S1C17W34/W35/W36 (rev1.2)

EPSON
EXCEED YOUR VISION

16-bit Single Chip Microcontroller

- Low voltage operation from 1.2 V with a single alkaline or silver oxide button battery.
- Ultra low standby power consumption (0.4 µA during HALT state in super economy mode)
- Embedded A/D converter to support various sensing applications

■ DESCRIPTIONS

The S1C17W34/W35/W36 is a 16-bit MCU that features low-voltage operation from 1.2 V even though Flash memory is included. The embedded high-efficiency DC-DC converter generates the constant-voltage to drive the IC with lower power consumption than 4-bit MCUs. This IC includes a real-time clock, a stopwatch, an LCD driver, a temperature sensor, an A/D converter, and a PWM timer capable of being used to generate drive waveforms for a motor driver 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.

■ FEATURES

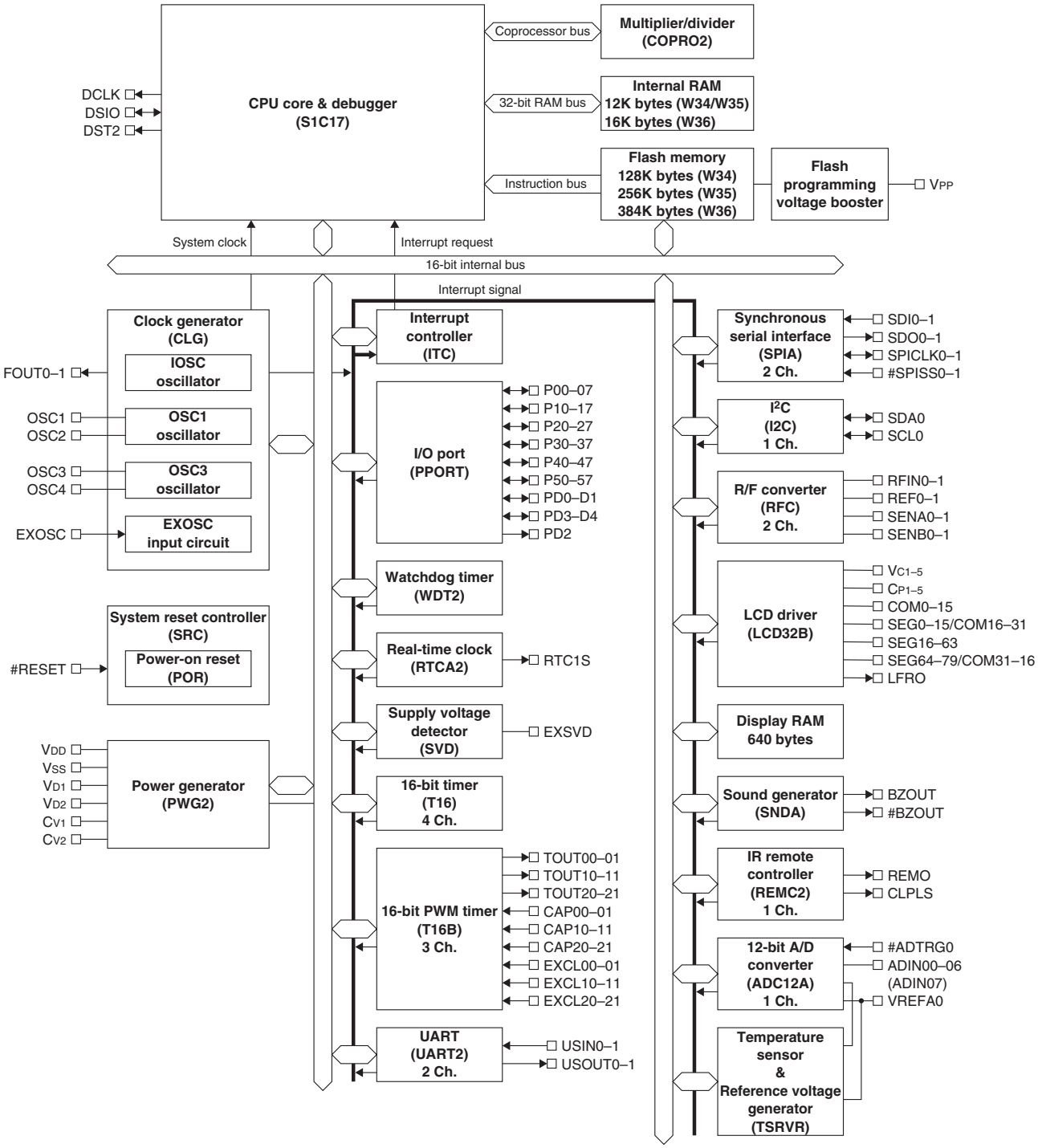
Model	S1C17W34	S1C17W35	S1C17W36
CPU			
CPU core	Seiko Epson original 16-bit RISC CPU core S1C17		
Other	On-chip debugger		
Embedded Flash memory			
Capacity	128K bytes (for both instructions and data)	256K bytes (for both instructions and data)	384K bytes (for both instructions and data)
Erase/program 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	12K bytes		16K bytes
Embedded display RAM			
Capacity	640 bytes		
Clock generator (CLG)			
System clock source	4 sources (IOSC/OSC1/OSC3/EXOSC)		
System clock frequency (operating frequency)	1.1 MHz (max.) V_{DD} = 1.2 to 1.6 V 4.2 MHz (max.) V_{DD} = 1.6 to 3.6 V		
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		
	Oscillation stop detection circuit included		
OSC3 oscillator circuit	4.2 MHz (max.) crystal/ceramic oscillator		
	250, 384, 500 kHz, 1, 2, and 4 MHz-switchable embedded oscillator		
	2.1 MHz (max.) CR oscillator (an external R is required)		
EXOSC clock input	4.2 MHz (max.) square or sine wave input		
Other	Configurable system clock division ratio		
	2 channels of external clock outputs (FOUT)		
	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 I/O ports	Input/output port: 52 bits (max.)		
	Output port: 1 bit (max.)		
	Pins are shared with the peripheral I/O.		
Number of input interrupt ports	48 bits (max.)		
Number of ports that support universal port multiplexer (UPMUX)	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 (RTCA2)	3 time zones		
	128–1 Hz and second counters (common for all time zones)		
	Minute, hour, day, day of the week, month, and year counters (available for each time zone)		
	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 operating clock/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		

