

■ INTRODUCTION

The S1F81100 is a System Power Supply IC. From the Li-Ion/Li-polymer battery, 4 channels output are generated via external devices. The 4 channels are independent of each other and can be controlled separately.

On this series, an I²C controller (for the slave function), input and output detecting functions, general purpose I/O pins and a sleep function are provided as well as three PWM controller channels and one series regulator channel.

The S1F81100 is also equipped with an I/O pin dedicated to interfacing with the XScale™ processor, and is most suitable for use as a power supply unit for mobile devices such as PDAs equipped with an XScale™ processor (PXA250/210) mounted and a smart phone.

■ FEATURES

<Regulator>

- Input Voltage: VIN 3.3V to 5.5V (When at least one of Vcc2 or Vcc3 is 3.3V)
2.8V to 5.5V (When both of Vcc2 and Vcc3 are 2.5V)
- Regulator: 4 channels

CH-1 (VCC1): PWM controller

Fast (1MHz) synchronized rectification type PWM controller

(Connected to an external component to configure a switching regulator.)

Features include a fast response circuit using a current/voltage returning system, a short-circuit-proof circuit, more compact external components by a fast clock, and a sub-regulator.

Output voltage: 1.5/1.4/1.3/1.2/1.1/1.0/0.9/0.8 V

One of these values is to be selected via the I²C controller.

Accuracy: within +/-5%

<u>Output current:</u>	Main unit:	In the sleep status:	OFF
		In operation:	Max: 500mA
	Sub unit:	Max: 20mA	

CH-2 (VCC2): PWM controller

Fast (1MHz) synchronized rectification type PWM controller

(Connected to an external component to configure a switching regulator.)

Features include a fast response circuit using a current/voltage returning system, a short-circuit-proof circuit, more compact external components by a fast clock, and a sub-regulator.

Output voltage: 3.3/2.5/1.8 V

One is to be selected from the mask options.

Accuracy: within +/-5%

<u>Output current:</u>	Main unit:	In the deep sleep status:	OFF
		In operation:	Max: 1A
	Sub unit:	Max: 10mA	

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CH-3 (VCC3): PWM controller

Fast (1MHz) synchronized rectification type PWM controller

(Connected to an external component to configure a switching regulator.)

Features include a fast response circuit using a current/voltage returning system, a short-circuit-proof circuit, more compact external components by a fast clock, and a sub-regulator.

Output voltage: 3.3/2.5/1.8 V

One is to be selected from the mask options.

Accuracy: within +/-5%

<u>Output current:</u>	Main unit:	In the deep sleep status:	OFF
		In operation:	Max: 1A
	Sub unit:	Max: 10mA	

CH-4 (for VCC4): Series Regulator

A low power consumption type Series Regulator.

Output voltage: 1.5/1.4/1.3/1.2/1.1/1.0/0.9/0.8 V ... the same voltage is output as CH-1

<u>Output current:</u>	In the sleep status:	OFF
	In operation:	Max: 20mA

- Regulator: 4 channels
- Conversion Efficiency: Switching regulator (CH-1): Max. 85% or more
Switching regulator (CH-2/CH-3): Max. 90% or more
- Shutdown current: Typ. 1μA
- External interface: Built-in interfaces in the I²C controller
(DA, SCL and AD_EN, for the slave function only).
- Output voltage detecting function:
1ch (nVCC_FLT)
The Low output is applied if the detected voltage of one of the three (CH-1~3) channels fails to comply with the specs.
- Input voltage detecting function:
1ch (nBAT_FLT)
The Low output is applied if the detected input voltage fails to comply with the specs.
- Resetting function: 1ch (XRST(I), nRESET(O))
- Sleep function: 1ch (PWR_EN, WUP)

