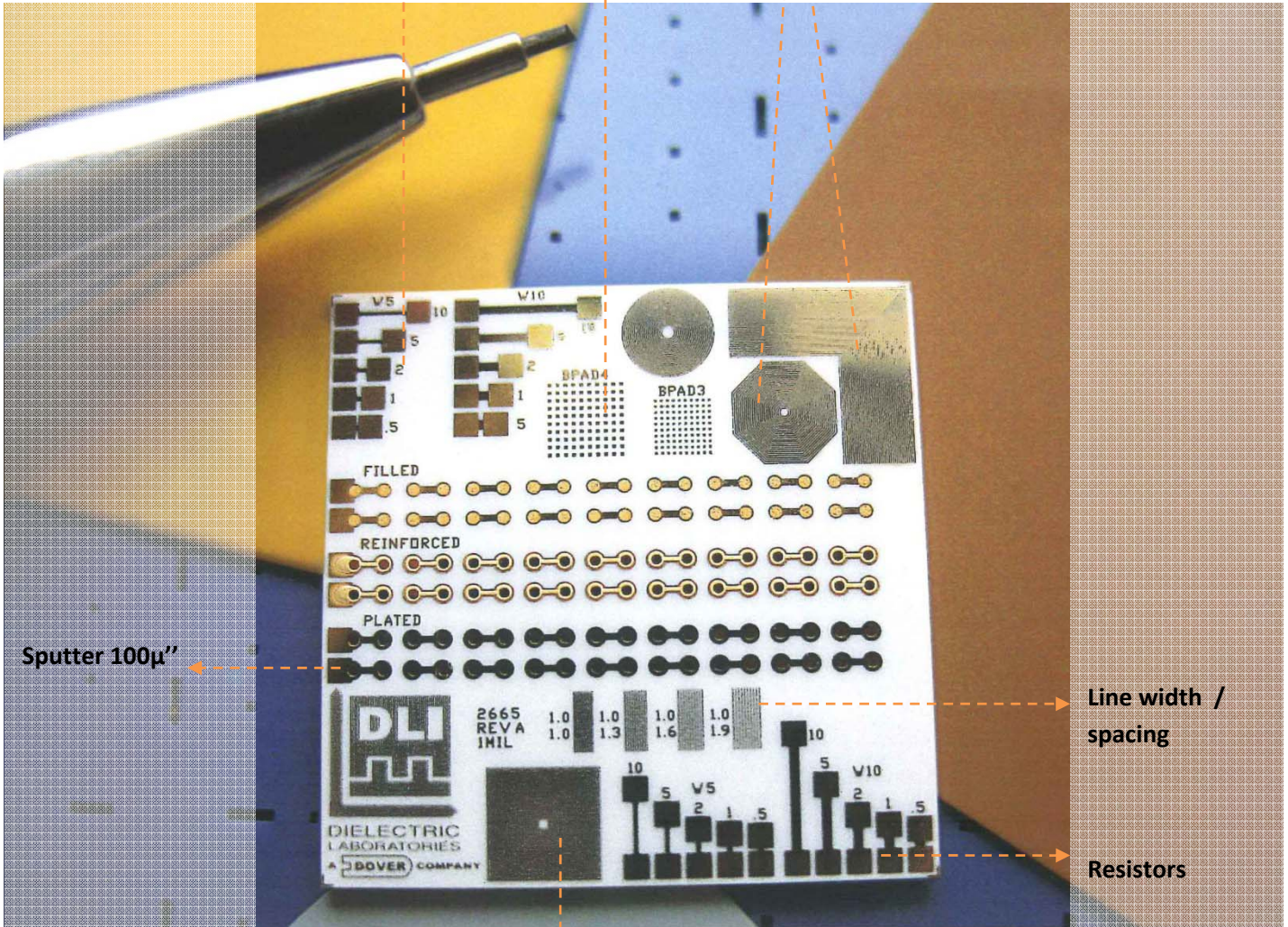


Resistors

Tuning Pads

Example of spiral inductor capability



Spiral inductor example

DLI - The Global Leader for High Frequency Solutions

## Build-to-Print Reference Guide

### Metal Coatings

- Gold (Au)
- Nickel (Ni)
- Titanium Tungsten (TiW)
- Platinum (Pt)
- Titanium (Ti)
- Copper (Cu)
- Nickel Vanadium (NiV)
- Gold Tin (AuSn)
- Tantalum Nitride (TaN)  
(Resistive Layer)

### Lithography

- |          |            |                |
|----------|------------|----------------|
| ■ Gold   | ≤150 μ"    | ≤0.5 ± 0.1 mil |
| ■ Gold   | 150-300 μ" | 1.0 ± 0.2 mil  |
| ■ Copper | 50-600 μ"  | 3.0 ± 0.4 mil  |
| ■ Nickel | 50-125 μ"  | 3.0 ± 0.4 mil  |

### Laser Drilling

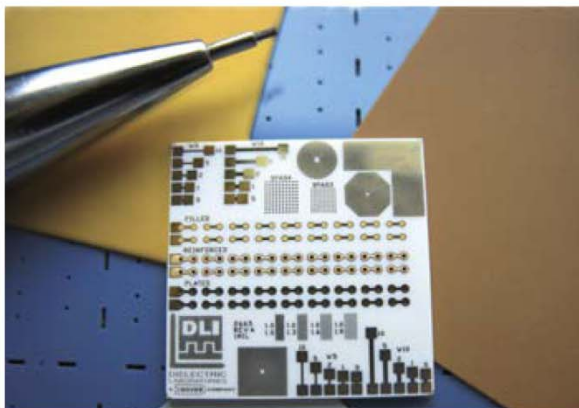
- Features as small as 0.003" dia.
- Drill features in high k dielectrics

### Other Options

- Edge-wrap metallization
- Castelated Vias
- Gold Filled Vias
- Reinforced Vias
- Spiral Inductors
- Interdigitated Capacitors
- Lange Coupler
- Resistors
  - Notched
  - Flush
  - Top-Hat
- Polyimide

- Solder Dam
- Selective Metallization
  - different top and bottom substrate metal scheme
  - different metal schemes on the same side of substrate
- RF test capabilities up to 67 GHz
- Contoured Surfaces
- Packaging
  - Photon Ring Packaging repopulation
  - Tape and Reel
  - Anti-Static Waffle Packaging up to 4" square

## TF Coupon



Resistors can be incorporated directly into the circuit design with the advantage of reducing assembly steps, improving thermal dissipation and improving reliability through the reduction of interconnections.

DLI's resistor technology utilizes TaN. This material has higher maximum exposure temperature and superior resistance to harsh environments (soldering and processing).

Under most circumstances DLI can tune a resistor in to tolerance of 10% without trimming. Although when tighter tolerance is required laser trimming is available.

DLI offers reinforced vias when higher current is required which gives better mechanical strength and lower resistance to the via hole.

Filled vias provide improved performance and reliability over plated vias but have a higher processing cost. Filled vias increase current carrying capacity and have higher thermal conductivity to the ground plane. When mounting active die, use of filled vias effectively conducts heat away from the die. DLI offers gold fill (copper or silver can diffuse into other layers of the metallization leading to reliability issues).

The precision of conductor line width and line spacing can be critical to achieving the performance required. Control of metal geometries is key to repeatable performance in microwave structures. Characteristic impedance of transmission lines is governed by line widths. DLI has extensive experience and can assist in tailoring ceramic/metallization systems to your design to achieve maximum performance. DLI is capable of meeting as small as 0.0005" line width and spacing with 0.0001" tolerance.