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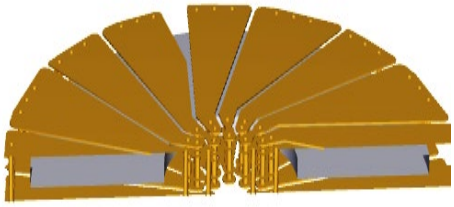
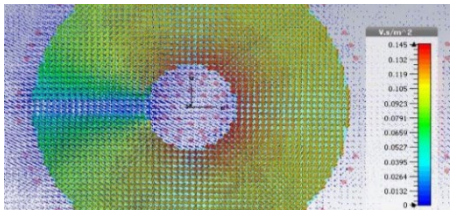
First choice for advanced applications

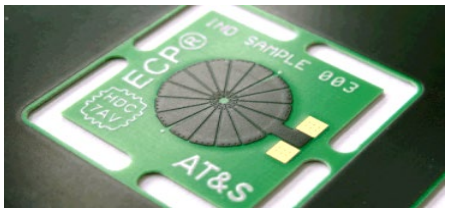
PCB INDUCTOR WITH EMBEDDED MAGNETIC CORE



DESIGN



SIMULATION



PRODUCTION

TARGET APPLICATIONS

- Inductor for non-isolated DC/DC converters
- Transformer for isolated DC/DC converters

FEATURES

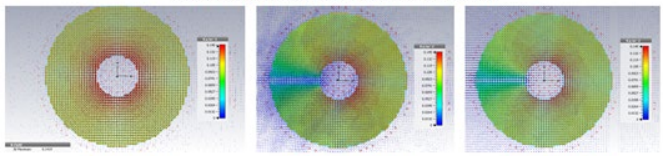
- Miniaturization (footprint and height reduction)
- Improved yields due to automated production
- In comparison to manually wound magnetic components
  - Reduced labor of production
  - Consistent performance

SIMULATION

Simulation and calculations were done to foresee the product's properties:

- Distribution of B-field lines
- Inductance over frequency
- DC resistance
- Thermal behaviour
- Fringing effect

Magnetic field lines distribution at 2.5 A



No air gap | Air gap 500µm | Air gap 350µm

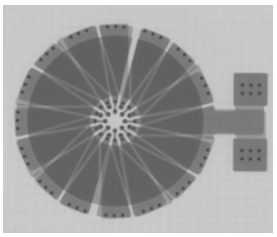
PRODUCTION

- Manufactured using standard PCB processes
- Assembly of inlays can be done by automatic SMT assmebly process
- High flexibility in core shape design (eg. EI-, UI-shape, toroid)

TECHNICAL DATA

PROPERTIES	SYMBOL	VALUE	
		Demo 1	Demo 2
Inductance	L (@ 1MHz)	2.2 µH	0.47 µH
Rated Current	I_R (@ ΔT = 40K)	1.8 A	2.5 A
Saturation Current	I_{sat} *	1.5 A	5 A
DC Resistance	R_{DC} (@ 0.1A)	79 mΩ	44 mΩ
Self-resonance frequency	f_{res}	35 MHz	120 MHz
Coil inner diameter	D_I	3 mm	3 mm
Coil outer diameter	D_O	10.5 mm	6 mm
Total thickness	h	0.5 mm	0.65 mm

* Inductance drops 30% at I_{sat}



X-ray of demonstrator

Horizon 2020 Research and Innovation program H2020-NMBP-02-2016 under Grant Agreement No 721107.

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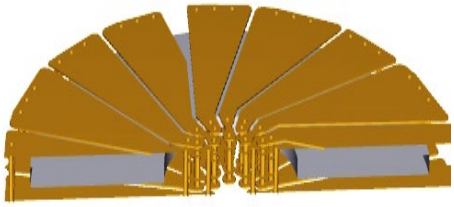
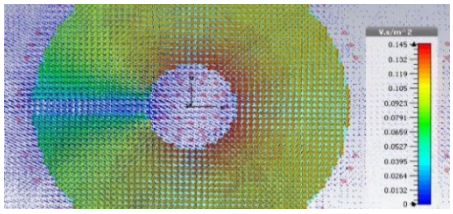
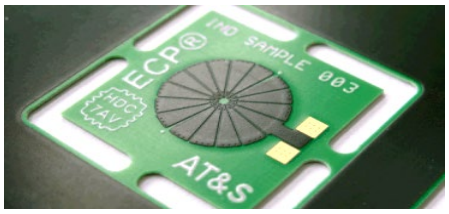
埋嵌有磁芯的PCB电感元件



设计



模拟



生产

应用目标

- 用于非隔离式直流-直流转换器的电感元件
- 用于隔离式直流-直流转换器的变压器

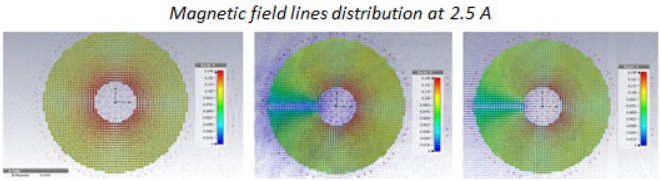
特征

- 小型化 (元件封装引脚和高度的缩小)
- 由于自动化生产的引入，良率得到改善
- 相对于手动缠绕的磁性元器件
  - 生产时所需的人力得以减少
  - 性能的稳定性得以保证

模拟

模拟和计算用于预测产品的性能：

- 磁场分布
- 依赖于频率的电感
- 直流电阻
- 热学行为
- 边缘效应

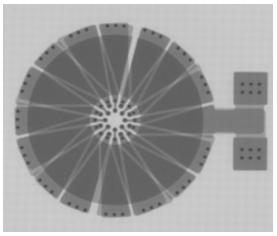


生产

- 采用标准PCB制程生产
- 镶嵌物的封装可以由自动化SMT封装制程完成
- 高度灵活的芯板外形设计 (例如：E形，U形，超环面)

技术数据

特性	符号	数值	
		演示部件 1	演示部件 2
电感	L (@ 1MHz)	2.2 µH	0.47 µH
额定电流	I_R (@ ΔT = 40K)	1.8 A	2.5 A
饱和电流	I_{sat} *	1.5 A	5 A
直流电阻	R_{DC} (@ 0.1A)	79 mΩ	44 mΩ
自谐频率	f_{res}	35 MHz	120 MHz
线圈内部直径	D_I	3 mm	3 mm
线圈外部直径	D_O	10.5 mm	6 mm
总厚度	h	0.5 mm	0.65 mm



演示部件的X光照图

* 在饱和电流下，电感下降30%

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