# RENESAS

Renesas
General-Purpose Memory

Catalog

R

Memory

Advanced technology exclusive to Renesas shows its true value when new demands arise.
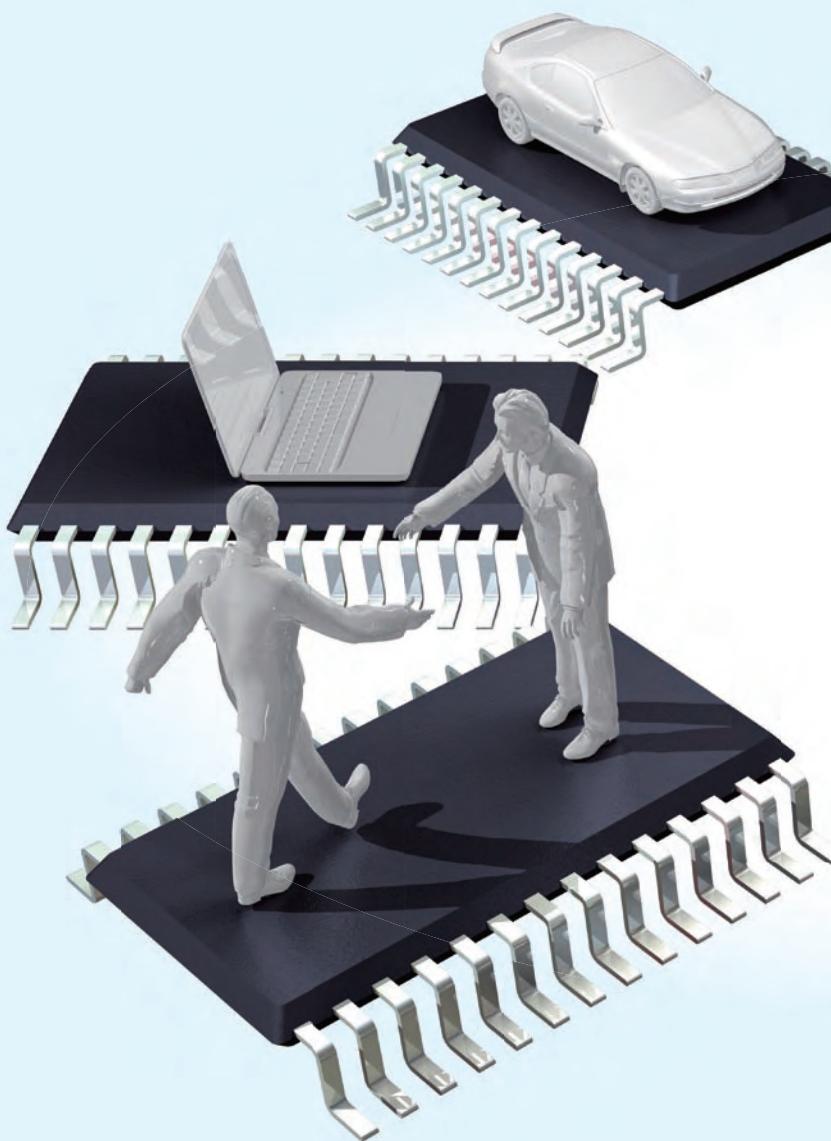
Low-Power Static Random Access memory

A comprehensive lineup to meet a variety of needs

Low-Power SRAM

Basic product evolution with maintenance of upward-compatibility

The full product lineup has been developed with upward-compatibility in mind, allowing use in a wide range of applications from industrial equipment to portable terminals.

▷ **5V ongoingly supported**

3V , 5V

▷ **Larger density**

256Kb→1Mb→2Mb→4Mb→8Mb→16Mb→32Mb→64Mb

▷ **Package compatibility and miniaturization**

SOP, TSOP, sTSOP, µTSOP, FBGA

Realization of high reliability

Renesas original technology maintains the high quality of a large density product.

▷ **ECC embedded technology**

Mounted on 0.13mm 16Mb SRAM

▷ **Advanced Low Power SRAM**

New memory cell composed by a fusion of SRAM and DRAM capacitor

Pursuit of higher performance

Ideal for portable terminal applications requiring a long data retention time on battery power.
A comprehensive range of wide guaranteed temperature range products is available to suit a variety of application systems. Support for automotive (CIS) applications.

▷ **Lower standby current**

$0.05µA(256Kb) \rightarrow 0.1µA(1Mb) \rightarrow 1.0µA(4Mb) \rightarrow 1.2µA(8Mb) \rightarrow 2.0µA(16Mb) \rightarrow 4.0µA(32Mb) \rightarrow 8.0µA(64Mb)$

▷ **Wider operating temperature ranges**

-40 to 85℃
Device-dependent specifications over 85℃

Environmentally friendly

▷ **Lead-free**

Mass production currently underway.

Low-power SRAM roadmap by process line

Density		2008	2009	2010	2011	2012	2013	2014	Status
Low	256Kb	0.6µm	x8						
	1Mb	0.25µm	x8						In stable mass production
	2Mb	0.25µm	x8, x16						
Middle	4Mb	0.18µm x8, x16			0.15µm Adv.				5V products : In stable mass production 3.3V products : In transition to Advanced. In stable mass production.
	8Mb	0.18µm x8, x16			0.15µm Adv.				5V products : In stable mass production 3.3V products : In transition to Advanced. In stable mass production.
Large	16Mb	0.13µm	x8, x16						In stable mass production
	16Mb		x8, x16		0.15µm Adv.				In stable mass production
	32Mb	x8, x16(16Mb+16Mb) MCP			0.15µm Adv.				(16Mb + 16Mb) In stable mass production 32Mb Single chip in stable mass production
	64Mb			0.15µm Adv.					(32Mb + 32Mb) MCP In stable mass production

Low-Power SRAM Lineup
Classified by density

256Kb, 1Mb, 2Mb Series
- Low typ. standby current
- Long production and market record
- Stable production to be continued in the future

▶▶▶ 256Kb
◎ M5M5256D Series
- 5V/3.3V
- SOP, TSOP(sTSOP size)
- 55ns/70ns

▶▶▶ 1Mb
◎ M5M51008D, M5M5V108D Series
- 5V/3.3V
- SOP, TSOP, sTSOP
- 55ns/70ns

▶▶▶ 2Mb
◎ M5M5V208A, M5M5V216A Series
- 3.3V
- TSOP, sTSOP
- 55ns/70ns

4Mb, 8Mb Series
- Continued 5V support
- Variety of packages
- Stable production to be continued in the future

▶▶▶ 4Mb
◎ R1LP0408C
- 5V
- SOP, TSOP
- 55ns/70ns

▶▶▶ 4Mb Advanced
Low Power SRAM
◎ R1LV0408D, R1LV0416D, R1LV0414D Series
- 3.3V
- SOP, TSOP, sTSOP, FBGA
- 55ns/70ns

▶▶▶ 8Mb
◎ HM628100, HM6216514
- 5V
- TSOP
- 55ns

▶▶▶ 8Mb Advanced
Low Power SRAM
◎ R1LV0808A, R1LV0816A Series
- 3.3V
- TSOP, µTSOP, FBGA
- 55ns/70ns

16Mb, 32Mb, 64Mb Series
- On-chip ECC R1LV1616H Series
- New memory cell Advanced Low Power SRAM Mass production
- MCP(Multi-Chip Package)

▶▶▶ 16Mb
◎ R1LV1616H Series
- 3.3V
- TSOP, FBGA
- 45ns/55ns
- On-chip ECC

▶▶▶ 16Mb Advanced
Low Power SRAM
◎ R1LV1616R Series
- 3.3V
- µTSOP, FBGA, TSOP
- 55ns*/70ns

*Please contact a Renesas Technology sales representative for details.

▶▶▶ 32Mb Advanced
Low Power SRAM
◎ R1WV3216R Series
- 3.3V
- µTSOP, FBGA
- 70ns
- 16Mb+16Mb Stacked MCP

◎ R1LV3216R Series
- 3.3V
- µTSOP, TSOP
- 55ns/70ns

▶▶▶ 64Mb Advanced
Low Power SRAM
◎ R1WV6416R Series
- 3.3V
- µTSOP, FBGA, TSOP
- 55ns/70ns
- 32Mb+32Mb Stacked MCP

Low-Power SRAM Package Lineup

▶ Rich lineup from SOP to FBGA ▶ µTSOP (II) is also the JEDEC standard package.

Memory Configuration		SOP	TSOP(I) & sTSOP(I)		TSOP(II)	µTSOP(II)	FBGA
x8	28-pins	1.27 / 256Kb / 11.93 / 17.5		0.55 / 256Kb / 8 / 13.4			
	32-pins	1.27 / 1Mb/4Mb / 14.1 / 20.75	0.5 / 1Mb / 8 / 20	1Mb/2Mb/4Mb 0.5 / 8 / 13.4	1.27 / 4Mb / 11.76 / 20.95		
x8/ x16	44-pins				0.8 / 2Mb/4Mb/ 8Mb / 11.76 / 18.41		
	48-pins (48ball)	8Mb/16Mb/ 32Mb/64Mb 0.5 / 12.00 / 20.00					4Mb/ 8Mb/ 16Mb/ 32Mb/ 64Mb* / 8.5 to 9.5 / 7.5 to 8.0
	52-pins					8Mb/ 16Mb/ 32Mb/ 64Mb 0.4 / 10.49 / 10.79	
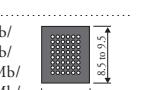
*64Mb FBGA package dimensions: 8.5mm × 11mm

Low-Power Static Random Access memory

Manufactured using 0.13mm CMOS process. Uses 6-transistor memory cells. ECC* for reduced soft errors.

*ECC : Error checking and correction

Features/Advantages for User

- ▷ Wide operating voltage range   2.7V to 3.6V
- ▷ Fast access   45ns max.
- ▷ Low current consumption in standby mode   0.5mA typ./8mA max.

Product Status

- ▷ In mass production

Rapid increase in soft errors caused by neutron radiation in 0.13mm SRAM
Difficult to maintain data storage integrity
Innate susceptibility to bit faults due to soft errors

Hardening against soft errors by incorporating ECC
ECC circuit corrects bit faults so data is read correctly.

Data	Parity
ECC circuit	
Data	
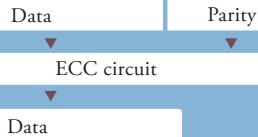
Product Specifications

Configuration		16Mb
		1M×16/2M×8[*1]
▶ Part No.		R1LV1616H
▶ Power supply voltage		2.7V to 3.6V
▶ Operating current		20mA max.
▶ Access time		45/55ns
▶ Standby current [ISB1]	SI version	8µA max.
▶ Data retention current [ICCDR]	SI version	8µA max.
▶ Operating temperature range		-40 to 85
▶ Package		TSOP(I)-48pin[*1]
		FBGA(CSP)-48ball

*1 : TSOP version only. Switchable to ×8 mode using BYTE# pin.

