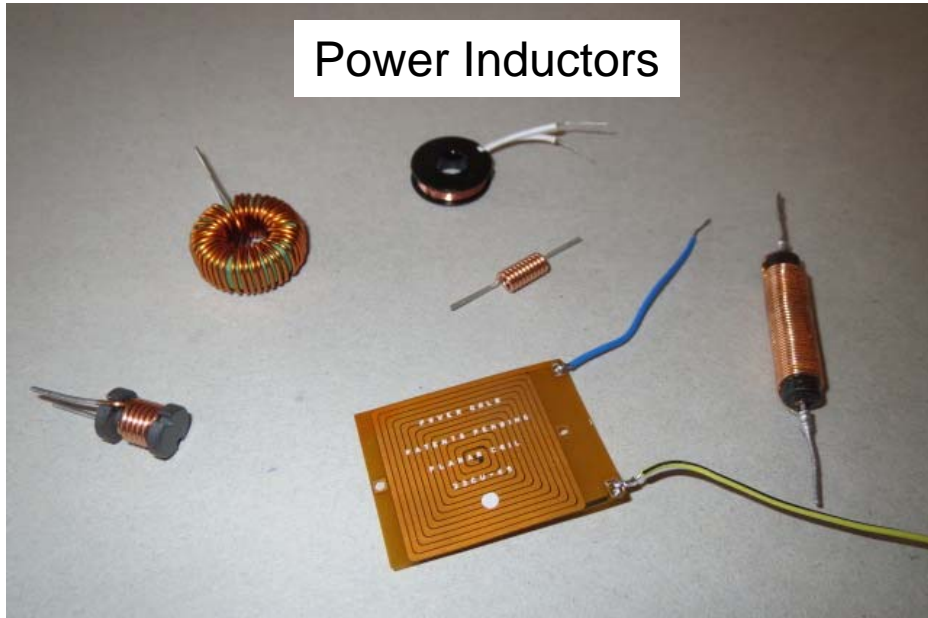
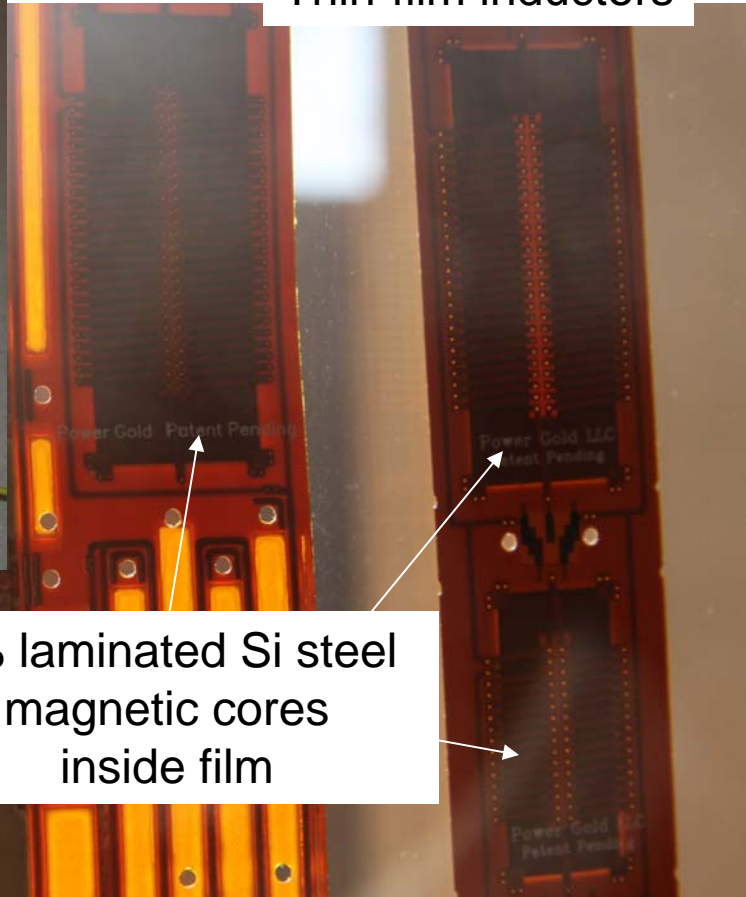


