAM	256Kb 5V/3V, 1Mb 5V/3V, 2Mb 3V, 4Mb 5V	0.15um Advanced LPSRAM					
	4Mb 3V, 8Mb 3V, 16Mb 3V,32Mb 3V(16Mbx2)	0.11um Advanced LPSRAM					
	16Mb 3V	0.13um (ECC embedded)					
	32Mb 3V	0.11um Advanced LPSRAM					
	64Mb 3V	0.15um	0.11um Advanced LPSRAM				
Asynchronous Fast SRAM	4Mb 3V/5V	0.18um CMOS (without ECC)					

New Products: 0.11um 32Mb/64Mb LPSRAM

- Not only die shrink but also achieves smaller active & standby current
- Enables longer battery life in battery backup application

			0.15um process product	0.11um process product	
32Mb 48-TSOP(I) 48-FBGA 52-uTSOP	Product model name		R1LV3216R series	RMLV3216A series	
	Access time	tAA	55ns	55ns	
	Operational current	Icc1	55mA (Max.)	35mA (Max.)	
	Standby current	ISB1	4uA (Typ.)@25°C 80uA (Max.)@85°C	0.6uA (Typ.)@25°C 24uA (Max.)@85°C	Isb1 (typ.) reduction by 85%
	Data retention voltage	VDR	2.0V	1.5V	
64Mb (MCP:32Mb x2) 48-TSOP(I) 48-FBGA 52-uTSOP	Product model name		R1WV6416R series	RMWV6416A series	
	Access time	tAA	55ns	55ns	
	Operational current	Icc1	60mA (Max.)	38mA (Max.)	
	Standby current	ISB1	8uA (Typ.)@25°C 160uA (Max.)@85°C	1.2uA (Typ.)@25°C 46uA (Max.)@85°C	Isb1 (typ.) reduction by 85%
	Data retention voltage	VDR	2.0V	1.5V	

Battery Backup Application (Basic Block Diagram)



Non-volatile RAM by battery backup

- **Low Standby Current = Longer battery life**
- **Low Soft Error Rate = High Reliability on data retention**

Soft Error

- A phenomenon observed as a memory failure by occasional bit(s) upset.
Also referred as “Single Event Upset (SEU).”
- Not a permanent hard failure and can be corrected by rewriting from the system (MCU) side.
- Until the early '90s, the main cause was α (alpha) rays generated from radioisotopes contained in trace amounts in semiconductor packaging materials. (Fig.1)
- But now, "Terrestrial Cosmic Rays" are being recognized as a dominant cause of soft errors. (Fig.2)

