

16-bit Single Chip Microcontroller

- 16KB/32KB Flash ROM with read/program protection function
- 1.8 to 5.5 V wide range operating voltage
- Ultra low standby power consumption (0.7 μ A during HALT state)
- Embedded A/D converter to support various sensing applications
- Various kinds of interfaces (UART, SPI, I²C)
- EEPROM emulation

■ DESCRIPTIONS

The S1C17M20/M21/M22/M23/M24/M25 is a 16-bit embedded Flash MCU that features low power consumption. The embedded Flash memory can also be used as an EEPROM emulation data memory via software. The S1C17M20/M21/M22/M23/M24/M25 includes various serial interfaces, an A/D converter, and various timers as well as a high-performance 16-bit CPU. It is suitable for applications that require an A/D conversion function, such as household equipment and FA products.

■ FEATURES

| Model | S1C17M20/M23 | | S1C17M21/M24 | S1C17M22/M25 |
|---|--|--|--|----------------|
| | 24-pin PKG | 32-pin PKG | | |
| CPU | | | | |
| CPU core | Seiko Epson original 16-bit RISC CPU core S1C17 | | | |
| Other | On-chip debugger | | | |
| Embedded Flash memory | | | | |
| Capacity (for both instructions and data) | 16K bytes (S1C17M20/M21/M22) 32K bytes (S1C17M23/M24/M25) | | | |
| Erase/program count | 1,000 times (min.) * Programming by the debugging tool ICDmini | | | |
| Other | Security function to protect from reading/programming by ICDmini On-board programming function using ICDmini Flash programming voltage can be generated internally. | | | |
| Embedded RAM | | | | |
| Capacity | 2K bytes | | | |
| Clock generator (CLG) | | | | |
| System clock source | 4 sources (IOSC/OSC1/OSC3/EXOSC) | | | |
| System clock frequency (operating frequency) | 21 MHz (max.) | | | |
| IOSC oscillator circuit (boot clock source) | 700 kHz (typ.) embedded oscillator 23 μ s (max.) starting time (time from cancelation of SLEEP state to vector table read by the CPU) | | | |
| OSC1 oscillator circuit | - | | 32.768 kHz (typ.) crystal oscillator | |
| | 32 kHz (typ.) embedded oscillator | | | |
| OSC3 oscillator circuit | - | | Oscillation stop detection circuit included | |
| | - | | 21 MHz (max.) crystal/ceramic oscillator | |
| | 12, 16, and 20 MHz-switchable embedded oscillator | | | |
| EXOSC clock input | - | | Auto-trimming function for the embedded oscillator | |
| | 21 MHz (max.) square or sine wave input | | | |
| Other | Configurable system clock division ratio Configurable system clock used at wake up from SLEEP state Operating clock frequency for the CPU and all peripheral circuits is selectable. | | | |
| I/O port (PPORT) | | | | |
| Number of general-purpose ports | I/O port | 17 bits (max.) | 23 bits (max.) | 39 bits (max.) |
| | Output port | 1 bit (max.) | | |
| | Other | Pins are shared with the peripheral I/O. | | |
| Number of input interrupt ports | 15 bits (max.) | 19 bits (max.) | 35 bits (max.) | |
| Number of ports that support universal port multiplexer (UPMUX) | 15 bits | 19 bits | 32 bits | |
| A peripheral circuit I/O function selected via software can be assigned to each port. | | | | |
| Timers | | | | |
| Watchdog timer (WDT2) | Generates NMI or watchdog timer reset. Programmable NMI/reset generation cycle | | | |
| Real-time clock (RTCA) | 128-1 Hz counter, second/minute/hour/day/day of the week/month/year counters Theoretical regulation function for 1-second correction Alarm and stopwatch functions | | | |
| 16-bit timer (T16) | 4 channels Generates the SPIA master clocks and the ADC12A trigger signal. | | | |
| 16-bit PWM timer (T16B) | 2 channels | | | |
| | Event counter/capture function | | | |
| | PWM waveform generation function Number of PWM output or capture input ports: 2 ports/channel | | | |

