CONTENTS

Tekcell

LITHIUM PRIMARY BATTERY

Vitzrocell (Tekcell Brand, a Korean Manufacturer) has been recognized as one of the best power solution providers of Lithium Primary Batteries in the world. We are proud of full-fledged range of products suitable for various applications such as Utility Meters (AMR), Asset Tracking, Security, Leak Detector, and Military Devices & Equipment. Based on more than 20 years of accumulated expertise equipped with ISO9001, ISO14001, UL and others, we have achieved a leading position in the global markets through creative R&D resources, vertically integrated production facilities, reliable products, on-time delivery, and superb technical service. In this context, we do have very close relationship with lots of valuable partners and customers in more than 50 countries.

CEO MESSAGE

“ Vitzrocell, a leader of portable power solutions! ”

Vitzrocell has been recognized as one of the best power solution providers and the most reliable manufacturers of Lithium Primary Batteries in the world. We’re proud of the full-fledged range of products suitable for various application. And our teammates of R&D , Marketing & Sales, Factory, and so on is duly ready and resourceful enough to offer the added value which you have not had taste before. Based on more than 21 years of accumulated know-how, we are glad to have achieved a leading position in the world wide markets.

Considering the remarkable growing demand for portable power solutions and our continuous innovation activities, we’re convinced that Vitzrocell will be able to make our valuable customers, partners, and the stakeholders happy with the enduring profitable growth with Vitzrocell. We humbly would like to invite you to enjoy and share the promising business opportunity with us as a strategic Partner.

VITZROCELL President Paul Jang

COMPANY HISTORY

We are Moving forward from GOOD to GREAT

1987~1993_Build the basis for a specialized company in the lithium battery field

Oct. 1987 Founded the Company
May. 1988 TechnicalAliance with Wilson Great batch for Lithium Battery
Oct. 1993 Won the contract as a Sole Manufacturer for the Korean Military

1994~ 2004 _ Build the solid basis for a leading technology company

Jul. 2000 Enlisted Venture Company with new Technology
Jun. 2002 Launched New Company name as "VITZROCELL"
Nov. 2004 Awarded USD 10M on the export/Ministry of commerce, industry and resources

2005~ _ Powerful leap towards the global TOP

Apr. 2005 Awarded "Advanced Technology and R&D center" by Ministry of Commerce in Korea.
Mar. 2006 ISO-1400 Approval
Nov. 2007 Certificate of Defense Quality Management System by Defense Agency for Technology and Quality (DTaQ)
Nov. 2009 Awarded "the Technology Fast 500 "by Deloitte Touche Tohmatsu
Sep. 2010 Awarded "Enterprise with Best Labor Management Culture 2010 " from Ministry of Labor.
Sep. 2010 Awarded USD 20M export/Ministry of commerce, industry and resources
May. 2012 Awarded "World Class 300" by Ministry of Commerce in Korea
Aug. 2012 Acquired Exium Technology Inc. for Oil & Gas exploration market
Sep. 2012 Establishment of 2nd factory & expansion of 1st factory
Feb. 2013 Awarded "KB Hidden Star 500 Company" by Kookmin Bank
Jul. 2013 Awarded "Excellent Labor-Management Company" by Ministry of Labor
Nov. 2013 Awarded a prize of USD 30 Million export (July, 2012 ~ June, 2013 record)
Nov. 2014 Awarded a prize of USD 50 Million export (July, 2013 ~ June, 2014 record)

CERTIFICATIONS

TS_16949, TS_ISO 9001, ISO 14001, IS 9001, Certificate of Advanced Technology Center Defense Agency for Technology & Quality

PRODUCTION INFRASTRUCTURE

100% self- developed facilities & large-scale production infra.

Vertical Systematization (Full Automation)
Vertical production for core parts like Lithium, Electrolyte etc

Factory in Ye-san

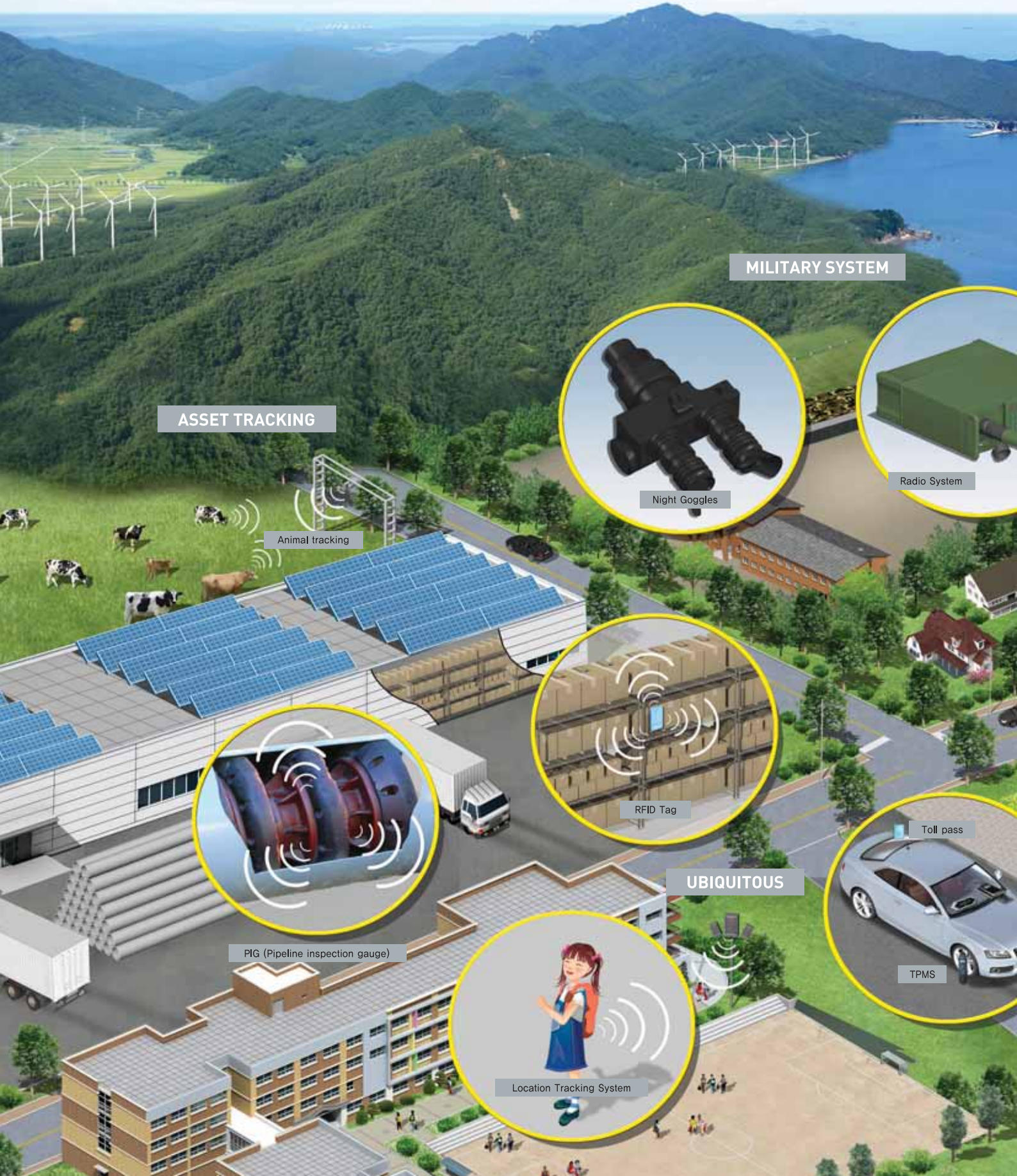
- Land Area : 16,920 ㎡
- Building Area : 6,887 ㎡
- Yearly Production Capa : 40,000,000 (CELL)

100% self-developed automatic facilities

OUR SOLUTION

Power Solution for Next Generation

VITZROCELL has products suitable for various applications including Utility Meter (AMR), Asset Tracking, Security, Leak Detector and Military Devices & Equipments. In addition, we are currently expanding our business in the military market and increasing the sales in AMR market. VITZROCELL is constantly planning new businesses including RFID Tag of heavy equipments and containers, Toll Pass equipments, wireless terminals, ocean equipments, new electronic appliances and medical devices.



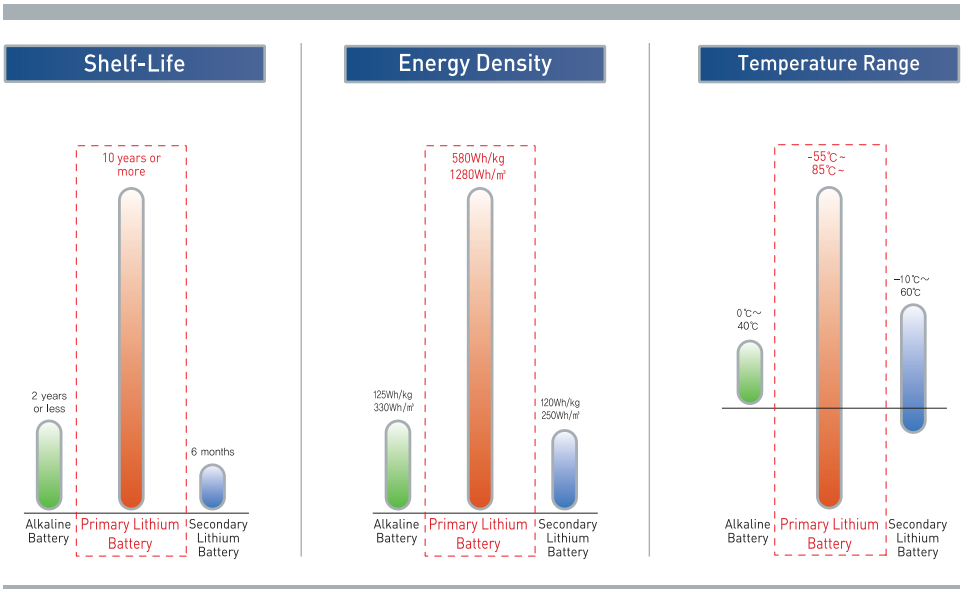

OCEAN EQUIPMENT
Buoy
Life Jacket
Tsunami Detector
OIL & GAS EXPLORATION
MWD(Measurement While Drilling)
ASSET TRACKING
Container Tracking
SMART GRID
Medical Equipments
Home Security system
AMR (Automatic meter reading)
– Gas Meter
– Water Meter
– Electricity Meter

Optimum Solution Provider adopting the best solution!
Becoming a leading firm in the global market!