Model	S1C17W34	S1C17W35	S1C17W36
Supply voltage detector (SVD)			
Detection level	30 levels (1.2 to 3.6 V)		
Other	Intermittent operation mode		
	Generates an interrupt or reset according to the detection level evaluation.		
	V_{DD} or an external voltage level is detectable.		
Serial interfaces			
UART (UART2)	2 channels		
	Baud-rate generator included, IrDA1.0 supported		
	Open drain output, signal polarity, and baud rate division ratio are configurable.		
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^2C (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 (REMC2)			
Number of transmitter channels	1 channel		
Other	EL lamp drive waveform can be generated for an application example.		
LCD driver (LCD32B)			
LCD output	80 SEG × 1–16 COM (max.), 64 SEG × 17–32 COM (max.)		
LCD contrast	16 levels		
Other	1/5 or 1/4 bias power supply included, external voltage can be applied.		
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, AC-bias resistive sensors (Ch.0 only)		
12-bit A/D converter (ADC12A)			
Conversion method	Successive approximation type		
Resolution	12 bits		
Number of conversion channels	1 channel		
Number of analog signal inputs	8 ports/channel (The temperature sensor output is connected to a port.)		
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.		
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: 2 systems (8 levels)		
	Internal interrupt: 21 systems (8 levels)		
Power supply voltage			
V_{DD} operating voltage	1.2 to 3.6 V		
V_{DD} operating voltage for Flash programming	2.4 to 3.6 V (V_{PP} = 7.5 V external power supply is required.) 2.4 to 3.6 V (When V_{PP} is generated internally)		
V_{DD} operating voltage for using LCD driver	2.5 to 3.6 V		
V_{DD} operating voltage for super economy mode	2.5 to 3.6 V		
Operating temperature			
Operating temperature range	-40 to 85 °C		
Current consumption (Typ. value)			
SLEEP mode *2	0.15 µA IOSC = OFF, OSC1 = OFF, OSC3 = OFF		
HALT mode	0.6 µA OSC1 = 32 kHz, RTC = ON		
	0.4 µA OSC1 = 32 kHz, RTC = ON, super economy mode		
	5.4 µA OSC1 = 32 kHz, RTC = ON, LCD = ON (no panel load, 1/5 bias), super economy mode		

