Integrated LC Filter For Cost-effective Power Electronics

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

Dan Ludois
• Professor in Electrical and Computer Engineering
• Moore Inventor Fellow

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 discreet 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.

More information:
Lesli Mark
WARF Accelerator Associate
lmark@WARF.org
(608) 960 - 9903

Receive WARF Accelerator tech updates
warf.org/accelerator