S1A00114B

S1A00114B Power Management IC(PMIC)

■ DESCRIPTIONS

The S1A00114B is a PMIC (Power Management IC) that features lithium-ion battery charging control, power management, and communication functions with a charger and a DSP. It allows various parameters required for CC-CV (Constant Current-Constant Voltage) charging control to be programmed into the embedded flash memory, and it also supports overcharge and overdischarge protection.

■ FEATURES

- **Lithium-ion battery charging control functions**
  - ✓ CC-CV charge method for lithium-ion battery
  - ✓ Configurable constant current through built-in flash memory
  - ✓ Overcharge voltage detection (detectable at 4.27 V/4.37 V/4.42 V for 100 ms)
  - ✓ Overcharge current detection, threshold can be set in the built-in flash memory
  - ✓ Optional function for DSP to control charging current

- **Power management functions**
  - ✓ ×1/3 charge pump with 90% efficiency (Iout = 2 mA, f = 60.1 kHz)
  - ✓ Over-discharge detection (detectable at 3.2 V for 200 ms every 12-second intervals)
  - ✓ V_{OUT}-GND short-circuit detection (detectable at 1/3 × V_{BAT} × 0.7216 for 25 ms)
  - ✓ V_programing connection detection (detectable at 1/3 × V_{BAT} × 1.0254 for 3 ms)

- **Communication with the charger (cradle)**
  - ✓ Communication load is configurable through the built-in flash memory
  - ✓ Communication contents include:
    - ➢ Battery charging conditions (voltage, current, temperature, cycle time)
    - ➢ V_{D5} voltage
    - ➢ Charging status
    - ➢ IC number (12-bit), ID code (15-bit, Epson's control code: 4-bit + User-specific code: 11-bit)
    - ➢ DSP communication data: Arbitrary data can be sent from the DSP to the charger (cradle)

- **DSP communication functions**
  - ✓ Battery voltage monitor (7-bit detection), power control command, charging information
  - ✓ Advanced battery capacity calculation function via battery charge calculation feature
  - ✓ I^2C interface (0.9 V to V_{BAT}, Max. 100 kHz)

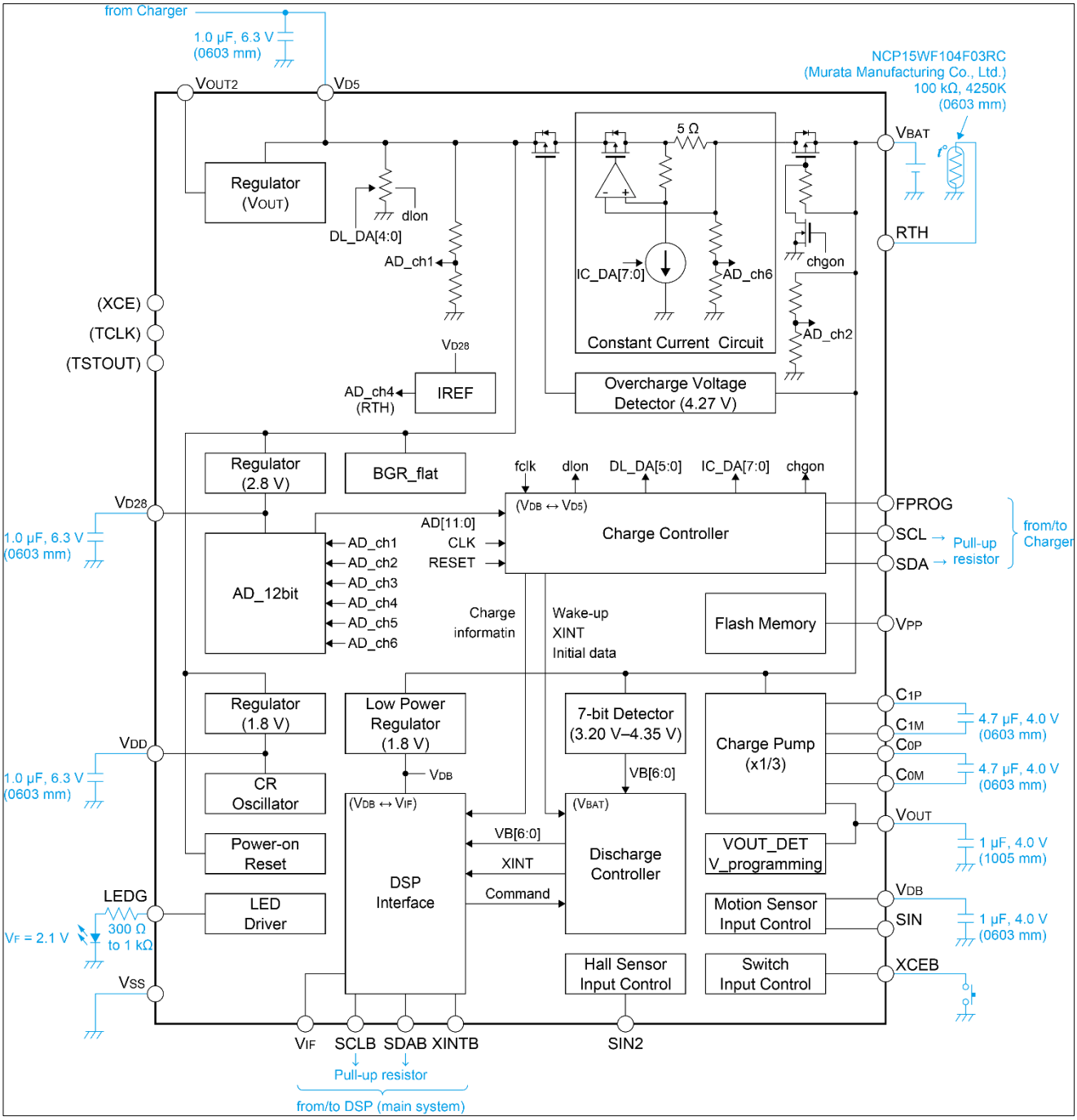
- **Power control for DSP (main system)**
  - ✓ External control via a switch (using push-button), motion sensor, and hall sensor
  - ✓ DSP command control, Power-off command, Shutdown command, etc.
  - ✓ Built-in V_{OUT} regulator to turn the DSP on during charging

