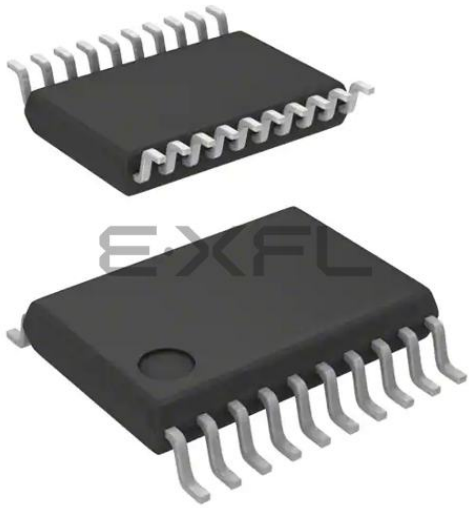


Welcome to E-XFL.COM

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	RL78
Core Size	16-Bit
Speed	24MHz
Connectivity	CSI, I²C, UART/USART
Peripherals	DMA, LVD, POR, PWM, WDT
Number of I/O	14
Program Memory Size	2KB (2K x 8)
Program Memory Type	FLASH
EEPROM Size	2K x 8
RAM Size	256 x 8
Voltage - Supply (Vcc/Vdd)	1.8V ~ 5.5V
Data Converters	A/D 11x8/10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	20-LSSOP (0.173", 4.40mm Width)
Supplier Device Package	20-LSSOP
Purchase URL	https://www.e-xfl.com/product-detail/renesas-electronics-america/r5f10266asp-v0

○ ROM, RAM capacities

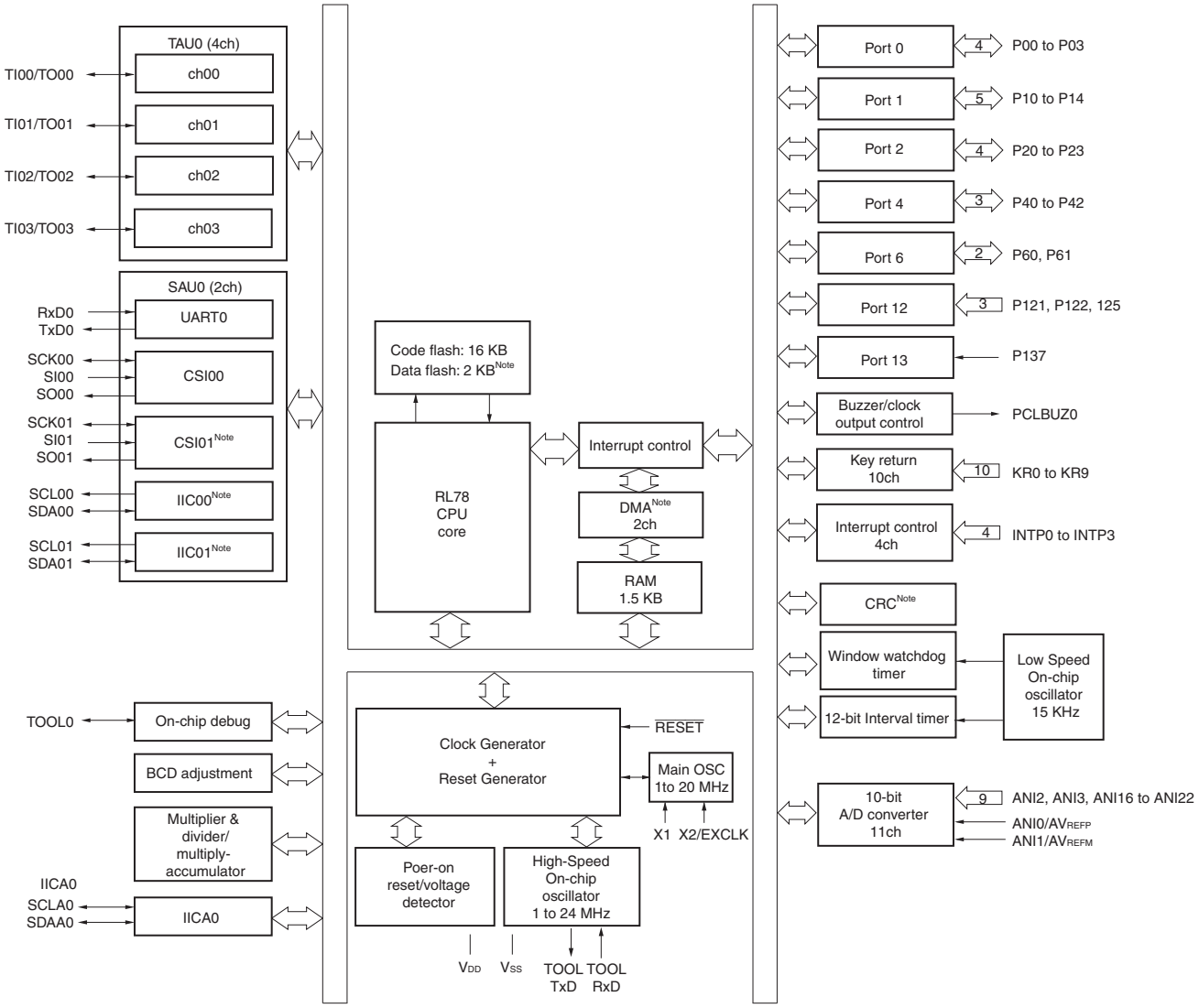
Code flash	Data flash	RAM	20 pins	24 pins	30 pins
16 KB	2 KB	2 KB	—	—	R5F102AA
	—		—	—	R5F103AA
	2 KB	1.5 KB	R5F1026A Note 1	R5F1027A Note 1	—
	—		R5F1036A Note 1	R5F1037A Note 1	—
12 KB	2KB	1 KB	R5F10269 Note 1	R5F10279 Note 1	R5F102A9
	—		R5F10369 Note 1	R5F10379 Note 1	R5F103A9
8 KB	2 KB	768 B	R5F10268 Note 1	R5F10278 Note 1	R5F102A8
	—		R5F10368 Note 1	R5F10378 Note 1	R5F103A8
4 KB	2KB	512 B	R5F10267	R5F10277	R5F102A7
	—		R5F10367	R5F10377	R5F103A7
2 KB	2 KB	256 B	R5F10266 Note 2	—	—
	—		R5F10366 Note 2	—	—

