

High Performance Low Pin-count Flash Microcontroller

R8C/2K – 2L



Description

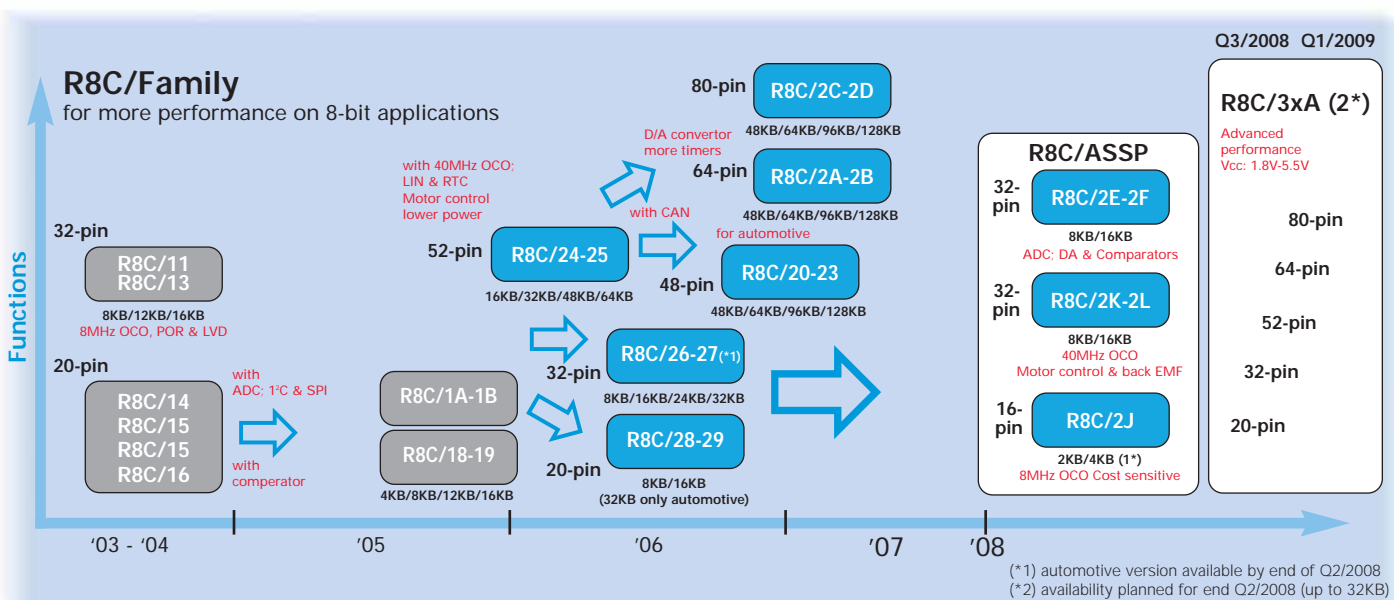
The R8C microcontroller family is the latest in a line of high performance microcontrollers from Renesas. At the beginning of April 2003 we offered the 1st R8C devices, with the unique innovation of the combination of an 16-bit core and 8-bit internal bus, to maximise performance and minimise cost. First we introduced the R8C/1x devices in 20pin & 32pin packages with memory sizes from 4KB to 16KB flash. With the 2nd R8C/2x generation by end of 2005 we added the high speed 40MHz on-chip oscillator—best accuracy over the total temperature range, new powerful features like motor control timers, CAN, DA converter, RTC, decrease the Vcc power supply to 2.2V and a number of other useful features like low power modes down to 0.7µA in STOP mode (1.8µA in WAIT mode). With its on-chip flash memory from 4KB to 128KB and a wide range of peripherals in packages of 20, 32, 48, 52, 64 and 80 pins the series has grown dramatically. More than 260 devices are in volume production today.

By the beginning of 2008, Renesas introduced a range of Application Specific Standard Products (ASSP), like the R8C/2E-2F.

The **R8C/2K & 2L** is a 32-pin device with memory sizes of 8KB & 16KB flash and offers an excellent solution for many low-end motor control application which needs small package and memory sizes.

