

S1C17M30/M31/M32/M33/M34 (rev1.2)

16-bit Single Chip Microcontroller

- 48K–96KB Flash ROM: Read/program protection function, 4KB RAM
- Supports 1.8 to 5.5 V wide range operating voltage.
- Equipped with an LCD driver capable of driving an 22–46 SEG × 8 COM LCD panel.
- Supports various kinds of interfaces (UART, SPI, I²C)

■ DESCRIPTIONS

The S1C17M30/M31/M32/M33/M34 is a 16-bit embedded Flash MCU that features low power consumption. It includes various serial interfaces, an LCD driver, a temperature sensor, an A/D converter, and various timers as well as a high-performance 16-bit CPU. It is suitable for battery-driven applications that require an LCD display and a temperature measurement function. The S1C17M30/M31/M32/M33/M34 allows use of a part of the Flash area or a dedicated area as an EEPROM by implementing a specific library.

■ FEATURES

Model	S1C17M30	S1C17M31	S1C17M32	S1C17M33	S1C17M34	
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)	48K bytes		64K bytes	96K bytes	64K bytes	
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	4K bytes					
Embedded display RAM						
Capacity	104 bytes					
Clock generator (CLG)						
System clock source	4 sources (IOSC/OSC1/OSC3/EXOSC)					
System clock frequency (operating frequency)	17.12 MHz (max.)					
IOSC oscillator circuit (boot clock source)	700 kHz (typ.) embedded oscillator 23 μs (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	–	32.768 kHz (typ.) crystal oscillator			
	32 kHz (typ.) embedded oscillator Oscillation stop detection circuit included					
OSC3 oscillator circuit	16.8 MHz (max.) crystal/ceramic oscillator 12 and 16 MHz-switchable embedded oscillator Auto-trimming function for the embedded oscillator					
EXOSC clock input	16.8 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	Input/output port	37 bits (max.)		53 bits (max.)	65 bits (max.)	51 bits (max.)
	Output port	1 bit (max.)				
	Other	Pins are shared with the peripheral I/O.				
Number of input interrupt ports	33 bits (max.)		49 bits (max.)	61 bits (max.)	47 bits (max.)	
Number of ports that support universal port multiplexer (UPMUX)	21 bits		32 bits		29 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)	3 channels Event counter/capture function PWM waveform generation function Number of PWM output or capture input ports: 2 ports/channel					

S1C17M30/M31/M32/M33/M34

Model	S1C17M30	S1C17M31	S1C17M32	S1C17M33	S1C17M34
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				
LCD driver (LCD8A)					
LCD output (max value.)	22 _{SEG} × 5 to 8 _{COM} 26 _{SEG} × 1 to 4 _{COM}		38 _{SEG} × 5 to 8 _{COM} 42 _{SEG} × 1 to 4 _{COM}	46 _{SEG} × 5 to 8 _{COM} 50 _{SEG} × 1 to 4 _{COM}	33 _{SEG} × 5 to 8 _{COM} 37 _{SEG} × 1 to 4 _{COM}
LCD power supply	External voltage must be applied.	1/3 bias power supply included, external voltage can be applied.	External voltage must be applied.	1/3 bias power supply included, external voltage can be applied.	
LCD contrast	–	16 levels	–	16 levels	
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 external analog signal inputs	2 ports			5 ports	
Number of internal analog signal inputs	1 port (The temperature sensor output is connected.)				
Temperature sensor/reference voltage generator (TSRVR)					
Temperature sensor circuit	Sensor output can be measured using ADC12A.				
Reference voltage generator	Reference voltage for ADC12A is selectable from 2.0 V, 2.5 V, V _{DD} , and external input.				
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 interrupt: 1 system (8 levels) Internal interrupt: 21 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)				

S1C17M30/M31/M32/M33/M34

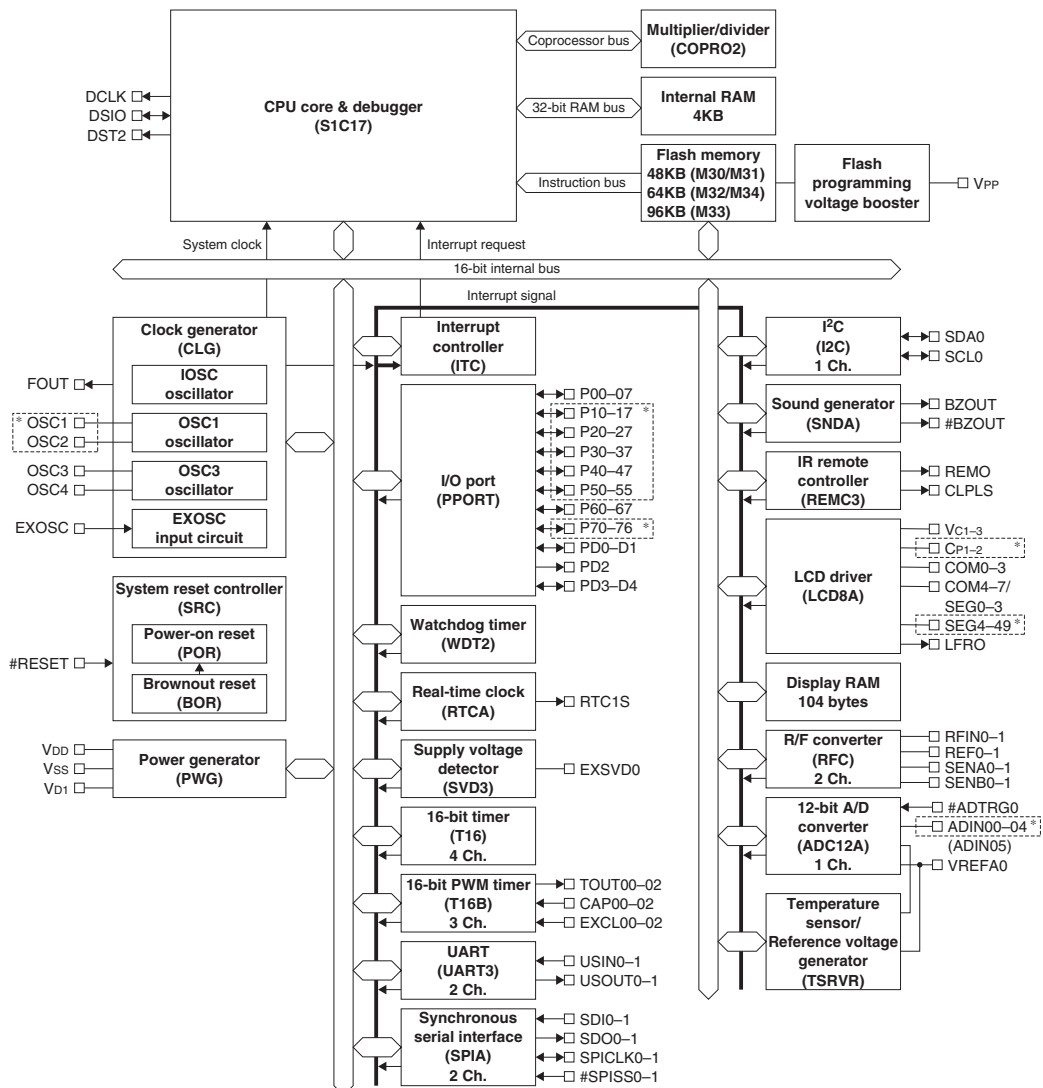
Model	S1C17M30	S1C17M31	S1C17M32	S1C17M33	S1C17M34
Operating temperature					
Operating temperature range	-40 to 85 °C				
Current consumption (typ. value)					
SLEEP mode *2	0.2 µA IOSC = OFF, OSC1 = OFF, OSC3 = OFF				
HALT mode	0.7 µA OSC1 = 32 kHz (crystal oscillator), RTC = ON				
RUN mode	5 µA OSC1 = 32 kHz (crystal oscillator), RTC = ON, CPU = OSC1				
	160 µA OSC3 = 1 MHz (ceramic oscillator), OSC1 = 32 kHz (crystal oscillator), RTC = ON, CPU = OSC3				
Shipping form					
1 *3	TQFP12-48PIN (P-TQFP048-0707-0.50, 7 × 7 mm, t = 1.2 mm, 0.5 mm pitch)	TQFP13-64PIN (P-TQFP064-1010-0.50, 10 × 10 mm, t = 1.2 mm, 0.5 mm pitch)	QFP14-80PIN (P-LQFP080-1212-0.50, 12 × 12 mm, t = 1.7 mm, 0.5 mm pitch)	TQFP13-64PIN (P-TQFP064-1010-0.50, 10 × 10 mm, t = 1.2 mm, 0.5 mm pitch)	
2	-			Die form (Pad pitch: 80 µm (min.))	-