■ BLOCK DIAGRAM

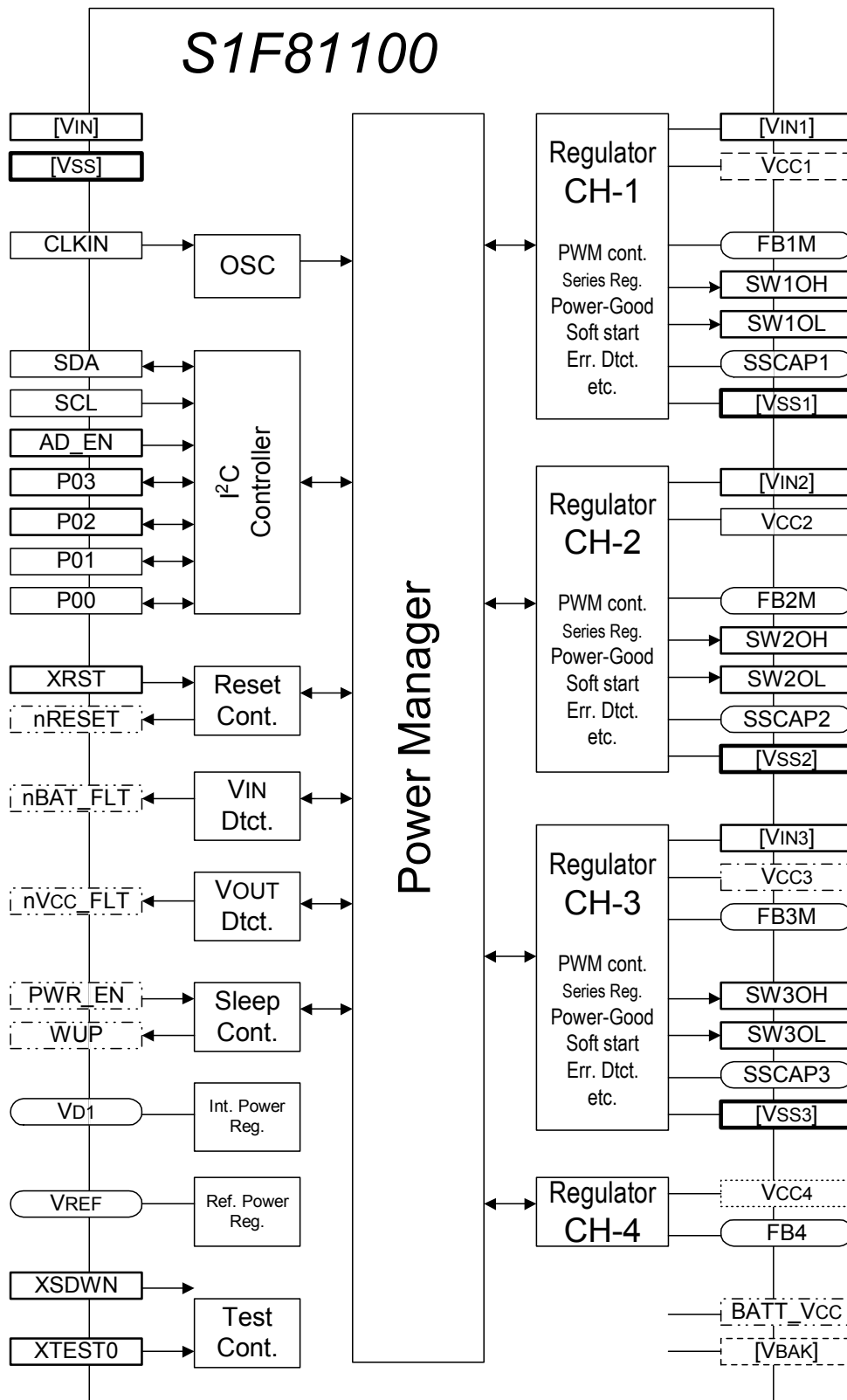


Fig.1 S1F81100 Block diagram

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PIN ASSIGNMENT

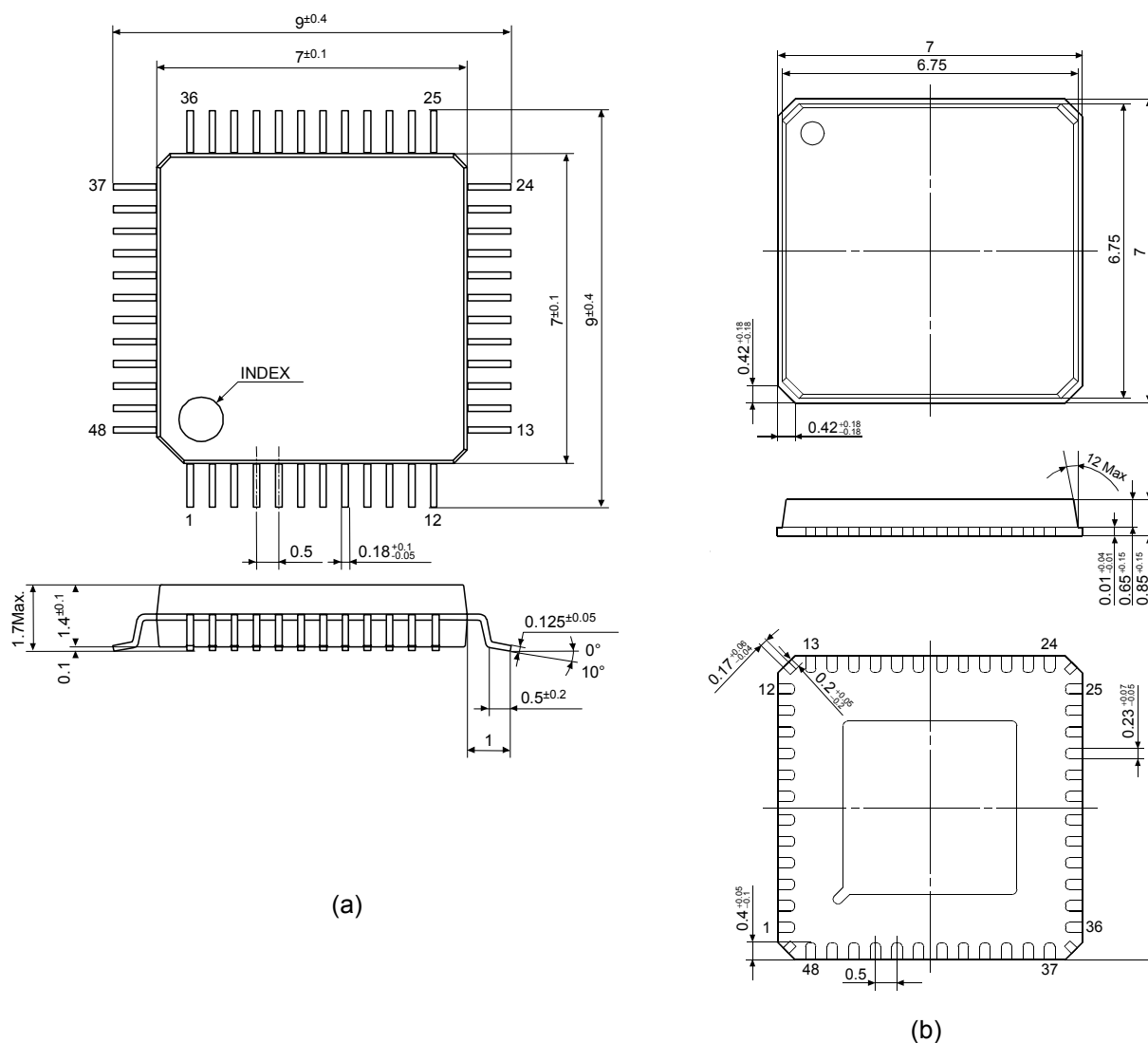


Fig.2 PKG Figure ((a)QFP12-48, (b)QFN7-48)

Table.1 S1F81100 pin assignment

Pin #	Pin name	Pin #	Pin name	Pin #	Pin name	Pin #	Pin name
1	FB3M	13	FB4	25	VD1	37	XPOR(N.C.)
2	SW3OL	14	VCC4	26	VBAK	38	P02
3	VSS3	15	VIN	27	BATT_VCC	39	P03
4	VCC1	16	XRST	28	PWR_EN	40	VCC2
5	VIN1	17	XTEST0	29	WUP	41	VIN2
6	SW1OH	18	XSDWN	30	nRESET	42	SW2OH
7	FB1M	19	AD_EN	31	nBAT_FLT	43	FB2M
8	SW1OL	20	TCLK(N.C.)	32	nVcc_FLT	44	SW2OL
9	VSS1	21	CLKIN	33	P00	45	VSS2
10	SSCAP3	22	Vss	34	P01	46	VCC3
11	SSCAP2	23	TIREF(N.C.)	35	SCL	47	VIN3
12	SSCAP1	24	VREF	36	SDA	48	SW3OH

