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Creating technology and solutions that power Australian industry

SCiB™ BATTERIES

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Toshiba's rechargeable SCiB™ battery is a lithium-ion battery with excellent reliability and performance that is coupled with high levels of safety.

From years of Research & Development, Toshiba has extensive experience in manufacturing batteries. The new SCiB™ battery with Lithium Titanate Oxide (LTO) offers many advantages over other lithium technologies and thus can be used in many applications safely.

SCiB™ cells are the basic building blocks for Toshiba batteries. These cells are arranged in series and/or parallel connections to make up larger units called SCiB™ modules. Modules, in turn, can be arranged in series and/or parallel connections to achieve a battery system of desired voltage and capacity.

To make the inherent LTO technology used in SCiB™ batteries even more safe, the cells are monitored by Cell Management System (CMU) in each module and further by a Battery Management Unit (BMU) at the battery unit level. No wonder Toshiba's SCiB™ batteries have become a preferred choice for use in many applications such as vehicles, buses, truck, trams, ferries as well as robots and Automated Guided Vehicles(AGVs).

Sustainability of SCiB™

Toshiba's SCiB™ contributes to realizing a sustainable society through a wide variety of applications.

SCiB™ is able to bring the following benefits and advantages:

- Increase in fuel and power efficiency and reductions in CO_2 and NOx emissions and life cycle costs
- Creation of new values for battery systems such as an increase in system availability and a reduction in system size
- Safety in low-temperature environments and highly reliable battery system.

Toshiba Battery Division has an established environmental management system in manufacturing process to adhere to the principles of: ~efficient use of resources, ~prevention of global warming and ~no use of prohibited chemical substances.

Toshiba Quality Control

Toshiba's manufacturing facility in Kashiwazaki city, Niigata prefecture, produces SCiB™ batteries under a high-level of certified quality management system. By flexibly managing the clean and dry rooms, the facility minimises the energy consumption required to maintain its manufacturing environment. Random quality checks are performed at each step of the process, and all products are visually inspected prior to shipment.

All products are printed with a QR code, allowing for immediate tracking of production lots in the event of any quality issues.

Toshiba's SCiB™ batteries are a preferred choice for many applications due to the following characteristics:

Very Long Battery Life

Over 70% maintained capacity after 20,000 charging and discharging cycles making it suitable for all applications that require frequent charging and discharging.

Safe Design

Lithium Titanate chemistry offers minimal heat generation from internal short circuits caused by external pressure and minimises any risk of fire or explosion. This makes the SCiB™ batteries suitable for e-mobility applications.

High Input & Output Current

SCiB™ batteries are capable of quick high power (current) charging and discharging thus making them suitablefor e-vehicle starting and braking.

Rapid Charging

SCiB™ allows automobiles, buses and other e-vehicles to be charged as quickly as refilling a fuel driven car. Typically, SCiB™ modules can be charged up to 80% SOC in 12 minutes.

Large State-of-Charge (SOC) Capacity

Excellent input/output characteristics over the entire range of SOC from 0 % to 100%. This makes it possible to reduce the number of batteries required for a system. These batteries can be discharged to 0% capacity in emergency situations.

Wide Temperature Range

Suitable from 45°C up to as low as -30°C. SCiB™ can be charged and discharged repeatedly at extremely low temperatures.

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SCiB™ Cell Specifications

2.9 Ah

10 Ah

20 Ah-HP

20 Ah

23 Ah

	High Power Type		Combination Type	High Energy Type	
Product Name	2.9 Ah Cell	10 Ah Cell	20 Ah Cell	20 Ah Cell	23 Ah Cell
Nominal Capacity	2.9 Ah	10 Ah	20 Ah	20 Ah	23 Ah
Nominal Voltage	2.4 V	2.4 V	2.3 V	2.3 V	2.3 V
Output Performance	520 W	1800 W	1900 W	1200 W	1000 W
Input Performance	410 W	1500 W	1900 W	1100 W	1000 W
Volume Energy Density	85 Wh/L	92 Wh/L	176 Wh/L	176 Wh/L	202 Wh/L
Weight Energy Density	46 Wh/kg	47 Wh/kg	84 Wh/kg	89 Wh/kg	96 Wh/kg
Dimensions	W63 x D14 x H97 mm	W116 x D22 x H106 mm	W116 x D22 x H106 mm	W116 x D22 x H106 mm	W116 x D22 x H106 mm
Weight	Approx. 150 g	Approx. 510 g	Approx. 545 g	Approx. 515 g	Approx. 550 g

