

CMOS 16-bit Single Chip Microcontroller

- Low Power MCU (operating voltage 1.8 V, 0.5 μ A/SLEEP, 2.5 μ A/HALT)
- S1C17 High Performance 16-bit RISC CPU Core with C Optimized Compact Code and Serial ICE Support
- Infrared Remote Controller with Carrier Generator
- 32K-Byte ROM and 2K-Byte RAM

■ DESCRIPTIONS

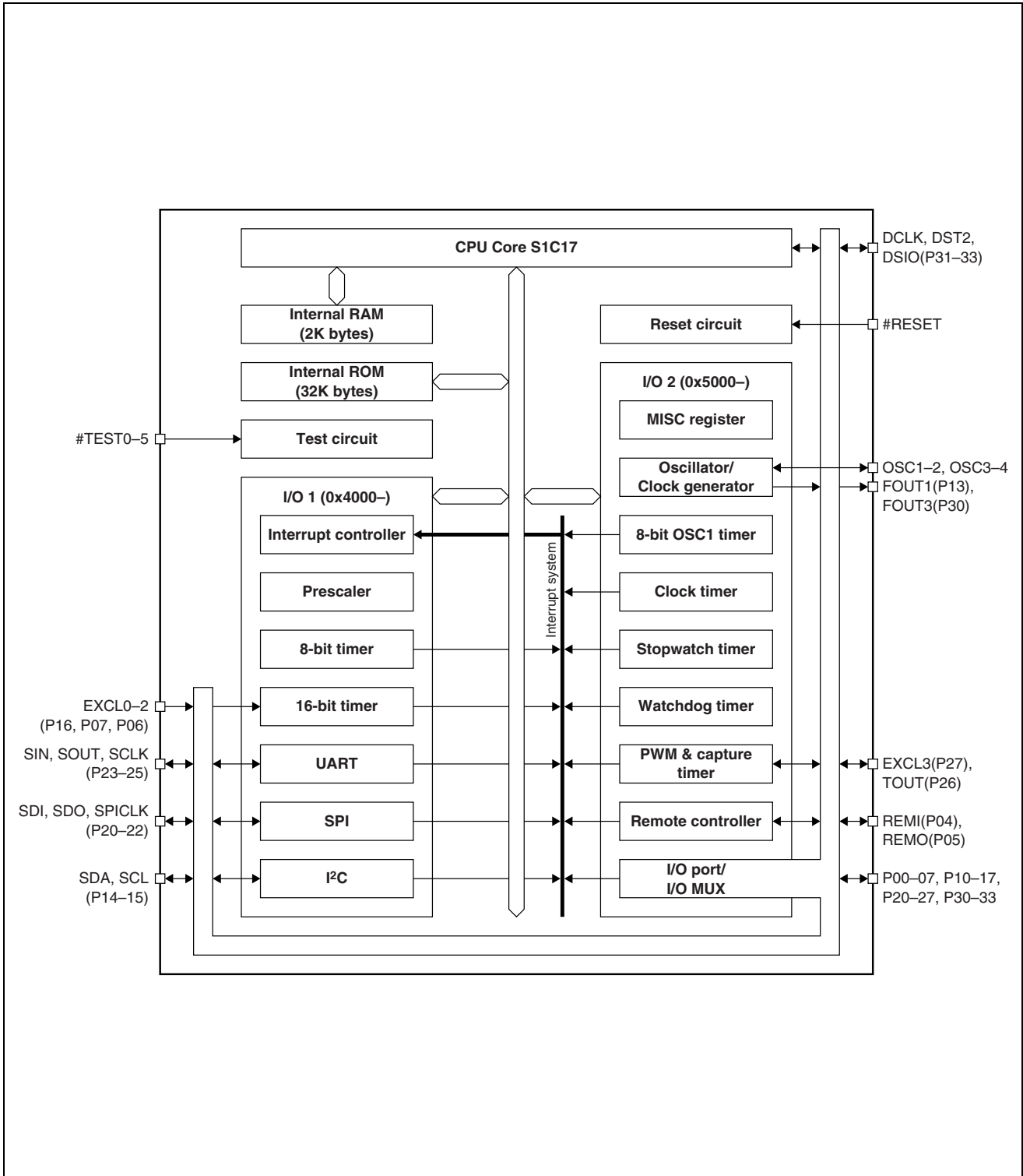
The S1C17001 is a 16-bit MCU that features high-speed operation, low power consumption, small size, large address space, and on-chip ICE. The S1C17001 consists of an S1C17 CPU Core, a 32K-byte ROM, a 2K-byte RAM, serial interface modules (UART that supports high bit rate and IrDA 1.0, SPI and I²C) for connecting various sensor modules, 8-bit timers, 16-bit timers, a PWM & capture timer, a clock timer, a stopwatch timer, a watchdog timer and 28 GPIO ports. The S1C17001 is capable of high-speed operation (8.2 MHz) with low operating voltage (1.8 V). Its 16-bit RISC processor executes one instruction in one clock cycle. The S1C17001 also provides an on-chip ICE function that allows on-board debugging and evaluating the program by connecting the S1C17001 to the ICD Mini (S5U1C17001H) or ICD board with only three wires.

