DirectFETs Are Qualified for Automotive

International Rectifier has qualified its DirectFET package for automotive applications and is introducing two new MOSFETs in the AEC-Q101 qualified package (Fig. 1.) Entirely lead-free, the AUIRF7739L2 and AUIRF7665S2 automotive DirectFET2 power MOSFETs offer high power density, dual-sided cooling and low parasitic inductance and resistance. Fig 2. compares the cooling capability and package resistance of the DirectFET package with that of popular plastic packages. These first two DirectFET2 devices are rated for 40-V and 100-V V_{DSS}. However, the automotive DirectFET2 packaging platform has been AEC-Q101 qualified for voltage ratings up to 250 V.

The 40-V AUIRF7739L2 is offered in the relatively new large (L) can version of DirectFET. The L can accommodates a die that is up to 30% larger in area than a D^2Pak, yet the L can has a footprint that is 60% smaller than the D^2Pak. The AUIRF7739L2 is optimized for low on-resistance, targeting heavy load motor control applications including electric power steering , battery switches and integrated starter alternators in micro hybrid vehicles, and chassis, drive train and power train systems.

The 100-V AUIRF7665S2, which comes in the small can version of DirectFET, is optimized for very low gate charge and targets automotive switching applications including the output stage of Class D audio amplifiers as well as dc-dc converters and fuel injection systems. Additional specs and features are listed below in the table.

Datasheets, application notes, simulation tools and qualification standards are available online at www.irf.com. Pricing for the AUIRF7739L2 and the AUIRF7665S2 begins at $2.60 each and $0.46 each, respectively, in low-volume quantities.

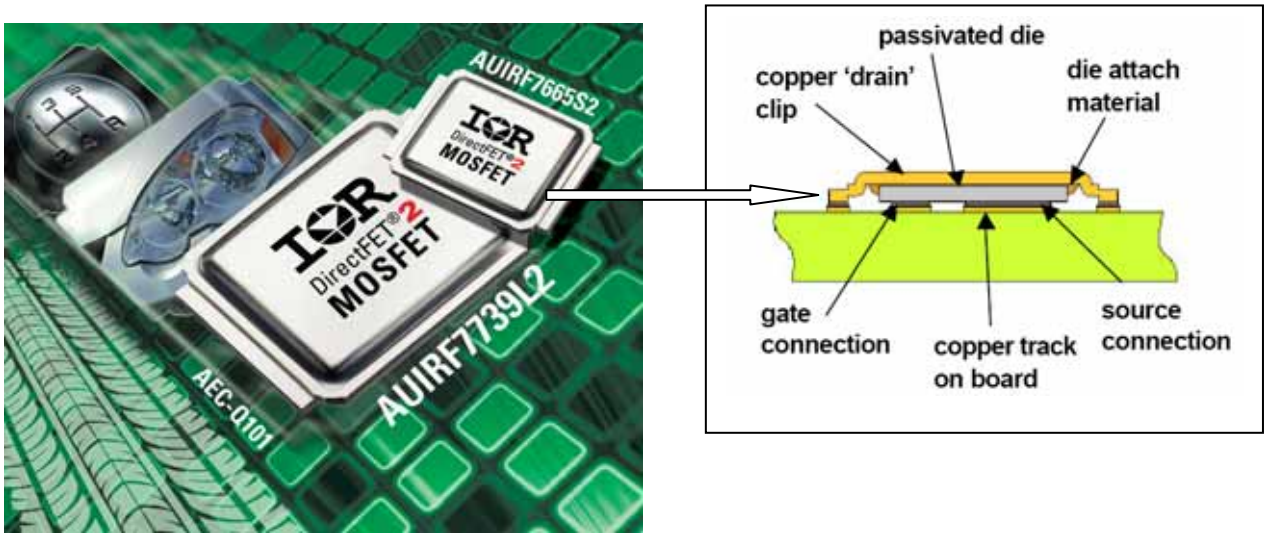

Fig. 1. The AUIRF7739L2 and AUIRF7665S2 are AEC-Q101 qualified MOSFETs in the DirectFET package, which replaces the traditional plastic, overmolded package with a metal can that allows top-side cooling.

