

# Build-to-Print Thin Film Solutions



Knowles Precision Devices offers Build-to-Print services to support thin film product design, manufacturing and testing from prototype to high volume production.

Our goal is to help you achieve the highest performance design possible. We do this through enhanced process controls and tighter line tolerances combined with material selection that suits your needs, including standard and custom ceramic substrates and pure metals.

Looking for tighter resistor tolerances, gold-filled vias or polyimide processing? Our engineering experts can help!

## TIGHT RESISTOR TOLERANCES: 5-6 WEEKS LEAD TIME\*

- » Typical resistor tolerances of +/-10% without trimming, with some designs achieving +/-5%
- » Tight resistor tolerances of +/-1% can be achieved using laser trimming technology
- » Resistors as small as  $50.8\mu\text{m}^2$  ( $0.002\text{ in}^2$ )
- » For tighter tolerances or more complex resistors, contact our experts

## GOLD-FILLED AND COPPER-FILLED VIAS: 6-7 WEEKS LEAD TIME\*

- » Provides a good thermal path and ground return path
- » Eliminates transfer of material through the substrate during assembly
- » Gold-filled vias can be baked at  $425^\circ\text{C}$ , thus enabling higher temperature range in your assembly process
- » Ask about our special via-fill process that meets Aerospace & Defense standards
- » Optimize your design by working with our experts

## POLYIMIDE PROCESSING: 6-8 WEEKS LEAD TIME\*

- » Withstands high temperature solders and provides a good, robust barrier to solder flow to protect your circuitry
- » As an alternative to wire bonding, bridges reduce the potential of damage during manufacturing and testing
- » Use it as a dielectric for supported bridges in components such as Hybrid Couplers
- » Use for air bridges or dielectric separation in the circuitry

\*Expedited requests available! Contact [KCCsales@knowles.com](mailto:KCCsales@knowles.com)

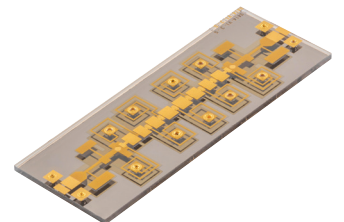
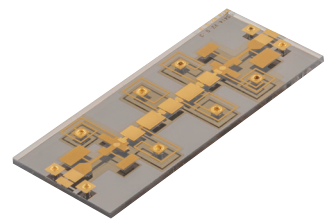
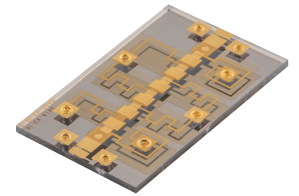
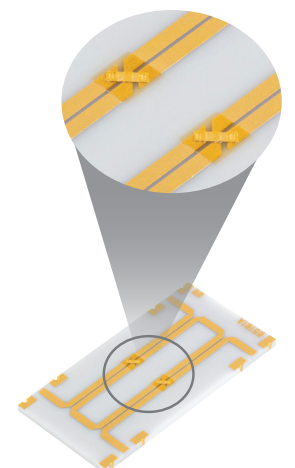
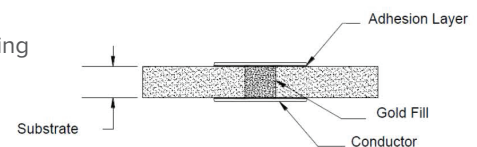
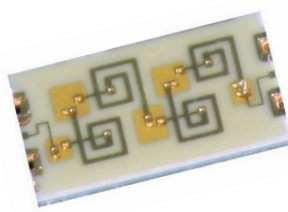


Diagram of a filled Via

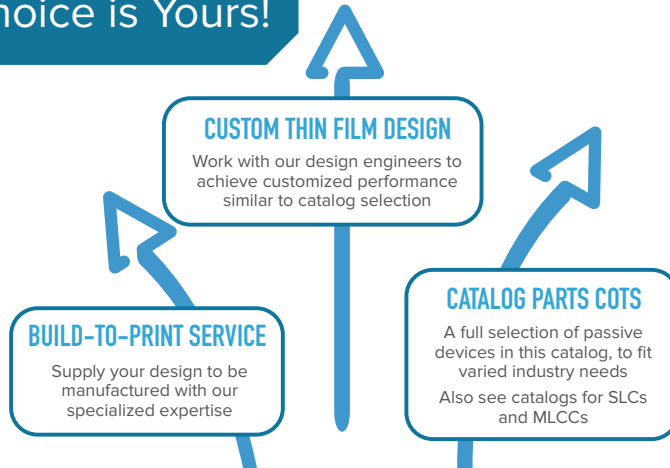


## Typical Thin Film Applications

- » Heat Sinks and Standoff
- » Integrated Passive Components
- » Custom Resistor Capacitor Networks
- » Hybrid Coupler
- » EMI Filters
- » Microwave Integrated Circuits (MIC)
- » Bias Decoupling and Filtering
- » PA Stabilization
- » Impedance Matching and Power Combining Network



## Catalog or Custom - The Choice is Yours!



## Proudly Made in the USA!

- » All Knowles Precision Devices' Thin Film Build to Print services are proudly made at our US manufacturing location Cazenovia, NY
- » Short standard lead times (as little as 4 weeks!); expedites available
- » Dedicated application engineering team - work with our experts and optimize for performance and SWAP-C
- » Our custom ceramics offer industry leading thermal performance and a higher dielectric constant allowing for smaller, high performance designs
- » Achieve the best manufacturing outcomes with Knowles' precision processing and testing capabilities



Visit [www.knowlesc capacitors.com](http://www.knowlesc capacitors.com) for more information



Check out our **NEW Build-to-Print Guide!**

[Click here to view](#)



From prototype to high volume production, let our experts help you with:

- » Substrate Selection
- » Metallization
- » Laser Techniques
- » Conductors
- » Vias
- » Resistors
- » Reliable Connections
- » Bias Networks Testing
- » Military and Space Grade Applications