SCiB™ Module Specifications

Suitable for Large Capacity Systems

2P12S module Type3-20

2P12S module Type3-23

2P12S module Type1-23

	For industrial devices and stationary systems		For automotive
Model	FM01202CCA04A	FM01202CCB01A	FM01202CCB02A
Configuration	2 x 20Ah cells in parallel with 12 x in series	2 x 23Ah cells in parallel with 12 x in series	
Nominal Capacity	40 Ah (25°C, at 8A discharge)	45 Ah (25°C, at 9A discharge)	
Nominal Voltage	27.6 V		
Voltage Range	18.0 ~ 32.4 V		
Ambient Temperature	-30°C ~ 45°C		
Ambient Humidity	80% RH or less (no condensation)		
Dimensions	W190 x D361 x H125		
Weight	Approx. 14 kg	Approx. 15 kg	
Maximum Current	160A (charge/discharge), 300A (Charge discharge, 10s), (Not over 55°C at module temperature, at 25°C ambient)		160A (charge/discharge), 350A (Charge / discharge, 10s), (Not over 55°C at module temperature, at 25°C ambient)
Major Functions	Cell voltage measurement, module temperature measurement, cell balancing, communication (CAN)		

SCiB™ Battery Pack Specifications

Suitable for Robotics, AGVs, UPS & Single Installations

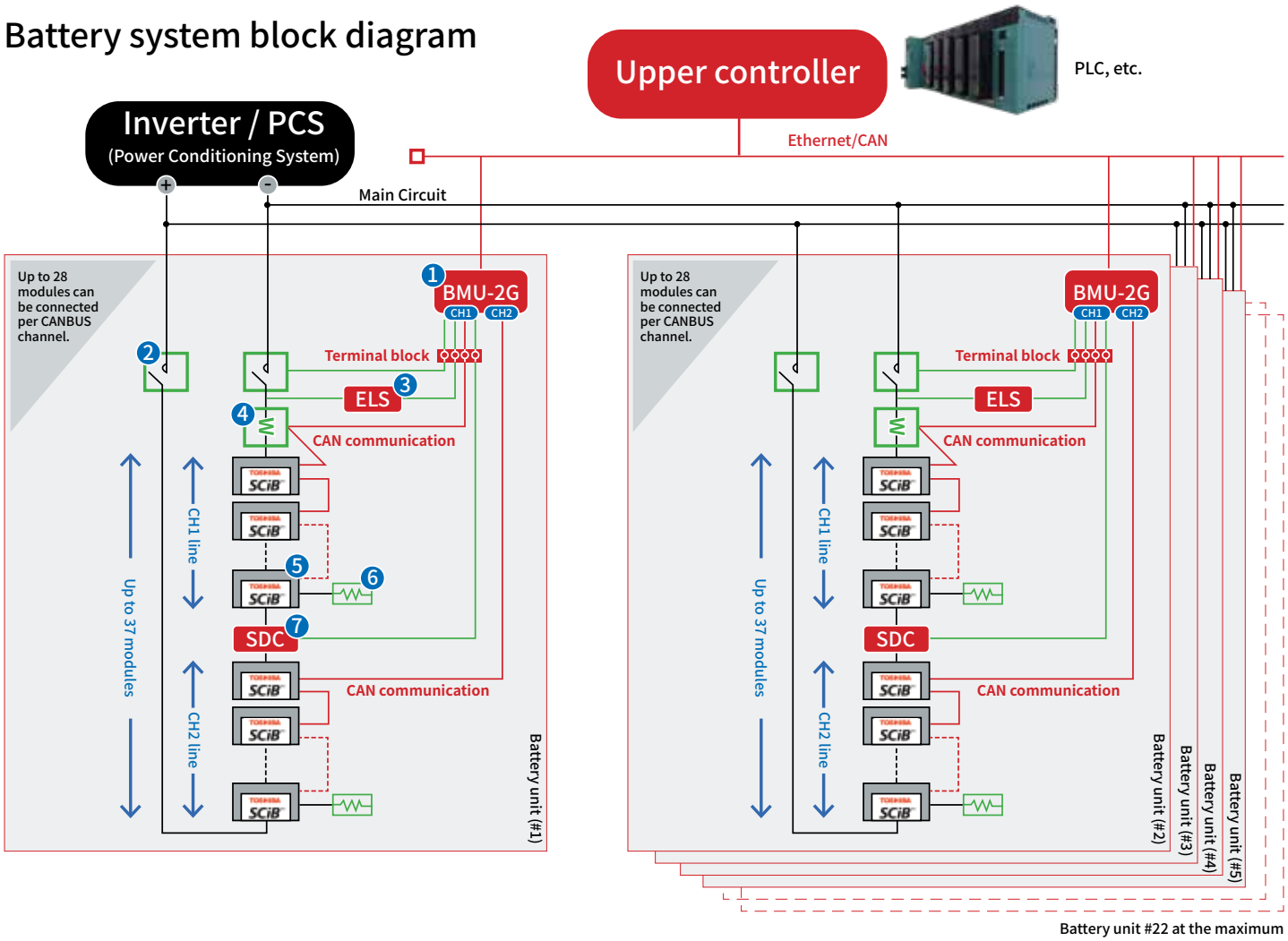
SIP24-23(1*)

