

## S1A00115B Power Management IC(PMIC)

### ■ DESCRIPTIONS

The S1A00115B is a PMIC (Power Management IC) that features lithium-ion battery charging control, power management, and communication functions with a charger. 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

#### ● Power management functions

- ✓  $\times 1/3$  charge pump with 90% efficiency ( $I_{out} = 2 \text{ mA}$ ,  $f = 60.1 \text{ kHz}$ )
- ✓ Over-discharge detection (detectable at 3.2 V for 200 ms every 12-second intervals)
- ✓  $V_{OUT-GND}$  short-circuit detection (detectable at  $1/3 \times V_{BAT} \times 0.7216$  for 25 ms)
- ✓ External control via a switch (using push-button)

#### ● 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)

#### ● Built-in CR oscillator circuit

- ✓ Oscillation frequency: 10 MHz

#### ● Operating current

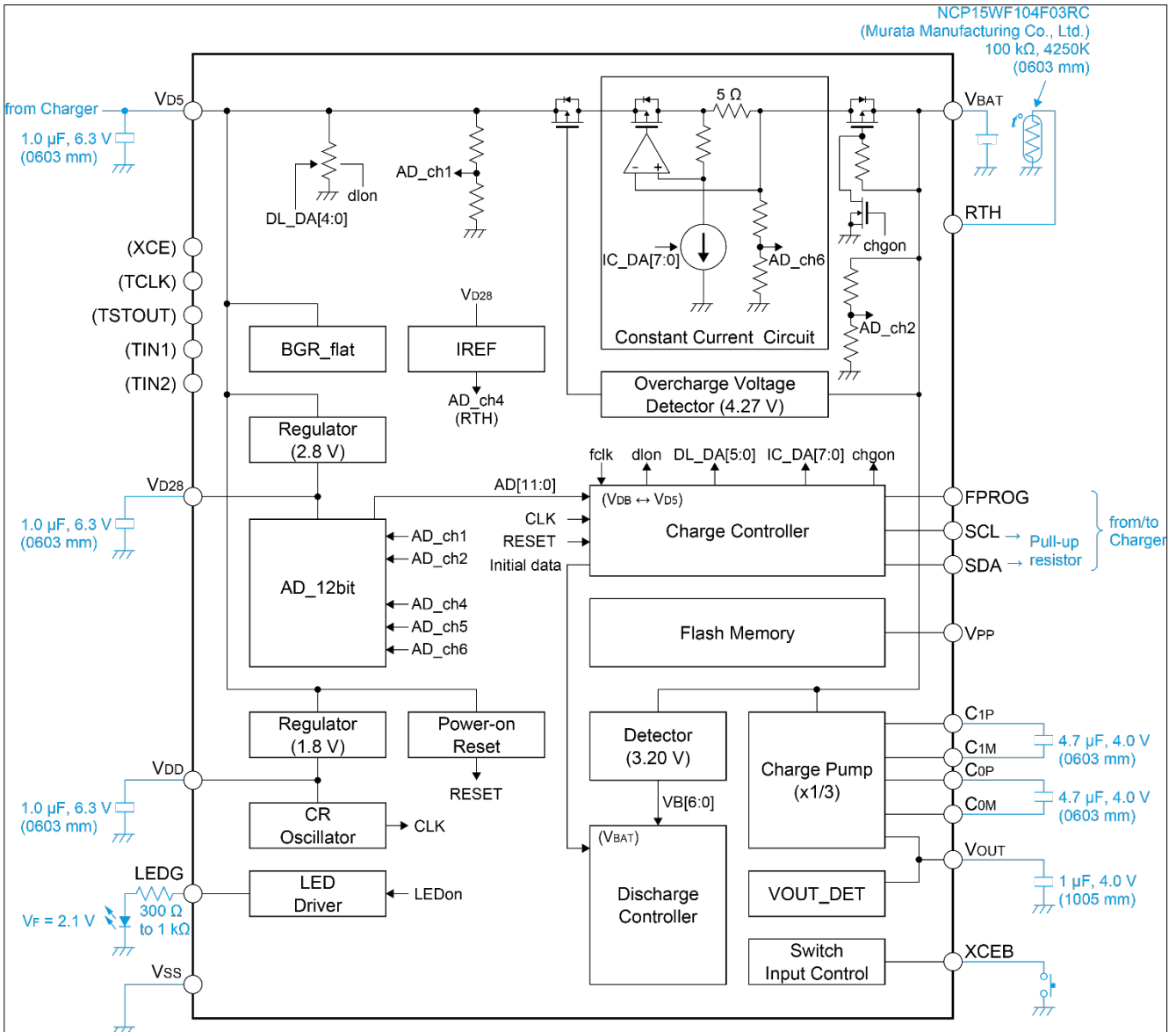
- ✓ During charge: Max. 3 mA
- ✓ DCDC ON:
  - Max. 70  $\mu\text{A}$  (60.1 kHz)
  - Max. 80  $\mu\text{A}$  (70.5 kHz)
  - Max. 90  $\mu\text{A}$  (81 kHz)
  - Max. 104  $\mu\text{A}$  (92.3 kHz)
- ✓ DCDC OFF: Max. 0.4  $\mu\text{A}$  ( $T_a = 25^\circ\text{C}$ )
- ✓ Shutdown: Max. 0.06  $\mu\text{A}$  ( $T_a = 25^\circ\text{C}$ )