Model	S1C17W34	S1C17W35	S1C17W36
Current consumption (Typ. value)			
RUN mode	6 µA OSC1 = 32 kHz, RTC = ON, CPU = OSC1		
	3 µA OSC1 = 32 kHz, RTC = ON, CPU = OSC1, super economy mode		
	150 µA OSC3 = 1 MHz (ceramic oscillator), OSC1 = 32 kHz, RTC = ON, CPU = OSC3		
Shipping form			
1 *3	QFP21-176PIN (P-LQFP176-2424-0.50, 24 × 24 mm, t = 1.7 mm, 0.5 mm pitch)		
2	Die form (Pad pitch: 80 µm (min.))		

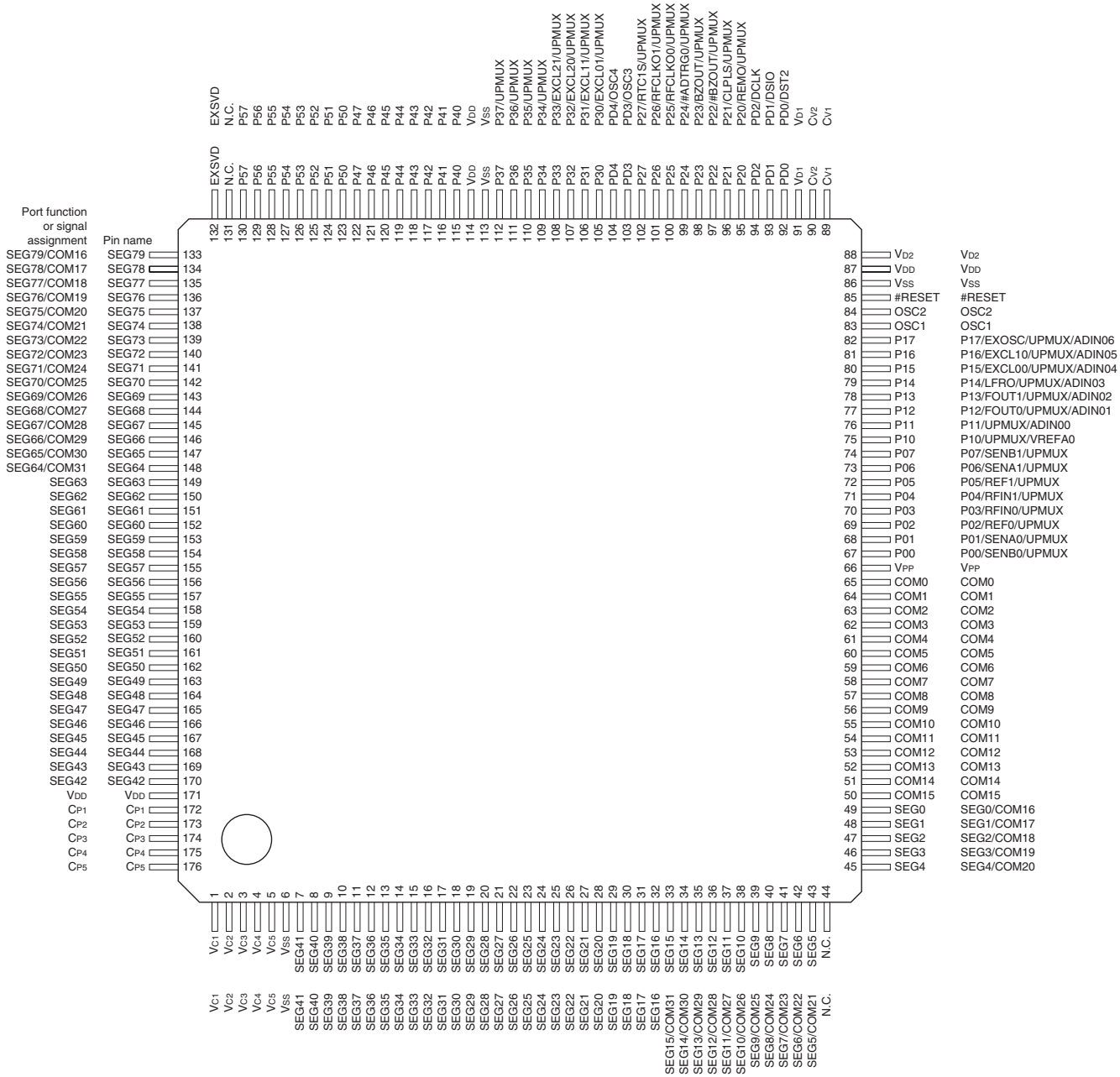
*1 The input filter in I2C (SDA and SCL inputs) does not comply with the standard for removing noise spikes less than 50 ns.
*2 The RAM retains data even in SLEEP mode.
*3 Shown in parentheses is a JEITA package name.

