Renesas Electronics America Inc - R5F2L3A7CNFA#U0 Datasheet

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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	Obsolete
Core Processor	R8C
Core Size	16-Bit
Speed	20MHz
Connectivity	I²C, LINbus, SIO, SSU, UART/USART
Peripherals	LCD, POR, PWM, Voltage Detect, WDT
Number of I/O	88
Program Memory Size	48KB (48K x 8)
Program Memory Type	FLASH
EEPROM Size	4K x 8
RAM Size	6K x 8
Voltage - Supply (Vcc/Vdd)	1.8V ~ 5.5V
Data Converters	A/D 20x10b; D/A 2x8b
Oscillator Type	Internal
Operating Temperature	-20°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	100-BQFP
Supplier Device Package	100-QFP (14x20)
Purchase URL	https://www.e-xfl.com/product-detail/renesas-electronics-america/r5f2l3a7cnfa-u0

Table 1.2 Programmable I/O Ports Provided for Each Group

Programmable I/O Port	R8C/L35C Group Total: 41 I/O pins								R8C/L36C Group Total: 52 I/O pins								R8C/L38C Group Total: 68 I/O pins								R8C/L3AC Group Total: 88 I/O pins							
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
P0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
P1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
P2	✓	✓	✓	✓	–	–	–	–	✓	✓	✓	✓	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
P3	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
P4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
P5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
P6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
P7	✓	✓	✓	✓	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
P10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓
P11	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
P12	–	–	–	–	✓	✓	✓	✓	–	–	–	–	✓	✓	✓	✓	–	–	–	–	✓	✓	✓	✓	–	–	–	–	✓	✓	✓	✓
P13	–	–	–	–	✓	✓	✓	✓	–	–	–	–	✓	✓	✓	✓	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes:
1. The symbol "✓" indicates a programmable I/O port.
2. The symbol "–" indicates the settings should be made as follows:
   - Set 1 to the corresponding bits in the PDi (i = 1 to 3, 5 to 7, and 10 to 13) register.
   - Set 0 to the corresponding bits in the Pi (i = 1 to 3, 5 to 7, and 10 to 13) register.
   - Set 0 to the corresponding bits in the P10DRR or P11DRR register.

Table 1.3 LCD Display Function Pins Provided for Each Group

Shared I/O Port	L35C Group Common output: Max. 4 Segment output: Max. 24								L36C Group Common output: Max. 8 Segment output: Max. 32								L38C Group Common output: Max. 8 Segment output: Max. 48								L3AC Group Common output: Max. 8 Segment output: Max. 56							
P0	SEG 7	SEG 6	SEG 5	SEG 4	SEG 3	SEG 2	SEG 1	SEG 0	SEG 7	SEG 6	SEG 5	SEG 4	SEG 3	SEG 2	SEG 1	SEG 0	SEG 7	SEG 6	SEG 5	SEG 4	SEG 3	SEG 2	SEG 1	SEG 0	SEG 7	SEG 6	SEG 5	SEG 4	SEG 3	SEG 2	SEG 1	SEG 0
P1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	SEG 11	SEG 10	SEG 9	SEG 8	SEG 15	SEG 14	SEG 13	SEG 12	SEG 11	SEG 10	SEG 9	SEG 8
P2	SEG 23	SEG 22	SEG 21	SEG 20	–	–	–	–	SEG 23	SEG 22	SEG 21	SEG 20	–	–	–	–	SEG 23	SEG 22	SEG 21	SEG 20	SEG 19	SEG 18	SEG 17	SEG 16	SEG 23	SEG 22	SEG 21	SEG 20	SEG 19	SEG 18	SEG 17	SEG 16
P3	–	–	–	–	SEG 27	SEG 26	SEG 25	SEG 24	SEG 31	SEG 30	SEG 29	SEG 28	SEG 27	SEG 26	SEG 25	SEG 24	SEG 31	SEG 30	SEG 29	SEG 28	SEG 27	SEG 26	SEG 25	SEG 24	SEG 31	SEG 30	SEG 29	SEG 28	SEG 27	SEG 26	SEG 25	SEG 24
P4	SEG 39	SEG 38	SEG 37	SEG 36	SEG 35	SEG 34	SEG 33	SEG 32	SEG 39	SEG 38	SEG 37	SEG 36	SEG 35	SEG 34	SEG 33	SEG 32	SEG 39	SEG 38	SEG 37	SEG 36	SEG 35	SEG 34	SEG 33	SEG 32	SEG 39	SEG 38	SEG 37	SEG 36	SEG 35	SEG 34	SEG 33	SEG 32
P5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	SEG 43	SEG 42	SEG 41	SEG 40
P6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	SEG 51	SEG 50	SEG 49	SEG 48	SEG 47	SEG 46	SEG 45	SEG 44	SEG 51	SEG 50	SEG 49	SEG 48	SEG 47	SEG 46	SEG 45	SEG 44
P7	COM 0	COM 1	COM 2	COM 3	–	–	–	–	COM 0	COM 1	COM 2	COM 3	SEG 55	SEG 54	SEG 53	SEG 52	COM 0	COM 1	COM 2	COM 3	SEG 55	SEG 54	SEG 53	SEG 52	COM 0	COM 1	COM 2	COM 3	SEG 55	SEG 54	SEG 53	SEG 52
P12	–	–	–	–	CL2	CL1	–	–	–	–	–	–	CL2	CL1	–	–	–	–	–	–	CL2	CL1	–	–	–	–	–	–	CL2	CL1	–	–
–	VL1								VL1								VL1								VL1							
–	VL2								VL2								VL2								VL2							
–	–								VL3								VL3								VL3							
–	VL4								VL4								VL4								VL4							

