

Shielded Rogowski Coil with Enhanced DC Measurement Capability for Double Pulse Test (DPT) Application

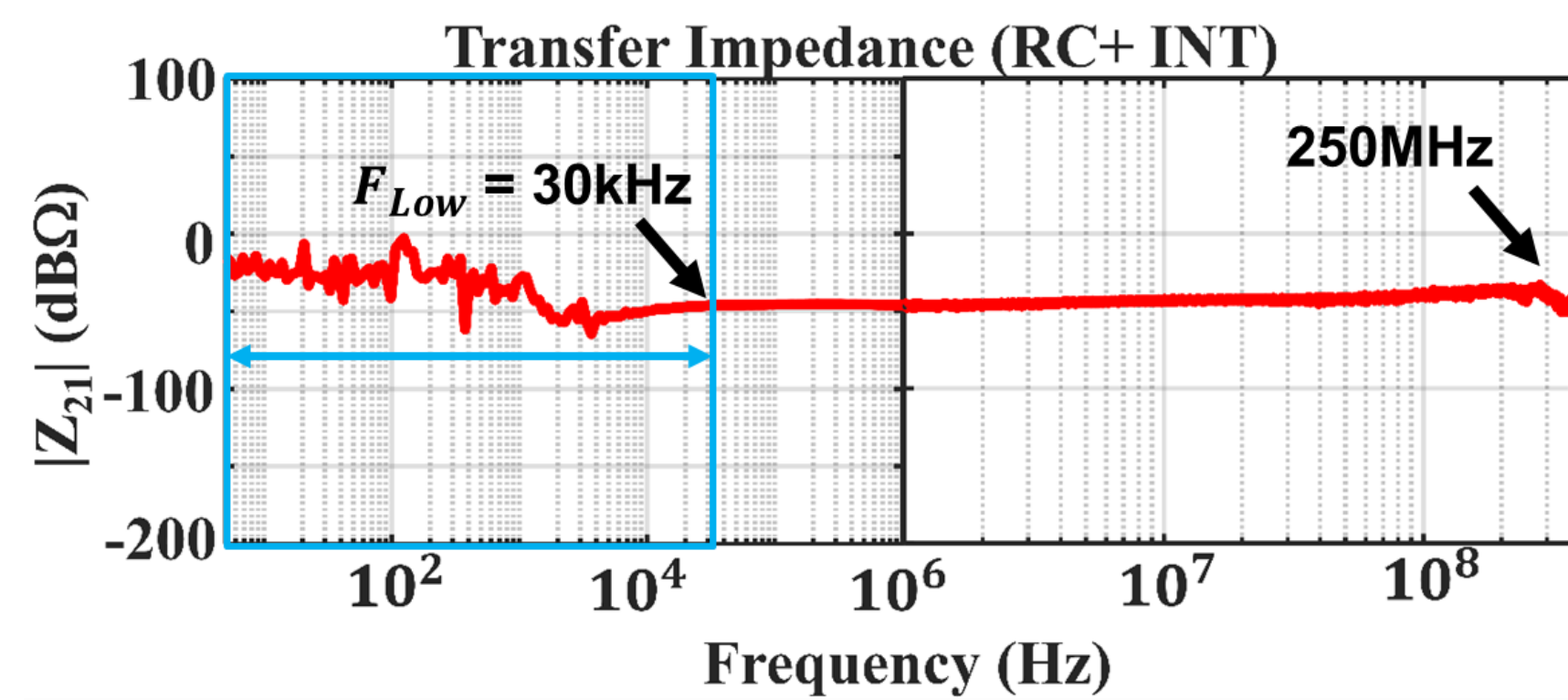
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MOTIVATION -

