

## **ECLIPS: Embedded Cooling Layer – Integrated Power System**

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### **Abstract**

A System of Producing High-Power RF Circuit Boards Employing a Newly Developed, Thermally Engineered, Ceramic-Matched CTE Metalized Layer.

ECLIPS is a recently developed and patented technology for the fabrication of Printed Circuit Boards used primarily in high-power RF/millimeter wave applications. It involves the use of a thermally engineering metalized layer with superior thermal characteristics and a ceramic-matched CTE. The resulting Printed Circuit Boards allow the user to direct die-attach high-power RF die, such as GaA and GaN devices through a cavity in the outer core layer(s), directly to the thermal layer below; and then wire bond to the surface conductive layer. CTE (coefficient of thermal expansion) of the material allows for the reliable die-attach and wire bonding and the thermal characteristics quickly and efficiently evacuate the tremendous heat generated.

This technology is an alternative to co-fired ceramics and hybrid integrated circuits and replaces the need for bulky, heavy heat sinking schemes around the high-power devices. And since the item is essentially a Printed Circuit Board, made from otherwise common Printed Circuit Board materials, the electronic components on board that do not need to be bare die can be standard “plastic parts” attached in a standard SMT (surface mount technology) process such as a vapor phase. This results in an electronic system that is smaller, lighter weight, and certainly much less costly than the common alternatives.