*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

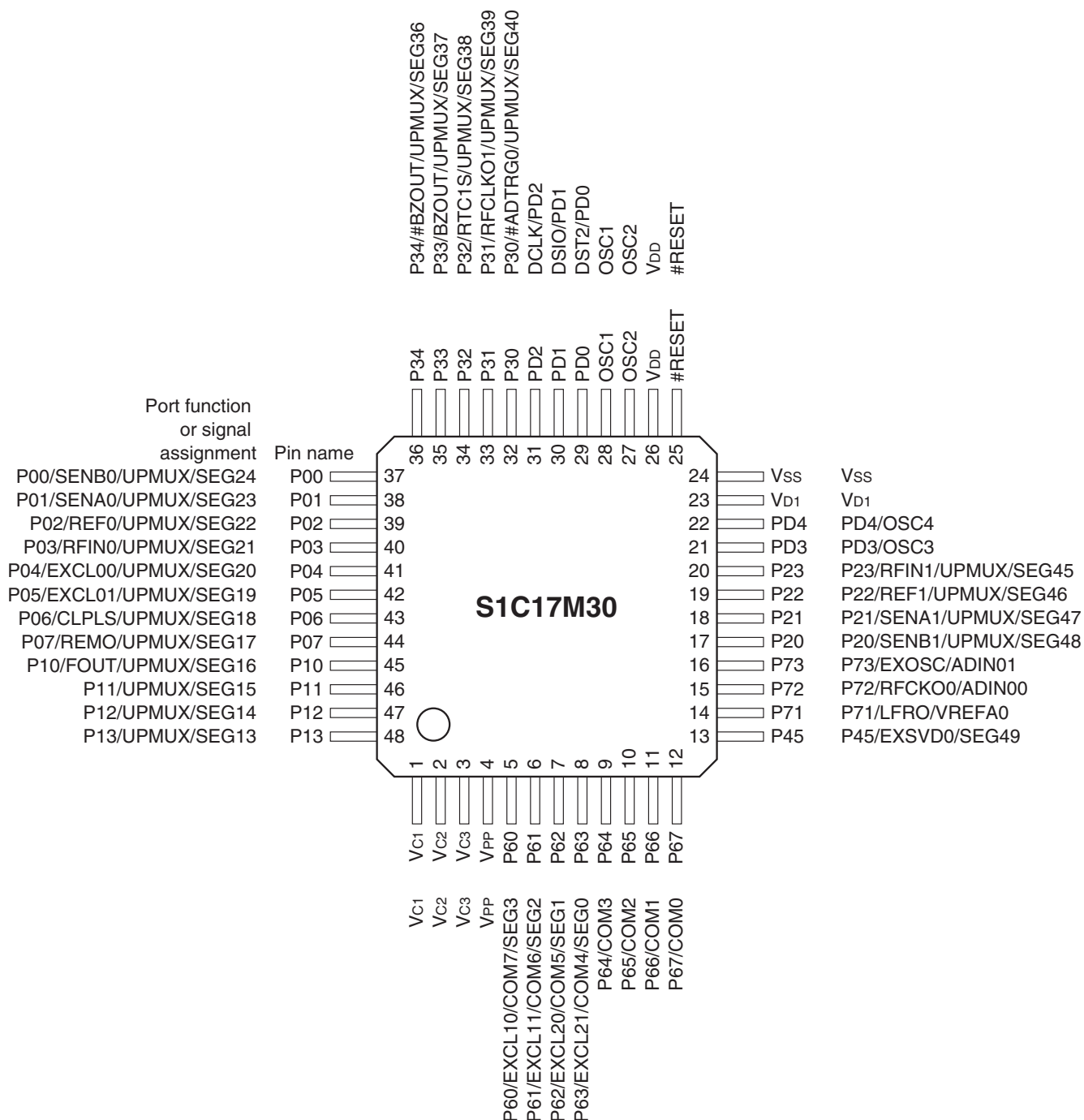


* The pin configuration and peripheral circuit function depends on the model. For more information, refer to "PIN DESCRIPTIONS."

