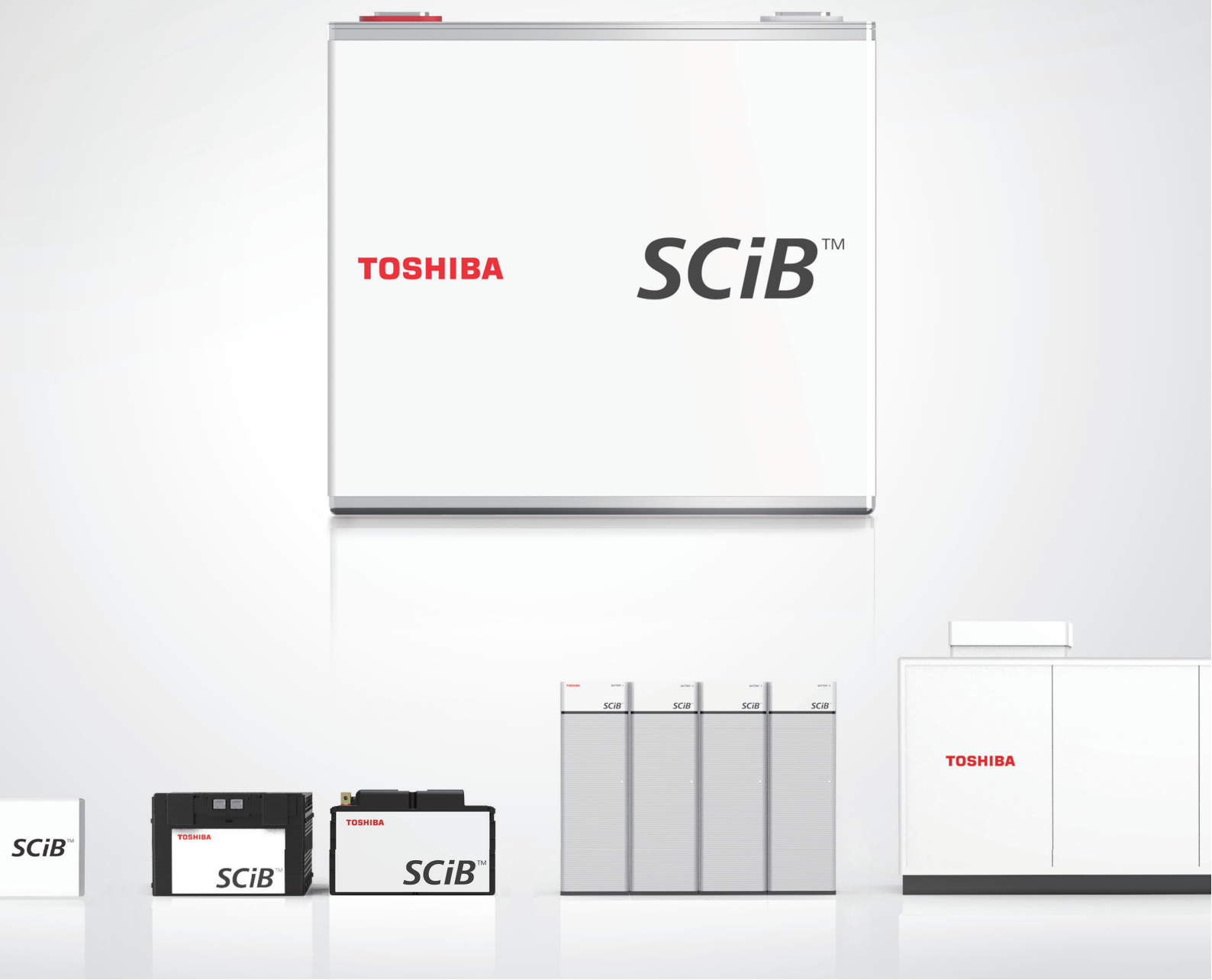




# TOSHIBA

Rechargeable Lithium-ion Battery

# *SCiB*<sup>TM</sup>

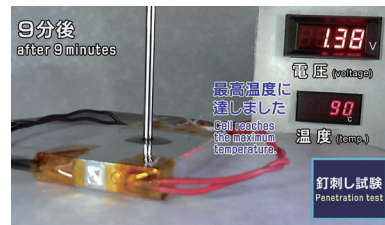
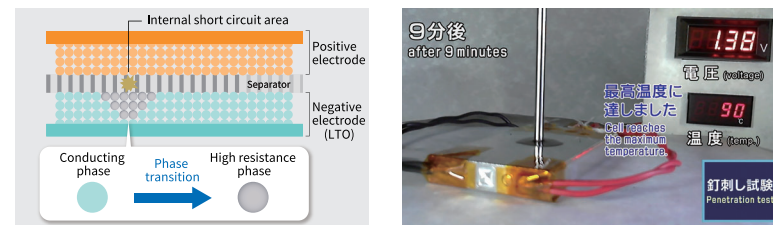


# SCiB™ uses lithium titanium oxide in its negative electrode to achieve excellent characteristics



## Safety

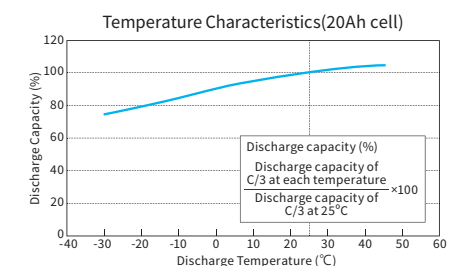
### Low risk of fire or explosion



In case of an internal short circuit, the lithium titanium oxide (LTO) in the negative electrode 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.

## Performance at low temperature

### Usable even at $-30^{\circ}\text{C}^*$

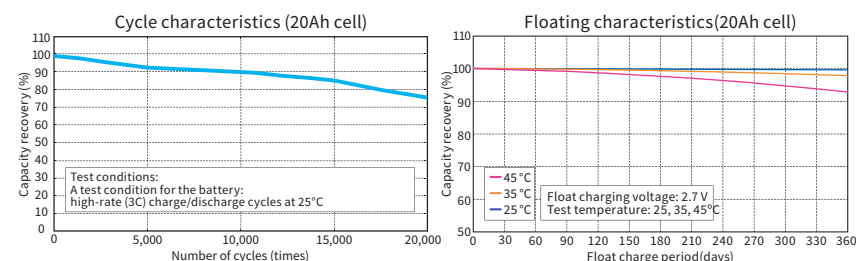


Since there is almost no lithium metal deposition even at low temperature usage, repeated charging and discharging is possible at  $-30^{\circ}\text{C}$ .

\*Operating temperature range depends on cell type.

