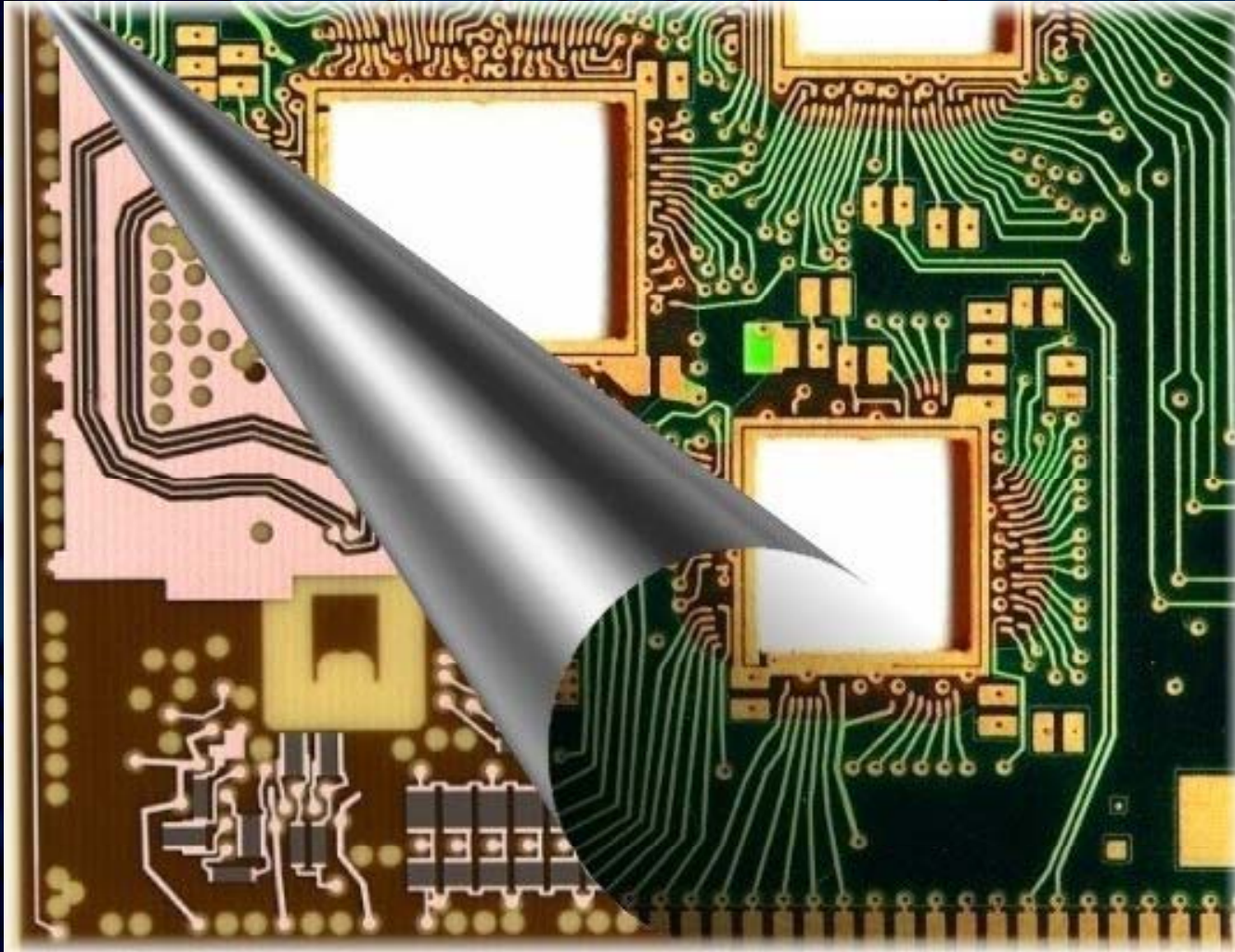


Ohmega Technologies, Inc.

