

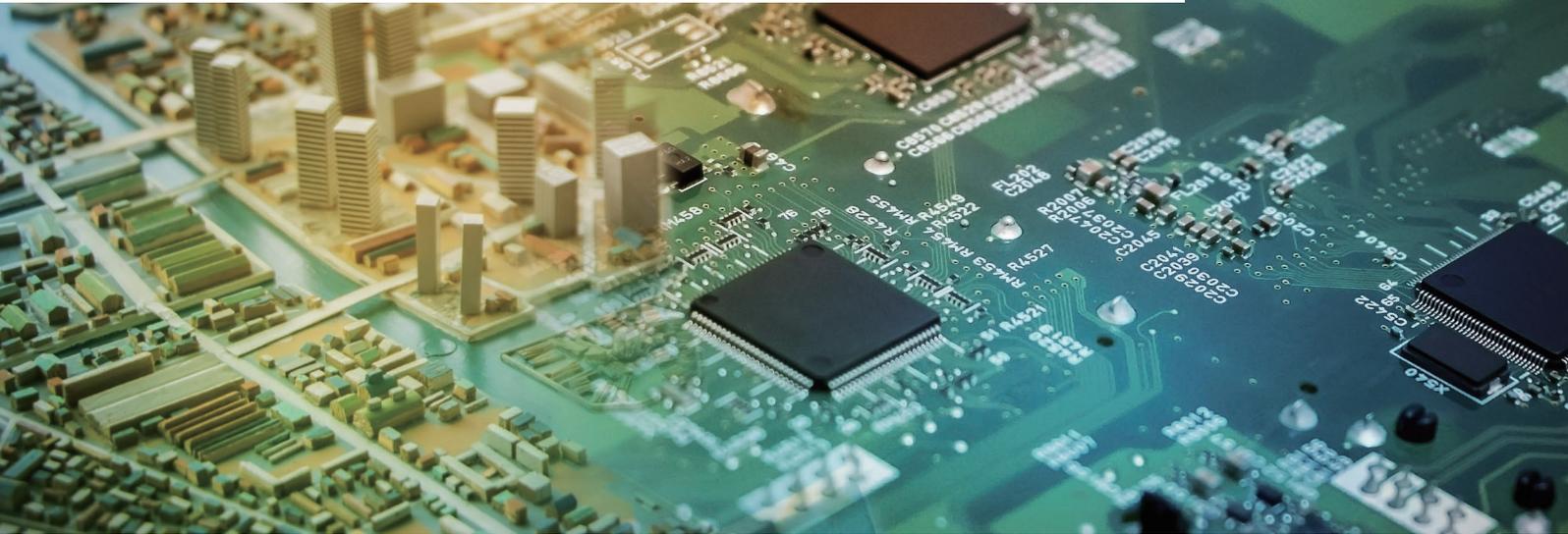
LOW POWER SRAMs

Advanced technology with superior performance
and industry-leading support



HIGH PERFORMANCE AND
HIGH RELIABILITY USING
RENESAS'S ORIGINAL TECHNOLOGY

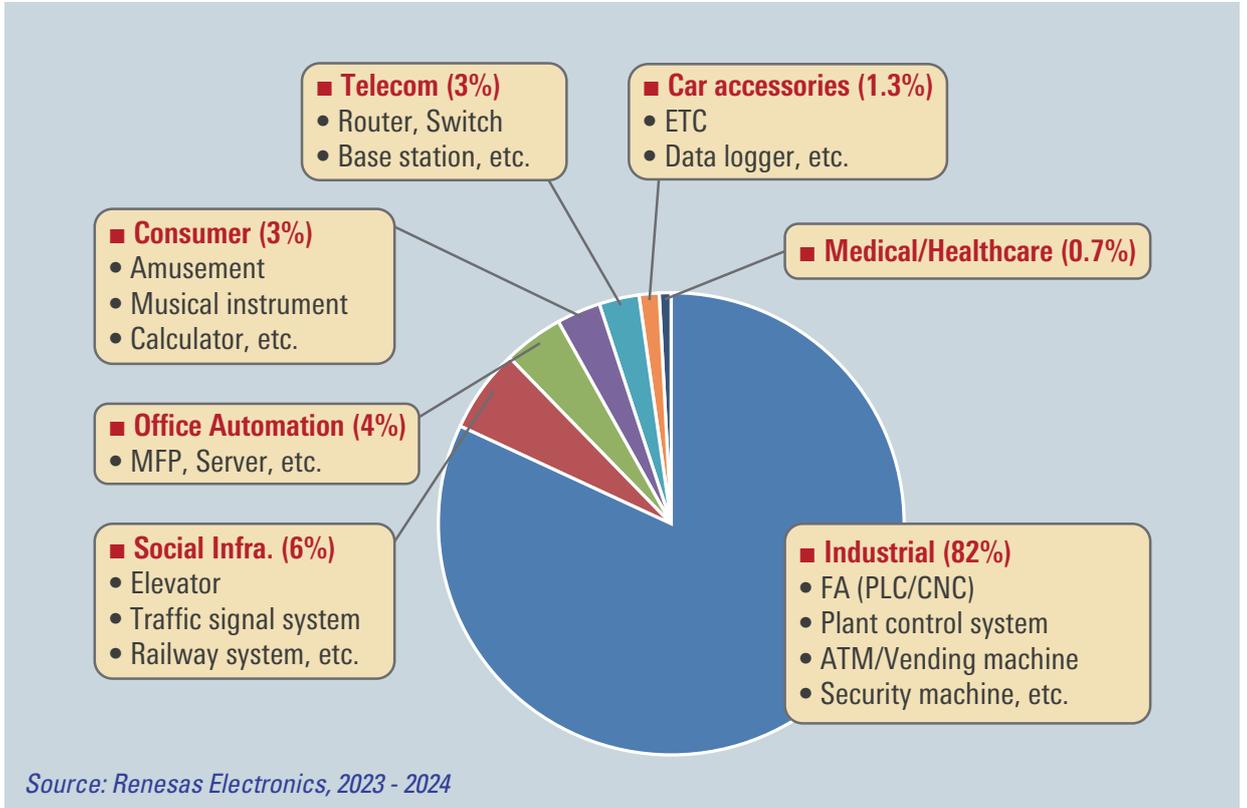
LOW POWER SRAMs



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Industry-Leading Support, Application of Renesas Low Power SRAM