■ BLOCK DIAGRAM

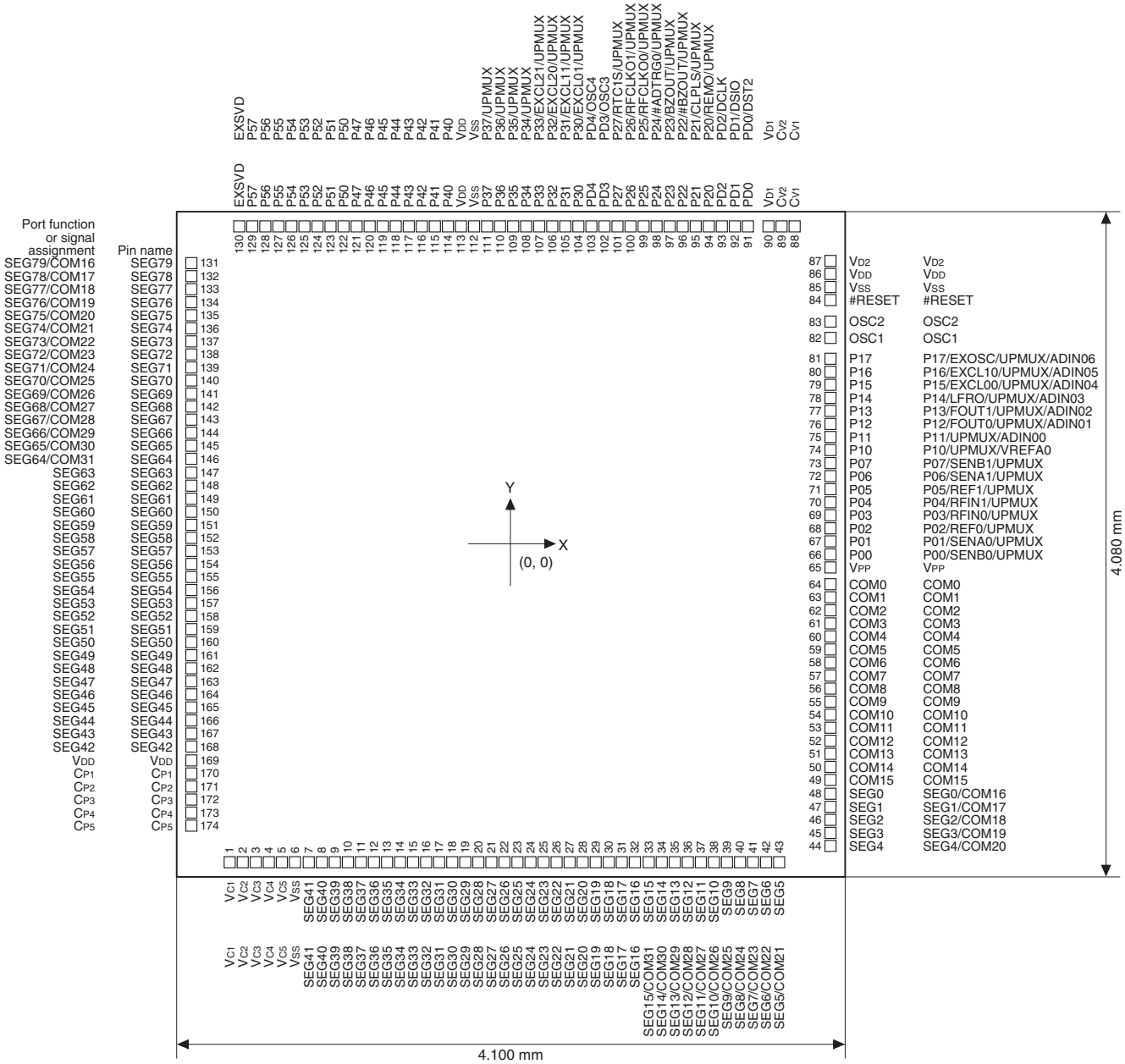


■ PIN CONFIGURATION DIAGRAMS

QFP21-176PIN



Chip


Port function or signal assignment
Pin name
SEG79/COM16 SEG79 131
SEG78/COM17 SEG78 132
SEG77/COM18 SEG77 133
SEG76/COM19 SEG76 134
SEG75/COM20 SEG75 135
SEG74/COM21 SEG74 136
SEG73/COM22 SEG73 137
SEG72/COM23 SEG72 138
SEG71/COM24 SEG71 139
SEG70/COM25 SEG70 140
SEG69/COM26 SEG69 141
SEG68/COM27 SEG68 142
SEG67/COM28 SEG67 143
SEG66/COM29 SEG66 144
SEG65/COM30 SEG65 145
SEG64/COM31 SEG64 146
SEG63 SEG63 147
SEG62 SEG62 148
SEG61 SEG61 149
SEG60 SEG60 150
SEG59 SEG59 151
SEG58 SEG58 152
SEG57 SEG57 153
SEG56 SEG56 154
SEG55 SEG55 155
SEG54 SEG54 156
SEG53 SEG53 157
SEG52 SEG52 158
SEG51 SEG51 159
SEG50 SEG50 160
SEG49 SEG49 161
SEG48 SEG48 162
SEG47 SEG47 163
SEG46 SEG46 164
SEG45 SEG45 165
SEG44 SEG44 166
SEG43 SEG43 167
SEG42 SEG42 168
VDD VDD 169
CP1 CP1 170
CP2 CP2 171
CP3 CP3 172
CP4 CP4 173
CP5 CP5 174
EXSVD P57 P56 P55 P54 P53 P52 P51 P50 P47 P46 P45 P44 P43 P42 P41 P40 VDD VSS P37/UPMUX P36/UPMUX P35/UPMUX P34/UPMUX P33/EXCL21/UPMUX P32/EXCL20/UPMUX P31/EXCL11/UPMUX P30/EXCL01/UPMUX PD4/OSC4 PD3/OSC3 P27/RTC1S/UPMUX P26/RFCLKO1/UPMUX P25/RFCLKO0/UPMUX P24/#ADTRG0/UPMUX P23/BZOUT/UPMUX P22/#BZOUT/UPMUX P21/CLPLS/UPMUX P20/REMO/UPMUX PD2/DCLK PD1/DSIO PD0/DST2 VD1 CV2 CV1
