

NEC TOKIN - Solution Strategy Based on Creation of Key Devices That Exploit Advanced Materials -

One of the corporate aims of NEC TOKIN is to become a “Device Creation Company Originating from Innovative Materials.” This special issue will introduce the solution strategy and product technology development that are propelling us toward this goal. Among the many cutting-edge products and technologies under development at NEC TOKIN, this feature will familiarize the reader with product R&D, device technologies and material technologies as it relates to our lineup of Proadlizer, next-generation NeoCapacitor, noise suppression sheets, and magnetic material for use in low-loss inductors, as well as RFID and piezoelectric devices. While pursuing device development, NEC TOKIN is also aggressively developing original material technologies that determine device performance, and proposing device solutions that will be ready to satisfy future needs related to the environment, security and the Ubiquitous Age.

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1 Fundamental R&D Strategy of NEC TOKIN

Ubiquitous technology driven by the advance of information and telecommunications technologies. Eco-friendly technologies that exist in harmony with the earth’s environment. Security technologies to ensure the safety and security of systems, data and users in our increasingly networked world. Anticipating the increasing importance of these and other areas, we at NEC TOKIN are focusing our corporate energies in advancing related technologies. Specifically we are moving forward with R&D activities that pursue solutions that fall along the following 3 axes, always keeping in synch with the ever evolving needs of the social environment and market:

- Energy Solutions
- Noise & Power Solutions, and
- Access Solutions

Through this strategy, we continue to provide our customers with optimum device solutions.

As a company that aspires to be a “Device Creation Company Originating from Innovative Materials,” NEC TOKIN places a high priority on the development of materials that determine device performance. We propose original solutions based on a variety of material technologies ranging from functional materials such as conductive polymers and battery mate-

rials, ferrites and metallic magnetic materials to various metal and ceramic materials while continuing to press forward with research and development of new materials.

In addition, our research and development activities not only cover the proposal of such solutions but also closely monitor market and technology trends and support the reinforcement of our shared platform technologies through basic research, feasibility studies, analysis and simulation, which

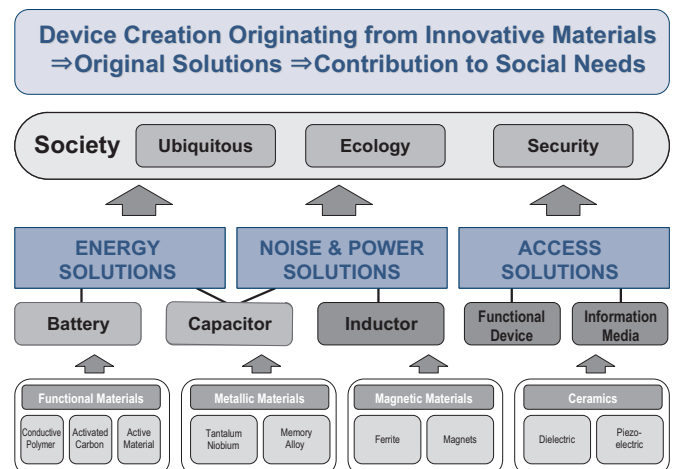


Fig. NEC TOKIN business activities.

together lead to the products of tomorrow (see Fig.).

2 NEC TOKIN Solution Strategy

In these next sections, we will provide a closer look at the three solution strategies of NEC TOKIN and innovative key devices that will power each.

2.1 Energy Solutions

Large-capacity and safe secondary batteries will be in demand for large-capacity power storage that is using solar energy and for HEV and EV in-vehicle applications. NEC TOKIN is the first and only company in the world to commercialize our original safe high-capacity Manganese-Lithium Ion secondary battery. In order to achieve high battery energy densities, non-inflammability for enhanced safety while responding to the demand for further cost reductions, the company has continued to pursue research and development by research into materials for the cathode, anode and electrolyte for batteries, and seeks to maintain its commanding positioning the large-capacity market.

Also in the power source built into mobile devices such as PCs and mobile phones, the industry is demanding new functionality ranging from instantaneous large current supply to accommodate the sudden fluctuations in power demanded by the CPU to relatively small current supply to support long-term operation. NEC TOKIN offers a complete lineup of cutting-edge devices that respond to a broad range of needs from devices that supply large current instantaneously to devices that can deliver power over a longer period. Through the combination of these devices, we can propose optimal energy solutions, which realize a more compact power system and improved electrical power efficiencies at a lower cost.