“Paper-thin” Coils



Power Inductors

See through
Thin-film inductors

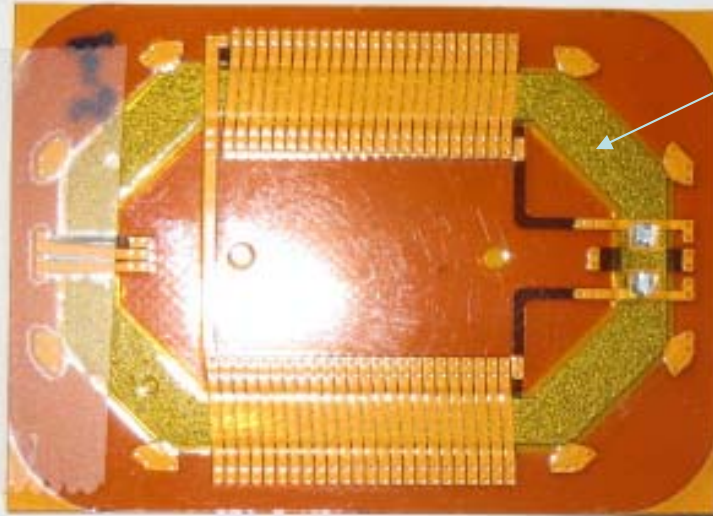


Power Gold
Patent # JP5823033 B2;
9,704,644; 8,879,276

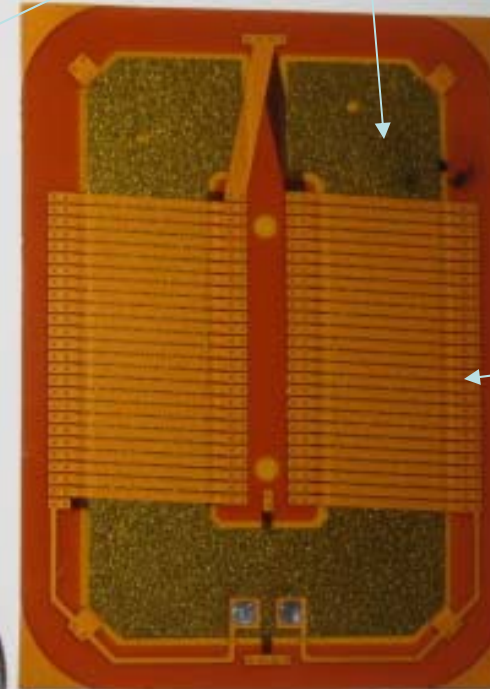
3% laminated Si steel
magnetic cores
inside film

3D Winding around Ferrite Core

Power Gold



Ferrite Core

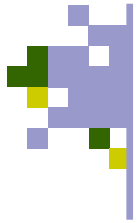


3D copper winding

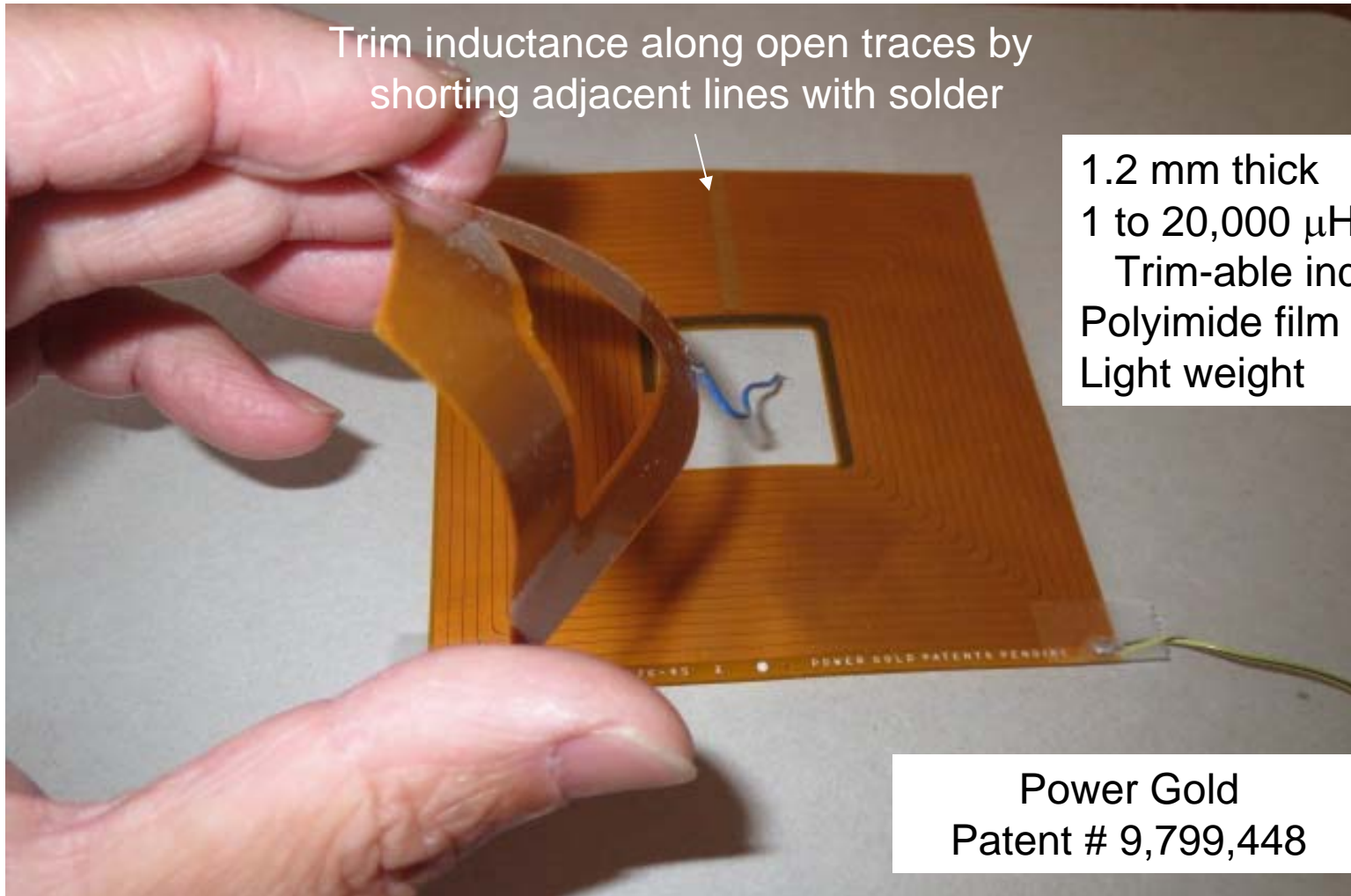
Power Gold
Patent # JP5823033 B2;
9,704,644; 8,879,276