Quick Facts About Static RAM

It goes without saying that semiconductor memory must be fault free. In fact, however, memory can sometimes malfunction, though this happens very rarely. If the malfunction is caused by a defect in the hardware it is sufficient to either discard the faulty device or to not use the defective portion. This is what is done with flash memory, for example. With DRAM and SRAM, however, there are some very rare cases in which the contents of the memory become reversed, even though the hardware is functioning properly. Unlike most faults or defects, there is no trace left in the physical memory after the error has occurred. Such errors are called soft errors. As ever finer processing has come to be employed in the production of DRAM and similar memory devices, their inherent susceptibility to soft errors has grown.

Broadly speaking, there are two main causes of soft errors. The first is alpha radiation. Alpha rays consist of a stream of helium nuclei, which emit radioactive impurities. When they penetrate silicon, an electrical charge is generated. The charge builds up at the memory nodes and cause the data values to reverse. The sources of such alpha radiation are materials such as aluminum, copper, and resin that are used in the memory devices. It is therefore possible to minimize alpha radiation by carefully scrutinizing the materials used in the fabrication of memory devices.

The second main cause of soft errors is neutron radiation from outer space. Through previously not a problem for terrestrial applications, advances in recent years in the fabrication of ultrafine high-grade SRAM have made it clear that neutron radiation can in fact have an effect on earthbound electronic devices. When neutron radiation from outer space penetrates a memory chip, some of the neutrons collide with the nuclei of the silicon atoms. It is thought that this causes charged particles to be released and sets the nuclei of the silicon atoms in motion, generating large electrical charges. This is believed to be the mechanism that causes the errors. Neutron radiation presents a more difficult problem than alpha radiation because, unlike the latter, it originates outside the chip, indeed outside the earth. In addition, neutron radiation easily penetrates

Features of Advanced Low-Power SRAM

A new memory cell design combining SRAM cells and DRAM capacitors.
Cell area is greatly reduced and soft errors are virtually eliminated.

Features/Advantages for User

- Smaller chips (about half the cell size of full CMOS) in smaller packages
- Capacitor cells for dramatically improved resistance to soft errors
- 64 Mb products employ 32 Mb + 32 Mb stacked MCP* technology for the large density in the industry.

*MCP : Multi Chip Package

Main Applications

- Wide range of applications including industrial, consumer, office, and communications equipment

Advantages of advanced low-power SRAM

Reduced Cell size	Stack Load Tr.	Smaller Drive Transistors
	▲	▲
Integrated Core Technologies	TFT Transistors	DRAM Capacitors
	▼	▼
High Reliability	Latch-up free	Soft Error free
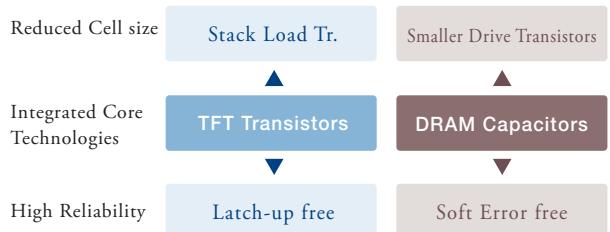
Product Specifications

► Density (configuration)	4Mb (512Kx8/256Kx16)	8Mb (1Mx8/512Kx16)	16Mb (2Mx8/1Mx16)	32Mb (4Mx8/2Mx16)	64Mb (8Mbx8/4Mbx16)
► Product No.	R1LV0408D/ R1LV0416D/R1LV0414D	R1LV0808A/ R1LV0816A	R1LV1616R	R1WV3216R/ R1LV3216R	R1WV6416R
► Operating power supply voltage	2.7V to 3.6V	2.4V to 3.6V	2.7V to 3.6V	2.7V to 3.6V	2.7V to 3.6V
► Operating current (duty=100%)	25mA(max.)	35mA(max.) 20mA(typ.)	40mA(max.) 25mA(typ.)	55mA(max.) 40mA(typ.)	60mA(max.) 45mA(typ.)
► Standby current	1µA typ. @3.0V, 25°C	1.2µA typ. @3.0V, 25°C	2µA typ. @3.0V, 25°C	4µA max. @3.0V, 25°C	8µA max. @3.0V, 25°C
► Operating temperature range	R : 0°C to 70°C I : -40°C to 85°C	I : -40°C to 85°C	R : 0°C to 70°C I : -40°C to 85°C	R : 0°C to 70°C I : -40°C to 85°C	R : 0°C to 70°C I : -40°C to 85°C
► Package	Chip / Wafer 32pin SOP 32pin sTSOP(I)/TSOP(II) 44pin TSOP(II) 48ball FBGA/Wafer Level CSP	Chip / Wafer 48pin TSOP(I) 44pin TSOP(II) 52pin µTSOP(II) 48ball FBGA	Chip / Wafer 48pin TSOP(I) 52pin µTSOP(II) 48ball FBGA/Wafer Level CSP	Chip / Wafer 48pin TSOP(I) 52pin µTSOP(II) 48ball FBGA	48pin TSOP(I) 52pin µTSOP(II) 48ball FBGA

shielding layers. Therefore, the first defense against soft errors caused by neutron radiation is to make the memory cells themselves less susceptible to having their values reversed. It is also necessary to make sure that errors that do occur will not affect neighboring cells. This is what Renesas Technology does in its advanced low-power SRAM products.

Nevertheless, it is important to recognize that soft errors do in fact occur and to put in place measures to correct them. One approach is to incorporate error checking and correction (ECC) circuitry into the memory chip. The ECC circuitry corrects soft errors automatically so that it seems from the outside that the memory operates flawlessly. The illustration below shows a neutron radiation evaluation system used by Renesas Technology. The amount of neutron radiation varies at different locations on the earth, so we collect data on neutron radiation levels in different regions worldwide. Through a combination of both basic and applied research we are finding ways to further improve the performance of our SRAM products.

Neutron Radiation Evaluation System Diagram

Sample (test board)

← Proton radiation
← Neutron radiation
■ Li plate target
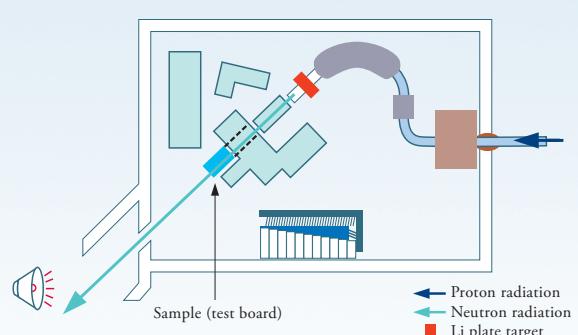
Source: NIKKEI ELECTRONICS, 2004 3-5

Fast Static Random Access Memory

Fast static random access memory meets the need for higher system speed and performance

Fast SRAM
Product Evolution

Memory for Communications Applications

- 36M/72M QDR™-II/DDR-II 600Mbps
- 18M Network SRAM 167MHz
- Even faster (1.067Gbps) 72M QDR™-II+/DDR-II+ added to product lineup.

Memory for General Industrial Applications

- 4M fast SRAM 10ns/12ns

*QDR: Quad Data Rate
*QDR and Quad Data Rate include a new family of products developed by Cypress, IDT, NEC, Samsung, and Renesas.

2009		2010			2011			
4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q

144M QDR™-II/DDR-II
144M QDR™-II+/DDR-II+

72M QDR™-II/DDR-II
72M QDR™-II+/DDR-II+

36M QDR™-II/DDR-II

18M Network SRAM

4M high-speed SRAM

LW : Late Write

■ Communications field   ■ General industrial field
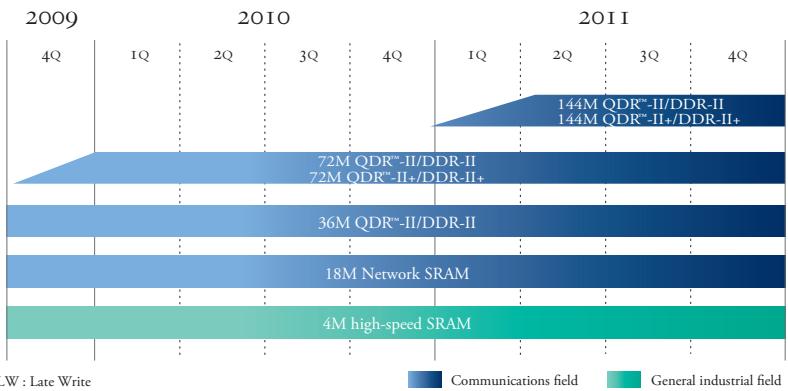
QDR™-II/DDR-II
SRAM Features and Lineup

Output occurs at a double data rate (DDR) in synchronization with the rising edge of the complementary clock signal, making this type of memory suitable for communication applications requiring large data transfer bandwidth such as routers and switches. A lineup of DDR SRAM with common I/O pin configurations is available to match a variety of applications.

World top-level transfer rate

- 300MHz, 600Mbps

Small packages

- 60% the use of a 100-pin TQFP: 165-pin BGA

Lead-containing/lead-free product support

- We are ready to respond flexibly to customer requests.

Ethernet Port — XAUI — NPU(FPGA) — Traffic Manager — SERDES — Switch Fabric

NSE/TCAM

Bridge

CPU

Flash

DRAM

Routing Buffer

Packet Buffer (QDR™-II/II+ or DDR-II/II+)

TM Buffer (QDR™-II/II+ or DDR-II/II+)

TM statistics

TM Control
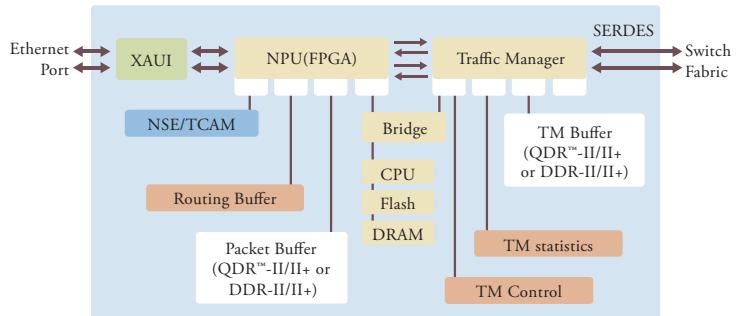
Density (bits)		36M / 72M			
Type		QDR™-II		DDR-II	
Function		2Word Burst	4Word Burst	2Word Burst(SIO/CIO)	4Word Burst(CIO)
Power supply voltage	V_{DD}	1.7V to 1.9V			
	V_{DDQ}	1.4V to VDD			
Interface		HSTL			
Bit configuration		x9 / x18 / x36			
Latency		1.5			
Operating frequency(MHz)		167 / 200 / 250		167 / 200 / 250 / 300	
Transfer rate(Mbps)		333 / 400 / 500		333 / 400 / 500 / 600	
Cycle time(ns)		6.0 / 5.0 / 4.0		6.0 / 5.0 / 4.0 / 3.3	
JTAG		Limited function of IEEE 1149.1			
Package		165ball MAP-BGA(15×17mm)			

QDR™-II+/DDR-II+ SRAM Features and Lineup

QDR™-II+ and DDR-II+ SRAM products have been added to the lineup in response to market demand for still more speed.

World top-level transfer rate

▶ 533MHz, 1.067Gbps

Built-in input termination resistor

▶ Enhanced signal integrity during high-speed operation Available settings:
105 < Rtt < 150 or 52 < Rtt < 105

▶ Product lineup also contains versions for systems requiring no termination resistors.

