Product specifications

Model No.	S1C31D41
CPU core	ARM® Cortex®-M0+ 32-bit RISC processor
Flash memory (for both programs and sound data)	96 KB On-board rewritable, programming voltage internally generated
Internal RAM (when HW Processor not being used)	8 KB (+18 KB)
Voice playback algorithm	EOV (Epson original high-compression voice & high-quality sound format) / 16-bit PCM
Playback channels	2-channel mixing support (e.g., Ch.: 0 voice, Ch. 1: BGM)
Sampling rate	15.625 kHz (best for both background music and voice playback)
Bit rate	EOV: 16/24 kbps
Multiple sound ROM	Supported
Gapless playback between phrases	Supported
Volume adjustment	Supported
Setting for number of repeats	Supported
Voice speed conversion	75% - 125% (5% steps)
Voice pitch conversion	75% - 125% (5% steps)
Tone generation	Supported
Sound DAC (for speakers)	Supported (15.625 kHz)
Electromagnetic buzzer & piezoelectric buzzer output mode	Supported (15.625 kHz)
Internal RAM check	W/R check, MARCH-C
Built-in Flash, external SPI-Flash check	Checksum, CRC
Serial interfaces	UART: 3 channels, synchronous serial interface: 3 channels, I^2C: 3 channels Quad serial peripheral interface (QSPI): 1 channel
Number of DMA controller channels	4 channels (memory ⇔ memory, memory ⇔ peripheral)
System clock sources	Selectable from among 4 types (IOSC/OSC1/OSC3/EXOSC) (16 MHz (max.)) * D41 OSC3 built-in oscillator circuit: ±1% @ Ta = 0 - 85°C
Number of multipurpose I/O ports	PKG32pin: 25 (max.) PKG48pin: 39 (max.) PKG64pin: 55 (max.)
Timers	16-bit timer (8 ch), 16-bit PWM (2 ch), WDT, RTC
12-bit A/D converter	12-bit successive-approximation ADC, 1 channel, 8 ports/channel (max.)
Supply voltage detection circuit	V_{DD}: 28 levels (1.8 to 5.0 V) / external voltage: 32 levels (1.2 to 5.0 V)
Temperature sensor / reference voltage generator circuit	Sensor output measurable at A/D Converter Reference voltage generator: A/D Converter reference voltage is selectable from 2.0 V, 2.5 V, V_{DD}, and external input
V_{DD} operating voltage	1.8 to 5.5 V * If V_{DD} > 3.6 V, the V_{D1} voltage mode must be set to mode 0.
V_{DD} operating voltage for Flash programming	2.2 to 5.5 V
External SPI-Flash interface VDDQSPI	3.0 to 3.6 V (usable at main V_{DD} voltage: 5 V, SPI-Flash power supply voltage: 3.3 V)
Operating temperature range	-40 to 85 °C

Operating frequency	V_{D1} voltage mode: mode 0	16 MHz
	V_{D1} voltage mod: mode 1	1.8 MHz
Current consumption (typical)	RUN V_{D1}: mode 0	215 µA/MHz (16 MHz)
	RUN V_{D1}: mode 1	130 µA/MHz (1.8 MHz)
	SLEEP	0.34 µA
	HALT (32.768 kHz oscillation)	1.5 µA
Package		P-TQFP032-0707-0.80 P-TQFP048-0707-0.50 P-LQFP064-1010-0.50