130 129 128 127 126 125 124 123 122 121 120 119 118 117 116 115 114 113 112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 96 95 94 93 92 91 90 89 88
87 VD2 VD2
86 VDD VDD
85 VSS VSS
84 #RESET #RESET
83 OSC2 OSC2
82 OSC1 OSC1
81 P17 P17/EXOSC/UPMUX/ADIN06
80 P16 P16/EXCL10/UPMUX/ADIN05
79 P15 P15/EXCL00/UPMUX/ADIN04
78 P14 P14/LFRO/UPMUX/ADIN03
77 P13 P13/FOUT1/UPMUX/ADIN02
76 P12 P12/FOUT0/UPMUX/ADIN01
75 P11 P11/UPMUX/ADIN00
74 P10 P10/UPMUX/VREFA0
73 P07 P07/SENB1/UPMUX
72 P06 P06/SENA1/UPMUX
71 P05 P05/REF1/UPMUX
70 P04 P04/RFIN1/UPMUX
69 P03 P03/RFIN0/UPMUX
68 P02 P02/REF0/UPMUX
67 P01 P01/SENA0/UPMUX
66 P00 P00/SENB0/UPMUX
65 VPP VPP
64 COM0 COM0
63 COM1 COM1
62 COM2 COM2
61 COM3 COM3
60 COM4 COM4
59 COM5 COM5
58 COM6 COM6
57 COM7 COM7
56 COM8 COM8
55 COM9 COM9
54 COM10 COM10
53 COM11 COM11
52 COM12 COM12
51 COM13 COM13
50 COM14 COM14
49 COM15 COM15
48 SEG0 SEG0/COM16
47 SEG1 SEG1/COM17
46 SEG2 SEG2/COM18
45 SEG3 SEG3/COM19
44 SEG4 SEG4/COM20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
VC1 VC2 VC3 VC4 VC5 VSS SEG41 SEG40 SEG39 SEG38 SEG37 SEG36 SEG35 SEG34 SEG33 SEG32 SEG31 SEG30 SEG29 SEG28 SEG27 SEG26 SEG25 SEG24 SEG23 SEG22 SEG21 SEG20 SEG19 SEG18 SEG17 SEG16 SEG15/COM31 SEG14/COM30 SEG13/COM29 SEG12/COM28 SEG11/COM27 SEG10/COM26 SEG9/COM25 SEG8/COM24 SEG7/COM23 SEG6/COM22 SEG5/COM21
Y
X
(0, 0)
4.080 mm
4.100 mm