S1C17M30/M31/M32/M33/M34

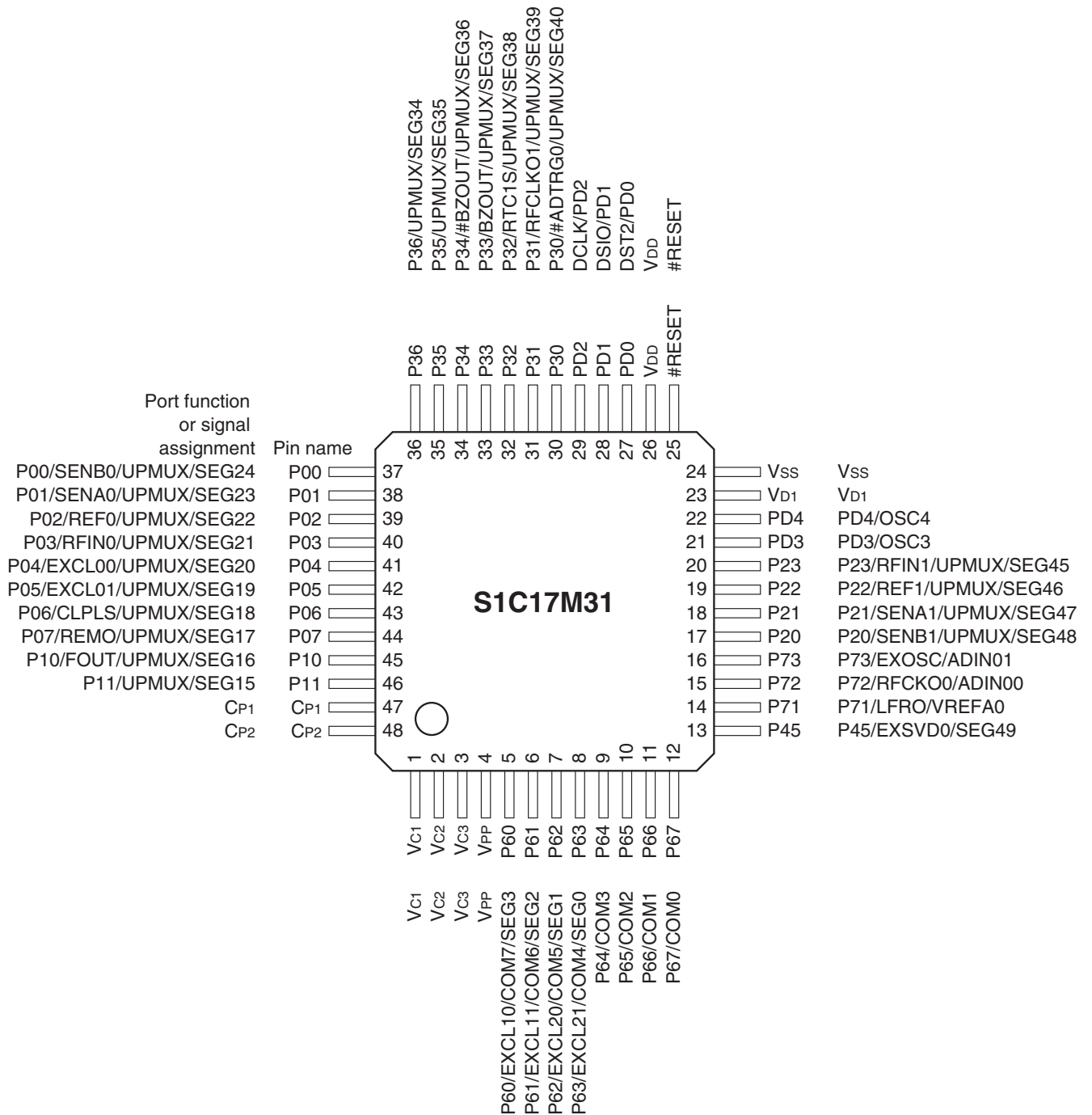
■ PIN CONFIGURATION DIAGRAMS

S1C17M30 Pin Configuration Diagram (TQFP12-48PIN)



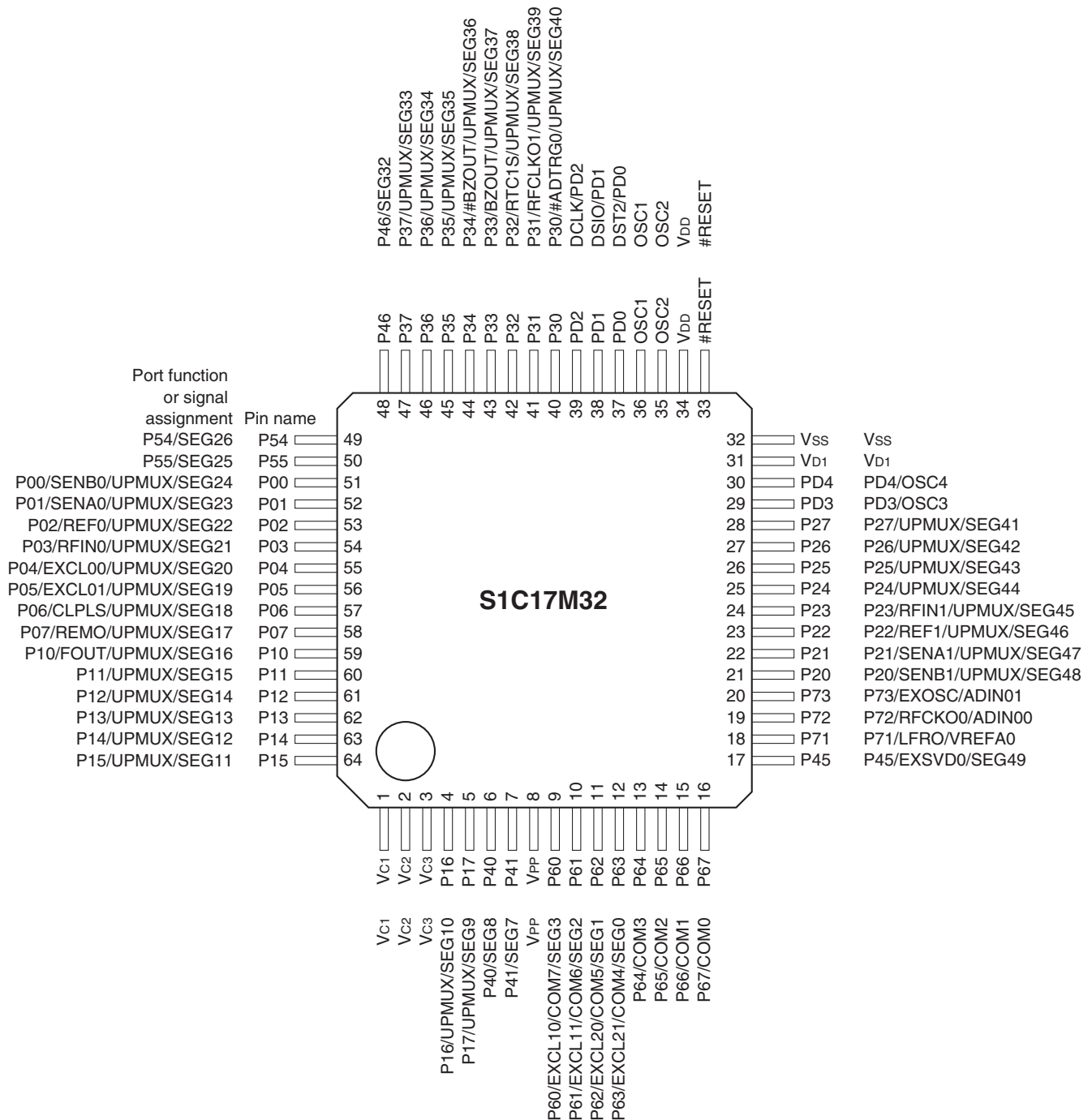
S1C17M30/M31/M32/M33/M34

S1C17M31 Pin Configuration Diagram (TQFP12-48PIN)



