

Equivalent Electrical Model of a Shielded Pulse Planar Transformer in Isolated Gate Drivers for SiC MOSFETs

Authors : Loreine Makki, Marc Anthony Mannah, Christophe Batard, Nicolas Ginot, Julien Weckbrodt

Abstract : Planar transformers are extensively utilized in high-frequency, high power density power electronic converters. The breakthrough of wide-bandgap technology compelled power electronic system miniaturization while inducing pivotal effects on system modeling and manufacturing within the power electronics industry. A significant consideration to simulate and model the unanticipated parasitic parameters emerges with the requirement to mitigate electromagnetic disturbances. This paper will present an equivalent circuit model of a shielded pulse planar transformer quantifying leakage inductance and resistance in addition to the interwinding capacitance of the primary and secondary windings. ANSYS Q3D Extractor was utilized to model and simulate the transformer, intending to study the immunity of the simulated equivalent model to high dv/dt occurrences. A convenient correlation between simulation and experimental results is presented.

Keywords : Planar transformers, wide-band gap, equivalent circuit model, shielded, ANSYS Q3D Extractor, dv/dt

Conference Title : ICPSPEPE 2022 : International Conference on Power Systems and Power Electronics in Power Engineering

Conference Location : Venice, Italy

Conference Dates : April 14-15, 2022