■ 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
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	–	–	DC-DC converter output
V_{D2}	V_{D2}	A	–	–	DC-DC converter stabilization capacitor connect pin
C_{V1-2}	C_{V1-2}	A	–	–	DC-DC converter charge pump capacitor connect pins
V_{C1-5}	V_{C1-5}	P	–	–	LCD panel driver power supply
C_{P1-5}	C_{P1-5}	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)
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)
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)
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)
P04	P04	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)
P05	P05	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)
P06	P06	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)
P07	P07	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)
P10	P10	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

Pin/pad name	Assigned signal	I/O	Initial state	Tolerant fail-safe structure	Function
P11	P11	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
P12	P12	I/O	Hi-Z	–	I/O port
	FOUT0	O			Clock external output Ch.0
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	ADIN01	A			12-bit A/D converter Ch.0 analog signal input 1
P13	P13	I/O	Hi-Z	–	I/O port
	FOUT1	O			Clock external output Ch.1
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	ADIN02	A			12-bit A/D converter Ch.0 analog signal input 2
P14	P14	I/O	Hi-Z	–	I/O port
	LFRO	O			LCD frame signal monitor output
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	ADIN03	A			12-bit A/D converter Ch.0 analog signal input 3
P15	P15	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)
	ADIN04	A			12-bit A/D converter Ch.0 analog signal input 4
P16	P16	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)
	ADIN05	A			12-bit A/D converter Ch.0 analog signal input 5
P17	P17	I/O	Hi-Z	–	I/O port
	EXOSC	I			Clock generator external clock input
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	ADIN06	A			12-bit A/D converter Ch.0 analog signal input 6
P20	P20	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)
P21	P21	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)
P22	P22	I/O	Hi-Z	–	I/O port
	#BZOUT	O			Sound generator inverted output
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P23	P23	I/O	Hi-Z	–	I/O port
	BZOUT	O			Sound generator output
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P24	P24	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)
P25	P25	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)
P26	P26	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)
P27	P27	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)
P30	P30	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)
P31	P31	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)
P32	P32	I/O	Hi-Z	–	I/O port
	EXCL20	I			16-bit PWM timer Ch.2 event counter input 0
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P33	P33	I/O	Hi-Z	–	I/O port
	EXCL21	I			16-bit PWM timer Ch.2 event counter input 1
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P34	P34	I/O	Hi-Z	–	I/O port
	UPMUX	I/O			User-selected I/O (universal port multiplexer)

