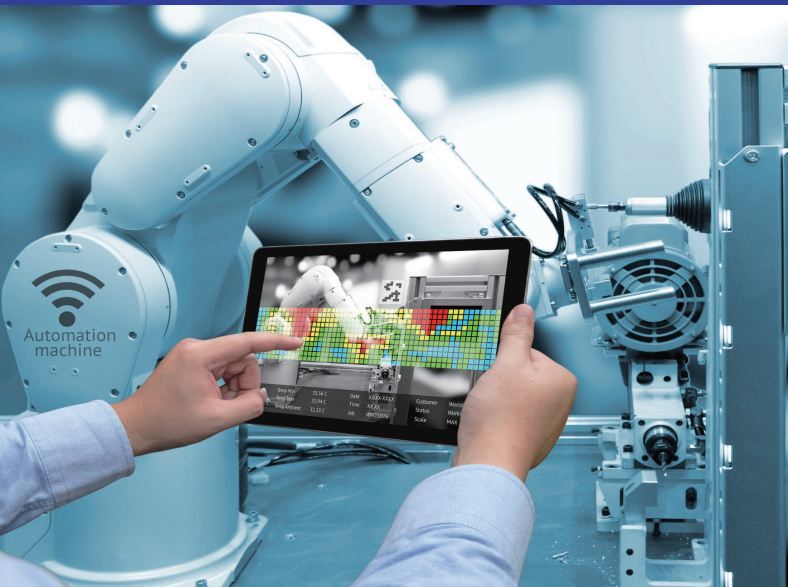


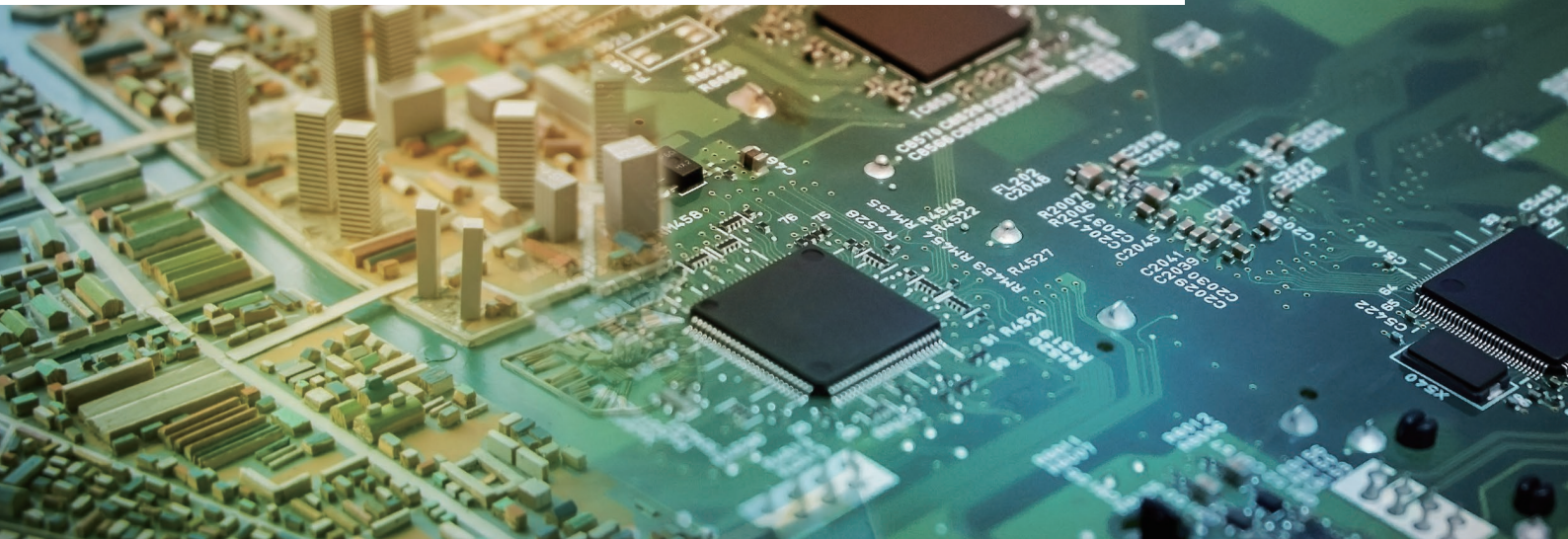
LOW POWER SRAMs

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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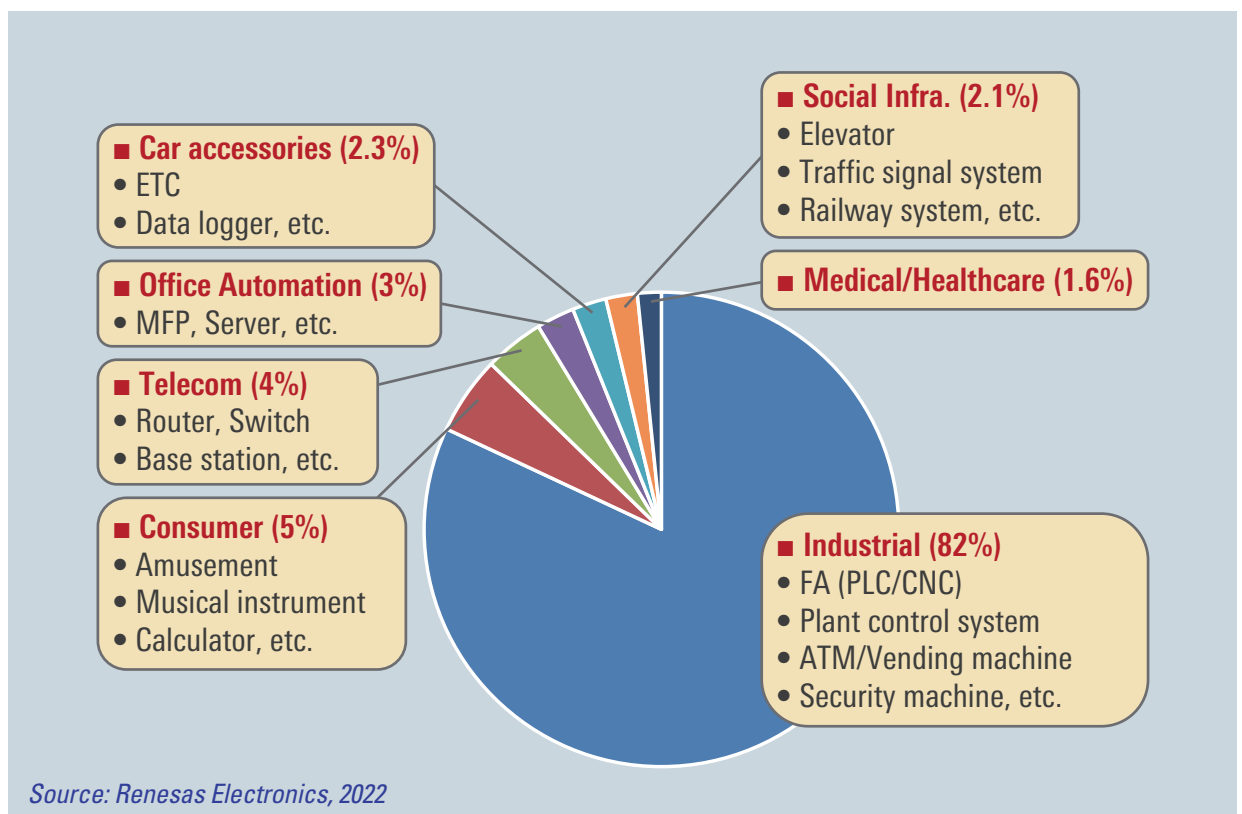
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Low Power SRAM Roadmap

SRAM type	Density, Voltage	Mass Production				Under Development	
		~2022	2023	2024	2025	2026	2027~
Low Power SRAM	256Kb, 1Mb (5V/3V)	0.15μm Advanced LPSRAM					
	2Mb (3V)						
	4Mb (5V)						
	4Mb (3V)	0.11μm Advanced LPSRAM					
	8Mb, 16Mb (3V)						
	32Mb, 64Mb (3V)						
	16Mb (3V) R1LV1616H series	0.13μm (ECC embedded)					
	16Mb (3V) RMLV1616A-U series	Sampling		0.11μm Advanced LPSRAM			