Notes:
1. The symbol "–" indicates there is no LCD display function. Set the corresponding bits in registers LSE1 to LSE3, LSE5 to LSE7 to 0 for these pins.
2. SEG52 to SEG55 can be used as COM7 to COM4.
   The R8C/L35C Group does not have pins SEG52 to SEG55, so 1/8 duty cannot be selected.
3. The R8C/L35C Group does not have the VL3 pin, so 1/4 bias cannot be selected. When the internal voltage multiplier is used, 1/2 bias cannot also be selected.

Table 1.8 Product List for R8C/L36C Group Current of Apr 2011

Part No.	Internal ROM Capacity		Internal RAM Capacity	Package Type	Remarks
	Program ROM	Data Flash			
R5F2L367CNFP	48 Kbytes	1 Kbyte × 4	6 Kbytes	PLQP0064KB-A	N Version
R5F2L367CNFA	48 Kbytes	1 Kbyte × 4	6 Kbytes	PLQP0064GA-A	
R5F2L368CNFP	64 Kbytes	1 Kbyte × 4	8 Kbytes	PLQP0064KB-A	
R5F2L368CNFA	64 Kbytes	1 Kbyte × 4	8 Kbytes	PLQP0064GA-A	
R5F2L36ACNFP	96 Kbytes	1 Kbyte × 4	10 Kbytes	PLQP0064KB-A	
R5F2L36ACNFA	96 Kbytes	1 Kbyte × 4	10 Kbytes	PLQP0064GA-A	
R5F2L36CCNFP	128 Kbytes	1 Kbyte × 4	10 Kbytes	PLQP0064KB-A	
R5F2L36CCNFA	128 Kbytes	1 Kbyte × 4	10 Kbytes	PLQP0064GA-A	
R5F2L367CDFP	48 Kbytes	1 Kbyte × 4	6 Kbytes	PLQP0064KB-A	D Version
R5F2L367CDFA	48 Kbytes	1 Kbyte × 4	6 Kbytes	PLQP0064GA-A	
R5F2L368CDFP	64 Kbytes	1 Kbyte × 4	8 Kbytes	PLQP0064KB-A	
R5F2L368CDFA	64 Kbytes	1 Kbyte × 4	8 Kbytes	PLQP0064GA-A	
R5F2L36ACDFP	96 Kbytes	1 Kbyte × 4	10 Kbytes	PLQP0064KB-A	
R5F2L36ACDFA	96 Kbytes	1 Kbyte × 4	10 Kbytes	PLQP0064GA-A	
R5F2L36CCDFP	128 Kbytes	1 Kbyte × 4	10 Kbytes	PLQP0064KB-A	
R5F2L36CCDFA	128 Kbytes	1 Kbyte × 4	10 Kbytes	PLQP0064GA-A	