Extensive product lineup

▶ An extensive lineup is available to match a wide range of system designs, including lead-free and non-lead-free versions, versions with wide temperature range tolerance, and versions with and without on-die termination (OTD).

▶ Density (bits)		72M		
▶ Type		QDR™-II+	DDR-II+	
▶ Function		4Word Burst	2Word Burst (CIO/SIO)	4Word Burst (CIO)
▶ Power supply voltage	V_{DD}	1.7V to 1.9V		
	V_{DDQ}	1.4V to 1.6V		
▶ Interface		HSTL		
▶ Bit configuration		x9 / x18 / x36		
▶ Latency		2.0 or 2.5		
▶ Operating frequency(MHz)		167 / 200 / 250 / 300 / 333 / 375 / 400 / 450 / 500 / 533		
▶ Transfer rate(Mbps)		333 / 400 / 500 / 600 / 666 / 750 / 800 / 900 / 1000 / 1066		
▶ Cycle time(ns)		6.0 / 5.0 / 4.0 / 3.6 / 3.3 / 3.0 / 2.7 / 2.5 / 2.2 / 2.0 / 1.9		
▶ JTAG		Limited function of IEEE 1149.1		
▶ Package		165ball MAP-BGA (15mm x 17mm)		
▶ On-die termination		The device has incorporates an input termination resistor. The termination resistance value can be adjusted by the user by means of an RQ connected to the ZQ pin.(Selected by ODT pin) 105 < Rtt < 150 or 52 < Rtt < 105		

Network SRAM

High speed, high data rate, and large density for broadband applications

▶ Double late write/pipeline read operation enabling 100% data bus utilization makes these products ideal as buffer memory in network devices.

▶ Comprehensive 2.5V/3.3V lineup offering choice of power supply to suit various systems.

▶ Density (bits)	18M	
▶ Bit Configuration	M5M5V5A36GP	M5M5V5636GP
▶ Part No.	512K×36	
▶ Package	100-pin TQFP(16mm × 22mm)	100-pin TQFP(16mm × 22mm)
▶ Power Supply Voltage	3.3V	3.3V / 2.5V
▶ Operating Frequency	100MHz (8.5ns clock access time)	167MHz
▶ Function	Late Write and Flow-Through Read	Double Late Write and Pipeline Read

Fast SRAM Lineup

Suitable for a variety of applications, including communications, networks, and industrial equipment.

▶ Density (bits)		4Mb					
▶ Part No.		R1RP0404DGE-2PR R1RP0404DFE-2LR	R1RW0404DGE-2PR R1RW0404DGE-2LR	R1RP0408DGE-0PR R1RP0408DGE-2PR R1RP0408DGE-2LR R1RP0408DGE-2PI	R1RW0408DGE-0PR R1RW0408DGE-2PR R1RW0408DGE-2LR R1RW0408DGE-2PI	R1RP0416DGE-0PR R1RP0416DGE-2PR R1RP0416DGE-2LR R1RP0416DGE-2SR R1RP0416DGE-2PI R1RP0416DSB-0PR R1RP0416DSB-2PR R1RP0416DSB-2LR R1RP0416DSB-2SR R1RP0416DSB-2PI R1RP0416DSB-0PI	R1RW0416DGE-0PR R1RW0416DGE-2PR R1RW0416DGE-2LR R1RW0416DGE-2SR R1RW0416DGE-2PI R1RW0416DSB-0PR R1RW0416DSB-2PR R1RW0416DSB-2LR R1RW0416DSB-2SR R1RW0416DSB-2PI R1RW0416DSB-0PI
▶ Bit configuration		x4		x8		x16	
▶ Power supply voltage		5V±10%	3V±0.3V	5V±10%	3.3V±0.3V	5V±10%	3V±0.3V
▶ Access time		12ns		10ns / 12ns			
▶ Average operating current		130mA max.	100mA max.	130mA max.	100mA max.	160mA max.	130mA max.
▶ Standby current		5mA					
	L version	1.0mA max.	0.8mA max.	1.0mA max.	0.8mA max.	1.0mA max.	0.8mA max.
	S version	-	-	-	-	0.5mA max.	0.5mA max.
▶ Data retention current	L version	0.5mA max.	0.4mA max.	0.5mA max.	0.4mA max.	0.5mA max.	0.4mA max.
	S version	-	-	-	-	200µA max	200µA max.
▶ Package		32pin 400mil SOJ		36pin 400mil SOJ		44pin 400mil SOJ/TSOP II	

EEPROM

MONOS memory cells provide reliability unsurpassed by our competitors.

## Highly Reliable Memory Cell Configuration MONOS[1]

*1 : MONOS : Metal Oxide Nitride Oxide Silicon

Memory Cells Providing Robust Data Reliability

The memory cell works by storing a charge in a nitride layer sandwiched between two oxide layers. Since the charge is stored in a large trap enclosed by layers of insulation, charge leakage is minimal and the data is retained even if a defect should form in the tunnel oxide layer.

Renesas is the only manufacturer[2] to employ a MONOS configuration for EEPROM and has been producing such memory products for more than 20 years. The robustness of this type of memory is attested to by our many customers. In recent years we have begun to use MONOS memory cells in our flash MCUs.
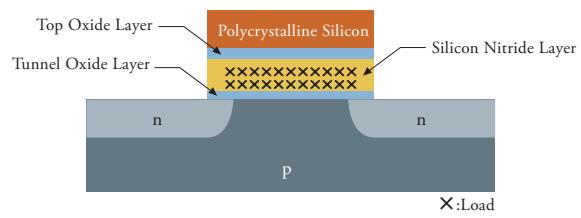
*2 : According to research conducted by Renesas.

Top Oxide Layer — Polycrystalline Silicon
Tunnel Oxide Layer — Silicon Nitride Layer
×××××××××××
×××××××××××
n   n
p
×:Load

Outline Structure of Memory Element

Roadmap

We deliver EEPROM with superior reliability and performance.

Data retention time (years)

100

10

HN58Cxxx
HN58Vxxx

HN58X24xxx
HN58X25xxx
HN58W24xxx

R1EX24xxx
R1EX25xxx

10k   100k   1000k   Rewrite cycles
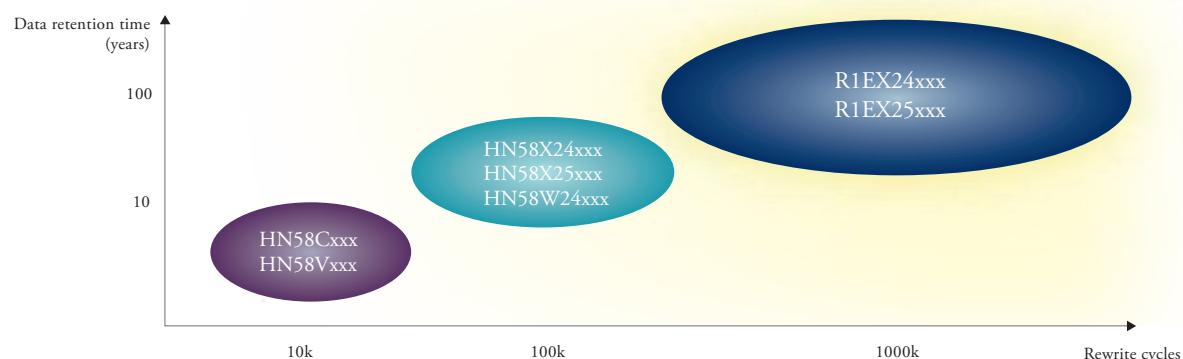
Example Applications

EEPROM is used in a wide variety of fields.

Consumer Products	Office Equipment	Communication Equipment	General Industrial Equipment
▶ Air Conditioners	▶ Multifunction Devices	▶ Radio Transceivers	▶ Meters (Power/Water/Gas)
▶ TVs	▶ Printers	▶ Camera Modules	▶ Motors
▶ Digital Cameras	▶ Projectors	▶ Fixed Telephones	▶ CCTV Cameras

Memory Density Lineup

A range of memory densities is available.

Interface	Package	Memory Density (Bits)									
		2K	4K	8K	16K	32K	64K	128K	256K	512K	1M
▶ Serial I²C-bus	TSSOP	●	●	●	●	●	●	●	●		
	SOP	●	●	●	●	●	●	●	●	●	●
▶ Serial SPI-bus	TSSOP	●	●	●	●	●	●	●	●	●	
	SOP	●	●	●	●	●	●	●	●		
▶ Parallel	TSOP						●		●		●
	SOP						●		●		●
	DIP						●		●		

Package Options

A variety of shipping configurations are available, including general-purpose packages, ultracompact packages, and wafers (with bumped wafer).

Unit [mm]

▶ SOP-8

▶ TSSOP-8

▶ TSSOP-14

▶ Wafer*/Bumped Wafers*

▶ Silicon-Fine pitch BGA*
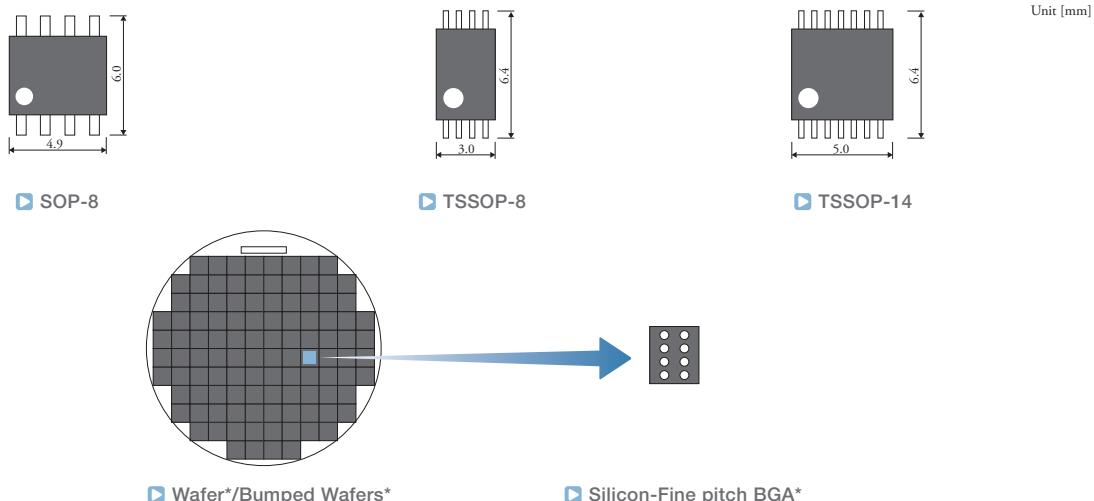
*Please contact a sales representative for details.

Shipping Preprogrammed Memory

Renesas can program EEPROM with data provided by the customer before shipment.*

Programming EEPROM can be a troublesome process.

In-House Programming

Investment in equipment.

Programing time

Outsourcing

Visible defects such as bent leads.

Several workdays are required.

▶▶▶

ℝENESAS

EEPROM is delivered with data already programmed.

Appearance and electrical characteristics guaranteed.

Can be mounted immediately.

▶ Guaranteed by Renesas.

* Please contact a Renesas sales representative regarding delivery conditions.

Highly reliable SRAM/EEPROM

We continue to develop products with high added value for automotive applications.