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■ PIN DESCRIPTION

Table.2 S1F81100 Pin List

[Power supply/controlling pins]			
Pin name	I/O	Level	Function
VIN	—	—	Voltage (+) input pin
VSS	—	—	Voltage (-) input pin
VBAK	—	—	I/O voltage input pin (short with Vcc2 on the board)
VD1	—	—	Internal constant voltage output pin
VREF	—	—	Reference voltage output pin
BATT_Vcc	—	—	I/O voltage pin (short with Vcc2 on the board)
nVcc_FLT	O	BATT_Vcc	Output voltage detection result output pin
nBAT_FLT	O	BATT_Vcc	Input voltage detection result output pin
nRESET	O	BATT_Vcc	System reset signal output pin
PWR_EN	I	BATT_Vcc	Sleep state setting input pin
WUP	O	BATT_Vcc	Sleep state flag output pin
CLKIN	I	Vcc2	External clock input pin
XRST	I	VIN	Resetting input pin
XTEST0	I	VIN	Testing input pin
XSDWN	I	VIN	Ultra-power-saving mode setting input pin
P00 to 01	I/O	Vcc2	General-purpose I/O pin
P02 to 03	I/O	VIN	General-purpose I/O pin
SCL	I	Vcc2	I ² C clock input pin
SDA	I/O	Vcc2	I ² C data I/O pin
AD_EN	I	VIN	I ² C Address enabling input pin
[CH-1 Related Pins]			
Pin name	I/O	Function	
VIN1	—	Voltage (+) input pin	
SW1OH	O	P-ch power MOS transistor drive signal output pin	
SW1OL	O	N-ch power MOS transistor drive signal output pin	
SSCAP1	—	CH-1 soft start setting pin	
FB1M	I	Output current feedback input pin	
Vcc1	I	Output voltage feedback input pin [sub-regulator output pin]	
VSS1	—	Voltage (-) input pin	
[CH-2 Related Pins]			
Pin name	I/O	Function	
VIN2	—	Voltage (+) input pin	
SW2OH	O	P-ch power MOS transistor drive signal output pin	
SW2OL	O	N-ch power MOS transistor drive signal output pin	
SSCAP2	—	CH-2 soft start setting pin	
FB2M	I	Output current feedback input pin	
Vcc2	I	Output voltage feedback input pin [sub-regulator output pin]	
VSS2	—	Voltage (-) input pin	
[CH-3 Related Pins]			
Pin name	I/O	Function	
VIN3	—	Voltage (+) input pin	
SW3OH	O	P-ch power MOS transistor drive signal output pin	
SW3OL	O	N-ch power MOS transistor drive signal output pin	
SSCAP3	—	CH-3 soft start setting pin	
FB3M	I	Output current feedback input pin	
Vcc3	I	Output voltage feedback input pin [sub-regulator output pin]	
VSS3	—	Voltage (-) input pin	
[CH-4 Related Pins]			
Pin name	I/O	Function	
Vcc4	O	Vcc4 voltage output pin	
FB4	I	Feedback input pin	

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■ BASIC EXTERNAL CONNECTION DIAGRAM