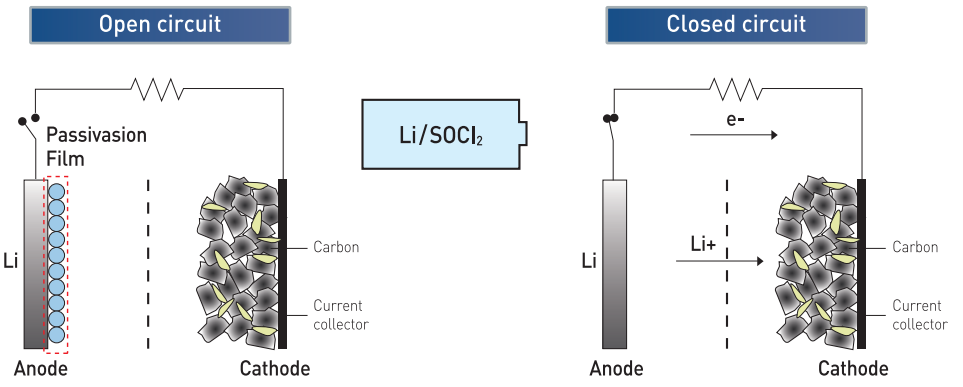
The lithium thionyl chloride battery

High and stable operating voltage	The TEKCELL lithium batteries have a nominal voltage of 3.6 Volts, which is considerably higher than any other commercially available battery.
Wide temperature range	The batteries are capable of operating in a wide temperature range normally from -55°C ~ +85°C.
Low self-discharge rate	Less than 1% self-discharge after 1 year storage at + 20°C
High energy density	The electrochemical system offers the highest energy density of any available primary battery: up to 650Wh/kg and 1,280Wh/dm3
Ultimate safety	All of the TEKCELL primary lithium batteries are UL recognized, and meet UN transportation test requirements.
Extensive Shelf Life	TEKCELL lithium batteries offer prolonged storage with a proven shelf life of 10 years when stored at normal room temperature.

Comparison with other battery types



Mechanism for reaction of $Li/SOCl_2$ Battery



Separator electolyte($SOCl_2$)

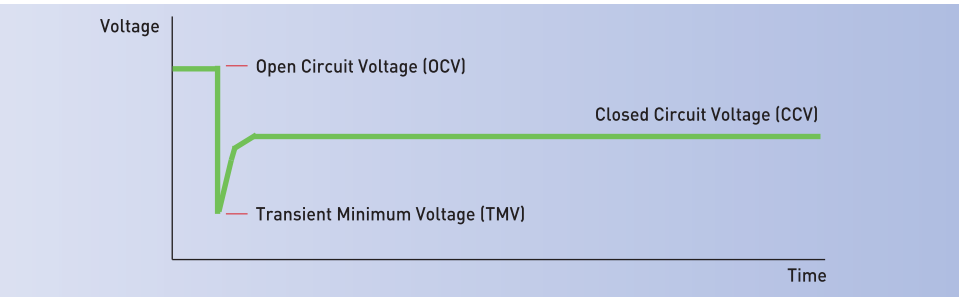
Passivation Film
Anode: $Li_2O+SOCl_2 \rightarrow 2LiCl+SO_2$

Separator electolyte($SOCl_2$)

Anode: $Li \rightarrow Li^+ + e$
Cathode: $2SOCl_2+4Li^+ +4e \rightarrow 4LiCl+SO_2+S$
Total: $4Li+2SOCl_2 \rightarrow 4LiCl(S)+(g)+S(s)$

FEATURE

Transient Minimum Voltage(TMV)

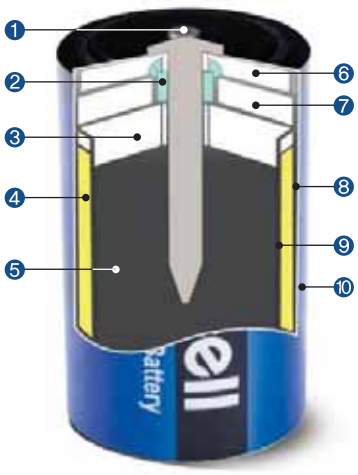


Lithium thionyl chloride battery has very low self discharge rate than other conventional batteries. That is due to the passivation layer (LiCl film) formed on the lithium surface This layer effectively prevents the self-discharge of the lithium as it is nonconductive. Therefore, this layer should be broken at the initial stage of discharge to allow lithium ion to flow to lithiumion. In the process, the layer adds to internal resistance, causing a momentary voltage drop, which is called TMV (Transient Minimum Voltage). The voltage of cells kept under proper conditions immediately recovers to normal operational voltage after TMV. TMV varies depending on the thickness and density of the passivation layer. The higher the discharge current gets, the lower TMV becomes. The passivation layer extends the shelf life by effectively preventing self-discharge but it brings about TMV. Thus, TMV must be fully considered, when a device is being designed.

Construction

Li/$SOCl_2$ Bobbin type

Application of Low Current drain



❶ Positive Pin&Current Collector
❷ Glass-to-Metal Seal ❸ Insulator ❹ Anode
❺ Cathode ❻ Spacer ❼ Header Base
❽ Case ❾ Separator ❿ Shrinkable Tube

Strength

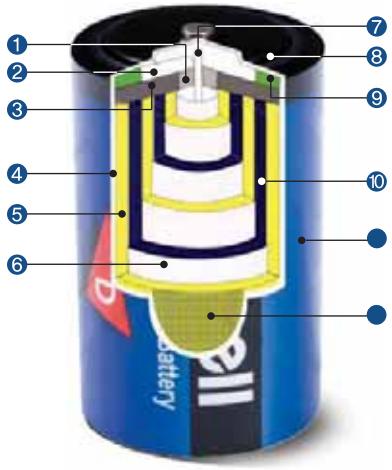
- High Safety Level
- Very Low Self Discharge Rate
- High Energy Density
- Excellent Operating Life

Weakness

- Low Power
- High Passivation (Voltage Delay)

Li/$SOCl_2$ Spiral type

Application of High Current drain



❶ Glass-to-Metal Seal ❷ Cell Tuse
❸ Header Base ❹ Case ❺ Anode
❻ Separator ❼ Positive pin ❽ Terminal Cap
❾ Spacer ❿ Cathode ● Shrinkable Tube
● Current Collector

Strength

- High Power
- Low Passivation (Voltage Delay)

Weakness

- Low Safety Level
- Low Operating Life
- Low Self Discharge Rate
- Low Energy Density

Hybrid Battery Technology as Pulse Assist

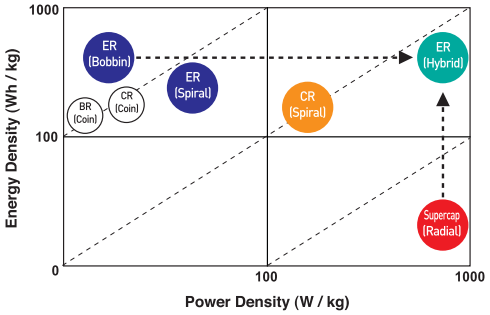
Vitzro Hybrid Battery

Hybrid Battery Type		Characteristic of Pulse Assist	Performance		
Main Power	Pulse Assist		Load of Battery	Working Voltage	Life of Battery
Primary Battery	Electrolytic Capacitor	Small capacitance	High	Low	Short
	Li 2nd Battery	Bad charge efficiency Limitation of Power	Middle	Middle	Middle
	Vitzrocap.	Ultra low resistance Excellent charge efficiency	Low	High	Long

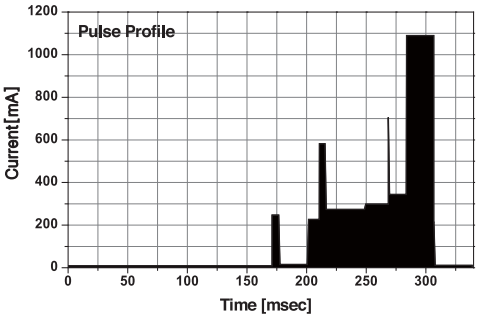
※ High Power Vitzrocap.
High Efficiency: EDLC (Electric Double Layer Capacitor) of physical reaction
High Power Design: Carbon electrode as thin film and high power combination

Comparison between Vitzrocap. and Li 2nd Battery

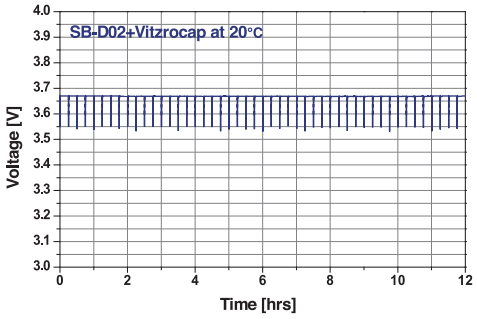
The Comparison of General Characteristics

