# Reliable Sealing of Metal Packages

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**Abstract**

This article addresses hermetic weld sealing of semiconductor devices, considered by many to be an important legacy technology from decades gone bye, and not currently relevant in today's arsenal of seal technologies. However, we will show that it is still used to seal various high power devices as well a high reliability semiconductors, crystals, photonic devices and hybrid circuit packages. Its popularity primarily stems from the fact that it can be used to quickly and efficiently produce true hermetic seals in components. The welding is so rapid, that it is essentially a room temperature technology and the equipment is small enough that it can be housed in a controlled chamber filled with any gas that is not explosive. Air, Nitrogen, Argon, Helium and their mixtures are the most common gasses. In some applications the technology competes against laser welding, but unlike laser welding the entire seal takes place in a few milliseconds because it is a single discharge component-shaped spot weld, which means that the entire seam is made in a single high speed discharge. This process results in minimal stress and distortion, and maximum hermetic properties, strength and reliability, without requiring electroplating or preforms. Internal dew points can be held to -40 degrees, or lower if required. Other common applications for this technology include sealing and welding of nuts and studs for hermetic applications and sealing of devices for medical applications that must endure autoclave sterilization. In the course this presentation, we will take you back to the roots of the origins of the original resistance welding process as taught by the original process developers so that you will see for yourself how things have changed, and the reasons for the changes.