Total thickness 8.5 mils;
4x inductance of planar coils
@ 13.56 MHz

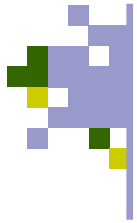


Bendable Film Inductors

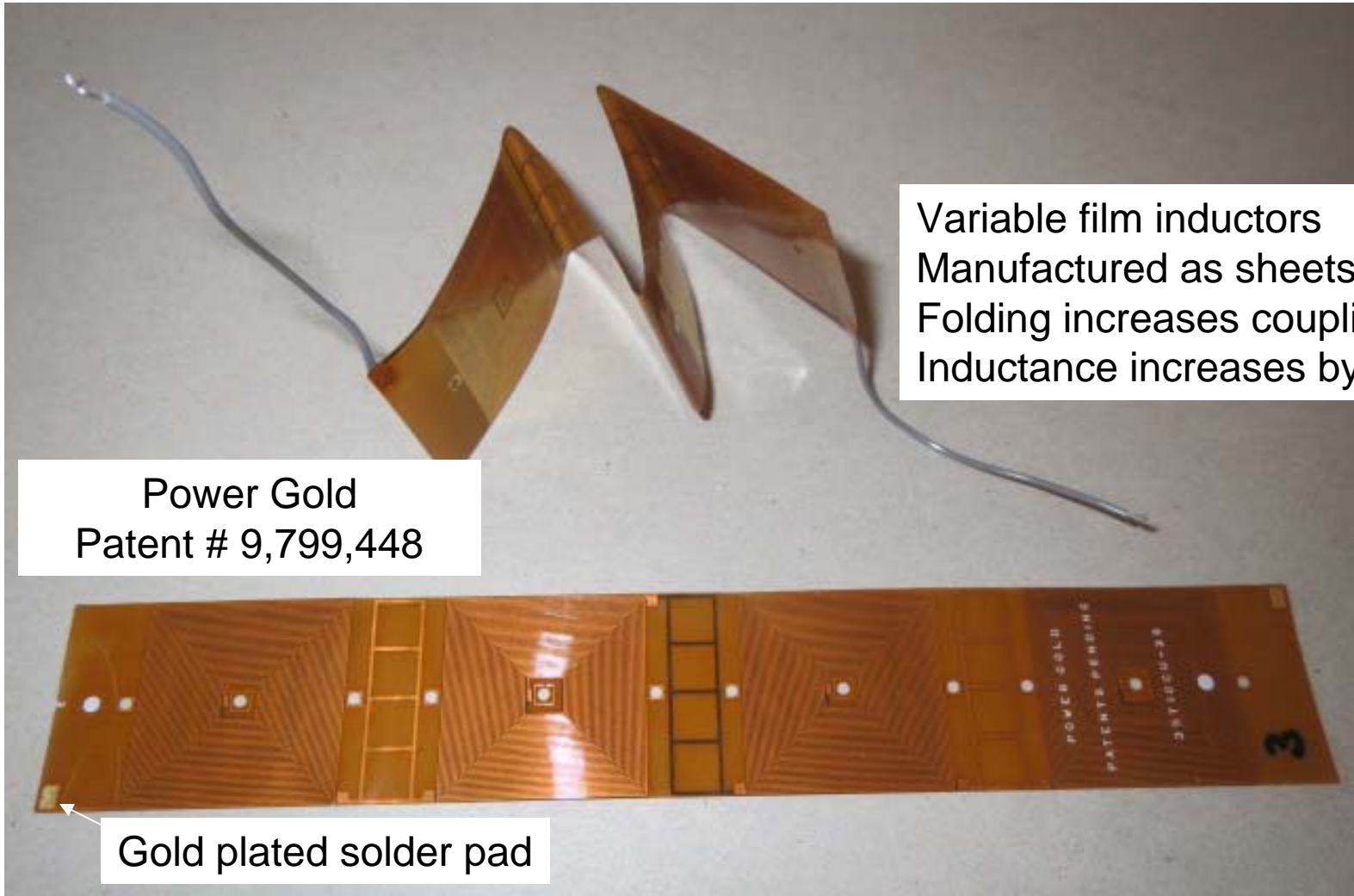


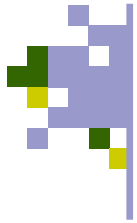
1.2 mm thick
1 to 20,000 μH
Trim-able inductance
Polyimide film - 200°C
Light weight