S1C17M20/M21/M22/M23/M24/M25

| Model | S1C17M20/M23 | | S1C17M21/M24 | S1C17M22/M25 |
|---|--|-----------------------|--------------|--|
| | 24-pin PKG | 32-pin PKG | | |
| Supply voltage detector (SVD3) | | | | |
| Detection voltage | V _{DD} or external voltage (one external voltage input port is provided and an external voltage level can be detected even if it exceeds V _{DD} .) | | | |
| Detection level | V _{DD} : 28 levels (1.8 to 5.0 V)/external voltage: 32 levels (1.2 to 5.0 V) | | | |
| Other | Intermittent operation mode Generates an interrupt or reset according to the detection level evaluation. | | | |
| Serial interfaces | | | | |
| UART (UART3) | 2 channels Baud-rate generator included, IrDA1.0 supported Open drain output, signal polarity, and baud rate division ratio are configurable. Infrared communication carrier modulation output function | | | |
| Synchronous serial interface (SPIA) | 2 channels 2 to 16-bit variable data length The 16-bit timer (T16) can be used for the baud-rate generator in master mode. | | | |
| I ² C (I2C) *1 | 1 channel Baud-rate generator included | | | |
| Sound generator (SNDA) | | | | |
| Buzzer output function | 512 Hz to 16 kHz output frequencies One-shot output function | | | |
| Melody generation function | Pitch: 128 Hz to 16 kHz ≈ C3 to C6 Duration: 7 notes/rests (Half note/rest to thirty-second note/rest) Tempo: 16 tempos (30 to 480) Tie/slur may be specified. | | | |
| IR remote controller (REMC3) | | | | |
| Number of transmitter channels | 1 channel | | | |
| Other | EL lamp drive waveform can be generated for an application example. Output inversion function | | | |
| R/F converter (RFC) | | | | |
| Conversion method | - | | | CR oscillation type with 24-bit counters |
| Number of conversion channels | | | | 2 channels (Up to two sensors can be connected to each channel.) |
| Supported sensors | | | | DC-bias resistive sensors |
| 12-bit A/D converter (ADC12A) | | | | |
| Conversion method | Successive approximation type | | | |
| Resolution | 12 bits | | | |
| Number of conversion channels | 1 channel | | | |
| Number of analog signal input ports | 4 ports | 6 ports | 8 ports | |
| Multiplier/divider (COPRO2) | | | | |
| Arithmetic functions | 16-bit × 16-bit multiplier 16-bit × 16-bit + 32-bit multiply and accumulation unit 32-bit ÷ 32-bit divider | | | |
| Reset | | | | |
| #RESET pin | Reset when the reset pin is set to low. | | | |
| Power-on reset | Reset at power on. | | | |
| Brownout reset | Reset when the power supply voltage drops. | | | |
| Key entry reset | Reset when the P00 to P01/P02/P03 keys are pressed simultaneously (can be enabled/disabled using a register). | | | |
| Watchdog timer reset | Reset when the watchdog timer overflows (can be enabled/disabled using a register). | | | |
| Supply voltage detector reset | Reset when the supply voltage detector detects the set voltage level (can be enabled/disabled using a register). | | | |
| Interrupt | | | | |
| Non-maskable interrupt | 4 systems (Reset, address misaligned interrupt, debug, NMI) | | | |
| Programmable interrupt | External int. | 1 system (8 levels) | | 19 systems (8 levels) |
| | Internal int. | 17 systems (8 levels) | | |
| Power supply voltage | | | | |
| V _{DD} operating voltage | 1.8 to 5.5 V | | | |
| V _{DD} operating voltage for Flash programming | 2.4 to 5.5 V (When V _{PP} (7.5 V) is supplied externally) 2.4 to 5.5 V (When V _{PP} is generated internally) | | | |
| Operating temperature | | | | |
| Operating temperature range | -40 to 85°C | | | |
| Current consumption (typ. value) | | | | |
| SLEEP mode *2 | 0.36 μA I _{OSC} = OFF, OSC1 = OFF, OSC3 = OFF | | | |
| HALT mode | 0.7 μA OSC1 = 32.768 kHz (crystal oscillator), RTC = ON | | | |

S1C17M20/M21/M22/M23/M24/M25

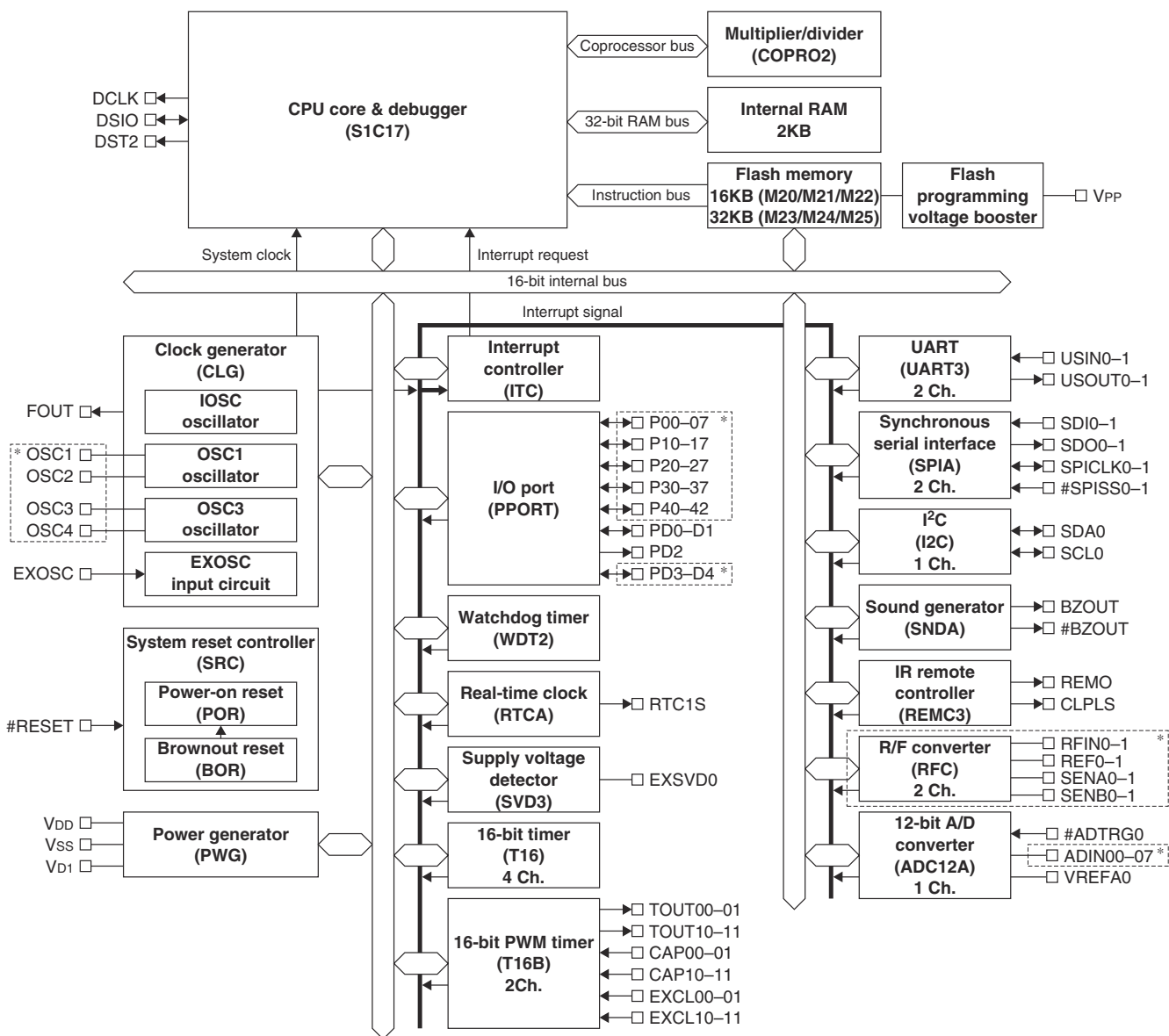
| Model | S1C17M20/M23 | | S1C17M21/M24 | S1C17M22/M25 |
|---|--|---|---|---|
| | 24-pin PKG | 32-pin PKG | | |
| Current consumption (typ. value) | | | | |
| RUN mode | 5 μ A OSC1 = 32.768 kHz (crystal oscillator), RTC = ON, CPU = OSC1 | | | |
| | 160 μ A OSC3 = 1 MHz (ceramic oscillator), OSC1 = 32.768 kHz (crystal oscillator), RTC = ON, CPU = OSC3 | | | |
| Shipping form | | | | |
| Package *3 | SQFN4-24PIN (P-VQFN024-0404-0.50, 4 x 4 mm, t = 1 mm, 0.5 mm pitch) | SQFN5-32PIN (P-VQFN032-0505-0.50, 5 x 5 mm, t = 1 mm, 0.5 mm pitch) | TQFP12-32PIN (P-TQFP032-0707-0.80, 7 x 7 mm, t = 1.2 mm, 0.8 mm pitch) | TQFP12-48PIN (P-TQFP048-0707-0.50, 7 x 7 mm, t = 1.2 mm, 0.5 mm pitch) |