2.2 Noise & Power Solutions

In step with the widespread adoption of digital devices, the need for measures to deal with the accompanying electromagnetic noise is becoming increasingly critical. From dealing the ongoing trend towards usage of higher frequencies to compliance with international standards on noise regulation that extends to the lower frequencies on the kHz order, wide scope of measures are needed. From the kHz band of low frequencies to the GHz band of high frequencies, NEC TOKIN offers the optimum measures to reduce noise according to its frequency band including capacitors, inductors and noise suppression sheets.

Also the increasing efficiency of PCs and other digital devices has been accompanied by growing demand for ever smaller, low-loss transformers and coils capable of meeting the high

current requirements for the power circuits of components such as inverters, switching power sources, and DC-DC converters.

Through our development of capacitor products, we are able to offer a complete cutting-edge lineup that includes the Neo-Capacitor boasting excellent low ESR and Proadlizer decoupling device supporting a broad frequency range, low impedance and high capacity in addition to our conventional Manganese-Tantalum capacitors.

While finding growing application in PCs and game consoles, the future of the Proadlizer will see the development of new markets that will lead to adoption by diverse digital devices.

In the development of these products, the role of material development is the most critical, and we are pressing forward with the research and development that will produce products such as conductive polymers to satisfy the demand for larger capacity in smaller packaging and low ESR.

In our development of inductors, we are moving forward not only with the line filters used in power circuitry but also more compact choke coils for use in digital devices such as PCs. While our research and development in the field of inductors seeks new levels of performance through product architecture, we put our priority on the development of core material with higher impedance and low loss, and are aggressively pursuing the development of high impedance ferrite material and new metal-type materials that deliver low loss.

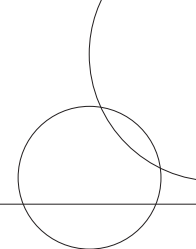
In answer to the demand for noise suppression sheets with noise absorption performance over a broader bandwidth, thinner sheets, non-inflammability, and greater flexibility, NEC TOKIN has been making advances in the development of composites that minimize incorporation of flame resistant materials such as halogen with high magnetic permeability (μ) and in the practical application of polymer binders, resulting in a material that satisfies the conflicting conditions of higher performance and halogen-free flame resistance.

This special issue will introduce the reader to products that are responding to previously described needs such as the Proadlizer, NeoCapacitor noise suppression sheets and cutting-edge magnetic-material products, and also provide a glimpse into unique characteristics of our materials, the related technology as well as products that practically apply their qualities.

2.3 Access Solutions

In the broad diversity of telecommunications equipment and terminals that will support our Ubiquitous Society of tomorrow, many advanced high-function devices will be used. Among them, the utilization of RFID is receiving a much consideration from a variety of perspectives, especially in areas such as logistics management and product/process control.

In addition to our commercialization of an IC card for prac-



tical application in the 125kHz bandwidth and IC tags operating at 13.56MHz, NEC TOKIN is moving its development of a 2.45GHz band IC tag using NEC's original NETLABEL chip into the practical application phase. Also for UHF band products, for which standardization has lagged, we have commercialized both IC tags and reader/writer products, bolstering a product lineup that can respond to the diverse needs of our customers. In this special issue, we would like to familiarize the reader with the product characteristics and some examples of practical applications related to these UHF-band IC tags and reader/writer related products.

We also believe that research and development aimed at the improving telecommunications quality and reliability are very important with a view towards minimizing telecommunications quality degradation arising from the influence of metals. Accordingly, this is one of the avenues that will be pursued in future activities.

For the large-screen LCD TVs which are the focus of much attention as a mainstream display device in the approaching Ubiquitous Society, we are developing piezoelectric inverters that boast high efficiency, thinner compact form, low noise and other highly desirable characteristics.

We look forward to introducing the reader to our commercialization of a 4-tube piezoelectric inverter, the characteristics of other newly developed products and examples of their practical application in this feature.

3 Future Challenges

While pressing forward with material technology-driven research and development activities, NEC TOKIN will exploit its proprietary technological resources and collaborate closely with the NEC Central Research Laboratories and universities with the aim of anticipating and supplying solutions to the diverse needs of society from ubiquity and ecologically-sound technology to security.