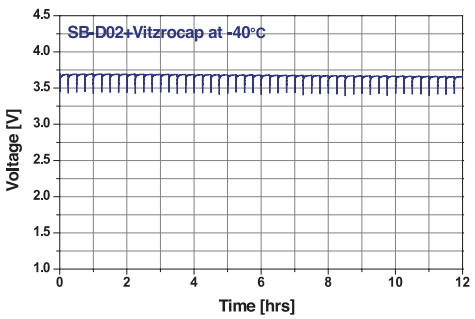


Pulse Test Power Profile

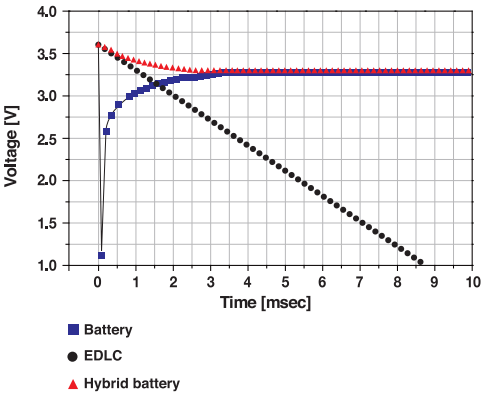


Comparison of Pulse Performance as Temperature





Hybrid battery discharge



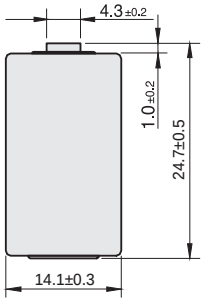
LITHIUM PRIMARY BATTERY

SB-AA02

Key Characteristics

- High and stable operating voltage
- Low self-discharge rate (less than 1% after 1 year of storage at + 20℃)
- Bobbin type
- Non-flammable inorganic electrolyte
- Hermetic glass-to-metal sealing
- UL recognized (file number MH18384)
- RoHS Compliance
- Non-restricted for transport

External Dimensions



※ Available Terminals :
TC ST 2P 3P 3PW AX Other type available by request

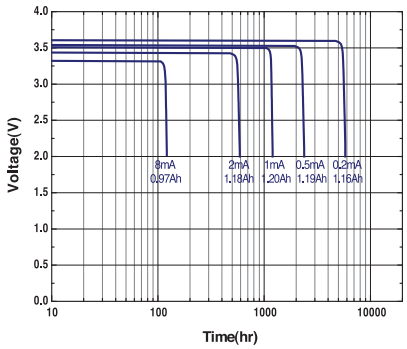
Specifications

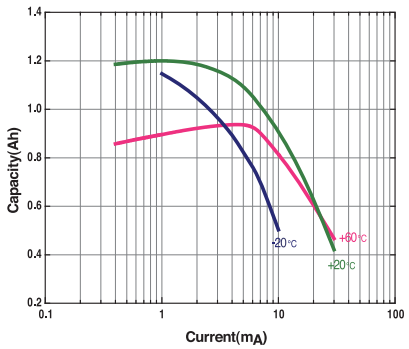
Model	SB-AA02
Nominal voltage	3.6V
Nominal capacity (at 1㎃, 20℃, 2.0V cut off)	1.2Ah
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	20mA
Max. pulse discharge current	50mA
Weight	9.0g
Operating temperature range	-55 ~ 85°C

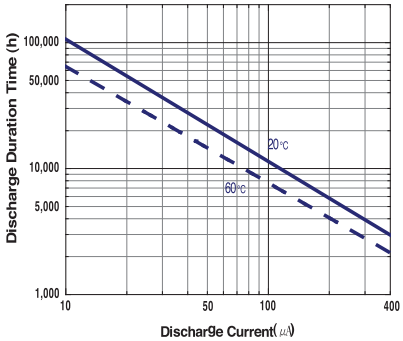
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20°C from undischarged cells with 10㎂ base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

Continuous Discharge at 20℃	Capacity vs. Current	Discharge Current vs. Duration Time







※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environment, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

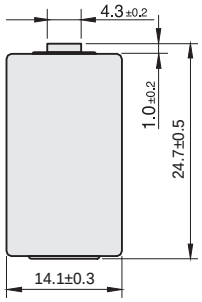
LITHIUM PRIMARY BATTERY

SB-AA02(P)

Key Characteristics

- High and stable operating voltage
- Superior voltage response during pulsing
- Low self-discharge rate (less than 1% after 1 year of storage at + 20°C)
- Bobbin type
- Non-flammable inorganic electrolyte
- Hermetic glass-to-metal sealing
- UL recognized (file number MH18384)
- RoHS Compliance
- Non-restricted for transport

External Dimensions



※ Available Terminals :
TC ST 2P 3P 3PW AX Other type available by request

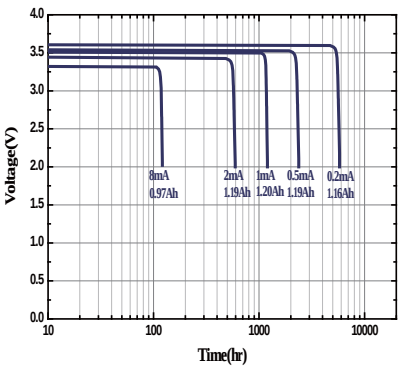
Specifications

Model	SB-AA02(P)
Nominal voltage	3.6V
Nominal capacity (at 1㎃, 20℃, 2.0V cut off)	1.2Ah
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	20mA
Max. pulse discharge current	80mA
Weight	9.0g
Operating temperature range	-55 ~ 85°C

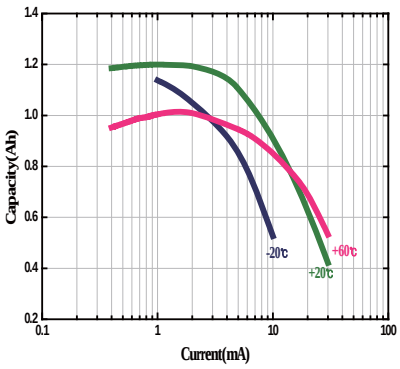
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20°C from undischarged cells with 10㎂ base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

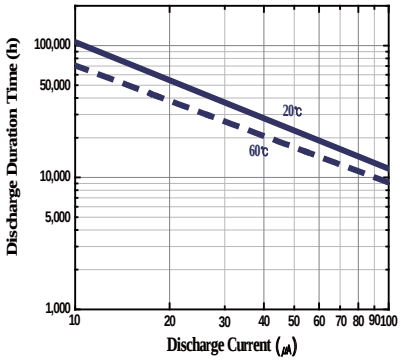
Continuous Discharge at 20℃



Capacity vs. Current



Discharge Current vs. Duration Time



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environment, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

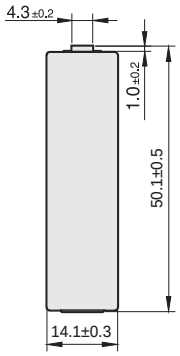
LITHIUM PRIMARY BATTERY

SB-AA11

Key Characteristics

- High and stable operating voltage
- Low self-discharge rate (less than 1% after 1 year of storage at + 20℃)
- Bobbin type
- Non-flammable inorganic electrolyte
- Hermetic glass-to-metal sealing
- UL recognized (file number MH18384)
- RoHS Compliance
- Non-restricted for transport

External Dimensions



※ Available Terminals :
TC ST 2P 3P 3PW AX Other type available by request

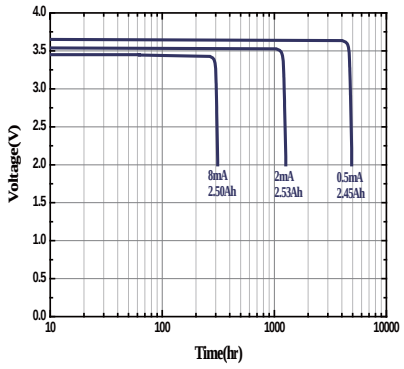
Specifications

Model	SB-AA11
Nominal voltage	3.6V
Nominal capacity (at 2㎃, 20℃, 2.0V cut off)	2.5Ah
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	60mA
Max. pulse discharge current	100mA
Weight	16.0g
Operating temperature range	-55 ~ 85℃

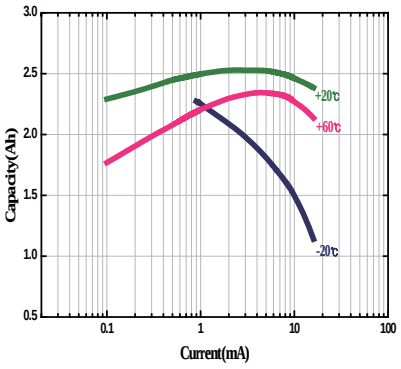
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20 ℃ from undischarged cells with 10㎂ base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

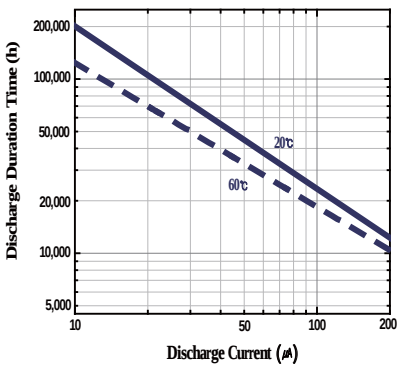
Continuous Discharge at 20℃



Capacity vs. Current



Discharge Current vs. Duration Time



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environment, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

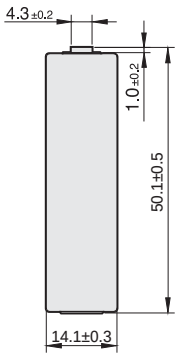
LITHIUM PRIMARY BATTERY

SB-AA11(P)