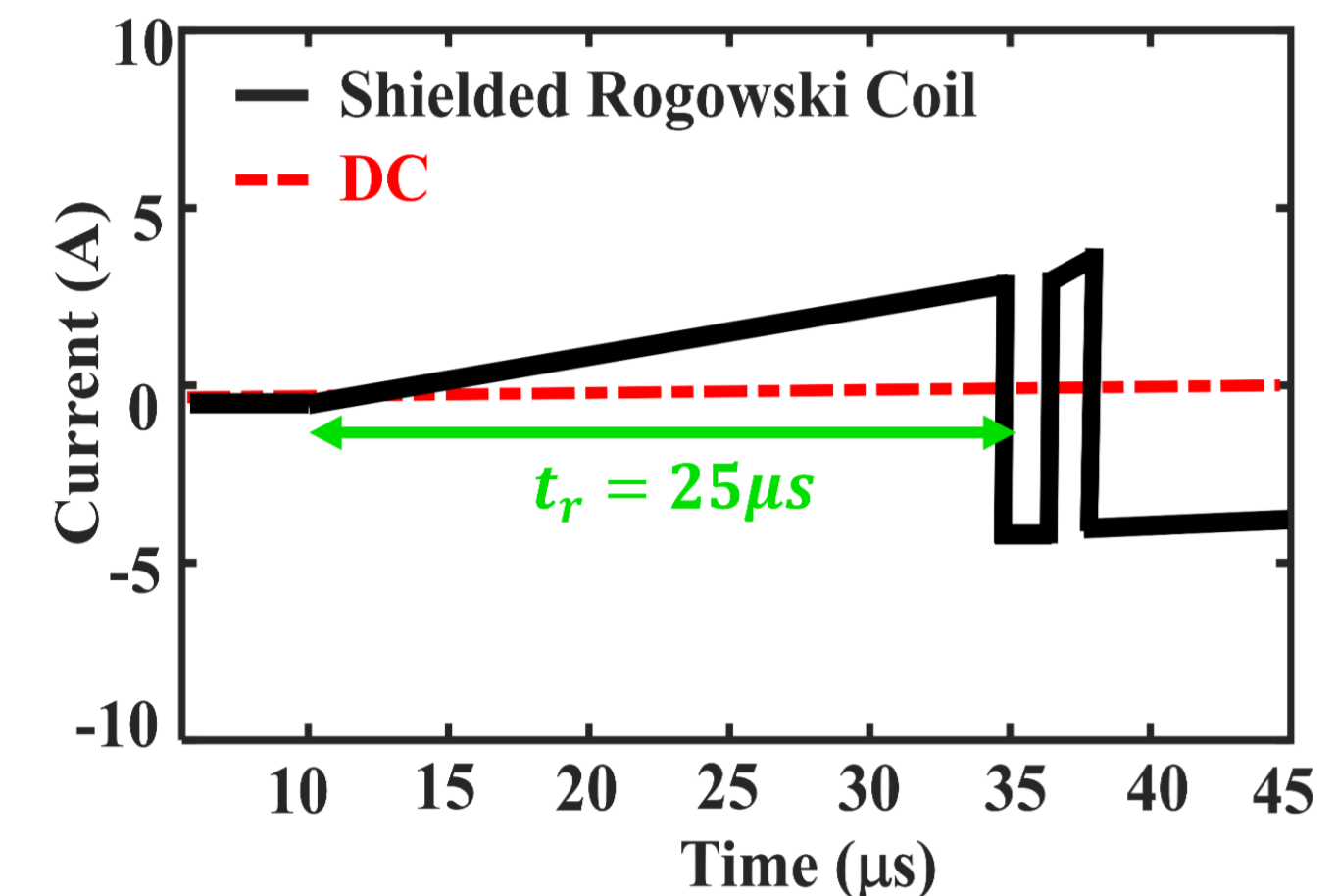
- The higher bandwidth of the shielded Rogowski coil is up to 250MHz. However, the lower bandwidth is limited to 30 kHz by the intrinsic noise of the op-amp in the integrator's circuit.
- A DC magnetic sensor has been combined with the combinational Rogowski coil realizing the HOKA principle to improve the lower measurement bandwidth without intruding the parasitic inductance in a DPT circuit.



