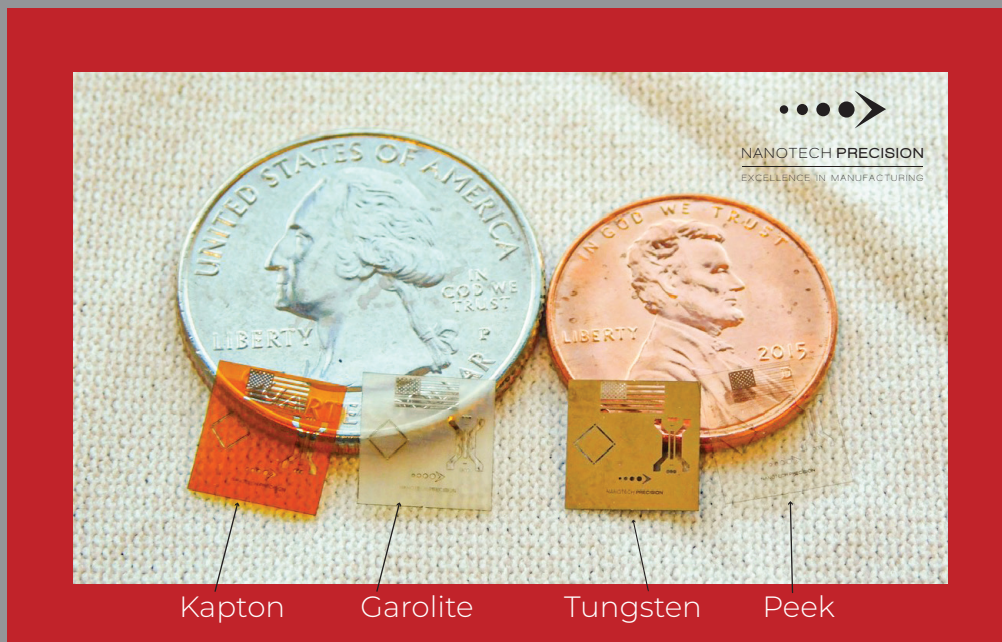


Small doesn't have to be complicated.

Simplifying Innovation In Microelectronics



As the demand continues to grow to produce everything smaller and smaller, organizations within the precision manufacturing industry must continually adapt to stay relevant. Nanotech Precision is yet again showcasing its ability to do that, this time utilizing the stability and versatility of its Femto Laser System to machine one design in four different materials.

In this second case study, Nanotech dove deeper into the world of microelectronics, focusing on producing consistent results among various materials. The case study presents four finished microcircuits, which were designed identically and manufactured in a combination of one transition metal and three polymers.

The materials selected (kapton, garolite, tungsten, and peek, pictured above) are those typically associated with PCB manufacturing. The design of the microcircuits showcases the versatility of Nanotech's Femto Laser System, specifically the ability to machine a wide range of materials while providing consistent results among them.

With Nanotech's Femto Laser System, engineers have the ability to be extremely flexible in their designs, without the burden of traditional material constraints. The extreme accuracy and precision of Nanotech Precision's Femto Laser make it an ideal solution for micro feature machining applications.

