

## **HITACHI RELEASES HIGH-PERFORMANCE N-CHANNEL POWER MOSFET SERIES ENABLING DC/DC CONVERTER TO BE MADE HIGHER EFFICIENCY AND SMALLER SIZE**

- HAT2164H offering approximately 40% lower on-resistance and HAT2165H offering approximately 45% higher speed than previous Hitachi products -

Tokyo, June 10, 2002 - Hitachi, Ltd. (TSE: 6501) today announced the Hitachi's 8th-generation N-channel power MOSFET series employing a 0.35-micrometer process and offering lower on-resistance and faster performance, for DC/DC converter use in routers, servers, notebook PCs, and so forth.

In the initial phase Hitachi is releasing the low-on-resistance HAT2164H and the high-speed HAT2165H, with sample shipments starting in July 2002 in Japan.

These two products offer 4.5 V drive capability at a 30 V Drain-Source breakdown voltage, and feature approximately 40% lower on-resistance  $R_{DS(on)}$  in the HAT2164H and approximately 45% lower FOM(Figure Of Merit) of on-resistance by Gate-Drain charge ( $R_{DS(on)} \cdot Q_{gd}$ ) in the HAT2165H compared with previous Hitachi models.

These products offer the industry's highest performance for a small, thin, surface-mount LPAK package (Hitachi package code) with the same mounting area as an SOP-8, and enable DC/DC converter to be made higher efficiency and smaller size.

### **[Background]**

As information volumes increase through the growth of communication networks and the use of broadband transmission for processing speeds improve, there is a growing demand for power in communication equipment such as base stations and routers, servers, and notebook PCs. At the same time, there is a need for DC/DC converters that offer lower voltage, larger current, and higher slew rate (high di/dt) together with higher efficiency and smaller size, in order to meet the demand for lower operating voltages and faster processing in MPUs and other LSIs that form the core of such products.

Power MOSFETs are key devices for achieving more efficient and compact power supplies, and Hitachi has previously released its 7th-generation N-channel MOSFET series employing a 0.5-micrometer process. Now, Hitachi is releasing its 8th-generation N-channel MOSFET series, employing a 0.35-micrometer process, to meet the need for even lower on-resistance and higher speed.

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## [About these Products]

Hitachi's 8th-generation N-channel MOSFET series employs a 0.35-micrometer process that has enabled the cell size to be reduced to approximately 70% that of the 7th-generation series. Two products with 4.5 V drive capability at a 30 V Drain-Source breakdown voltage are being released in the initial phase, for synchronous rectification use on the secondary side of isolated-type DC/DC converters, and for non-isolated-type DC/DC converters. The HAT2164H, designed for lower on-resistance(RDS(on)), achieves an on-resistance of 3.0 milliohms (typ.) at VGS = 4.5 V, approximately 40% lower than that of the 7th-generation series HAT2099H, through further optimization of the cell structure design. The figure for VGS = 10V is 2.5 milliohms (typ.), enabling high power supply efficiency to be achieved through low loss.

Meanwhile the HAT2165H, designed for high speed, achieves smaller cell size through the use of a similar 0.35-micrometer process, and maintains low on-resistance while achieving higher speed through the use of cell structure design optimization and a processing method that reduce the Gate-Drain charge (Qgd). It achieves the FOM(Figure Of Merit) of on-resistance by Gate-Drain charge(RDS(on) • Qgd) of 37 milliohms nanocoulombs (typ.) at VGS=4.5V, the most important switching loss parameter for attaining higher speed. Approximately 45% improved the speed compared with the 7th-generation series HAT2099H. The figure for at VGS = 10 V is 28.5 milliohms nanocoulombs (typ.) , and the possibility of a higher circuit frequency permitted by higher speed enables power supplies to be made smaller.

These products employ a small, thin, surface-mount LFAK package (Hitachi package code) with the same mounting area as an SOP-8, with package loss reduced through wireless construction.

Future plans include the provision of a lineup of 20 V, 40 V, and 100 V breakdown voltage products, to handle both the primary side and secondary side of DC/DC converters in communication equipment, servers, and so forth. Hitachi plans to offer a product lineup that will support a variety of circuit types and handle different output voltages for secondary side applications.

## < Typical Applications >

- Various kinds of isolated-type DC/DC converters (secondary side) for base stations, routers, and similar information communication equipment, servers, etc.
- CPU drive DC/DC converters for notebook PCs, servers, etc.

## < Prices in Japan >(For Reference)

Product Code	Sample Price (Yen)
HAT2164H	200
HAT2165H	200

## < Specifications >

Product Code	Package*	Maximum Ratings			On-Resistance RDS (on) (milliohm)				Gate-Drain charge Qgd (nanocoulomb) typ.
		VDSS (V)	ID (A)	Pch** (W)	VGS = 4.5 V		VGS = 10 V		
					typ.	max.	typ.	max.	
HAT2164H	LFAK	30	60	30	3.0	4.4	2.5	3.1	15
HAT2165H	LFAK	30	55	30	3.9	5.6	3.0	3.7	9.5

\* LFAK: Hitachi package code

\*\* Tc=25

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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.

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