650-V IGBTs Deliver High Efficiency With Soft Switching

ROHM's RGTV and RGW series 650-V IGBTs are said to combine class-leading low conduction loss with high-speed switching characteristics. This makes them well suited for power conversion in general-purpose inverters and converters for consumer appliances, such air conditioners and induction heaters, as well as industrial equipment, including power conditioners, welding machines, and UPSs. A total of 21 models are offered across the RGTV series, which features short-circuit tolerance, and the RGW series, which offers fast switching speed. The table below lists devices by current rating and packaging options.

ROHM utilized thin-wafer technology and a proprietary structure to optimize the tradeoff between conduction loss and switching speed. For example, when the new IGBTs are used in an interleaved PFC circuit, efficiency is improved by 1.2% at light loads and 0.3% under heavy loads, says the vendor, contributing to lower application power consumption. Fig. 1 illustrates this example of improved efficiency, while Fig. 2 depicts the reduction in wafer thickness and reduction in switching losses.

In addition, optimizing the internal design allowed ROHM to achieve smooth switching characteristics that decrease voltage overshoot by 50% compared to products with equivalent efficiency, according to the vendor. This improvement reduces the number of parts required along with design load (Fig. 3.) The two new IGBT series are now available in both sample and OEM quantities.

For more information, see the RGTV series page, and the RGW series page.

Table. Device ratings and packaging options for the RGTV and RGW series 650-V IGBTs.

New RGTV Series (Short-Circuit Tolerance Type)

	TO-247N		TO-3PFM	
	IGBT Only	With Built-In FRD	IGBT Only	With Built-In FRD
30A	RGTV60TS65	RGTV60TS65D	RGTV60TK65	RGTV60TK65D
50A	RGTV00TS65	RGTV00TS65D	RGTV00TK65	RGTV00TK65D
80A	RGTVX6TS65	★ RGTVX6TS65D	-	-

Condition: Tj=100℃, ★ Under Development

New RGW Series (High-Speed Switching Type)

	TO-247N		TO-3PFM	
	IGBT Only	With Built-In FRD	IGBT Only	With Built-In FRD
30A	RGW60TS65	RGW60TS65D	RGW60TK65	RGW60TK65D
40A	RGW80TS65	RGW80TS65D	RGW80TK65	RGW80TK65D
50A	RGW00TS65	RGW00TS65D	RGW00TK65	RGW00TK65D

