November 17, 2021

NGK INSULATORS, LTD.

TOREX SEMICONDUCTOR LTD.

Ossia Inc.

NGK, TOREX, Ossia Start Collaboration to Spread Use of Wireless Power Transmission/Transfer Systems

NGK INSULATORS, LTD. (hereinafter, “NGK”), TOREX SEMICONDUCTOR LTD. (hereinafter, "TOREX") and Ossia Inc. (hereinafter "Ossia") have started working together to spread the use of wireless power transmission/transfer (WPT) systems. The companies have developed a WPT power receiver development kit using a combination of NGK’s lithium-ion rechargeable batteries EnerCera®, TOREX’s low-current-consumption power supply ICs and Ossia’s WPT technologies.

Adoption of sensor networks using many IoT devices has been increasing in recent years. Conventionally, powering IoT devices involved power cables and primary batteries (disposable batteries), so cumbersome wiring and replacing batteries had been an issue. Using radio frequency (RF) to transfer power over about 10 meters, WPT is attracting attention as a power supply technology that promotes the realization and widespread use of maintenance-free IoT devices as it enables power supply to places where wiring presents difficulties and eliminates the need to replace batteries. In particular, Ossia’s Cota® WPT using the 5.8 GHz band is expected to be used in a wide range of applications, including power supplies for sensors installed in places such as enterprise environments, retail, factories and warehouses. At the higher frequency of 5.8GHz, it enables smaller receivers and more precise control of power supply.

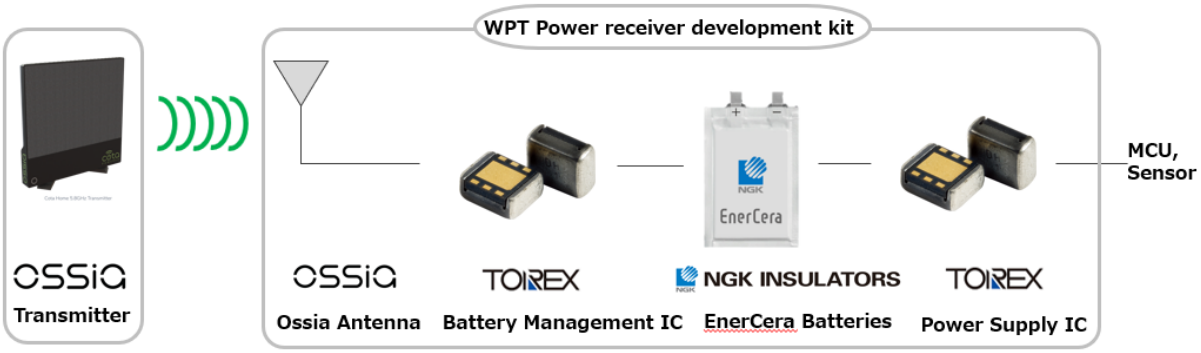
NGK, TOREX and Ossia are working together to spread the use of 5.8 GHz band WPT. The WPT power receiver development kit comprises the Ossia Antenna that extracts radio frequency as power, EnerCera batteries that store the power and a power supply IC that stably supplies the stored power at an optimal voltage to an MCU* or sensor. Connecting this kit to any MCU or sensor enables developing a device with WPT as a power source.

* Microcontroller unit (MCU): A semiconductor chip used for such purposes as controlling electronic device operations.

- Iwao Ohwada, Vice President, General Manager, Advanced Device Components Div., Electronics Business Group, NGK INSULATORS, LTD.
With features such as low resistance, high capacity, and long life, EnerCera batteries are an ideal energy storage device for WPT because it can efficiently charge the power transmitted via WPT and store it for long periods of time and provide high enough output to power MCUs and sensors. Combined with the power supply IC and Ossia's WPT technology, we will promote the development and popularization of maintenance-free IoT devices powered by WPT using the 5.8 GHz band.

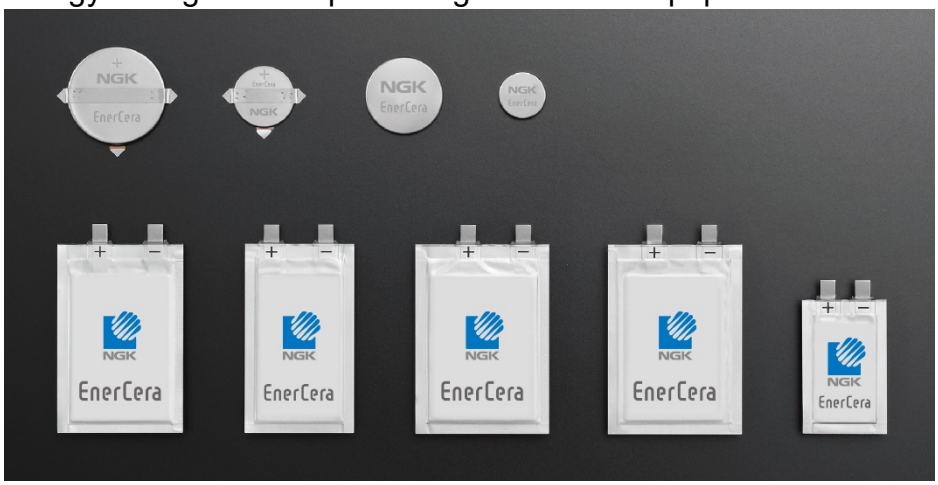
- Tomoharu Yamamoto, General Manager, Product Planning & Overseas Sales Management HQs, TOREX SEMICONDUCTOR LTD.
TOREX's power supply ICs realize low consumption, high efficiency, and low noise, enabling EnerCera to be charged with zero waste by the power transferred via WPT. The micro DCDC series, integrating a coil and control IC, facilitates stable supply of power stored in EnerCera at an optimal voltage to MCUs or sensors, helping to make devices even more compact.