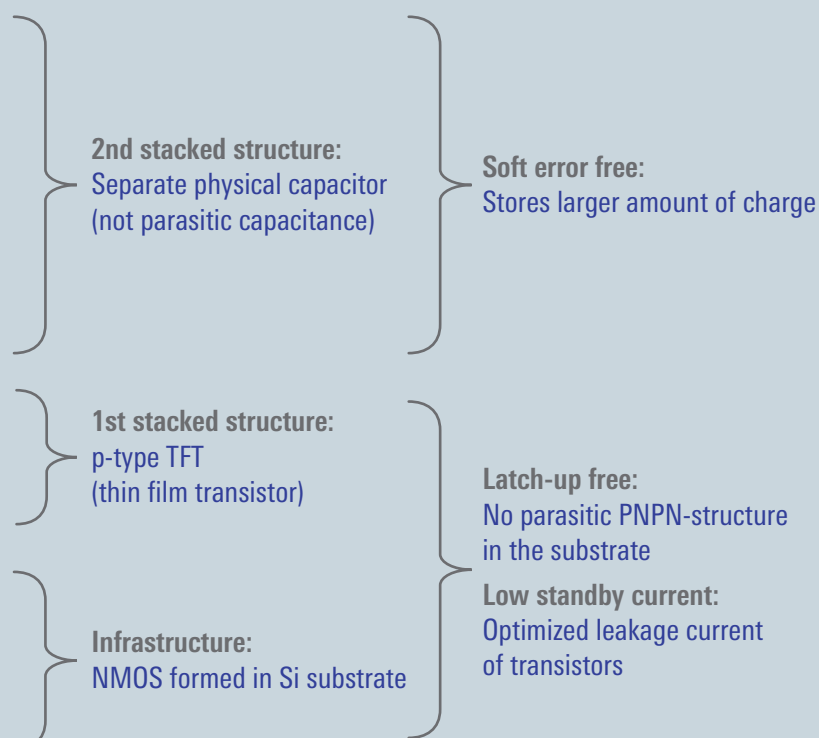
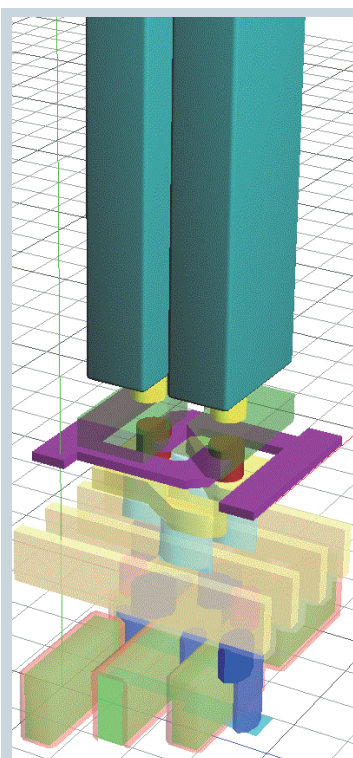
- Widest product lineup from 256Kbit to 64Mbit
- Long term and stable support
- Highest quality with Renesas core advanced technology
- Easy switch to higher density in the same package

Industry-Leading Support, Application of Renesas Low Power SRAM



Advanced Low Power SRAM Technology with Superior Performance and Reliability

- Low standby current
- High reliability
 - Soft error free
 - Latch-up free



Renesas' Advanced LPSRAM Technology: 3D Image of Memory Cell

Product Differentiation

Renesas supports soft error free products for entire lineup of 256Kbit to 64Mbit

✓ Production Soft error countermeasure: **Yes** **No**

Vendor	Process	256Kb	1Mb	2Mb	4Mb	8Mb	16Mb	32Mb	64Mb
Renesas	0.15μm Advanced	✓	✓	✓	✓ (5V)	Change to 0.11μm Advanced			
	0.11μm Advanced				✓ (3V)	✓	✓	✓	✓
Competitor	90nm CMOS no ECC	✓	✓	✓	✓	✓	✓	✓	✓
	65nm CMOS ECC embedded				✓	✓	✓	✓	✓

Product Benchmark

Only Renesas supports unique products that realize both lowest standby current and soft error free

vs.	Renesas 0.11μm Advanced LPSRAM	Competitor's 65nm LPSRAM (with ECC)
Standby current	0.3μA (4Mb, typ.)	3.5μA (4Mb, typ.)
vs.	Renesas 0.11μm Advanced LPSRAM	Competitor's 90nm LPSRAM (no ECC)
Soft error rate	< 0.04 FIT / Mbit	500 to 5,000 FIT / Mbit

Soft Error Rate Comparison

Advanced LPSRAM has superior Soft Error Immunity to ECC-embedded SRAMs

Product Family	Countermeasure against soft error?	By what?	Soft error rate (Measured)
Advanced LPSRAM series (0.11 μ m / 0.15 μ m)	YES	Soft Error immune process & device technology	< 0.1 FIT/Mb
R1LV1616H series <EOL> (0.13 μ m CMOS 16Mb)	YES	Embedded ECC	< 5.5 FIT/Mb

RMLV1616A series, etc.