#### ● Shipment package

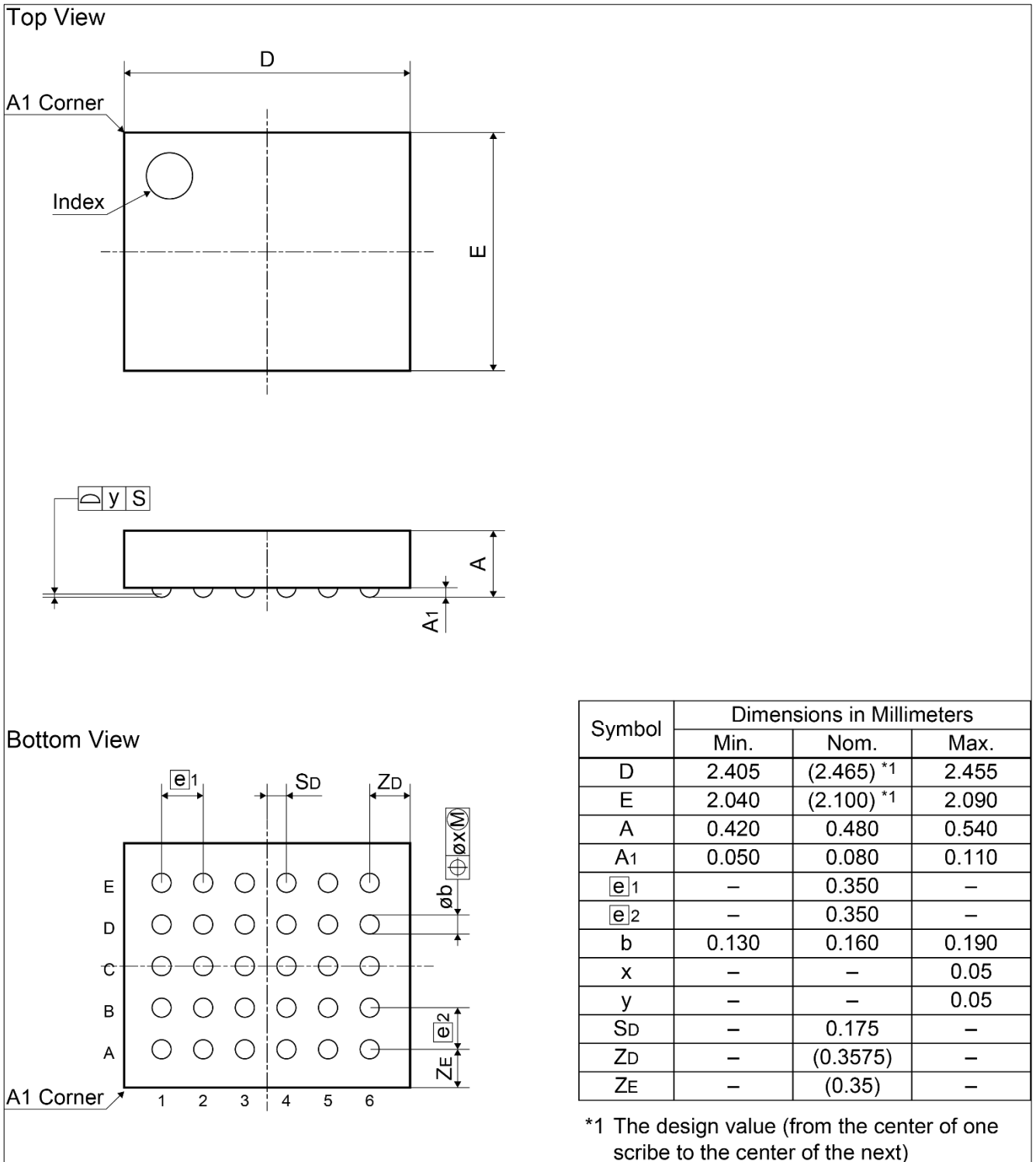
- ✓ WCSP package (2.465 mm  $\times$  2.100 mm)

# S1A00115B

## ■ BLOCK DIAGRAM



## ■ PACKAGE OUTLINE



# S1A00115B

## NOTICE: PLEASE READ THE FOLLOWING NOTICE CAREFULLY 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

©2024 Seiko Epson Corporation 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/](https://global.epson.com/products_and_drivers/semicon/)

Document code: 414596900

First issue Nov.5 2024

Revised June, 2024 in Japan