

# Nichicon SLB Series Evaluation Board User Manual

## Nichicon SLB Series Battery charging & monitoring reference circuit

### **CAUTION**

#### **ENGINEERING EVALUATION PURPOSES ONLY**

This evaluation board is made for the purpose of the product evaluation. It is strictly prohibited to use this evaluation board for any other purpose.

Torex Semiconductor does not guarantee that all samples will perform in exactly the same way and we recommend that you always consult our product data sheets for the minimum and maximum specifications.

It is also important that you evaluate all our products carefully before mass production and in case of any doubt, please contact your Torex representative.

**Nichicon SLB Series Evaluation Board***Nichicon SLB Series Battery charging & monitoring reference circuit***Battery Feature : SLB Series**

- 20C High-rate rapid charge/discharge performance
- High density input/output like an electric double layer capacitor
- Long life of more than 25,000 charge/discharge cycles
- Low temperature characteristics enabling operation even at -30°C
- Uses highly safe lithium titanium oxide (LTO)

**Battery Lineup**

Part Number	SLB03070LR35	SLB03090LR80	SLB04255L040	SLB08115L140	SLB12400L151	
Nominal Voltage	2.4V	2.4V	2.4V	2.4V	2.4V	
Voltage Range	1.8V ~ 2.8V	1.8V ~ 2.8V	1.8V ~ 2.8V	1.8V ~ 2.8V	1.8V ~ 2.8V	
Max. charge/discharge current	7mA	16mA	80mA	280mA	3000mA	
Nominal Capacity	0.35mAh	0.80mAh	4mAh	14mAh	150mAh	
ESR	Max. 12Ω	Max. 8Ω	Max. 0.6Ω	Max. 0.24Ω	Max. 0.06Ω	
Temperature Range	-30°C ~ 60°C	-30°C ~ 60°C	-30°C ~ 60°C	-30°C ~ 60°C	-30°C ~ 60°C	
Size	Diameter	3.0mm	3.3mm	4.0mm	8.0mm	12.5mm
	Height	7.0mm	9.0mm	25.5mm	11.5mm	40.0mm

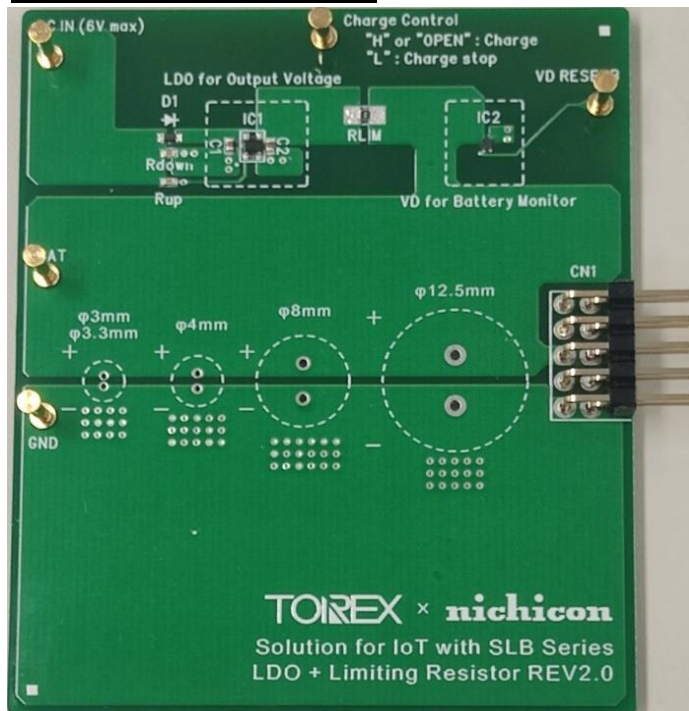
2023/4/14

**Contact Nichicon**English : <https://www.nichicon.co.jp/english/contact/inquiry/>日本語 : <https://www.nichicon.co.jp/contact/capacitor/>

## Nichicon SLB Series Evaluation Board

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### Evaluation Board Picture