SIP48-23(2*)

	For industrial devices and stationary systems		
Model	FP01101MCB01A		FP01101MCB02A
Nominal Capacity	22 Ah, 556 Wh	44 Ah, 1112 Wh	22 Ah, 1112 Wh
Nominal Voltage	25.3 V		50.6 V
Maximum, Current	125 A (200 s)		125 A (200 s)
Ambient Temperature	-30°C ~ 45°C		
Ambient Humidity	80% RH or less (no condensation)		
Dimensions	W247 x D188 x H165	2 Units of W247 x D188 x H165 each	2 Units of W247 x D188 x H165 each
Weight	Approx. 8 kg	Approx. 16 kg	

Note: Please consult Toshiba representative for selection and appropriatness of SCiB™ batteries for your application. SCiB™ batteries need careful selection for certain applications.

Battery system block diagram



1 BMU (Battery Managemenl Unit)

BMU monitors the cell voltage and temperature of each battery module, and protects the battery if an abnormality is detected. Additionally, this measures the charge/discharge current, and calculates the SOC value. Furthermore, this notifies the upper controller of the battery information, measurement/calculation information, etc. via Ethernet or CAN communication.

2G Type

2 Contactor (MC)

Contactors are installed respectively to the positive terminal and negative terminal of the main circuit to allow redundant isolation.

S Type (Standard)

H Type
(High Current)

3 Current leak sensor (ELS)

Current leak sensor detects leakage or earthing faults in the system.

ELS

4 Current sensor (HCT)

Current sensor measures the charging/ discharging current. Measured data is sent to BMU via CAN communication. (only for BMU-2G)

C Type

5 Battery Module (MDL)

A battery module consists of 24 cells (2 in parallel and 12 in series), and incorporates the cell monitoring unit (CMU) that monitors the voltage and temperature of these cells.

Type 3

6 Termination plug (TP)

Termination plug is the termination resistor for CAN communication.

TP

7 Service disconnect (SDC)

Service disconnect is used to disconnect the main circuit when installing/ removing the battery module or during maintenance work. Multiple SDCs are used to break a string into extra low voltage (ELV) segments before maintenance begins. A feedback sensor is also installed in each plug so the BMU can check all parts are restored before operation can commense.