Combinational Rogowski Coil (RC)

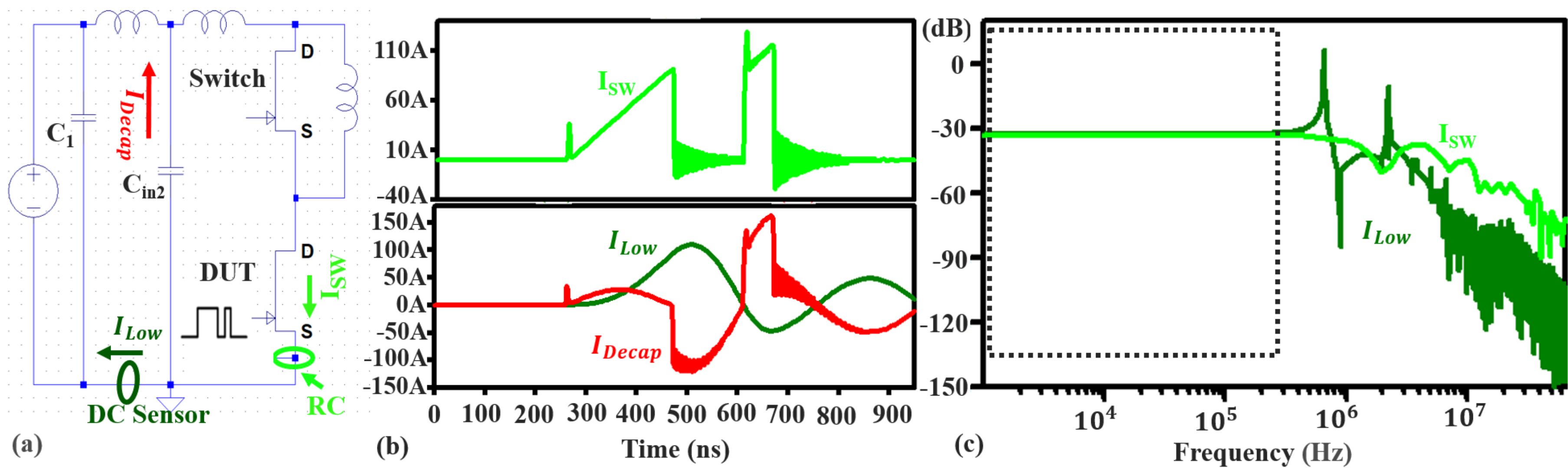


Frequency response of the RC+INT



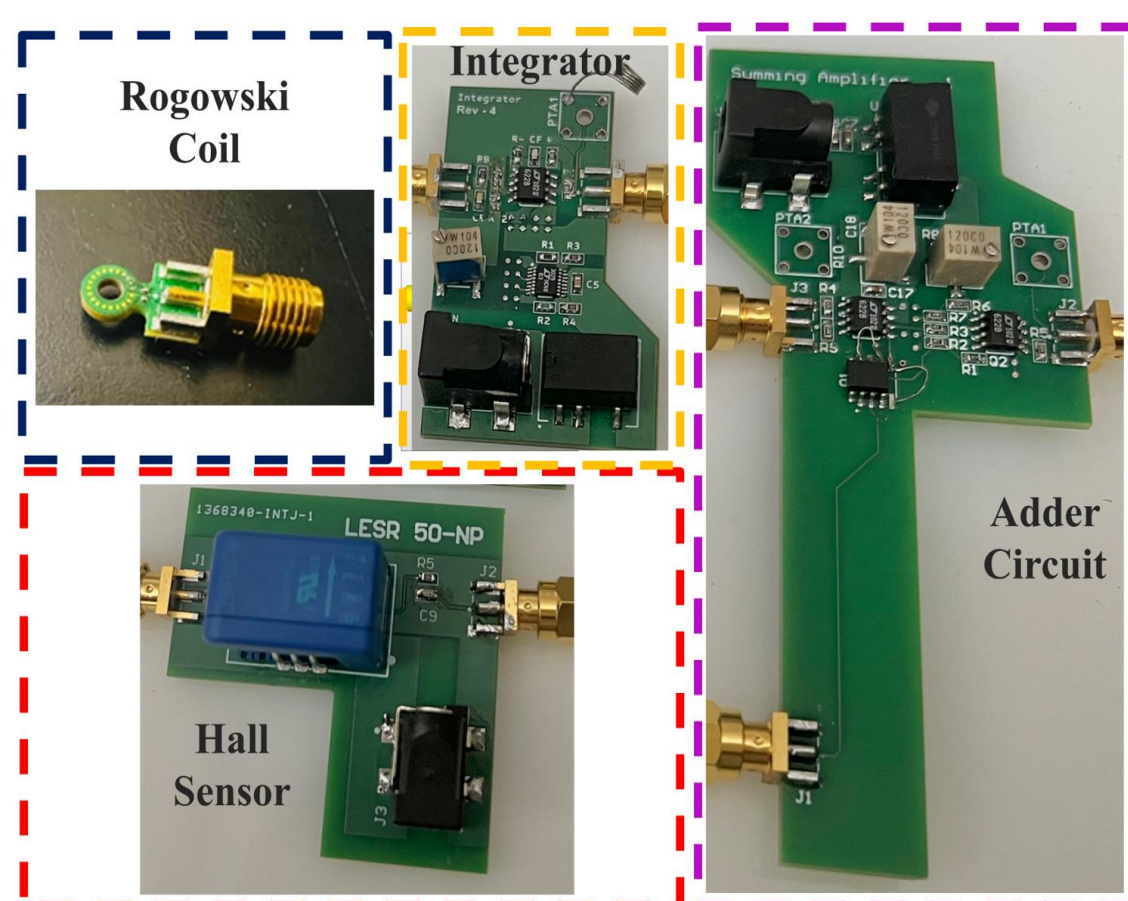
Measured current waveform is distorted

LOCATION SELECTION FOR DC SENSING -

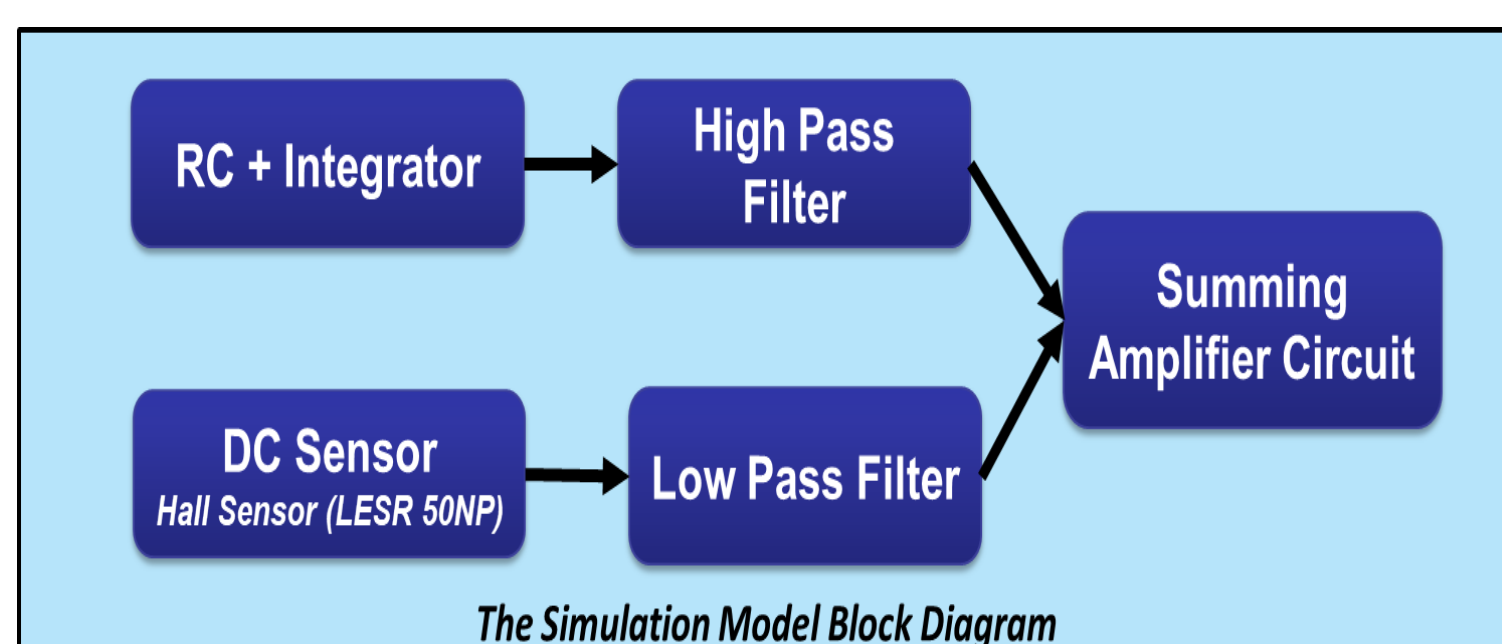


- The Fast Fourier Transform of the I_{Decap} , I_{Low} and I_{SW} verifies that the $I_{SW} = I_{Low}$ at the low frequency regime.