### Evaluation Board SPEC

Ta=25°C

		CONDITION / SIGNAL	MIN.	TYP.	MAX.	UNIT
Vin	Input Voltage Range	-	2.0	5.0	6.0	V
Battery Voltage	CV Voltage (Max Charge Voltage)	Ta=25°C	-	2.63	-	V
		Ta=-40°C ~ 85°C	-	2.63	2.70	
Detect Voltage	Battery Low Voltage Monitor	RESETB="L"	1.786	1.800	1.814	V
Release Voltage	Battery High Voltage Monitor	RESETB="H"	2.443	2.475	2.507	V

## **Nichicon SLB Series Evaluation Board**

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### **XC6240 / XC6140 Feature**

#### **Charger IC for LTO Battery : XC6240 Series**

- |                        |       |                         |
|------------------------|-------|-------------------------|
| ▪ Input Voltage Range  | ..... | 1.5V ~ 6.0V             |
| ▪ Output Voltage Range | ..... | 2.63V @ Ta=25°C         |
|                        | ..... | Max 2.70V @ Ta=-40~85°C |
| ▪ Output Current       | ..... | 150mA                   |
- Designed to reduce the discharge current from the battery.
  - Low profile package with h=0.33 mm for low profile solutions.

<https://product.torexsemi.com/en/series/xc6240>

#### **Battery Monitor IC for LTO Battery : XC6140 Series**

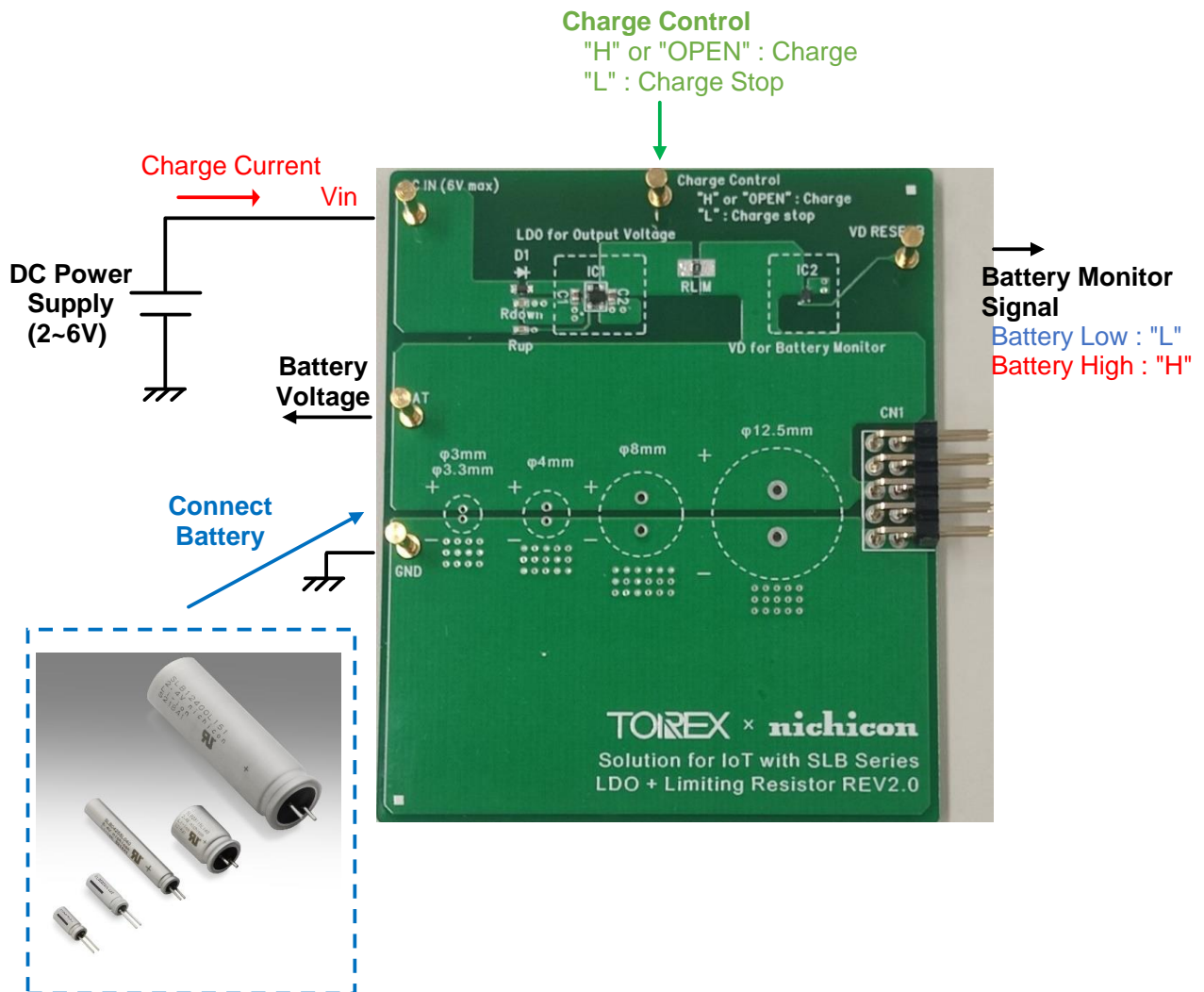
- |                       |       |             |
|-----------------------|-------|-------------|
| ▪ Input Voltage Range | ..... | 1.1V ~ 6.0V |
| ▪ Detect Voltage      | ..... | 1.6V ~ 2.2V |
| ▪ Release Voltage     | ..... | 2.475V      |
- Optimum detection voltage for over-discharge protection of LTO batteries.
  - Large hysteresis width for stable signal output even with LTO batteries with high internal impedance.
  - Designed to reduce the discharge current from the battery.
  - Low profile package with h=0.33 mm for low profile solutions.