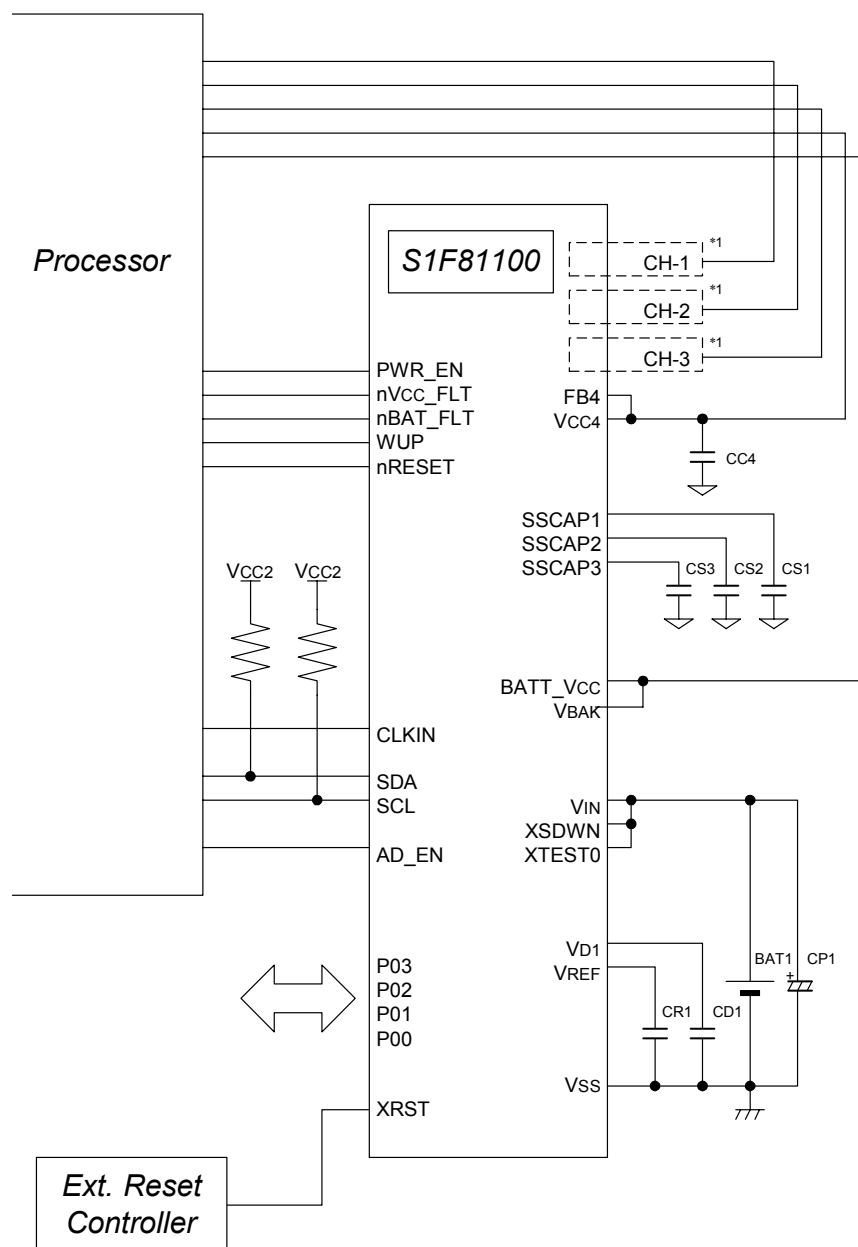


Fig.3 S1F81100 Basic external connection diagram (1) (*1 Refer Fig.4)

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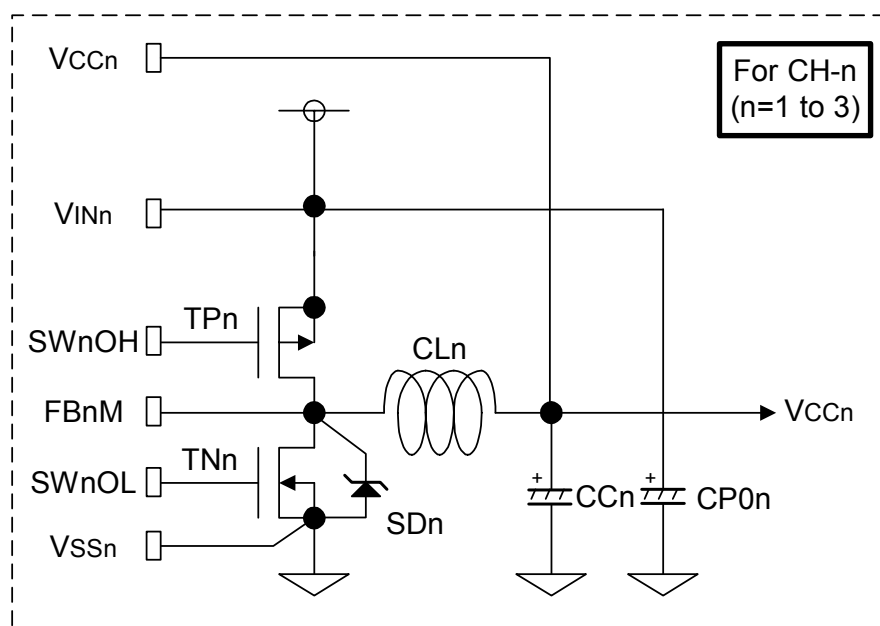


Fig.4 S1F81100 Basic external connection diagram (2)

Table.3 External component list (Examples)

Symbol	Components	Parameter	Comments
CL1 to 3	Choke-type coil	10 μ H	*1
TP1 to 3	P-ch power MOS transistor		*2
TN1 to 3	N-ch power MOS transistor		*3
SD1 to 3	Schottky diode		*4
CC1 to 3	Capacitor	100 μ F	*5
CC4	Capacitor	22 μ F	
CS1	Capacitor	0.0068 μ F	
CS2 to 3	Capacitor	0.01 μ F	
CD1	Capacitor	0.1 μ F	
CR1	Capacitor	0.1 μ F	
CP1	Capacitor	100 μ F	
CP01 to 03	Capacitor	47 μ F	
BAT1	Lithium battery	(2.8)3.3 to 5.5V	

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