*1 The input filter in I2C (SDA and SCL inputs) does not comply with the standard for removing noise spikes less than 50 ns.

*2 The RAM retains data even in SLEEP mode.

*3 Shown in parentheses are JEITA package names.

■ BLOCK DIAGRAM

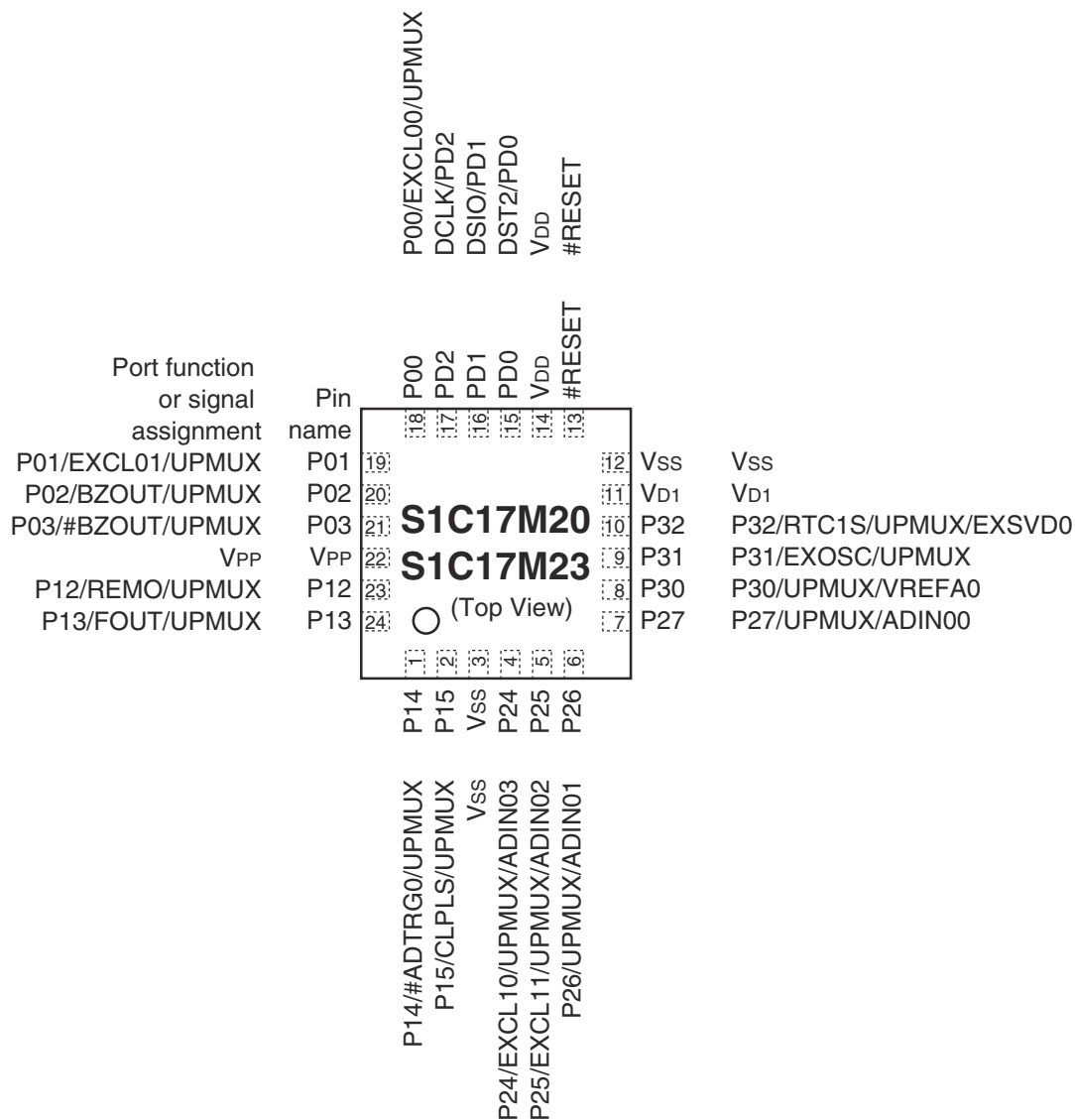


* The pin configuration and peripheral circuit function depends on the model. For more information, refer to "PIN DESCRIPTIONS."

