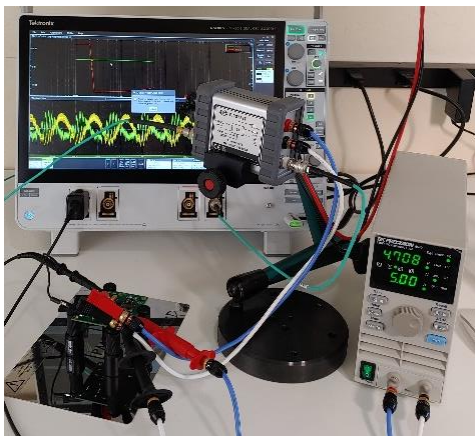


# DC-DC Converter Input Impedance Testing with the Tektronix 5/6 Series MSO

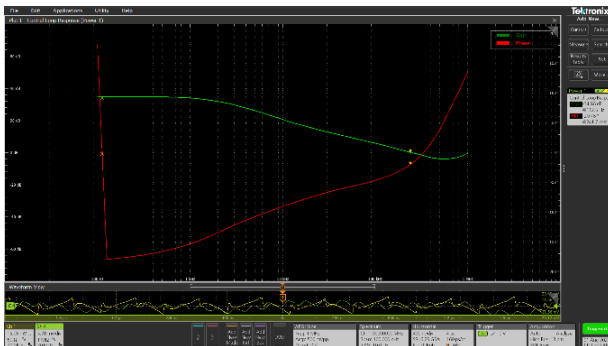
## Picotest PSRR Injector

### Now you can measure switching converter input impedance with ease

Characterizing the input impedance of a DC/DC converter is a necessary step in designing a stable input filter to counter-balance the converter's negative input resistance. The J2121A High Power Line Injector makes this challenging measurement easy. The J2121A uses the Tektronix 5/6 Series MSO oscillator output signal to modulate the Device Under Test (DUT) input voltage—the output of the J2121A—while accommodating a wide range of voltages and current. The DUT's input voltage and input current (taken from the J2121A's current sense monitor) are divided using the Math function of the MSO and input impedance is displayed. A simple "through" calibration corrects for the scaling of the current monitor and the probe connections.



J2121A DC-DC Converter Input Impedance Test with an ADI-Maxim MAX20098, 36V, 7A Evaluation Board. The J2121A output is connected to the converter's input; a scope probe is connected to CH2 of the MSO. The J2121A current monitor connects to CH1. The scope displays impedance or negative resistance as shown below with 12V<sub>IN</sub> and 5A I<sub>OUT</sub>. Green = gain. Red = phase.



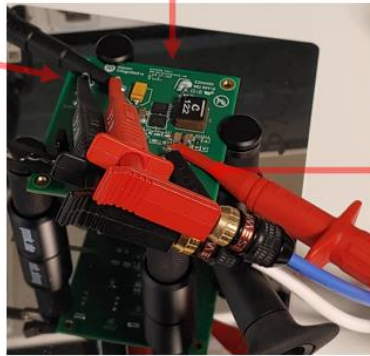
- The J2121A is especially suited to high power applications:
  - PSRR
  - Input Impedance
  - Inductor DC Bias Testing
- Bus voltages up to 400V, 20A output current, 100-1MHz bandwidth
- Includes Isolated Current Sense Monitor output (100mV/A), eliminating the need for a current probe
- Uses MSO 5/6 AFG for modulation
- Supports military and satellite buss applications
- Supports higher voltage/current applications compared to the low noise PSRR Injector, J2120A