SRAM for automotive applications

We draw on many years of experience supplying SRAM to industrial customers as we continue to extend our lineup of products for automotive applications. We can promise our customers stable supply over the long term, and our highly reliable and large-density products will always be at the cutting edge.

Operating voltage

▶ Fast SRAM:
  5V/3V dual power supply support
▶ Low-power SRAM:
  3V support only

Range of large-density products

▶ 4Mb → 8Mb → 16Mb → 32Mb

Package compatibility and compactness

▶ TSOP

Wide operating temperature range

▶ - 40 to +105
  Special arrangements required for support over 105°C.

Superior reliability

▶ Advanced LPSRAM
  New type of memory cell combining SRAM and DRAM capacitor

Automotive-Grade SRAM Roadmap

Type	2008	2009	2010	2011	2012	2013	2014	Remarks
High-Speed SRAM					4Mb x16 0.18μm			PKG:44-TSOP CS:NOW MP:Q2/'10
Low-Power SRAM					4Mb x16 0.15μm Advanced			PKG:44-TSOP CS:NOW MP:Q2/'10
					8Mb x8/x16 0.15μm Advanced			PKG:44-TSOP, 48-TSOP CS:NOW MP:Q2/'10
					16Mb x8/x16 0.15μm Advanced			PKG:48-TSOP CS:Q3/'10 MP:Q4/'10
					32Mb x8/x16 0.15μm Advanced			PKG:48-TSOP CS:Q3/'10 MP:Q4/'10

As of Apr./10
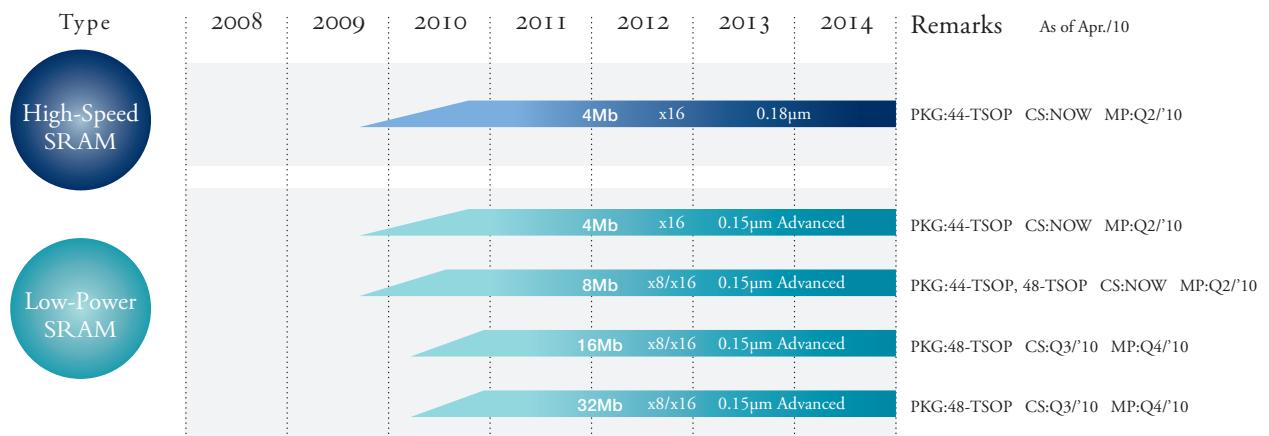
Note: Timing of sample shipments and start of mass production are subject to change without prior notice.

Automotive-Grade SRAM Lineup

Product	Density	Power supply voltage	Word size	Package	Product No.*	Remarks
▶ Fast SRAM	4Mb	4.5 to 5.5V	x16	44-TSOP	R1RP0416DSD	
		3.0 to 3.6V	x16		R1RW0416DSD	
▶ Low-power SRAM	4Mb	2.7 to 3.6V	x16	44-TSOP	R1LV0416DSD	Lead frame:Cu
	8Mb	2.7 to 3.6V	x8 / x16	44-TSOP	R1LV0816ASB	
				48-TSOP	R1LV0816ASA	
	16Mb	2.7 to 3.6V	x8 / x16	48-TSOP	R1LV1616RSF	
	32Mb	2.7 to 3.6V	x8 / x16	48-TSOP	R1LV3216RSF	

* Product numbers of automotive-grade versions are subject to change.

Serial EEPROM
for automotive applications

Our new lineup of serial EEPROM products for automotive applications provides support for the I²C bus and SPI bus specifications that are standard on Renesas MCUs. Products are available in capacities ranging from 2Kbit to 512Kbit.

Product schedule for automotive applications

▶ Versions supporting temperatures up to 85°C :
Mass production starts in fiscal 2010

▶ Versions supporting temperatures over 85°C :
Under development

Products for automotive applications

▶ Serial EEPROM
- I²C bus series
- SPI bus series

Interface	Pin assignments	Frequency	Density (bits)	Features	Trend	Renesas
I²C-bus (2-wire type)	A0 Vcc / A1 WP / A2 SCL / Vss SDA	400kHz to 1MHz	Up to 1M	● Extensive product lineup ● Support for many MCUs	↗	●
SPI-bus (3-wire type)	/S Vcc / Q /HOLD / /W C / Vss D	3MHz to 5MHz	Up to 512K	● Extensive product lineup ● High-speed performance	↗	●
Microwire-bus (3-wire type)	CS Vcc / SK NC / Di NC / Do GND	250kHz to 1MHz	Up to 16K	● Long history ● Small density ● Low speed	↘	
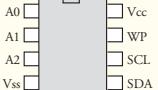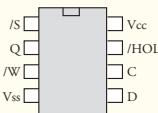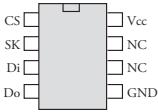
Serial EEPROM Products for automotive applications (under development)

Interface	Memory density (bits)	Memory configuration (words x bits)	Write cycle time (sec.)	Page size (bytes)	Write protect area	Operating frequency (Hz)	Power supply voltage (V)	Operating temperature range (°C)	Package SOP8	Package TSSOP8
▶ I²C bus	512K	64Kx8	5m	128	Full size	400k	1.8 to 5.5	-40 to 85	●	
	256K	32Kx8		64					●	●
	128K	16Kx8		64					●	●
	64K	8Kx8		32					●	●
	32K	4Kx8		32					●	●
	16K	2Kx8		16					●	●
	8K	1Kx8		16					●	●
	4K	512x8		16					●	●
	2K	256x8		16					●	
▶ SPI bus	512K	64Kx8	5m	128	Upper 1/4, Upper 1/2, Full size	5M / 3M*	1.8 to 5.5	-40 to 85		●
	256K	32Kx8		64					●	●
	128K	16Kx8		64					●	●
	64K	8Kx8		32					●	●
	32K	4Kx8		32					●	●
	16K	2Kx8		32					●	●
	8K	1Kx8		32					●	●
	4K	512x8		16					●	●
	2K	256x8		16					●	●

*2.5V to 5.5V / 1.8V to 5.5V

IC Function Tables

Low-Power SRAM

Memory density (bit)	Configuration (word x bit)	Part No.	Package	Access Time (ns)	Functions/Features	Power Supply Voltage (V)	Operating Ambient Temperature (°C)
▶ 64M	4Mx16/ 8Mx8	R1WV6416RSD-5SR	µTSOP(52)	55	Advanced low-power SRAM, ×8 switching by byte #, 32Mb + 32Mb stacked MCP	2.7 ~ 3.6	0 ~ 70
		R1WV6416RSD-7SR	µTSOP(52)	70			
		R1WV6416RSD-5SI	µTSOP(52)	55			-40 ~ 85
		R1WV6416RSD-7SI	µTSOP(52)	70			
		R1WV6416RSA-5SR	TSOP(48)	55			0 ~ 70
		R1WV6416RSA-7SR	TSOP(48)	70			
		R1WV6416RSA-5SI	TSOP(48)	55			-40 ~ 85
		R1WV6416RSA-7SI	TSOP(48)	70			
	4Mx16	R1WV6416RBG-5SR	FBGA(48)	55	Advanced low-power SRAM, 32Mb + 32Mb stacked MCP	2.7 ~ 3.6	0 ~ 70
		R1WV6416RBG-7SR	FBGA(48)	70			
		R1WV6416RBG-5SI	FBGA(48)	55			-40 ~ 85
		R1WV6416RBG-7SI	FBGA(48)	70			
▶ 32M	2Mx16/ 4Mx8	R1LV3216RSD-5SR	µTSOP(52)	55	Advanced low-power SRAM, 32Mb single chip, ×8 switching by byte #	2.7 ~ 3.6	0 ~ 70
		R1LV3216RSD-7SR	µTSOP(52)	70			
		R1LV3216RSD-5SI	µTSOP(52)	55			-40 ~ 85
		R1LV3216RSD-7SI	µTSOP(52)	70			
		R1LV3216RSA-5SR	TSOP(48)	55			0 ~ 70
		R1LV3216RSA-7SR	TSOP(48)	70			
		R1LV3216RSA-5SI	TSOP(48)	55			-40 ~ 85
		R1LV3216RSA-7SI	TSOP(48)	70			
	2Mx16	R1WV3216RBG-7SR	FBGA(48)	70	Advanced low-power SRAM, 16Mb + 16Mb stacked MCP	2.7 ~ 3.6	0 ~ 70
		R1WV3216RBG-7SI	FBGA(48)	70			-40 ~ 85
▶ 16M	1Mx16/ 2Mx8	R1LV1616RSD-5SR	µTSOP(52)	55*	Advanced low-power SRAM, ×8 switching by byte #	2.7 ~ 3.6	0 ~ 70
		R1LV1616RSD-7SR	µTSOP(52)	70			
		R1LV1616RSD-5SI	µTSOP(52)	55*			-40 ~ 85
		R1LV1616RSD-7SI	µTSOP(52)	70			
		R1LV1616RSA-5SR	TSOP(48)	55*			0 ~ 70
		R1LV1616RSA-7SR	TSOP(48)	70			
		R1LV1616RSA-5SI	TSOP(48)	55*			-40 ~ 85
		R1LV1616RSA-7SI	TSOP(48)	70			
		R1LV1616HSA-4SI	TSOP(48)	45	Full CMOS low-power SRAM, ×8 switching by byte #		
		R1LV1616HSA-5SI	TSOP(48)	55			
	1Mx16	R1LV1616RBG-5SR	FBGA(48)	55*	Advanced low-power SRAM	2.7 ~ 3.6	0 ~ 70
		R1LV1616RBG-7SR	FBGA(48)	70			
		R1lV1616RBG-5SI	FBGA(48)	55*			-40 ~ 85
		R1LV1616RBG-7SI	FBGA(48)	70			
		R1LV1616HBG-4SI	FBGA(48)	45	Full CMOS low-power SRAM		
		R1LV1616RBG-5SI	FBGA(48)	55			
▶ 8M	512Kx16/1Mx8	R1LV0816ASD-5SI	µTSOP(52)	55	Advanced low-power SRAM, ×8 switching by byte #	2.4 ~ 3.6	-40 ~ 85
		R1LV0816ASD-7SI	µTSOP(52)	70			
		R1LV0816ASA-5SI	TSOP(48)	55			
		R1LV0816ASA-7SI	TSOP(48)	70			
	512Kx16	R1LV0816ASB-5SI	TSOP(44)	55	Advanced low-power SRAM		
		R1LV0816ASB-7SI	TSOP(44)	70			
		R1LV0816ABG-5SI	FBGA(48)	55			
		R1LV0816ABG-7SI	FBGA(48)	70			
	1Mx8	R1LV0808ASB-5SI	TSOP(44)	55	Advanced low-power SRAM		
		R1LV0808ASB-7SI	TSOP(44)	70			
	512Kx16	HM6216514LTTI-5SL	TSOP(44)	55	Full CMOS low-power SRAM	4.5 ~ 5.5	-40 ~ 85
	1Mx8	HM628100LTTI-5SL	TSOP(44)	55			

*Please contact a Renesas Technology sales representative for details.