S1C17M20/M21/M22/M23/M24/M25

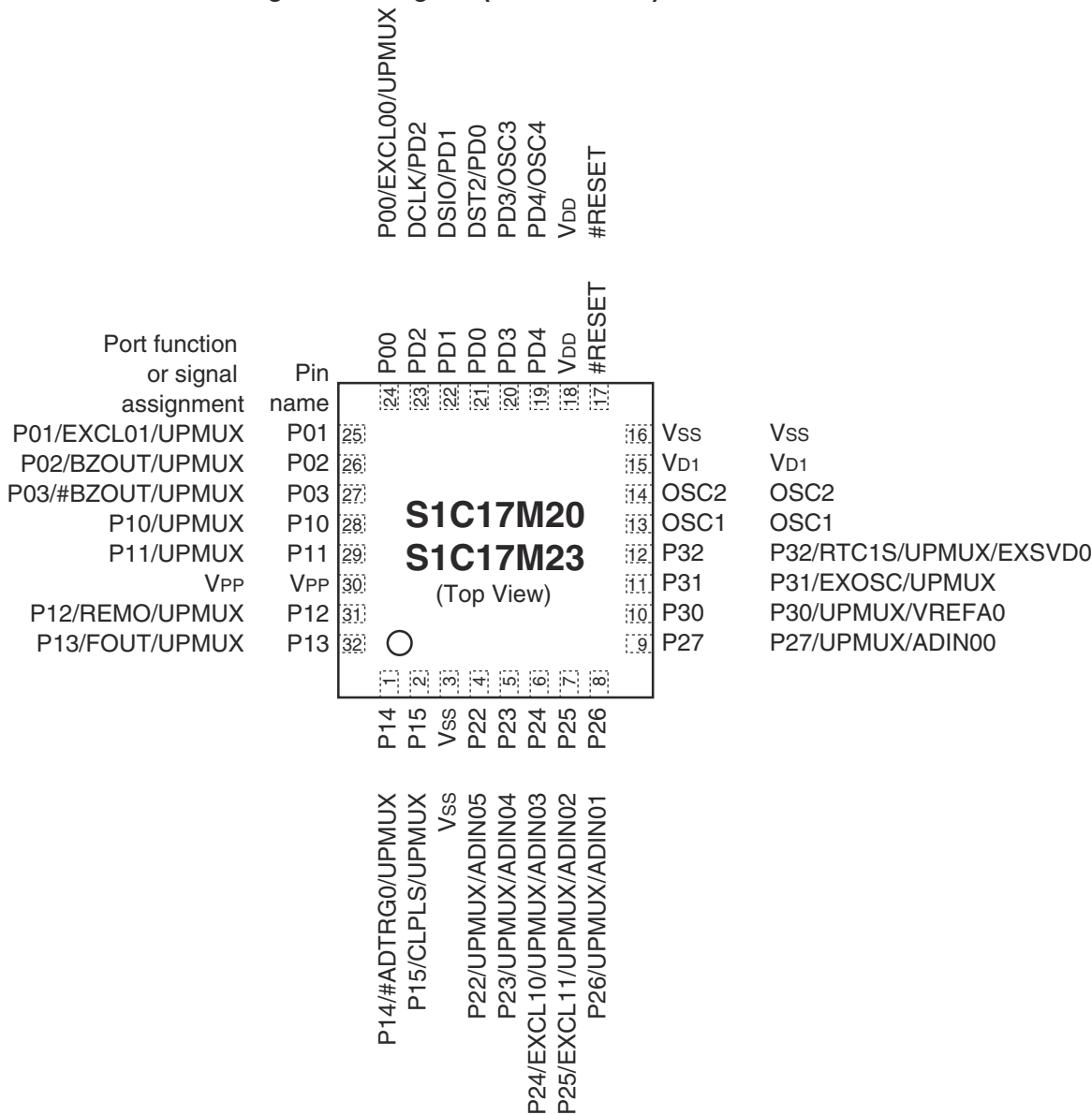
■ PIN CONFIGURATION DIAGRAMS

S1C17M20/M23 Pin Configuration Diagram (SQFN4-24PIN)



