Industrial Lithium-ion Battery

Toshiba Rechargeable Battery \textit{SCiB}$^\text{TM}$
SCiB™ uses lithium titanium oxide in its anode to achieve excellent characteristics

### Safety

**Low risk of fire or explosion**

In case of an internal short circuit, the lithium titanium oxide (LTO) in the anode layer of SCiB™ phase transforms to being highly resistive, thus minimizing risk of drastic current flow that may lead to rupture, fire, or other accidents.

### Long life

**Cycle life of 20,000 times or more**

The capacity remains at 70% or more even after 20,000 times of charging/discharging. SCiB™ also has small degree of deterioration even with float charging*, making it usable for applications that keep constant voltage such as backup power supply.

* Float charging: Float charging means continuous constant voltage charging

### Rapid charging

**Rapidly charges to about 80% of the capacity in 6 minutes**

The favorable anode charging characteristics provide rapid charging to about 80% of the capacity in 6 minutes.

### Performance at low temperature

**Usable even at −30°C**

Since there is almost no lithium metal deposition even at low temperature usage, repeated charging and discharging is possible at −30°C.

### High input/output

**Large current for both input and output**

SCiB™ can accept large current input and output. Thus, it can store large regenerative energy generated during deceleration of railways and automobiles, and can supply large current necessary for starting the motor.

### Wide effective SOC* range

**Available SOC range of 0 to 100%**

SCiB™ exhibits excellent input/output characteristics over a wide SOC* range. This makes it possible to reduce the nominal battery capacity or amount of batteries necessary for a system, as compared to other batteries that have a narrower SOC range.

* SOC: State of Charge
Widespread Revolution in Energy Usage

- **Automobile, ship, railway, etc.**
- **Electricity stabilization, Energy conservation**
- **Industrial machine/device**
- **Facilities/Equipment**
- **Battery installation**
- **Backup power source**

**Factory**
- **Forklift**
- **AGV**
- **Fridge-freezer**
- **Industrial robot**

**Signal light**
- **Station**
- **Housing**
- **Street light**
- **Automobile**

**Solar power generation**
- **Communication base station**
- **Bicycle/car parking fare machine**
- **UPS**
- **Building**
- **Railcar**

**Theme park**
- **Ship**
- **Transforming station**

This battery has been adopted for low-fuel-consumption technologies that effectively use regenerative energy at deceleration.

This battery has been adopted for rapid-charge-type electric buses in operation in California and other 11 states in the United States.

Suzuki Motor Corporation
**Mild hybrid**

This battery has been adopted for the rapid-charge hybrid-type boat “RAICHO-N”.

This battery has been adopted for rapid-charge-type electric buses in operation in cities in Europe.

Tokyo University of Marine Science and Technology
**Hybrid-type battery-powered boat**

This battery has been adopted for hybrid-type tram buses in operation in cities in Europe.

Tokyo Metro Co., Ltd.
**Rapid-charge-type electric bus**

This battery has been adopted for regenerative battery devices to effectively use the regenerative electricity generated by deceleration of a railcar.

TOBU Railway CO., LTD.
**Power supply device for running in emergency**

This battery has been adopted for measures to balance the demand and supply due to diffusion of recyclable energy.

Tokyo Metro Co., Ltd.
**Hybrid-type tram bus**

This battery has been adopted for large battery systems for adjustment of electricity demand and supply in the United States.

Willey Battery USA LLC
**Battery system for adjustment of electricity demand and supply**

This battery has been adopted for rapid-charge hybrid-type boat "RAICHO-N".

This battery has been adopted for power supply devices for running in emergency in Tokyo Metro Ginza Line 1000-series cars.

Hybrid-type battery-powered boat

This battery has been adopted for regenerative power supplies (UPS) that serve as backup power supplies for critical loads including small servers to large data centers.

TOSHIBA INFRASTRUCTURE SYSTEMS & SOLUTIONS CORPORATION
**Uninterruptible power supply (UPS)**

This battery has been adopted for "TOSMOVE NEO" that moves an elevator continuously in the case of power outage.

TOSHIBA ELEVATOR AND BUILDING SYSTEMS CORPORATION
**Power-outage continuous operation function**

This battery has been adopted for automated guided vehicles (AGVs) in the production line in Kashiwazaki Factory of Toshiba Corporation.

Toshiba Corporation
**Automated guided vehicle (AGV)**

This battery has been adopted for street light systems that store the electricity generated by solar power panels and activates night lights.

