SupIR-SMD™: Advanced Rad Hard MOSFET Packaging Designed for Direct-to-PCB Mounting

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For classical space applications, radiation hardened (rad hard) electronic components must be capable of withstanding severe thermal, mechanical and radiation conditions, for 15 years or sometimes longer. For spacecraft power systems, the barrier is amplified as the majority of the power components are only available in surface mount packages. Power system designers are often challenged to reliably attach surface mount power packages to PCBs however, due to thermal expansion mismatch between the board and package, manufacturing inefficiency are often encountered. This leads to increase manufacturing costs, development effort and time-to-market.

To overcome these challenges, IR HiRel developed an advanced rad hard FET package, the SupIR-SMD, that enables direct-to-PCB mounting. Compared to the nearest packaging solution, the SMD-2 on carrier, SupIR-SMD offers improved physical performance parameters and a superior solution for thermal expansion and heat transfer. SupIR-SMD is also JANS-qualified in accordance with MIL-PRF-19500.

In this presentation, we'll discuss the design methodology, and the PCB-level protocols developed to simulate our typical customer application and environment, and qualify the SupIR-SMD package.