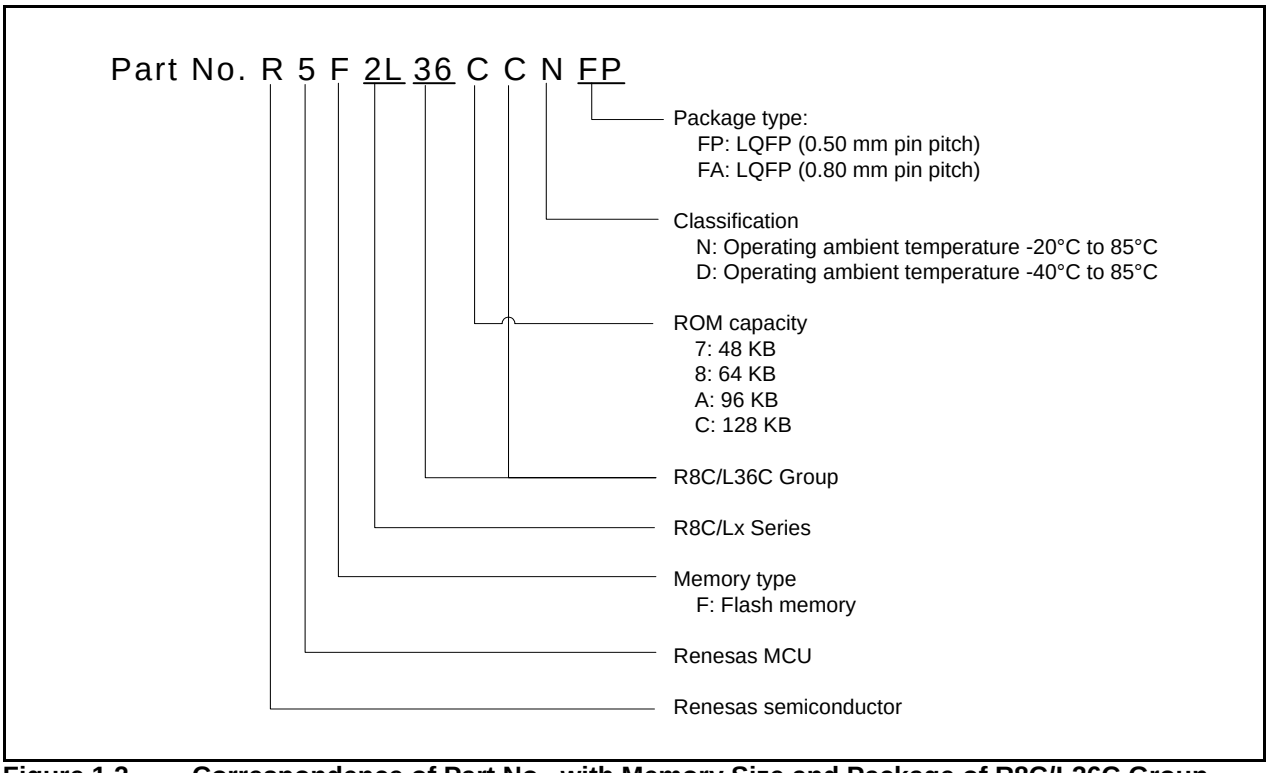