SDC-1500

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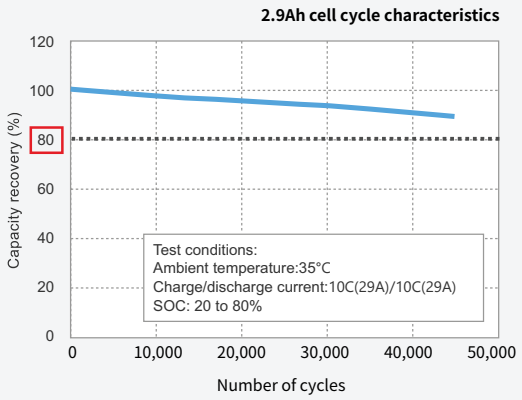
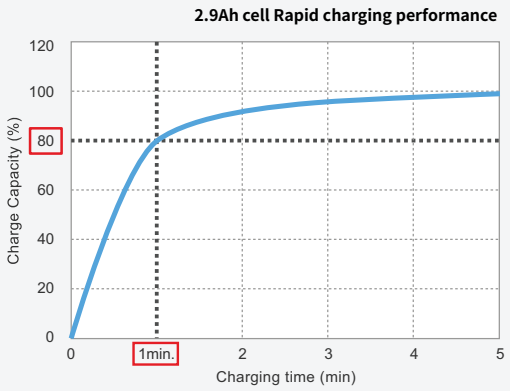
Data of high power type SCiB™ Cell

Long life (cycle characteristics)

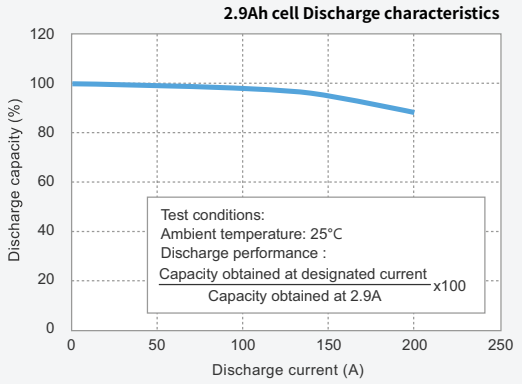


Rapid charging



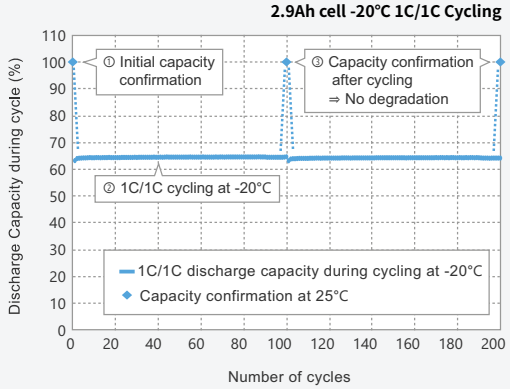
*Performance depends on usage conditions.

High-rate discharge



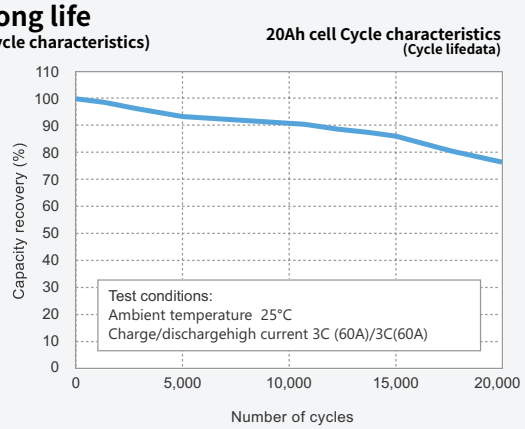
*Performance depends on usage conditions.

Low-temperature operation

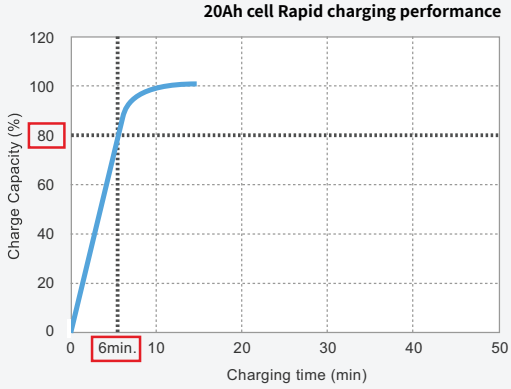


Data of high energy type SCiB™ Cell

Long life (cycle characteristics)