Low-Power SRAM

Memory density (bit)	Configuration (word x bit)	Part No.	Package	Access Time (ns)	Functions/Features	Power Supply Voltage (V)	Operating Ambient Temperature (°C)
▶ 4M	512Kx8	R1LP0408CSP-5SC	SOP(32)	55	SC: Low-standby current version (10µA), CSC Series is reverse type employing TSOP(32)	4.5 to 5.5	-20 to 70
		R1LP0408CSP-7LC	SOP(32)	70			
		R1LP0408CSB-5SC	TSOP(32)	55			
		R1LP0408CSB-7LC	TSOP(32)	70			
		R1LP0408CSC-5SC	TSOP(32)	55			
		R1LP0408CSC-7LC	TSOP(32)	70			
		R1LP0408CSP-5SI	SOP(32)	55			-40 to 85
		R1LP0408CSP-7LI	SOP(32)	70			
		R1LP0408CSB-5SI	TSOP(32)	55			
		R1LP0408CSB-7LI	TSOP(32)	70			
		R1LP0408CSC-5SI	TSOP(32)	55			
		R1LP0408CSC-7LI	TSOP(32)	70			
		R1LV0408DSP-5SR	SOP(32)	55	Advanced low-power SRAM, S: Low-standby current version (10µA)	2.7 to 3.6	0 to 70
		R1LV0408DSP-7LR	SOP(32)	70			
		R1LV0408DSA-5SR	sTSOP(32)	55			
		R1LV0408DSA-7LR	sTSOP(32)	70			
		R1LV0408DSB-5SR	TSOP(32)	55			
		R1LV0408DSB-7LR	TSOP(32)	70			
		R1LV0408DSP-5SI	SOP(32)	55			-40 to 85
		R1LV0408DSP-7LI	SOP(32)	70			
		R1LV0408DSA-5SI	sTSOP(32)	55			
		R1LV0408DSA-7LI	sTSOP(32)	70			
		R1LV0408DSB-5SI	TSOP(32)	55			
		R1LV0408DSB-7LI	TSOP(32)	70			
	256Kx16	R1LV0416DSB-5SI	TSOP(44)	55	Advanced low-power SRAM, S: Low-standby current version (10µA)	2.7 to 3.6	-40 to 85
		R1LV0416DSB-7LI	TSOP(44)	70			
		R1LV0416DBG-5SI	FBGA(48)	55			
		R1LV0416DBG-7LI	FBGA(48)	70			
		R1LV0414DSB-5SI	TSOP(44)	55	Advanced low-power SRAM, Single chip select pin type	2.7 to 3.6	
		R1LV0414DSB-7LI	TSOP(44)	70			
▶ 2M	256Kx8	M5M5V208AKV-70HI	sTSOP(32)	70		2.7 to 3.6	-40 to 85
	128Kx16	M5M5V216ATP-55HI	TSOP(44)	55		2.7 to 3.6	-40 to 85
		M5M5V216ATP-70HI	TSOP(44)	70			
▶ 1M	128Kx8	M5M51008DFP-55H	SOP(32)	55	DRV Series is reverse type employing TSOP(32)	4.5 to 5.5	0 to 70
		M5M51008DFP-70H	SOP(32)	70			
		M5M51008DVP-55H	TSOP(32)	55			
		M5M51008DVP-70H	TSOP(32)	70			
		M5M51008DRV-55H	TSOP(32)	55			
		M5M51008DRV-70H	TSOP(32)	70			
		M5M51008DKV-55H	sTSOP(32)	55			
		M5M51008DKV-70H	sTSOP(32)	70			
		M5M51008DFP-55HI	SOP(32)	55			-40 to 85
		M5M51008DFP-70HI	SOP(32)	70			
		M5M51008DVP-55HI	TSOP(32)	55			
		M5M51008DVP-70HI	TSOP(32)	70			
		M5M51008DRV-55HI	TSOP(32)	55			
		M5M51008DRV-70HI	TSOP(32)	70			
		M5M51008DKV-55HI	sTSOP(32)	55			
		M5M51008DKV-70HI	sTSOP(32)	70			
		M5M5V108DFP-70H	SOP(32)	70		2.7 to 3.6	0 to 70
		M5M5V108DVP-70H	TSOP(32)	70			
		M5M5V108DKV-70H	sTSOP(32)	70			
		M5M5V108DFP-70HI	SOP(32)	70			-40 to 85
		M5M5V108DVP-70HI	TSOP(32)	70			
		M5M5V108DKV-70HI	sTSOP(32)	70			
▶ 256k	32Kx8	M5M5256DFP-55LL	SOP(28)	55	XL version: Ultralow-standby current version (5µA)	4.5 to 5.5	0 to 70
		M5M5256DFP-55XL	SOP(28)	55			
		M5M5256DFP-70LL	SOP(28)	70			
		M5M5256DFP-70XL	SOP(28)	70			
		M5M5256DVP-55LL	TSOP(28)	55			
		M5M5256DVP-55XL	TSOP(28)	55			
		M5M5256DVP-70LL	TSOP(28)	70			
		M5M5256DVP-70XL	TSOP(28)	70			
		M5M5256DFP-70LLI	SOP(28)	70			-40 to 85
		M5M5256DVP-70LLI	TSOP(28)	70			
		M5M5256DFP-70G	SOP(28)	70	XG version: Ultralow-standby current version (2.4µA) (Vcc=3.0-3.6V)	3.0 to 3.6 & 4.5 to 5.5	0 to 70
		M5M5256DFP-70XG	SOP(28)	70			
		M5M5256DVP-70G	TSOP(28)	70			
		M5M5256DVP-70XG	TSOP(28)	70			
		M5M5256DFP-70GI	SOP(28)	70			-40 to 85
		M5M5256DVP-70GI	TSOP(28)	70			

*Please contact a Renesas Technology sales representative for details.

IC Function Tables

Fast SRAM
Asynchronous SRAM

Memory density (bit)	Configuration (word x bit)	Part No.	Package	Access Time (ns)	Functions/Features	Power Supply Voltage (V)	Operating Ambient Temperature (°C)
▶ 4M	1Mx4	R1RW0404DGE-2PR	SOJ(32)	12	L: Low-standby current version (0.8mA)	3.0 to 3.6	0 to 70
		R1RW0404DGE-2LR	SOJ(32)	12			
		R1RP0404DGE-2PR	SOJ(32)	12	L: Low-standby current version (0.8mA)	4.5 to 5.5	0 to 70
		R1RP0404DGE-2LR	SOJ(32)	12			
	512Kx8	R1RW0408DGE-0PR	SOJ(36)	12	L: Low-standby current version (0.8mA)	3.0 to 3.6	0 to 70
		R1RW0408DGE-2PR	SOJ(36)	12			
		R1RW0408DGE-2LR	SOJ(36)	12			
		R1RW0408DGE-2PI	SOJ(36)	12			-40 to 85
		R1RP0408DGE-0PR	SOJ(36)	12	L: Low-standby current version (0.8mA)	4.5 to 5.5	0 to 70
		R1RP0408DGE-2PR	SOJ(36)	12			
		R1RP0408DGE-2LR	SOJ(36)	12			
		R1RP0408DGE-2PI	SOJ(36)	12			
	256Kx16	R1RW0416DGE-0PR	SOJ(44)	10	L: Low-standby current version (0.8mA) S: Ultralow-standby current version (0.5mA)	3.0 to 3.6	0 to 70
		R1RW0416DSB-0PI	TSOP(44)	10			-40 to 85
		R1RW0416DGE-2PR	SOJ(44)	12			0 to 70
		R1RW0416DGE-2LR	SOJ(44)	12			
		R1RW0416DGE-2SR	SOJ(44)	12			
		R1RW0416DGE-2PI	SOJ(44)	12			
		R1RW0416DSB-0PR	TSOP(44)	10			-40 to 85
		R1RW0416DSB-2PR	TSOP(44)	12			0 to 70
		R1RW0416DSB-2LR	TSOP(44)	12			
		R1RW0416DSB-2SR	TSOP(44)	12			
		R1RW0416DSB-2PI	TSOP(44)	12			-40 to 85
		R1RP0416DGE-0PR	SOJ(44)	10	L: Low-standby current version (0.8mA) S: Ultralow-standby current version (0.5mA)	4.5 to 5.5	0 to 70
		R1RP0416DSB-0PI	TSOP(44)	10			-40 to 85
		R1RP0416DGE-2PR	SOJ(44)	12			0 to 70
		R1RP0416DGE-2LR	SOJ(44)	12			
		R1RP0416DGE-2SR	SOJ(44)	12			
		R1RP0416DGE-2PI	SOJ(44)	12			-40 to 85
		R1RP0416DSB-0PR	TSOP(44)	10			0 to 70
		R1RP0416DSB-2PR	TSOP(44)	12			
		R1RP0416DSB-2LR	TSOP(44)	12			
		R1RP0416DSB-2SR	TSOP(44)	12			
		R1RP0416DSB-2PI	TSOP(44)	12			-40 to 85

Network SRAM

Memory density (bit)	Configuration (word x bit)	Part No.	Package	Operating Frequency(MHz)	Functions / Features	Power Supply Voltage V_{DD} (V)	I/O Power Supply Voltage V_{DDQ} (V)	Operating Ambient Temperature (°C)
▶ 18M	512Kx36	M5M5V5A36GP-85	TQFP(100)	100	Flow-Through Read Access time:8.55ns	3.3 ± 0.165	3.3	0 to 70
		M5M5V5636GP-16I	TQFP(100)	167	Pipeline Read Double Late Write	3.3 ± 0.165	3.3/2.5	-40 to 85
						2.5 ± 0.125	2.5	

