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New 650 V Fast Body Diode MOSFETs Increase Voltage Headroom for Soft Switching in Industrial, Telecom, and Renewable Energy Applications

Product Benefits:

- 650V drain-to-source voltage
- Low reverse recovery charge (Q_{rr}) increases reliability in zero voltage switching / soft switching topologies
- Offered in thin-lead TO-220 FullPAK, D²PAK (TO-263), TO-247AC, TO-220AB, and PowerPAK® 8x8 packages
- Ultra-low on-resistance and gate charge reduce conduction and switching losses
- Withstand high energy pulses in the avalanche and commutation mode with guaranteed limits through 100 % UIS testing
- RoHS-compliant and halogen-free



Market Applications:

- Switch mode applications including solar inverters, server and telecom power systems, ATX/Silver box PC SMPS, welding equipment, UPS, battery chargers, external electric vehicle (EV) charging stations, and LED, high-intensity discharge (HID), and fluorescent ballast lighting

Circuit Topologies:

- Designed for soft switching or zero voltage switching topologies such as:
 - Phase-shifted bridges
 - LLC converters
 - 3-level inverters
- Can be also be used for “hard switching” topologies where the body diode MOSFET operates only in the first quadrant (never turns on):
 - Power factor correction (PFC)
 - Two-switch forward converter
 - Flyback converter
 - Forward converter

The News:

- Vishay Intertechnology expands its portfolio of fast body diode n-channel power MOSFETs with the introduction of new 650 V EF Series devices. Built on E Series superjunction technology and augmenting



the company's 600 V offering, the Vishay Siliconix SiHx21N65EF, SiHx28N65EF, and SiHG33N65EF provide additional voltage headroom for industrial, telecom, and renewable energy applications when desired.

The Perspective:

The Vishay Siliconix 650 V EF series of fast body diode MOSFETs provides a full complement to Vishay's standard E Series components by delivering a 10x lower Qrr and increased reliability than standard MOSFETs, while offering 650 V options to offer additional voltage headroom. This completes the superjunction family for 600 V and 650 V with both E series and EF series options available and expands the Vishay Siliconix offering to devices that can be used in ZVS / soft switching topologies such as phase-shifted bridges and LLC converter half bridges. The devices' low Qrr allows them to regain the ability to block the full breakdown voltage more quickly, helping to avoid failure from shoot-through and thermal overstress. Their ultra-low on-resistance and gate charge translate into extremely low conduction and switching losses to save energy in high-power, high-performance switch mode applications.

The Key Specifications:

Part #	R _{DS(ON)} (mΩ) @ 10 V (max.)	Q _g (nC) @ 10 V (typ.)	I _D (A) @ 25 °C	Qrr (μC) @ 25 °C (typ.)	Package
SiHA21N65EF	180	71	21	1.2	Thin-lead TO-220 FullPAK
SiHB21N65EF	180	71	21	1.2	D ² PAK (TO-263)
SiHG21N65EF	180	71	21	1.2	TO-247AC
SiHH21N65EF	157	68	21	0.9	PowerPAK 8x8
SiHP21N65EF	180	71	21	1.2	TO-220AB
SiHG28N65EF	102	97	28	1.1	TO-247AC
SiHP28N65EF	102	97	28	1.1	TO-220AB
SiHG33N65EF	95	114	33	1.18	TO-247AC

Availability:

Samples and production quantities of the new 650 V EF Series MOSFETs are available now, with lead times of 16 to 18 weeks for large orders.

To access the product datasheets on the Vishay website, go to

- <http://www.vishay.com/ppg?91772> (SiHA21N65EF)
- <http://www.vishay.com/ppg?91606> (SiHB21N65EF)
- <http://www.vishay.com/ppg?91607> (SiHG21N65EF)
- <http://www.vishay.com/ppg?91739> (SiHH21N65EF)
- <http://www.vishay.com/ppg?91550> (SiHP21N65EF)
- <http://www.vishay.com/ppg?91708> (SiHG28N65EF)
- <http://www.vishay.com/ppg?91707> (SiHP28N65EF)
- <http://www.vishay.com/ppg?91717> (SiHG33N65EF)

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