- Jennifer Grenz, Chief Revenue Officer, Ossia Inc.
Ossia's Cota Real Wireless Power is uniquely suited for multiple battery applications. Charging batteries with wireless power changes the way companies can design products without needing to have easy access for frequent battery replacement. It is also an environmental benefit to reduce disposable battery waste. One Cota transmitter can power multiple batteries simultaneously, even while in motion, allowing for product innovation.



EnerCera batteries

EnerCera is an ultra-small/ultra-thin lithium-ion rechargeable battery using NGK's original crystal-oriented ceramic plate as electrodes. EnerCera's unique battery structure (semi-solid-state battery) where small amounts of electrolytic solution are infused into multi-layered ceramic battery materials, enabling it to achieve features required to power IoT devices but which had been difficult to incorporate in existing lithium-ion rechargeable batteries, such as being ultra-small/ultra-thin, high capacity, high output, high-heat-resistance and long life. EnerCera batteries' innovation and practicality have been highly commended, and it has received many awards as an energy storage device promoting the full-scale popularization of IoT modules.



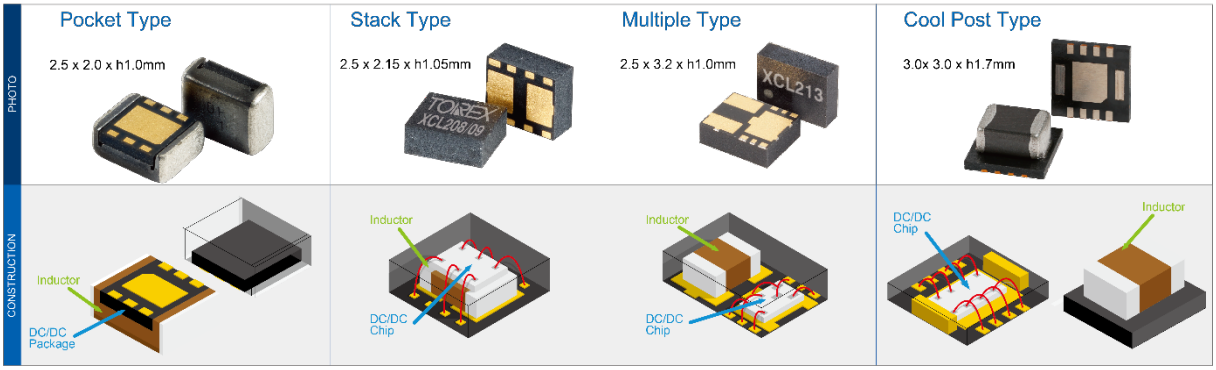
EnerCera Battery Series EnerCera Coin (above four products) and EnerCera Pouch (five products below)

■EnerCera Product Site https://www.ngk-insulators.com/en/product/electron/enercera/

■EnerCera Special Site https://enercera.ngk-insulators.com/en/

"micro DC/DC" XCL Series

"micro DC/DC" The XCL series is ultra-small DC/DC converters that integrate a coil and a control IC using Torex's unique technology. Our unbending dedication as a power IC manufacturer has maximized DC/DC converter performance, and we have realized a product that simultaneously achieves space-saving, high efficiency, low noise, high heat dissipation, and low cost.



■"micro DC/DC" XCL Series Product Site

https://www.torexsemi.com/technical-support/application-note/xcl-intro/

About NGK INSULATORS, LTD.

NGK INSULATORS (NGK) is a leading company in the field of ceramics. Since its foundation in 1919, NGK has used its unique ceramic technology to provide numerous ground-breaking products that solve social issues. Today, NGK is active in more than 20 countries worldwide, with business foci including mobility, energy, IoT and industry. As one of the largest manufacturers of ceramic substrates for automotive catalytic converters, NGK is actively reducing the strain on our global environment. Furthermore, NGK's products include the energy storage system "NAS" batteries, in addition to the compact, thin, and high-energy-density lithium-ion rechargeable battery "EnerCera" series, vital tools for sustainable energy infrastructure. Through providing innovative, high-quality products, NGK is committed to contributing to our society. In order to create a future where people can coexist with nature, NGK will continue to develop and provide products that support social infrastructure while preserving the environment. www.ngk-insulators.com/en/

About TOREX SEMICONDUCTOR LTD.

Since its establishment in 1995, TOREX SEMICONDUCTOR (TSE First: 6616) has been the only exclusive analog power source IC manufacturer in Japan. TOREX provides one of the smallest highly efficient analog power source ICs in the world. The IC adds value to customers' products, and power source design solutions for accelerating customers' product development, with the motto of Powerfully Small for its manufacturing. TOREX's products are popular in markets including industrial machines, car accessories, communication, PCs, and wearable devices both in Japan and overseas. www.torexsemi.com/

About Ossia Inc.

Ossia Inc. is leading the world on what is possible with wireless power. Ossia's flagship Cota® technology redefines wireless power by safely delivering remote, targeted energy to devices at a distance. Ossia's Cota technology is a patented smart antenna technology that automatically keeps multiple devices charged without any user intervention and enables an efficient and truly wire-free, powered-up world that is always on and always connected. Ossia is headquartered in Redmond, Washington. Visit our website at www.ossia.com