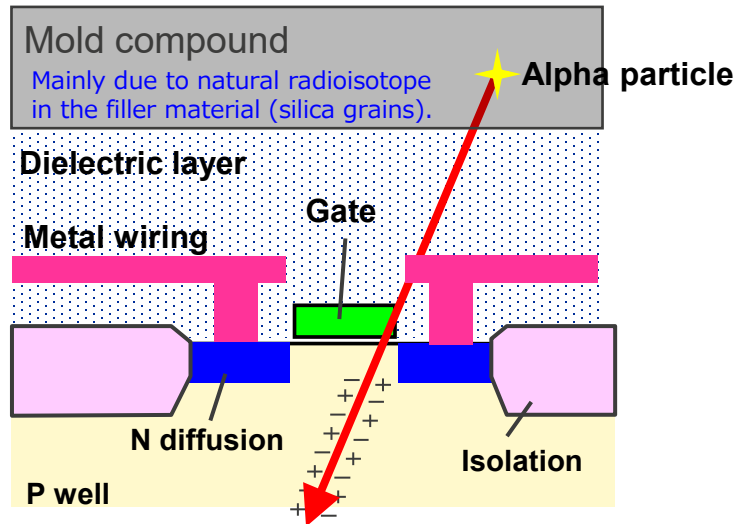


Fig.1 alpha-particle induced soft error

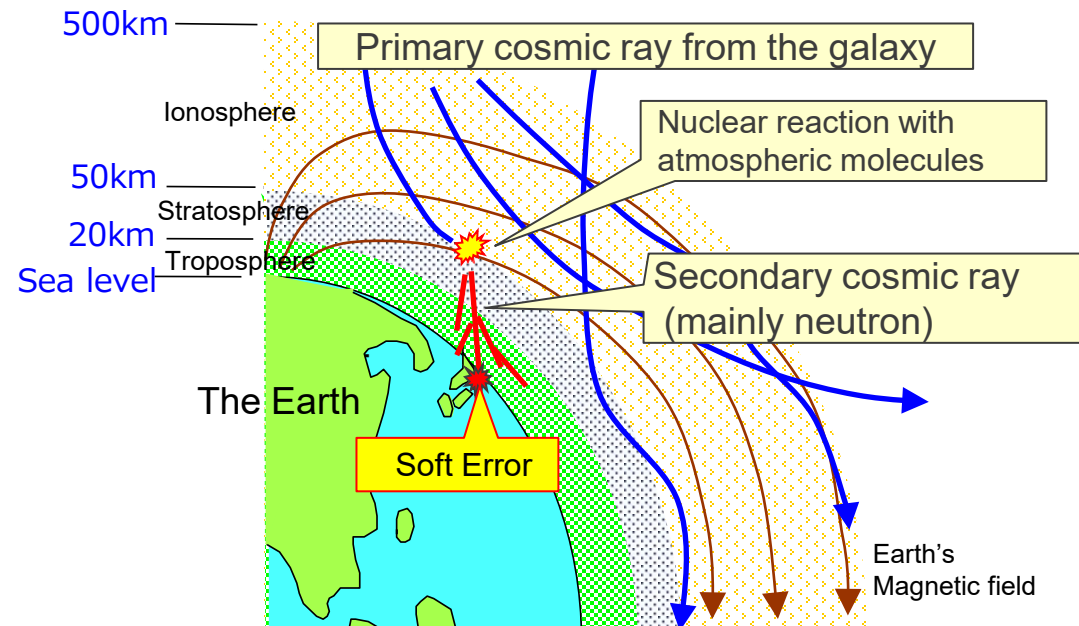


Fig.2 cosmic ray (neutron) induced soft error

Product Differentiation

Renesas supports soft error free products for entire line-up of 256Kbit to 64Mbit!

Soft Error Countermeasures ?

YES

NO

✓ In Production

Supplier	Process	256Kb	1Mb	2Mb	4Mb	8Mb	16Mb	32Mb	64Mb	Remarks
 RENESAS LP-SRAM	0.13um CMOS ECC embedded						✓			Market Introduction in 2003 (16Mb only)
	0.15um Advanced	✓	✓	✓	✓ (5V)	Changes to 0.11um Advanced				Market Introduction in 2004 (first with 16Mb)
	0.11um Advanced				✓ (3V)	✓	✓	✓	✓	Market Introduction in 2013 (first with 4Mb)
Competitor A LP-SRAM	90nm CMOS Non-ECC	EOL	✓	✓	✓	✓	✓	✓	✓	90nm CMOS (Note)
	65nm CMOS ECC embedded				✓	✓	✓	✓	✓	65nm CMOS (Note)
Competitor B LP-SRAM	CMOS Non-ECC	✓	✓	✓	✓	✓	✓			No 32Mb+ product (Note)
	CMOS ECC embedded				✓	✓				No 16Mb+ product (Note)

Note : Renesas recognition based on public information and sales information.
It is not the official announcement of each competitor company.

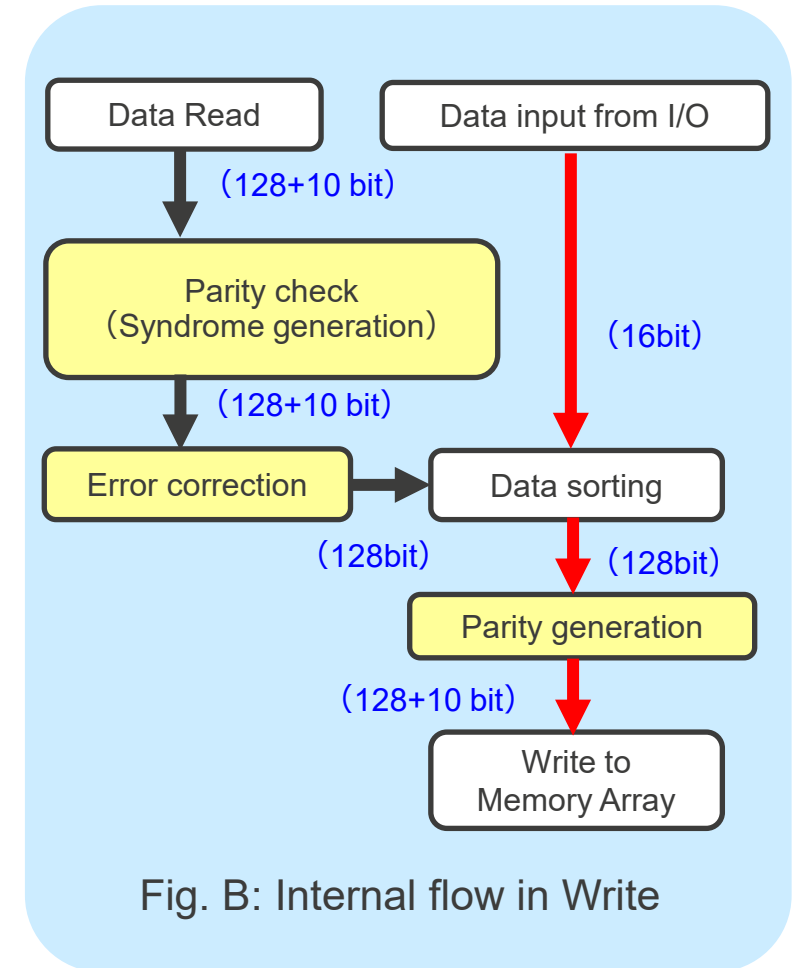
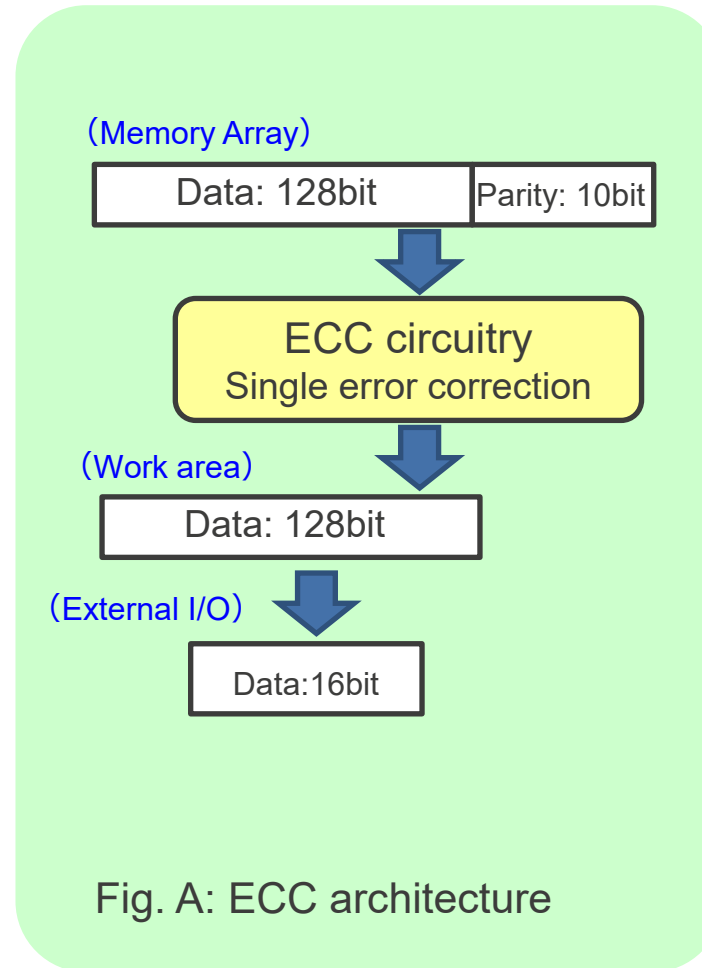
ECC: Error Correction Code, or Error Checking and Correction