<https://product.torexsemi.com/en/series/xc6140>

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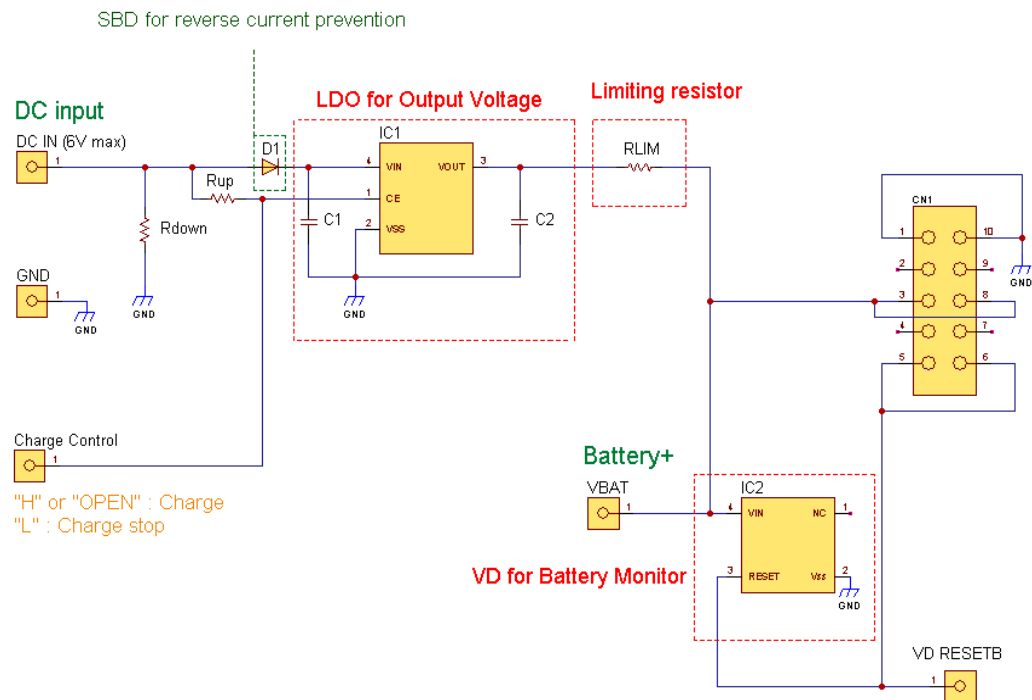
### Quick Start Procedure