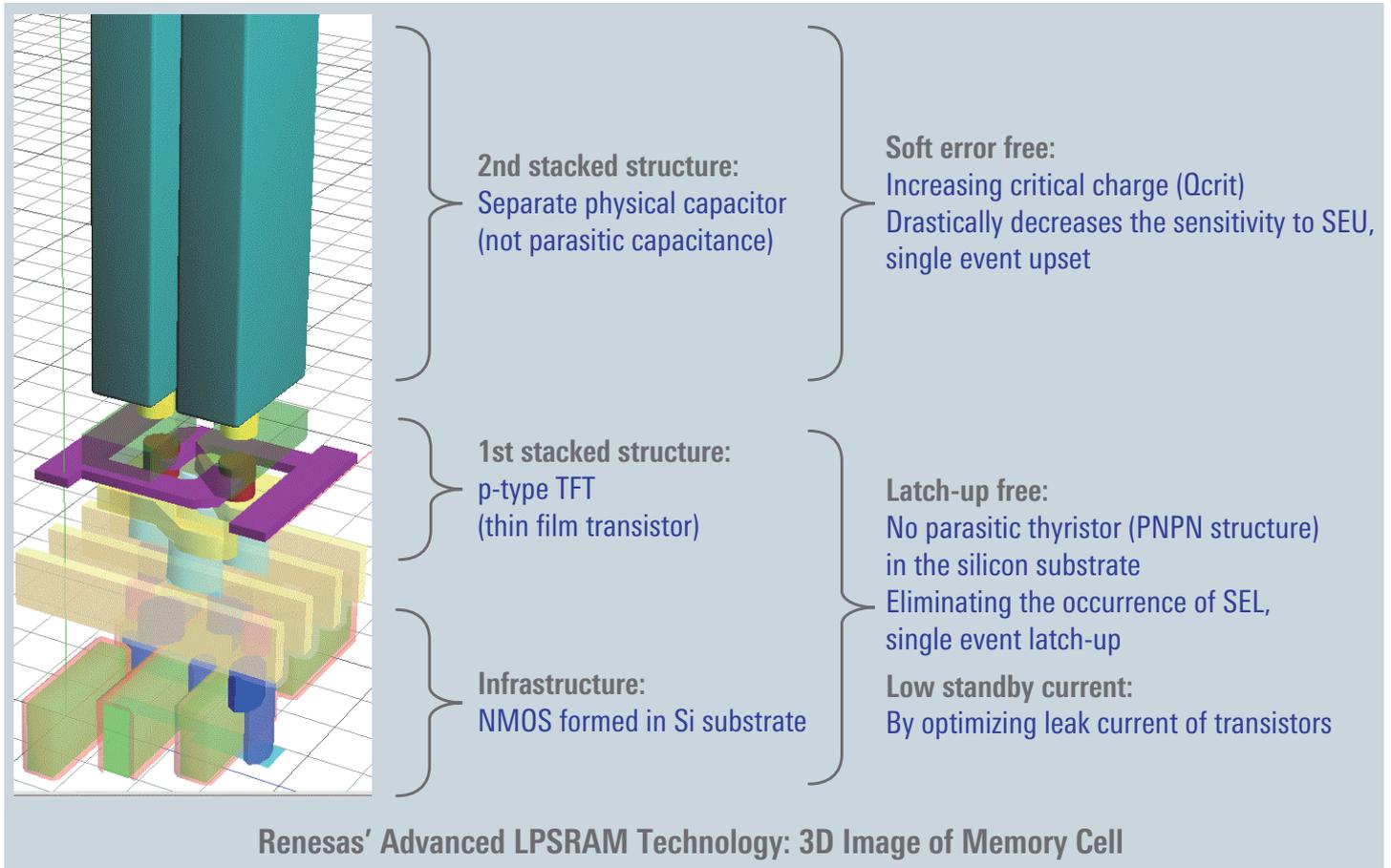
Low Power SRAM Roadmap

- Widest product lineup from 256Kbit to 64Mbit
- New products planned utilizing 22nm FD-SOI technology to ensure product longevity of Renesas Low Power SRAM product family

Low Power SRAMs		~2024	2025	2026	2027	2028	2029~	
Current Products	256Kb, 1Mb (5V/3V) 2Mb (3V) 4Mb (5V)	150nm Advanced LPSRAM					Product Longevity TBD	
	4Mb, 8Mb, 16Mb (3V), 32Mb, 64Mb (3V)	110nm Advanced LPSRAM						
New Products	256Kb, 1Mb (5V/3V) 2Mb (3V) 4Mb (5V/3V)	Shift Planning to Development	22nm FD-SOI 4Mb to 256Kb LPSRAM		Date for Production			