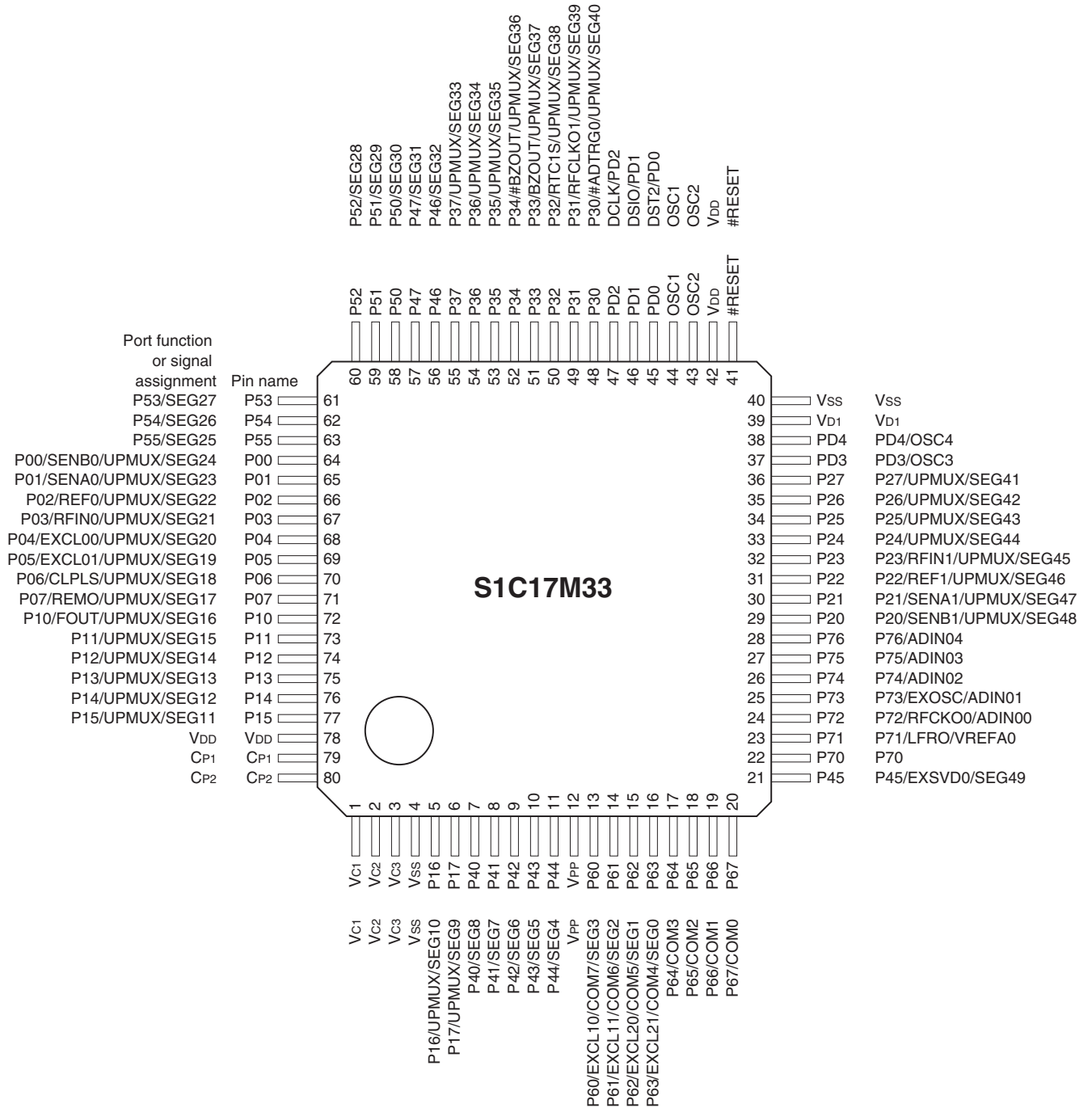
S1C17M30/M31/M32/M33/M34

S1C17M32 Pin Configuration Diagram (TQFP13-64PIN)