## Long life

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



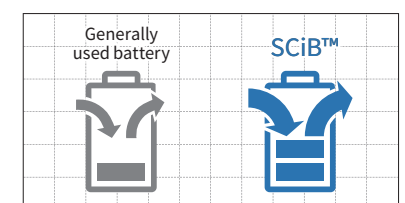
The capacity remains at 70% or more even after 20,000 times of charging/discharging. SCiB™ also has small degree of deterioration even with float charging\*\*, making it usable for applications that keep constant voltage such as backup power supply.

\*Cycle characteristics depends on cell type and usage conditions

\*\* Float charging: Float charging means continuous constant voltage charging.

## High input/output

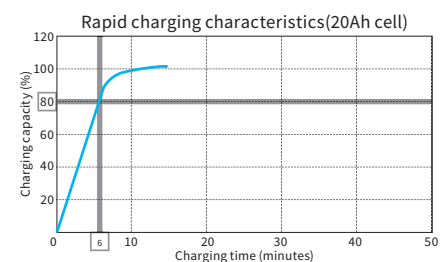
### Large current for both input and output



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.

## Rapid charging

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

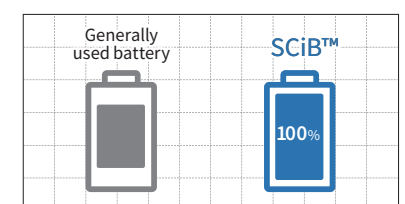


The favorable negative electrode charging characteristics provide rapid charging to about 80% of the capacity in 6 minutes.

