MULTI-CAVITY BOARD LEVEL SHIELDING: WHEN MAXIMIZING PCB REAL ESTATE AND REDUCING WEIGHT IS CRITICAL

As electronic devices continue to get smaller and printed circuit board complexity increases due to higher operating frequencies, the requirements for advanced board level shielding solutions become more acute. As well, with the rise in wireless products, the need for circuit board isolation has grown significantly due to the challenging operation of wireless protocols like Bluetooth, LTE, CDMA, GPS, Zigbee, WiFi, and many others.

Very often, designers use individual board shields to isolate noisy components or groups of components on the board to reduce potential interference between different portions of the PCB. As PCBs get smaller, the need for more RF isolation increases. Solder traces and the spacing between the individual shields take up a significant portion of the PCB real estate. Rather than having multiple shields on a PCB, which require their own solder trace, a single "multi-cavity" shield is employed with a common cover and common walls. A multi-cavity PCB shield maximizes the available board space while reducing the overall solder trace footprint by as much 25-50 percent (Figure 1). Multi-cavity shielding also uses less material, which can significantly reduce the weight of the printed circuit board.

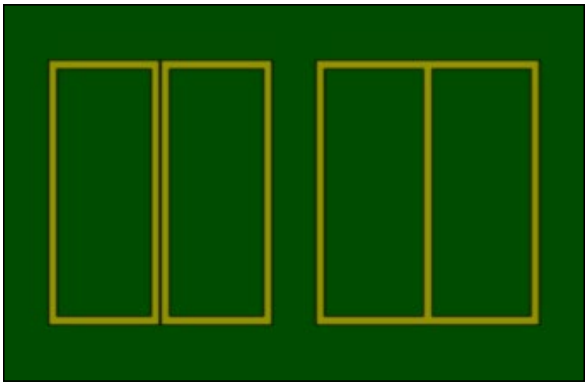
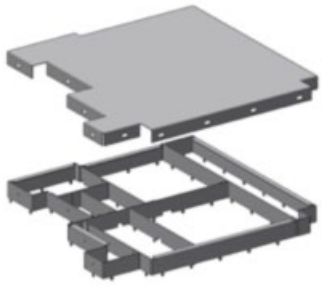


Figure 1: *Individual shield solder trace (left) vs. multi-cavity shield solder trace.*

Multi-cavity board level shielding is an effective solution to combine many individual shields, which are in close proximity, into one PCB shielded enclosure. These shields are typically designed as a two-piece component with inner walls, which are strategically placed, to partition off the separate compartments utilizing one common cover. Multi-cavity shields are produced using either photo chemical etching or a stamping process, which allows designers to easily construct these shields for surface-mount, through-hole, or a combination of both if required. The design flexibility of multi-cavity shielding enables implementation of standard features such as ventilation holes for cooling, mouse holes for trace entry/exit, custom cutouts for connector and cables, and vault tabs for enhanced grounding of inner walls to cover.



FASweld™ Shields
Through-Hole w/ Welded Frame

The industry's two most common multi-cavity shield construction styles are FASweld™ and SmartFORM™. FASweld style shields are often used when a design calls for low-volume, high-complexity multi-cavity construction where the inner walls are welded to the perimeter frame to create multi-compartments. These shields tend to be larger in size and are recommended for through-hole applications.

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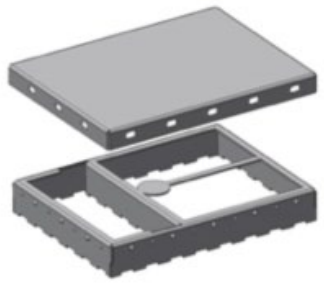
MULTI-CAVITY BOARD LEVEL SHIELDING: WHEN MAXIMIZING PCB REAL ESTATE AND REDUCING WEIGHT IS CRITICAL (cont'd)



SmartFORM™ Shields
Surface-Mount w/ Pick Target

SmartFORM style shields are formed complete from a single piece of material to create the inner walls and are purposely designed for surface-mount applications. This is the most economical method to produce high-volume multi-cavity shielding since these designs can be photo-etched or stamped using progressive die tooling. These shields are also designed with an optional pick target for tape-and-reel automation.

As with any EMI/RFI shield, it's imperative that you consider shielding in the early stages of your design. It's best to prevision for printed circuit board shielding and remove it if it's not required after compliance testing. The use of SmartFORM style shields should also be used when possible to help reduce shield placement costs.

Whatever your industry, whatever your application, Orbel's custom design and manufacturing process means engineered solutions designed to your exact demands. Start to finish, from conception through delivery, Orbel offers today's most effective EMI/RFI shielding, photo-etched precision metal parts, precision metal stampings, and electroplated metal foils. For more information, visit Orbel.com or call 610-829-5000.

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