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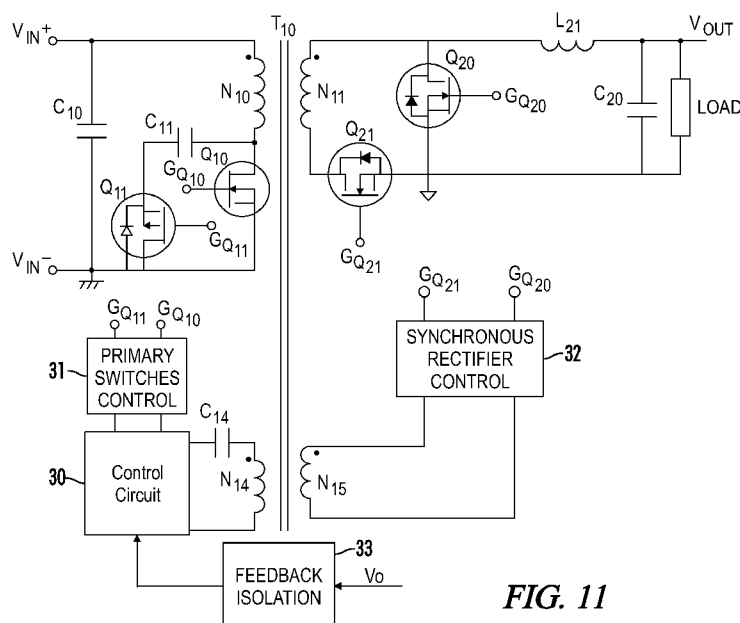


FIG. 11

(57) Abstract: A switch-mode power converter includes a power isolation transformer (T_{10}) and a drive transformer (T_{20}) having their various windings collectively wound on a magnetic core having a center leg and outer legs. A primary winding and one or more secondary windings of the power transformer are wound on the center leg, and first and second windings of the drive transformer are wound on an outer leg. A primary control circuit controls one or more primary switches to supply the input voltage to the primary winding. A secondary control circuit controls secondary switches connected between the secondary windings and a load. Another control circuit controls operation of the primary and secondary control circuits based at least in part on a feedback signal. The drive transformer windings are further configured to provide isolation between the primary control circuit and the synchronous rectifier control circuit.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/030301**A. CLASSIFICATION OF SUBJECT MATTER****H02M 3/28(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H02M 3/28; H02M 3/335; H02M 7/5375

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: "Converter", "Inverter", "IM(Integrated Magnetic)", "SR(Synchronous Rectifier)", "Center leg", "Outer leg", "Power transformer", "Drive transformer"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 2009-0244931 A1 (Power-One Inc.) 01 Oct. 2009 see abstract, paragraphs [0043]-[0049], claims 1-20, and figures 2,4a.	1-5,8,11,16 6-7,9-10,12-15 ,17-20
Y	US 2002-0110005 A1 (Hengchun Mao et al.) 15 Aug. 2002 see abstract, claim 1, and figure 3.	6-7,9-10,12-15 ,17-20
Y	US 4821163 A (Gordon E. Bloom) 11 Apr. 1989 see abstract, column 12, line 27-38, claims 1-24, and figure 12.	7,12,17,20
A	US 5784266 A (Virginia Power Technologies Inc.) 21 Jul. 1998 see abstract, claims 1-15, and figures 1-9.	1-20
A	US 2005-0041441 A1 (Murata Manufacturing Co.) 24 Feb. 2005 see abstract, claims 1-20, and figures 1-11.	1-20

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009-0244931 A1	01.10.2009	CN 102047542 A EP 2263300 A2 US 8031494 B2 WO 2009-120451 A2 WO 2009-120451 A3	04.05.2011 22.12.2010 04.10.2011 01.10.2009 01.10.2009
US 2002-0110005 A1	15.08.2002	CN 1295853 C CN 1381942 A EP 1231705 A2 EP 1231705 A3 EP 1231705 B1 US 6674658 B2	17.01.2007 27.11.2002 14.08.2002 03.12.2003 04.08.2010 06.01.2004
US 4821163 A	11.04.1989	None	
US 5784266 A	21.07.1998	None	
US 2005-0041441 A1	24.02.2005	CN 1585247 A CN 1585247 C EP 1513248 A2 EP 1513248 A3 JP 2005-102468 A JP 4155211 B2 KR 10-0583670 B1 KR 10-2005-0020593 A US 7042739 B2	23.02.2005 16.04.2008 09.03.2005 11.07.2007 14.04.2005 24.09.2008 26.05.2006 04.03.2005 09.05.2006