Key Characteristics

- High and stable operating voltage
- Superior voltage response during pulsing
- Low self-discharge rate (less than 1% after 1 year of storage at + 20℃)
- Bobbin type
- Non-flammable inorganic electrolyte
- Hermetic glass-to-metal sealing
- UL recognized (file number MH18384)
- RoHS Compliance
- Non-restricted for transport

External Dimensions



※ Available Terminals :
TC ST 2P 3P 3PW AX Other type available by request

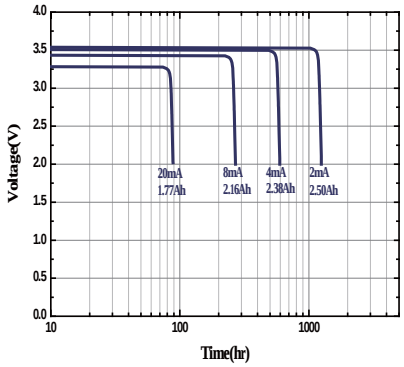
Specifications

Model	SB-AA11(P)
Nominal voltage	3.6V
Nominal capacity (at 2㎃, 20℃, 2.0V cut off)	2.5Ah
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	60mA
Max. pulse discharge current	150mA
Weight	16.0g
Operating temperature range	-55 ~ 85°C

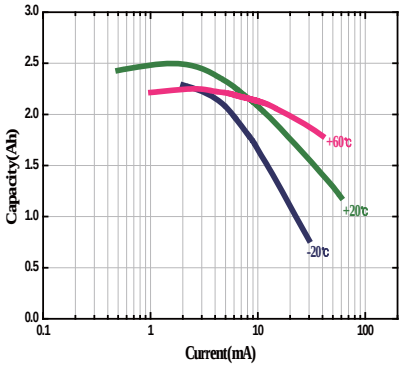
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20°C from undischarged cells with 10㎂ base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

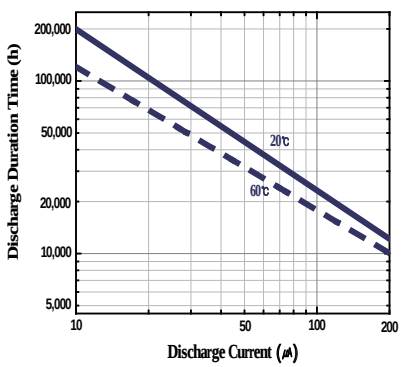
Continuous Discharge at 20℃



Capacity vs. Current



Discharge Current vs. Duration Time



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environment, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

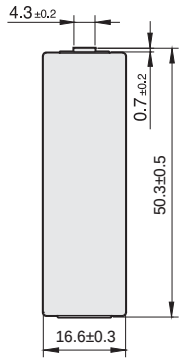
LITHIUM PRIMARY BATTERY

SB-A01

Key Characteristics

- High and stable operating voltage
- Low self-discharge rate (less than 1% after 1 year of storage at + 20℃)
- Bobbin type
- Non-flammable inorganic electrolyte
- Hermetic glass-to-metal sealing
- UL recognized (file number MH18384)
- RoHS Compliance
- Non-restricted for transport

External Dimensions



※ Available Terminals :
TC ST AX Other type available by request

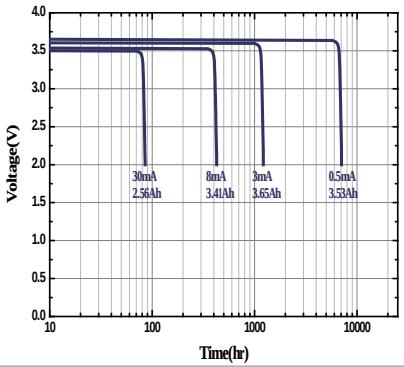
Specifications

Model	SB-A01
Nominal voltage	3.6V
Nominal capacity (at 3㎃, 20℃, 2.0V cut off)	3.65Ah
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	70mA
Max. pulse discharge current	160mA
Weight	24.0g
Operating temperature range	-55 ~ 85℃

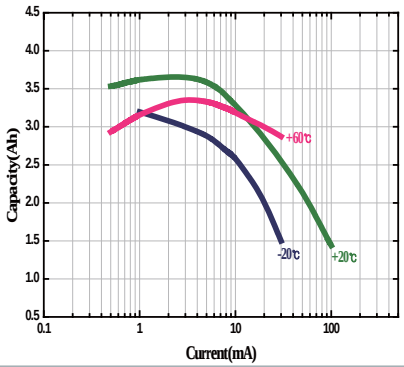
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20 ° C from undischarged cells with 10㎂ base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

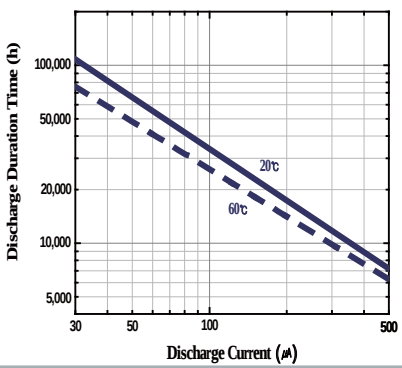
Continuous Discharge at 20℃



Capacity vs. Current



Discharge Current vs. Duration Time



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environment, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

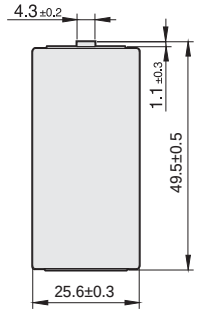
LITHIUM PRIMARY BATTERY

SB-C02

Key Characteristics

- High and stable operating voltage
- Low self-discharge rate (less than 1% after 1 year of storage at + 20℃)
- Bobbin type
- Non-flammable inorganic electrolyte
- Hermetic glass-to-metal sealing
- UL recognized (file number MH18384)
- RoHS Compliance

External Dimensions



※ Available Terminals :
TC ST AX Other type available by request

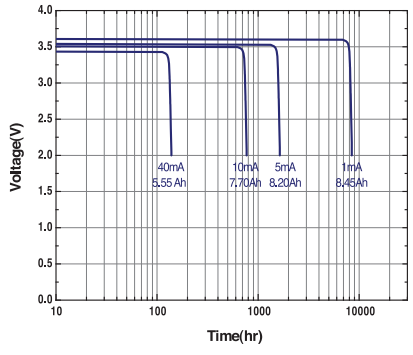
Specifications

Model	SB-C02
Nominal voltage	3.6V
Nominal capacity (at 4㎃, 20℃, 2.0V cut off)	8.5Ah
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	80mA
Max. pulse discharge current	180mA
Weight	51.0g
Operating temperature range	-55 ~ 85°C

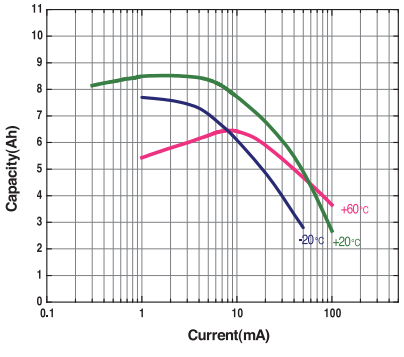
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20 ° C from undischarged cells with 10㎂ base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

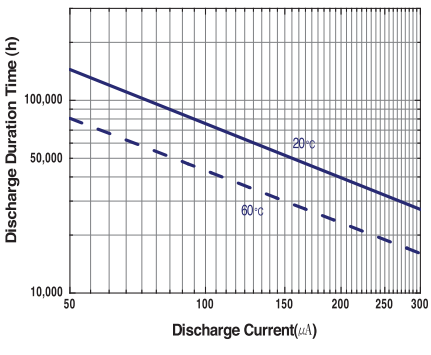
Continuous Discharge at 20℃



Capacity vs. Current



Discharge Current vs. Duration Time



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environment, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

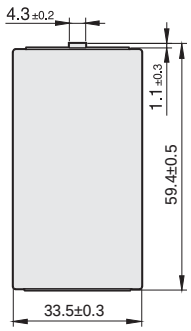
LITHIUM PRIMARY BATTERY

SB-D02

Key Characteristics

- High and stable operating voltage
- Low self-discharge rate (less than 1% after 1 year of storage at + 20°C)
- Bobbin type
- Non-flammable inorganic electrolyte
- Hermetic glass-to-metal sealing
- UL recognized (file number MH18384)
- RoHS Compliance

External Dimensions



※ Available Terminals :
TC ST AX Other type available by request

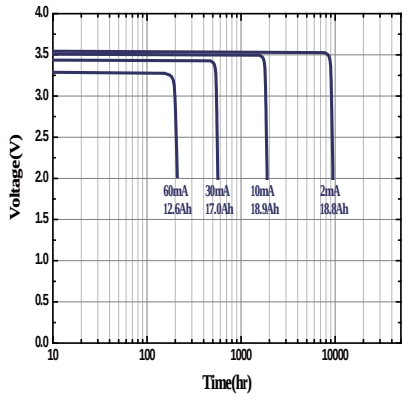
Specifications

Model	SB-D02
Nominal voltage	3.6V
Nominal capacity (at 6㎃, 20℃, 2.0V cut off)	19.0Ah
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	100mA
Max. pulse discharge current	250mA
Weight	100.0g
Operating temperature range	-55 ~ 85°C

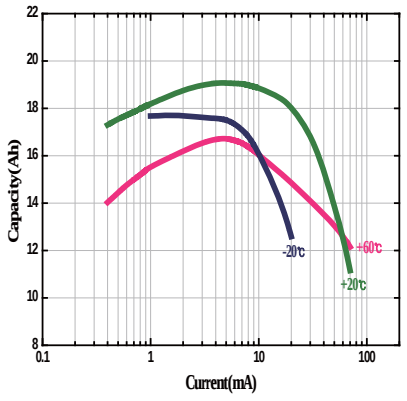
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20 °C from undischarged cells with 10㎂ base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