- Therefore, the DC magnetic field sensor can be placed between the DC link capacitor and the decoupling capacitors in a DPT circuit.
- This concludes that the inclusion of the DC sensor will not influence the power loop inductance.

PROTOTYPE DESIGN

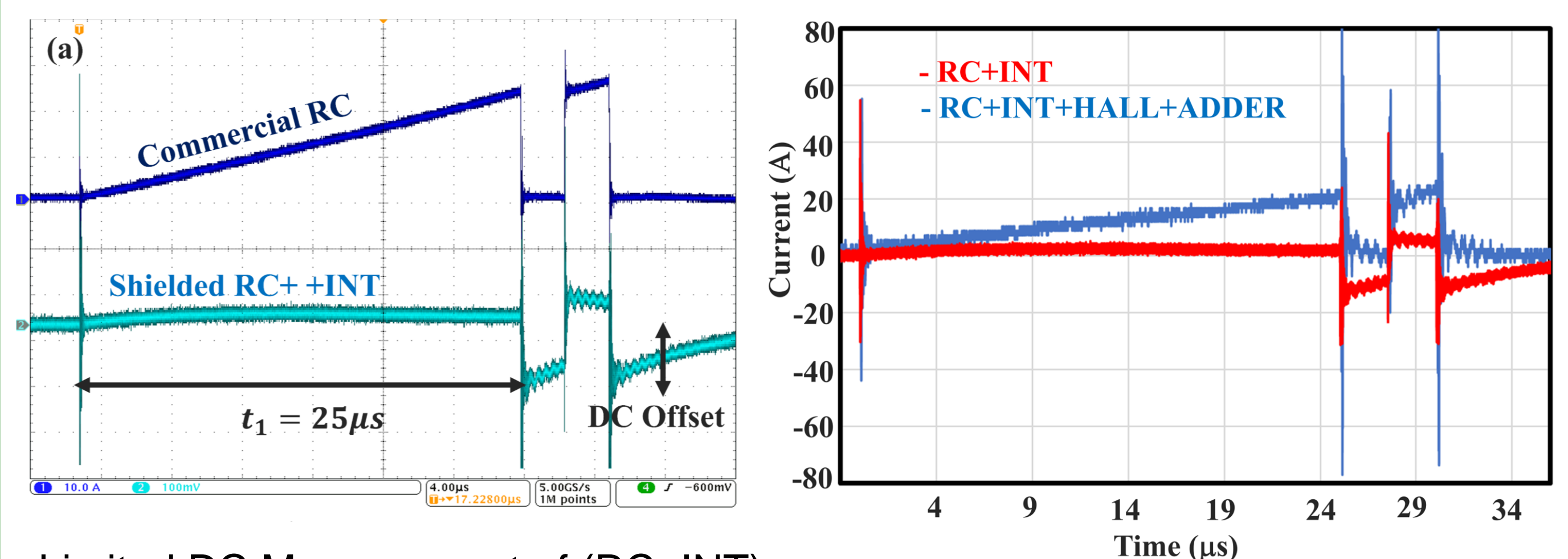


Probe Prototype



Overall Design Block

DOUBLE PULSE TEST RESULTS



Limited DC Measurement of (RC+INT)

DC Measurement Improved

CONCLUSION

- The low-frequency measurement capability of the RC circuit was compromised by the intrinsic noise of the integrator op-amp.
- The inclusion of the Hall sensor improves DC measurement without intruding into the power loop inductance of the DP circuit.