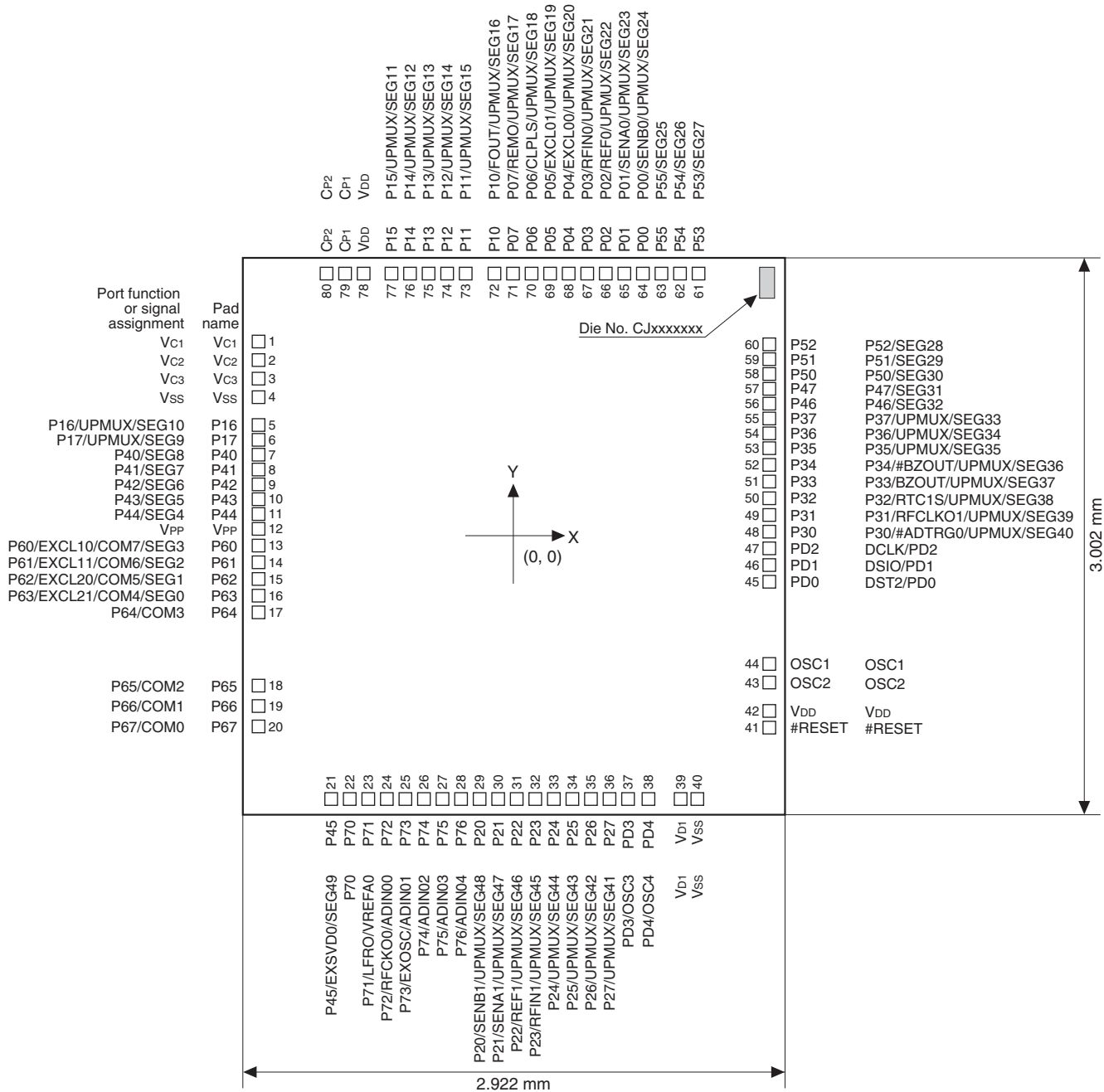
S1C17M30/M31/M32/M33/M34

S1C17M33 Pin Configuration Diagram (QFP14-80PIN)



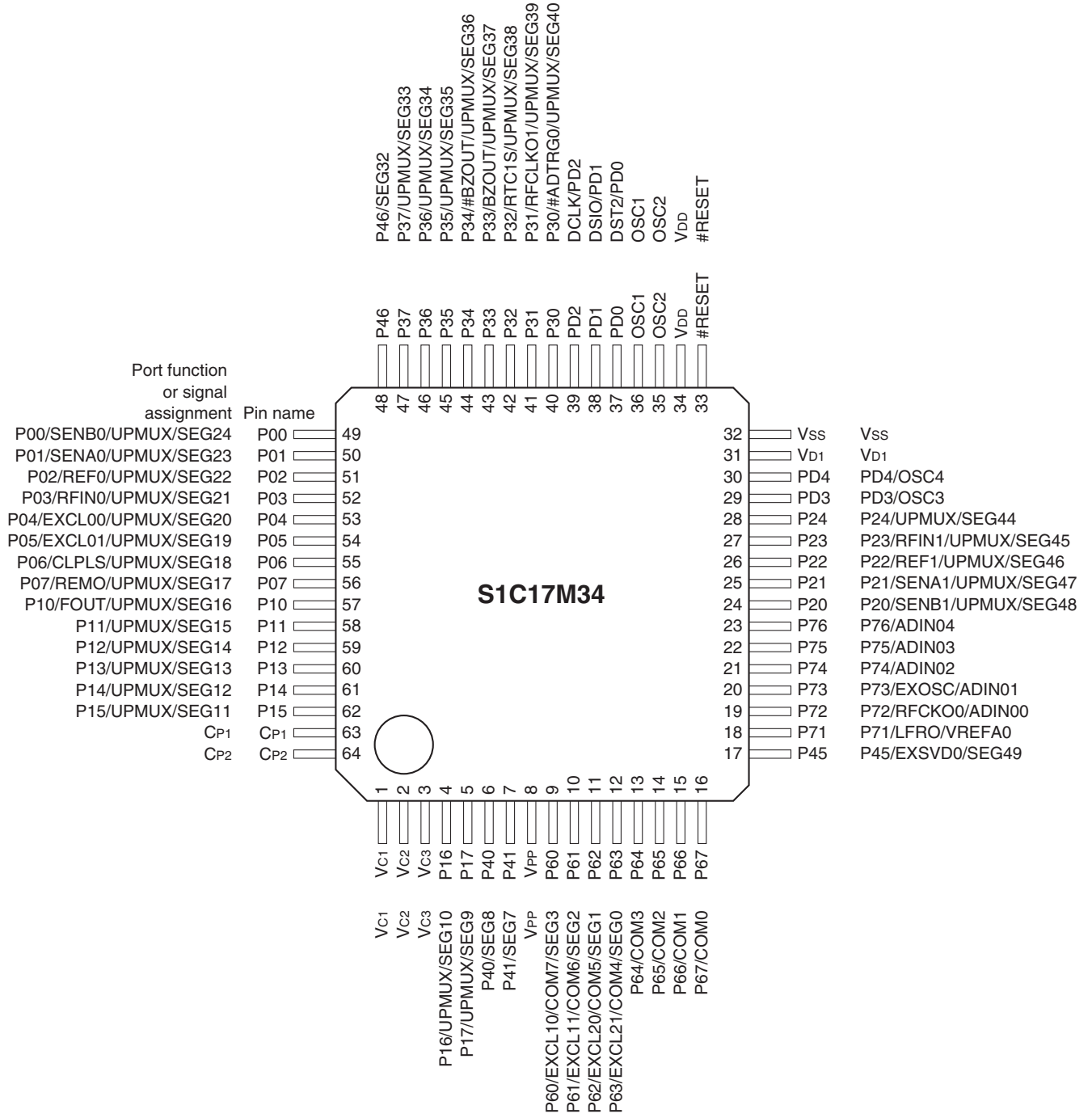
S1C17M30/M31/M32/M33/M34

S1C17M33 Pad Configuration Diagram (Chip)



S1C17M30/M31/M32/M33/M34

S1C17M34 Pin Configuration Diagram (TQFP13-64PIN)



S1C17M30/M31/M32/M33/M34

■ 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	S1C17M30	S1C17M31	S1C17M32	S1C17M33	S1C17M34
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	✓	✓	✓	✓	✓
V_{C1-3}	V_{C1-3}	P	–	–	LCD panel driver power supply	✓	✓	✓	✓	✓
$CP1-2$	$CP1-2$	A	–	–	LCD power supply booster capacitor connect pins	–	✓	–	✓	✓
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	✓	✓	✓	✓	✓
	SENB0	A			R/F converter Ch.0 sensor B oscillator pin	✓	✓	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	✓	✓	✓	✓	✓
	SEG24	A			LCD segment output	✓	✓	✓	✓	✓
P01	P01	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)	✓	✓	✓	✓	✓
	SEG23	A			LCD segment output	✓	✓	✓	✓	✓
P02	P02	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)	✓	✓	✓	✓	✓
	SEG22	A			LCD segment output	✓	✓	✓	✓	✓
P03	P03	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)	✓	✓	✓	✓	✓
	SEG21	A			LCD segment output	✓	✓	✓	✓	✓
P04	P04	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)	✓	✓	✓	✓	✓
	SEG20	A			LCD segment output	✓	✓	✓	✓	✓
P05	P05	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)	✓	✓	✓	✓	✓
	SEG19	A			LCD segment output	✓	✓	✓	✓	✓
P06	P06	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)	✓	✓	✓	✓	✓
	SEG18	A			LCD segment output	✓	✓	✓	✓	✓

