

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 November 2008 (13.11.2008)

PCT

(10) International Publication Number
WO 2008/137656 A3

- (51) International Patent Classification:
H02M 1/42 (2007.01)
- (21) International Application Number:
PCT/US2008/062387
- (22) International Filing Date: 2 May 2008 (02.05.2008)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/915,547 2 May 2007 (02.05.2007) US
- (71) Applicant (for all designated States except US): **CIRRUS LOGIC, INC.** [US/US]; 2901 Via Fortuna, Austin, Texas 78746 (US).

AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

- (72) Inventor: **MELANSON, John, L.**; 901 West 9th Street, Apt. #201, Austin, TX 78703 (US).
- (74) Agent: **CHAMBERS, Kent, B.**; Hamilton & Terrile, LLP, P.O. Box 203518, Austin, TX 78720 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

Published:
— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
7 May 2009

(54) Title: POWER FACTOR CORRECTION CONTROLLER WITH FEEDBACK REDUCTION

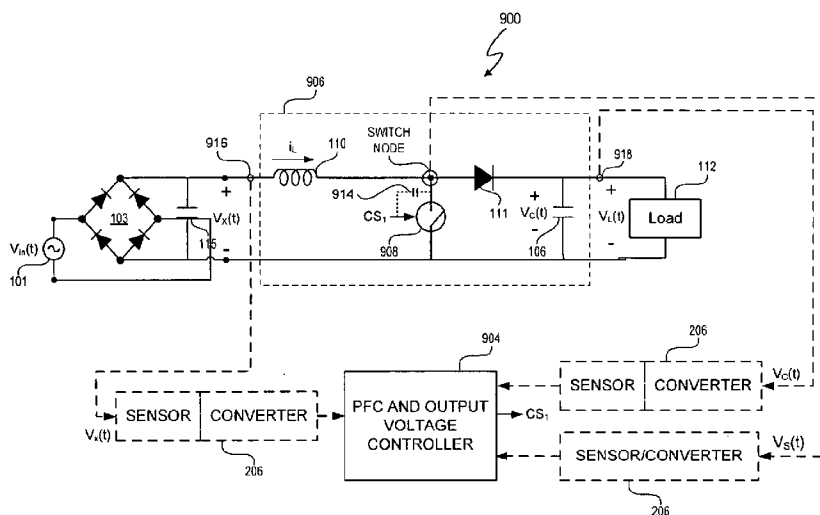


Figure 9

(57) Abstract: A power control system (900) includes a feedback loop having a power factor correction (PFC) and output voltage controller (904) and a switching power converter (906). The switching power converter (906) includes an inductor (110) to supply charge to an output capacitor (106) and a switch (908) to control inductor current ramp-up times. The PFC and output voltage controller (904) provides a control signal (CS1) to the switch (908) to control PFC and regulate output voltage Vc(t) of the switching power converter (906). During a single period of the control signal, the PFC and output voltage controller (904) obtains the line input voltage Vx(t) and output voltage Vc(t) of the switching power converter (906) using a single feedback signal received from the switching power converter (906).

WO 2008/137656 A3

INTERNATIONAL SEARCH REPORT

International application No PCT/US2008/062387
--

A. CLASSIFICATION OF SUBJECT MATTER
INV. H02M1/42

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

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 445 600 B2 (BEN-YAAKOV SHMUEL [IL]) 3 September 2002 (2002-09-03)	1,3,4,8, 9,11,12, 14,20,22
Y	column 5, line 45 - column 6, line 55; figures 3,4	6,7, 17-19
X	SAM BEN-YAAKOV ET AL: "The Dynamics of a PWM Boost Converter with Resistive Input" IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, IEEE SERVICE CENTER, PISCATAWAY, NJ, USA, vol. 46, no. 3, 1 June 1999 (1999-06-01), XP011023511 ISSN: 0278-0046 Paragraph II.	1,3,4,8, 9,11,12, 14,20,22
	----- -/--	

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
 - *E* earlier document but published on or after the international filing date
 - *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
 - *O* document referring to an oral disclosure, use, exhibition or other means
 - *P* document published prior to the international filing date but later than the priority date claimed
 - *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
 - *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
 - *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
 - * & * document member of the same patent family

Date of the actual completion of the international search
10 September 2008

Date of mailing of the international search report
26/03/2009

Name and mailing address of the ISA/
 European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040,
 Fax: (+31-70) 340-3016

Authorized officer
Braccini, Roberto

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/062387

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/223255 A1 (BEN-YAAKOV SHMUEL [IL] ET AL) 4 December 2003 (2003-12-04) paragraphs [0007] - [0024]; figure 2 -----	1,3,4,8, 9,11,12, 14,20,22
Y	US 6 259 614 B1 (RIBARICH THOMAS J [US] ET AL) 10 July 2001 (2001-07-10) abstract; figures 1,2 -----	6,7, 17-19
A	US 6 043 633 A (LEV ARIE [IL] ET AL) 28 March 2000 (2000-03-28) abstract; figures 4-10 -----	4,5,15, 16

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/062387

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.
2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1(*), 3-9, 11, 12(*), 14-20, 22

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1(*),3-9,11,12(*),14-20,22

Power factor correction controller configured to determine an inductor flyback time by sensing voltage transients on a gate of the boost switch.

(*) When comprising alternative (c2).

2. claims: 1(**),2,4-10,12(**),13,15-21

Power factor correction controller capable of regulating output voltage without output voltage sensing.

(**) When comprising alternative (c1).

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2008/062387

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6445600	B2	03-09-2002	AT 229706 T 15-12-2002
			DE 69904480 D1 23-01-2003
			DE 69904480 T2 30-10-2003
			EP 1097505 A2 09-05-2001
			WO 0003473 A2 20-01-2000
			JP 2002520991 T 09-07-2002
			US 2001024374 A1 27-09-2001
US 2003223255	A1	04-12-2003	AU 2003228088 A1 19-12-2003
			EP 1522139 A2 13-04-2005
			WO 03103116 A2 11-12-2003
US 6259614	B1	10-07-2001	US RE40016 E1 22-01-2008
US 6043633	A	28-03-2000	AU 754809 B2 28-11-2002
			AU 4423299 A 20-12-1999
			EP 1097414 A1 09-05-2001
			WO 9963414 A1 09-12-1999