Power Gold
Patent # 9,799,448

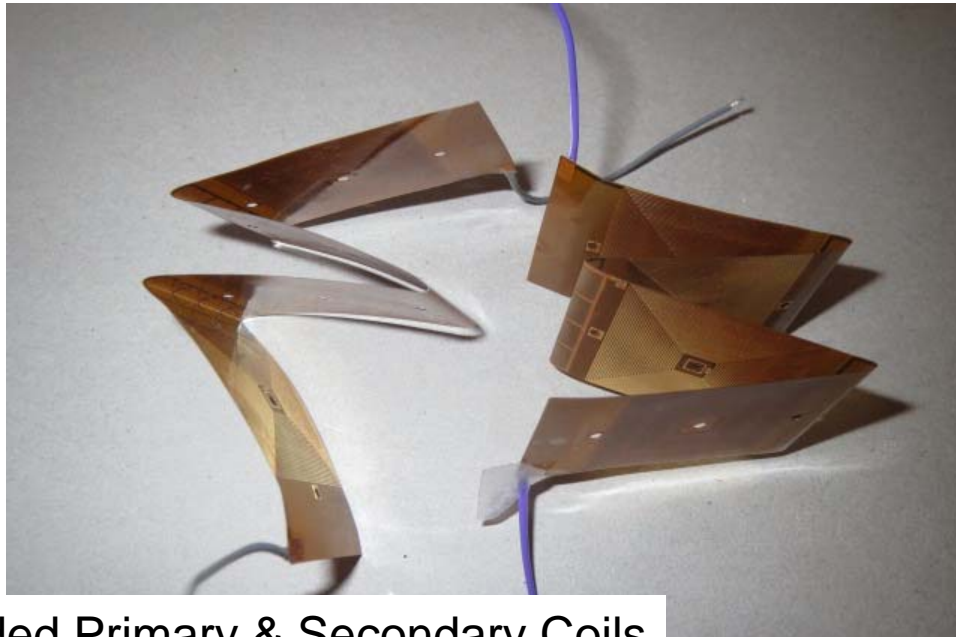


Folding Film Inductors





Film Transformer

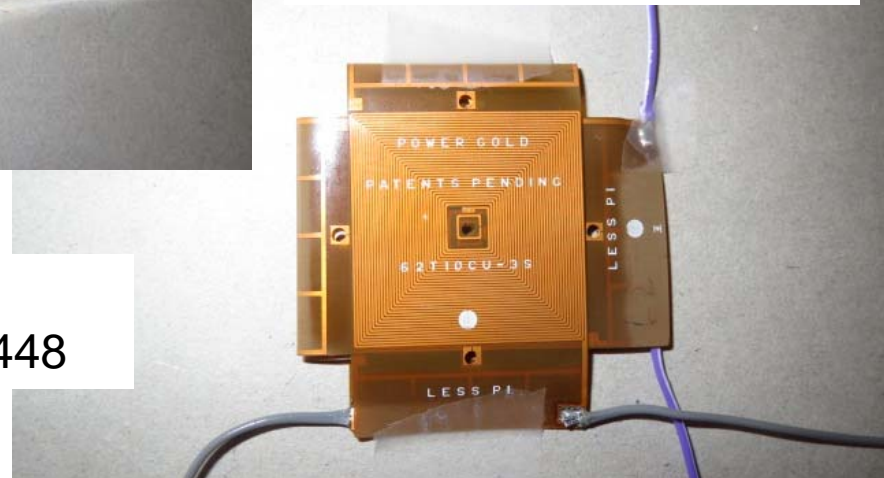


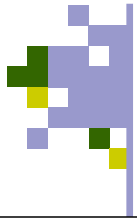