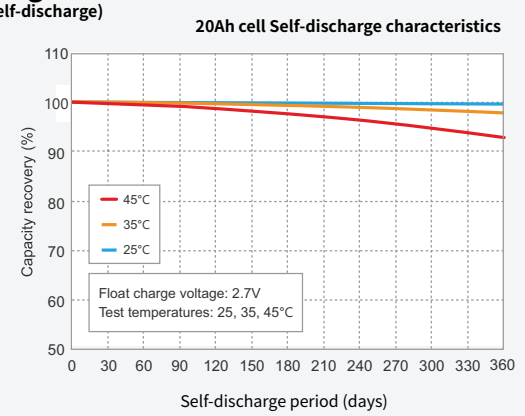


Rapid charging

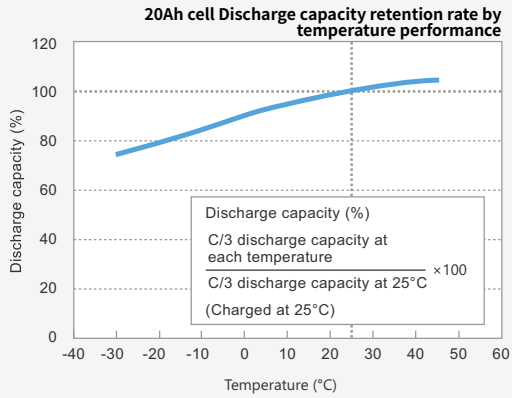


*Performance depends on usage conditions.

Long life (Self-discharge)



Low-temperature operation



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SCiB™ Batteries - Applications and Advantages

Electric Buses

SCiB™ batteries installed on-board e-buses provide high power on demand. When installed in a stationary charger, SCiB™ batteries provide the ability to rapidly charge the bus independent of local grid quality. Their compact size and high energy mean less batteries, more passenger space and reduced costs.

Electric Cars

SCiB™ batteries are used on-board e-cars for safe high power. Off-board, the same chemistry provides rapid charging in stationary systems. Their compact size and high energy mean less batteries, more passenger space and reduced costs. Also, with high input & output power, energy is stored more efficiently during deceleration and braking. This improves the overall efficiency and reduces emissions.

Mining Vehicles & Machinery

With large energy capacity, rapid charging and low risk of fire, SCiB™ is ideal for many mining applications.

Electric Trucks

SCiB™ batteries can power e-Trucks. They can quickly charge in the time it takes for a driver to have a coffee break. When a truck is on a downward slope, SCiB™ efficiently recovers the regenerated energy so as to assist in climbing up later.
Also, high energy storage in the batteries enable a truck additional distance on the same charge.

Stand-alone Solar Lighting

With large energy capacity, SCiB™ is an ideal battery for stand-alone solar lights in inaccessible locations as well as emergency lighting. With almost zero battery maintenance, such installations can become an “install and forget” dream.

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SCiB™ Batteries - Applications and Advantages

Trams and Trains

SCiB™ batteries can power trams and trains due to their high input & output power capabilities, compact size and high energy density. Additionally, large roof-top surface enables solar panels to be mounted to generate additional electricity for auxiliaries which can be stored in batteries. When installed in sationary chargers, SCiB™ batteries also provide for rapid charging of trams and trains.

Electric Ferries

SCiB™ batteries can propel e- ferries. They can be used for charging the ferries quickly when they are at a ferry wharf. Their compact size and high energy mean less batteries, more passenger space and reduced costs.

Automatic Guided Vehicles & Automatic Mobile Robots

SCiB™ batteries are best suited for Automatic Guided Vehicles (AGV) and Automatic Mobile Robots (AMR) due to their 0% -100% depth of discharge, rapid charging and low risk of fire. Their compact size enables these machines to be smaller in size.

UPS

SCiB™ batteries help realise smaller footprint for uninterrupted power supplies (UPS), thus improving space utilisation in electrical rooms. Their high depth of discharge (0% -100%) ensures longer availability of power in emergency situations.

Energy Storage

SCiB™ batteries are ideal for storing solar energy due to their high depth of discharge from 0% to 100%. Their performance is unaffected over a wide temperature range.

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