R1LV1616H series (w/ embedded ECC)

- 0.13um CMOS process
- Full CMOS (6T memory cell)
- 45ns access time
- Low standby current:
0.5uA Typ. / 8uA Max.
- High reliability :
Low soft error rate
by embedded ECC together with
“Alternate ECC Architecture”



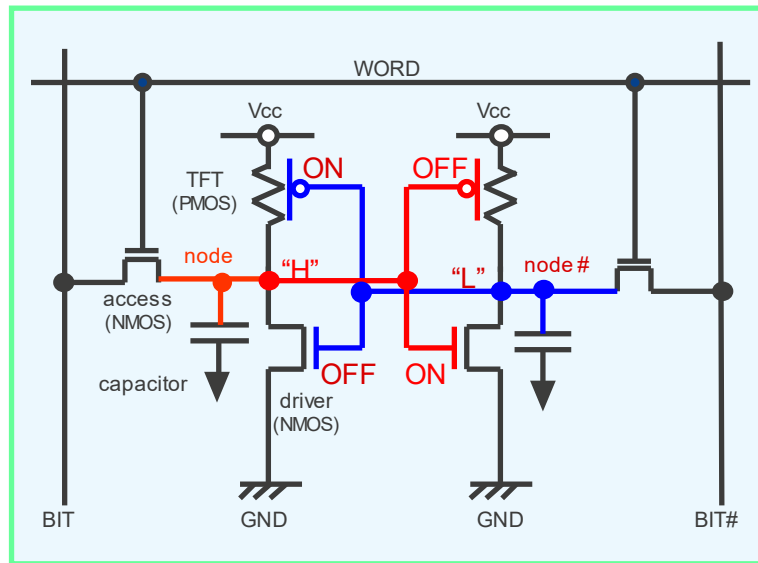
Measures against multi-cell errors:
Different word addresses are assigned to
physically adjacent memory cells.
Also known as “Bit interleaving ”



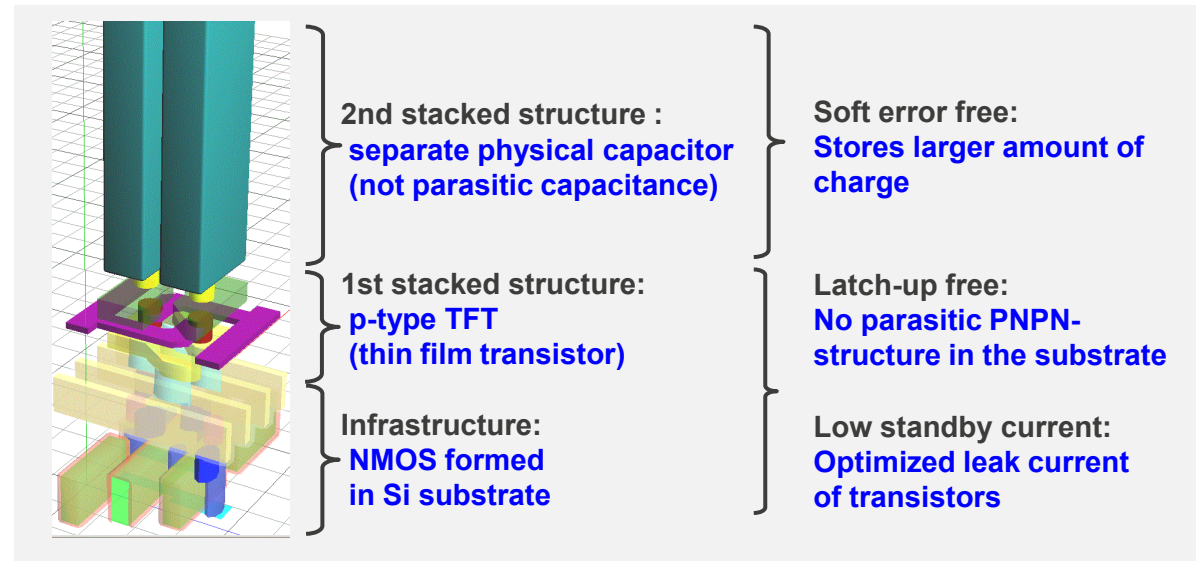
ECC: Error Check and Correction
Syndrome: A bit-string (vector) indicating which bit is upset

