

# Electronics Packaging Methods and Materials for Implantable Medical Devices

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## Abstract

Electronics packaging for complex medical devices demands innovation and advanced capabilities, but achieved in a manner which ensures reliability and performance. The evolution of "smart" systems is driving complexity with integration of logic, memory, signal processing, biosensors, power and wireless connectivity. For implantable, wearable and portable devices, miniaturized and unique form factors require innovative size, weight and power (SWaP) reductions. This paper provides an overview of requirements and applications of smart medical devices. Advanced electronic packaging options that can support complex integration in miniaturized, atypical form factors are discussed. Flexible 3D interconnects that can accommodate folded, nested and/or rolled form factors, as well as custom stacked die ball grid array (SDBGGA) packages are presented. The development of biocompatible material constructions incorporating liquid crystal polymer (LCP) and noble metals for direct implants is also discussed.