Pin/pad name	Assigned signal	I/O	Initial state	Tolerant fail-safe structure	Function
P35	P35	I/O	Hi-Z	–	I/O port
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P36	P36	I/O	Hi-Z	–	I/O port
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P37	P37	I/O	Hi-Z	–	I/O port
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P40–47	P40–47	I/O	Hi-Z	–	I/O ports
P50–57	P50–57	I/O	Hi-Z	–	I/O ports
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
EXSVD	EXSVD	A	Hi-Z	✓	External power supply voltage detection input
SEG0	SEG0	A	Hi-Z	–	LCD segment output
	COM16	A			LCD common output
SEG1	SEG1	A	Hi-Z	–	LCD segment output
	COM17	A			LCD common output
SEG2	SEG2	A	Hi-Z	–	LCD segment output
	COM18	A			LCD common output
SEG3	SEG3	A	Hi-Z	–	LCD segment output
	COM19	A			LCD common output
SEG4	SEG4	A	Hi-Z	–	LCD segment output
	COM20	A			LCD common output
SEG5	SEG5	A	Hi-Z	–	LCD segment output
	COM21	A			LCD common output
SEG6	SEG6	A	Hi-Z	–	LCD segment output
	COM22	A			LCD common output
SEG7	SEG7	A	Hi-Z	–	LCD segment output
	COM23	A			LCD common output
SEG8	SEG8	A	Hi-Z	–	LCD segment output
	COM24	A			LCD common output
SEG9	SEG9	A	Hi-Z	–	LCD segment output
	COM25	A			LCD common output
SEG10	SEG10	A	Hi-Z	–	LCD segment output
	COM26	A			LCD common output
SEG11	SEG11	A	Hi-Z	–	LCD segment output
	COM27	A			LCD common output
SEG12	SEG12	A	Hi-Z	–	LCD segment output
	COM28	A			LCD common output
SEG13	SEG13	A	Hi-Z	–	LCD segment output
	COM29	A			LCD common output
SEG14	SEG14	A	Hi-Z	–	LCD segment output
	COM30	A			LCD common output
SEG15	SEG15	A	Hi-Z	–	LCD segment output
	COM31	A			LCD common output
SEG16–63	SEG16–63	A	Hi-Z	–	LCD segment outputs
SEG64	SEG64	A	Hi-Z	–	LCD segment output
	COM31	A			LCD common output
SEG65	SEG65	A	Hi-Z	–	LCD segment output
	COM30	A			LCD common output
SEG66	SEG66	A	Hi-Z	–	LCD segment output
	COM29	A			LCD common output
SEG67	SEG67	A	Hi-Z	–	LCD segment output
	COM28	A			LCD common output
SEG68	SEG68	A	Hi-Z	–	LCD segment output
	COM27	A			LCD common output
SEG69	SEG69	A	Hi-Z	–	LCD segment output
	COM26	A			LCD common output

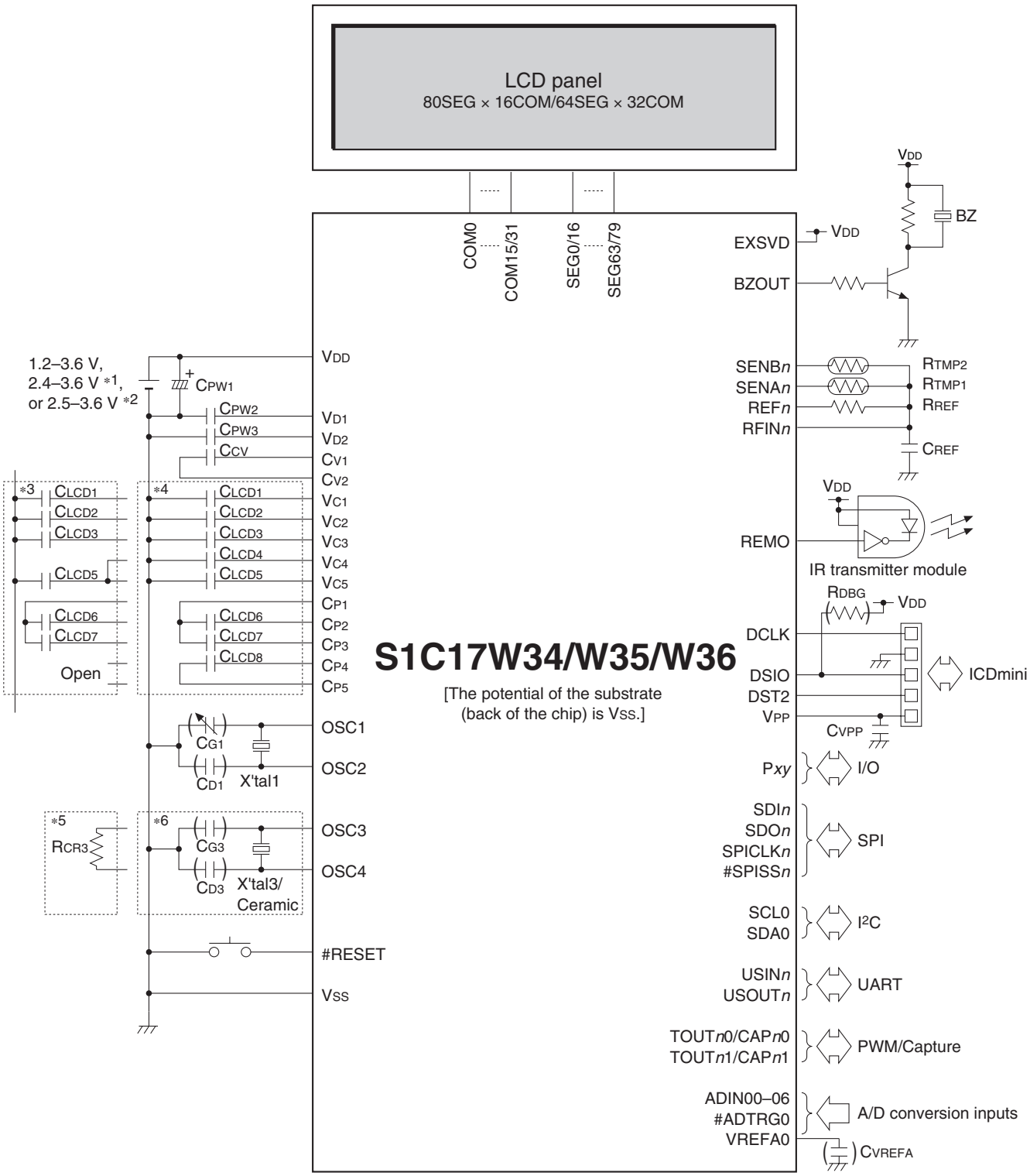
Pin/pad name	Assigned signal	I/O	Initial state	Tolerant fail-safe structure	Function
SEG70	SEG70	A	Hi-Z	–	LCD segment output
	COM25	A			LCD common output
SEG71	SEG71	A	Hi-Z	–	LCD segment output
	COM24	A			LCD common output
SEG72	SEG72	A	Hi-Z	–	LCD segment output
	COM23	A			LCD common output
SEG73	SEG73	A	Hi-Z	–	LCD segment output
	COM22	A			LCD common output
SEG74	SEG74	A	Hi-Z	–	LCD segment output
	COM21	A			LCD common output
SEG75	SEG75	A	Hi-Z	–	LCD segment output
	COM20	A			LCD common output
SEG76	SEG76	A	Hi-Z	–	LCD segment output
	COM19	A			LCD common output
SEG77	SEG77	A	Hi-Z	–	LCD segment output
	COM18	A			LCD common output
SEG78	SEG78	A	Hi-Z	–	LCD segment output
	COM17	A			LCD common output
SEG79	SEG79	A	Hi-Z	–	LCD segment output
	COM16	A			LCD common output
COM0–15	COM0–15	A	Hi-Z	–	LCD common outputs