Two high performance timers can drive up to 12 x 16-bit PWM and also includes 3phase motor control with automatic dead time insertions with back EMF. The internal high speed oscillator at 40MHz +/-2% can be calibrated down to 1%. To make your system more reliable this device includes different fail-safe functions like clock stop detection, SFR protection, dataflash, watchdog timer, etc. This helps to reduce costs in the next generation of applications. This R8C/2K-2L is suitable for low end motor control solutions or applications which require a lot of PWM.

Group	Device	Package Type	Memory Size		
			Flash	RAM	Data Flash
R8C/2K	R5F212K2SNFP	PLOP0032GB-A	8KB	1KB	-
	R5F212K4SNFP	PLOP0032GB-A	16KB	1.5KB	-
R8C/2L	R5F212L2SNFP	PLOP0032GB-A	8KB	1KB	2 x 1KB
	R5F212L4SNFP	PLOP0032GB-A	16KB	1.5KB	2 x 1KB



Timer A (1ch, 8-bit)	Timer RC (2ch, 16-bit)	USART (async/Sync) 2 x ch
Timer B (1ch, 8-bit)	A/D (10-bit, 9 ch)	
Timer RD (2ch, 16-bit)	Watchdog Timer (on/off)	
Clock stop detection	M16C Core 20 MHz@5V	POR/LVD
RAM up to 1.5KB	Dataflash* 1 2 x 1KB block	Flash Memory 8KB, 16KB
on chip osc. low speed (125KHz)	on chip osc. 40MHz	Multiplier
25 I/O (8 w/ 20mA drive) + 3 Input Only		
Hardware LIN (via UART + Timer A)		

• **Temperature range**

N : Operating Ambient Temperature -20 °C to 85 °C
D : Operating Ambient Temperature -40 °C to 85 °C

• **Packages**

32pin LQFP (7 x 7 x 1.7mm)
0.8mm pitch

R8C Development Tools

R8C Starter Kit (RSK)



The kit includes:

- CPU board with target microcontroller
- LCD panel for user/diagnostic interaction
- E8a on-chip debugger
- Trial C compiler and IDE
- Tutorial session
- Sample peripheral driver code

• **M16C CPU Core (16-bit)**

- 1 to 20 MHz@ 3.0-5.5V
- 1 to 10 MHz@ 2.7-5.5V
- 1 to 5 MHz@ 2.2V-5.5V

• **Clock generation circuit**

- Main clock (selectable X in/X out) with X in/X out (up to 20MHz)
- Low/High speed internal ring oscillator (125KHz/40MHz)
- Main clock stop detect feature

• **Timers**

- 8-bit, Timers with prescaler (Timer A,B) 2ch
- 16-bit, Timer (Timer RC – with I/C & O/C) 1ch
- > for 4 x 16-bit PWM with different duty cycles
- 16-bit, Timer (Timer RD – with I/C & O/C) 2ch
- > for 8 x 16-bit PWM with different duty cycles
- Watchdog Timer with ring oscillator

• **Serial I/O**

- USART (synchron/ asynchron) 2ch

• **Analog**

- AD converter - 10-bit 9ch

• **POR and LVD**

- (2 levels: Vdet1 =2.85V; Vdet2=3.6V)

• **I/O and interrupts**

- 25 I/O + 3 Input Only 28 pins
- High current drive ports (LED) 8pins
- HW-Interrupts: internal/external 13/ 4
- SW-Interrupts/ Prio. Levels 4/ 7

• **Memory capacity**

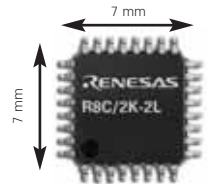
- 8KB/ 1KB
- 16KB/ 1.5KB
- 2 x 1KB Data Flash on R8C/2L

• **E8a on-chip debugger - Single wire debugger**

Low cost on-chip debugger
A single wire debug interface to debug and flash your microcontroller

• **Software**

Embedded Workbench HEW4.0, Renesas C-Compiler also trial Compilers from IAR and tasking



Application areas

- White goods
- Home appliances
- Small applications
- HVAC
- Security systems
- Metering
- Motor control
- Lighting/ballast control