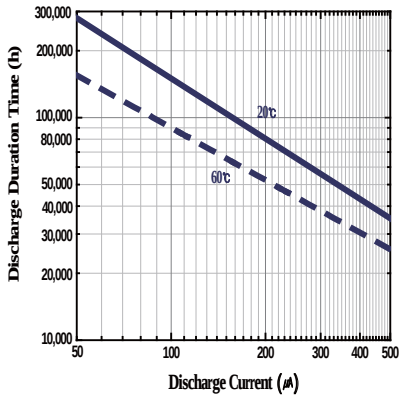
Continuous Discharge at 20℃



Capacity vs. Current



Discharge Current vs. Duration Time



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environments, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

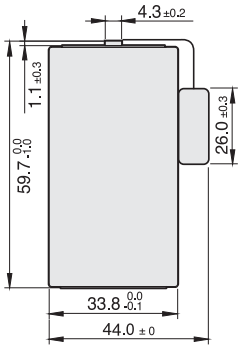
LITHIUM PRIMARY BATTERY

SB-D02(2F)

Key Characteristics

- High and stable operating voltage
- Non-flammable inorganic electrolyte
- High pulse current can be used
- Non-restricted for transport

External Dimensions



※ Available Terminals :
TC ST 2P 3P 3PW
Other type available
by request

Specifications

Hybrid Battery :(SB-D02) + EDLC (2.0F EDLC)

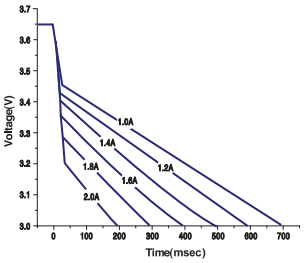
Model	HSB-D02 (2F)
Nominal voltage	3.6V
Nominal capacity (at 6㎃, 20℃, 2.0V cut off)	19Ah
Max. 0.1s Pulse current to 3.0V	5A
Max. Pulse length at 1A	2Sec
Weight	110g
Operating temperature range	-55 ~ 85° C

※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20 ° C from undischarged cells with 10㎂ base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

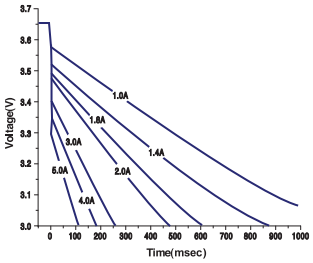
※ Before using the product, consult with VITZROCELL

Characteristic Curve

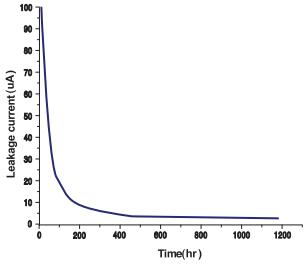
Voltage Graph for -40° Current



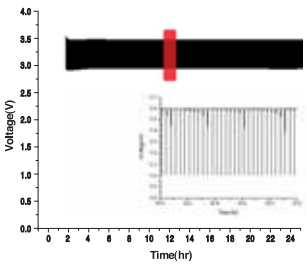
Voltage Graph for 20℃ Current



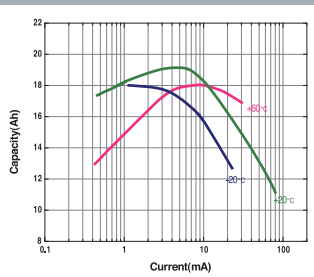
EDLC leakage current



Comparison of pulse performance at 20℃_5A 0.1s



Graph on Capacity per Temperature



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environments, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

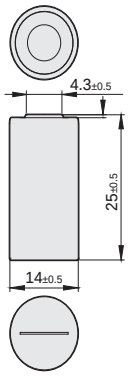
LITHIUM PRIMARY BATTERY

SW-AA01

Key Characteristics

- High and stable operating voltage
- Low self-discharge rate (less than 2% after 1 year of storage at + 20°C)
- Superior pulse capability
- Spiral type (with safety vent)
- Non-flammable inorganic electrolyte
- Hermetic glass-to-metal sealing
- RoHS Compliance
- Non-restricted for transport

External Dimensions



※ Available Terminals :
TC ST 2P 3P 3PW Other type available by request

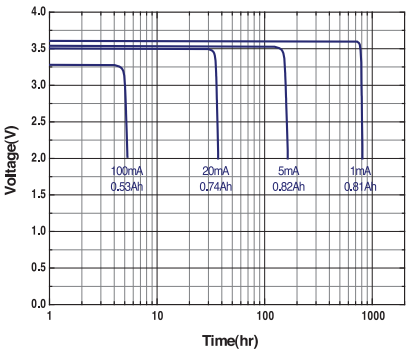
Specifications

Model	SW-AA01
Nominal voltage	3.6V
Nominal capacity (at 1㎃, 20℃, 2.0V cut off)	0.8Ah
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	100mA
Max. pulse discharge current	300mA
Weight	9.0g
Operating temperature range	-55 ~ 85 °C

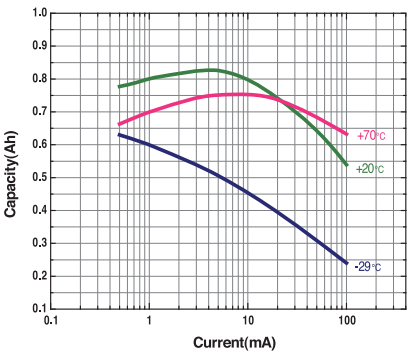
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20 ° C from undischarged cells with 10㎂ base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

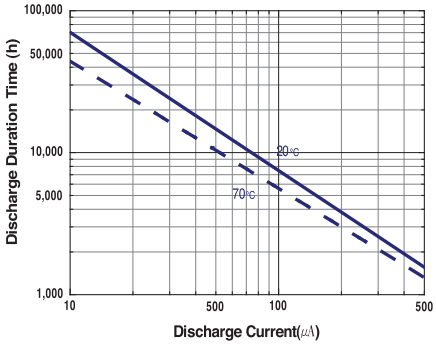
Continuous Discharge at 20℃



Capacity vs. Current



Discharge Current vs. Duration Time



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environments, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

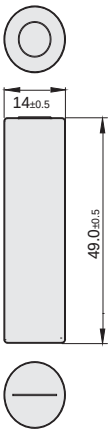
LITHIUM PRIMARY BATTERY

SW-AA11

Key Characteristics

- High and stable operating voltage
- Low self-discharge rate (less than 2% after 1 year of storage at + 20 °C)
- Superior pulse capability
- Spiral type (with safety vent)
- Non-flammable inorganic electrolyte
- Hermetic glass-to-metal sealing
- RoHS Compliance
- Non-restricted for transport

External Dimensions



※ Available Terminals :
FF ST 2P 3P 3PW Other type available by request

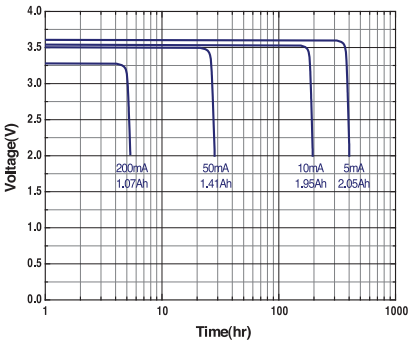
Specifications

Model	SW-AA11
Nominal voltage	3.6V
Nominal capacity (at 3㎃, 20℃, 2.0V cut off)	2.0Ah
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	250mA
Max. pulse discharge current	800mA
Weight	17.0g
Operating temperature range	-55 ~ 85°C

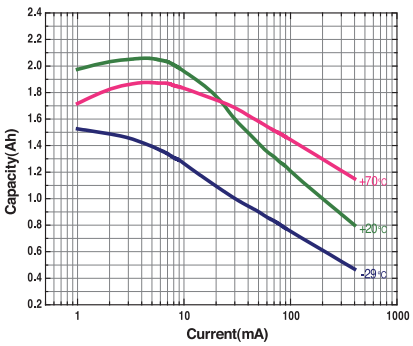
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20 °C from undischarged cells with 10㎂ base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

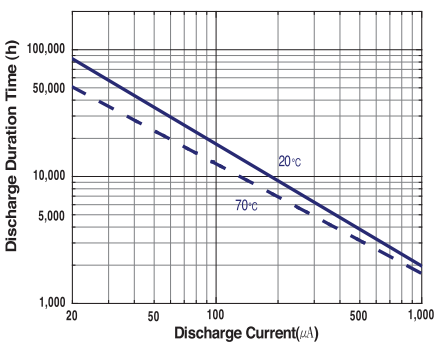
Continuous Discharge at 20℃



Capacity vs. Current



Discharge Current vs. Duration Time



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environments, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

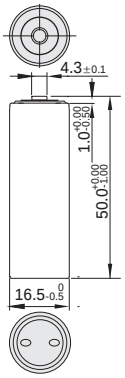
LITHIUM PRIMARY BATTERY

SW-A01

Key Characteristics

- High and stable operating voltage
- Low self-discharge rate (less than 2% after 1 year of storage at + 20 °C)
- Superior pulse capability
- Spiral type (with safety vent)
- Non-flammable inorganic electrolyte
- Hermetic glass-to-metal sealing
- RoHS Compliance