## Nichicon SLB Series Evaluation Board

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### Block Diagram



### BOM

#### Required Circuit Component

Item	Value	Description	Size [mm]	Part Number	Manufacture
IC1	-	Battery Charger for LTO Battery	SSOT-24	XC6240A263NR-G	TOREX
C1	1uF	Ceramic cap., 25V/1μF	1005	C1005X5R1E105K050BC	TDK
C2	1uF	Ceramic cap., 25V/1μF	1005	C1005X5R1E105K050BC	TDK
IC2	-	Battery Monitor IC for LTO Battery	USPQ-4B05	XC6140C18A9R-G	TOREX
D1	-	Schottky Barrier Diode, 40V/200mA	SOD-523	XBS024S15R-G	TOREX
Rup	100kΩ	Resistor	1005	100kΩ	-
Rdown	100kΩ	Resistor	1005	100kΩ	-
RLIM	Jumper	Resistor	2012	0Ω	-

#### Battery

Item	Value	Description	Size [mm]	Part Number	Manufacture
Battery	-	-	-	SLB Series (Implement the system yourself)	Nichicon

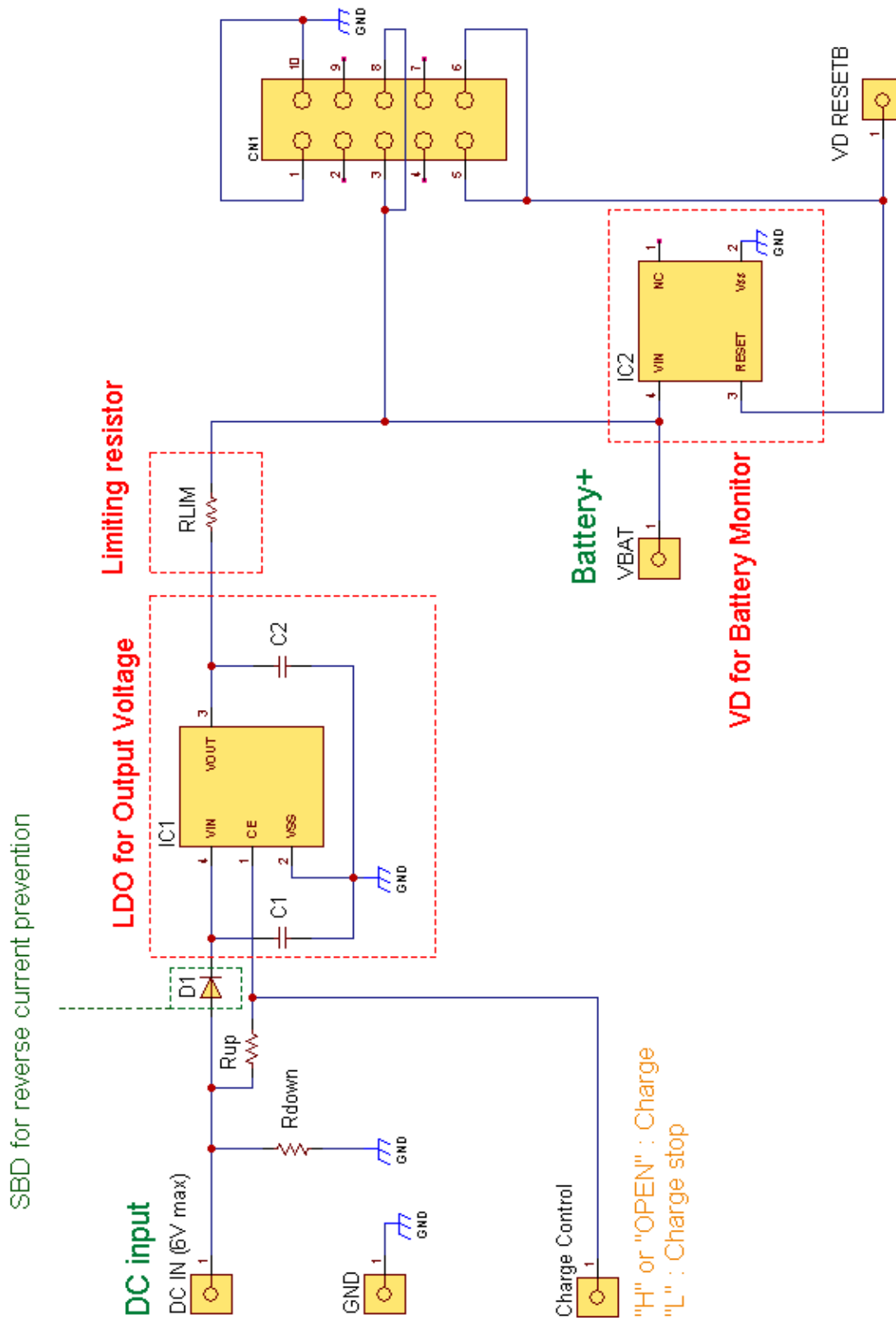
#### Connector

Item	Value	Description	Size [mm]	Part Number	Manufacture
CN1	-	Pin Header, Dual 2x5	-	61301021021	Würth Elektronik

