Ametek Electronic Packaging S-Bend Ceramic Feedthrough

Ken McGillivray – Ametek, New Bedford, MA

E-Mail: ken.mcgillivray@ametek.com

Abstract

This is a technical presentation of Ametek Electronic Packaging's introduction of a novel high speed ceramic interconnect design (Ceramic Feedthrough) to achieve higher bandwidth signal performance in hermetic packages. Ametek's design, referred to as an "S-Bend Ceramic Feedthrough" provides a smooth, uninterrupted RF signal path from the wirebond shelf inside the package down to the printed wiring board outside the package without 90 degree via transitions. Superior performance at operating frequencies up to 80 GHz (and higher) can be achieved. This design may be applied to hermetic package applications requiring compact interconnect separation of 0.050 inch and smaller, as compared to larger SMP and SSMP designs. Vertical signal paths (0.01 to 1 inch height) connecting the internal RF devices with the external printed wiring board can be accommodated, providing a solution for mismatched "device height" to "board height" design scenarios. Ametek's "S-Bend Ceramic Feedthrough" provides a high frequency interconnect advantage by eliminating 90 degree transitions ("vertical vias" and "stair-step vias") through a package wall as compared with the "related art" disclosed in United States Patent No. 8,933. The S-Bend design eliminates the RF reflection caused by 90 degree via transitions. A bandwidth performance increase is achieved as the result of the reduced reflection coefficient (no via transitions) and the related benefits of reduced return loss and reduced transmission loss. The S-Bend Ceramic Feedthrough design may be applied to package applications utilizing HTCC as well as LTCC ceramic package manufacturing technologies.