External Dimensions



※ Available Terminals :
FF ST 2P 3P 3PW Other type available by request

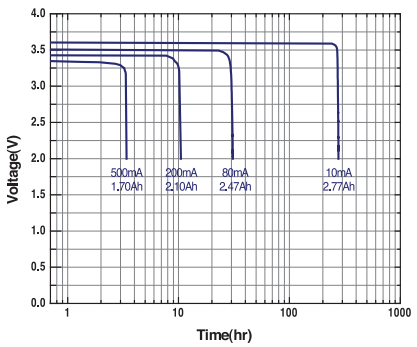
Specifications

Model	SW-A01
Nominal voltage	3.6V
Nominal capacity (at 5㎃, 20℃, 2.0V cut off)	3.0Ah
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	600mA
Max. pulse discharge current	1,500mA
Weight	30.0g
Operating temperature range	-55 ~ 85 °C

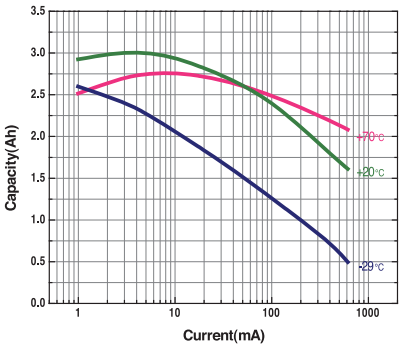
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20 ° C from undischarged cells with 10㎂ base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

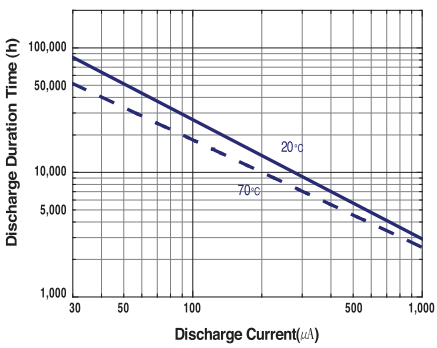
Continuous Discharge at 20℃



Capacity vs. Current



Discharge Current vs. Duration Time



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environments, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

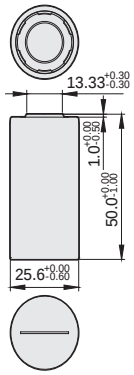
LITHIUM PRIMARY BATTERY

SW-C01

Key Characteristics

- High and stable operating voltage
- Low self-discharge rate (less than 2% after 1 year of storage at + 20°C)
- Superior pulse capability
- Spiral type (with safety vent)
- Finished with 4A fuse
- Non-flammable inorganic electrolyte
- Hermetic glass-to-metal sealing
- UL recognized (file number MH18384)
- RoHS Compliance

External Dimensions



※ Available Terminals :
FF ST Other type available by request

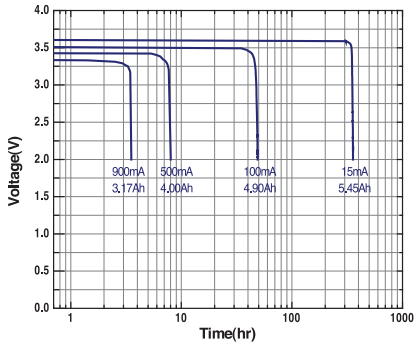
Specifications

Model	SW-C01
Nominal voltage	3.6V
Nominal capacity (at 15㎃, 20℃, 2.0V cut off)	6.0Ah
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	900mA
Max. pulse discharge current	1,800mA
Weight	52.0g
Operating temperature range	-55 ~ 85°C

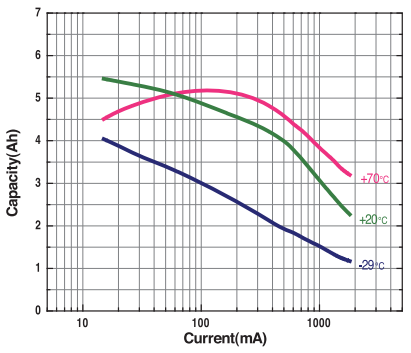
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20 ° C from undischarged cells with 10㎂ base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

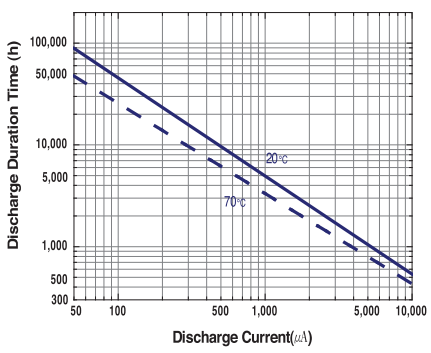
Continuous Discharge at 20℃



Capacity vs. Current



Discharge Current vs. Duration Time



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environments, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

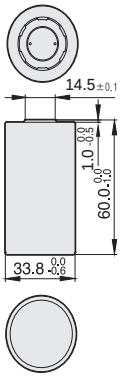
LITHIUM PRIMARY BATTERY

SW-D03

Key Characteristics

- High and stable operating voltage
- Low self-discharge rate (less than 2% after 1 year of storage at + 20°C)
- Superior pulse capability
- Spiral type (with safety vent)
- Finished with 4A fuse
- Non-flammable inorganic electrolyte
- Hermetic glass-to-metal sealing
- UL recognized (file number MH18384)
- RoHS Compliance

External Dimensions



※ Available Terminals :
FF ST Other type available by request

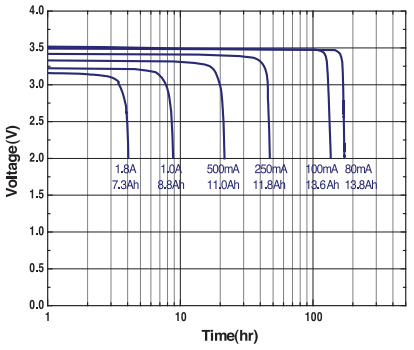
Specifications

Model	SW-D02
Nominal voltage	3.6V
Nominal capacity (at 20㎃, 20℃, 2.0V cut off)	14.0Ah
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	1,800mA
Max. pulse discharge current	3,000mA
Weight	102.0g
Operating temperature range	-55 ~ 85°C

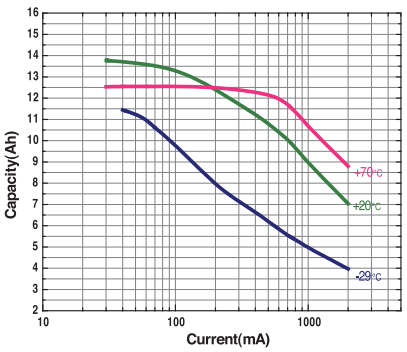
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20 ° C from undischarged cells with 10㎂ base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

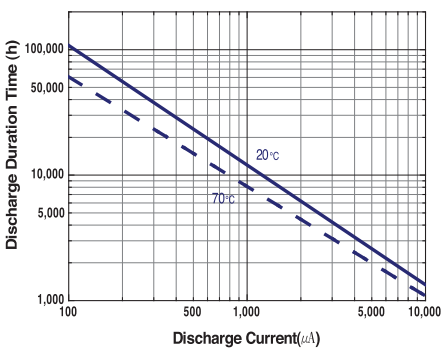
Continuous Discharge at 20℃



Capacity vs. Current



Discharge Current vs. Duration Time



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environments, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

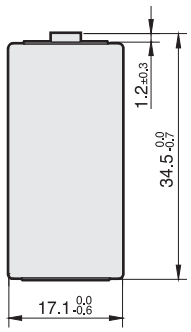
LITHIUM PRIMARY BATTERY

CR123A

Key Characteristics

- High and stable operating voltage
- Low self-discharge rate (less than 2% after 1 year of storage at + 20 °C)
- UL recognized (file number MH18384)
- RoHS Compliance
- Non-restricted for transport

External Dimensions



※ Available Terminals :
TC FF ST 2P 3P 3PW Other type available by request

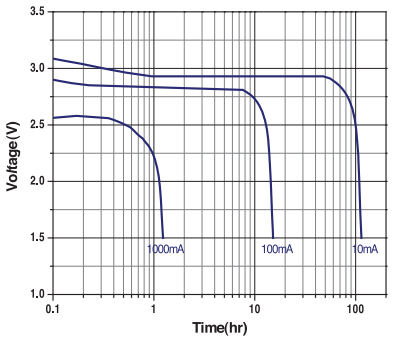
Specifications

Model	CR123A
Nominal voltage	3.0V
Nominal capacity (at 14㎃, 20℃, 2.0V cut off)	1,500mAh
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	1,000mA
Max. pulse discharge current	3,500mA
Weight	16.0g
Operating temperature range	-30 ~ 60 °C

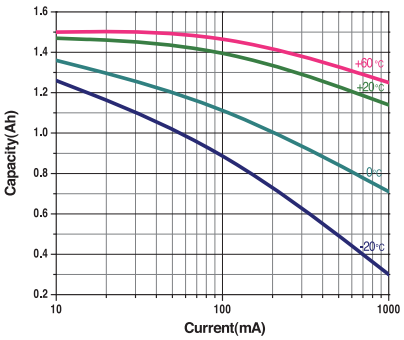
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20 °C from undischarged cells with 10㎂ base current, yield voltage readings above 2.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

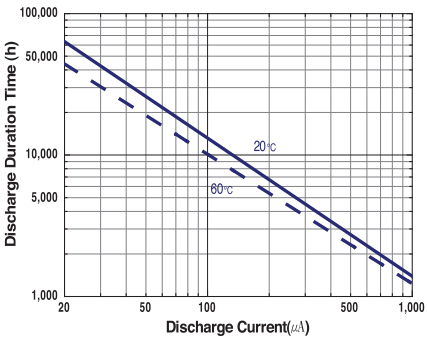
Continuous Discharge at 20℃



Capacity vs. Current



Discharge Current vs. Duration Time



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environments, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

