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.

LOCATION SELECTION FOR DC SENSING -

- The Fast Fourier Transform of the $I_{\text{Decap}}$, $I_{\text{Low}}$ and $I_{\text{SW}}$ verifies that $I_{\text{SW}} = I_{\text{Low}}$ 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

DOUBLE PULSE TEST RESULTS

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.