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 *n*	Function
Synchronous serial interface (SPIA)	SDI*n*	I	*n* = 0, 1	SPIA Ch.*n* data input
	SDO*n*	O		SPIA Ch.*n* data output
	SPICLK*n*	I/O		SPIA Ch.*n* clock input/output
	#SPISS*n*	I		SPIA Ch.*n* slave-select input
I^2C (I2C)	SCL*n*	I/O	*n* = 0	I2C Ch.*n* clock input/output
	SDA*n*	I/O		I2C Ch.*n* data input/output
UART (UART2)	USIN*n*	I	*n* = 0, 1	UART2 Ch.*n* data input
	USOUT*n*	O		UART2 Ch.*n* data output
16-bit PWM timer (T16B)	TOUT*n*0/CAP*n*0	I/O	*n* = 0, 1, 2	T16B Ch.*n* PWM output/capture input 0
	TOUT*n*1/CAP*n*1	I/O		T16B Ch.*n* PWM output/capture input 1

■ BASIC EXTERNAL CONNECTION DIAGRAM



*1: For Flash programming
*2: For super economy mode/LCD operation
*3: When 1/4 bias is selected
*4: When 1/5 bias is selected
*5: When OSC3 CR oscillator is selected
*6: When OSC3 crystal/ceramic oscillator is selected
( ): Do not mount components if unnecessary.

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.) and applications individually listed in this document (“General Purpose”). Epson products are NOT intended for any use beyond the General 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. Therefore, you are advised to use Epson products only for General Purpose uses. Should you desire to buy and use Epson products for a particular purpose other than a General Purpose use, 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.

   [Particular purpose]
   Space equipment (artificial satellites, rockets, etc.)
   Transportation vehicles and their control equipment (automobiles, aircraft, trains, ships, etc.)
   Medical equipment (other than applications individually listed in this document) / 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
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. e1.0, 2021.9)

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

https://global.epson.com/products_and_drivers/semicon/

Document Code: 413238902
First issue March 2016
Revised August 2022 in JAPAN Ⓛ