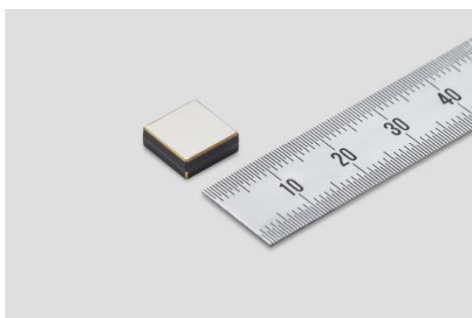


July 25, 2022

Maxell, Ltd.

Maxell Commercializes High-capacity Ceramic Packaged All-Solid-State Battery

Achieves approximately twice the energy density^{*1} and operating temperature up to 105°C for 10 years of use^{*2}



High-capacity ceramic packaged all-solid-state batteries PSB401010H

Maxell, Ltd. (President and Representative Director: Keiji Nakamura / hereinafter “Maxell”) has succeeded in increasing the energy density of a ceramic packaged all-solid-state battery using a sulfide based solid electrolyte, resulting in a newly developed and commercialized ceramic packaged all-solid-state battery that has approximately twice the energy density of its predecessor^{*1}.

This high-capacity ceramic packaged all-solid-state battery achieved twice the energy density by adopting new technologies regarding structures and processes, while maintaining various properties such as the capacity, output characteristics and heat resistance of the ceramic packaged all-solid-state battery announced in March 2021.

Responding to the requests from FA and infrastructure device manufacturers, Maxell will begin sample shipment of high-capacity ceramic packaged all-solid-state battery achieving half the volume from August 2022.

With this high-capacity ceramic packaged all-solid-state battery, reliability in a 250°C environment^{*3} can be maintained - something that was difficult with conventional lithium-ion batteries - and surface mounting is enabled by reflow soldering. Because of their ability to support smaller size and larger capacity^{*1}, sales of these products will also be expanded to the markets such as those of medical devices (where sterilization is essential), FA equipment and in-vehicle equipment, as well as those markets where surface mounting is required.

Maxell is planning to install manufacturing equipment for mass production of the high-capacity ceramic packaged all-solid-state batteries at the Kyoto factory in the spring 2023.

Main features of high-capacity ceramic packaged all-solid-state battery

1. Achieve small size and high capacity with approximately twice the energy density^{*1} (PSB401010H)
2. Achieve operating temperature up to 105°C for 10 years of use^{*2}
3. Surface mountable on board by reflow soldering (maximum temperature of around 250°C)

Maxell has been developing and manufacturing lithium-ion batteries and micro batteries for many years. It is developing an all-solid-state battery with high performance and high reliability*⁴ by fusing cultivated analog core technologies*⁵ and other technology from collaboration with other companies, and by adding the newly developed process technology. The company is planning a transition to quick start up of mass production of high-capacity ceramic packaged all-solid-state batteries by utilizing factories, equipment, production engineering technology and know-how for micro and lithium-ion batteries in Japan.

Maxell considers that a rechargeable battery with high heat resistance and long-life performance including high reliability and safety is required for solving future social issues, and that sulfide-based solid electrolyte and ceramic packages are the important technologies that can greatly improve heat resistance and reliability. Maxell is currently continuing to develop even greater capacity and higher energy density of batteries, in addition to a high-capacity ceramic packaged all-solid-state battery. Maxell believes that such development can contribute to the realization of a maintenance-free society in various fields.

Maxell will continue to improve technology that supports long life and a wide temperature range, and will contribute to solving social issues through continuous productization of high-performance batteries.

*1 Approximately twice, smaller size and larger capacity: Comparison with ceramic packaged all-solid-state battery PSB401515L

Announced and released on March 30, 2021 “1st in the World*¹ to Develop a Mountable Sulfide Based All-solid-state Battery” https://ssl4.eir-parts.net/doc/6810/ir_material4/156724/00.pdf

*2 operating temperature up to 105°C for 10 years of use: Estimated from the results of Maxell’s life prediction by various evaluation and analysis

*3 reliability in a 250°C environment: The reflow at the maximum temperature of 250°C does not show any deterioration in the basic characteristics such as capacity and load characteristics.

*4 high performance and high reliability: Developing from four perspectives: long life, high heat resistance, high output, and large capacity

*5 Analog Core Technologies: Unique technologies that Maxell has been developing and handing down in the areas of processing, molding, and forming of materials, which make up the DNA of the company. The collective term for the three technologies that are indispensable for Maxell’s manufacturing, namely Mixing & Dispersion, Fine Coating, and High Precision Molding & Forming. <https://www2.maxell.co.jp/corporate/analogcore.html>

“All-solid-state battery” webpage

https://biz.maxell.com/en/rechargeable_batteries/allsolidstate.html

Contacts:

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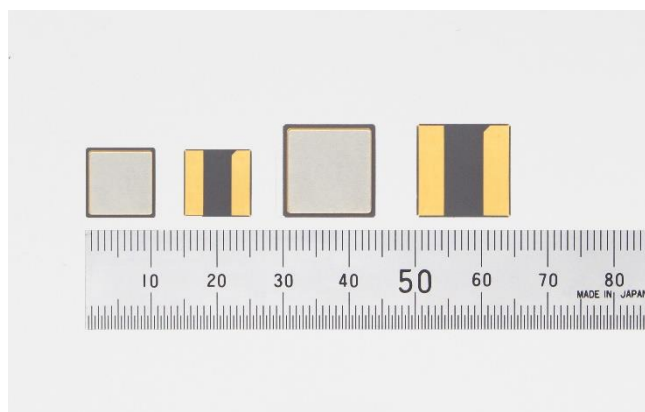
E-mail: marketing_sales@maxell.co.jp

Inquiries:

https://biz.maxell.com/en/rechargeable_batteries/inquiry_form_input1.html

Appendix

Appearance and specifications of high-capacity ceramic packaged all-solid-state battery



High-capacity ceramic packaged all-solid-state battery PSB401010H (left) and PSB401515L (right)

Specifications of high-capacity ceramic packaged all-solid-state battery

Model		PSB401010H
Size	Length (mm)	10.5
	Width (mm)	10.5
	Height (mm)	4.0
Weight (g)		1.2
Charge (CCCV)	Voltage (V)	2.6
	Current (mA)	4.0
	Temperature (°C)	-20~105 °C
Discharge (CC)	End voltage (V)	0.0
	Maximum current*1 (mA)	30.0
	Temperature (°C)	-50~125 °C
Maximum operating temperature for 10 years of continuous use*2 (°C)		105 °C
Nominal Voltage (V)		2.3
Nominal Capacity (mAh)		8.0

*1 Maximum current that can be maintained at 1.8V or more after discharge for 1 sec.

*2 Maximum operating temperature for 10 years of continuous use estimated from the results of Maxell's life prediction by various evaluation and analysis

* Specifications are subject to change without notice.