36MQDR™ SRAM Series

Memory density (bit)	Configuration (word x bit)	Part No.	Package	Operating Frequency(MHz)	Functions / Features	Power Supply Voltage (V)	I/O Power Supply Voltage (V)	Operating Ambient Temperature (°C)
▶ 36M	4Mx9	R1Q2A3609BBG-40R	BGA(165)	250	QDR™-II 2 Word Burst HSTL interface	1.7 to 1.9	1.5/1.8 typ.	0 to 70
		R1Q2A3609BBG-50R	BGA(165)	200				
		R1Q2A3609BBG-60R	BGA(165)	167				
		R1Q3A3609BBG-33R	BGA(165)	300	QDR™-II 4 Word Burst HSTL interface			
		R1Q3A3609BBG-40R	BGA(165)	250				
		R1Q3A3609BBG-50R	BGA(165)	200				
		R1Q3A3609BBG-60R	BGA(165)	167				
	2Mx18	R1Q4A3618BBG-33R	BGA(165)	300	DDR-II 2 Word Burst HSTL interface			
		R1Q4A3618BBG-40R	BGA(165)	250				
		R1Q5A3618BBG-33R	BGA(165)	300	DDR-II 4 Word Burst HSTL interface			
		R1Q5A3618BBG-40R	BGA(165)	250				
		R1Q2A3618BBG-40R	BGA(165)	250	QDR™-II 2 Word Burst HSTL interface			
		R1Q2A3618BBG-50R	BGA(165)	200				
		R1Q2A3618BBG-60R	BGA(165)	167				
		R1Q3A3618BBG-33R	BGA(165)	300	QDR™-II 4 Word Burst HSTL interface			
		R1Q3A3618BBG-40R	BGA(165)	250				
		R1Q3A3618BBG-50R	BGA(165)	200				
		R1Q3A3618BBG-60R	BGA(165)	167				
	1Mx36	R1Q4A3636BBG-33R	BGA(165)	300	DDR-II 2 Word Burst HSTL interface			
		R1Q4A3636BBG-40R	BGA(165)	250				
		R1Q5A3636BBG-33R	BGA(165)	300	DDR-II 4 Word Burst HSTL interface			
		R1Q5A3636BBG-40R	BGA(165)	250				
		R1Q2A3636BBG-40R	BGA(165)	250	QDR™-II 2 Word Burst HSTL interface			
		R1Q2A3636BBG-50R	BGA(165)	200				
		R1Q2A3636BBG-60R	BGA(165)	167				
		R1Q3A3636BBG-33R	BGA(165)	300	QDR™-II 4 Word Burst HSTL interface			
		R1Q3A3636BBG-40R	BGA(165)	250				
		R1Q3A3636BBG-50R	BGA(165)	200				
		R1Q3A3636BBG-60R	BGA(165)	167				

Notes
1. When ordering the lead-free version, append "B0" to the end of the product number (example: R1Q2A3609BBG-50RB0).
2. When ordering the wide operating temperature range version, replace the "R" at the end of the product number with "I" (example: R1Q2A3609BBG-50I).

IC Function Tables

Memory Density (bit)	Configuration (word x bit)	Part No.	Package	Operating Frequency(MHz)	Functions / Features	Power Supply Voltage (V)	I/O Power Supply Voltage (V)	Operating Ambient Temperature (°C)
▶ 72M	8Mx9	R1Q2A7209RBG-40RA0	BGA(165)	250	QDR™-II 2 Word Burst HSTL interface	1.7 to 1.9	1.5/1.8 typ.	0 to 70
		R1Q2A7209RBG-50RA0	BGA(165)	200				
		R1Q3A7209RBG-40RA0	BGA(165)	250	QDR™-II 4 Word Burst HSTL interface			
		R1Q3A7209RBG-50RA0	BGA(165)	200				
		R1Q4A7209RBG-40RA0	BGA(165)	250	DDR-II 2 Word Burst HSTL interface			
		R1Q4A7209RBG-50RA0	BGA(165)	200				
		R1Q5A7209RBG-40RA0	BGA(165)	250	DDR-II 4 Word Burst HSTL interface			
		R1Q5A7209RBG-50RA0	BGA(165)	200				
	4Mx18	R1Q4A7218RBG-30RA0	BGA(165)	333	DDR-II 2 Word Burst HSTL interface			
		R1Q4A7218RBG-33RA0	BGA(165)	300				
		R1Q4A7218RBG-40RA0	BGA(165)	250				
		R1Q5A7218RBG-30RA0	BGA(165)	333	DDR-II 4 Word Burst HSTL interface			
		R1Q5A7218RBG-33RA0	BGA(165)	300				
		R1Q5A7218RBG-40RA0	BGA(165)	250				
		R1Q2A7218RBG-40RA0	BGA(165)	250	QDR™-II 2 Word Burst HSTL interface			
		R1Q2A7218RBG-50RA0	BGA(165)	200				
		R1Q3A7218RBG-30RA0	BGA(165)	333	QDR™-II 4 Word Burst HSTL interface			
		R1Q3A7218RBG-33RA0	BGA(165)	300				
		R1Q3A7218RBG-40RA0	BGA(165)	250				
	2Mx36	R1Q4A7236RBG-30RA0	BGA(165)	333	DDR-II 2 Word Burst HSTL interface			
		R1Q4A7236RBG-33RA0	BGA(165)	300				
		R1Q4A7236RBG-40RA0	BGA(165)	250				
		R1Q5A7236RBG-30RA0	BGA(165)	333	DDR-II 4 Word Burst HSTL interface			
		R1Q5A7236RBG-33RA0	BGA(165)	300				
		R1Q5A7236RBG-40RA0	BGA(165)	250				
		R1Q2A7236RBG-40RA0	BGA(165)	250	QDR™-II 2 Word Burst HSTL interface			
		R1Q2A7236RBG-50RA0	BGA(165)	200				
		R1Q3A7236RBG-30RA0	BGA(165)	333	QDR™-II 4 Word Burst HSTL interface			
		R1Q3A7236RBG-33RA0	BGA(165)	300				
		R1Q3A7236RBG-40RA0	BGA(165)	250				

Notes
1. When ordering the lead-free version, replace the "A0" at the end of the product number with "B0" (example: R1Q2A7209RBG-40RB0).
2. When ordering the wide operating temperature range version, replace the "R" at the end of the product number with "I" (example: R1Q2A7209RBG-40I).

72MQDR™
-II+ SRAM Series (Latency 2.5, No ODT)

Memory Density (bit)	Configuration (word x bit)	Part No.	Package	Operating Frequency(MHz)	Functions / Features	Power Supply Voltage (V)	I/O Power Supply Voltage (V)	Operating Ambient Temperature (°C)
▶ 72M	8Mx9	R1QAA7209RBG-22RA0	BGA(165)	450	QDR™-II+ 4 Word Burst HSTL interface Latency 2.5, No ODT	1.7 to 1.9	1.5V typ.	0 to 70
		R1QAA7209RBG-25RA0	BGA(165)	400				
		R1QBA7209RBG-22RA0	BGA(165)	450	DDR-II+ 2 Word Burst HSTL interface Latency 2.5, No ODT			
		R1QBA7209RBG-25RA0	BGA(165)	400				
		R1QCA7209RBG-22RA0	BGA(165)	450	DDR-II+ 4 Word Burst HSTL interface Latency 2.5, No ODT			
		R1QCA7209RBG-25RA0	BGA(165)	400				
	4Mx18	R1QAA7218RBG-19RA0	BGA(165)	533	QDR™-II+ 4 Word Burst HSTL interface Latency 2.5, No ODT			
		R1QAA7218RBG-20RA0	BGA(165)	500				
		R1QAA7218RBG-22RA0	BGA(165)	450				
		R1QBA7218RBG-19RA0	BGA(165)	533	DDR-II+ 2 Word Burst HSTL interface Latency 2.5, No ODT			
		R1QBA7218RBG-20RA0	BGA(165)	500				
		R1QBA7218RBG-22RA0	BGA(165)	450				
		R1QCA7218RBG-19RA0	BGA(165)	533	DDR-II+ 4 Word Burst HSTL interface Latency 2.5, No ODT			
		R1QCA7218RBG-20RA0	BGA(165)	500				
		R1QCA7218RBG-22RA0	BGA(165)	450				
	2Mx36	R1QAA7236RBG-19RA0	BGA(165)	533	QDR™-II+ 4 Word Burst HSTL interface Latency 2.5, No ODT			
		R1QAA7236RBG-20RA0	BGA(165)	500				
		R1QAA7236RBG-22RA0	BGA(165)	450				
		R1QBA7236RBG-19RA0	BGA(165)	533	DDR-II+ 2 Word Burst HSTL interface Latency 2.5, No ODT			
		R1QBA7236RBG-20RA0	BGA(165)	500				
		R1QBA7236RBG-22RA0	BGA(165)	450				
		R1QCA7236RBG-19RA0	BGA(165)	533	DDR-II+ 4 Word Burst HSTL interface Latency 2.5, No ODT			
		R1QCA7236RBG-20RA0	BGA(165)	500				
		R1QCA7236RBG-22RA0	BGA(165)	450				

Notes
1. When ordering the lead-free version, replace the "A0" at the end of the product number with "B0" (example: R1QAA7209RBG-22RB0).
2. When ordering the wide operating temperature range version, replace the "R" at the end of the product number with "I" (example: R1QAA7209RBG-22I).
3. ODT stands for "on-die termination."

IC Function Tables

-II+ SRAM Series (Latency 2.5, With ODT)

Memory Density (bit)	Configuration (word x bit)	Part No.	Package	Operating Frequency(MHz)	Functions / Features	Power Supply Voltage (V)	I/O Power Supply Voltage (V)	Operating Ambient Temperature (°C)
▶ 72M	8Mx9	R1QDA7209RBG-22RA0	BGA(165)	450	QDR™-II+ 4 Word Burst HSTL interface Latency 2.5, With ODT	1.7 to 1.9	1.5V typ.	0 to 70
		R1QDA7209RBG-25RA0	BGA(165)	400				
		R1QEA7209RBG-22RA0	BGA(165)	450	DDR-II+ 2 Word Burst HSTL interface Latency 2.5, With ODT			
		R1QEA7209RBG-25RA0	BGA(165)	400				
		R1QFA7209RBG-22RA0	BGA(165)	450	DDR-II+ 4 Word Burst HSTL interface Latency 2.5, With ODT			
		R1QFA7209RBG-25RA0	BGA(165)	400				
	4Mx18	R1QDA7218RBG-19RA0	BGA(165)	533	QDR™-II+ 4 Word Burst HSTL interface Latency 2.5, With ODT			
		R1QDA7218RBG-20RA0	BGA(165)	500				
		R1QDA7218RBG-22RA0	BGA(165)	450				
		R1QEA7218RBG-19RA0	BGA(165)	533	DDR-II+ 2 Word Burst HSTL interface Latency 2.5, With ODT			
		R1QEA7218RBG-20RA0	BGA(165)	500				
		R1QEA7218RBG-22RA0	BGA(165)	450				
		R1QFA7218RBG-19RA0	BGA(165)	533	DDR-II+ 4 Word Burst HSTL interface Latency 2.5, With ODT			
		R1QFA7218RBG-20RA0	BGA(165)	500				
		R1QFA7218RBG-22RA0	BGA(165)	450				
	2M x 36	R1QDA7236RBG-19RA0	BGA(165)	533	QDR™-II+ 4 Word Burst HSTL interface Latency 2.5, With ODT			
		R1QDA7236RBG-20RA0	BGA(165)	500				
		R1QDA7236RBG-22RA0	BGA(165)	450				
		R1QEA7236RBG-19RA0	BGA(165)	533	DDR-II+ 2 Word Burst HSTL interface Latency 2.5, With ODT			
		R1QEA7236RBG-20RA0	BGA(165)	500				
		R1QEA7236RBG-22RA0	BGA(165)	450				
		R1QFA7236RBG-19RA0	BGA(165)	533	DDR-II+ 4 Word Burst HSTL interface Latency 2.5, With ODT			
		R1QFA7236RBG-20RA0	BGA(165)	500				
		R1QFA7236RBG-22RA0	BGA(165)	450				

Notes
1. When ordering the lead-free version, replace the "A0" at the end of the product number with "B0" (example: R1QDA7209RBG-22RB0).
2. When ordering the wide operating temperature range version, replace the "R" at the end of the product number with "I" (example: R1QDA7209RBG-22I).
3. ODT stands for "on-die termination."

