

# Ultra-low PDN Impedance Measurement

## The 2-port shunt-through impedance measurement is the key to testing very low impedances

The 2-port shunt-through measurement is accepted as the gold standard for measuring micro-ohm impedance levels with a VNA while supporting measurement at very high frequencies. These capabilities make it ideal for measuring power distribution networks.

Unfortunately, this measurement includes an undesirable ground loop. Left uncorrected, the ground loop introduces significant errors when measuring milliohm impedances. These errors are dependent on the cable quality, cable length, and other factors.

Picotest offers both passive and active ground isolating solutions spanning frequency ranges from DC to more than 500MHz supporting most applications. Picotest also offers 50 Ohm hand-held probes and high-quality cables that support this measurement. These Picotest solutions can also be used with oscilloscopes and other instruments that include ground loops.

### J2102B-BNC & J2102B-N Common Mode Transformer

The simplest and lowest cost method for eliminating a ground loop is to add a wideband common mode transformer to the measurement, such as the Picotest J2102B Common Mode Transformer. The J2102B-BNC has BNC connectors and the J2102B-N has N connectors.



### J2113A Differential Amplifier

The J2113A is a solid-state Semi-Floating Differential Amplifier (SFA), or ground loop isolator, that provides OPTIMUM isolation for low impedance measurements. It can measure down to DC as compared to the lowest frequency that can be measured with a common mode transformer.



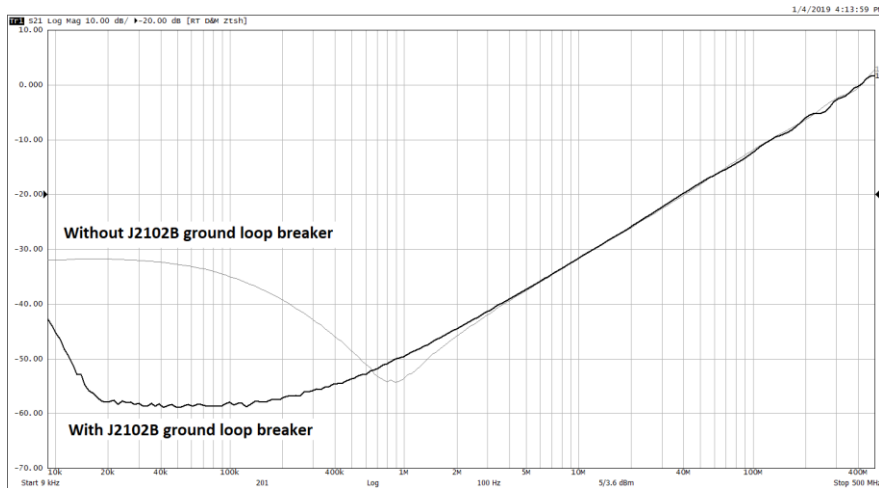
- The Picotest J2102B Common Mode Transformer and J2113A Differential Amplifier are used to break the ground loop in all commercial VNAs, oscilloscopes, and spectrum analyzers
- Both Picotest solutions support the 2-port shunt-through impedance measurement required for component and Power Distribution Network (PDN) measurement
- Both greatly attenuate the effects of the low frequency ground loops
- The J2102B supports measurements from ~3 kHz to > 6 GHz.
- The J2113A supports measurements from DC to 500MHz. The maximum input voltage is 1.9 V. It is optimized for pulse response.



2-Port Shunt-Through test setup using the Copper Mountain S5065 and the J2102B-BNC

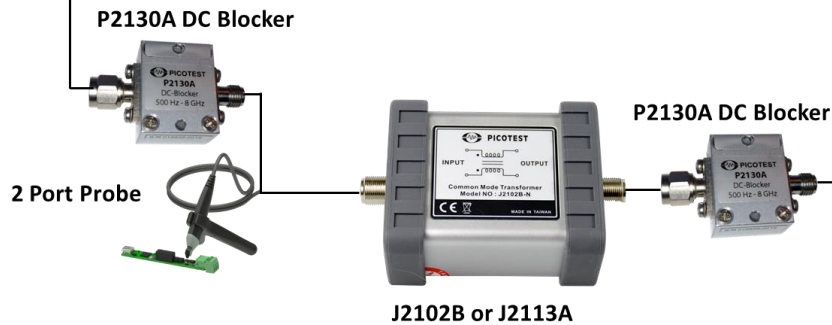


# 2-Port Shunt-Through Measurement



A known 1 mΩ resistor measured using 2-port shunt-through impedance measurements using the Copper Mountain S5065. The J2102B removes the ground loop error in 2 port shunt-through impedance measurements.

Copper Mountain VNA S5065



Measurement set up to test ultra-low impedance in the 2-port shunt-through configuration using the Copper Mountain S5065 VNA and the Picotest J2102B/J2113A ground loop breaker solutions.

## 2-Port Testing Products

<b>J2102B-BNC and J2102B-N</b>	Available with <b>BNC</b> and <b>N</b> type connectors Common Mode Transformer 3dB Bandwidth: 1Hz – > 6GHz
<b>J2113A</b>	Semi-Floating Differential Amplifier 3dB Bandwidth: DC-800 MHz Maximum Input Voltage: 1.9V Typical CMRR - > 57dB
<b>P21B01</b>	PDN Probe Bundle includes 1-Port and 2-Port 50 Ohm Transmission Line PDN Probes, Accessory Kit, and two P2130A DC Blockers

To learn how this solution can address your specific needs please contact Picotest:

877-914-7426

[info@picotest.com](mailto:info@picotest.com)

[www.picotest.com](http://www.picotest.com)



P21B01 PDN Probe Bundle and DC Blocks (2-Port Probe shown)



PCK01 High Performance Cable and Connector Kit

Picotest provides products that are designed to simplify measurements while providing the ultimate resolution and fidelity.

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