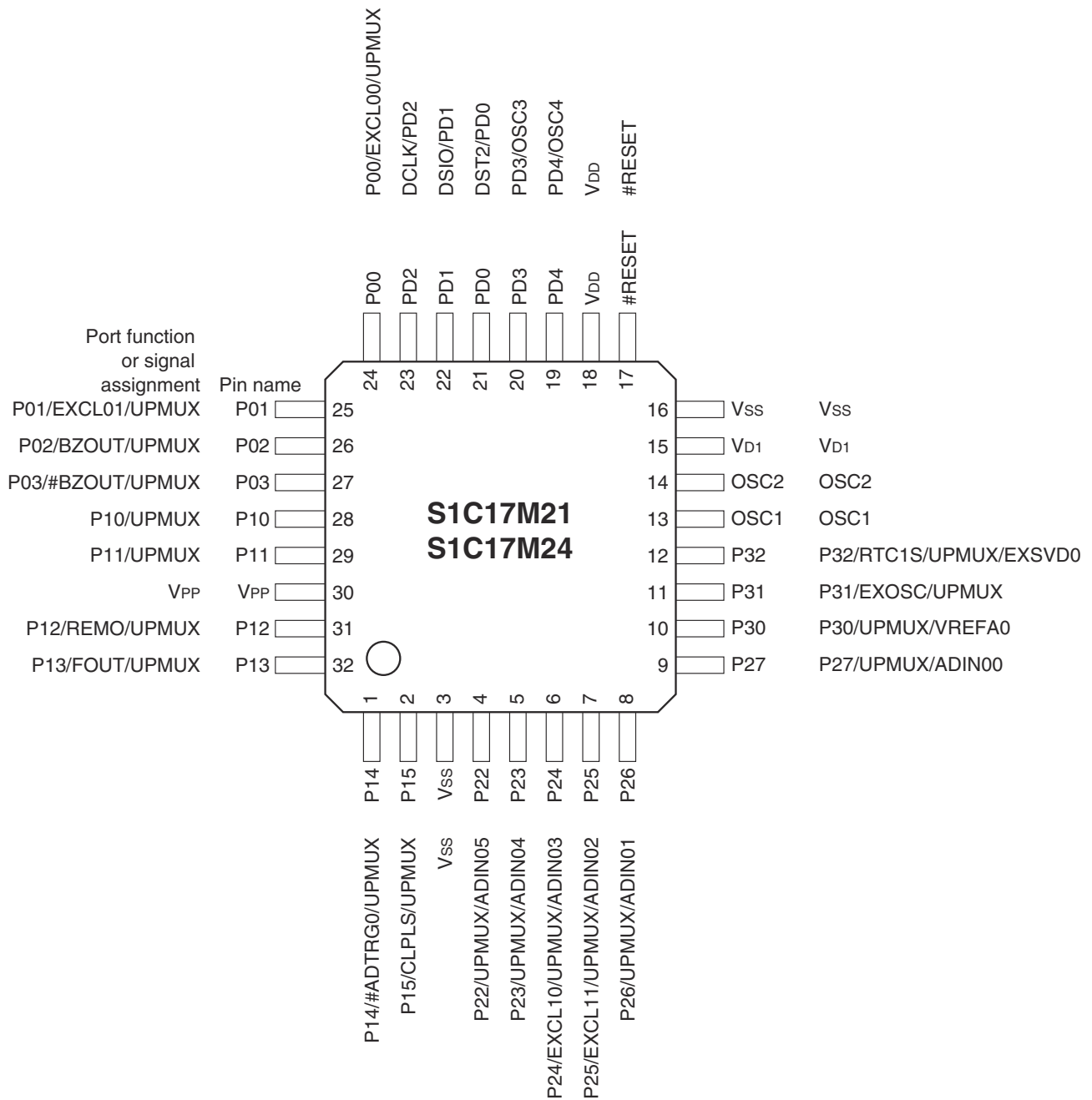
S1C17M20/M21/M22/M23/M24/M25

S1C17M20/M23 Pin Configuration Diagram (SQFN5-32PIN)



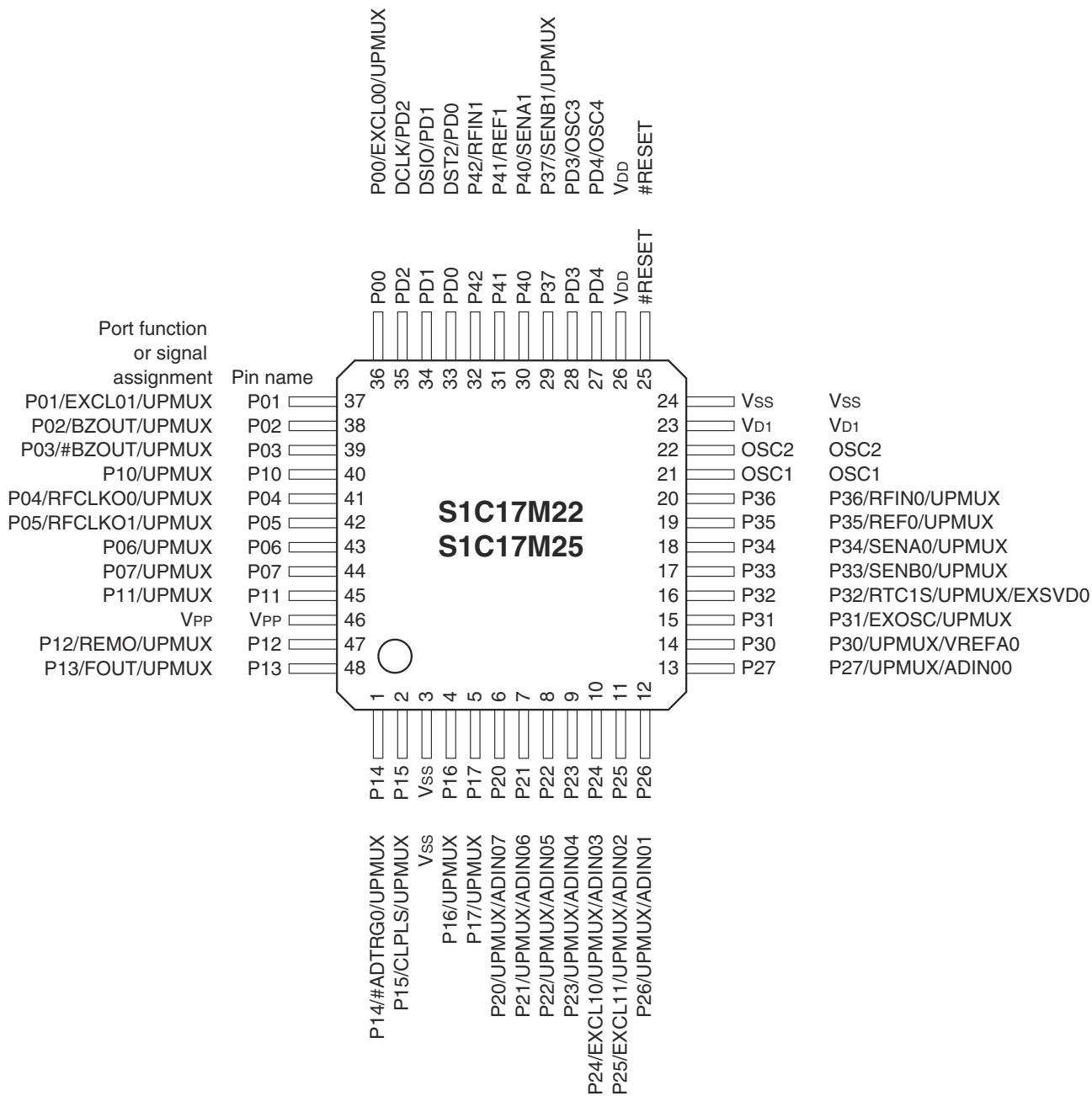
S1C17M20/M21/M22/M23/M24/M25

S1C17M21/M24 Pin Configuration Diagram (TQFP12-32PIN)



S1C17M20/M21/M22/M23/M24/M25

S1C17M22/M25 Pin Configuration Diagram (TQFP12-48PIN)



S1C17M20/M21/M22/M23/M24/M25

■ PIN DESCRIPTIONS

Symbol meanings

Assigned signal: The signal listed at the top of each pin is assigned in the initial state. The pin function must be switched via software to assign another signal (see the “I/O Ports” chapter).