	8Mb, 16Mb (3V)		22nm FD-SOI 16Mb / 8Mb LPSRAM					
	32Mb, 64Mb (3V)		22nm FD-SOI 64Mb / 32Mb LSRAM					

Advanced Low Power SRAM

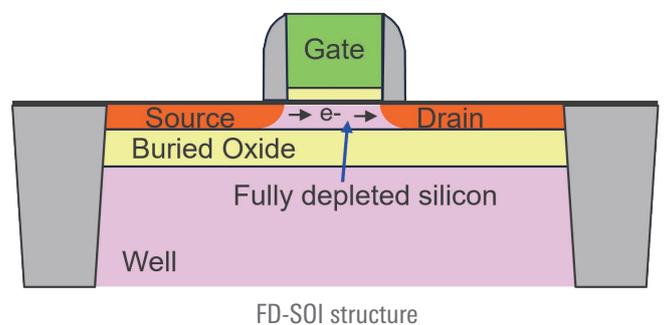
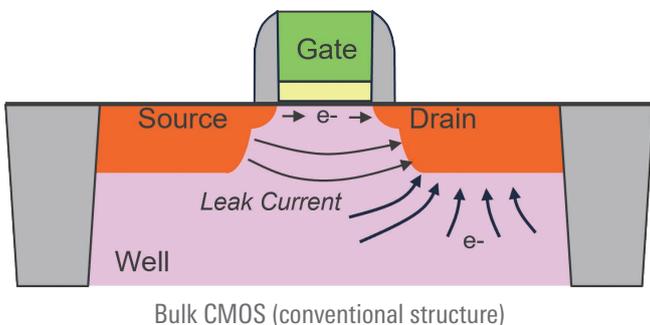
– Existing Technology with Proven Track Record of Mass Production



FD-SOI

– Advanced Technology Platform for New Products

■ An evolution of silicon on insulator (SOI) devices, with fully depleted channel structure formed on buried oxide (BOX) layer

