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SINCE 1919 99 YEARS

October 31, 2018
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NGK Develops New Power Source for IoT Device, Chip-type Ceramic Secondary Battery "EnerCera" Series

- Compatible with High-temperature Installation on Circuit Board or in Card -

NGK INSULATORS, LTD. (President Taku Oshima; Headquarters: Nagoya, Japan; "NGK") announced that it has developed the small, thin and high-energy-density ceramic secondary battery "EnerCera®" series successfully. Mass production will start in April 2019 to be adopted as a power source of "IoT; everything connects to the internet" devices, smart cards and so on.

EnerCera is a Li-ion secondary battery with NGK's original Crystal Oriented Ceramic Plate as electrodes. The Crystal Oriented Ceramic Plate is composed of just an active material and it contains no organic binder or conductive material which exists in a Li-ion battery normally but does not contribute to battery capacity. Therefore, EnerCera realizes high energy density and low internal resistance with a small and thin body and is capable of high-temperature installation. The energy density is double and the internal resistance is less than a half (*1) compared to commercial secondary batteries of the same size. Therefore, EnerCera is an ultra-small/ultra-thin onboard-type high-performance battery for operating ICs, sensors and a wireless communication system which needs large current such as several 10 mA to several 100 mA. In addition, CV (Constant Voltage)-charging capability eliminates the need for a charger IC to control the charge current.

EnerCera has two types: "EnerCera Coin," a coin type cell, 1 mm to 2 mm thick, for mounting on a circuit board, and "EnerCera Pouch," an ultra-thin and bendable cell, 0.4 mm to 0.45 mm thick, for embedding in a card. EnerCera Coin is the world's first (*1) SMD (surface mount devices)-type Li-ion battery which can be mounted by Solder Reflow, commonly used as an electronic component-mounting process, and it has a high discharge current property sufficient to operate devices. EnerCera Pouch is the world's first (*1) thin-type Li-ion battery which can be embedded by hot lamination (above 100 degree Celsius) used widely in the IC card production. The EnerCera Pouch lineup has a fast charging type, a high-capacity type and a high-power type for customers' various device designs.

The EnerCera series is expected to be adopted for applications which require high capacity in a small and thin body, such as IoT devices, beacons (short-range wireless communication devices), RFID tags, electronic shelf labels (ESLs), wearable devices, solar watches and backup power of solid state drives (SSDs). NGK has provided EnerCera samples to tens of companies worldwide. The production lines are ready, with 2 million units per month, at NGK's Nagoya factory and NGK Ceramic Devices Co., Ltd.'s Yamanashi factory. NGK plans to start mass production in the spring of 2019.

NGK will exhibit EnerCera at "IDTechEX Show!" to be held in Santa Clara, USA, from Wednesday, November 14, to Thursday, November 15, 2018.

(*1) As of October 31, 2018, based on NGK's research

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EnerCera® series

EneCera® Coin lineup

Model Number	ET1210C-R	ET2010C-R	ET920C (under development)	ET1616C (under development)
Dimensions: Diameter	12 mm	20 mm	9 mm	16 mm
Height	1 mm	1 mm	2 mm	1.6 mm
Nominal Capacity	5 mAh	15 mAh	8 mAh	24 mAh
Nominal Voltage	2.3 V			
Constant Voltage (CV) Charging	OK (No current control required)			
Internal Resistance	20 Ω	8 Ω	30 Ω	8 Ω
Peak Discharge Current*2	25 mA	60 mA	15 mA	60 mA
Operating Temp. (recommended)	-20℃ ～ 60℃			
Heatproof Temp. (in process)	260℃ (reflowrable)		80℃	

*2 Maximum current within 0.5V drop for 1 sec.

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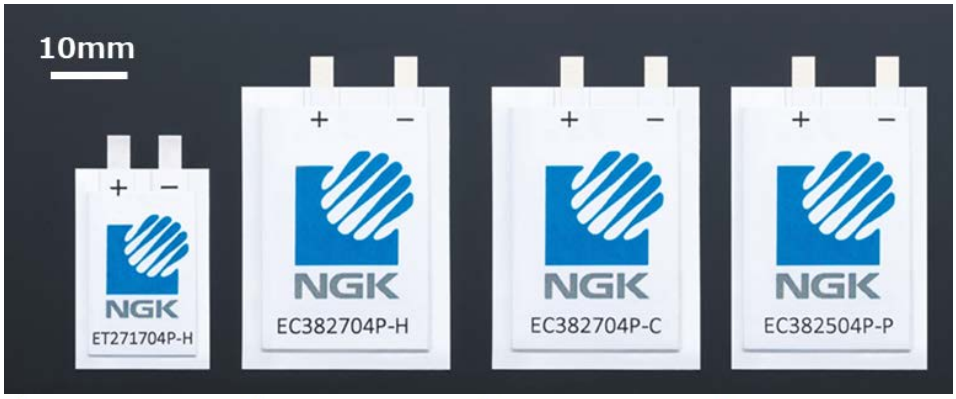
EnerCera® Pouch Lineup



Model Number	ET271704P-H	EC382704P-H	EC382704P-C	EC382504P-P
Dimensions	27 mm×17 mm	38 mm×27 mm	38 mm×27 mm	38 mm ×25 mm
Thickness	0.40 mm	0.45 mm	0.45 mm	0.45 mm
Nominal Capacity	5 mAh	20 mAh	27 mAh	20 mAh
Nominal Voltage	2.3 V	3.8 V		
CV Charging	OK (No current control required)	N/A (CC – CV charging is required)		
Internal Resistance	3.5 Ω	2.5 Ω	2 Ω	1 Ω
Peak Discharge Current*2	150 mA	200 mA	250 mA	500 mA
Bendability	Conforming to ISO 14443-1 standard No deterioration after bending and torsion tests			
Operating Temp. (recommended)	-20℃ ～ 60℃	0℃ ～ 45℃		
Heatproof Temp. (in process)	135℃ (hot lamination is available)		80℃ (only cold lamination is available)	
Features	Fast charging*3 (High heat resistance)	High heat resistance	High capacity	High power

*2 Maximum current within 0.5V drop for 1 sec.

*3 80% capacity is charged for 10 min.

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The contents are at the time of this press release. Since it is a product under development, contents may be changed without notice.

About NGK

NGK is the world's largest manufacturer of electrical insulators, including 1,000-kV ultrahigh-voltage (UHV) transmission and substation insulators, and has a 100-year history. With foundations in exclusive ceramics technology, NGK contributes to environmental conservation, providing a wide range of products and technology in the "Triple E" growth fields of energy, ecology and electronics. NGK is also one of the largest manufacturers of HONEYCERAM and diesel particulate filters (DPF) for catalyst converters for automobiles. NGK is also the world's leading manufacturer succeeding in commercialization of large-capacity energy storage systems (NAS batteries), which has overturned the conventional wisdom that power cannot be stored.

To learn more about NGK, visit: https://www.ngk-insulators.com/en/index.html