I/O: I = Input
 O = Output
 I/O = Input/output
 P = Power supply
 A = Analog signal
 Hi-Z = High impedance state

Initial state: I (Pull-up) = Input with pulled up
 I (Pull-down) = Input with pulled down
 Hi-Z = High impedance state
 O (H) = High level output
 O (L) = Low level output

Tolerant fail-safe structure:

✓ = Over voltage tolerant fail-safe type I/O cell included (see the “I/O Ports” chapter)
 The over voltage tolerant fail-safe type I/O cell allows interfacing without passing unnecessary current even if a voltage exceeding V_{DD} is applied to the port. Also unnecessary current is not consumed when the port is externally biased without supplying V_{DD} .

| Pin/pad name | Assigned signal | I/O | Initial state | Tolerant fail-safe structure | Function | M20/M23 (24-pin) | M20/M23 (32-pin) M21/M24 | M22/M25 (48-pin) |
|--------------|-----------------|-----|---------------|------------------------------|--|------------------|-----------------------------|------------------|
| V_{DD} | V_{DD} | P | – | – | Power supply (+) | ✓ | ✓ | ✓ |
| V_{SS} | V_{SS} | P | – | – | GND | ✓ | ✓ | ✓ |
| V_{PP} | V_{PP} | P | – | – | Power supply for Flash programming | ✓ | ✓ | ✓ |
| V_{D1} | V_{D1} | A | – | – | V_{D1} regulator output | ✓ | ✓ | ✓ |
| OSC1 | OSC1 | A | – | – | OSC1 oscillator circuit input | – | ✓ | ✓ |
| OSC2 | OSC2 | A | – | – | OSC1 oscillator circuit output | – | ✓ | ✓ |
| #RESET | #RESET | I | I (Pull-up) | – | Reset input | ✓ | ✓ | ✓ |
| P00 | P00 | I/O | Hi-Z | ✓ | I/O port | ✓ | ✓ | ✓ |
| | EXCL00 | I | | | 16-bit PWM timer Ch.0 event counter input 0 | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| P01 | P01 | I/O | Hi-Z | ✓ | I/O port | ✓ | ✓ | ✓ |
| | EXCL01 | I | | | 16-bit PWM timer Ch.0 event counter input 1 | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| P02 | P02 | I/O | Hi-Z | ✓ | I/O port | ✓ | ✓ | ✓ |
| | BZOUT | O | | | Sound generator output | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| P03 | P03 | I/O | Hi-Z | ✓ | I/O port | ✓ | ✓ | ✓ |
| | #BZOUT | O | | | Sound generator inverted output | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| P04 | P04 | I/O | Hi-Z | ✓ | I/O port | – | – | ✓ |
| | RFCLKO0 | O | | | R/F converter Ch.0 clock monitor output | – | – | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | – | – | ✓ |
| P05 | P05 | I/O | Hi-Z | ✓ | I/O port | – | – | ✓ |
| | RFCLKO1 | O | | | R/F converter Ch.1 clock monitor output | – | – | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | – | – | ✓ |
| P06 | P06 | I/O | Hi-Z | ✓ | I/O port | – | – | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | – | – | ✓ |
| P07 | P07 | I/O | Hi-Z | ✓ | I/O port | – | – | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | – | – | ✓ |
| P10 | P10 | I/O | Hi-Z | ✓ | I/O port | – | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | – | ✓ | ✓ |
| P11 | P11 | I/O | Hi-Z | ✓ | I/O port | – | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | – | ✓ | ✓ |