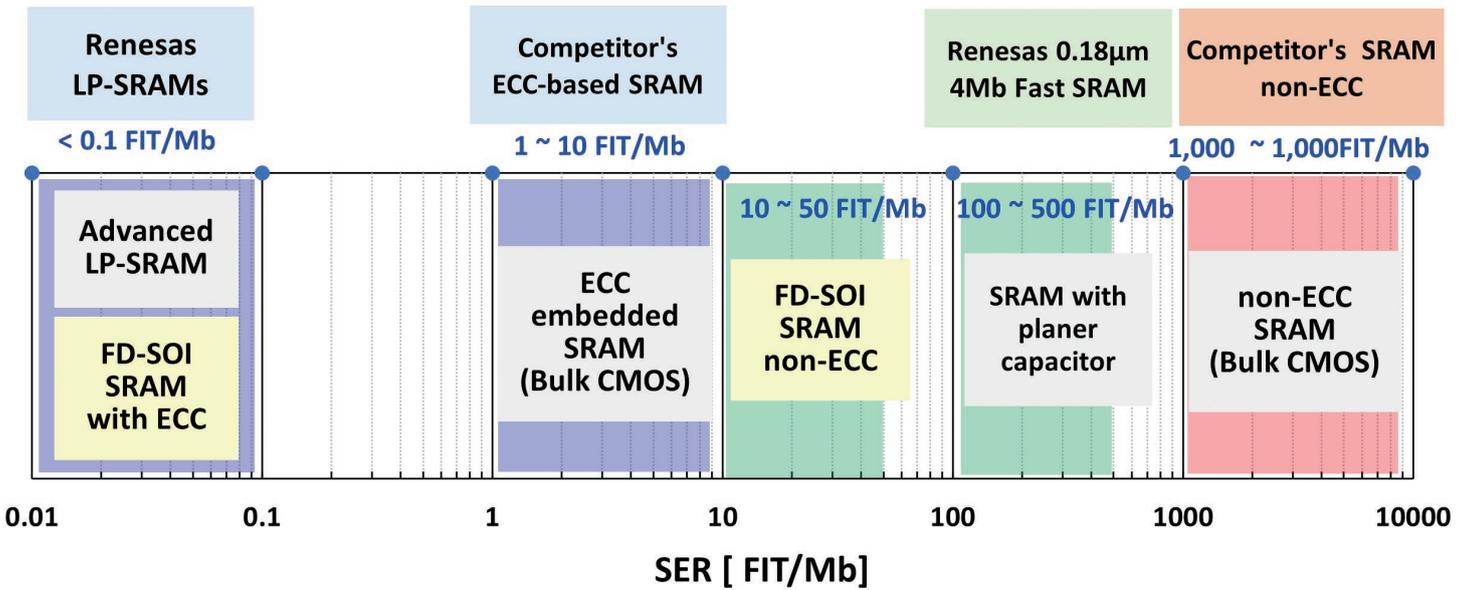


In FD-SOI:

- BOX layer effectively mitigates excess leakage current, thereby enhancing low power operation.
- Minimal sensitive volume to high-energy particles (alpha-rays/neutrons) results in reduced charge collection, providing superior soft error immunity.
- Latch-up free: No parasitic PNPN structure formed within silicon substrate.

Soft Error Rate Comparison

Product Family	Soft Error Mitigation?	By what?	Soft Error Rate
150nm / 110nm Advanced LP-SRAM (in stable production)	YES	<ul style="list-style-type: none"> Maximizing Critical Charge (Qcrit) by adding dedicated capacitor element No need for embedded ECC 	< 0.06 FIT/Mb [150nm] < 0.04 FIT/Mb [110nm] (Measured)
22nm FD-SOI SRAM (under development)	YES	<ul style="list-style-type: none"> Minimizing Collected Charge (Qcoll) by FD-SOI structure Further SER mitigation by ECC 	< 0.02 FIT/Mb [22nm] (Target value)



Package Lineup for Low Power SRAM

	SOP	TSOP-I	sTSOP	TSOP-II	µTSOP	FBGA
28-pin						
32-pin						
44-pin						x8 / x16 config.
48-pin (48-ball)						
52-pin						

■ Renesas provides 6 kinds of common packages, which are upward compatible, making it easy to expand density without changing the PCB.