Renesas 0.11/0.15 μ m
Advanced LP-SRAMs

< 0.1 FIT/Mb

R1LV1616H series

Renesas 0.13 μ m
16Mb LP-SRAM

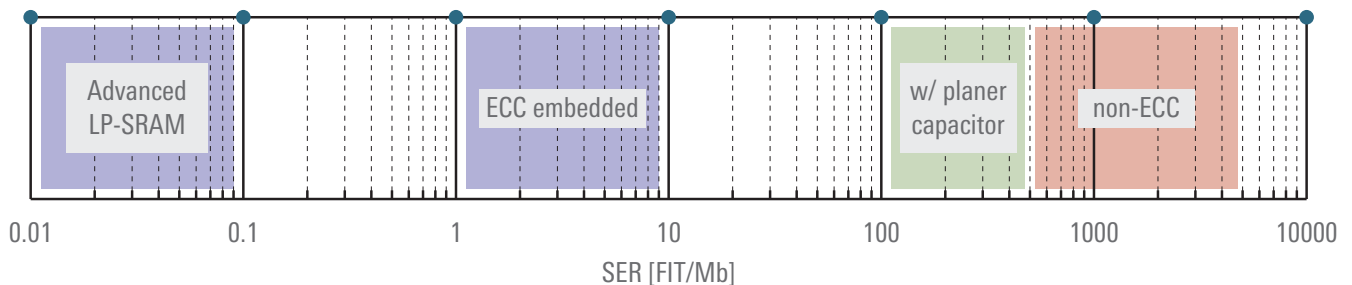
< 10 FIT/Mb

Renesas 0.18 μ m
4Mb Fast SRAM

100 to 500 FIT/Mb

Conventional SRAMs

500 to 5,000 FIT/Mb,
typically ~ 1,000 FIT/Mb



Package Lineup for Low Power SRAM

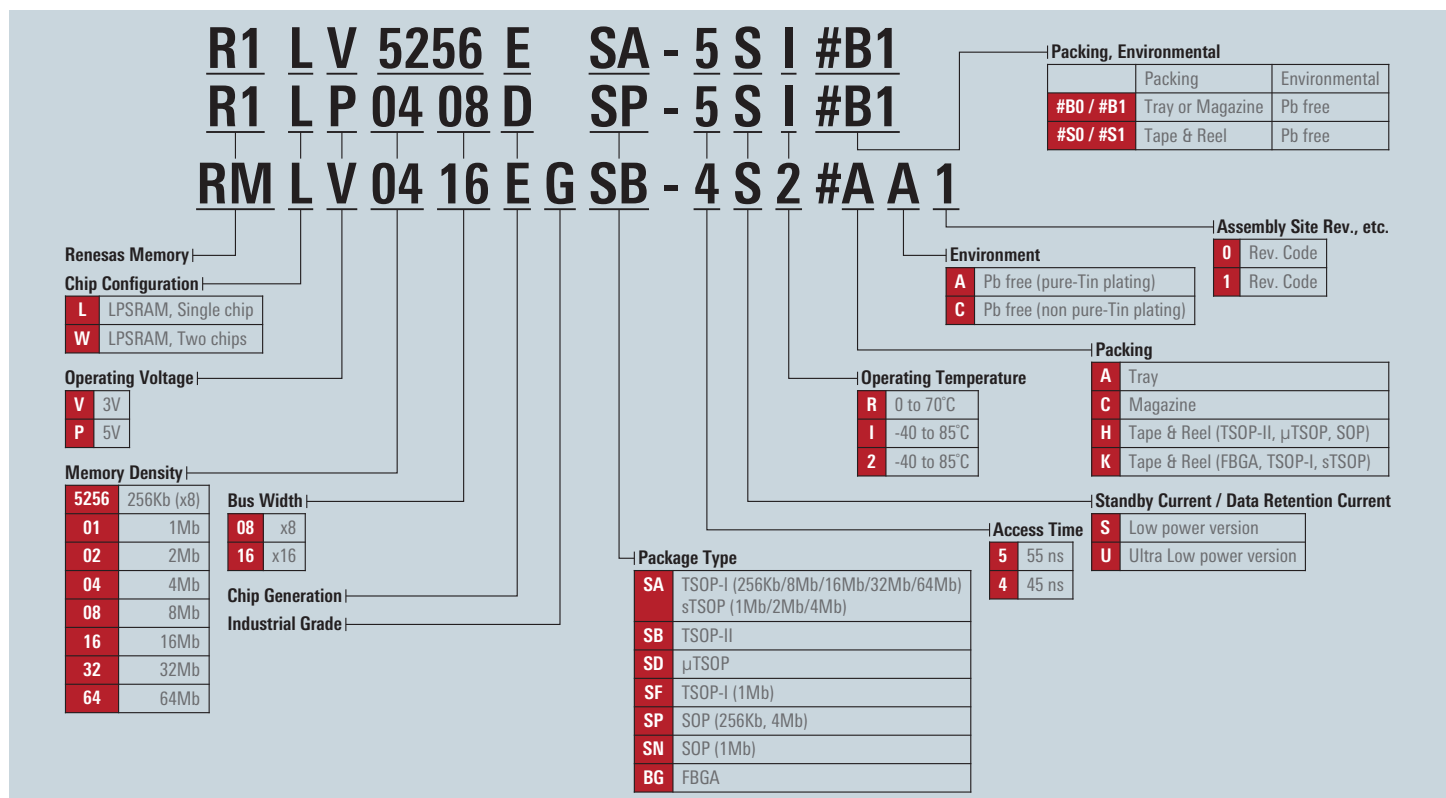
	SOP	TSOP-I	sTSOP	TSOP-II	μ TSOP	FBGA
28-pin						
32-pin						
44-pin						x8 / x16 config.
48-pin (48-ball)						
52-pin						