Condition: Tj=100℃

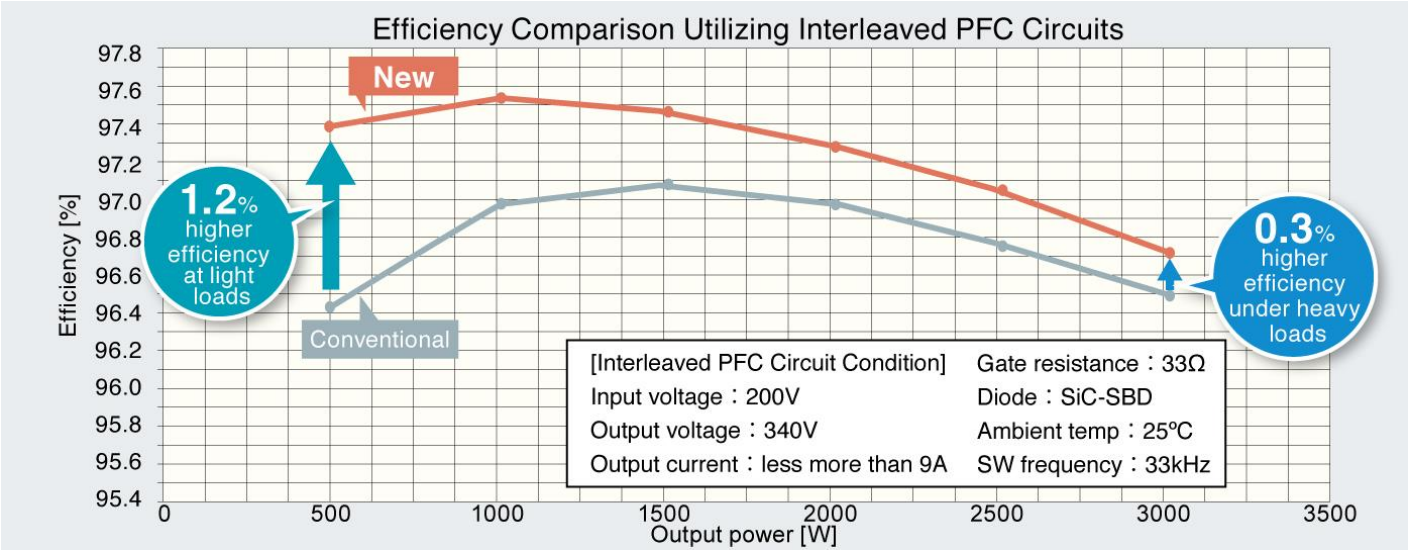

Fig. 1. When applied in an interleaved PFC circuit, the IGBTs are said to improve efficiency by 1.2% at light loads and 0.3% under heavy loads versus existing devices.

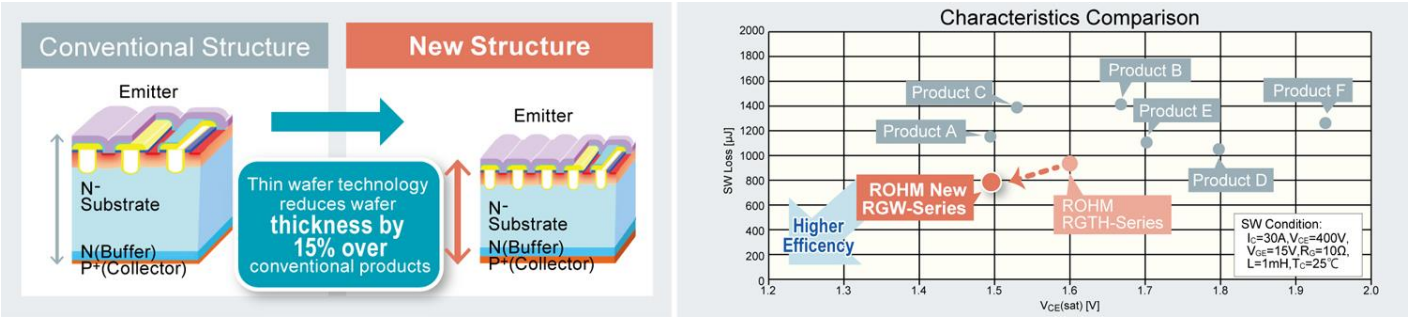

Fig. 2. These two new series adopt thin wafer technology that reduces wafer thickness by 15% over conventional products and an original structure featuring a refined cell design to provide the industry's lowest conduction loss ($V_{CE(sat)}$=1.5V) with fast switching characteristics (t_f = 30 to 40 ns), according to the vendor.

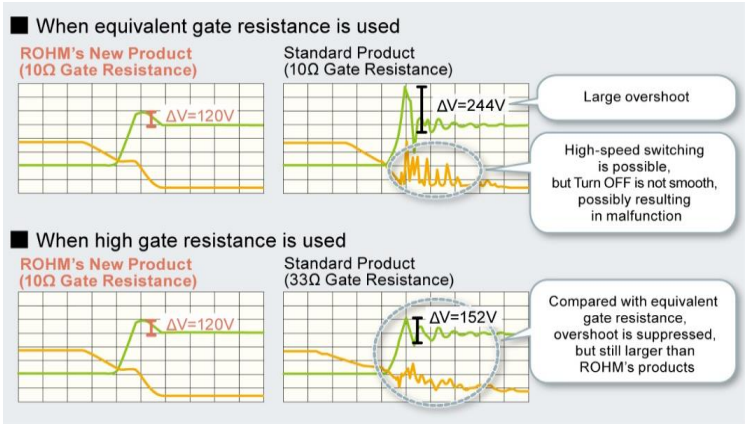

Fig. 3. Internal device optimization makes it possible to achieve soft switching for smooth on-off operation. This decreases voltage overshoot during switching by as much as 50% over conventional products, reducing the number of external parts required, such as gate resistors and snubber circuits used to control overshoot.