Advanced Low Power SRAM technology

- Exclusive technology achieves both high-performance and high-reliability without any technical trade-off
- Excellent soft error immunity without embedded ECC
- Latch-up free memory cell structure

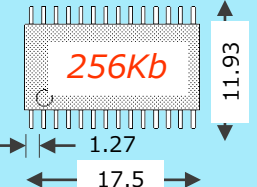
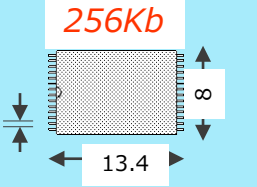
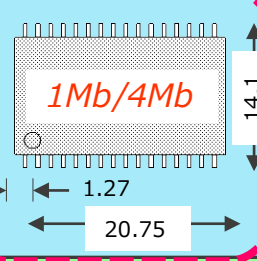
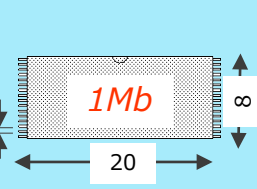
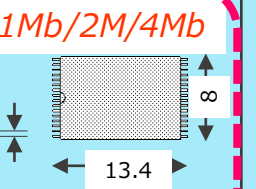
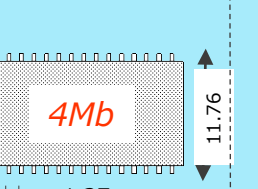
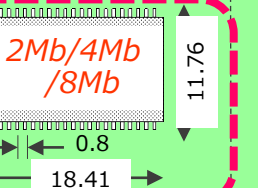
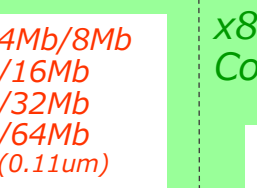
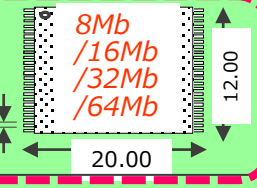
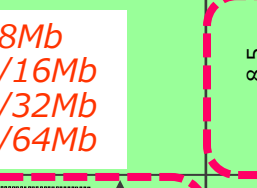
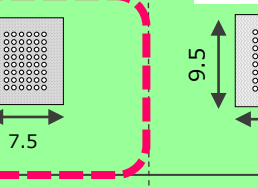
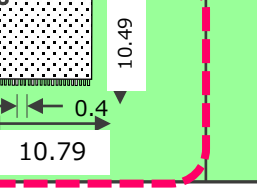


Memory cell circuit



3D image of the memory cell

Package Line-up: Renesas LPSRAM

	SOP	TSOP-I	sTSOP	TSOP-II	uTSOP	FBGA
28pin						
32pin						
44pin						
48pin (48ball)						
52pin	Renesas provides 6 kinds of common packages, which are upward compatible, making it easy to expand density without changing printed circuit board					

x8 Config. ↑
x8 / x16 Config. ↓

Low Power SRAM Product Lineup(256Kb)

Wafer Process	Density	Bit Config.	Catalog Part Name	Orderable Part Name	Package (pinout)	Packing Type	Access Time	Operating Voltage	Operating Temperature	PLP period
0.15um Advanced	256Kbit	32K x 8	R1LP5256ESA-5SI	R1LP5256ESA-5SI#B1	TSOP-I (28)	Tray	55ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2031
				R1LP5256ESA-5SI#S1	TSOP-I (28)	Tape & Reel	55ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2031
			R1LP5256ESP-5SI	R1LP5256ESP-5SI#B1	SOP (28)	Magazine	55ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2031
				R1LP5256ESP-5SI#S1	SOP (28)	Tape & Reel	55ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2031
0.15um Advanced	256Kbit	32K x 8	R1LV5256ESA-5SI	R1LV5256ESA-5SI#B1	TSOP-I (28)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				R1LV5256ESA-5SI#S1	TSOP-I (28)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
			R1LV5256ESP-5SI	R1LV5256ESP-5SI#B1	SOP (28)	Magazine	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				R1LV5256ESP-5SI#S1	SOP (28)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031

(Note) Containers called “magazine”, “tube”, or “stick” are all referred to as "Magazine" here.