■ FEATURES

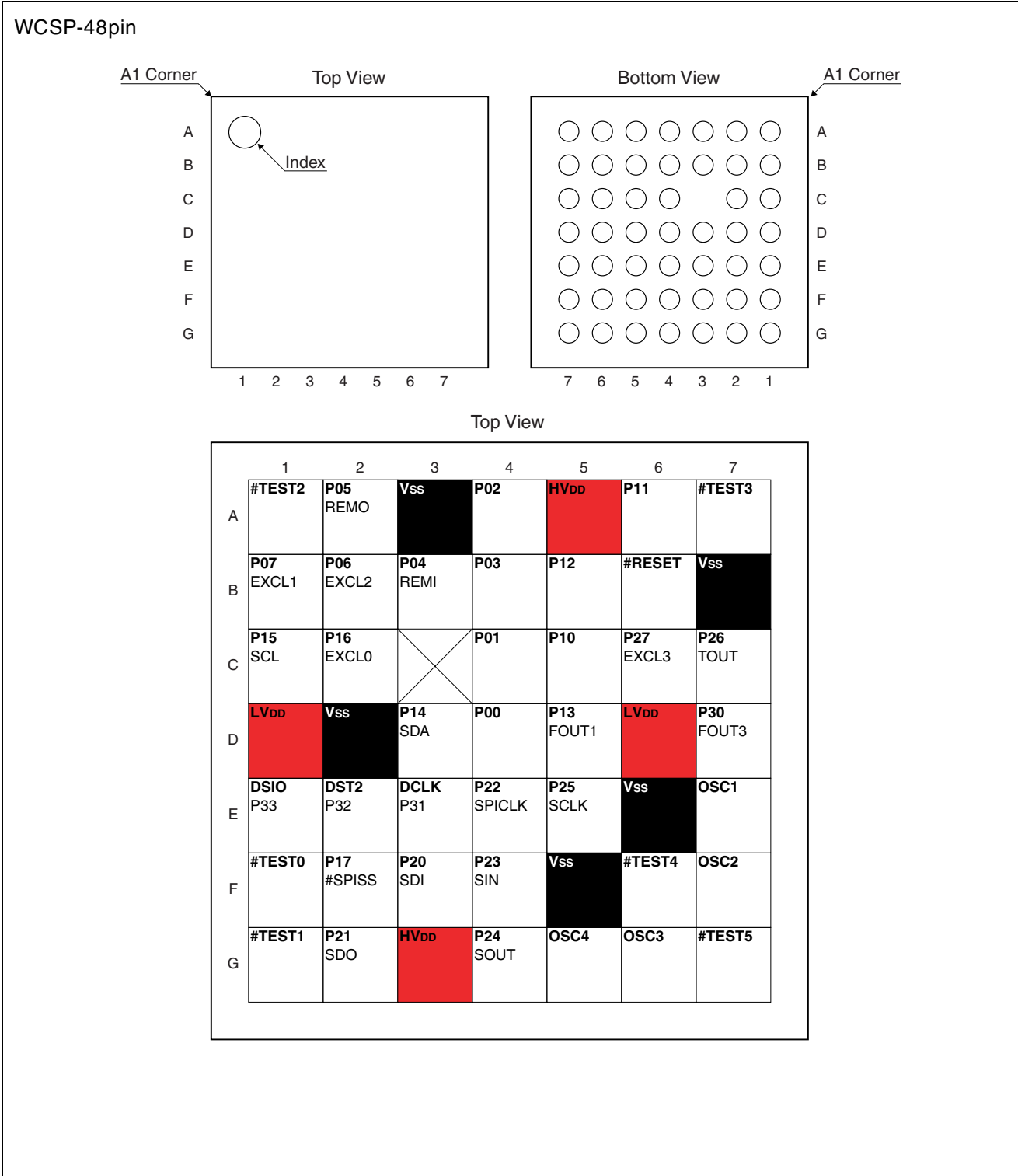
- CPU • Seiko Epson original 16-bit RISC CPU core S1C17
- Main (OSC3) oscillator • Crystal/ceramic oscillator or external clock input 8.2 MHz (max.)
- Sub (OSC1) oscillator..... • Crystal oscillator or external clock input 32.768 kHz (typ.)
- On-chip ROM..... • 32K bytes
- On-chip RAM..... • 2K bytes
- I/O ports • Max. 28 general-purpose I/O ports (Pins are shared with the peripheral I/O.)
- Serial interfaces.....
 - SPI (master/slave) 1 ch.
 - I²C (master) 1 ch.
 - UART (with IrDA 1.0) 1 ch.
 - Remote controller (REMC) 1 ch.
- Timers
 - 8-bit timer (T8F) 1 ch.
 - 16-bit timer (T16) 3 ch.
 - PWM & capture timer (T16E) 1 ch.
 - Clock timer (CT) 1 ch.
 - Stopwatch timer (SWT) 1 ch.
 - Watchdog timer (WDT) 1 ch.
 - 8-bit OSC1 timer (T8OSC1) 1 ch.
- Interrupts
 - Reset
 - NMI
 - 14 hardware interrupts (8 levels)
- Power supply voltage
 - Core voltage (LVDD) 1.65 V to 2.7 V
 - I/O voltage (HVDD) 1.65 V to 3.6 V
- Operating temperature • -40°C to 85°C
- Current consumption (typ.).....
 - SLEEP state: 0.5 μ A
 - HALT state: 2.5 μ A (32 kHz)
 - Run state: 10 μ A (32 kHz)
 - 1800 μ A (8 MHz)
- Shipping form • WCSP-48pin plastic package
- Flash memory model for developing mask ROM code..... • S1C17704