Product List

Product Series	Density	Org.	Supply Voltage (V)	Access Time (ns)	Standby Current (typ.)	Temp. Range	TSOP	SOP	FBGA	μTSOP
R1LP5256E	256 Kb	x8	4.5 - 5.5	55	0.6 μA	-40°C to 85°C	✓	✓		
R1LP0108E	1 Mb	x8	4.5 - 5.5	55	0.6 μA	-40°C to 85°C	✓	✓		
R1LP0408D	4 Mb	x8	4.5 - 5.5	55	0.8 μA	-40°C to 85°C	✓	✓		
R1LV5256E	256 Kb	x8	2.7 - 3.6	55	0.6 μA	-40°C to 85°C	✓	✓		
R1LV0108E	1 Mb	x8	2.7 - 3.6	55	0.6 μA	-40°C to 85°C	✓	✓		
R1LV0208BSA	2 Mb	x8	2.7 - 3.6	55	1 μA	-40°C to 85°C	✓			
R1LV0216BSB	2 Mb	x16	2.7 - 3.6	55	1 μA	-40°C to 85°C	✓			
RMLV0408E	4 Mb	x8	2.7 - 3.6	45	0.3 μA	-40°C to 85°C	✓	✓		
RMLV0414E	4 Mb	x16	2.7 - 3.6	45	0.3 μA	-40°C to 85°C	✓			
RMLV0416E	4 Mb	x16	2.7 - 3.6	45	0.3 μA	-40°C to 85°C	✓		✓	
RMLV0808BGSB	8 Mb	x8	2.4 - 3.6	45	0.45 μA	-40°C to 85°C	✓			
RMLV0816BGBG	8 Mb	x16	2.4 - 3.6	45	0.45 μA	-40°C to 85°C			✓	
RMLV0816BGSA	8 Mb	x16	2.4 - 3.6	45	0.45 μA	-40°C to 85°C	✓			
RMLV0816BGSB	8 Mb	x16	2.4 - 3.6	45	0.45 μA	-40°C to 85°C	✓			
RMLV0816BGSD	8 Mb	x16	2.4 - 3.6	45	0.45 μA	-40°C to 85°C				✓
RMLV1616A-S	16 Mb	x16	2.7 - 3.6	55	0.5 μA	-40°C to 85°C	✓		✓	✓
RMLV1616A-U	16 Mb	x16	2.7 - 3.6	45, 55	0.4 μA	-40°C to 85°C	✓		✓	
RMLV3216A	32 Mb	x16	2.7 - 3.6	55	0.6 μA	-40°C to 85°C	✓		✓	✓
RMWV6416A	64 Mb	x16	2.7 - 3.6	55	1.2 μA	-40°C to 85°C	✓		✓	✓

Low Power SRAM Part Name Decoder

R1 L V 5256 E SA - 5 S I #B1
R1 L P 04 08 D SP - 5 S I #B1
RM L V 04 16 E G SB - 4 S 2 #A A 1

Chip Configuration

- L** LPSRAM, Single chip
- W** LPSRAM, Two chips

Operating Voltage

- V** 3V
- P** 5V

Memory Density

5256	256Kb (x8)
01	1Mb
02	2Mb
04	4Mb
08	8Mb
16	16Mb
32	32Mb
64	64Mb

Bus Width

- 08** x8
- 16** x16

Chip Generation

- 08** 8Mb
- 16** 16Mb
- 32** 32Mb
- 64** 64Mb

Industrial Grade

- 08** x8
- 16** x16

Package Type

- SA** TSOP-I (256Kb/8Mb/16Mb/32Mb/64Mb) sTSOP (1Mb/2Mb/4Mb)
- SB** TSOP-II
- SD** μTSOP
- SF** TSOP-I (1Mb)
- SP** SOP (256Kb, 4Mb)
- SN** SOP (1Mb)

Access Time

- 5** 55 ns
- 4** 45 ns

Standby Current / Data Retention Current

- S** Low power version
- U** Ultra Low power version

Environment

- A** Pb free (pure-Tin plating)
- C** Pb free (non pure-Tin plating)

Packing, Environmental

	Packing	Environmental
#B0 / #B1	Tray or Magazine	Pb free
#S0 / #S1	Tape & Reel	Pb free

Assembly Site Rev., etc.

- 0** Rev. Code
- 1** Rev. Code

Operating Temperature

- R** 0 to 70°C
- I** -40 to 85°C
- 2** -40 to 85°C

Packing

- A** Tray
- C** Magazine
- H** Tape & Reel (TSOP-II, μTSOP, SOP)
- K** Tape & Reel (FBGA, TSOP-I, sTSOP)

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