- **Built-in CR oscillator circuit**
  - ✓ Oscillation frequency: 10 MHz

- **Operating current**
  - ✓ During charge: Max. 3 mA
  - ✓ DCDC ON: Max. 70 µA (60.1 kHz)
    Max. 80 µA (70.5 kHz)
    Max. 90 µA (81 kHz)
    Max. 104 µA (92.3 kHz)
  - ✓ DCDC OFF: Max. 0.4 µA (Ta = 25℃)
  - ✓ Shutdown: Max. 0.06 µA (Ta = 25℃)

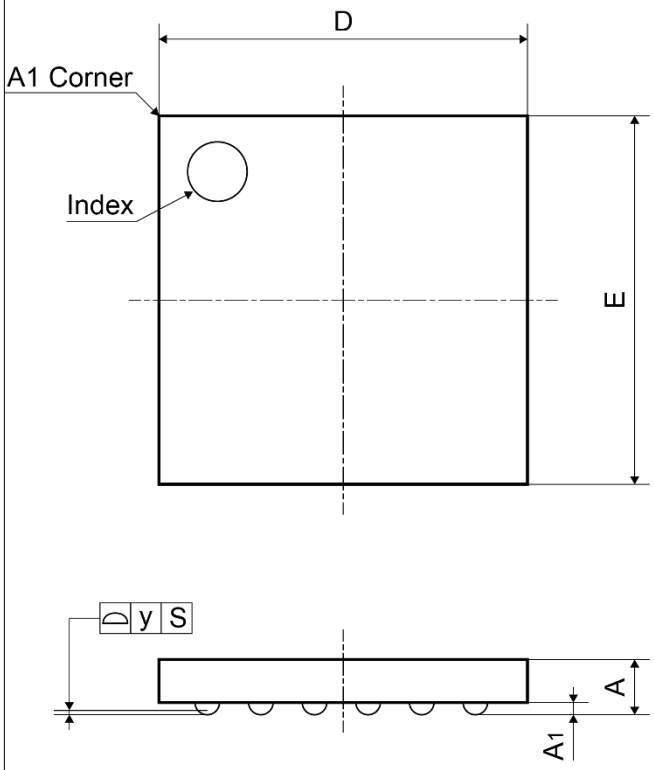
- **Shipment package**
  - ✓ WCSP package (2.43 mm × 2.42 mm)

■ BLOCK DIAGRAM

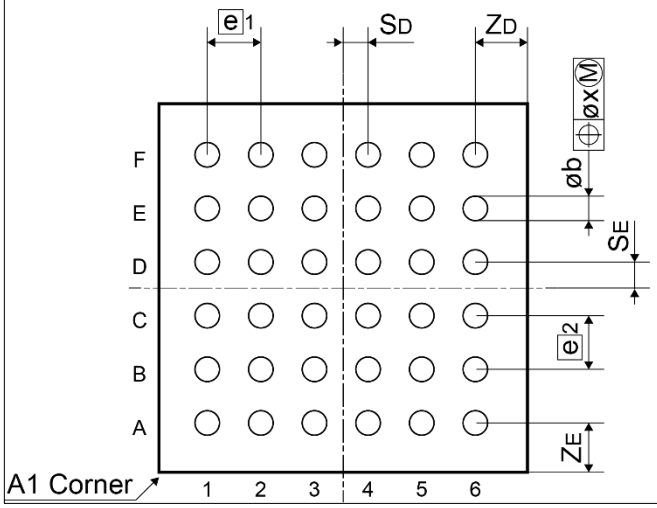


■ PACKAGE OUTLINE

Top View



Bottom View



Symbol	Dimensions in Millimeters		
	Min.	Nom.	Max.
D	2.405	2.430	2.455
E	2.390	2.415	2.440
A	0.220	0.280	0.340
A_1	0.050	0.080	0.110
e1	–	0.350	–
e2	–	0.350	–
b	0.130	0.160	0.190
x	–	–	0.05
y	–	–	0.05
S_D	–	0.175	–
S_E	–	0.175	–
Z_D	–	(0.34)	–
Z_E	–	(0.3325)	–

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Rev. e1.4, 2023. 4

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Document code: 414596801
First issue Nov.5 2024