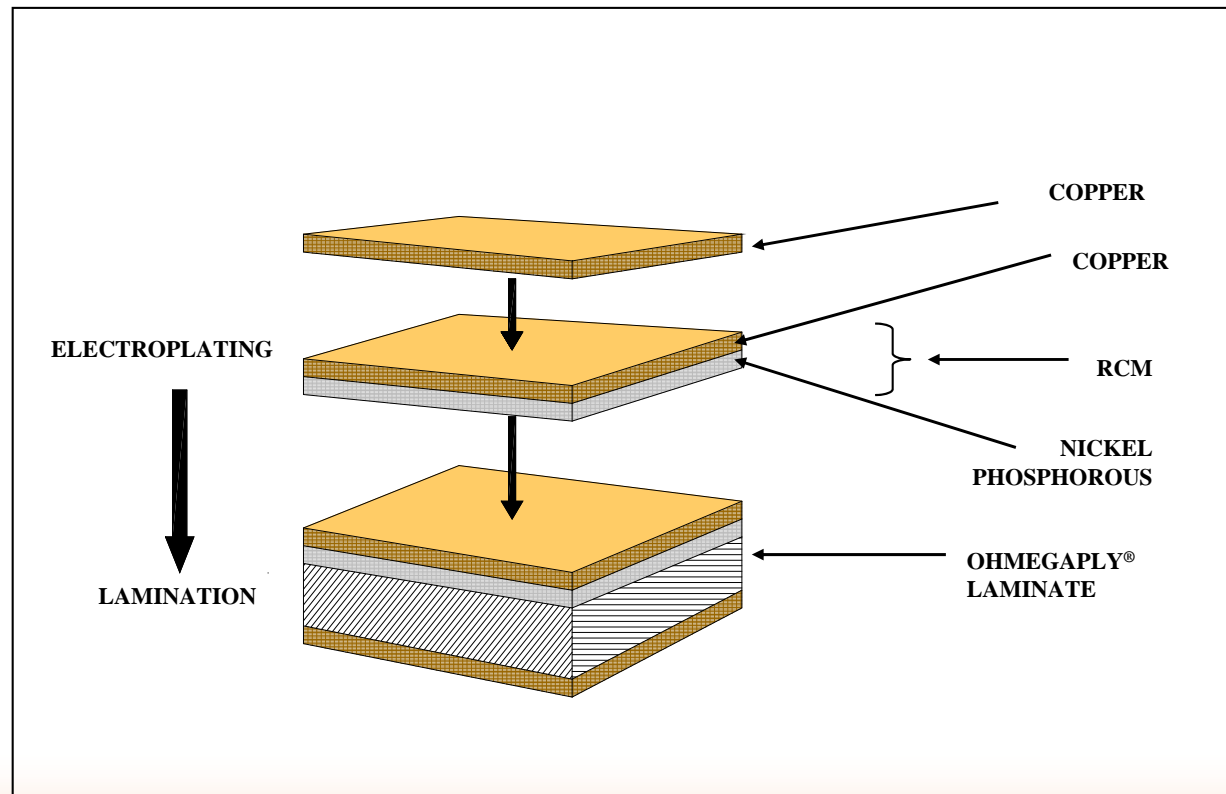


OhmegaPly[®] Overview Presentation

1. Electrodeposited thin film resistive material for planar resistor
2. Standard subtractive PCB processing
3. Surface or embedded resistors
4. Mature technology (36+ years)
5. Field Proven, Excellent Long Term Reliability
6. Performance Enhancing, Cost Effective Resistor Technology in High Speed/High Density Circuit Designs

OhmegaPly[®] Manufacturing Overview

OhmegaPly[®] is a Nickel Phosphorous (NiP) metal alloy that is electrodeposited onto the matte, or tooth side, of copper foil. The thin film NiP metal alloy/copper foil combination is called OhmegaPly RCM (RESISTOR-CONDUCTOR MATERIAL). The RCM is laminated to a dielectric material (like any other copper foil) and subtractively processed to produce copper circuitry and planar resistors. Because of its thin film nature, it can be embedded within layers without increasing the thickness of the board or occupying any board surface area as is required for discrete chip resistors.



Sheet Resistivity	Material Tolerance	Typical Applications
10 Ω/\square	3%	Developed for series termination resistors as ORBIT [®] (Ohmega Resistors Built In Trace) and also used for other applications, like flexible heaters
25 Ω/\square	5%	} Used primarily for series/parallel termination resistors and power dividers
50 Ω/\square	5%	
100 Ω/\square	5%	Used primarily as pullup/pulldown resistors for electronic logic circuits
250 Ω/\square	10%	High ohmic applications

A. Electrical Advantages

1. Improved line impedance matching,
2. Shorter signal paths and reduced series inductance,
3. Eliminate the inductive reactance of the SMT device,
4. Reduced cross talk, noise and EMI

B. PCB Design Advantages

1. Increase active component density & reduced form factors,
2. Improved wireability due to elimination of via.
3. Improved reliability due to elimination of solder joints.

C. Improved Reliability

1. Low RTC of <50 PPM (-55 ° C to 125 ° C)
2. Life testing: 100,000 hours = +2% at 110° C
3. Stable over wide frequency range: tested beyond to 40+ GHz.
4. Lead-free compatible

D. Economic Advantages

1. Elimination of discrete resistors
2. Improved assembly yield
3. Board densification and/or size reduction

D. Economic Advantages

4. Board simplification (double sided SMT to single sided SMT; potential layer and via count reduction)
5. Deliver tested board to the assemblers

E. Minimal Risk

1. Over 34 years of use
2. Predictable
 - Design: Know how to achieve target with simple formula ($L/W \times R_s$)
 - Process: Know how to characterize and compensate
 - Linear relationship: increase 10% resistor length equal to 10% increase in resistance value
 - Yield: standard distribution, tolerance drive yields
3. Proven long term reliability