S1C17M30/M31/M32/M33/M34

Pin/pad name	Assigned signal	I/O	Initial state	Tolerant fail-safe structure	Function	S1C17M30	S1C17M31	S1C17M32	S1C17M33	S1C17M34
P07	P07	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)	✓	✓	✓	✓	✓
	SEG17	A			LCD segment output	✓	✓	✓	✓	✓
P10	P10	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	FOUT	O			Clock external output	✓	✓	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	✓	✓	✓	✓	✓
	SEG16	A			LCD segment output	✓	✓	✓	✓	✓
P11	P11	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	✓	✓	✓	✓	✓
	SEG15	A			LCD segment output	✓	✓	✓	✓	✓
P12	P12	I/O	Hi-Z	✓	I/O port	✓	-	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	✓	-	✓	✓	✓
	SEG14	A			LCD segment output	✓	-	✓	✓	✓
P13	P13	I/O	Hi-Z	✓	I/O port	✓	-	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	✓	-	✓	✓	✓
	SEG13	A			LCD segment output	✓	-	✓	✓	✓
P14	P14	I/O	Hi-Z	✓	I/O port	-	-	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	-	-	✓	✓	✓
	SEG12	A			LCD segment output	-	-	✓	✓	✓
P15	P15	I/O	Hi-Z	✓	I/O port	-	-	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	-	-	✓	✓	✓
	SEG11	A			LCD segment output	-	-	✓	✓	✓
P16	P16	I/O	Hi-Z	✓	I/O port	-	-	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	-	-	✓	✓	✓
	SEG10	A			LCD segment output	-	-	✓	✓	✓
P17	P17	I/O	Hi-Z	✓	I/O port	-	-	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	-	-	✓	✓	✓
	SEG9	A			LCD segment output	-	-	✓	✓	✓
P20	P20	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)	✓	✓	✓	✓	✓
	SEG48	A			LCD segment output	✓	✓	✓	✓	✓
P21	P21	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	SENA1	A			R/F converter Ch.1 sensor A oscillator pin	✓	✓	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	✓	✓	✓	✓	✓
	SEG47	A			LCD segment output	✓	✓	✓	✓	✓
P22	P22	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	REF1	A			R/F converter Ch.1 reference oscillator pin	✓	✓	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	✓	✓	✓	✓	✓
	SEG46	A			LCD segment output	✓	✓	✓	✓	✓
P23	P23	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	RFIN1	A			R/F converter Ch.1 oscillation input	✓	✓	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	✓	✓	✓	✓	✓
	SEG45	A			LCD segment output	✓	✓	✓	✓	✓
P24	P24	I/O	Hi-Z	✓	I/O port	-	-	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	-	-	✓	✓	✓
	SEG44	A			LCD segment output	-	-	✓	✓	✓
P25	P25	I/O	Hi-Z	✓	I/O port	-	-	✓	✓	-
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	-	-	✓	✓	-
	SEG43	A			LCD segment output	-	-	✓	✓	-
P26	P26	I/O	Hi-Z	✓	I/O port	-	-	✓	✓	-
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	-	-	✓	✓	-
	SEG42	A			LCD segment output	-	-	✓	✓	-
P27	P27	I/O	Hi-Z	✓	I/O port	-	-	✓	✓	-
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	-	-	✓	✓	-
	SEG41	A			LCD segment output	-	-	✓	✓	-
P30	P30	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)	✓	✓	✓	✓	✓
	SEG40	A			LCD segment output	✓	✓	✓	✓	✓

S1C17M30/M31/M32/M33/M34

Pin/pad name	Assigned signal	I/O	Initial state	Tolerant fail-safe structure	Function	S1C17M30	S1C17M31	S1C17M32	S1C17M33	S1C17M34
P31	P31	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)	✓	✓	✓	✓	✓
	SEG39	A			LCD segment output	✓	✓	✓	✓	✓
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)	✓	✓	✓	✓	✓
	SEG38	A			LCD segment output	✓	✓	✓	✓	✓
P33	P33	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	BZOUT	O			Sound generator output	✓	✓	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	✓	✓	✓	✓	✓
	SEG37	A			LCD segment output	✓	✓	✓	✓	✓
P34	P34	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	#BZOUT	O			Sound generator inverted output	✓	✓	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	✓	✓	✓	✓	✓
	SEG36	A			LCD segment output	✓	✓	✓	✓	✓
P35	P35	I/O	Hi-Z	✓	I/O port	-	✓	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	-	✓	✓	✓	✓
	SEG35	A			LCD segment output	-	✓	✓	✓	✓
P36	P36	I/O	Hi-Z	✓	I/O port	-	✓	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	-	✓	✓	✓	✓
	SEG34	A			LCD segment output	-	✓	✓	✓	✓
P37	P37	I/O	Hi-Z	✓	I/O port	-	-	✓	✓	✓
	UPMUX	I/O			User-selected I/O (universal port multiplexer)	-	-	✓	✓	✓
	SEG33	A			LCD segment output	-	-	✓	✓	✓
P40	P40	I/O	Hi-Z	✓	I/O port	-	-	✓	✓	✓
	SEG8	A			LCD segment output	-	-	✓	✓	✓
P41	P41	I/O	Hi-Z	✓	I/O port	-	-	✓	✓	✓
	SEG7	A			LCD segment output	-	-	✓	✓	✓
P42	P42	I/O	Hi-Z	✓	I/O port	-	-	-	✓	-
	SEG6	A			LCD segment output	-	-	-	✓	-
P43	P43	I/O	Hi-Z	✓	I/O port	-	-	-	✓	-
	SEG5	A			LCD segment output	-	-	-	✓	-
P44	P44	I/O	Hi-Z	✓	I/O port	-	-	-	✓	-
	SEG4	A			LCD segment output	-	-	-	✓	-
P45	P45	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	EXSVD0	A			External power supply voltage detection input	✓	✓	✓	✓	✓
	SEG49	A			LCD segment output	✓	✓	✓	✓	✓
P46	P46	I/O	Hi-Z	✓	I/O port	-	-	✓	✓	✓
	SEG32	A			LCD segment output	-	-	✓	✓	✓
P47	P47	I/O	Hi-Z	✓	I/O port	-	-	-	✓	-
	SEG31	A			LCD segment output	-	-	-	✓	-
P50	P50	I/O	Hi-Z	✓	I/O port	-	-	-	✓	-
	SEG30	A			LCD segment output	-	-	-	✓	-
P51	P51	I/O	Hi-Z	✓	I/O port	-	-	-	✓	-
	SEG29	A			LCD segment output	-	-	-	✓	-
P52	P52	I/O	Hi-Z	✓	I/O port	-	-	-	✓	-
	SEG28	A			LCD segment output	-	-	-	✓	-
P53	P53	I/O	Hi-Z	✓	I/O port	-	-	-	✓	-
	SEG27	A			LCD segment output	-	-	-	✓	-
P54	P54	I/O	Hi-Z	✓	I/O port	-	-	-	✓	-
	SEG26	A			LCD segment output	-	-	✓	✓	-
P55	P55	I/O	Hi-Z	✓	I/O port	-	-	✓	✓	-
	SEG25	A			LCD segment output	-	-	✓	✓	-
P60	P60	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	EXCL10	I			16-bit PWM timer Ch.1 event counter input 0	✓	✓	✓	✓	✓
	COM7	A			LCD common output	✓	✓	✓	✓	✓
	SEG3	A			LCD segment output	✓	✓	✓	✓	✓
P61	P61	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	EXCL11	I			16-bit PWM timer Ch.1 event counter input 1	✓	✓	✓	✓	✓
	COM6	A			LCD common output	✓	✓	✓	✓	✓
	SEG2	A			LCD segment output	✓	✓	✓	✓	✓