Folded Primary & Secondary Coils

Designed to 300V
Dielectric breakdown >1000V

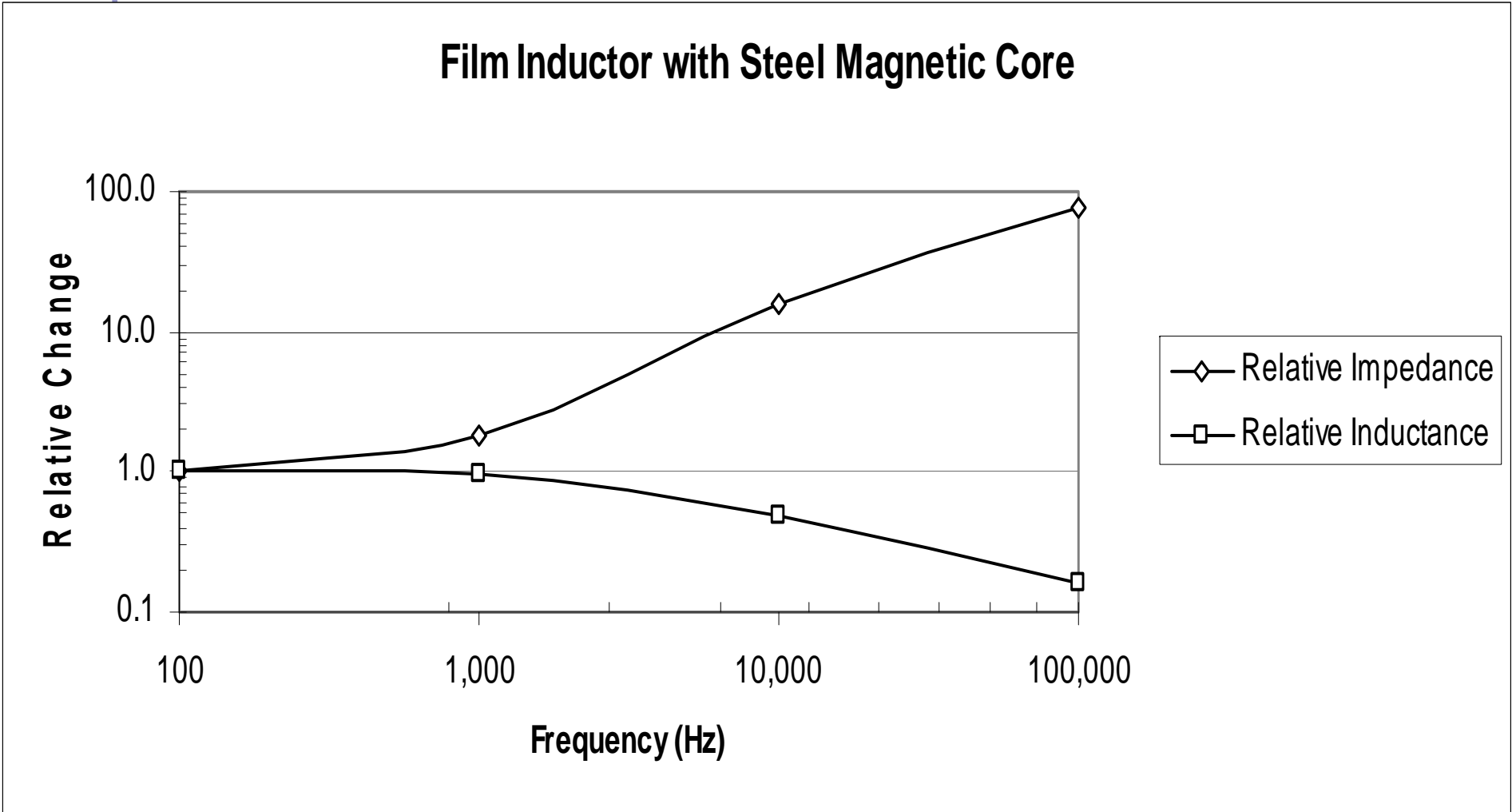
Two coils folded together
as a transformer

