

E-33	Keywords	Y2	device	Z4	electricity	S6/7	energy storage/traffic system
						E29	electrical machinery

Toshiba Corporation

## SCiB™ Long-Life Lithium Ion Rechargeable Battery

### Features

SCiB™ uses lithium titanium oxide (LTO) in its anode to achieve excellent characteristics, including safety, long life, low-temperature performance, rapid charging, high input/output power and large effective capacity.

SCiB™ has been widely used for vehicle, industrial and infrastructure applications, including automobiles, buses, railroad cars, elevators and large-scale power storage facilities linked to renewable energy.

### Effects or Remarks

#### Six features

SCiB™ provides a long life of over 20,000\*<sup>1</sup> charge/discharge cycles, rapid charging, high Input/output power performance and excellent low-temperature operation, all while maintaining a high level of safety.

**Safety:** Uses highly safe lithium titanium oxide (LTO)

**Long life:** Over 20,000 cycles\*<sup>1</sup>

**Low-temperature operation:** Can be used at temperatures as low as -30°C

**Rapid charging:** Rechargeable in 6 minutes\*<sup>1</sup>

**High input/output:** Chargeable at large current and provides large current output

**Wide effective SOC range\*<sup>2</sup>:** Provides a large available capacity

\*<sup>1</sup> Measured with a particular single cell under specific conditions

\*<sup>2</sup> SOC: State of Charge

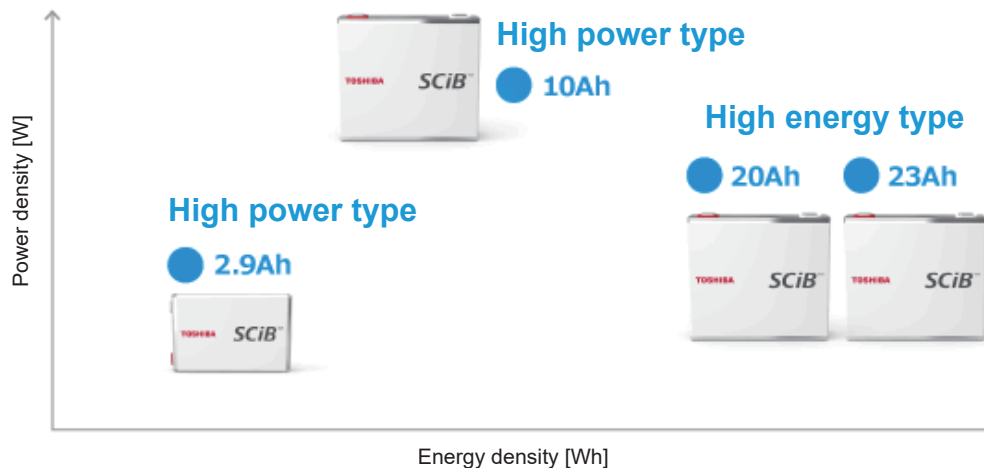


### Characteristics

SCiB™ rechargeable cells can be categorized into two types: high power and high energy.

The high power cell is suitable for applications requiring the charging and discharging of large current in a short time such as regenerative braking in automotive applications.

The high energy cell is suitable for applications requiring large capacity such as electric vehicles and stationary storage systems.



The SCiB™ rechargeable battery does not explode or ignite easily even when short-circuited, and lithium metal deposition is extremely unlikely to occur even under high input, low temperature, and long-term cycle use.

Materials/technology	SCiB™	Conventional Lithium-ion battery	Event between electrodes	Electrochemical potential of anode
Anode material	Lithium Titanate Oxide (LTO, noncombustible materials) → thermally stable	Carbon materials		
Internal short-circuit current	Small → Obtained higher resistivity due to phase transformation of the LTO surface where the short circuit occurred	Large		
Lithium metal deposition	No → Does not reach deposition potential for lithium even at high input, low temperature, and long cycle stages	Yes	<p>→ Does not reach deposition potential for lithium even at rapid charging, low-temperature charging, and long cycle stages</p>	

**Effects or Remarks**

- ◆ This enables efficient recovery/reuse of regenerative energy, allowing effective utilization of limited energy.
- ◆ With its improved cycle life, reduced maintenance frequency, reduced waste requiring disposal, and lower running costs, the SCiB™ rechargeable battery can help reduce environment impact. It was also certified as Toshiba’s “Excellent ECP\*3” (given to Toshiba products with excellent environmental features).

\*3 Environmental Conscious Products (environmentally harmonious product)

**Installation in Practice or Schedule**

- Domestic Installation at automobile manufacturers
- Suzuki Motor Corporation "eNe-CHARGE (vehicle's regenerative braking system)"
  - Nissan Motor Co., Ltd. "DAYZ/ DAYZ Highway STAR" (2019\*4)
  - Mitsubishi Motors Corporation "eK wagon" (2019\*4)
  - Mazda Motor Corporation "MAZDA 3"s mild hybrid system "M Hybrid" (2019\*4)
  - Hino Motors, Ltd. "Hino Profia Hybrid" (2019\*4)

- Other installation record
- Tohoku Electric Power Company "Verification Project for Storage Battery System to Deal With Frequency Fluctuation at Nishi Sendai Substation" 40 MW output storage battery system (2013\*4)  
Storage battery system and micro EV battery (2014\*4)
  - Tohoku Electric Power Company "Verification Project for Minami Soma Substation Supply and Demand Balance Improvement Storage Battery System" 400 MW output storage battery system (2015\*4)

- Overseas
- Indiana State, USA "Plug-in Ecosystem Verification Experiment Project" Storage battery system (2013\*4)
  - Madrid Province, Spain: Projects for "Development of Safe Low-Cost Large-Scale Storage Battery System Technology" and "Development of Series Stabilization Low-Cost High-Output Storage Battery System Technology", Mobile storage battery system (2015\*4)

\*4: Year of press release

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