

December 3, 2019
NGK INSULATORS, LTD.

***NGK to Commence Mass Production of Coin-type Cell in the
Chip-type Ceramic Secondary Battery “EnerCera” Series of
New Power Sources for IoT Devices***

*Adding the world’s first high heat resistance-type cell
for lithium-ion secondary batteries to the lineup*

NGK INSULATORS, LTD. (hereinafter “NGK”) based in Nagoya, Japan, announced that it will commence mass production of “EnerCera Coin,” a coin type cell in the “EnerCera” series of power sources for IoT devices, in December. NGK further announced that it has successfully developed a new high heat resistance type cell that can operate at 85 degrees Celsius, and that it will start shipping samples of this cell. This cell is the world’s first* lithium (Li)-ion secondary battery capable of operating at 85 degrees Celsius.

NGK has so far provided shipments of EnerCera Coin samples to numerous device manufacturers. EnerCera Coin has a small and thin body, yet still has a large capacity and supports high-temperature mounting on circuit boards with reflow soldering. For these reasons, NGK has obtained a reasonable expectation that several device manufacturers will adopt EnerCera Coin. Accordingly, NGK has decided to successively commence mass production of the high capacity type cell from December.

In parallel, NGK has also successfully developed a high heat resistance type cell that features a wider range of operating temperatures, and will begin shipping samples of this type in December. The operating temperature range for the high capacity type is from minus 40 degrees to positive 60 degrees Celsius. There were strong requests from many customers for NGK to provide an expanded operating temperature range from minus 40 degrees to positive 85 degrees Celsius—a range that corresponds to the standard operating temperature range for electronic components, ICs and other devices for automotive and industrial applications. To do so, NGK focused on the high thermal stability of its unique battery structure (semi-solid state battery). With this structure, small amounts of liquid electrolyte are infused into multi-layered ceramic battery materials. Based on the high thermal stability afforded by this structure, NGK adopted a design that enables the cell to be operated at even higher temperatures. As a result, NGK has realized the world’s first-ever Li-ion secondary battery with an operating temperature of 85 degrees Celsius.

The high heat resistance type cell has the performance capability to maintain at least 95% of its capacity even after 1,000 charging and discharging cycles at 85 degrees Celsius. As such, it is optimal for use in automotive equipment, factory automation applications, and outdoor IoT devices.

EnerCera Coin will be available in three cell types. There will be a high capacity type cell and a high heat resistance type cell for circuit boards, mountable with reflow soldering, as well as a high power type that is currently under development for use in wearable devices such as smartwatches. Going forward, NGK will seek to increase adoption of the three cell types in IoT devices.

The EnerCera series is a Li-ion secondary battery with a high-energy density and small and thin body that uses NGK’s original Crystal Oriented Ceramic Plate as electrodes. With its high heat resistance, the EnerCera series stands out for its compatibility with high-temperature mounting on devices. The EnerCera series has two types: “EnerCera Pouch,” a thin type that can be embedded by hot lamination in IC cards, and EnerCera Coin, a coin type. NGK has already commenced mass production of EnerCera Pouch from April 2019, with products shipped to customers such as smart card manufacturers.

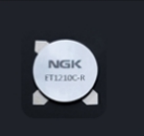
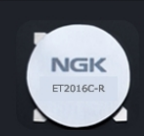
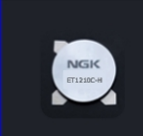

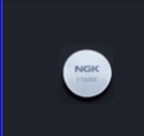
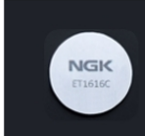
The EnerCera series has been highly acclaimed as an innovative battery energy storage system that solves the power source problem that has hindered the full-scale, widespread adoption of IoT modules—in a way that would not be possible with conventional Li-ion secondary batteries. The EnerCera series has so far received accolades such as the CES Innovation Awards at CES 2019, the world’s largest trade show in consumer electronics, and the Grand Prize award in the Device and Technology category of CEATAC AWARD 2019.

* Source: NGK research as of December 3, 2019.



EnerCera series
EnerCera Pouch (left) and
EnerCera Coin (right)

EnerCera Coin lineup

	High Capacity Type		High Heat Resistance Type		High Power Type (under development)	
Appearance						
Model Number	ET1210C-R	ET2016C-R	ET1210C-H	ET2016C-H	ET920C	ET1616C
Dimensions (mm)	Φ12*1.0t	Φ20*1.6t	Φ12*1.0t	Φ20*1.6t	Φ9×2.0t	Φ16×1.6t
Nominal Capacity (mAh) 2.7V charge	5	25	4	20	5	14
Nominal Voltage (V)	2.3	2.3	2.3	2.3	2.3	2.3
Energy Density (mWh / cc)	100	115	80	90	90	100
Constant Voltage (CV) Charging (Charging Time: 0→80%)	OK (35 min.)	OK (100 min.)	OK (75 min.)	OK (210 min.)	OK (130 min.)	OK (100 min.)
Peak Discharge Current* (mA)	25	60	20	45	25	80
Operating Temp. (recommended)	-40°C to 60°C		-40°C to 85°C		-40°C to 60°C	
Mounting method	Reflow soldering		Reflow soldering		Embedded	
Applications	Smartkeys, RFID tags, electronic shelf labels (ESLs), backup power supplies, and others Commence mass production in December		Automotive power supplies (for ECUs, Sensors), factory automation (backup), outdoor IoT devices, and others Start shipping samples in December		Multifunctional wristwatches, wearable devices	

* Maximum current within 0.5 V drop for 1 sec.

* The information disclosed in this press release is current as of the time of release.

NGK contributes to the achievement of the SDGs.

Ceramics for electric and electronic machinery support affordable and universal information and communications technology.



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 (DPFs) 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. Its President is Taku Oshima.

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