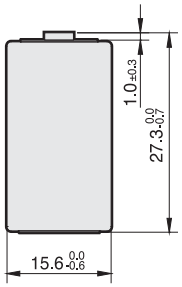
LITHIUM PRIMARY BATTERY

CR2

Key Characteristics

- High and stable operating voltage
- Low self-discharge rate (less than 2% after 1 year of storage at + 20 °C)
- UL recognized (file number MH18384)
- RoHS Compliance
- Non-restricted for transport

External Dimensions



※ Available Terminals :
TC FF ST 2P 3P 3PW Other type available by request

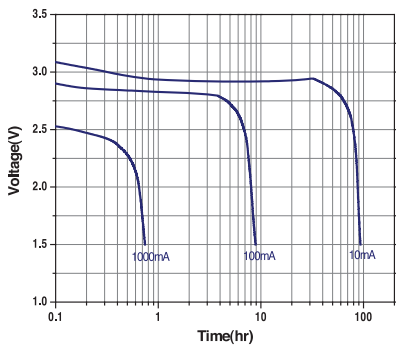
Specifications

Model	CR2
Nominal voltage	3.0V
Nominal capacity (at 10㎃, 20℃, 2.0V cut off)	850mAh
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	800mA
Max. pulse discharge current	2,500mA
Weight	11.5g
Operating temperature range	-30 ~ 60 °C

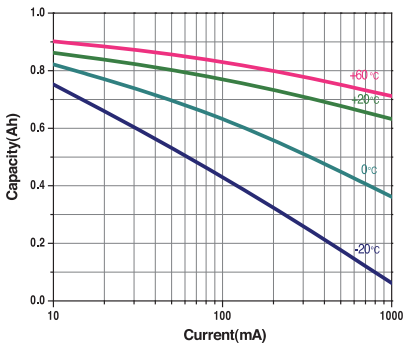
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20 ° C from undischarged cells with 10㎂ base current, yield voltage readings above2.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

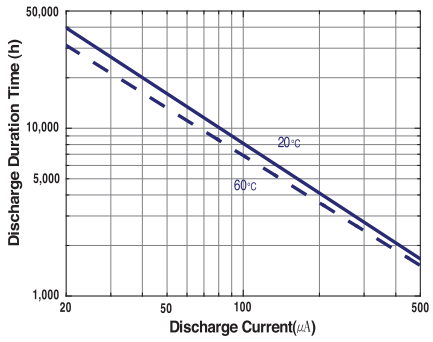
Continuous Discharge at 20℃



Capacity vs. Current



Discharge Current vs. Duration Time



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environments, we recommend you to consult Vitzrocell.

Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

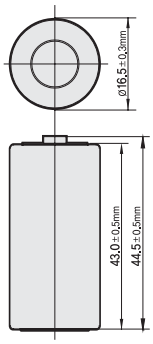
LITHIUM PRIMARY BATTERY

CR17450

Key Characteristics

- High and stable operating voltage
- Low self-discharge rate (less than 2% after 1 year of storage at +20℃)
- UL recognized (file number MH18384)
- RoHS Compliance
- Non-restricted for transport

External Dimensions



※ **Available Terminals:**
TC FF ST 2P 3P 3PW Other type available by request

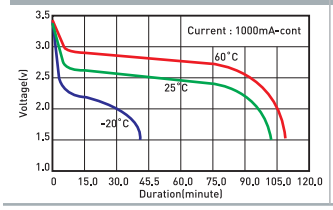
Specifications

Model	CR17450
Nominal voltage	3.0V
Nominal capacity (at 10㎃, 20℃, 2.0V cut off)	2400mAh
Maximum recommended continuous current (Higher currents are possible, consult Vitzrocell)	1000mA
Max. pulse discharge current	3000mA
Weight	23.0g
Operating temperature range	-30 ~ +60°C

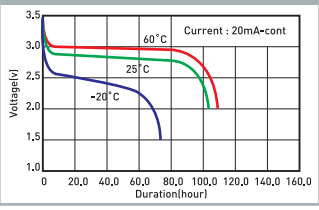
※ Max. pulse current/0.1 second pulses, drained every 2 min at + 20 ° C from undischarged cells with 10㎂ base current, yield voltage readings above2.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history.
Fitting the cell with a capacitor may be recommended in severe conditions. Consult Vitzrocell.

Characteristic Curve

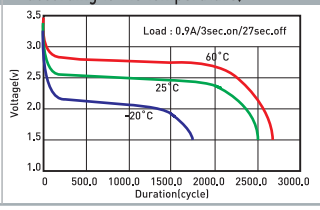
Characteristic Curve(Discharge 1000mA)



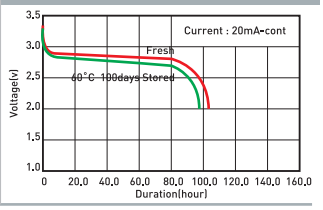
Characteristic Curve(Discharge 20mA)



Characteristic Curve(Pulse discharge according to the temperature)



Characteristic Curve



※ This data was made on basis of nominal capacity for the purpose of enabling users to forecast approximate life time.
In order to calculate precise life time under various environments, we recommend you to consult Vitzrocell.

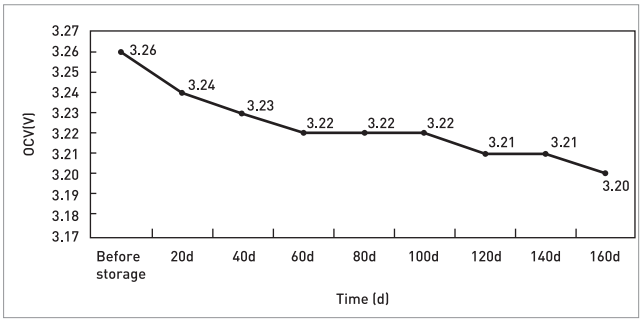
Warning

Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

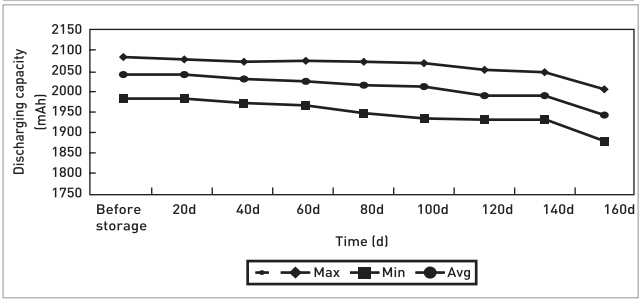
※ Any information given here is for reference only. Information is also dependent on actual conditions of use and does not guarantee future performance, and subject to change.

Graph of testing result for CR17450 stored under high-temp. 60C(Electrical capabllity)

Item \ Time		Before storage	20d	40d	60d	80d	100d	120d	140d	160d
OCV(V)	Avg	3.26	3.24	3.23	3.22	3.22	3.22	3.21	3.21	3.20



Item \ Time		Before storage	20d	40d	60d	80d	100d	120d	140d	160d
20mA-Cont(mAh) to 2.0V	Max	2065	2081	2074	2074	2068	2067	2051	2045	2005
	Min	1983	1982	1975	1970	1945	1930	1932	1928	1875
	Avg	2041	2041	2027	2021	2012	2009	1987	1907	1940



LITHIUM PRIMARY BATTERY

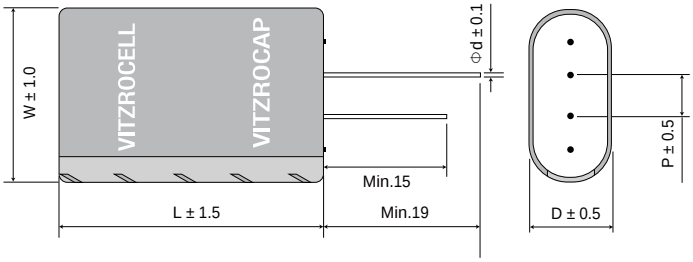
EDLC Line Up

Features

- Two Lead Terminals and Cylindrical Cell
- Very Low ESR(High-power density)
- High-Capacitance
- RoHS Compliant

D	P	d
8.5	5	0.6
10.5	5	0.6
12.5	7	0.6

Drawing



Product List

Item		Performance	
Rated Voltage(V_R)		5.0 volts	5.4 volts
Nominal Capacitance Range		1.5 to 7.5 F	1.5 to 7.5F
Capacitance Tolerance		-20% to +30% (at 25℃)	-20% to +30% (at 25℃)
Operating Temperature Range		-25℃ to 70℃	-40℃ to 65℃
Operating at 85℃		Max 4.2 volts	Max 4.6 volts
Endurance		After 1,000 hours at rated voltage loaded under +65℃, +70℃ the capacitor shall meet the specified endurance limits :	
		Capacitance change ≤ 30% of initial value	
		Internal resistance ≤ 2 times of specified value	
Temperature Characteristics	Measure at	At -25, +25, 70℃	At -40, +25, 65℃
	△ C	≤±30% of initial value	
	Internal Resistance	≤±2 times of specified value	
Cycle Life Characteristics	500,000 Cycles	Capacitance change ≤ 30% of initial value	
		Internal resistance ≤ 2 times of specified value	
Shelf Life		After 1,000 hours storage at +65℃(2.7 volts), +70℃(2.5 volts) without load, the capacitor shall meet the specified endurance limits :	

