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## What is "Embedded - Microcontrollers"?

"Embedded - Microcontrollers" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

## Applications of "Embedded - Microcontrollers"

| Details | |
|---|---|
| Product Status | Active |
| Core Processor | R32C/100 |
| Core Size | 16/32-Bit |
| Speed | 50MHz |
| Connectivity | CANbus, EBI/EMI, I²C, IEBus, UART/USART |
| Peripherals | DMA, LVD, PWM, WDT |
| Number of I/O | 84 |
| Program Memory Size | 384KB (384K x 8) |
| Program Memory Type | FLASH |
| EEPROM Size | 8K x 8 |
| RAM Size | 40K x 8 |
| Voltage - Supply (Vcc/Vdd) | 3V ~ 5.5V |
| Data Converters | A/D 26x10b; D/A 2x8b |
| Oscillator Type | Internal |
| Operating Temperature | -40°C ~ 85°C (TA) |
| Mounting Type | Surface Mount |
| Package / Case | 100-LQFP |
| Supplier Device Package | 100-LFQFP (14x14) |
| Purchase URL | https://www.e-xfl.com/product-detail/renesas-electronics-america/r5f64185dfb-u0 |

## 1.2 Product Information

Tables 1.5 and 1.6 list the product information and Figure 1.1 shows the details of the part number.

**Table 1.5 R32C/118 Group Product List for Normal Speed Version (1/2) As of February, 2013**

| Part Number | Package Code (1) | ROM Capacity (2) | RAM Capacity | Remarks |
|---|---|---|---|---|
| R5F64185NFD (P) | PLQP0144KA-A | 384 Kbytes + 8 Kbytes | 40 Kbytes | -20°C to 85°C (N version) |
| R5F64185DFD | | | | -40°C to 85°C (D version) |
| R5F64185PFD | | | | -40°C to 85°C (P version) |
| R5F64185NFB (P) | PLQP0100KB-A | | | -20°C to 85°C (N version) |
| R5F64185DFB | | | | -40°C to 85°C (D version) |
| R5F64185PFB | | | | -40°C to 85°C (P version) |
| R5F64186NFD (P) | PLQP0144KA-A | 512 Kbytes + 8 Kbytes | | -20°C to 85°C (N version) |
| R5F64186DFD | | | | -40°C to 85°C (D version) |
| R5F64186PFD | | | | -40°C to 85°C (P version) |
| R5F64186NFB (P) | PLQP0100KB-A | | | -20°C to 85°C (N version) |
| R5F64186DFB | | | | -40°C to 85°C (D version) |
| R5F64186PFB | | | | -40°C to 85°C (P version) |
| R5F64187NFD (P) | PLQP0144KA-A | 640 Kbytes + 8 Kbytes | 48 Kbytes | -20°C to 85°C (N version) |
| R5F64187DFD | | | | -40°C to 85°C (D version) |
| R5F64187PFD | | | | -40°C to 85°C (P version) |
| R5F64187NFB (P) | PLQP0100KB-A | | | -20°C to 85°C (N version) |
| R5F64187DFB | | | | -40°C to 85°C (D version) |
| R5F64187PFB | | | | -40°C to 85°C (P version) |
| R5F64188NFD (P) | PLQP0144KA-A | 768 Kbytes + 8 Kbytes | 63 Kbytes | -20°C to 85°C (N version) |
| R5F64188DFD | | | | -40°C to 85°C (D version) |
| R5F64188PFD | | | | -40°C to 85°C (P version) |
| R5F64188NFB (P) | PLQP0100KB-A | | | -20°C to 85°C (N version) |
| R5F64188DFB | | | | -40°C to 85°C (D version) |
| R5F64188PFB | | | | -40°C to 85°C (P version) |
| R5F64189NFD (P) | PLQP0144KA-A | 1 Mbyte + 8 Kbytes | | -20°C to 85°C (N version) |
| R5F64189DFD | | | | -40°C to 85°C (D version) |
| R5F64189PFD | | | | -40°C to 85°C (P version) |
| R5F64189NFB (P) | PLQP0100KB-A | | | -20°C to 85°C (N version) |
| R5F64189DFB | | | | -40°C to 85°C (D version) |
| R5F64189PFB | | | | -40°C to 85°C (P version) |

(P): On planning phase

Notes:
1. The old package codes are as follows:
   PLQP0100KB-A: 100P6Q-A; PLQP0144KA-A: 144P6Q-A
2. “8 Kbytes” in the ROM capacity indicates the data flash memory capacity.

**Table 1.10 Pin Characteristics for the 144-pin Package (4/4)**

| Pin No. | Control Pin | Port | Interrupt Pin | Timer Pin | UART/CAN Module Pin | Intelligent I/O Pin | Analog Pin | Bus Control Pin |
|---|---|---|---|---|---|---|---|---|
| 115 | | P11_3 | | | CTS8/RTS8 | IIO1_3 | | CS3/WR2 |
| 116 | | P11_2 | | | RXD8 | IIO1_2 | | CS2 |
| 117 | | P11_1 | | | CLK8 | IIO1_1 | | CS1 |
| 118 | | P11_0 | | | TXD8 | IIO1_0 | | CS0 |
| 119 | | P0_3 | | | | | AN0_3 | D3 |
| 120 | | P0_2 | | | | | AN0_2 | D2 |
| 121 | | P0_1 | | | | | AN0_1 | D1 |
| 122 | | P0_0 | | | | | AN0_0 | D0 |
| 123 | | P15_7 | | | CTS6/RTS6/SS6 | IIO0_7 | AN15_7 | |
| 124 | | P15_6 | | | CLK6 | IIO0_6 | AN15_6 | |
| 125 | | P15_5 | | | RXD6/SCL6/STXD6 | IIO0_5 | AN15_5 | |
| 126 | | P15_4 | | | TXD6/SDA6/SRXD6 | IIO0_4 | AN15_4 | |
| 127 | | P15_3 | | | CTS7/RTS7 | IIO0_3 | AN15_3 | |
| 128 | | P15_2 | | | RXD7 | IIO0_2 | AN15_2 | |
| 129 | | P15_1 | | | CLK7 | IIO0_1 | AN15_1 | |
| 130 | VSS | | | | | | | |
| 131 | | P15_0 | | | TXD7 | IIO0_0 | AN15_0 | |
| 132 | VCC | | | | | | | |
| 133 | | P10_7 | KI3 | | | | AN_7 | |
| 134 | | P10_6 | KI2 | | | | AN_6 | |
| 135 | | P10_5 | KI1 | | | | AN_5 | |
| 136 | | P10_4 | KI0 | | | | AN_4 | |
| 137 | | P10_3 | | | | | AN_3 | |
| 138 | | P10_2 | | | | | AN_2 | |
| 139 | | P10_1 | | | | | AN_1 | |
| 140 | AVSS | | | | | | | |
| 141 | | P10_0 | | | | | AN_0 | |
| 142 | VREF | | | | | | | |
| 143 | AVCC | | | | | | | |
| 144 | | P9_7 | | | RXD4/SCL4/STXD4 | | ADTRG | |