Notes 1. This is 640 bytes when the self-programming function or data flash function is used. (For details, see **CHAPTER 3 CPU ARCHITECTURE**.)

2. The self-programming function cannot be used for R5F10266 and R5F10366.

Caution When the flash memory is rewritten via a user program, the code flash area and RAM area are used because each library is used. When using the library, refer to RL78 Family Flash Self Programming Library

1.6.2 24-pin products



Note Provided only in the R5F102 products.

(T_A = −40 to +85°C, 1.8 V ≤ V_{DD} ≤ 5.5 V, V_{SS} = 0 V) (2/4)

Parameter	Symbol	Conditions		MIN.	TYP.	MAX.	Unit
Output current, low[Note 1]	I_{OL1}	20-, 24-pin products: Per pin for P00 to P03[Note 4], P10 to P14, P40 to P42 30-pin products: Per pin for P00, P01, P10 to P17, P30, P31, P40, P50, P51, P120, P147				20.0 [Note 2]	mA
		Per pin for P60, P61				15.0 [Note 2]	mA
		20-, 24-pin products: Total of P40 to P42 30-pin products: Total of P00, P01, P40, P120 (When duty ≤ 70% [Note 3])	4.0 V ≤ V_{DD} ≤ 5.5 V			60.0	mA
			2.7 V ≤ V_{DD} < 4.0 V			9.0	mA
			1.8 V ≤ V_{DD} < 2.7 V			1.8	mA
		20-, 24-pin products: Total of P00 to P03[Note 4], P10 to P14, P60, P61 30-pin products: Total of P10 to P17, P30, P31, P50, P51, P60, P61, P147 (When duty ≤ 70% [Note 3])	4.0 V ≤ V_{DD} ≤ 5.5 V			80.0	mA
			2.7 V ≤ V_{DD} < 4.0 V			27.0	mA
			1.8 V ≤ V_{DD} < 2.7 V			5.4	mA
		Total of all pins (When duty ≤ 70% [Note 3])				140	mA
	I_{OL2}	Per pin for P20 to P23				0.4	mA
		Total of all pins				1.6	mA

Notes 1. Value of current at which the device operation is guaranteed even if the current flows from an output pin to the V_{SS} pin.