72MQDR™
-II+ SRAM Series (Latency 2.0, No ODT)

Memory Density (bit)	Configuration (word x bit)	Part No.	Package	Operating Frequency(MHz)	Functions / Features	Power Supply Voltage (V)	I/O Power Supply Voltage (V)	Operating Ambient Temperature (°C)
▶ 72M	8Mx9	R1QGA7209RBG-27RA0	BGA(165)	375	QDR™-II+ 4 Word Burst HSTL interface Latency 2.0, No ODT	1.7 to 1.9	1.5V typ.	0 to 70
		R1QGA7209RBG-30RA0	BGA(165)	333				
		R1QHA7209RBG-27RA0	BGA(165)	375	DDR-II+ 2 Word Burst HSTL interface Latency 2.0, No ODT			
		R1QHA7209RBG-30RA0	BGA(165)	333				
		R1QJA7209RBG-27RA0	BGA(165)	375	DDR-II+ 4 Word Burst HSTL interface Latency 2.0, No ODT			
		R1QJA7209RBG-30RA0	BGA(165)	333				
	4Mx18	R1QGA7218RBG-22RA0	BGA(165)	450	QDR™-II+ 4 Word Burst HSTL interface Latency 2.0, No ODT			
		R1QGA7218RBG-25RA0	BGA(165)	400				
		R1QHA7218RBG-22RA0	BGA(165)	450	DDR-II+ 2 Word Burst HSTL interface Latency 2.0, No ODT			
		R1QHA7218RBG-25RA0	BGA(165)	400				
		R1QJA7218RBG-22RA0	BGA(165)	450	DDR-II+ 4 Word Burst HSTL interface Latency 2.0, No ODT			
		R1QJA7218RBG-25RA0	BGA(165)	400				
	2M x 36	R1QGA7236RBG-22RA0	BGA(165)	450	QDR™-II+ 4 Word Burst HSTL interface Latency 2.0, No ODT			
		R1QGA7236RBG-25RA0	BGA(165)	400				
		R1QHA7236RBG-22RA0	BGA(165)	450	DDR-II+ 2 Word Burst HSTL interface Latency 2.0, No ODT			
		R1QHA7236RBG-25RA0	BGA(165)	400				
		R1QJA7236RBG-22RA0	BGA(165)	450	DDR-II+ 4 Word Burst HSTL interface Latency 2.0, No ODT			
		R1QJA7236RBG-25RA0	BGA(165)	400				

Notes
1. When ordering the lead-free version, replace the "A0" at the end of the product number with "B0" (example: R1QAA7209RBG-22RB0).
2. When ordering the wide operating temperature range version, replace the "R" at the end of the product number with "I" (example: R1QAA7209RBG-22I)
3. ODT stands for "on-die termination."

72MQDR™
-II+ SRAM Series (Latency 2.0, With ODT)

Memory Density (bit)	Configuration (word x bit)	Part No.	Package	Operating Frequency(MHz)	Functions / Features	Power Supply Voltage (V)	I/O Power Supply Voltage (V)	Operating Ambient Temperature (°C)
▶ 72M	8Mx9	R1QKA7209RBG-27RA0	BGA(165)	375	QDR™-II+ 4 Word Burst HSTL interface Latency 2.0, With ODT	1.7 to 1.9	1.5V typ.	0 to 70
		R1QKA7209RBG-30RA0	BGA(165)	333				
		R1QLA7209RBG-27RA0	BGA(165)	375	DDR-II+ 2 Word Burst HSTL interface Latency 2.0, With ODT			
		R1QLA7209RBG-30RA0	BGA(165)	333				
		R1QMA7209RBG-27RA0	BGA(165)	375	DDR-II+ 4 Word Burst HSTL interface Latency 2.0, With ODT			
		R1QMA7209RBG-30RA0	BGA(165)	333				
	4Mx18	R1QKA7218RBG-22RA0	BGA(165)	450	QDR™-II+ 4 Word Burst HSTL interface Latency 2.0, With ODT			
		R1QKA7218RBG-25RA0	BGA(165)	400				
		R1QLA7218RBG-22RA0	BGA(165)	450	DDR-II+ 2 Word Burst HSTL interface Latency 2.0, With ODT			
		R1QLA7218RBG-25RA0	BGA(165)	400				
		R1QMA7218RBG-22RA0	BGA(165)	450	DDR-II+ 4 Word Burst HSTL interface Latency 2.0, With ODT			
		R1QMA7218RBG-25RA0	BGA(165)	400				
	2M x 36	R1QKA7236RBG-22RA0	BGA(165)	450	QDR™-II+ 4 Word Burst HSTL interface Latency 2.0, With ODT			
		R1QKA7236RBG-25RA0	BGA(165)	400				
		R1QLA7236RBG-22RA0	BGA(165)	450	DDR-II+ 2 Word Burst HSTL interface Latency 2.0, With ODT			
		R1QLA7236RBG-25RA0	BGA(165)	400				
		R1QMA7236RBG-22RA0	BGA(165)	450	DDR-II+ 4 Word Burst HSTL interface Latency 2.0, With ODT			
		R1QMA7236RBG-25RA0	BGA(165)	400				

Notes
1. When ordering the lead-free version, replace the "A0" at the end of the product number with "B0" (example: R1QAA7209RBG-22RB0).
2. When ordering the wide operating temperature range version, replace the "R" at the end of the product number with "I" (example: R1QAA7209RBG-22I)
3. ODT stands for "on-die termination."

IC Function Tables

Serial EEPROM
Industrial Grade

Interface	Memory Density (bit)	Configuration (word x bit)	Part No.	Package	Write Cycle Time (ms)	Operating Frequency (Hz)	Write Protect Area	Page Size (Byte)	Power Supply Voltage (V)	Operating Ambient Temperature (°C)
▶ I²C bus	1M	128Kx8	HN58W241000FPIAG	SOP(8)W	5	1M	Full size	256	2.5 to 3.6	-40 to 85
	512K	64Kx8	R1EX24512ASAS0I	SOP(8)		400k	Full size	128	1.8 to 5.5	
			R1EX24512BSAS0I	SOP(8)						
	256K	32Kx8	R1EX24256ASAS0I	SOP(8)			Full size	64		
			R1EX24256BSAS0I ★★	SOP(8)						
			R1EX24256ATBS0I	TSSOP(14)						
			R1EX24256BTAS0I ★★	TSSOP(8)						
			R1EX24256ASA00I	SOP(8)			Upper 1/8			
			R1EX24256BSA00I ★★	SOP(8)						
			R1EX24256ATB00I	TSSOP(14)						
			R1EX24256BTA00I ★★	TSSOP(8)						
	128K	16Kx8	R1EX24128ASAS0I	SOP(8)			Full size	64		
			R1EX24128BSAS0I ★★	SOP(8)						
			R1EX24128ATAS0I	TSSOP(8)						
			R1EX24128BTAS0I ★★	TSSOP(8)						
			R1EX24128ASA00I	SOP(8)			Upper 1/8			
			R1EX24128BSA00I ★★	SOP(8)						
			R1EX24128ATA00I	TSSOP(8)						
			R1EX24128BTA00I ★★	TSSOP(8)						
	64K	8K x 8	R1EX24064ASAS0I	SOP(8)			Full size	32		
			R1EX24064ATAS0I	TSSOP(8)						
			R1EX24064ASA00I	SOP(8)			Upper 1/4			
			R1EX24064ATA00I	TSSOP(8)						
	32K	4K x 8	R1EX24032ASAS0I	SOP(8)			Full size	32		
			R1EX24032ATAS0I	TSSOP(8)						
			R1EX24032ASA00I	SOP(8)			Upper 1/4			
			R1EX24032ATA00I	TSSOP(8)						
	16K	2K x 8	R1EX24016ASAS0I	SOP(8)			Full size	16		
			R1EX24016ATAS0I	TSSOP(8)						
			R1EX24016ASA00I	SOP(8)			Upper 1/2			
			R1EX24016ATA00I	TSSOP(8)						
	8K	1K x 8	R1EX24008ASAS0I	SOP(8)			Full size	16		
			R1EX24008ATAS0I	TSSOP(8)						
			R1EX24008ASA00I	SOP(8)			Upper 1/2			
			R1EX24008ATA00I	TSSOP(8)						
	4K	512 x 8	R1EX24004ASAS0I	SOP(8)			Full size	16		
			R1EX24004ATAS0I	TSSOP(8)						
	2K	256 x 8	R1EX24002ASAS0I	SOP(8)			Full size	16		
			R1EX24002ATAS0I	TSSOP(8)						
▶ SPI bus	512K	64Kx8	R1EX25512ATA00I	TSSOP(8)	5	5M/3M*1	Upper 1/4, Upper 1/2, Full size	128	1.8 to 5.5	-40 to 85
	256K	32Kx8	HN58X25256FPIAG	SOP(8)				64		
			R1EX25256ASA00I ★★	SOP(8)						
			HN58X25256TIAG	TSSOP(14)						
			R1EX25256ATA00I ★★	TSSOP(8)						
	128K	16Kx8	HN58X25128FPIAG	SOP(8)				64		
			R1EX25128ASA00I ★★	SOP(8)						
			HN58X25128TIAG	TSSOP(14)						
			R1EX25128ATA00I ★★	TSSOP(8)						
	64K	8Kx8	R1EX25064ASA00I	SOP(8)				32		
			R1EX25064ATA00I	TSSOP(8)						
	32K	4Kx8	R1EX25032ASA00I	SOP(8)				32		
			R1EX25032ATA00I	TSSOP(8)						
	16K	2K x 8	R1EX25016ASA00I	SOP(8)				32		
			R1EX25016ATA00I	TSSOP(8)						
	8K	1Kx8	R1EX25008ASA00I	SOP(8)				32		
			R1EX25008ATA00I	TSSOP(8)						
	4K	512x8	R1EX25004ASA00I	SOP(8)				16		
			R1EX25004ATA00I	TSSOP(8)						
	2K	256x8	R1EX25002ASA00I	SOP(8)				16		
			R1EX25002ATA00I	TSSOP(8)						