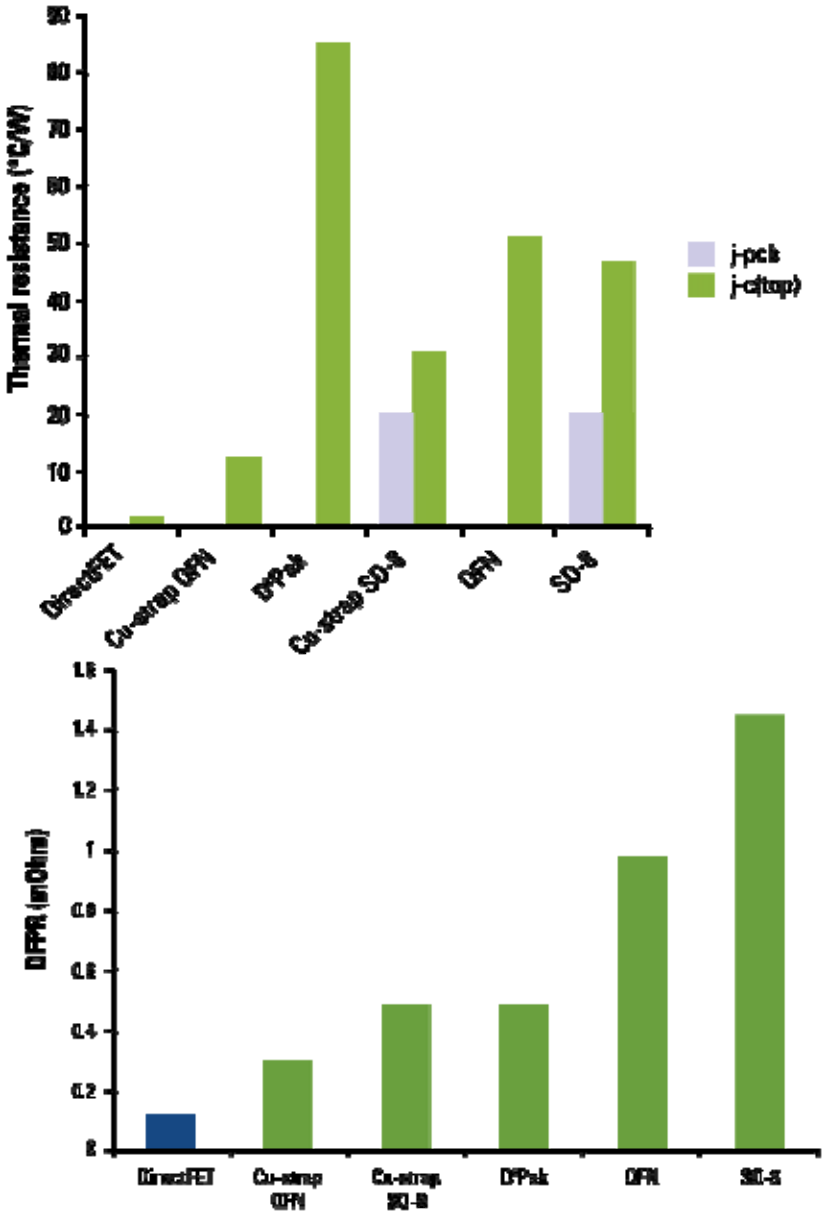

Fig. 2. The DirectFET package reduces the thermal resistance from the die to the top of the package when compared with standard surface-mount packages for power MOSFETs (top bar graph). DirectFET also introduces less parasitic resistance (die-free package resistance) than the standard packages (bottom bar graph).

Table. Key Specs and features of AUIRF7739L2 and AUIRF7665S2 automotive DirectFET2 power MOSFETs

	AUIRF7739L2	AUIRF7665S2
Key Specifications	40-V rating Large can 700-μΩ $R_{DS(ON)}$ typ. 1000-μΩ $R_{DS(ON)}$ max.	100-V rating Small can 51-mΩ $R_{DS(ON)}$ typ. 62-mΩ $R_{DS(ON)}$ max. 8.3-nC Q_G typ.
Key Features	Optimized for low $R_{DS(ON)}$ 60% smaller footprint than D^2PAK High current-handling capability	Optimized for low Q_G Excellent switching performance
	Dual-sided cooling Low parasitic parameters AEC-Q101 qualified and survives auto-clave test	
Targeted applications	Motor control (electric power steering) Dc-dc conversion (micro hybrid) Battery switch (micro hybrid)	Class D audio Dc-dc conversion Fuel injection