LITHIUM PRIMARY BATTERY

Military Pack

	BA-6853AK		BA-300K		BA-6813AK	
Item	Specification	Remark	Specification	Remark	Specification	Remark
Nominal Voltage(V)	14.4	Open Circuit Voltage(OCV)	28.4	Open Circuit Voltage(OCV)	10.8	Open Circuit Voltage(OCV)
Nominal Capacity(Ah)	13.0	at 20mA, 20℃, 8V cut off	26.0	at 40mA, 20℃, 16V cut off	13.0	at 20mA, 20℃, 6V cut off
Pack Construction	4 Series	Unit Cell: SW-D02	8 Series×2 Parallel	Unit Cell: SW-D02	3 Series	Unit Cell: SW-D02
Life Time as Temperature(Hr)	16 (60℃)	at 6.5Ω 1min, 50Ω 9min pulse discharge, 10V cut-off	26 (54℃)	at 32Ω continuous discharge, 19.2V cut-off	11 (60℃)	at 131Ω continuous discharge, 7.5V cut-off
	20 (21℃)		26 (21℃)		15 (21℃)	
	8 (-32℃)		6 (-29℃)		5 (-32℃)	
Dimension(mm)	102×72×65.7	W×D×H	189×146×71.5	W×D×H	210×40×40	W×D×H
Weight(g)	500		3,000		450	
NSN	6135-37-511-2825	National Stock Number	6135-37-502-0931	National Stock Number	6135-37-511-2828	National Stock Number
Main Application	PRC-999K	FM Radio Set	SB-30K	Changer for filed operation	ADU-95	Automatic Decode Unit
Shelf Life(years)	5		5		5	

	BA-6818AK		BA-6802K		BA-6821AK	
Item	Specification	Remark	Specification	Remark	Specification	Remark
Nominal Voltage(V)	14.4	Open Circuit Voltage(OCV)	7.2	Open Circuit Voltage(OCV)	32.4	Open Circuit Voltage(OCV)
Nominal Capacity(Ah)	13.0	at 20mA, 20℃, 8V cut off	13.0	at 20mA, 20℃, 4V cut off	13.0	at 20mA, 20℃, 18V cut off
Pack Construction	4 Series	Unit Cell: SW-D02	2 Series	Unit Cell: SW-D02	9 Series	Unit Cell: SW-D02
Life Time as Temperature(Hr)	15 (60℃)	at 6.5Ω 1min, 50Ω 9min pulse discharge, 10V cut-off	23 (54℃)	at 15Ω continuous discharge, 4V cut-off	21 (60℃)	at 11Ω 1min, 110Ω 9min pulse discharge, 21V cut-off
	18 (21℃)		22 (21℃)		23 (21℃)	
	9 (-20℃)		4 (-25℃)		14 (-20℃)	
Dimension(mm)	210×40×40	W×D×H	36×135	ØXL	207×76×77	W×D×H
Weight(g)	550		240		1,200	
NSN	6135-37-511-2827	National Stock Number	6135-37-509-7092	National Stock	6135-37-511-2826	National Stock Number
Main Application	ARF-95	Security Device	K-CAM	NumberChemical Detector	PRC-950K	AM Radio Set
Shelf Life(years)	5		5		5	

LITHIUM PRIMARY BATTERY

Military Pack

	BA-6863K		BA-6812K		BA-6086K	
Item	Specification	Remark	Specification	Remark	Specification	Remark
Nominal Voltage(V)	14.4	Open Circuit Voltage(OCV)	7.2	Open Circuit Voltage(OCV)	10.8	Open Circuit Voltage(OCV)
Nominal Capacity(Ah)	26.0	at 40mA, 20℃, 8V cut off	13.0	at 20mA, 20℃, 4V cut off	4.0	at 6mA, 20℃, 6V cut off
Pack Construction	4 Series×2 Parallel	Unit Cell: SW-D02	2 Series	Unit Cell: SW-D02	3 Series×2 Parallel	Unit Cell: SW-AA11
Life Time as Temperature(Hr)	9 (54℃)	at 6.5Ω 1min, 3.2Ω 9min pulse discharge, 7V cut-off	16 (54℃)	at 10Ω continuous discharge, 5.5V cut-off	12 (54℃)	at 11Ω 1min, 50Ω 1min, 265Ω 8min, pulse discharge, 6V cut-off
	9 (21℃)		12 (21℃)		12 (21℃)	
	5 (-20℃)		3 (-20℃)		6 (-29℃)	
Dimension(mm)	170×72.2×65.7	W×D×H	38×135	ØXL	130×16×58	W×D×H
Weight(g)	1,000		250		160	
NSN	6135-37-509-8121	National Stock	6135-37-507-8697	National Stock	6135-37-506-5009	National Stock Number
Main Application	VRC-680AK	Number Portable Terminal Set	PAS-01K	Number Heat Reflection Sight	PRC-96K	Communication Device
Shelf Life(years)	5		5		5	

	BA-6218K		BA-6012K		BA-6085K	
Item	Specification	Remark	Specification	Remark	Specification	Remark
Nominal Voltage(V)	18.0	Open Circuit Voltage(OCV)	7.2	Open Circuit Voltage(OCV)	14.4	Open Circuit Voltage(OCV)
Nominal Capacity(Ah)	4.0	at 6mA, 20℃, 10.0V cut off	4.0	at 6mA, 20℃, 4V cut off	2.0	at 3mA, 20℃, 8V cut off
Pack Construction	5 Series×2 Parallel	Unit Cell: SW-AA11	2 Series×2 Parallel	Unit Cell: SW-AA11	4 Series	Unit Cell: SW-AA11
Life Time as Temperature(Hr)	55 (54℃)	at 35mA(430Ω) continuous discharge, 10V cut-off	60 (54℃)	at 140Ω continuous discharge, 4.5V cut-off	30 (54℃)	at 64.7Ω 5sec, 200Ω 5sec, 336.7Ω 40sec, pulse discharge, 10V cut-off
	55 (21℃)		60 (21℃)		29 (21℃)	
	48 (-35℃)		45 (-29℃)		7 (-29℃)	
Dimension(mm)	78×54×45	W×D×H	59×55.3×17	W×D×H	55×32×35	54.5×31.5×35.6
Weight(g)	220		100		100	
NSN	6135-37-505-3618	National Stock Number	6135-37-508-7363	National Stock Number	6135-37-502-8021	National Stock Number
Main Application	PRG-1831K	Remote Explosion Device	PDR-1K	Radiation Device	PRC-85K	Communication Device
Shelf Life(years)	5		5		5	

LITHIUM PRIMARY BATTERY

Military Pack

	BA-6501K		BA-6822AK		BA-6823AK	
Item	Specification	Remark	Specification	Remark	Specification	Remark
Nominal Voltage(V)	3.6	Open Circuit Voltage(OCV)	10.8	Open Circuit Voltage(OCV)	7.2	Open Circuit Voltage(OCV)
Nominal Capacity(Ah)	13	at 20mA, 20℃, 2V cut off	13	at 20mA, 20℃, 6V cut off	13	at 20mA, 20℃, 4V cut off
Pack Construction	1Series	Unit cell: SW-D03	3Series	Unit cell: SW-D03	2Series	Unit cell: SW-D03
Life Time as Temperature(Hr)	10(21℃)	at 22Ω 30min, 2Ω 15min pulse discharge, 2.0V cut-off	100(21℃)	at 102Ω continuous discharge, 7.5V cut-off	100(21℃)	at 68Ω continuous discharge, 7.5V cut-off
	12(54℃)		100(54℃)		100(52℃)	
	6(-30℃)		80(-32℃)		80(-32℃)	
Dimension(mm)	26.8 x 79	ØxH	120.5 x 68 x 41	WxDxH	71 x 37.5 x 70	WxDxH
Weight(g)	130		400		250	
NSN	6135-37-515-4077	National Stock	6135-37-525-4782	National Stock	6135-37-525-4860	National Stock
Main Application	K11	Fire control system	K421	Remote control Firing device	K421	Remote control Firing device
Shelf Life(years)	3		5		5	

	BA-6301K	
Item	Specification	Remark
Nominal Voltage(V)	28.8	Open Circuit Voltage(OCV)
Nominal Capacity(Ah)	12	at 30mA, 20℃, 16V cut off
Pack Construction	8Series x 2Parallel	Unit cell: SW-C01
Life Time as Temperature(Hr)	11.8(21℃)	at 35.7Ω continuous discharge, 16V cut-off
	14.2(43℃)	
	5.8(-32℃)	at 27.7Ω continuous discharge, 7.5V cut-off
Dimension(mm)	190 x 81 x 59	WxDxH
Weight(g)	1100	
NSN	미 정	National Stock
Main Application	ATL-1K	Firing device
Shelf Life(years)	3	

LITHIUM PRIMARY BATTERY

Battery Application Worksheet

Company Information

Company

Name	E-Mail
Department	Tel.
Address	Fax.

Physical Requirements

Battery type & Pack construction Li/$SOCl_2$, Li/MnO_2 (series, parallel)

at 20mA, 20℃, 6V cut off

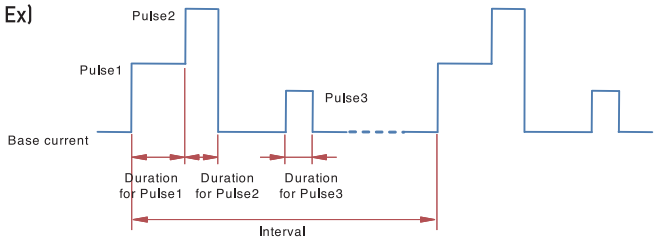
Application | Terminal or connector | Cable

Electrical Requirements

Capacity	Expected life time
Cut-off voltage (Minimum operating voltage)	Maximum operating voltage

Current profile

Ex)



	Current(mA)	Duration(sec)	Interval(sec)
Base current		X	X
Pulse1			
Pulse2			
Pulse3			

Environmental Requirements

Storage Temperature (min, mean, max) | Operating Temperature (min, mean, max)

Additional Information

LITHIUM PRIMARY BATTERY

Available Terminals

Available Terminals

TC Type	
ST Type	
2P Type	
3PW Type	
3P Type	
AX Type