S1C17001

■ BLOCK DIAGRAM



■ PIN LAYOUT DIAGRAM



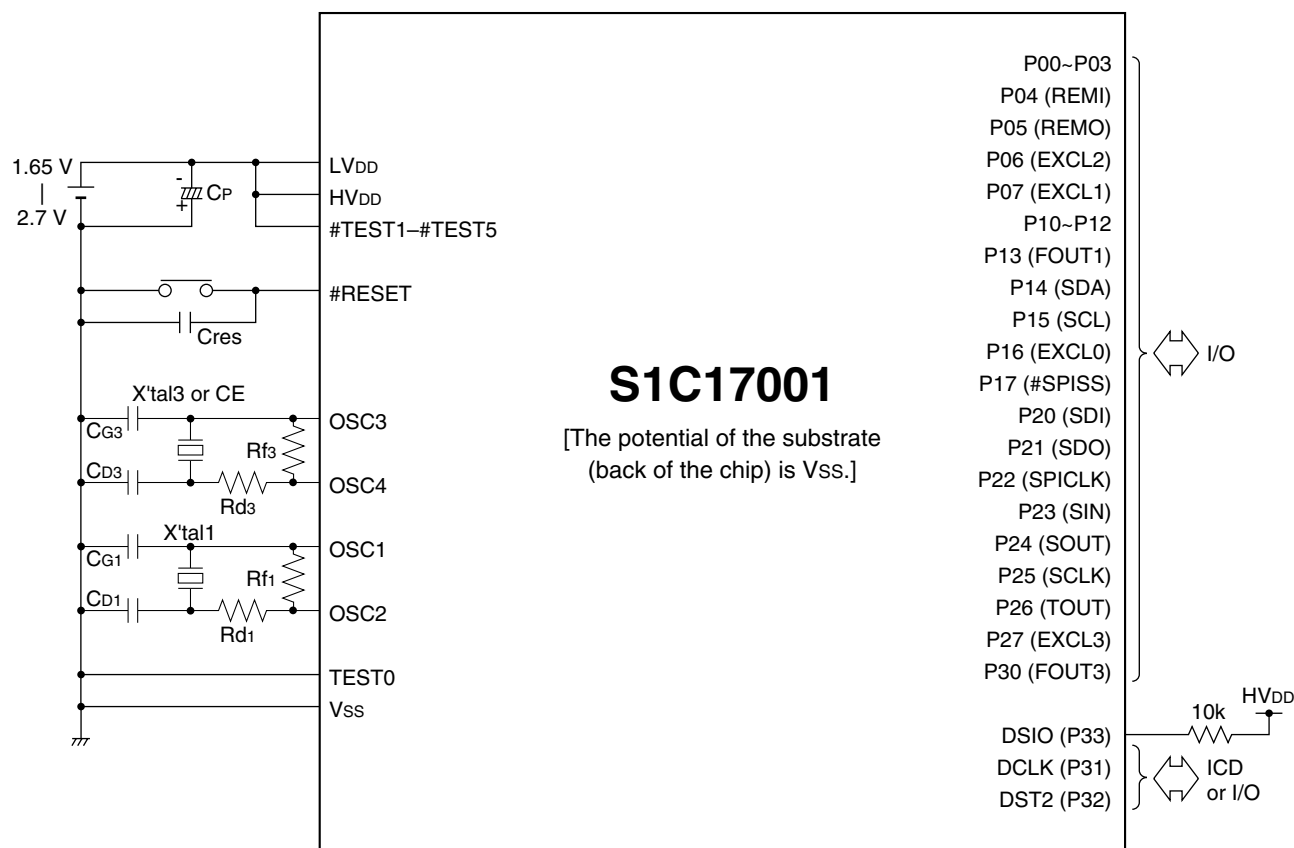
■ PIN DESCRIPTION

No.	Pin name	I/O	Initial	Function
1	Vss	–	–	Power supply pin (GND)
2	#TEST1	I	I (Pull-UP)	Test pin (fix at high during normal operation)
3	#TEST2	I	I (Pull-UP)	Test pin (fix at high during normal operation)
4	#TEST3	I	I (Pull-UP)	Test pin (fix at high during normal operation)
5	#TEST4	I	I (Pull-UP)	Test pin (fix at high during normal operation)
6	#TEST5	I	I (Pull-UP)	Test pin (fix at high during normal operation)
7	OSC3	I	I	OSC3 oscillation input pin (external clock may be input)
8	OSC4	O	O	OSC3 oscillation output pin
9	OSC1	I	I	OSC1 oscillation input pin (external clock may be input)
10	OSC2	O	O	OSC1 oscillation output pin
11	HVdd	–	–	Power supply pin (HVDD+)
12	Vss	–	–	Power supply pin (GND)
13	#TEST0	I	I (Pull-UP)	Test pin (fix at high during normal operation)
14	#RESET	I	I (Pull-UP)	Initial reset input pin
15	DSIO/P33	I/O	I (Pull-UP)	On-chip debugger data I/O pin* or I/O port pin
16	DST2/P32	I/O	O (L)	On-chip debugger status output pin* or I/O port pin
17	DCLK/P31	I/O	O (H)	On-chip debugger clock output pin* or I/O port pin
18	P30/FOUT3	I/O	I (Pull-UP)	I/O port pin* or OSC3 divider clock output pin
19	P27/EXCL3	I/O	I (Pull-UP)	I/O port pin* or T16E external clock input pin
20	P26/TOUT	I/O	I (Pull-UP)	I/O port pin* or T16E PWM signal output pin
21	P25/SCLK	I/O	I (Pull-UP)	I/O port pin* or UART clock input pin
22	P24/SOUT	I/O	I (Pull-UP)	I/O port pin* or UART data output pin
23	P23/SIN	I/O	I (Pull-UP)	I/O port pin* or UART data input pin
24	P22/SPICLK	I/O	I (Pull-UP)	I/O port pin* or SPI clock I/O pin
25	P21/SDO	I/O	I (Pull-UP)	I/O port pin* or SPI data output pin
