



# Multi-level metallisation thru-wafer transformer and bias feed network for microwave circuits

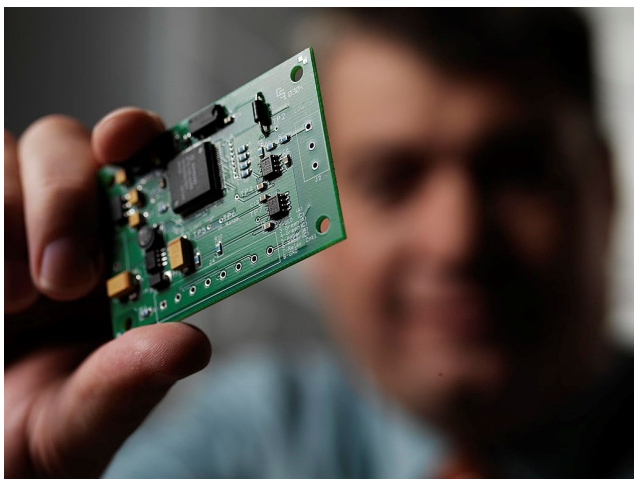
## BACKGROUND

Many microwave circuit applications, such as distributed power amplifiers, require an impedance transformer which can also act as to feed DC voltage and current into the circuit. Typically, these impedance transformers are a trade-off between bandwidth, power handling, and transformation ratio, and size.

## OUR SOLUTION

Our innovation utilises the hot-via structure, available in all state-of-the-art MMIC fabrication processes, which effectively adds an extra layer of metal, creating a via through the semiconductor wafer allowing the metal on the back of the wafer to carry ground, DC, or RF signals. This innovation can operate as an RF-only or DC-RF mode.

In general, the elimination of airbridge structures improves bandwidth and reduces the overall size. When used as both a transformer and bias-tee, the DC-RF isolation and power handling are also improved.



Source: [https://commons.wikimedia.org/wiki/File:u.s.\\_department\\_of\\_energy\\_-\\_science\\_-\\_395\\_027\\_001\\_\(9578326584\).jpg](https://commons.wikimedia.org/wiki/File:u.s._department_of_energy_-_science_-_395_027_001_(9578326584).jpg), public domain.

## ADVANTAGES / BENEFITS

Improved performance of bifilar/trifilar transformers
Improved bandwidth
Improved isolation
Reduced size

## APPLICATIONS

- ✓ RF/microwave/millimetre wave ICs

## INVENTORS

Professor Simon Mahon, Professor Michael Heimlich, Professor Anthony Parker, Dr Dushmantha Thalakatuna, Irfan Shahid, Melissa Gorman

## INTELLECTUAL PROPERTY POSITION

Australian Provisional Patent filed - 2020901927

## PARTNERING OPPORTUNITY

We are seeking an industry partner for further development and commercialisation of this technology through a research collaboration or technology licence.

## WOULD YOU LIKE TO KNOW MORE?

Office of Commercialisation and Innovation  
[ip@mq.edu.au](mailto:ip@mq.edu.au)