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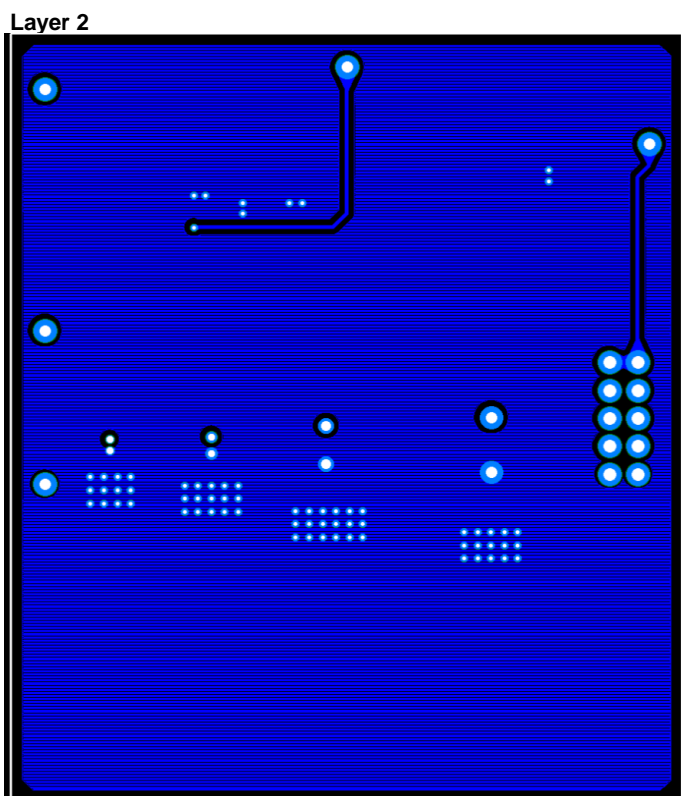
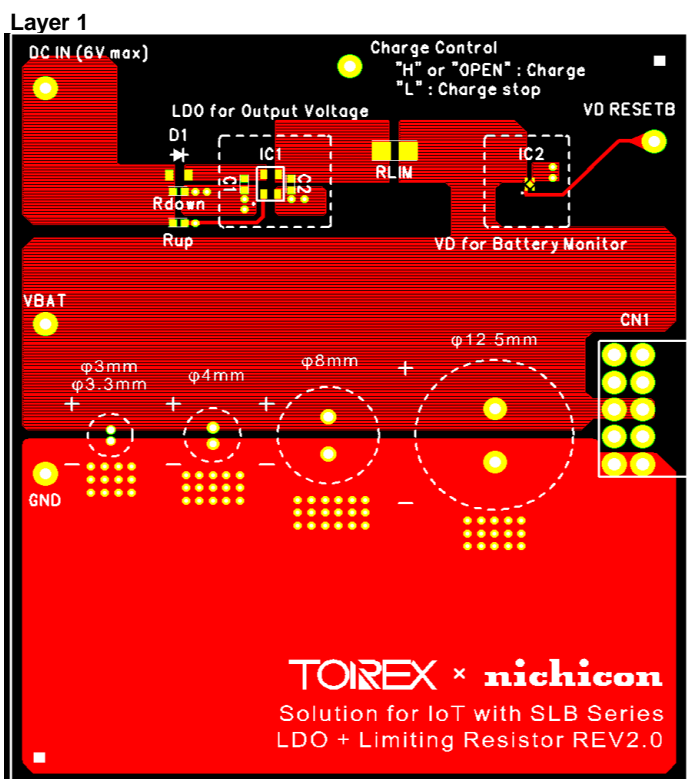
## Schematic



## Nichicon SLB Series Evaluation Board

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### PCB Layout





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