26	P20/SDI	I/O	I (Pull-UP)	I/O port pin* or SPI data input pin
27	P17/#SPISS	I/O	I (Pull-UP)	I/O port pin (with interrupt)* or SPI slave select input pin
28	P16/EXCL0	I/O	I (Pull-UP)	I/O port pin (with interrupt)* or T16 Ch.0 external clock input pin
29	P15/SCL	I/O	I (Pull-UP)	I/O port pin (with interrupt)* or I ² C clock output pin
30	P14/SDA	I/O	I (Pull-UP)	I/O port pin (with interrupt)* or I ² C data I/O pin
31	P13/FOUT1	I/O	I (Pull-UP)	I/O port pin (with interrupt)* or OSC1 clock output pin
32	P12	I/O	I (Pull-UP)	I/O port pin (with interrupt)
33	P11	I/O	I (Pull-UP)	I/O port pin (with interrupt)
34	P10	I/O	I (Pull-UP)	I/O port pin (with interrupt)
35	P07/EXCL1	I/O	I (Pull-UP)	I/O port pin (with interrupt)* or T16 Ch.1 external clock input pin
36	P06/EXCL2	I/O	I (Pull-UP)	I/O port pin (with interrupt)* or T16 Ch.2 external clock input pin
37	P05/REMO	I/O	I (Pull-UP)	I/O port pin (with interrupt)* or Remote control signal output pin
38	P04/REMI	I/O	I (Pull-UP)	I/O port pin (with interrupt)* or Remote control signal input pin
39	P03	I/O	I (Pull-UP)	I/O port pin (with interrupt)
40	HVdd	–	–	Power supply pin (HVDD+)
41	Vss	–	–	Power supply pin (GND)
42	P02	I/O	I (Pull-UP)	I/O port pin (with interrupt)
43	P01	I/O	I (Pull-UP)	I/O port pin (with interrupt)
44	P00	I/O	I (Pull-UP)	I/O port pin (with interrupt)
45	LVdd	–	–	Power supply pin (LVDD+)
46	Vss	–	–	Power supply pin (GND)
47	LVdd	–	–	Power supply pin (LVDD+)
48	Vss	–	–	Power supply pin (GND)

Note: The pin names described in boldface type and description with ‘*’ are default settings.

■ BASIC EXTERNAL CONNECTION DIAGRAM

Single power supply system (LVDD = HVDD)