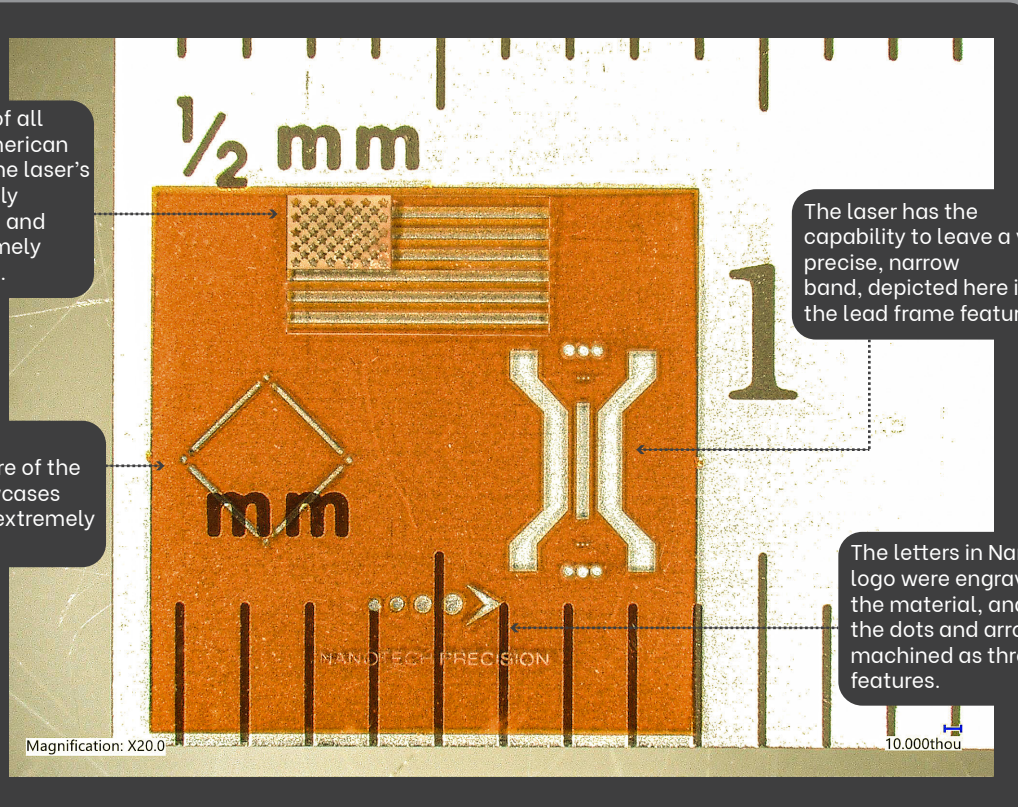
Kapton

The micro detail of all 50 stars in the American flag showcases the laser's ability to flawlessly engrave, emboss, and shade in at extremely small proportions.

The diamond, or 'chip inlay', feature of the microcircuit showcases the ability to cut extremely precise slots.

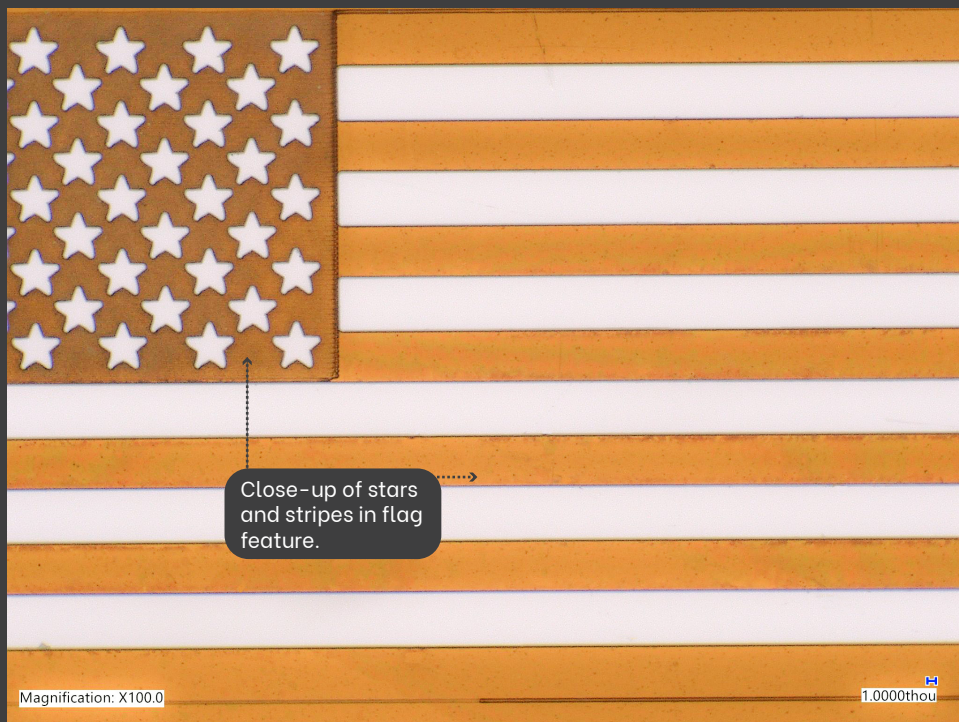
The laser has the capability to leave a very precise, narrow band, depicted here in the lead frame feature.