■ 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	✓		✓	✓
RMWV3216A	32 Mb	x16	2.7 - 3.6	55	1 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



MEMO

[illegible]

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SALES OFFICES

Refer to "http://www.renesas.com/" for the latest and detailed information.

Renesas Electronics Corporation

TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan

Renesas Electronics America Inc. Milpitas Campus

1001 Murphy Ranch Road, Milpitas, CA 95035, U.S.A.

Tel: +1-408-432-8888, Fax: +1-408-434-5351

Renesas Electronics America Inc. San Jose Campus

6024 Silver Creek Valley Road, San Jose, CA 95138, USA

Tel: +1-408-284-8200, Fax: +1-408-284-2775

Renesas Electronics Canada Limited

603 March Road, Ottawa, ON K2K 2M5, Canada

Tel: +1-613-595-6300, Fax: +1-613-595-6329

Renesas Electronics Europe GmbH

Arcadiastrasse 10, 40472 Düsseldorf, Germany

Tel: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.

Room 101-T01, Floor 1, Building 7, Yard No. 7, 8th Street, Shangdi, Haidian District, Beijing 100085, China

Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.

Unit 301, Tower A, Central Towers, 555 Langao Road, Putuo District, Shanghai 200333, China

Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

Renesas Electronics Hong Kong Limited

Unit 3501-03, 35/F, One Kowloon, 1 Wang Yuen Street, Kowloon Bay, Hong Kong

Tel: +852-2265-6688, Fax: +852 2886-9022

Renesas Electronics Taiwan Co., Ltd.

13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan

Tel: +886-2-8175-9600, Fax: +886-2-8175-9670

Renesas Electronics Singapore Pte. Ltd.

80 Bendemeer Road, #06-02 Singapore 339949

Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.

Unit No 3A-1 Level 3A Tower 8 UOA Business Park, No 1 Jalan Pengaturcara U1/51A, Seksyen U1, 40150 Shah Alam, Selangor, Malaysia

Tel: +60-3-5022-1288, Fax: +60-3-5022-1290

Renesas Electronics India Pvt. Ltd.

Bagmane Tech Park, Municipal No. 66/1-4, Lakeview Block, Block B, Ground Floor, Krishnappa Garden, C V Raman Nagar, Bengaluru, Karnataka 560 093, India

Tel: +91-80-67208700

Renesas Electronics Korea Co., Ltd.

7F, Hae-seong 2nd building, 508, Teheran-ro, Gangnam-gu, Seoul, Korea 06178

Tel: +82-2-558-3737, Fax: +82-2-558-5338