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■ ■ ■ ■ Devices thru Material Innovation
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NEC/TOKIN

Energy Devices

General Guide



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- Please request for a specification sheet for detailed product data prior to the purchase.
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Energy Devices

We offer the ideal Energy Solution for your mobile system and products that realize the highest levels of Environmental Friendliness



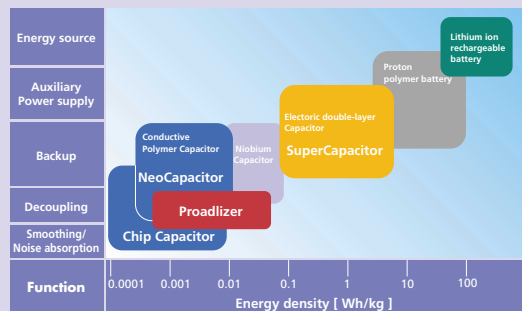
The rapid evolution of mobile systems continues to fuel demands for reduced power consumption and lower voltage operation.

At NEC TOKIN, we believe in an "energy solution" that satisfies these demands through the right combination of batteries and capacitors.

By handling the battery and capacitor as a single unit, not as separate devices, we can offer a combination of energy devices ideal for your mobile system.

We also understand the impact on the environment when batteries and capacitors are discarded. So for us, "environmental friendliness" is an essential consideration when designing and manufacturing products: especially now, as we appreciate the urgency of alleviating stress on the environment. We have therefore made serious efforts to develop products that either have minimum impact on the environment when discarded, or that do not need to be discarded at all.

Energy Devices of NEC TOKIN

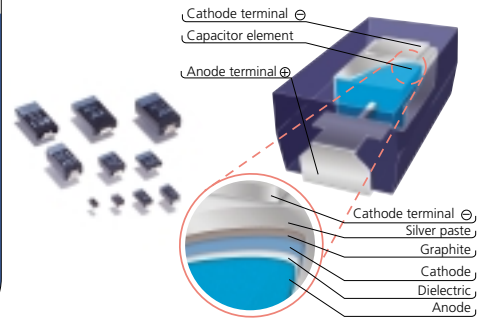


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Chip capacitors

Our chip capacitors lead the world in advanced technology

Capacitors are components that stabilize the voltage and current of an electronic circuit while charging and discharging electricity. Our chip capacitors use fine tantalum (Ta) and niobium (Nb) powder as the raw material of the dielectric, realizing a high capacitance with a small size. Since it developed the first tantalum capacitor in 1955, we have been supplying capacitors that lead the world.



Tantalum chip capacitors

Lead-free

Conductive polymer tantalum chip capacitors NeoCapacitor

Lead-free

Conductive polymer niobium capacitors

Sample stage

Series	E/SV, F/SV	PS/L, PS/G	NB/P
Anode	Tantalum	Tantalum	Niobium
Dielectric	Tantalum oxide film	Tantalum oxide film	Niobium oxide film
Cathode	Manganese dioxide	Conductive polymer	Conductive polymer

Features
Our tantalum chip capacitors offer a range of small, high-capacity models. The lead in the terminal plating has been zero to lower the impact on environment, but with a shape and performance equal to its predecessors using lead, our tantalum chip capacitors can easily replace the existing capacitors. These capacitors are widely used in small, lightweight electronics products such as mobile telephones, PDAs, and digital cameras.

The NeoCapacitor realizes an extremely low ESR and higher permissible ripple current by employing conductive polymer for the cathode, effectively suppressing the noise that has come to be superimposed on circuits. These capacitors have the same shape as manganese dioxide tantalum capacitors, and are available in a wide range of large to small sizes. The major applications of the NeoCapacitor include absorbing voltage fluctuation in mobile telephones, digital cameras, storage devices and MPU circuits of personal computers, and smoothing in DC/DC converters.