S1C17M30/M31/M32/M33/M34

Pin/pad name	Assigned signal	I/O	Initial state	Tolerant fail-safe structure	Function	S1C17M30	S1C17M31	S1C17M32	S1C17M33	S1C17M34
P62	P62	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	EXCL20	I			16-bit PWM timer Ch.2 event counter input 0	✓	✓	✓	✓	✓
	COM5	A			LCD common output	✓	✓	✓	✓	✓
	SEG1	A			LCD segment output	✓	✓	✓	✓	✓
P63	P63	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	EXCL21	I			16-bit PWM timer Ch.2 event counter input 1	✓	✓	✓	✓	✓
	COM4	A			LCD common output	✓	✓	✓	✓	✓
	SEG0	A			LCD segment output	✓	✓	✓	✓	✓
P64	P64	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	COM3	A			LCD common output	✓	✓	✓	✓	✓
P65	P65	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	COM2	A			LCD common output	✓	✓	✓	✓	✓
P66	P66	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	COM1	A			LCD common output	✓	✓	✓	✓	✓
P67	P67	I/O	Hi-Z	✓	I/O port	✓	✓	✓	✓	✓
	COM0	A			LCD common output	✓	✓	✓	✓	✓
P70	P70	I/O	Hi-Z	-	I/O port	-	-	-	✓	-
P71	P71	I/O	Hi-Z	-	I/O port	✓	✓	✓	✓	✓
	LFRO	O			LCD frame signal monitor output	✓	✓	✓	✓	✓
	VREFA0	A			12-bit A/D converter Ch.0 reference voltage input, constant voltage output	✓	✓	✓	✓	✓
P72	P72	I/O	Hi-Z	-	I/O port	✓	✓	✓	✓	✓
	RFCLKO0	O			R/F converter Ch.0 clock monitor output	✓	✓	✓	✓	✓
	ADIN00	A			12-bit A/D converter Ch.0 analog signal input 0	✓	✓	✓	✓	✓
P73	P73	I/O	Hi-Z	-	I/O port	✓	✓	✓	✓	✓
	EXOSC	I			Clock generator external clock input	✓	✓	✓	✓	✓
	ADIN01	A			12-bit A/D converter Ch.0 analog signal input 1	✓	✓	✓	✓	✓
P74	P74	I/O	Hi-Z	-	I/O port	-	-	-	✓	✓
	ADIN02	A			12-bit A/D converter Ch.0 analog signal input 2	-	-	-	✓	✓
P75	P75	I/O	Hi-Z	-	I/O port	-	-	-	✓	✓
	ADIN03	A			12-bit A/D converter Ch.0 analog signal input 3	-	-	-	✓	✓
P76	P75	I/O	Hi-Z	-	I/O port	-	-	-	✓	✓
	ADIN04	A			12-bit A/D converter Ch.0 analog signal input 4	-	-	-	✓	✓
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	✓	✓	✓	✓	✓

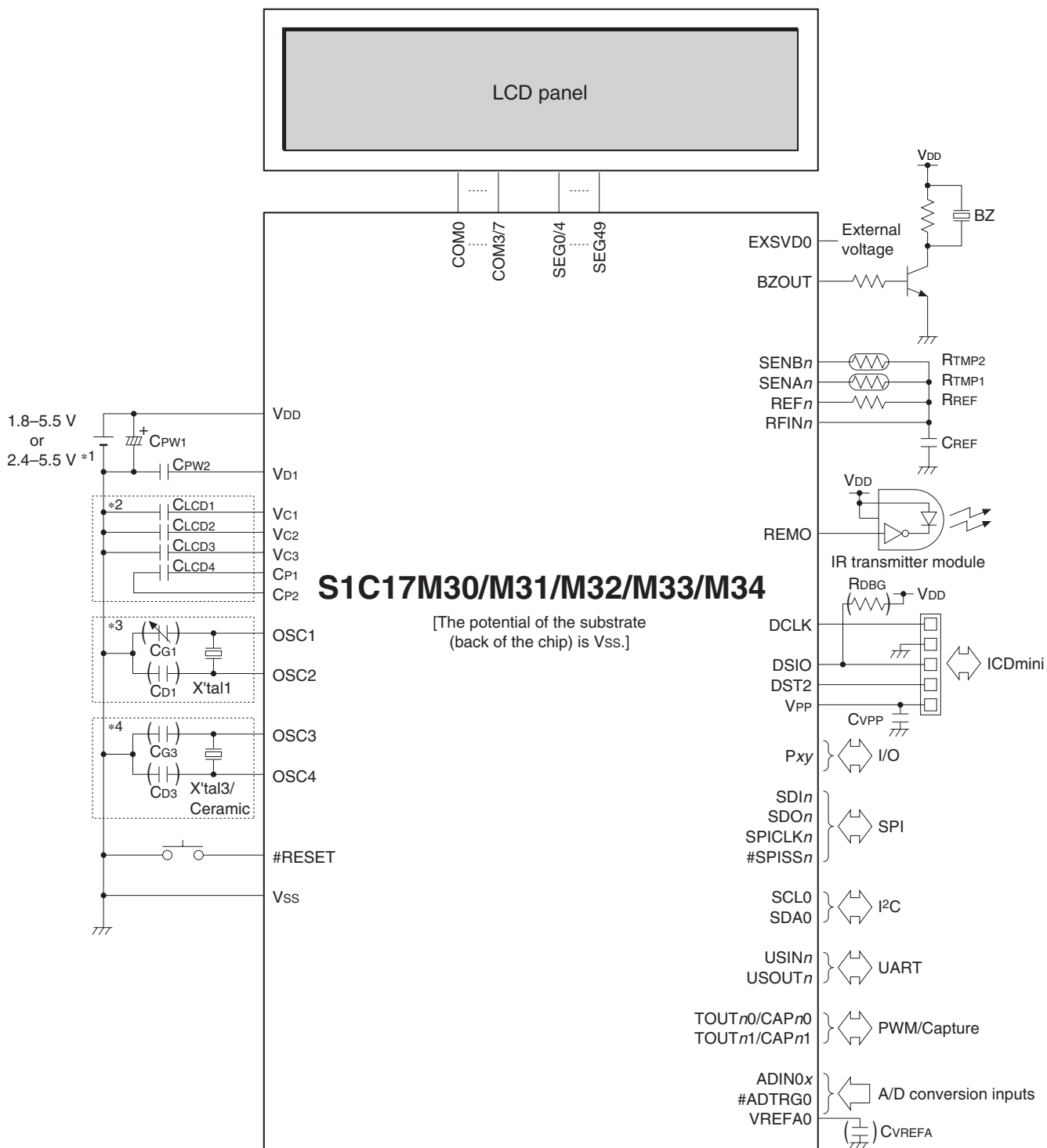
Universal port multiplexer (UPMUX)