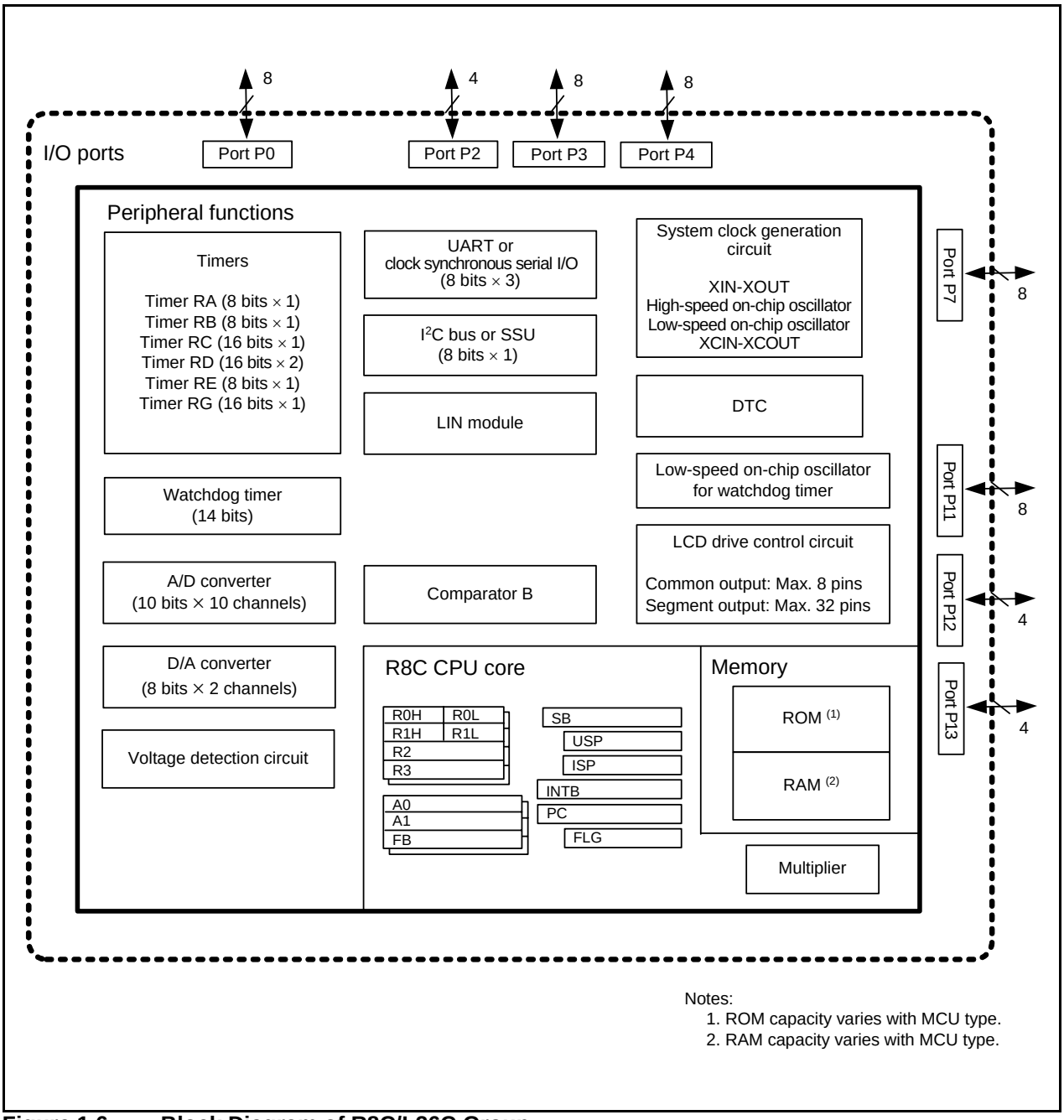