# Converter Input Impedance Measurement

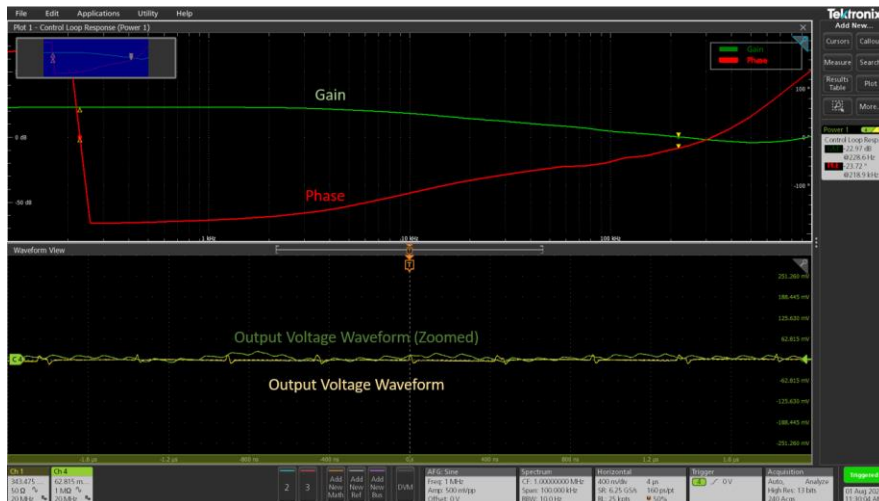
MAX20098 Evaluation Board  
MAX20098 EVKIT

Input Voltage Connection



Output Voltage Connection

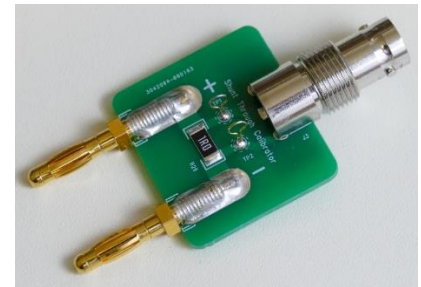
Test connections are shown for the MAX20098 Synchronous Buck Converter with  $12V_{IN}$  with a 5A output. The results of the input magnitude and phase impedance measurement with the output voltage waveform are shown below.



To learn how this solution can address your specific needs please contact Picotest:  
877-914-7426

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

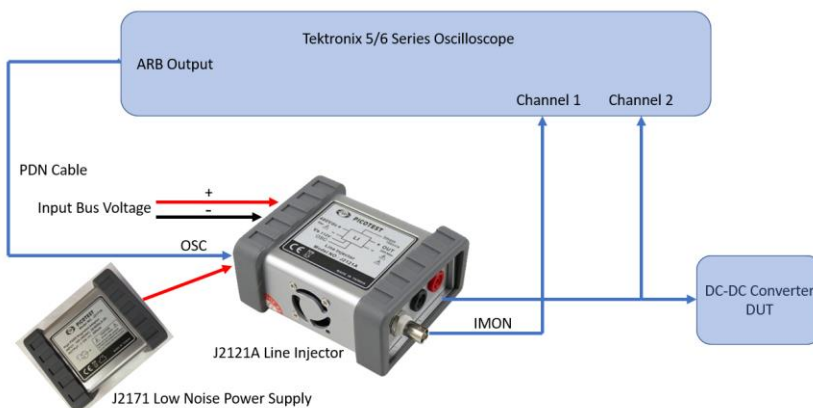
[www.picotest.com](http://www.picotest.com)



The J2121A includes a 10ohm shunt calibrator.

## Converter input impedance testing products

<b>J2121A Line Injector</b>	J2121A + J2171A - 200mA Low Noise Power Supply 1-ohm Calibration Fixture
<b>SMA/SMA -1000</b>	1m PDN Cable, SMA-SMA Connectors



The input impedance test setup diagram shows the use of an oscilloscope with the J2121A line injector. The input bus voltage to the line injector is fed into the J2121A. The included J2171A power supply powers the J2121A. The DUT is connected to the output of the J2121A. The current monitor output of the J2121A is connected to CH1 of the oscilloscope. The oscilloscope oscillator output modulates the J2121A output voltage which drives the DC-DC converter DUT.

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

This information is subject to change without notice.  
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