2. However, do not exceed the total current value.

3. The output current value under conditions where the duty factor ≤ 70%.
If duty factor > 70%: The output current value can be calculated with the following expression (where n represents the duty factor as a percentage).
- Total output current of pins = (I_{OL} × 0.7)/(n × 0.01)

<Example> Where n = 80% and I_{OL} = 10.0 mA
Total output current of pins = (10.0 × 0.7)/(80 × 0.01) ≅ 8.7 mA
However, the current that is allowed to flow into one pin does not vary depending on the duty factor. A current higher than the absolute maximum rating must not flow into one pin.

4. 24-pin products only.

Remark Unless specified otherwise, the characteristics of alternate-function pins are the same as those of the port pins.

(T_A = –40 to +85°C, 1.8 V ≤ V_{DD} ≤ 5.5 V, V_{SS} = 0 V) **(3/4)**

Parameter	Symbol	Conditions		MIN.	TYP.	MAX.	Unit
Input voltage, high	V_{IH1}	Normal input buffer 20-, 24-pin products: P00 to P03[Note 2], P10 to P14, P40 to P42 30-pin products: P00, P01, P10 to P17, P30, P31, P40, P50, P51, P120, P147		0.8V_{DD}		V_{DD}	V
	V_{IH2}	TTL input buffer 20-, 24-pin products: P10, P11 30-pin products: P01, P10, P11, P13 to P17	4.0 V ≤ V_{DD} ≤ 5.5 V	2.2		V_{DD}	V
			3.3 V ≤ V_{DD} < 4.0 V	2.0		V_{DD}	V
			1.8 V ≤ V_{DD} < 3.3 V	1.5		V_{DD}	V
	V_{IH3}	P20 to P23		0.7V_{DD}		V_{DD}	V
	V_{IH4}	P60, P61		0.7V_{DD}		6.0	V
	V_{IH5}	P121, P122, P125[Note 1], P137, EXCLK, RESET		0.8V_{DD}		V_{DD}	V
	V_{IL1}	No6603.86 0.72 Tw 34 ref98 482.34 560.3604 Tm19(No6.14 34.32E]TJ26E.98 0 [(, P137, EXC)-6(LK41 0 Tw6					

2.4 AC Characteristics

(T_A = −40 to +85°C, 1.8 V ≤ V_{DD} ≤ 5.5 V, V_{SS} = 0 V)

Items	Symbol	Conditions			MIN.	TYP.	MAX.	Unit
Instruction cycle (minimum instruction execution time)	T_{CY}	Main system clock (f_{MAIN}) operation	HS (High-speed main) mode	2.7 V ≤ V_{DD} ≤ 5.5 V	0.04167		1	μs
				2.4 V ≤ V_{DD} < 2.7 V	0.0625		1	μs
			LS (Low-speed main) mode	1.8 V ≤ V_{DD} ≤ 5.5 V	0.125		1	μs
		During self programming	HS (High-speed main) mode	2.7 V ≤ V_{DD} ≤ 5.5 V	0.04167		1	μs
				2.4 V ≤ V_{DD} < 2.7 V	0.0625		1	μs
			LS (Low-speed main) mode	1.8 V ≤ V_{DD} ≤ 5.5 V	0.125		1	μs
External main system clock frequency	f_{EX}	2.7 V ≤ V_{DD} ≤ 5.5 V			1.0		20.0	MHz
		2.4 V ≤ V_{DD} < 2.7 V			1.0		16.0	MHz
		1.8 V ≤ V_{DD}						