Low Power SRAM Product Lineup(1Mb~2Mb)

Wafer Process	Density	Bit Config.	Catalog Part Name	Orderable Part Name	Package (pinout)	Packing Type	Access Time	Operating Voltage	Operating Temperature	PLP period
0.15um Advanced	1Mbit	128K x 8	R1LP0108ESA-5SI	R1LP0108ESA-5SI#B1	sTSOP (32)	Tray	55ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2031
				R1LP0108ESA-5SI#S1	sTSOP (32)	Tape & Reel	55ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2031
			R1LP0108ESF-5SI	R1LP0108ESF-5SI#B1	TSOP-I (32)	Tray	55ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2031
				R1LP0108ESF-5SI#S1	TSOP-I (32)	Tape & Reel	55ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2031
			R1LP0108ESN-5SI	R1LP0108ESN-5SI#B1	SOP (32)	Magazine	55ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2031
				R1LP0108ESN-5SI#S1	SOP (32)	Tape & Reel	55ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2031
0.15um Advanced	1Mbit	128K x 8	R1LV0108ESA-5SI	R1LV0108ESA-5SI#B1	sTSOP (32)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				R1LV0108ESA-5SI#S1	sTSOP (32)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
			R1LV0108ESF-5SI	R1LV0108ESF-5SI#B1	TSOP-I (32)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				R1LV0108ESF-5SI#S1	TSOP-I (32)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
			R1LV0108ESN-5SI	R1LV0108ESN-5SI#B1	SOP (32)	Magazine	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				R1LV0108ESN-5SI#S1	SOP (32)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
0.15um Advanced	2Mbit	256K x 8	R1LV0208BSA-5SI	R1LV0208BSA-5SI#B1	sTSOP (32)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				R1LV0208BSA-5SI#S1	sTSOP (32)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
		128K x16	R1LV0216BSB-5SI	R1LV0216BSB-5SI#B1	TSOP-II (44)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				R1LV0216BSB-5SI#S1	TSOP-II (44)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031

Low Power SRAM Product Lineup(4Mb)

Wafer Process	Density	Bit Config.	Catalog Part Name	Orderable Part Name	Package (pinout)	Packing Type	Access Time	Operating Voltage	Operating Temperature	PLP period
0.15um Advanced	4Mbit	512K x 8	R1LP0408DSB-5SI	R1LP0408DSB-5SI#B1	TSOP-II (32)	Tray	55ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2031
				R1LP0408DSB-5SI#S1	TSOP-II (32)	Tape & Reel	55ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2031
			R1LP0408DSP-5SI	R1LP0408DSP-5SI#B1	SOP (32)	Magazine	55ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2031
				R1LP0408DSP-5SI#S1	SOP (32)	Tape & Reel	55ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2031
0.11um Advanced	4Mbit	512K x 8	RMLV0408EGSA-4S2	RMLV0408EGSA-4S2#AA1	sTSOP (32)	Tray	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV0408EGSA-4S2#KA1	sTSOP (32)	Tape & Reel	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
			RMLV0408EGSB-4S2	RMLV0408EGSB-4S2#AA1	TSOP-II (32)	Tray	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV0408EGSB-4S2#HA1	TSOP-II (32)	Tape & Reel	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
			RMLV0408EGSP-4S2	RMLV0408EGSP-4S2#CA1	SOP (32)	Magazine	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV0408EGSP-4S2#HA1	SOP (32)	Tape & Reel	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
		256K x 16	RMLV0414EGSB-4S2	RMLV0414EGSB-4S2#AA1	TSOP-II (44)	Tray	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV0414EGSB-4S2#HA1	TSOP-II (44)	Tape & Reel	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
			RMLV0416EGBG-4S2	RMLV0416EGBG-4S2#AC0	FBGA (48)	Tray	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV0416EGBG-4S2#KC0	FBGA (48)	Tape & Reel	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
			RMLV0416EGSB-4S2	RMLV0416EGSB-4S2#AA1	TSOP-II (44)	Tray	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV0416EGSB-4S2#HA1	TSOP-II (44)	Tape & Reel	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031

Low Power SRAM Product Lineup(8Mb)

Wafer Process	Density	Bit Config.	Catalog Part Name	Orderable Part Name	Package (pinout)	Packing Type	Access Time	Operating Voltage	Operating Temperature	PLP period
0.11um Advanced	8Mbit	1M x 8	RMLV0808BGSB-4S2	RMLV0808BGSB-4S2#AA0	TSOP-II (44)	Tray	45ns	2.4V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV0808BGSB-4S2#HA0	TSOP-II (44)	Tape & Reel	45ns	2.4V to 3.6V	-40 to 85 °C	Mar. 2031
		512K x 16	RMLV0816BGBG-4S2	RMLV0816BGBG-4S2#AC0	FBGA (48)	Tray	45ns	2.4V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV0816BGBG-4S2#KC0	FBGA (48)	Tape & Reel	45ns	2.4V to 3.6V	-40 to 85 °C	Mar. 2031
		512K x 16 / 1M x 8	RMLV0816BGSA-4S2	RMLV0816BGSA-4S2#AA0	TSOP-I (48)	Tray	45ns	2.4V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV0816BGSA-4S2#KA0	TSOP-I (48)	Tape & Reel	45ns	2.4V to 3.6V	-40 to 85 °C	Mar. 2031
		512K x 16	RMLV0816BGSB-4S2	RMLV0816BGSB-4S2#AA0	TSOP-II (44)	Tray	45ns	2.4V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV0816BGSB-4S2#HA0	TSOP-II (44)	Tape & Reel	45ns	2.4V to 3.6V	-40 to 85 °C	Mar. 2031
		512K x 16 / 1M x 8	RMLV0816BGSD-4S2	RMLV0816BGSD-4S2#AA1	uTSOP (52)	Tray	45ns	2.4V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV0816BGSD-4S2#HA1	uTSOP (52)	Tape & Reel	45ns	2.4V to 3.6V	-40 to 85 °C	Mar. 2031