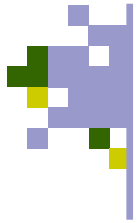
Power Gold
Patent # 9,799,448



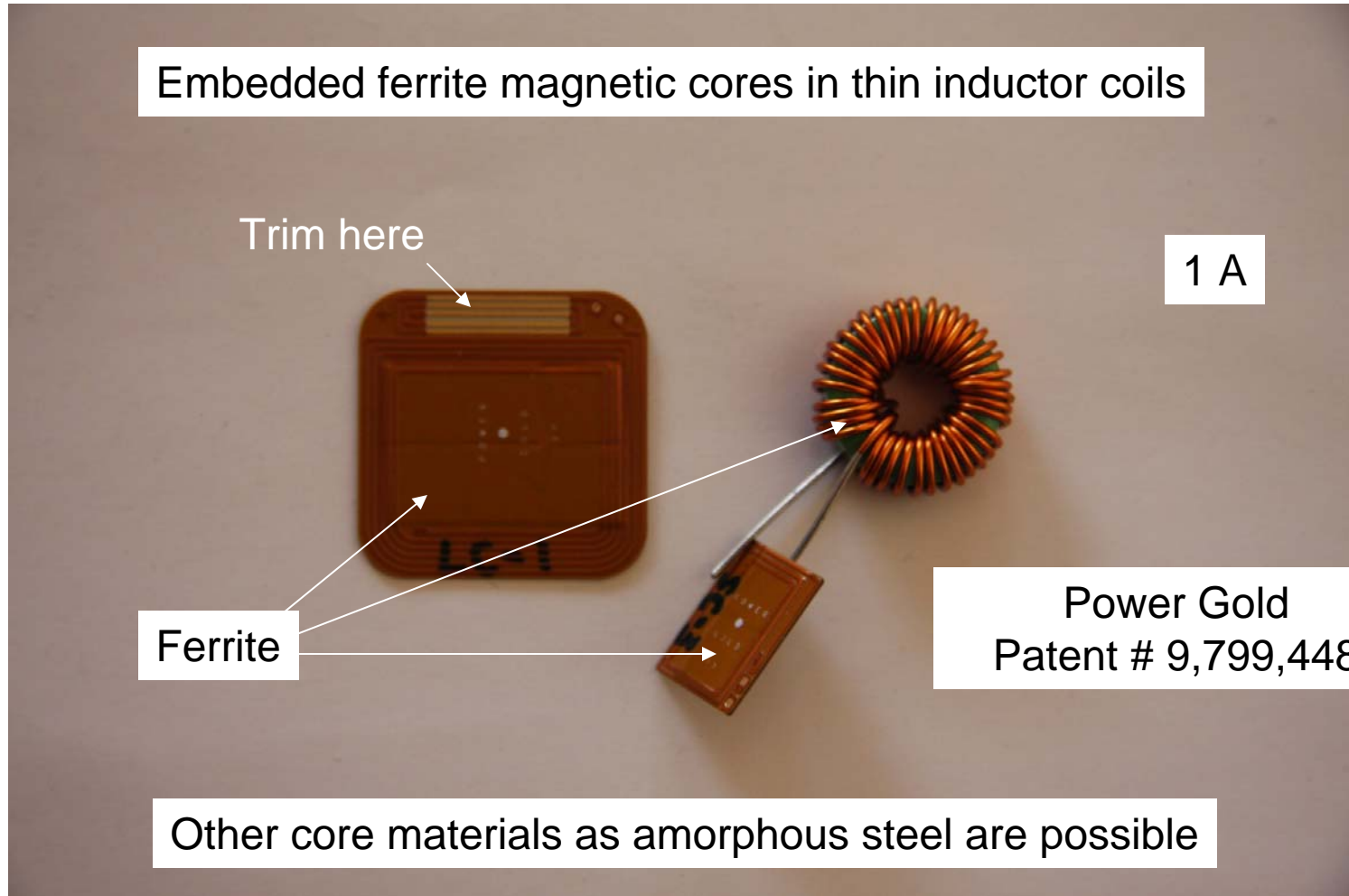


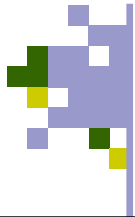
Inductance vs Frequency





Ferrite Cores

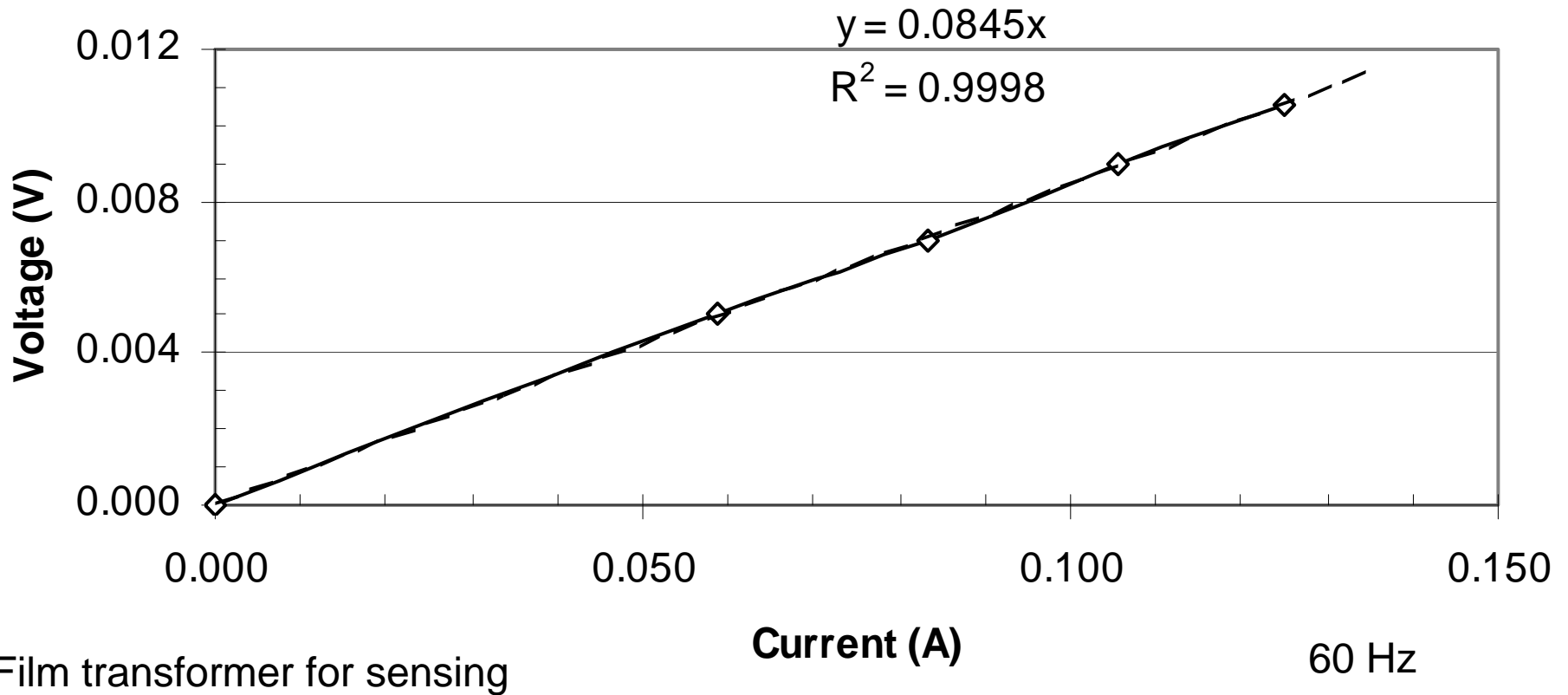


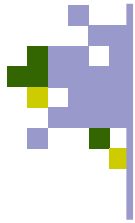


8A Film-Isolation Transformer



Film differential inductor with current sense

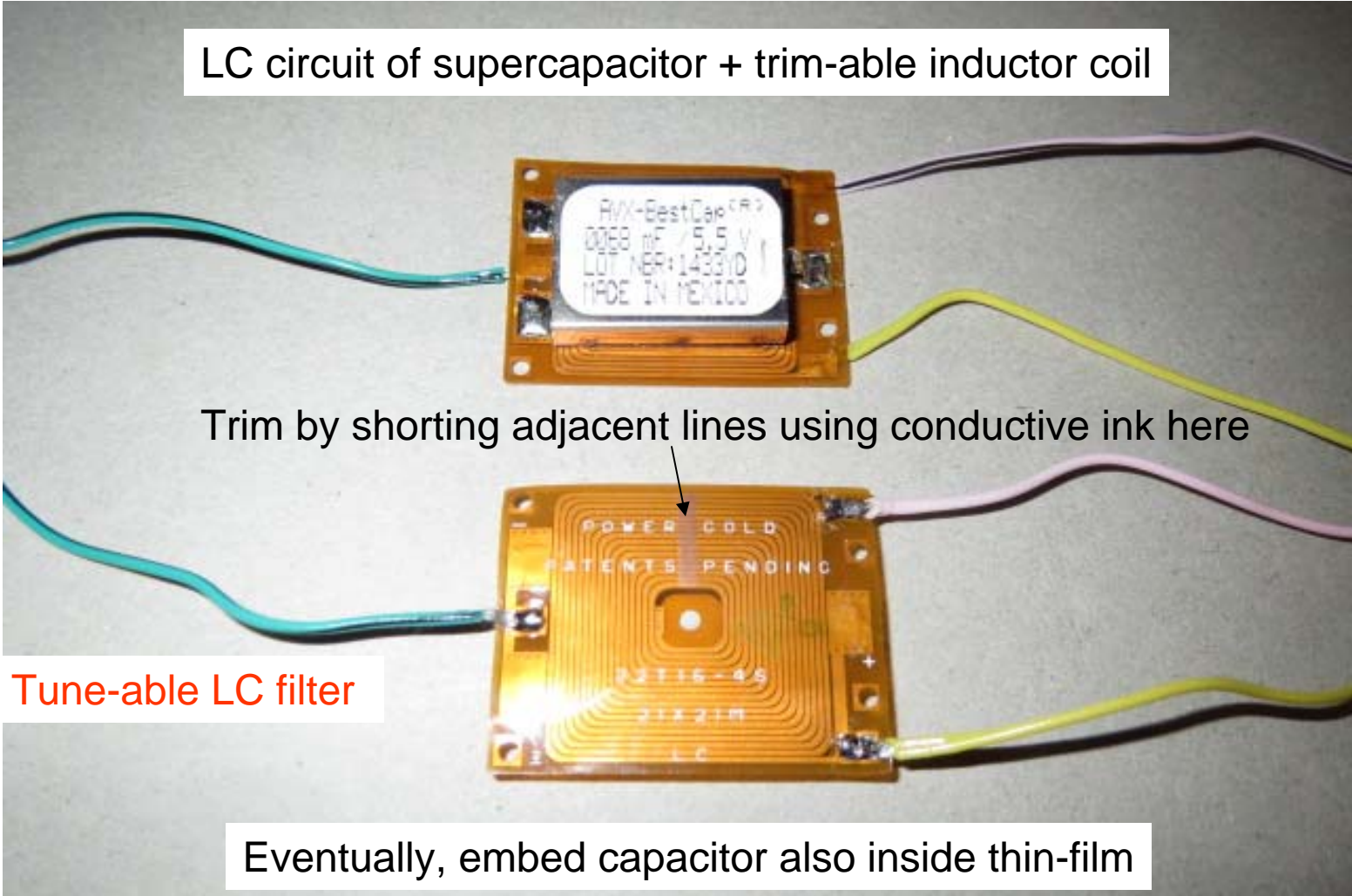




LC Filter Module



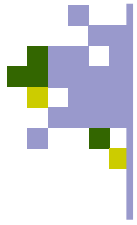
LC circuit of supercapacitor + trim-able inductor coil



Trim by shorting adjacent lines using conductive ink here

Tune-able LC filter

Eventually, embed capacitor also inside thin-film



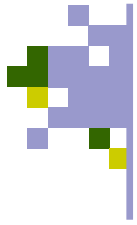
Wireless Power Transmission



