

Embedded Thin Film Nickel-Phosphorus Resistors An Update on Current Applications & Design for Military and Space Electronics

Bruce Mahler
Ohmega Technologies, Inc.
bmahler@ohmega.com

The Nickel-Phosphorus (NiP) thin film resistive material has been used for over 45 years in a variety of high-performance military/aerospace and space-based applications. The NiP resistive material acts as a resistive “blank slate”—providing the PCB designer with a tool for addressing contemporary electronic issues requiring passive resistors or resistive films.

Embedded NiP resistors exhibit excellent stability in harsh environments where temperature extremes, high G-force, vibration and highly magnetic fields make the use of discrete chip resistors problematic. Embedded NiP resistors are fractions of a micron thick film which has no impact on PCB thickness. They also eliminate the need for solder joints, and can be placed within the PCB under other components, allowing for reducing the board size or thickness. The NiP resistors are created using standard subtractive PCB processes, allowing for the production of extremely small resistor footprints.

This paper will review some of the current applications and designs for the NiP resistor technology, including in high frequency power dividers, heater elements, R-Card and absorbers and as terminating resistors for high speed logic.