

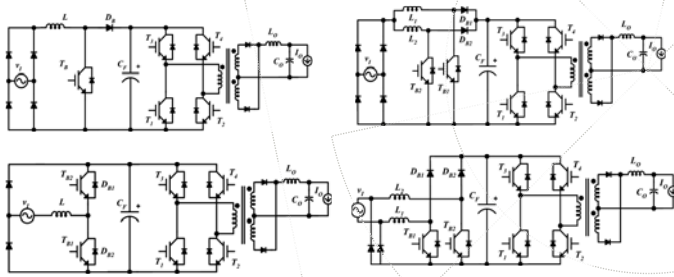
High Performance AC-DC Converters

Background and challenges

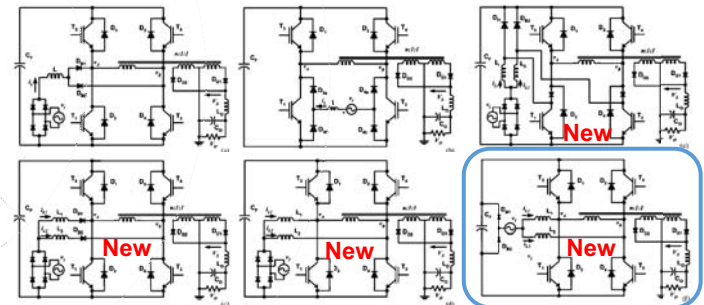
Restrictive Standards impose → nearly sinusoidal input current on Switch Mode Power Supplies. To comply there is a need of two conversion stages (boost PFC & Isolated DC-DC) which results in a low efficiency and high cost solution.

Investigation on Hard Switched Power Electronic Converters' Topologies and on Control Processes, to obtain Full Bridge Single Stage AC-DC Converters with Power Factor Correction presenting **High Efficiency, High Power Density and Low Cost**.

Typical Two Stages Topologies



Study of innovative Single Stage Topologies

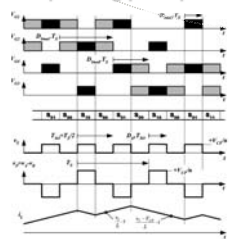


Description and main innovation

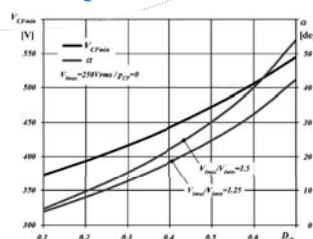
Single Stage Power Factor Correctors Full Bridge AC-DC Converters:

The optimization of the most promising topologies resulted in new high performance converters for 1kW output power with less and cost effective components that fully comply with standards.

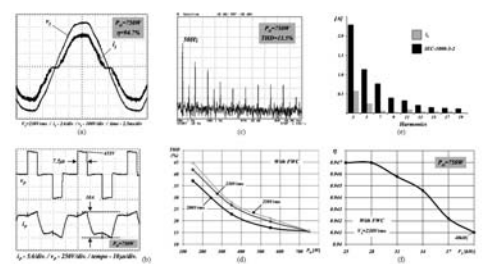
Operating principle



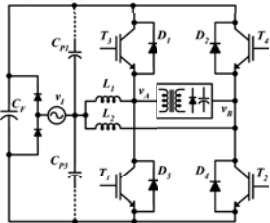
Design limits



THD and standards compliance



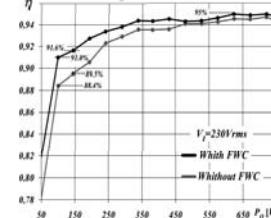
Topology Best Performance



Prototype



Efficiency



Innovation

1. Symmetrical transistors' current distribution
2. No minimum power operation restriction
3. Full compliance with standards
4. High efficiency >94%
5. Reduced number of components
6. Lower cost

Achievements

PHDs	MSc	IEEE Transactions	Other ISI Journals	IEEE Reconized Conferences	Ranking State of art	Funding	Impact in technology
1	2	4	2	6	Better characteristics	PEst-OE/EEI/LA0008/2011	Promising

IEEE Transactions on Power Electronics (TPE) – (2011 & 2014) – 2 papers;
IEEE Transactions on Industrial Electronics (TIE) – (2010 & 2014) – 2 papers;
Elsevier – International Journal on Electrical Power & Energy Systems (2012) – 1 paper
Taylor & Francys – International Journal on Electronics(2012) – 1 paper