S1C17M20/M21/M22/M23/M24/M25

| Pin/pad name | Assigned signal | I/O | Initial state | Tolerant fail-safe structure | Function | M20/M23 (24-pin) | M20/M23 M21/M24 (32-pin) | M22/M25 (48-pin) |
|--------------|-----------------|-----|---------------|------------------------------|---|------------------|--------------------------|------------------|
| P12 | P12 | I/O | Hi-Z | ✓ | I/O port | ✓ | ✓ | ✓ |
| | REMO | O | | | IR remote controller transmit data output | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| P13 | P13 | I/O | Hi-Z | ✓ | I/O port | ✓ | ✓ | ✓ |
| | FOUT | O | | | Clock external output | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| P14 | P14 | I/O | Hi-Z | ✓ | I/O port | ✓ | ✓ | ✓ |
| | #ADTRG0 | I | | | 12-bit A/D converter Ch.0 trigger input | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| P15 | P15 | I/O | Hi-Z | ✓ | I/O port | ✓ | ✓ | ✓ |
| | CLPLS | O | | | IR remote controller clear pulse output | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| P16 | P16 | I/O | Hi-Z | ✓ | I/O port | - | - | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | - | - | ✓ |
| P17 | P17 | I/O | Hi-Z | ✓ | I/O port | - | - | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | - | - | ✓ |
| P20 | P20 | I/O | Hi-Z | - | I/O port | - | - | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | - | - | ✓ |
| | ADIN07 | A | | | 12-bit A/D converter Ch.0 analog signal input 7 | - | - | ✓ |
| P21 | P21 | I/O | Hi-Z | - | I/O port | - | - | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | - | - | ✓ |
| | ADIN06 | A | | | 12-bit A/D converter Ch.0 analog signal input 6 | - | - | ✓ |
| P22 | P22 | I/O | Hi-Z | - | I/O port | - | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | - | ✓ | ✓ |
| | ADIN05 | A | | | 12-bit A/D converter Ch.0 analog signal input 5 | - | ✓ | ✓ |
| P23 | P23 | I/O | Hi-Z | - | I/O port | - | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | - | ✓ | ✓ |
| | ADIN04 | A | | | 12-bit A/D converter Ch.0 analog signal input 4 | - | ✓ | ✓ |
| P24 | P24 | I/O | Hi-Z | - | I/O port | ✓ | ✓ | ✓ |
| | EXCL10 | I | | | 16-bit PWM timer Ch.1 event counter input 0 | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| | ADIN03 | A | | | 12-bit A/D converter Ch.0 analog signal input 3 | ✓ | ✓ | ✓ |
| P25 | P25 | I/O | Hi-Z | - | I/O port | ✓ | ✓ | ✓ |
| | EXCL11 | I | | | 16-bit PWM timer Ch.1 event counter input 1 | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| | ADIN02 | A | | | 12-bit A/D converter Ch.0 analog signal input 2 | ✓ | ✓ | ✓ |
| P26 | P26 | I/O | Hi-Z | - | I/O port | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| | ADIN01 | A | | | 12-bit A/D converter Ch.0 analog signal input 1 | ✓ | ✓ | ✓ |
| P27 | P27 | I/O | Hi-Z | - | I/O port | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| | ADIN00 | A | | | 12-bit A/D converter Ch.0 analog signal input 0 | ✓ | ✓ | ✓ |
| P30 | P30 | I/O | Hi-Z | - | I/O port | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| | VREFA0 | A | | | 12-bit A/D converter Ch.0 reference voltage input | ✓ | ✓ | ✓ |
| P31 | P31 | I/O | Hi-Z | ✓ | I/O port | ✓ | ✓ | ✓ |
| | EXOSC | I | | | Clock generator external clock input | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| P32 | P32 | I/O | Hi-Z | ✓ | I/O port | ✓ | ✓ | ✓ |
| | RTC1S | O | | | Real-time clock 1-second cycle pulse output | ✓ | ✓ | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | ✓ | ✓ | ✓ |
| | EXSVD0 | A | | | External power supply voltage detection input | ✓ | ✓ | ✓ |
| P33 | P33 | I/O | Hi-Z | ✓ | I/O port | - | - | ✓ |
| | SENB0 | A | | | R/F converter Ch.0 sensor B oscillator pin | - | - | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | - | - | ✓ |
| P34 | P34 | I/O | Hi-Z | ✓ | I/O port | - | - | ✓ |
| | SENA0 | A | | | R/F converter Ch.0 sensor A oscillator pin | - | - | ✓ |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | - | - | ✓ |

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| Pin/pad name | Assigned signal | I/O | Initial state | Tolerant fail-safe structure | Function | M20/M23 (24-pin) | M20/M23 (32-pin) | M21/M24 | M22/M25 (48-pin) |
|--------------|-----------------|-----|---------------|------------------------------|--|------------------|------------------|---------|------------------|
| | | | | | | | | | |
| P35 | P35 | I/O | Hi-Z | ✓ | I/O port | - | - | ✓ | |
| | REF0 | A | | | R/F converter Ch.0 reference oscillator pin | - | - | ✓ | |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | - | - | ✓ | |
| P36 | P36 | I/O | Hi-Z | ✓ | I/O port | - | - | ✓ | |
| | RFIN0 | A | | | R/F converter Ch.0 oscillation input | - | - | ✓ | |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | - | - | ✓ | |
| P37 | P37 | I/O | Hi-Z | ✓ | I/O port | - | - | ✓ | |
| | SENB1 | A | | | R/F converter Ch.1 sensor B oscillator pin | - | - | ✓ | |
| | UPMUX | I/O | | | User-selected I/O (universal port multiplexer) | - | - | ✓ | |
| P40 | P40 | I/O | Hi-Z | ✓ | I/O port | - | - | ✓ | |
| | SENA1 | A | | | R/F converter Ch.1 sensor A oscillator pin | - | - | ✓ | |
| P41 | P41 | I/O | Hi-Z | ✓ | I/O port | - | - | ✓ | |
| | REF1 | A | | | R/F converter Ch.1 reference oscillator pin | - | - | ✓ | |
| P42 | P42 | I/O | Hi-Z | ✓ | I/O port | - | - | ✓ | |
| | RFIN1 | A | | | R/F converter Ch.1 oscillation input | - | - | ✓ | |
| PD0 | DST2 | O | O (L) | ✓ | On-chip debugger status output | ✓ | ✓ | ✓ | |
| | PD0 | I/O | | | I/O port | ✓ | ✓ | ✓ | |
| PD1 | DSIO | I/O | I (Pull-up) | ✓ | On-chip debugger data input/output | ✓ | ✓ | ✓ | |
| | PD1 | I/O | | | I/O port | ✓ | ✓ | ✓ | |
| PD2 | DCLK | O | O (H) | - | On-chip debugger clock output | ✓ | ✓ | ✓ | |
| | PD2 | O | | | Output port | ✓ | ✓ | ✓ | |
| PD3 | PD3 | I/O | Hi-Z | ✓ | I/O port | - | ✓ | ✓ | |
| | OSC3 | A | | | OSC3 oscillator circuit input | - | ✓ | ✓ | |
| PD4 | PD4 | I/O | Hi-Z | ✓ | I/O port | - | ✓ | ✓ | |
| | OSC4 | A | | | OSC3 oscillator circuit output | - | ✓ | ✓ | |