*1 Vcc=2.5 to 5.5V / 1.8 to 5.5V
★★ Under development

Serial EEPROM
Consumer Grade

Interface	Memory Density (bit)	Configuration (word x bit)	Part No.	Package	Write Cycle Time (ms)	Operating Frequency (Hz)	Write Protect Area	Page Size (Byte)	Power Supply Voltage (V)	Operating Ambient Temperature (°C)
▶ I²C bus	1M	128Kx8	HN58W241000FPI	SOP(8)W	5	1M	Full size	256	2.5 to 3.6	-40 to 85
	512K	64Kx8	R1EX24512ASAS0A	SOP(8)		400k	Full size	128	1.8 to 5.5	
			R1EX24512BSAS0A ★★	SOP(8)						
	256K	32Kx8	R1EX24256ASAS0A	SOP(8)			Full size	64		
			R1EX24256BSAS0A ★★	SOP(8)						
			R1EX24256ATBS0A	TSSOP(14)						
			R1EX24256BTAS0A★★	TSSOP(8)						
			R1EX24256ASA00A	SOP(8)			Upper 1/8			
			R1EX24256BSA00A ★★	SOP(8)						
			R1EX24256ATB00A	TSSOP(14)						
			R1EX24256BTA00A★★	TSSOP(8)						
	128K	16Kx8	R1EX24128ASAS0A	SOP(8)			Full size	64		
			R1EX24128BSAS0A ★★	SOP(8)						
			R1EX24128ATAS0A	TSSOP(8)						
			R1EX24128BTAS0A ★★	TSSOP(8)						
			R1EX24128ASA00A	SOP(8)			Upper 1/8			
			R1EX24128BSA00A ★★	SOP(8)						
			R1EX24128ATA00A	TSSOP(8)						
			R1EX24128BTA00A★★	TSSOP(8)						
	64K	8K x 8	R1EX24064ASAS0A	SOP(8)			Full size	32		
			R1EX24064ATAS0A	TSSOP(8)						
			R1EX24064ASA00A	SOP(8)			Upper 1/4			
			R1EX24064ATA00A	TSSOP(8)						
	32K	4K x 8	R1EX24032ASAS0A	SOP(8)			Full size	32		
			R1EX24032ATAS0A	TSSOP(8)						
			R1EX24032ASA00A	SOP(8)			Upper 1/4			
			R1EX24032ATA00A	TSSOP(8)						
	16K	2K x 8	R1EX24016ASAS0A	SOP(8)			Full size	16		
			R1EX24016ATAS0A	TSSOP(8)						
			R1EX24016ASA00A	SOP(8)			Upper 1/2			
			R1EX24016ATA00A	TSSOP(8)						
	8K	1K x 8	R1EX24008ASAS0A	SOP(8)			Full size	16		
			R1EX24008ATAS0A	TSSOP(8)						
			R1EX24008ASA00A	SOP(8)			Upper 1/2			
			R1EX24008ATA00A	TSSOP(8)						
	4K	512 x 8	R1EX24004ASAS0A	SOP(8)			Full size	16		
			R1EX24004ATAS0A	TSSOP(8)						
	2K	256 x 8	R1EX24002ASAS0A	SOP(8)			Full size	16		
			R1EX24002ATAS0A	TSSOP(8)						
▶ SPI bus	512K	64Kx8	R1EX25512ATA00A	TSSOP(8)	5	5M/3M*1	Upper 1/4, Upper 1/2, Full size	128	1.8 to 5.5	-40 to 85
	256K	32Kx8	HN58X25256FPI	SOP(8)				64		
			R1EX25256ASA00A ★★	SOP(8)						
			HN58X25256TI	TSSOP(14)						
			R1EX25256ATA00A★★	TSSOP(8)						
	128K	16Kx8	HN58X25128FPI	SOP(8)				64		
			R1EX25128ASA00A ★★	SOP(8)						
			HN58X25128TI	TSSOP(14)						
			R1EX25128ATA00A★★	TSSOP(8)						
	64K	8Kx8	R1EX25064ASA00A	SOP(8)				32		
			R1EX25064ATA00A	TSSOP(8)						
	32K	4Kx8	R1EX25032ASA00A	SOP(8)				32		
			R1EX25032ATA00A	TSSOP(8)						
	16K	2K x 8	R1EX25016ASA00A	SOP(8)				32		
			R1EX25016ATA00A	TSSOP(8)						
	8K	1Kx8	R1EX25008ASA00A	SOP(8)				32		
			R1EX25008ATA00A	TSSOP(8)						
	4K	512x8	R1EX25004ASA00A	SOP(8)				16		
			R1EX25004ATA00A	TSSOP(8)						
	2K	256x8	R1EX25002ASA00A	SOP(8)				16		
			R1EX25002ATA00A	TSSOP(8)						

*1 Vcc=2.5 to 5.5V / 1.8 to 5.5V
★★ Under development

IC Function Tables

Serial EEPROM
Automotive (Accessory) Grade

Interface	Memory Density (bit)	Part No.	Package	Write Cycle Time (ms)	Operating Frequency (Hz)	Write Protect Area	Page Size (Byte)	Power Supply Voltage (V)	Operating Ambient Temperature (°C)
▶ I²C bus	512K	R1EX24512BSAS0P★★	SOP(8)	5	400k	Full size	128	1.8 to 5.5	-40 to 85
	256K	R1EX24256BSAS0P★★	SOP(8)				64		
		R1EX24256BTAS0P★★	TSSOP(8)						
	128K	R1EX24128BSAS0P★★	SOP(8)				64		
		R1EX24128BTAS0P★★	TSSOP(8)						
	64K	R1EX24064ASAS0P★★	SOP(8)				32		
		R1EX24064ATAS0P★★	TSSOP(8)						
	32K	R1EX24032ASAS0P★★	SOP(8)				32		
		R1EX24032ATAS0P★★	TSSOP(8)						
	16K	R1EX24016ASAS0P★★	SOP(8)				16		
		R1EX24016ATAS0P★★	TSSOP(8)						
	8K	R1EX24008ASAS0P★★	SOP(8)				16		
		R1EX24008ATAS0P★★	TSSOP(8)						
	4K	R1EX24004ASAS0P★★	SOP(8)				16		
		R1EX24004ATAS0P★★	TSSOP(8)						
	2K	R1EX24002ASAS0P★★	SOP(8)				16		
		R1EX24002ATAS0P★★	TSSOP(8)						
▶ SPI bus	512K	R1EX25512ATA00P★★	TSSOP(8)	5	5M/3M*1	Upper 1/4, Upper 1/2, Full size	128	1.8 to 5.5	-40 to 85
	256K	R1EX25256ASA00P★★	SOP(8)				64		
		R1EX25256ATA00P★★	TSSOP(8)						
	128K	R1EX25128ASA00P★★	SOP(8)				64		
		R1EX25128ATA00P★★	TSSOP(8)						
	64K	R1EX25064ASA00P★★	SOP(8)				32		
		R1EX25064ATA00P★★	TSSOP(8)						
	32K	R1EX25032ASA00P★★	SOP(8)				32		
		R1EX25032ATA00P★★	TSSOP(8)						
	16K	R1EX25016ASA00P★★	SOP(8)				32		
		R1EX25016ATA00P★★	TSSOP(8)						
	8K	R1EX25008ASA00P★★	SOP(8)				32		
		R1EX25008ATA00P★★	TSSOP(8)						
	4K	R1EX25004ASA00P★★	SOP(8)				16		
		R1EX25004ATA00P★★	TSSOP(8)						
	2K	R1EX25002ASA00P★★	SOP(8)				16		
		R1EX25002ATA00P★★	TSSOP(8)						

*1 Vcc=2.5V to 5.5V / 1.8V to 5.5V ★★ : Under development

Parallel EEPROM

Memory Density (bit)	Configuration (word x bit)	Part No.	Package	Access Time (ns)	Write Cycle Time (ms)	Page Size (Byte)	Functions/ Features	Power Supply Voltage (V)	Operating Ambient Temperature (°C)
▶ 1M	128Kx8	HN58V1001T	TSOP(32)	250	15	128	With reset function	2.7 to 5.5	0 to 70
		HN58C1001T	TSOP(32)	150	10	128	With reset function	4.5 to 5.5	0 to 70
		HN58C1001FP	SOP(32)						-20 to 85
									-40 to 85
▶ 256K	32Kx8	HN58V257AT	TSOP(32)	120	10	64	With reset function	2.7 to 5.5	0 to 70
									-20 to 85
		HN58C257AT	TSOP(32)	85 / 100	10	64	With reset function	4.5 to 5.5	0 to 70
									-20 to 85
		HN58V256AT	TSOP(28)	120	10	64		2.7 to 5.5	0 to 70
									-40 to 85
		HN58C256AT	TSOP(28)	85 / 100	10	64		4.5 to 5.5	0 to 70
									-40 to 85
		HN58V256AFP	SOP(28)	120	10	64		2.7 to 5.5	0 to 70
									-40 to 85
		HN58C256AFP	SOP(28)	85 / 100	10	64		4.5 to 5.5	0 to 70
									-40 to 85
		HN58C256AP	DIP(28)	85 / 100	10	64		4.5 to 5.5	0 to 70
▶ 64K	8Kx8	HN58V66AT	TSOP(28)	70 / 100	10	64	With reset function	2.7 to 5.5	0 to 70
									-40 to 85
		HN58V65AT	TSOP(28)	70 / 100	10	64		2.7 to 5.5	0 to 70
									-20 to 85
									-40 to 85
		HN58V66AFP	SOP(28)	70 / 100	10	64	With reset function	2.7 to 5.5	0 to 70
									-40 to 85
		HN58V65AFP	SOP(28)	70 / 100	10	64		2.7 to 5.5	0 to 70
									-40 to 85
		HN58V66AP	DIP(28)	70 / 100	10	64	With reset function	2.7 to 5.5	0 to 70
									-40 to 85
		HN58V65AP	DIP(28)	70 / 100	10	64		2.7 to 5.5	-40 to 85

Environmental Considerations for Renesas Electronics Products

Renesas Electronics is working actively to improve product environmental quality in all aspects of its business operations, including product design, materials procurement, manufacturing, and shipping.

Design

■ **Development of environmentally compliant products through product environmental assessment**

Making products more resource and energy efficient (more compact, higher integration, reduced power consumption, extended service life)
Reducing environmental load due to chemicals (management of chemical content of products)

■ **Compliance with domestic and international product environmental regulations**

EU RoHS Directive, China RoHS, ELV Directive, REACH Regulation

Renesas Product Environmental Quality Management Sequence

Global environmental preservation

Resource conservation / Health effects

Regulations

RoHS Directive
WEEE Directive
ELV Directive
REACH Regulation
China RoHS   etc.

Customers

Requirement to eliminate restricted substances
Requirement to report chemical substances content

Renesas Electronics

Requirement to eliminate restricted substances
Requirement to report chemical substances content

Suppliers

Development, design

Design of environmentally compliant products (development and design operations)

Procurement

Green procurement (materials procurement and product environmental management operations)
Conformance assessment (quality assurance, development, and design operations)

Manufacturing

Production management (manufacturing operations)

Management of chemical substances

Shipment of environmentally compliant products

Procurement

■ **Thoroughgoing green procurement activities**

■ **Investigation and confirmation of chemical content of procured parts and materials**

Manufacturing

■ **Prevention of inclusion or contamination by prohibited chemicals in products (process management)**

■ **Reduction of CO_2 emissions (reduction of PFC output and energy usage), reduction of environmental load from chemicals used in manufacturing, reduction of waste materials**

Shipping

■ **Reduction of volume of packing materials (expanding reuse of plastic packaging materials)**

■ **Reduction of energy consumption in transport (improving overall efficiency of distribution)**

Compliance with customer requirements

Transmission of information such as chemical content of products

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RoHS : Restriction of the use of certain Hazardous Substances in electrical and electronic equipment
WEEE : Waste Electrical and Electronic Equipment

ELV : End of Life Vehicles
REACH : Registration, Evaluation, Authorization and Restriction of Chemicals

Memo

Memo

Renesas General-Purpose Memory

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