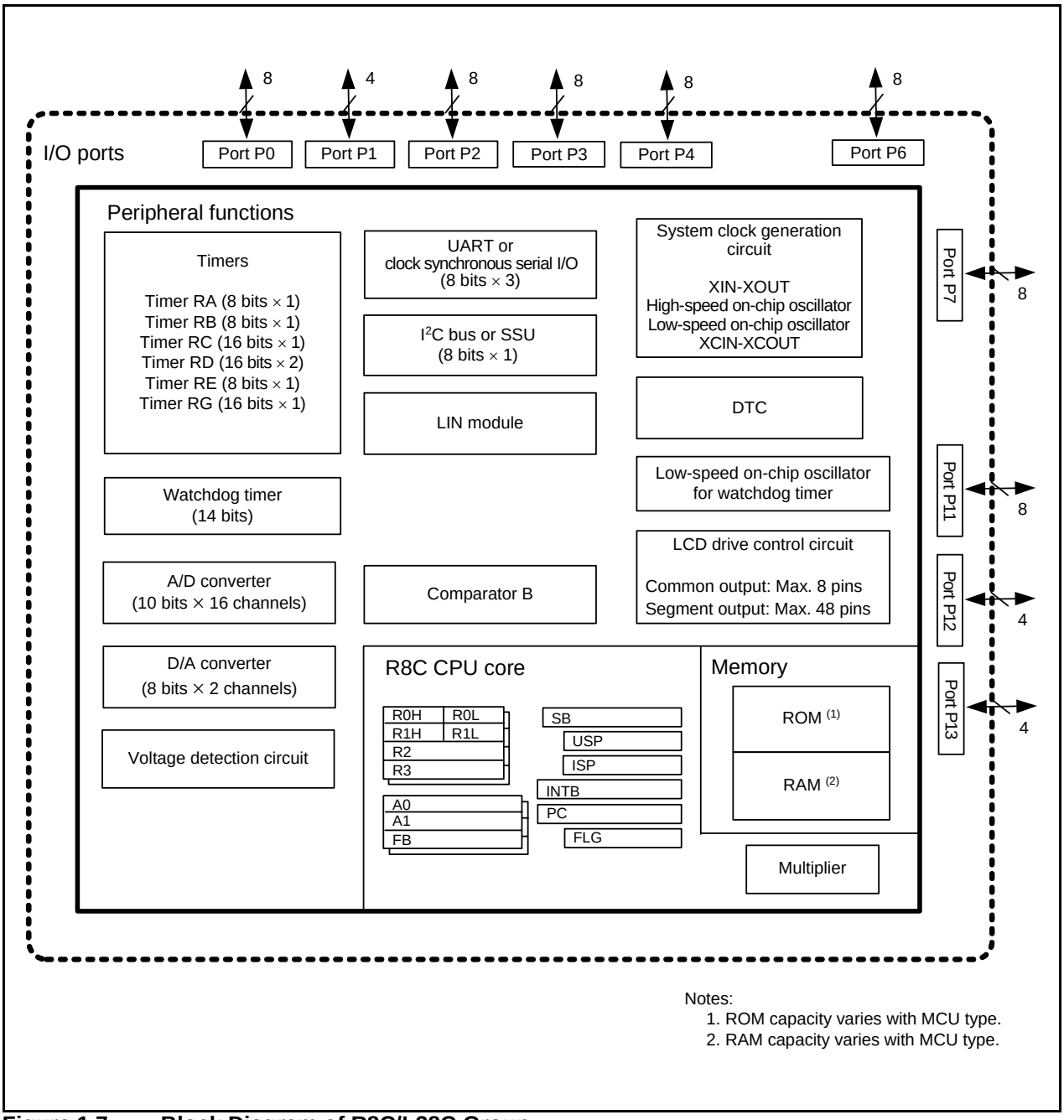