The letters in Nanotech's logo were engraved onto the material, and the dots and arrow were machined as through-features.



Magnification: X20.0

10.000thou



Close-up of stars and stripes in flag feature.

Magnification: X100.0

1.0000thou

Garolite

The strains of fiber in the garolite caused an inconsistent ablation rate in the laser, creating additional challenges during the manufacturing process of the flag. As you can see, those challenges were overcome and the flag is clearly etched.

The extremely precise slots of the diamond feature were effectively machined, in spite of the difficult fiber strains in the material.

The lead frame feature's smallest through-hole dimensions are 53.39 microns (pictured below).

The letters in the Nanotech logo were engraved, while the dots and arrow were machined as through-features.

Magnification: X20.0

10.000thou

Through-hole measurements in lead frame feature.

Magnification: X300.0

10.00µm

[1]204.95µm

[2]204.72µm

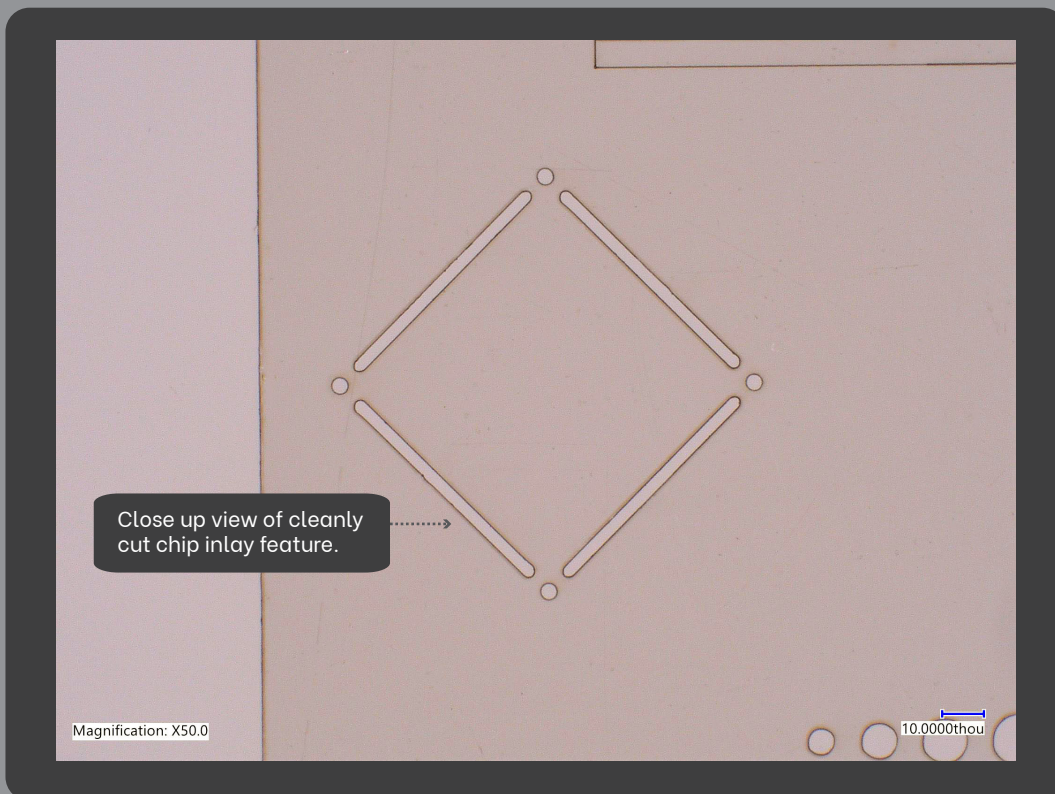
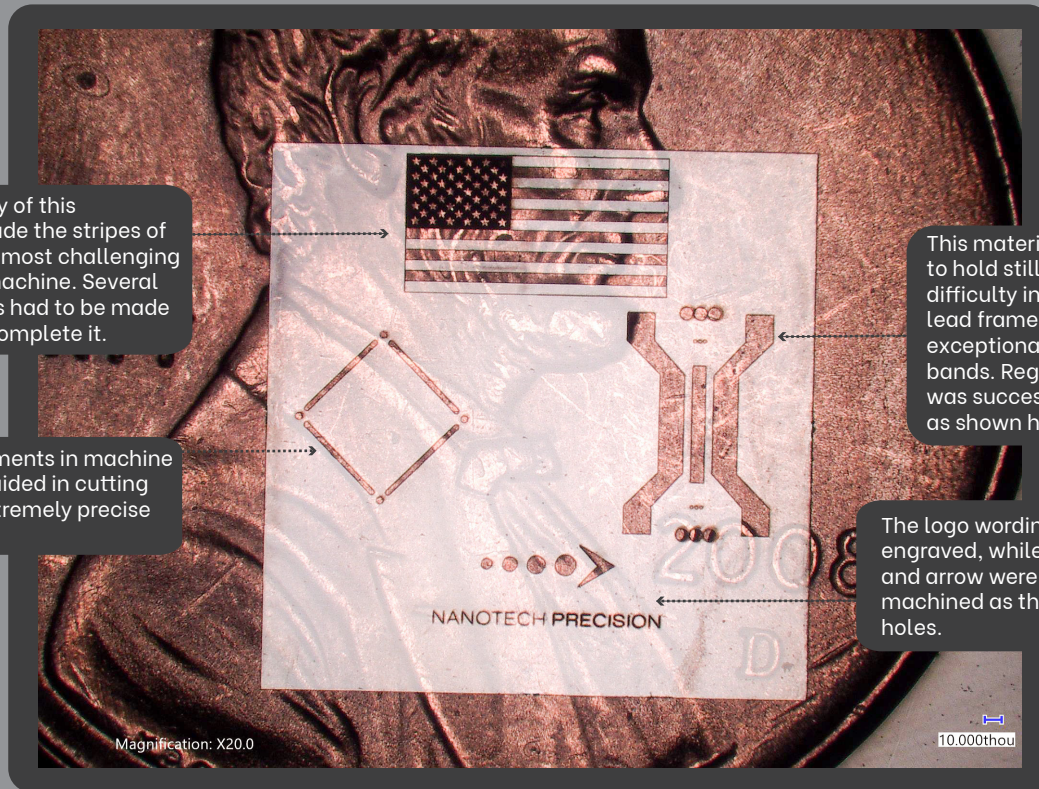
[3]204.16µm

[6]53.93µm

[4]53.69µm

[5]53.39µm

Peek



Tungsten

This rare metal proved to be the least problematic material to machine. All 50 stars were neatly shaded in, while the narrow stripes of the flag were kept sharply in tact.

Zero cutting force from the laser provides the ability to successfully machine compact features, such as these.

The lead frame feature showcases the laser's ability to cut extremely precise holes. The smallest ones in this feature have roughly the same diameter as a human hair.

The Nanotech logo is clearly engraved and machined through.

Magnification: X20.0

10.000thou

Close up of chip inlay, lead frame, and engraved logo features.

Magnification: X50.0

10.000thou

The solution is simple.

Rely on Nanotech Precision to deliver smart, innovative results.

Nanotech Precision, LLC, specializes in high-volume production of small and micro-sized components. The versatility of Nanotech's Femto Laser System allows engineers to be more flexible in their designs, providing a wide range of materials to choose from. Nanotech Precision is dedicated to machining complex parts that meet only the highest standard of quality, taking precision to a new level.

nanotechmn.com

763-424-9677

sales@nanotechmn.com



NANOTECH PRECISION

EXCELLENCE IN MANUFACTURING

Nanotech Precision is

ISO 13485:2016 certified.

