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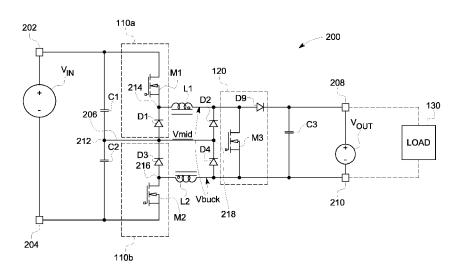


FIG. 2

(57) Abstract: A dual-buck boost switching converter topology for use in high voltage power factor control applications is disclosed. The new topology includes dual buck converters cascaded with a boost converter. The dual buck converters are configured to equally share the input voltage such that voltage stresses on the buck converter components is significantly reduced. Voltage sharing is realized through the use of multiple magnetically coupled energy storage inductors and a pair of sharing diodes. The sharing diodes provide current paths for balancing voltages applied to the buck converter components.





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С. ДОСИМІ	ENTS CONSIDERED TO BE RELEVANT	
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Х	DE 10 2006 014780 A1 (SCHEKULIN ULRICH [DE]) 18 October 2007 (2007-10-18) figure 4	1
Х	EP 0 852 422 A2 (MOOSBAUER PETER DIPL ING [DE]) 8 July 1998 (1998-07-08) figures 15,19 paragraph [0034]	1-24
A	WO 2009/095836 A2 (PHILIPS INTELLECTUAL PROPERTY [DE]; KONINKL PHILIPS ELECTRONICS NV [NL) 6 August 2009 (2009-08-06) figure 5	6,13,19, 24
А	US 2009/268496 A1 (TAN JINGTAO [CN] ET AL) 29 October 2009 (2009-10-29) figure 23	1,2,7, 14,20

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DE 102006014780 A1 EP 0852422 A2 W0 2009095836 A2		NONE AT 215279 T DE 19700100 A1 EP 0852422 A2	15-04-2002 16-07-1998 08-07-1998
	08-07-1998	DE 19700100 A1	16-07-1998
WO 2009095836 A2			30 0, 1550
	06-08-2009	CN 101926082 A EP 2248249 A2 JP 5117580 B2 JP 2011511607 A KR 20100113603 A TW 200942076 A US 2010296324 A1 WO 2009095836 A2	22-12-2010 10-11-2010 16-01-2013 07-04-2011 21-10-2010 01-10-2009 25-11-2010 06-08-2009
US 2009268496 A1	29-10-2009	TW 200945743 A US 2009268496 A1 US 2012182775 A1	01-11-2009 29-10-2009 19-07-2012
EP 2421135 A2	22-02-2012	DE 102010035020 A1 EP 2421135 A2	23-02-2012 22-02-2012