

950-V Superjunction MOSFETs With Fast Body Diode Address Lighting And Industrial SMPSs

[Infineon Technologies'](#) CoolMOS PFD7 high-voltage MOSFET family is said to set a new benchmark in 950-V superjunction (SJ) technology. The 950-V series combines high performance with ease of use and features an integrated fast body diode ensuring a robust device and in turn a reduced bill-of-materials (BOM). Tailored to ultrahigh-power density as well as the highest efficiency designs, the MOSFETs primarily address lighting systems, as well as consumer and industrial SMPS applications.

The devices are suitable for flyback, PFC, and LLC and LCC designs, including half- or full-bridge configurations making commutation robust and reliable. By integrating an ultra-fast body diode with ultra-low reverse recovery charge (Q_{rr}), they offer hard commutation ruggedness and reliability. According to the company, this makes it the most robust SJ MOSFET in this voltage class, enabling usage across all topologies in the targeted applications.

In addition, significantly reduced switching losses (E_{oss} , Q_{oss} , and Q_g) improve efficiency in hard- and soft-switching applications and result in up to 4°K lower MOSFET temperature compared to a 900-V CoolMOS C3 SJ MOSFET, says Infineon. The MOSFETs also improve light- and full-load PFC efficiency by more than 0.2% while matching the performance with regard to LLC efficiency.

The CoolMOS PFD7 family offers up to 55% lower on-resistance devices in various SMD and THD packages, such as 450 mΩ in DPAK or 60 mΩ in TO247 (see the table and figure). This enables designers to use smaller packages and boost power density and board space savings at reduced BOM and production costs. A gate-source threshold voltage ($V_{GS,th}$) of 3 V and smallest $V_{GS,th}$ variation of ± 0.5 V, makes the new devices easy to design-in and drive.

Due to the low threshold voltage and tolerance, MOSFET linear mode operation is avoided while allowing lower driving voltage and reduced idle loss. Additionally, a 60% lower gate charge compared to CoolMOS C3 results in significantly reduced driving losses. ESD ruggedness is ensured with a human body model (HBM) level of class 2, providing reduced ESD-related failures and improved manufacturing yield.

The 950-V CoolMOS PFD7 family is offered in SMD and THD packages to enable smaller form factors with an increased power density and BOM savings. All product variants can be ordered now. For more information, see the 950-V CoolMOS PFD7 [page](#).



Figure. The CoolMOS PFD7 950-V superjunction MOSFETs feature reduced on-resistance and 60% improved gate charge compared to earlier generation CoolMOS C3 900-V devices.

Table. Key specs for members of the CoolMOS PFD7 high-voltage MOSFET family.

Product	R _{DS(on)} max	I _D nom	I _D puls max	Q _G
D2PAK (TO-263)				
IPB95R310PFD7	310 mΩ	17.5 A	62 A	61 nC
IPB95R450PFD7	450 mΩ	13.3 A	43 A	43 nC
DPAK (TO-252)				
IPD95R450PFD7	450 mΩ	13.3 A	43 A	43 nC
TO-220 (FullPAK)				
IPA95R310PFD7	310 mΩ	8.7 A	62 A	61 nC
IPA95R450PFD7	450 mΩ	7.2 A	43 A	43 nC
TO-247				
IPW95R060PFD7	60 mΩ	74.7 A	342 A	315 nC
IPW95R310PFD7	310 mΩ	17.5 A	62 A	61 nC