Film antenna with LEDs:

<https://vimeo.com/84417998>





Unique Features



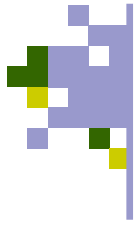
High Frequency Film Inductors:

- 1) 25 microns amorphous steel core for 100 kHz
- 2) 137 microns ferrite core for MHz
- 3) Air core inductors for GHz (mH capability!)
- 4) Polyimide replaced by LCP, teflon or paper
- 5) Flat, thin Cu minimizes skin effect

Fixed, trim-able or variable accordion film inductors
Bend-able, fold-able, stretchable

Film modules:

- 1) Adjustable LC filter to match resonant frequency
 - Wireless power transmission
 - Wireless charging
- 2) Sense film transformers
- 3) EMI isolation



Cost Advantages



Lower Variable Cost:

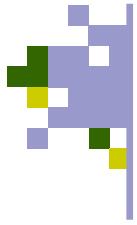
- 1) Less total weight = less raw materials consumed
- 2) Roll-to-roll production = less labor, faster thru-put

Fixed Cost:

Panel and roll-to-roll manufacturing facilities exist
Output >> mechanically winding each inductor
Eliminate inventory of bobbin sizes, shapes
One R2R line produces 100s of coil types

Design, manufacture inside USA

Patented technology
File additional joint patent to further protect IPs



Quality



Polyimide & copper films
Can gold plate exposed copper

200°C High temperature durable
Adhesiveless copper/polyimide
Acid, solvents resistance

Uniform, consistent Roll-2-roll process
Automated optical inspection thru film
Test, yield mapping then film singulation

Bends to squeeze coil inside tight spaces

Integrate other film components

