

MAJR Shield^{®†} – EMI/RFI Shielding and Thermal Management Board Level Shield (5310 Series), †US Patent No.:7,589,968

Product Summary

MAJR Shield is an EMI/RFI Board Level Shield that allows significant airflow and heat dissipation of electronic components. Thermally, MAJR Shield incorporates either straight honeycomb with stand-off fence mounting for convection “Chimney effect” heat dissipation or angled honeycomb for forced air applications – both configurations provide high EMI/RFI shielding performance.

Product Application

MAJR Shield is designed for applications where EMI/RFI shielding and heat dissipation is needed. MAJR Shield is also used for electronics that require long life by targeting airflow to reduce component operating temperature.

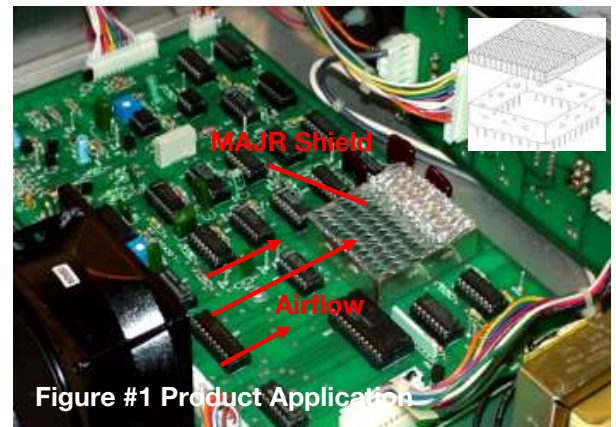
Heat dissipation of the MAJR Shield product is accomplished by two methods: 1. Convection “chimney effect”, cool air enters the bottom of the shield capturing heat from electronic components, and exiting the shield through conductive honeycomb cells. 2. Forced air from an external fan is directed into the interior of the shield by means of angled honeycomb cells; heated air then exits through opposite angled honeycomb cells (Figure #1).

MAJR Shield metal honeycomb material utilizes the waveguide beyond cut off effect and is designed to meet EMC emission / susceptibility requirements for present and future electronic equipment; see radiated testing (Figure #2).

Metal honeycomb material is available in either steel or aluminum with a variety of plating, or an RoHS compliant galvanic coating. Fence materials are available in a variety of solderable metals such as Nickel silver, tin plated steel, brass, or copper; other metals and plating available upon request. MAJR Shield is available in many customizable configurations of length, width, and height. In addition to angled or straight honeycomb, mounting configurations such as SMT feet, pin, stand-off, or flat surface are available.

Product Features

- High EMI/RFI Shielding performance through the use of metal honeycomb material
- Excellent cooling of electronic components without the expense and weight of heat pipes
- Easily mounted to a circuit board footprint using standard mounting configurations
- Low cost photo etch and form tooling for standard or complex applications
- Able to see and test the shielded circuit through 0.125 in. dia. straight honeycomb cells
- Metal honeycomb is removable for component replacement and since grounded to the fence it will not act like an antenna re-radiating electronic device noise as a floating heat sink.



Product Technical Data

Radiated testing - Testing was conducted in a shielded enclosure to control spurious emissions. A transmit loop antenna within the various MAJR Shield configurations was used for the test. A dual ridge horn antenna was used as the receive antenna in a far field condition; figure #2 and figure #3.



Figure #2 Test Configuration



Calibration of reference level

Calibration was performed with a loop antenna without a shield to establish a baseline frequency response. A solid shield was placed over the loop antenna to establish the dynamic range for each frequency (1-10 GHz).



Product Testing

Testing was performed using various MAJR Shield configurations placed over the transmit loop antenna. Each shield was compressed onto the test fixture base (Ag/AI conductive elastomer) using a non-conductive tension line.

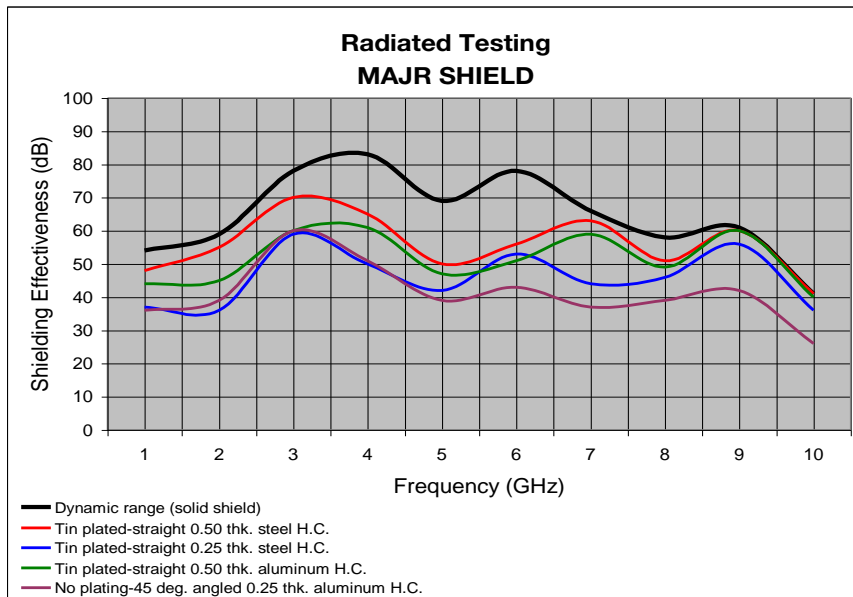


Figure #3 Graph of Frequency vs. Shielding Effectiveness

Summary

Operational frequencies are ever increasing in electronic devices and due to inherent skin effect heat is becoming more of an issue along with radiated emission levels. Heat must be removed from chips as soon as possible to avoid improper operation, failure, or premature product life. Shielding is needed to protect against crosstalk and to meet FCC and CE regulations. The MAJR Shield product can accomplish both heat dissipation and shielding functions at the source.