

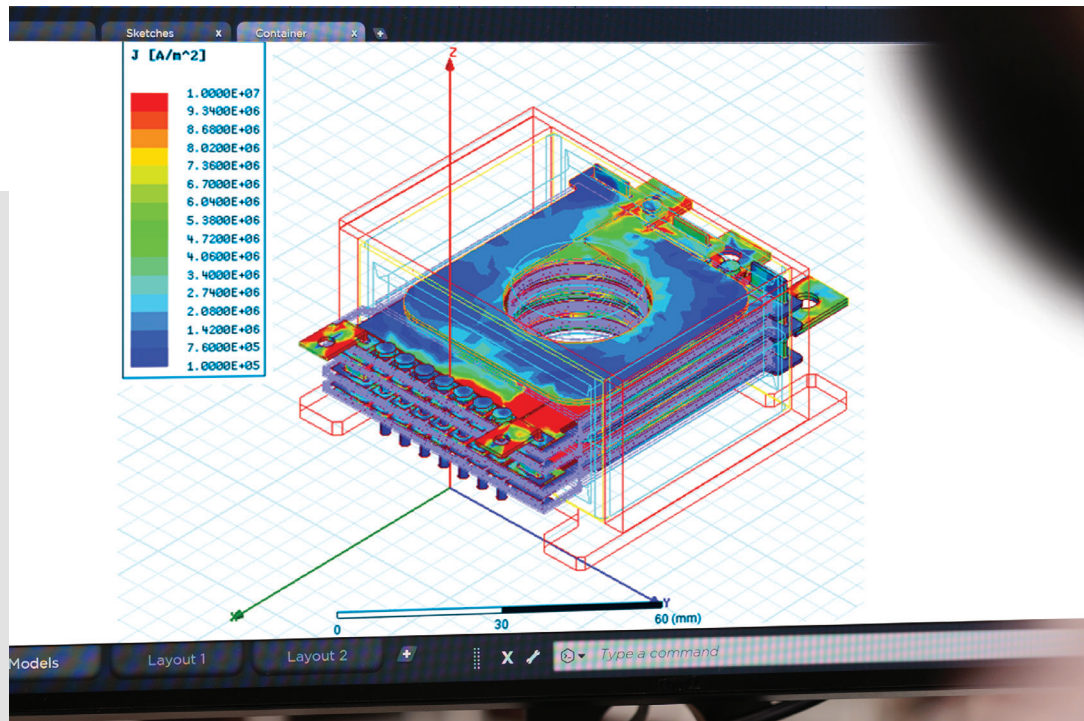
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MITIGATING PARASITICS

In Planar Transformers

TOP TIPS

Mitigating Parasitics



Top Design Tips for Mitigating Parasitics in Planar Transformers

Leakage inductance and inter-winding and intra-winding capacitances are considered unwanted parasitics in most planar transformer designs. This is due to the losses induced by the imperfect coupling from primary to secondary windings. Capacitances introduced from primary to secondary or between individual turns can cause oscillations and parallel resonant circuits which are generally unwanted for most topologies. The exception is typically an LLC converter which can actually benefit from these electrical phenomena.

By considering these factors during the design process, it is possible to significantly improve the performance of planar transformers. Continue reading for some of our top design tips that help to mitigate parasitics in planar transformers.

- 1. Use low loss materials.** One of the most effective ways to reduce parasitics in planar transformers is to use low loss materials in their construction. These materials have low electrical resistance, which reduces the amount of energy that is lost as heat during the transformer's operation. Examples of low loss materials include ferrite, high-permeability, and high-frequency cores.
- 2. Use interleaved windings.** Interleaving primary and secondary windings can be used to help cancel out the MMF generated by each winding. By canceling the MMF generated when a coil is excited you can reduce the leakage inductance on the transformer.
- 3. Optimize the transformer's geometry.** The geometry of a planar transformer plays a significant role in its performance. By optimizing the dimensions of the transformer, such as the width and thickness of the conductive traces, it is possible to reduce parasitics and improve its efficiency. Optimizing the thickness of the conductors for skin effect will also improve efficiencies in the transformer.
- 4. Use shielding.** Shielding can be used to reduce parasitics in planar transformers by providing a physical barrier between the transformer's primary and secondary windings. This reduces the amount of capacitive and inductive coupling between the two windings, which can help to improve the transformer's efficiency and self-resonant frequency.
- 5. Use resonant transformer topologies.** Resonant transformer topologies, such as the half-bridge and full-bridge, can be used to reduce parasitics in planar transformers. These topologies typically require additional discrete components such as inductors and capacitors to realize the impedance needed for resonant switching.
- 6. Get expert advise.** Standex Electronics can provide expert guidance to ensure each design is tailored to meet the specific performance targets of our customers.

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