Low Power SRAM Product Lineup(16Mb)

Wafer Process	Density	Bit Config.	Catalog Part Name	Orderable Part Name	Package (pinout)	Packing Type	Access Time	Operating Voltage	Operating Temperature	PLP period
0.13um CMOS	16Mbit ECC embedded	1M x 16	R1LV1616HBG-4SI	R1LV1616HBG-4SI#B0	FBGA (48)	Tray	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				R1LV1616HBG-4SI#S0	FBGA (48)	Tape & Reel	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
			R1LV1616HBG-5SI	R1LV1616HBG-5SI#B0	FBGA (48)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				R1LV1616HBG-5SI#S0	FBGA (48)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
		1M x 16 / 2M x 8	R1LV1616HSA-4SI	R1LV1616HSA-4SI#B1	TSOP-I (48)	Tray	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				R1LV1616HSA-4SI#S1	TSOP-I (48)	Tape & Reel	45ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
			R1LV1616HSA-5SI	R1LV1616HSA-5SI#B1	TSOP-I (48)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				R1LV1616HSA-5SI#S1	TSOP-I (48)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
0.11um Advanced	16Mbit	1M x 16	RMLV1616AGBG-5S2	RMLV1616AGBG-5S2#AC0	FBGA (48)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2030
				RMLV1616AGBG-5S2#KC0	FBGA (48)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2030
		1M x 16 / 2M x 8	RMLV1616AGSA-5S2	RMLV1616AGSA-5S2#AA0	TSOP-I (48)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2030
				RMLV1616AGSA-5S2#KA0	TSOP-I (48)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2030
			RMLV1616AGSD-5S2	RMLV1616AGSD-5S2#AA1	uTSOP (52)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV1616AGSD-5S2#HA1	uTSOP (52)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031

Low Power SRAM Product Lineup(32Mb~64Mb)

Wafer Process	Density	Bit Config.	Catalog Part Name	Orderable Part Name	Package (pinout)	Packing Type	Access Time	Operating Voltage	Operating Temperature	PLP period
0.11um Advanced	32Mbit	2M x 16	RMWV3216AGBG-5S2	RMWV3216AGBG-5S2#AC0	FBGA (48)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2030
				RMWV3216AGBG-5S2#KC0	FBGA (48)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2030
0.11um Advanced	32Mbit New product	2M x 16	RMLV3216AGBG-5S2	RMLV3216AGBG-5S2#AC0	FBGA (48)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV3216AGBG-5S2#KC0	FBGA (48)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
		2M x 16 / 4M x 8	RMLV3216AGSA-5S2	RMLV3216AGSA-5S2#AA0	TSOP-I (48)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV3216AGSA-5S2#KA0	TSOP-I (48)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
			RMLV3216AGSD-5S2	RMLV3216AGSD-5S2#AA0	uTSOP (52)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				RMLV3216AGSD-5S2#HA0	uTSOP (52)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
0.11um Advanced	64Mbit New product	4M x 16	RMWV6416AGBG-5S2	RMWV6416AGBG-5S2#AC0	FBGA (48)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				RMWV6416AGBG-5S2#KC0	FBGA (48)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
		4M x 16 / 8M x 8	RMWV6416AGSA-5S2	RMWV6416AGSA-5S2#AA0	TSOP-I (48)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				RMWV6416AGSA-5S2#KA0	TSOP-I (48)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
			RMWV6416AGSD-5S2	RMWV6416AGSD-5S2#AA0	uTSOP (52)	Tray	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031
				RMWV6416AGSD-5S2#HA0	uTSOP (52)	Tape & Reel	55ns	2.7V to 3.6V	-40 to 85 °C	Mar. 2031

