

Integrated LC Filter For Cost-effective Power Electronics

Novel LC filter combines inductor and capacitor to improve cost-efficiency and ease of manufacturing



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- Professor in Electrical and Computer Engineering
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Market:

Passive filter elements, such as inductors and capacitors, are fundamental components in all power electronic circuits. The market for power electronic systems is \$90 billion, with 6% CAGR with discrete components for power electronic systems >\$20 billion.

Technology:

In this novel inductance-capacitance (LC) filter, a dual energy core (DEC) design stores magnetic and electric field energy in a single element that has both inductive and capacitive terminals. The inductor, capacitor, and damping resistor are integrated into the inverter output cables and manufactured in a single process.

IP and Stage:

2 issued patents. We have built a 50Hp silicon carbide inverter using off-the-shelf components and connected it to a 30 Hp induction motor to meet National Electrical Manufacturers Association (NEMA) requirements for managing power anomalies and mitigating damaging effects of voltage pulses and spikes.

Impact:

The single LC element can be up to 50% smaller, significantly lighter, more power dense, and can be manufactured in a single process to be more cost-effective than conventional discrete power electronics circuits. The lighter, low-cost, easy manufacturability of this technology directly enables increased weight-restricted applications and reduced COGS for higher power electronics systems profit margins.

Ask:

Introductions to power electronics and grid tied inverter manufacturers.

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