THE UNIVERSITY OF ALABAMA RESEARCH
Office for Technology Transfer

Permanent Magnet Coupled Power Inductor for Multi-phase DC-DC Switching Power Converters

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Status:

Seeking R&D and/or licensing partner

Patent Pending

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Permanent Magnet Coupled Power Inductor

- A Permanent Magnet On-chip power Inductor (PMOI) consisting of a spiral design and a multi-stage permanent magnet
- Represents a vast improvement over conventional coupled power inductors in three distinct ways:
  - The PMOI utilizes a permanent magnet to generate a flux cancellation effect which aids in yielding a 100% increase in the saturation current, reduces both the total power inductor size to half for the same inductance value, and/or doubles the inductance density
  - Novelty also may be found in the PMOI's ability to avoid demagnetization under the maximum or rated input current by maintaining an appropriate field intensity
  - No other scientist skilled in the art has pioneered an inductor possessing these useful features

Advantages

- Novel design provides increased saturation current
  - results in increased energy storage
- Less effective total flux in the ferrite core
  - we can pass more current in the coil before the core saturates
  - high saturation current in the same small size and same inductance value

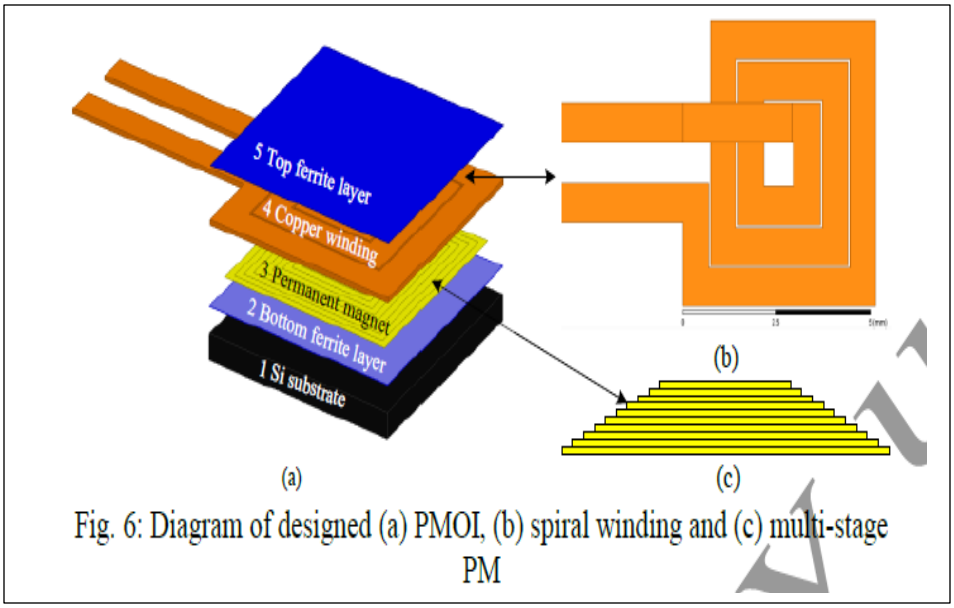

Fig. 6: Diagram of designed (a) PMOI, (b) spiral winding and (c) multi-stage PM

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