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 _n	I/O		SPIA Ch. <i>n</i> clock input/output
	#SPISS _n	I		SPIA Ch. <i>n</i> slave-select input
I ² C (I2C)	SCL _n	I/O	<i>n</i> = 0	I2C Ch. <i>n</i> clock input/output
	SDA _n	I/O		I2C Ch. <i>n</i> data input/output
UART (UART3)	USIN _n	I	<i>n</i> = 0, 1	UART3 Ch. <i>n</i> data input
	USOUT _n	O		UART3 Ch. <i>n</i> data output
16-bit PWM timer (T16B)	TOUT _{n0} /CAP _{n0}	I/O	<i>n</i> = 0, 1, 2	T16B Ch. <i>n</i> PWM output/capture input 0
	TOUT _{n1} /CAP _{n1}	I/O		T16B Ch. <i>n</i> PWM output/capture input 1

S1C17M30/M31/M32/M33/M34

■ BASIC EXTERNAL CONNECTION DIAGRAM



- *1: For Flash programming
- *2: When the internal LCD power supply is used (S1C17M31/M33/M34)
- *3: When OSC1 crystal oscillator is selected (S1C17M30/M32/M33/M34)
- *4: When OSC3 crystal/ceramic oscillator is selected
- (): Do not mount components if unnecessary.

S1C17M30/M31/M32/M33/M34

NOTICE : PLEASE READ CAREFULLY BELOW BEFORE USING THIS DOCUMENT

The contents of this document are subject to change without notice.

1. This document may not be copied, reproduced, or used for any other purpose, in whole or in part, without the consent of the Seiko Epson Corporation ("Epson").
2. Before purchasing or using Epson products, please contact our sales representative for the latest information and always be sure to check the latest information published on Epson's official web sites and other sources.
3. Information provided in this document such as application circuits, programs, usage, etc., are for reference purposes only. Using the application circuits, programs, usage, etc. in the design of your equipment or systems is your own responsibility. Epson makes no guarantees against any infringements or damages to any third parties' intellectual property rights or any other rights resulting from the information. This document does not grant you any licenses, intellectual property rights or any other rights with respect to Epson products owned by Epson or any third parties.
4. Epson is committed to constantly improving quality and reliability, but semiconductor products in general are subject to malfunction and failure. By using Epson products, you shall be responsible for your hardware. Software and systems must be designed well enough to prevent death or injury as well as any property damage even if any of the malfunctions or failures might be caused by Epson products. When designing your products using Epson products, please be sure to check and comply with the latest information regarding Epson products (this document, specifications, data sheets, manuals, Epson's web site, etc.). When using the information included above materials such as product data, charts, technical contents, programs, algorithms and application circuit examples, you shall evaluate your products both on a stand-alone basis as well as within your overall systems. You shall be solely responsible for deciding whether or not to adopt and use Epson products.
5. Epson has prepared this document and programs provided in this document carefully to be accurate and dependable, but Epson does not guarantee that the information and the programs are always accurate and complete. Epson assumes no responsibility for any damages which you incur due to misinformation in this document and the programs.
6. No dismantling, analysis, reverse engineering, modification, alteration, adaptation, reproduction, etc., of Epson products is allowed.
7. Epson products have been designed, developed and manufactured to be used in general electronic applications (office equipment, communications equipment, measuring instruments, home electronics, etc.) ("General Purpose") and applications which is individually listed in this document or designated by Epson ("Designated Purpose"). Epson products are NOT intended for any use beyond the General Purpose and Designated Purpose uses that requires particular/higher quality or reliability in order to refrain from causing any malfunction or failure leading to death, injury, serious property damage or severe impact on society, including, but not limited to those listed below ("Particular Purpose"). Therefore, you are advised to use Epson products only for General Purpose and Designated Purpose uses. Should you desire to buy and use Epson products for a Particular Purpose, Epson makes no warranty and disclaims with respect to Epson products, whether express or implied, including without limitation any implied warranty of merchantability or fitness for any Particular Purpose. Please be sure to contact our sales representative and obtain approval in advance.
[Examples of Particular Purpose]
Space equipment (artificial satellites, rockets, etc.) /
Transportation vehicles and their control equipment (automobiles, aircraft, trains, ships, etc.) /
Medical equipment / Relay equipment to be placed on ocean floor /
Power station control equipment / Disaster or crime prevention equipment / Traffic control equipment / Financial equipment
Other applications requiring similar levels of reliability as those listed above. Please be sure to contact our sales representative for details of the other applications.
8. Epson products listed in this document and our associated technologies shall not be used in any equipment or systems that laws and regulations in Japan or any other countries prohibit to manufacture, use or sell. Furthermore, Epson products and our associated technologies shall not be used for developing weapons of mass destruction, or any other military purposes or applications. If exporting Epson products or our associated technologies, you shall comply with the Foreign Exchange and Foreign Trade Control Act in Japan, Export Administration Regulations in the U.S.A. (EAR) and other export-related laws and regulations in Japan and any other countries and follow the required procedures as provided by the relevant laws and regulations.
9. Epson assumes no responsibility for any damages (whether direct or indirect) caused by or in relation with your non-compliance with the terms and conditions in this document.
10. Epson assumes no responsibility for any damages (whether direct or indirect) incurred by any third party that you assign, transfer, loan, etc., Epson products to.
11. For more details or other concerns about this document, please contact our sales representative.
12. Company names and product names listed in this document are trademarks or registered trademarks of their respective companies.

Rev. e1.4, 2023. 4

©Seiko Epson Corporation 2023, All rights reserved.

SEIKO EPSON CORPORATION

Sales & Marketing Division

MD Sales & Marketing Department
JR Shinjuku Miraina Tower, 4-1-6 Shinjuku,
Shinjuku-ku, Tokyo 160-8801, Japan

EPSON semiconductor website

global.epson.com/products_and_drivers/semicon/

Document Code: 413497802
First Issue June 2017
Revised August 2023 in JAPAN ©