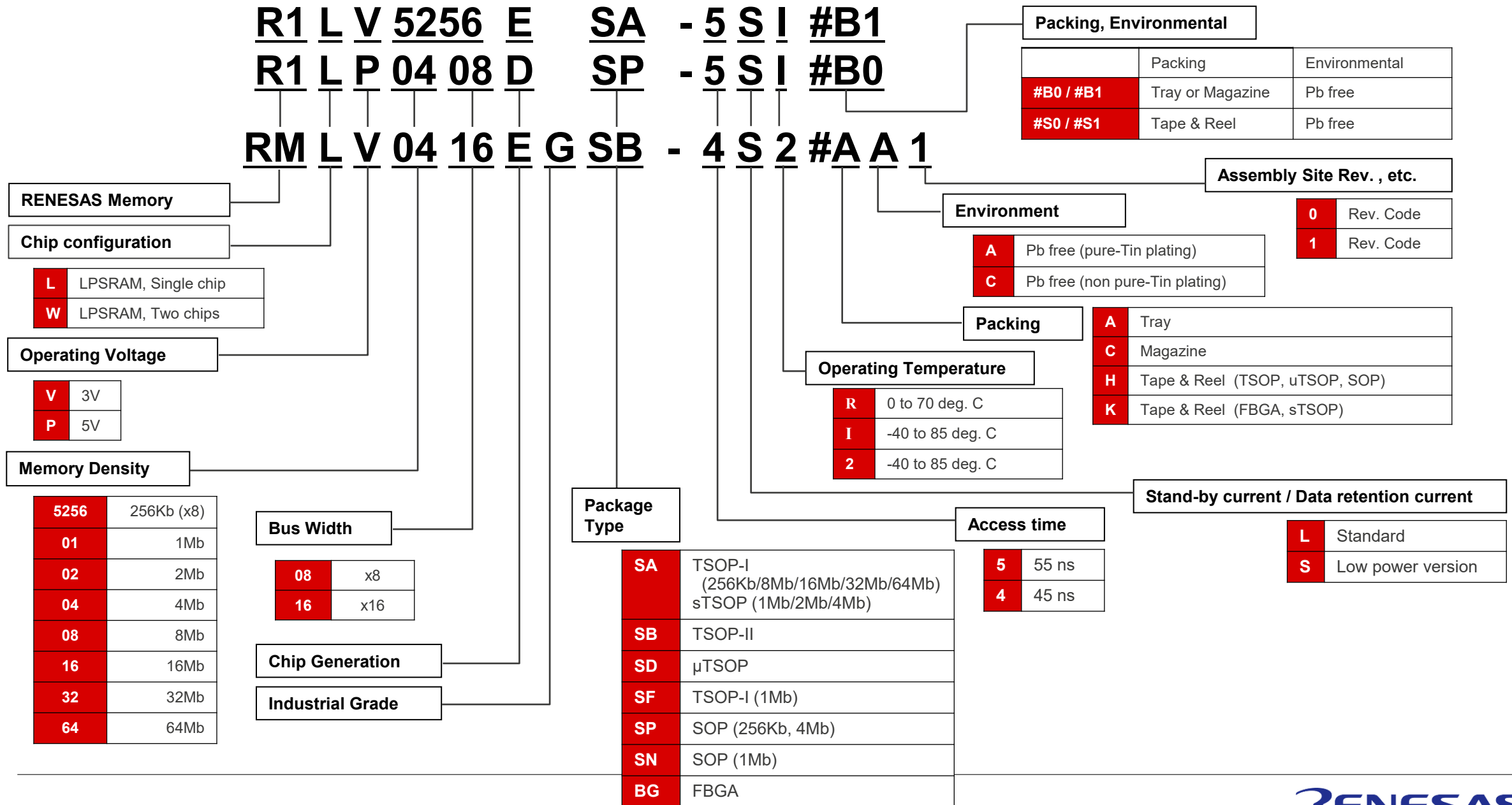
Fast SRAM Product Lineup(4Mb, 5V)

Wafer Process	Density	Bit Config.	Catalog Part Name	Orderable Part Name	Package (pinout)	Packing Type	Access Time	Operating Voltage	Operating Temperature	PLP period
0.18um CMOS	4Mbit	512K x 8	R1RP0408DGE-2LR	R1RP0408DGE-2LR#B1	SOJ (36)	Magazine	12ns	4.5V to 5.5V	0 to 70 °C	-
			R1RP0408DGE-2PI	R1RP0408DGE-2PI#B1	SOJ (36)	Magazine	12ns	4.5V to 5.5V	-40 to 85 °C	-
			R1RP0408DGE-2PR	R1RP0408DGE-2PR#B1	SOJ (36)	Magazine	12ns	4.5V to 5.5V	0 to 70 °C	-
		256K x 16	R1RP0416DGE-2LR	R1RP0416DGE-2LR#B1	SOJ (44)	Magazine	12ns	4.5V to 5.5V	0 to 70 °C	-
			R1RP0416DGE-2PI	R1RP0416DGE-2PI#B1	SOJ (44)	Magazine	12ns	4.5V to 5.5V	-40 to 85 °C	-
			R1RP0416DGE-2PR	R1RP0416DGE-2PR#B1	SOJ (44)	Magazine	12ns	4.5V to 5.5V	0 to 70 °C	-
			R1RP0416DGE-2SR	R1RP0416DGE-2SR#B1	SOJ (44)	Magazine	12ns	4.5V to 5.5V	0 to 70 °C	-
		256K x 16	R1RP0416DSB-0PI	R1RP0416DSB-0PI#D1	TSOP-II (44)	Tray	10ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2030
			R1RP0416DSB-0PR	R1RP0416DSB-0PR#D1	TSOP-II (44)	Tray	10ns	4.5V to 5.5V	0 to 70 °C	Mar. 2030
			R1RP0416DSB-2LR	R1RP0416DSB-2LR#D1	TSOP-II (44)	Tray	12ns	4.5V to 5.5V	0 to 70 °C	Mar. 2030
				R1RP0416DSB-2LR#S1	TSOP-II (44)	Tape & Reel	12ns	4.5V to 5.5V	0 to 70 °C	Mar. 2030
			R1RP0416DSB-2PI	R1RP0416DSB-2PI#D1	TSOP-II (44)	Tray	12ns	4.5V to 5.5V	-40 to 85 °C	Mar. 2030
			R1RP0416DSB-2PR	R1RP0416DSB-2PR#D1	TSOP-II (44)	Tray	12ns	4.5V to 5.5V	0 to 70 °C	Mar. 2030
				R1RP0416DSB-2PR#S1	TSOP-II (44)	Tape & Reel	12ns	4.5V to 5.5V	0 to 70 °C	Mar. 2030
			R1RP0416DSB-2SR	R1RP0416DSB-2SR#D1	TSOP-II (44)	Tray	12ns	4.5V to 5.5V	0 to 70 °C	Mar. 2030