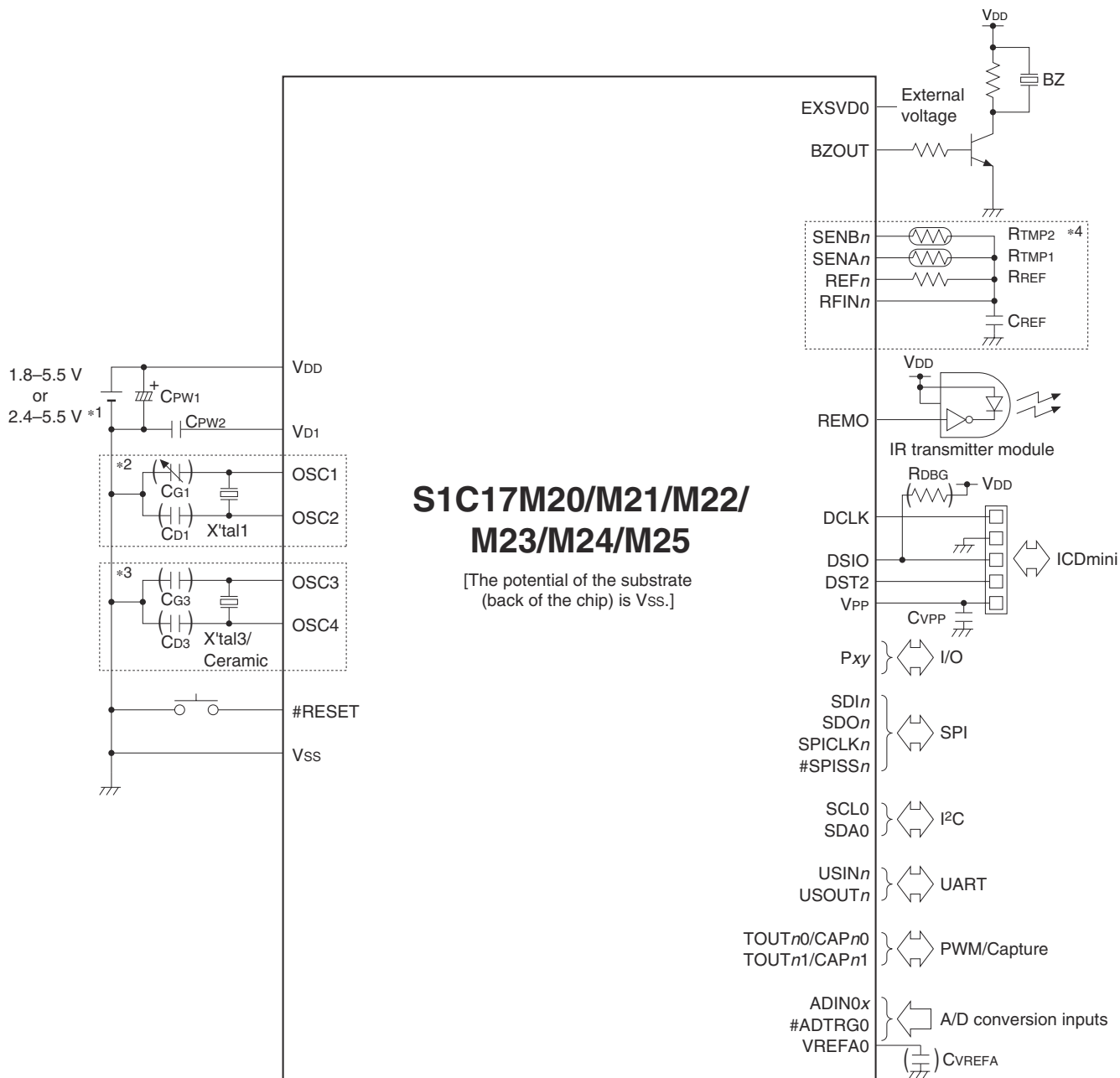
Universal port multiplexer (UPMUX)

The universal port multiplexer (UPMUX) allows software to select the peripheral circuit input/output function to be assigned to each pin from those listed below. Note, however, that a function cannot be assigned to two or more pins simultaneously.

| Peripheral circuit | Signal to be assigned | I/O | Channel number <i>n</i> | Function |
|-------------------------------------|---|-----|-------------------------|--|
| Synchronous serial interface (SPIA) | SDIn | I | <i>n</i> = 0, 1 | SPIA Ch. <i>n</i> data input |
| | SDOn | O | | SPIA Ch. <i>n</i> data output |
| | SPICLK _{<i>n</i>} | I/O | | SPIA Ch. <i>n</i> clock input/output |
| | #SPISS _{<i>n</i>} | I | | SPIA Ch. <i>n</i> slave-select input |
| I ² C (I2C) | SCL _{<i>n</i>} | I/O | <i>n</i> = 0 | I2C Ch. <i>n</i> clock input/output |
| | SDA _{<i>n</i>} | I/O | | I2C Ch. <i>n</i> data input/output |
| UART (UART3) | USIN _{<i>n</i>} | I | <i>n</i> = 0, 1 | UART3 Ch. <i>n</i> data input |
| | USOUT _{<i>n</i>} | O | | UART3 Ch. <i>n</i> data output |
| 16-bit PWM timer (T16B) | TOUT _{<i>n</i>0} /CAP _{<i>n</i>0} | I/O | <i>n</i> = 0, 1 | T16B Ch. <i>n</i> PWM output/capture input 0 |
| | TOUT _{<i>n</i>1} /CAP _{<i>n</i>1} | I/O | | T16B Ch. <i>n</i> PWM output/capture input 1 |

S1C17M20/M21/M22/M23/M24/M25

■ BASIC EXTERNAL CONNECTION DIAGRAM



*1: For Flash programming

*2: When the OSC1 crystal oscillator is used (except for the S1C17M20/M23 (24-pin package))

*3: When the OSC3 crystal/ceramic oscillator is used (except for the S1C17M20/M23 (24-pin package))

*4: When the R/F converter is used (available in the S1C17M22/M25)

(): Do not mount components if unnecessary.

S1C17M20/M21/M22/M23/M24/M25

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(Rev. e1.0, 2021.9)

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Document Code: 413530302
First Issue July 2016
Revised August 2022 in JAPAN ©