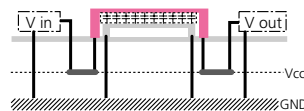
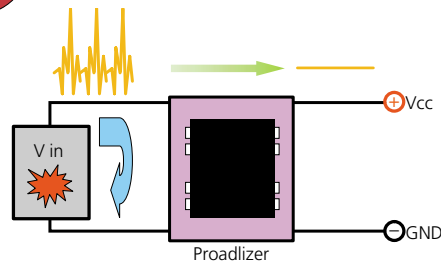
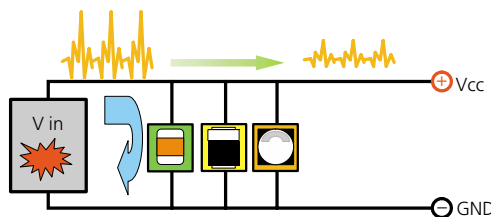
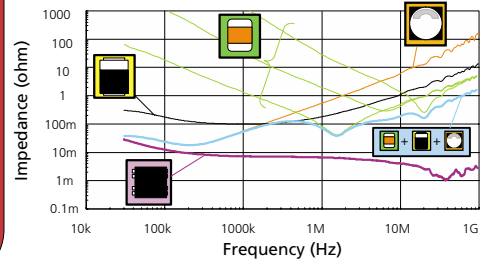
These capacitors use niobium, a metal in the same group as tantalum, for the anode. They use the same conductive polymer for the cathode as the NeoCapacitor to realize an ultra-low ESR. The shape, structure, and performance of these capacitors is also almost the same as the NeoCapacitor. Niobium has about 100 times the deposits of tantalum, enabling a more stable product supply. Development in this series is mainly focussing on high-capacity (220 μF or more) models that require large amounts of materials, such as those in the capacitance area of aluminum electrolytic capacitors.

Proadlizer™

The Proadlizer is a new decoupling device with a low impedance characteristic in a broadband of up to over 1GHz.

The Proadlizer has an ESL characteristic of a few pHs, the lowest among all devices used for decoupling, as well as having a capacity equal to that of conductive polymer capacitors and a low ESR characteristic. In addition, it takes only one Proadlizer to support complex decoupling circuits and achieve ideal flat impedance in a wide frequency band of up to over 1GHz.

One Proadlizer supports complex decoupling circuits



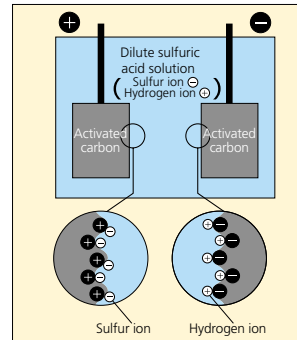
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Electric double-layer capacitors SuperCapacitor

The SuperCapacitor can be charged and discharged limitlessly and rapidly

The electric double-layer capacitor SuperCapacitor accumulates and supplies electric energy by physical adsorption of ions. Unlike ordinary batteries, a chemical reaction is not used. Therefore, these capacitors can be theoretically charged and discharged as many times as required, and rapidly. In addition, the SuperCapacitor uses our original technology to minimize the gaps between the activated carbon particles by optimum composition of the activated carbon, as more electric energy can be stored as the surface area of the electrodes increases.

A weak voltage is applied to each electrode, so that one is positively charged and the other is negatively charged.



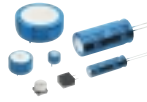
High power type FB series

For use in severe environments such as in freight cars and other vehicles. This series has realized a higher voltage of 24V without using any protection circuits, in addition to the conventional characteristics of high-power and long-life. Using a one-package structure, it is highly resistant to vibration and weather.



General type

Covers wide variety of back-up applications such as memory, actuator and solenoid valve. Furthermore, the new FC series, which is surface mountable, has made the general-purpose model even easier to adopt.



Thin type HP series

Peak current assistance for mobile applications

When used in combination with a battery in electronic systems on which a pulsating load is imposed, such as digital cameras and mobile telephones, this series can substantially extend the working time of the battery.