L-Kougen Co. Ltd.
**Solar power light**

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Suzuki Motor Corporation
**Mild hybrid**
**Lineup of Toshiba Rechargeable Battery SCiBTM**, selectable according to your application

### SCiBTM cell

<table>
<thead>
<tr>
<th>Feature</th>
<th>High energy type</th>
<th>High power type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product name</td>
<td>23Ah cell</td>
<td>10Ah cell</td>
</tr>
<tr>
<td>Nominal capacity</td>
<td>23Ah</td>
<td>10Ah</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>2.3V</td>
<td>2.4V</td>
</tr>
<tr>
<td>Volume energy density</td>
<td>220Wh/L</td>
<td>170Wh/L</td>
</tr>
<tr>
<td>Dimensions</td>
<td>W116×D22×H104mm</td>
<td>W113×D22×H105mm</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 55.8g</td>
<td>Approx. 51.5g</td>
</tr>
<tr>
<td>Remarks</td>
<td>This value is calculated from the internal resistance.</td>
<td></td>
</tr>
</tbody>
</table>

### SCiBTM module

For industrial devices and stationary systems,

<table>
<thead>
<tr>
<th>Feature</th>
<th>High energy type</th>
<th>High power type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product name</td>
<td>Type3-22</td>
<td>Type3-20</td>
</tr>
<tr>
<td>Nominal capacity</td>
<td>45Ah</td>
<td>45Ah</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>DC27.6V</td>
<td>DC11.0V</td>
</tr>
<tr>
<td>Voltage range</td>
<td>3.0 to 3.3 V</td>
<td>4.9 to 5.3 V</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-30 to +40ºC</td>
<td>-30 to +40ºC</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>85%RH or less (no condensation)</td>
<td>85%RH or less (no condensation)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>W109×D163×H125mm (Protrusions excluded)</td>
<td>W104×D163×H125mm</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 15 kg</td>
<td>Approx. 14 kg</td>
</tr>
<tr>
<td>Remarks</td>
<td>Cell voltage measurement, module temperature measurement, cell balancing*, communication (CAN)</td>
<td></td>
</tr>
<tr>
<td><strong>Remarks</strong></td>
<td>Charging by solar power generation (PV) is enabled.</td>
<td></td>
</tr>
</tbody>
</table>

### SCiBTM system

This is the stationary battery system widely used for the purpose of stable supply of electricity, backup, energy saving, and others.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Three-phase system</th>
<th>Single-phase system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>Three-phase system</td>
<td>Single-phase system</td>
</tr>
<tr>
<td>Nominal capacity</td>
<td>15 to 4000kW</td>
<td>5 to 200 kVA</td>
</tr>
<tr>
<td>Nominal load power factor</td>
<td>0.8 to 1.0</td>
<td>0.8 to 1.0</td>
</tr>
<tr>
<td>Power interruption stop period</td>
<td>3 minutes, 10 minutes (can be optionally tailored to arbitrary periods)</td>
<td>5 kVA for 10 minutes, 3.4 to 4.6 kW for 10 minutes</td>
</tr>
<tr>
<td>Output</td>
<td>11-275kW</td>
<td>5 kVA</td>
</tr>
<tr>
<td>Battery capacity</td>
<td>Single-phase system</td>
<td>Three-phase system</td>
</tr>
</tbody>
</table>

### Additional Information

- SCiBTM rechargeable cells can be categorized into two types: high energy and high power. The high energy type is used when a large capacity is required for electric automobiles, while the high power type is used when charge/discharge of a large current is required in a short time such as use of regenerative energy.
- SCiBTM rechargeable cells can be categorized into two types: high energy and high power. The high energy type is used when a large capacity is required for electric automobiles, stationary batteries, and others.
- Additionally, the SIP series and five-series battery pack are equipped with a battery management unit (BMU) and do not require an external protection circuit for use.
- This consists of more than one cell combined to obtain the required capacity and voltage. A cell monitoring unit (CMU) is mounted, and controller area network (CAN) communication provides transmission of the voltage data and temperature data.
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* These products are only available for Japan.

**Organization (NEC) subordinated projects.** Specifications shown herein are not guaranteed values. These values are subject to change without notice. Performance depends on usage conditions.
SCiB™ can be used in a wide range of applications, such as automotive, railway, industrial equipment, power equipment and power supply solutions for buildings and facilities. To customers who are considering using the SCiB™ for mass production, please feel free to contact us.

Manufacturing and R&D center: Toshiba Kashiwazaki Factory

Kashiwazaki Factory consistently undertakes the development, manufacturing, and quality control of SCiB™. It has a flexible production system that allows it to respond to demand changes. This environment-friendly factory also flexibly controls the clean and dry areas, and minimizes energy consumption required for sustainability. Moreover, the factory is equipped with a production quality system that meets TS16949, enabling it to supply high-quality, stable products.

Safety precautions

- Do not use this product for facilities in which there is a risk to human life or a disruption to public functionality if the product fails or malfunctions (nuclear power generator controls, aerospace applications, traffic equipment, life support equipment, safety equipment, and others).
- This product is produced under strict quality controls, however it may malfunction depending on the operating environment and conditions. Please consider countermeasure design (redundancies, failsafe measures, etc.) if using this product in facilities in which failure of the product would be expected to cause a great loss or accident.
- The operating environment must be within the range of specifications noted in the catalog and instruction manuals. Using the product outside the specified range may cause injury, a re, or some other accident.
- Be sure to carefully read the instruction manuals before using this product so that you can use it correctly.
- Toshiba is not responsible for any losses related to malfunctions or abnormalities in equipment or devices connected to the product when the product fails or malfunctions, including losses from other secondary repercussions.
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For detailed information of this product, please visit our Website. ScIB Search http://www.scib.jp/en/index.htm

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