Note: Characteristics depends on cell type and usage conditions

## 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

The indicated data were measured under specific conditions. The performance varies according to the customer's condition for use.



# Widespread Revolution in Energy Usage



The high input/output capability of SCiB™ makes it possible to efficiently store the large electric energy generated during deceleration and braking, improving fuel efficiency and reducing emissions.



Battery systems composed of small SCiB™ cells help realize safe, long-life, and rapidly rechargeable electric vehicles.



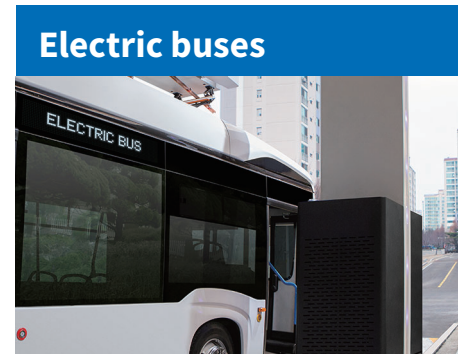
Featuring high power and long life even at low temperature, SCiB™ is an easy replacement for automotive lead-acid batteries.



SCiB™ allows cranes to efficiently use the large kinetic energy that is generated while freight containers are lowered, contributing to improving fuel efficiency and reducing emissions.



The minimum battery space required by SCiB™ makes it possible to secure spacious cabin. SCiB™ enables efficient operations of electric ferries with a small quantity of batteries.



Electric buses using SCiB™ can be charged in a short period of time. A reduction in the quantity of batteries makes it possible to secure a spacious passenger cabin and reduce costs.



SCiB™ allows buses and other large vehicles to efficiently convert large kinetic energy into electric energy.



SCiB™ efficiently accepts the regenerative energy to assist the acceleration during upward slope or as an energy source of air conditioner/refrigerator while the engine is idle.



SCiB™ is suitable for the electrification of diesel locomotives. It can also be used to provide electric energy while a train is running on non-electrified sections and even in the event of emergency.



SCiB™ eliminates battery replacement because of its outstanding rapid-charging performance, enabling unattended operations of automated guided vehicles (AGVs) and autonomous mobile robots (AMRs).



Taking advantage of its long life and high input/output, SCiB™ realizes a storage battery system with high reliability and excellent life cycle economy for power supply/demand regulation and VPP.



SCiB™ helps realize small, light uninterruptible power supply (UPS) systems, improving space utilization and reducing battery replacement costs.



SCiB™ enables safe, small battery systems to support the development of IoT infrastructure because of its high input/output density close to that of capacitors, long life, and low-temperature operation.



While conventional drones require battery replacement, SCiB™ makes it possible to create new drones that eliminate the need for battery replacement.