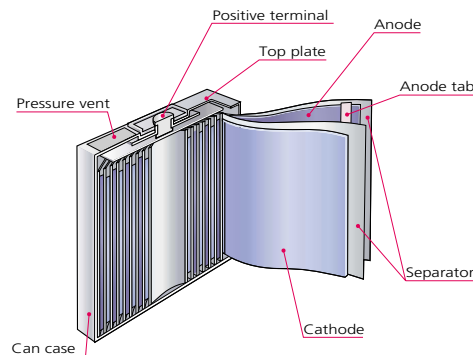
Lithium ion rechargeable batteries

High-capacity rechargeable battery realizing small, light, and slim mobile equipment

Lithium ion rechargeable batteries feature the excellent characteristic that the capacity does not decrease even if recharged repeatedly with charge still remaining. These batteries are in circulation in mobile equipment such as cellular phones and notebook PCs, and an expansion of the lineup to cover power equipment is planned. Lithium ion rechargeable batteries reduce waste due to their recyclability, and use no cadmium, lead, or mercury, making them extremely environmentally safe. To meet your equipment needs, we supply battery packs that come with battery protection circuits or cases.

- High energy density
Small and lightweight with about 1/2 the weight and about 20 to 50% the volume of Ni-Cd batteries and Ni-MH batteries with the same capacity.
- High operating voltage
Because a high voltage (about three times that of Ni-Cd batteries and Ni-MH batteries) can be obtained, the number of batteries to be used can be reduced.
- No memory effect
Lithium ion rechargeable batteries can be additionally charged because they have no memory effect, unlike Ni-Cd batteries.

●Structure (prismatic cell)



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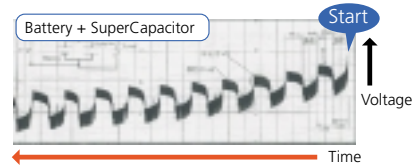
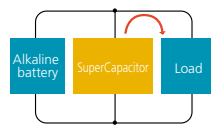


ENERGY SOLUTION

An ideal energy solution based on batteries and capacitors

Combining the best capacitor with the battery enhances the efficiency of electric energy, the battery life substantially extending. For example, in systems on which a pulsating load is imposed, such as digital cameras and mobile telephones, a slim-type electric double-layer capacitor, the SuperCapacitor, should be used in combination with the battery because the SuperCapacitor supplies instantaneous energy in large quantities. In this way, systems can work much longer on batteries.

A 1.6 times longer battery working time can be achieved by supplying a current from the SuperCapacitor instantaneously in a digital still camera when the peak current is necessary (during auto focus or flash operation).



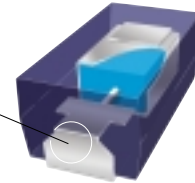
ECOLOGY

NEC TOKIN is the forerunner of "environmental friendliness"

We released the E/SV series of chip tantalum capacitors that use lead-free tin plating for the solder plating of terminals in autumn 2000, and are also developing the NeoCapacitor, which does not use lead. To reduce the impact on the environment when batteries are discarded, we have released a high-capacity electric double-layer capacitor, the SuperCapacitor, that can theoretically be charged and discharged as many times as required, and that uses environmentally friendly materials. A proton polymer battery that can be charged and discharged about 100,000 times is also under development. In this way, we are promoting development of products that do not have to be replaced.

Lead-free chip tantalum capacitors, E/SV series

Terminal plating	
Lead solder plating (tin: 90%, lead: 10%)	Replaced by lead-free plating



SuperCapacitor that can theoretically be charged and discharged as many times as required

Lead battery Number of times of charging/discharging: About 1,000 Electrode: Lead and cadmium, which have a serious effect on the environment	VS	SuperCapacitor Number of times of charging/discharging: Theoretically as many times as required Electrode: Environmentally friendly active carbon
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High power type SuperCapacitor



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