Figure 1.2 Correspondence of Part No., with Memory Size and Package of R8C/L36C Group



Notes:
1. ROM capacity varies with MCU type.
2. RAM capacity varies with MCU type.

Figure 1.6 Block Diagram of R8C/L36C Group



Notes:
1. ROM capacity varies with MCU type.
2. RAM capacity varies with MCU type.

Figure 1.7 Block Diagram of R8C/L38C Group

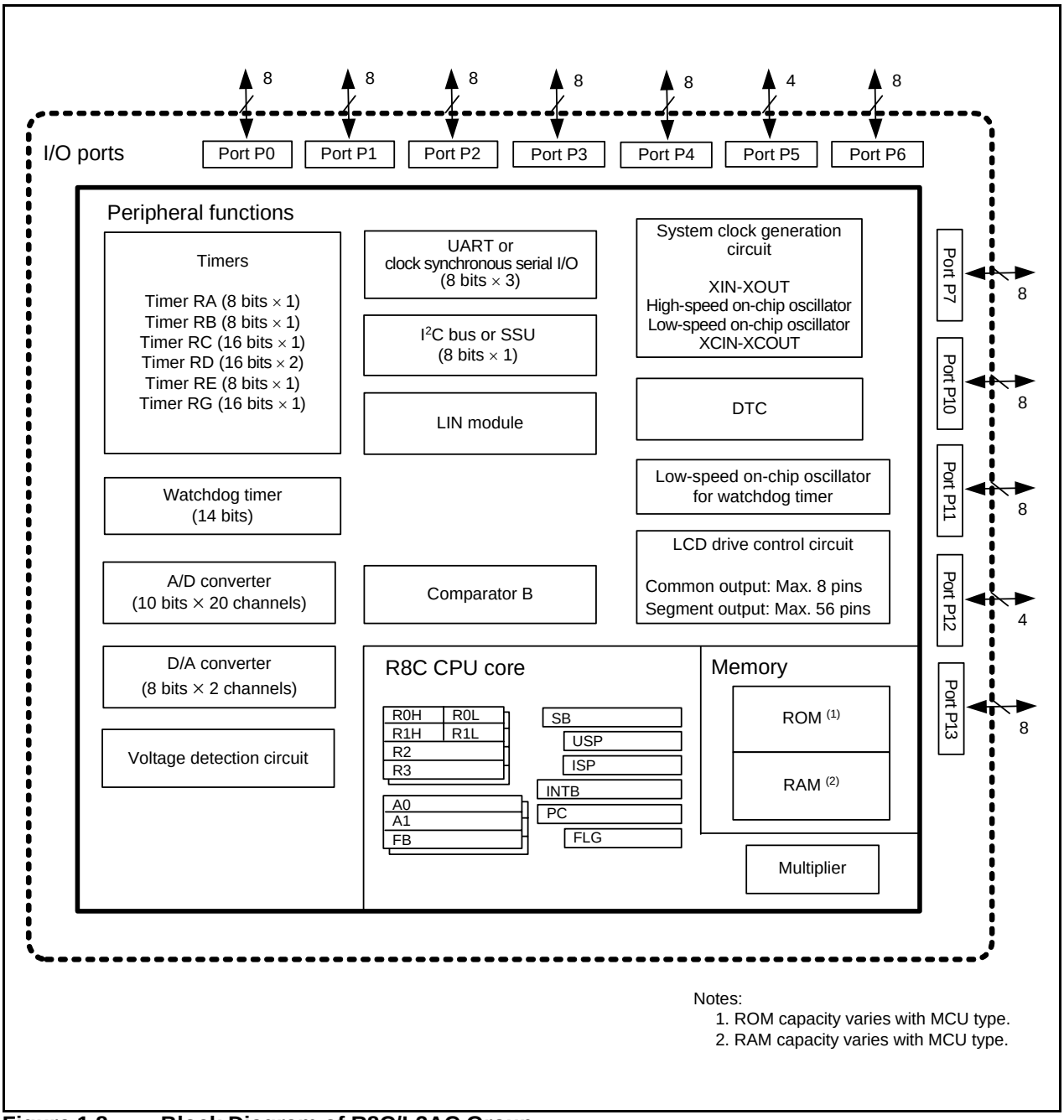


Figure 1.8 Block Diagram of R8C/L3AC Group

1.4 Pin Assignments

Figures 1.9 to 1.13 show Pin Assignments (Top View). Tables 1.11 to 1.13 list the Pin Name Information by Pin Number.

