

BBG Tech Tip #8

Test Coupons

Test coupons are used as an indicator of quality—a tool for both the manufacturer and customer to help determine the quality of the manufacturing process and, hopefully, the quality of the finish printed circuit board. The word “hopefully” is used because the testing of the coupon is at best to be representative of the finished product.

The customer will use the coupon as an incoming inspection tool and would help in determining failure analysis if a failure occurred during or after the assembly process. The purpose of the coupon is destructive analysis to “help” verify the quality of the printed circuit board to be shipped.

Test coupons—when required by the customer’s specifications—are placed on every manufacturing panel and are approximately a half-inch in size by several inches in length depending on the complexity of the board they are to “mimic.” Coupons will have the same amount of layers, hole-sizes, solder mask and even a test for controlled impedance if required.

Before the coupons are sheared or separated from the manufacturing panel, they are serialized or numbered to record that a specific board or boards that came from the very same manufacturing panel as that particular coupon.

Before the printed circuit boards are shipped from the manufacturer, the coupons are cross-sectioned and inspected. Those coupons that pass will have their corresponding boards shipped to the customer. Those printed circuit boards associated to the coupons that failed are considered scrap and are not to be shipped.

Coupons are used primarily in military or in commercial orders that require IPC-6012 Class 2 or 3 which will determine the sampling plan or rather the amount of coupons that need to be sectioned per manufacturing lot. The more critical the application, the larger the sampling plan. The addition of coupons, all the associated inspection and paperwork required is a major cost adder and must be seriously considered necessary for the application.

The words “hopefully” and “help” were mentioned earlier and here is why: Coupons are just to give a level of comfort that the board pretty much was manufactured correctly per the print. However, there is no guarantee that everything is perfect—as our industry professionals do state:

“When the coupon is bad, the board is bad. When the coupon is good, the board *may be good.*”

Research for the above information may be from, but is not limited to, IPC reference manuals, the PCB Handbook, the Bare Board PWB Design Manual and consultation with industry professionals. Please consult a process engineer familiar with your company’s PCB assembly process before making any procedure changes.