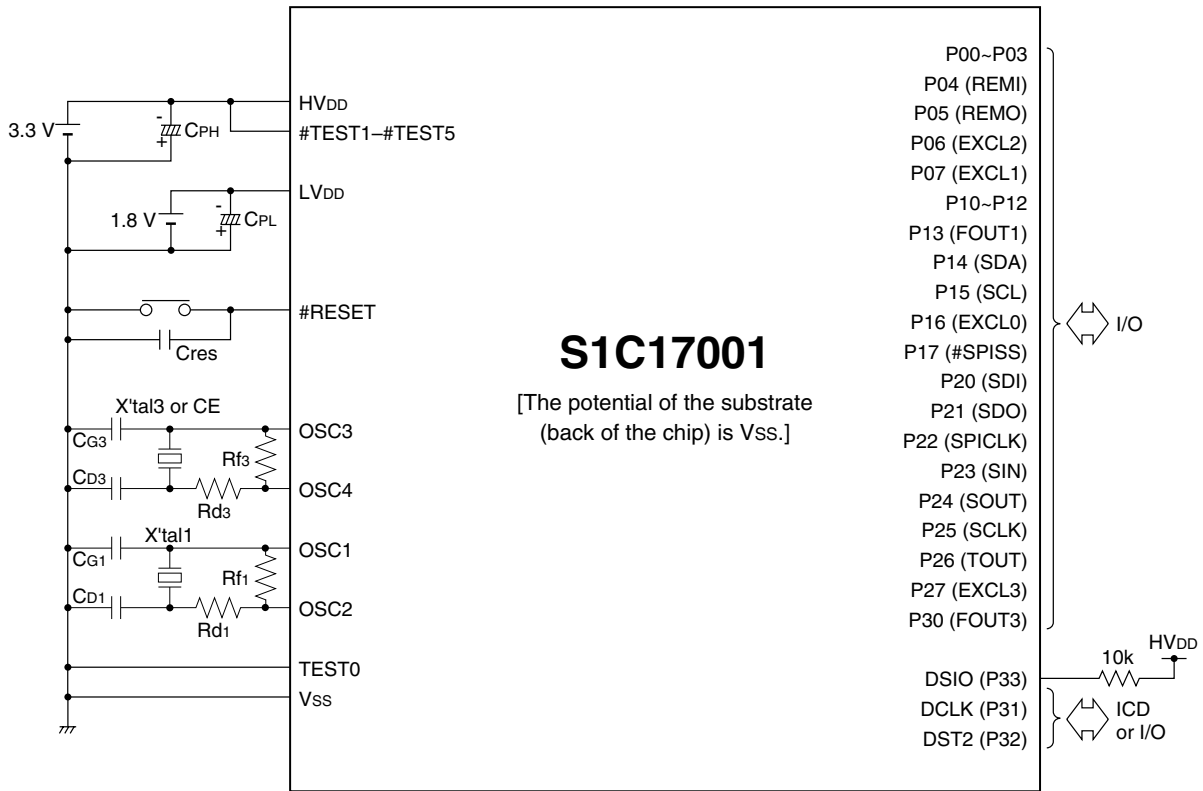
Recommended values for external parts

Symbol	Name	Recommended value
X'tal1	Crystal oscillator	32.768 kHz (MC-146, EPSON TOYOCOM)
CG1	Gate capacitor	7 pF
CD1	Drain capacitor	7 pF
Rf1	Feedback resistor	10 MΩ
Rd1	Drain resistor	0 Ω
X'tal3	Crystal oscillator	8 MHz (CA-301, EPSON TOYOCOM)
CE	Ceramic oscillator	0.2~8 MHz
CG3	Gate capacitor	27 pF
CD3	Drain capacitor	27 pF
Rf3	Feedback resistor	1 MΩ
Rd3	Drain resistor	0 Ω
CP	Capacitor for power supply	3.3 μF
Cres	Capacitor for #RESET pin	0.47 μF

Note: The above table is simply an example, and is not guaranteed to work.

S1C17001

Dual-power supply system (LVDD ≠ HVDD)



Recommended values for external parts

Symbol	Name	Recommended value
X'tal1	Crystal oscillator	32.768 kHz (MC-146, EPSON TOYOCOM)
CG1	Gate capacitor	7 pF
CD1	Drain capacitor	7 pF
Rf1	Feedback resistor	10 MΩ
Rd1	Drain resistor	0 Ω
X'tal3	Crystal oscillator	8 MHz (CA-301, EPSON TOYOCOM)
CE	Ceramic oscillator	0.2~8 MHz
CG3	Gate capacitor	27 pF
CD3	Drain capacitor	27 pF
Rf3	Feedback resistor	1 MΩ
Rd3	Drain resistor	0 Ω
CP	Capacitor for power supply	3.3 μF
Cres	Capacitor for #RESET pin	0.47 μF

Note: The above table is simply an example, and is not guaranteed to work.

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