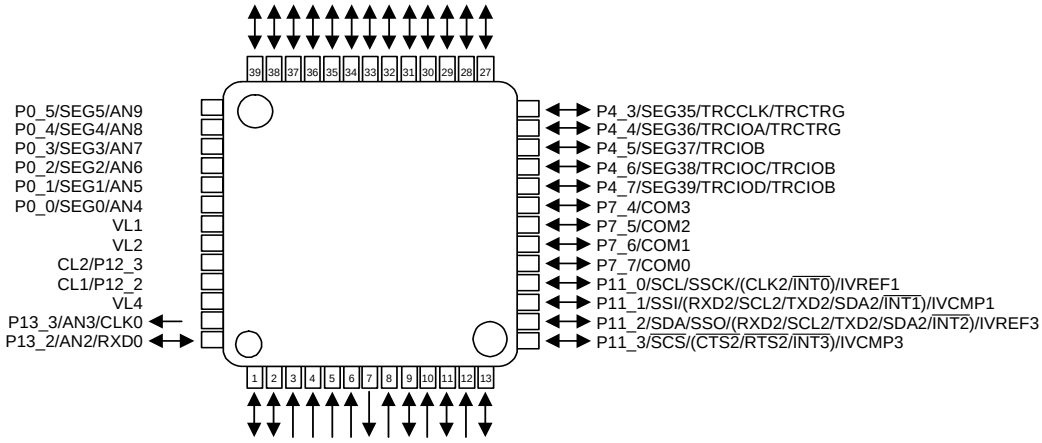


Figure 1.9 Pin Assignment (Top View) of PLQP0052JA-A Package

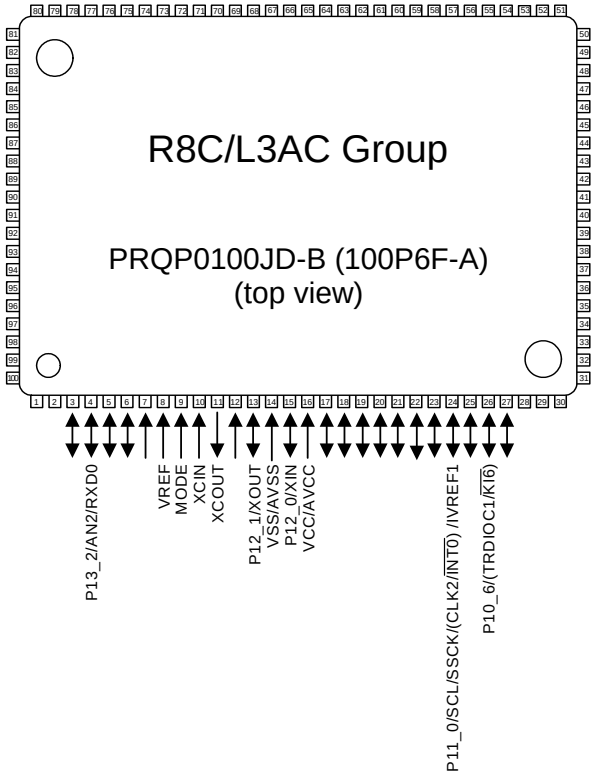


Figure 1.13 Pin Assignment (Top View) of PRQP0100JD-B Package

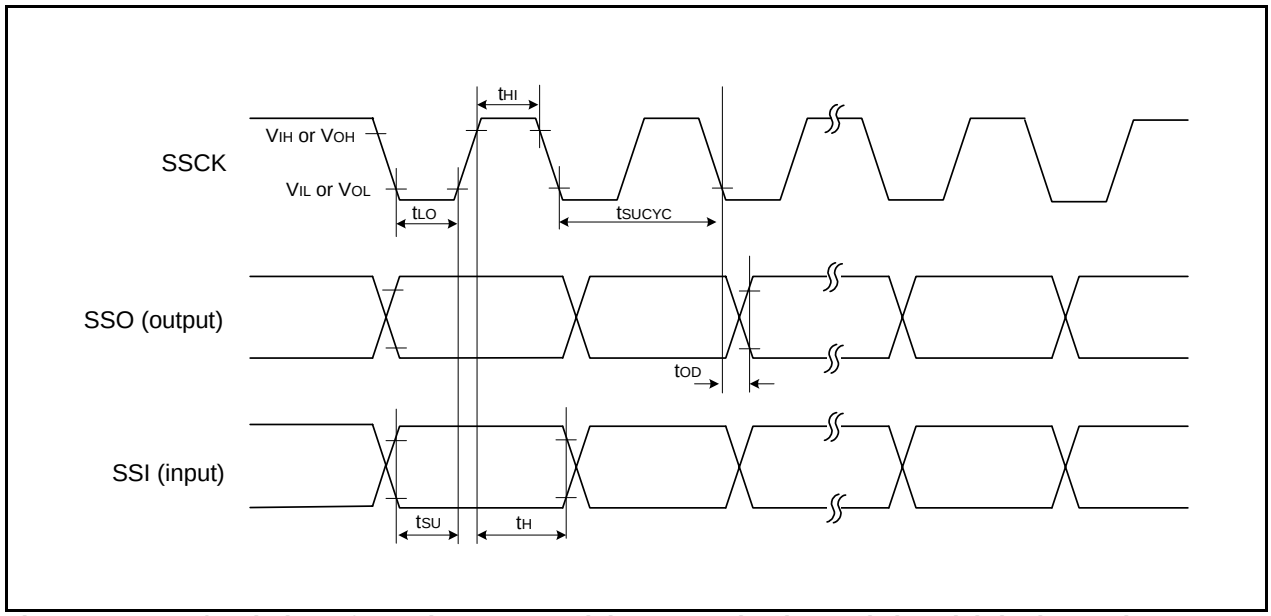


Figure 5.6 I/O Timing of Synchronous Serial Communication Unit (SSU) (Clock Synchronous Communication Mode)