# Lineup of Toshiba Rechargeable Battery SCiB™, selectable according to your application

Cell						
There are three lineups: High-energy type, High-power type, and Combination type. The High-energy type cell is suitable for applications requiring large capacity such as electric in a short time such as during regenerative braking. The Combination type is suitable for vehicles and stationary storage systems. The High-power type is suitable for applications requiring large current charge/discharge applications requiring both large capacity and large current charge/discharge.						
Photo	High energy type			Photo	Combination Type	High power type
Product name	23Ah cell			Product name	20Ah-HP cell	10Ah cell
Rated capacity	23Ah			Rated capacity	20Ah	10Ah
Nominal voltage	2.3V			Nominal voltage	2.3V	2.4V
Output Power	1000W* (SOC50%, 10s, 25°C)			Output Power	1900W* (SOC50%, 10s, 25°C)	1800W* (SOC50%, 10s, 25°C)
Input Power	1000W* (SOC50%, 10s, 25°C)			Input Power	1900W* (SOC 50%, 10s, 25°C)	1500W* (SOC 50%, 10s, 25°C)
Volumetric energy density	202Wh/L			Volumetric energy density	176Wh/L	92Wh/L
Weight energy density	96Wh/kg			Weight energy density	84Wh/kg	47Wh/kg
Dimensions	W116×D22×H106 mm			Dimensions	W116 × D22 × H106 mm	W116 × D22 × H106 mm
Weight	Approx. 550g			Weight	Approx. 545g	Approx. 510g
Product name	20Ah cell			Product name	2.9Ah cell	2.9Ah cell
Rated capacity	20Ah			Rated capacity	2.9Ah	2.9Ah
Nominal voltage	2.3V			Nominal voltage	2.4V	2.4V
Output Power	1200W* (SOC50%, 10s, 25°C)			Output Power	520W* (SOC 50%, 10s, 25°C)	520W* (SOC 50%, 10s, 25°C)
Input Power	1100W* (SOC50%, 10s, 25°C)			Input Power	410W* (SOC 50%, 10s, 25°C)	410W* (SOC 50%, 10s, 25°C)
Volumetric energy density	176Wh/L			Volumetric energy density	85Wh/L	85Wh/L
Weight energy density	89Wh/kg			Weight energy density	46Wh/kg	46Wh/kg
Dimensions	W116×D22×H106 mm			Dimensions	W63 × D14 × H97 mm	W63 × D14 × H97 mm
Weight	Approx. 515g			Weight	Approx. 150g	Approx. 150g

\* This value is calculated from the internal resistance.  
※ 23Ah and 10Ah cell use part of technology achievement made by Japan's New Energy and Industrial Technology Development Organization (NEDO) subsidized projects.  
※ Specifications shown herein are not guaranteed values. These values are subject to change without notice. Performance depends on usage conditions.

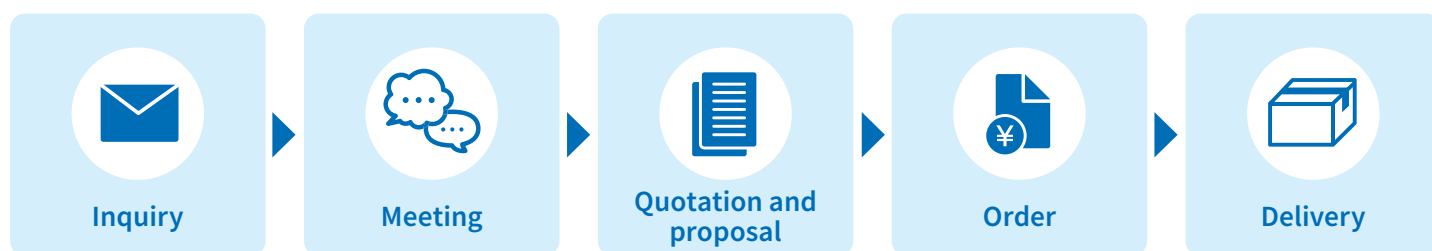
Module / Pack						
This consists of more than one cell combined to obtain the required capacity and voltage. A cell monitoring unit (CMU) is mounted, and controller area network (CAN) communication. Additionally, SCiB™ Industrial Pack is equipped with a battery management unit (BMU) and provides transmission of the voltage data and temperature data. does not require an external protection circuit for use.						
Photo	Industrial battery module			Photo	Industrial battery pack	
Product name	Type3-23	Type3-20	Type3-20HP	Product name	SCiB™ Industrial Pack(24V)	
Model name	FM01202CCB01A	FM01202CCA04A	FM01202CCE01A	Model name	FP01101MCB01A	FP01101MCB02A[*1] x2
Rated capacity	45Ah	40Ah	39Ah	Rated capacity	22Ah	44Ah
Nominal energy	1242Wh	1104Wh	1076Wh	Nominal energy	556Wh	1113Wh
Max. charge/discharge current	160 A (continuous), 350 A (rush current)		160 A (continuous), 500 A (rush current)	Max. charge/discharge current	125A(200 sec)	150A(200 sec)
Nominal voltage	DC27.6V			Nominal voltage	DC25.3V	
Voltage range	DC18.0 to 32.4V			Voltage range	DC16.5 to 29.7V	
Ambient temperature	-30 to 45°C			Ambient temperature	-30 to 45°C	
Ambient humidity	85%RH or less (no condensation)			Ambient humidity	85%RH or less (no condensation)	
Dimensions	W190×D361×H125mm (Protrusions excluded)			Dimensions	W247×D188×H165mm	Using two units (W247×D188×H165mm)
Weight	Approx. 15 kg	Approx. 14kg	Approx. 15 kg	Weight	Approx. 8kg	Approx. 16kg
Major built-in functions	Cell voltage measurement, module temperature measurement, cell balancing*, CAN communication * Function to even differences in voltage among cells connected in series			Remarks	For stand-alone use	Using two units of [*1] in parallel
Product name	SCiB™ Industrial Pack (48V)			Product name	SCiB™ Industrial Pack (48V)	
Model name	FP01101MCB02A[*2] x2			Model name	FP01101MCB02A[*2] x2	
Rated capacity	22Ah			Rated capacity	22Ah	
Nominal energy	1113Wh			Nominal energy	1113Wh	
Max. charge/discharge current	125A(200 sec)			Max. charge/discharge current	125A(200 sec)	
Nominal voltage	DC50.6V			Nominal voltage	DC50.6V	
Voltage range	DC33.0 to 59.4V			Voltage range	DC33.0 to 59.4V	
Ambient temperature	-30 to 45°C			Ambient temperature	-30 to 45°C	
Ambient humidity	85%RH or less (no condensation)			Ambient humidity	85%RH or less (no condensation)	
Dimensions	W190×D361×H125mm (Protrusions excluded)			Dimensions	W247×D188×H165mm	Using two units (W247×D188×H165mm)
Weight	Approx. 15 kg	Approx. 14kg	Approx. 15 kg	Weight	Approx. 8kg	Approx. 16kg
Major built-in functions	Cell voltage measurement, module temperature measurement, cell balancing*, CAN communication * Function to even differences in voltage among cells connected in series			Remarks	For stand-alone use	Using two units of [*1] in parallel

