

Renesas Technology Releases Industry's Smallest TV Tuner Variable-Capacitance Diode for Mobile Phones

— Ultra-small 0.6×0.3 (mm) size plus large capacitance ratio at low voltage, for terrestrial digital TV broadcasts capable mobile phones —

Tokyo, July 21, 2005 — Renesas Technology Corp. today announced three TV tuner variable-capacitance diodes (varicap diodes)^{*1} for mobile phones: the RKV650KP featuring the industry's smallest size 0.6×0.3 (mm), and the extended-package RKV650KN and RKV650KL. Sample shipments will begin in Japan in August 2005.

These new products offer the following features.

(1) Industry's smallest size (RKV650KP)

At $0.6 \text{ mm} \times 0.3 \text{ mm} \times 0.3 \text{ mm}$ (typ.), the RKV650KP features the industry's smallest size for a TV tuner varicap diode. This represents an approximately 70% reduction in mounting area compared with Renesas Technology's previous models for analog TV tuner use, enabling user systems to be made smaller.

(2) Large capacitance ratio at low voltage (RKV650KP, RKV650KN, RKV650KL)

These three new products achieve the industry's highest capacitance ratio of 3.5 (in case of $C_{0.5}/C_{2.5}$)^{*2} in the approximately 2.5 V low-voltage range, enabling them to be used in TV tuners for terrestrial digital TV broadcasts capable mobile phones.

At the same time, the tradeoff high-frequency series resistance^{*3} characteristic has been kept down to 0.5 (at $V_R = 1 \text{ V}$, $f = 470 \text{ MHz}$), enabling high sensitivity and low noise to be achieved.

< Product Background >

TV tuner varicap diodes make use of the characteristic whereby capacitance varies when a voltage is applied, and are actually used to adapt to the radio wave (frequency assigned to a channel) to be received. While Renesas Technology currently mass-produces TV tuner models for mobile phones with analog broadcasting capability, TV tuner products supporting terrestrial digital broadcasting (so-called one-segment broadcasting) that can be viewed on mobile devices, which will begin in March 2006, require a high capacitance change ratio in a lower voltage range of around 2.5 V.

At the same time, there is a strong demand for smaller diode dimensions that enable user products to be made smaller and thinner.

In response to these needs, Renesas Technology has developed these new TV tuner varicap diodes for terrestrial digital broadcasting capable mobile phones, featuring a high capacitance change ratio together with ultra-small dimensions.

<Additional Product Details >

The RKV650KP, RKV650KN, and RKV650KL achieve a large capacitance ratio at a low voltage together with lower high-frequency series resistance as a result of the PN junction formation process conditions and epitaxial layer optimization.

The MP6 (Micro Package 6) (Renesas package code) package used by the RKV650KP achieves ultra-small dimensions of 0.6 mm × 0.3 mm × 0.3 mm (typ.) through the use of an undersurface electrode structure in which electrodes are located on the undersurface of the package. The RKV650KN and RKV650KL extended-package models employ the following packages, allowing a choice of models to suit different systems.

- RKV650KN: 0.8 mm × 0.5 mm × 0.3 mm (typ.) undersurface electrode structure MP8 (Micro Package 8) (Renesas package code)
- RKV650KL: Lead pin type EFP (Extremely small Flat lead Package) (Renesas package code) with 1.0 (body dimensions of 0.8) mm × 0.6 mm × 0.47 mm (typ.)

Future plans include the ongoing development of low-voltage varicap diodes for terrestrial digital TV broadcasts capable mobile phones to extend the product lineup. Strenuous efforts will also be made to reduce variation characteristics in order to provide diodes offering greater ease of use.

< Notes >

- Notes: 1. Variable-capacitance diode (varicap diode): A diode characterized by variation of its capacitance in accordance with an applied reverse voltage. Making use of this characteristic, varicap diodes are used for frequency regulation.
2. Capacitance ratio of 3.5 (in case of C 0.5/C 2.5): The inter-pin capacitance ratio with reverse voltages of 0.5 V and 2.5 V. The capacitance change ratio is an important characteristic in varicap diodes, with a higher figure representing higher performance.
3. High-frequency series resistance: Parasitic resistance of a varicap diode. A small value of this resistance makes possible a low unit oscillation stop voltage, low noise, and stable operation.

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

< Typical Applications >

Digital TV tuners for terrestrial digital TV broadcasts capable mobile phones, etc.

< Prices in Japan > *For Reference

Product Name	Package (Renesas Package Code)	Sample Price [Tax Included] (Yen)
RKV650KP	MP6	15 [16]
RKV650KN	MP8	13 [14]
RKV650KL	EFP	12 [13]

< Specifications >

Product Name	Package (Renesas Package Code)	Maximum Ratings Reverse Voltage VR	Inter-Pin Capacitance C	Capacitance Change Ratio n	High-Frequency Series Resistance rs
RKV650KP	MP6	15 V	C0.5 = 7.0 to 8.5 pF	3.5 typ.	0.5 typ.
RKV650KN	MP8	15 V	C2.5 = 1.9 to 2.3 pF		(at VR = 1 V, f = 470 MHz)
RKV650KL	EFP	15 V			

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.