Fast SRAM Product Lineup(4Mb, 3.3V)

Wafer Process	Density	Bit Config.	Catalog Part Name	Orderable Part Name	Package (pinout)	Packing Type	Access Time	Operating Voltage	Operating Temperature	PLP period
0.18um CMOS	4Mbit	512K x 8	R1RW0408DGE-2LR	R1RW0408DGE-2LR#B1	SOJ (36)	Magazine	12ns	3.0V to 3.6V	0 to 70 °C	-
			R1RW0408DGE-2PI	R1RW0408DGE-2PI#B1	SOJ (36)	Magazine	12ns	3.0V to 3.6V	-40 to 85 °C	-
			R1RW0408DGE-2PR	R1RW0408DGE-2PR#B1	SOJ (36)	Magazine	12ns	3.0V to 3.6V	0 to 70 °C	-
		256K x 16	R1RW0416DGE-2LR	R1RW0416DGE-2LR#B1	SOJ (44)	Magazine	12ns	3.0V to 3.6V	0 to 70 °C	-
			R1RW0416DGE-2PI	R1RW0416DGE-2PI#B1	SOJ (44)	Magazine	12ns	3.0V to 3.6V	-40 to 85 °C	-
			R1RW0416DGE-2PR	R1RW0416DGE-2PR#B1	SOJ (44)	Magazine	12ns	3.0V to 3.6V	0 to 70 °C	-
		256K x 16	R1RW0416DSB-0PI	R1RW0416DSB-0PI#D1	TSOP-II (44)	Tray	10ns	3.0V to 3.6V	-40 to 85 °C	Mar. 2030
				R1RW0416DSB-0PI#S1	TSOP-II (44)	Tape & Reel	10ns	3.0V to 3.6V	-40 to 85 °C	Mar. 2030
			R1RW0416DSB-0PR	R1RW0416DSB-0PR#D1	TSOP-II (44)	Tray	10ns	3.0V to 3.6V	0 to 70 °C	Mar. 2030
				R1RW0416DSB-0PR#S1	TSOP-II (44)	Tape & Reel	10ns	3.0V to 3.6V	0 to 70 °C	Mar. 2030
			R1RW0416DSB-2LR	R1RW0416DSB-2LR#D1	TSOP-II (44)	Tray	12ns	3.0V to 3.6V	0 to 70 °C	Mar. 2030
			R1RW0416DSB-2PI	R1RW0416DSB-2PI#D1	TSOP-II (44)	Tray	12ns	3.0V to 3.6V	-40 to 85 °C	Mar. 2030
				R1RW0416DSB-2PI#S1	TSOP-II (44)	Tape & Reel	12ns	3.0V to 3.6V	-40 to 85 °C	Mar. 2030
			R1RW0416DSB-2PR	R1RW0416DSB-2PR#D1	TSOP-II (44)	Tray	12ns	3.0V to 3.6V	0 to 70 °C	Mar. 2030
				R1RW0416DSB-2PR#S1	TSOP-II (44)	Tape & Reel	12ns	3.0V to 3.6V	0 to 70 °C	Mar. 2030
			R1RW0416DSB-2SR	R1RW0416DSB-2SR#D1	TSOP-II (44)	Tray	12ns	3.0V to 3.6V	0 to 70 °C	Mar. 2030

Low Power SRAM : Part name decoder



Asynchronous Fast 4Mb SRAM : Part name decoder

R1 R W 04 16 D SB - 2 P I #D1

RENESAS Memory

Fast SRAM

Operation Voltage

W	3.3V
P	5V

Memory density

04	4Mb
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Bus Width

08	x8
16	x16

Chip generation

Packing, Environmental

	Packing	Environmental
#B0 / #B1	Magazine (SOJ)	Pb free
#D0 / #D1	Tray (TSOP)	Pb free
#S0 / #S1	Tape & Reel	Pb free

Operating Temperature

R	0 to 70 deg C
I	-40 to 85 deg C

Stand by current / Data retention current

P	Standard
L	Low power version
S	Super Low power version

Access time

2	12 ns
0	10 ns

Package type

GE	SOJ
SB	TSOP-II

Example shown here: Part number R1RW0416DSB-2PI#D1

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