Components						
Battery modules are built up into larger arrays with peripheral battery system components. Toshiba has battery system components available for building battery systems. Following is part of the products.						
				Photo		
				Product name	①BMU (Battery Management Unit)	②Current sensor
				Type	2G type (BMU-2G-RJ45)	C2 type (CAN communication)
				Model name	5P4E0124P001	PUR-0000145
				Function	- Cell voltage/ battery module temperature monitoring - Battery protection & SOC calculation - Communication with customer's upper controller via Ethernet/CAN	Measurement of charging/discharging current
						Termination resistor for CAN communication

For more details & other components (Contactor, Service disconnect, Current leak sensor, Self-starter gateway for BMU and related cables), please visit our website and refer to our catalog of "Battery System Components".



## From Inquiry to Delivery



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 from the following Website.



For detailed information of this product, please visit our Website.

<https://www.global.toshiba/ww/products-solutions/battery/scib.html>

## Manufacturing Sites

SCiB™ is manufactured at 2 factories, Kashiwazaki Operations (Kashiwazaki City, Niigata Prefecture) and Yokohama Battery Operations (Yokohama City, Kanagawa Prefecture). It is produced under a high-level quality system that complies with IATF16949/ISO9001.

Toshiba is actively engaged in environmental conservation activities and is in the process of acquiring ISO14001 certification. Renewable electricity has been introduced 100% at both factories toward decarbonization.



Kashiwazaki Operations



Yokohama Battery Operations

## 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.
- The technical information in this document is for the purpose of explaining the typical operations and applications of the product, but not for granting any license or guarantee in regard to intellectual property rights, or any other rights, belonging to third parties or Toshiba.
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**Toshiba Corporation**  
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<Agent>

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- The design, specifications, components, and others may change without prior notice.
- The package design presented is for catalog purpose, so the design of the actual battery will be different.

SBT(E)-006h 23-01

The contents of this catalog are as of January 2023.