

## **Renesas Technology to Release Bidirectional Zener Diodes Among the Smallest in the Industry to Protect Against Electrostatic Discharge (ESD) in Multifunction Mobile Devices**

— Measures  $0.6 \times 0.3$  mm, 70% smaller than comparable earlier devices, and delivers excellent protection against ESD —

Tokyo, June 9, 2009 — Renesas Technology Corp. today announced two new bidirectional Zener diodes\*<sup>1</sup> for protecting the circuitry of mobile devices from damage due to stray voltage from internal or external electrostatic discharge (ESD). The RKZ7.5TKP has a package measuring only  $0.6 \times 0.3$  mm, among the smallest in the industry, while the RKZ7.5TKL provides an additional package option. Sample shipments of both products will begin on June 9, 2009 in Japan.

### **< Product Background >**

The current trend in mobile devices such as mobile phones is toward compact, thin dimensions and multifunctionality. Mobile phones in particular require a high mounting density, making them susceptible to static electricity generated internally or externally. As a result, effective measures are necessary to prevent malfunction or damage from electrostatic discharge (ESD). As compactness is also a key priority, Renesas Technology is working to reduce the size of Zener diodes, a key device for dealing with ESD, and has developed and put into mass production bidirectional Zener diodes, which perform the work of two conventional Zener diodes. The newly developed bidirectional Zener diode products are among the smallest in the industry while providing excellent ESD absorption.

### **< Product Details >**

The features of the RKZ7.5TKP and RKZ7.5TKL are summarized below.

#### **(1) Package among the smallest in the industry (RKZ7.5TKP)**

The RKZ7.5TKP achieves a package size ( $0.6 \text{ mm} \times 0.3 \text{ mm}$ ,  $0.3 \text{ mm}$  thick (typ.)) that is among the smallest in the industry for bidirectional Zener diodes through the use of a base electrode configuration, in which the electrical contacts are arranged on the base of the device. This is 70% smaller than previous bidirectional Zener diodes from Renesas and makes it possible for customers to create more compact products.

#### **(2) Protects against both forward and reverse ESD by providing the same functionality as two Zener diodes**

Bidirectional Zener diodes have electrical characteristics different from those of conventional Zener diodes. They have Zener breakdown characteristics in both directions, making one bidirectional Zener diode equivalent to two conventional Zener diodes. They also can protect circuits from both forward- and reverse-biased ESD. This means that a single bidirectional Zener diode can be used to protect a LED matrix circuit, for example, from reverse-biased wraparound current, instead of using two conventional Zener diodes, as is the usual practice. This reduces the total number of devices and reduces the combined mounting area.

#### **(3) Excellent protection against ESD**

While achieving impressive miniaturization, excellent ESD protection is maintained through optimization of the PN-junction formation process conditions. The new bidirectional Zener diodes meet the requirements of the IEC61000-4-2, level 4 (contact discharge)\*<sup>2</sup> electrostatic discharge immunity test standard.

(4) Environmentally friendly lead-free and halogen-free version (RKZ7.5TKP)

The RKZ7.5TKP employs the MP6 (Micro Package 6) (Renesas package code), which uses a base electrode configuration to achieve dimensions of only 0.6 mm × 0.3 mm. The base electrodes (lead-free) are formed by gold plating, and the package body is formed from halogen-free resin. This reduces the environmental impact of the product during both the production and disposal stages.

The RKZ7.5TKL has an EFP (Extremely small Flat lead Package) (Renesas package code) with lead wires and measures 1.0 (body size: 0.8) mm × 0.6 mm. It is also lead-free, and Renesas Technology plans to offer a version of the product using halogen-free resin for the package body in future.

Customers can choose from the above two package types to match the characteristics and requirements of their products.

Renesas Technology will continue to develop new bidirectional Zener diodes with lower Zener voltages, extending its lineup of products suitable for low-voltage mobile devices. The company is also working actively to reduce variations in electrical characteristics and to supply diode products that provide additional flexibility.

< Notes >

Notes: 1. Bidirectional Zener diode: When reverse-biased current is applied to a diode, the current flow increases suddenly when a certain voltage is reached. This is called the yield phenomenon, and a Zener diode is a type of diode that uses this phenomenon to ensure a constant voltage. Taking advantage of this characteristic, Zener diodes are commonly used to absorb voltage surges. The electrical characteristics of a bidirectional Zener diode differ from those of a conventional Zener diode in that they produce the yield phenomenon in both bias directions, rather than just one.

2. IEC 61000-4-2, level 4 (contact discharge): IEC 61000-4-2 is a testing standard established by the International Electrotechnical Commission to evaluate the resistance to electrostatic discharge of electronic devices. There are two test methods, one in which the test sample is brought into contact with the test circuit to expose it to an electrical discharge and a second non-contact method in which the test sample is exposed to an air discharge.

To evaluate the new bidirectional Zener diodes, the conditions of the standard were satisfied and a test circuit was designed to simulate the current waveform that would result when an electrically charged person touched the test sample with a metal object.

\* Product names, company names, or brands mentioned are the property of their respective owners.

**< Typical Applications >**

- Mobile phones, portable DVD players, game machines, etc.
- LED protection

**< Prices in Japan > \*For Reference**

<b>Product Name</b>	<b>Package (Renesas Package Code)</b>	<b>Sample Price [Tax Included] (Yen)</b>
RKZ7.5TKP	MP6	15
RKZ7.5TKL	EFP	15

**< Specifications >**

<b>Product Name</b>	<b>Package (Renesas Package Code)</b>	<b>Power Dissipation</b>	<b>Zener Voltage</b>	<b>Capacitance</b>	<b>Electrostatic Breakdown Voltage</b>
		<b>Pd</b> <mW>	<b>Vz</b> <V>	<b>C</b> <pF>	<b>&lt;kV&gt;</b>
RKZ7.5TKP	MP6	100	6.0 to 9.0	6 (typ.)	8 (min.)
RKZ7.5TKL	EFP	100		8 (typ.)	

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\*\*\* Information contained in this news release is current as of the date of the press announcement, but may be subject to change without prior notice. \*\*\*