



(51) International Patent Classification:

H03K 19/00 (2006.01) *H03K 17/00* (2006.01)
H02M 3/00 (2006.01)

(21) International Application Number:

PCT/EP2013/050869

(22) International Filing Date:

17 January 2013 (17.01.2013)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

13/351,618 17 January 2012 (17.01.2012) US
12151561.3 18 January 2012 (18.01.2012) EP

(72) Inventor; and

(71) Applicant : **ZAJC, Franc** [SI/SI]; Zg. Pirnice 88, 1215
Medvode (SI).

(74) Agent: **ISARPATENT, PATENT- UND RECHTSAN-
WÄLTE**; Friedrichstrasse 31, 80801 Munich (DE).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

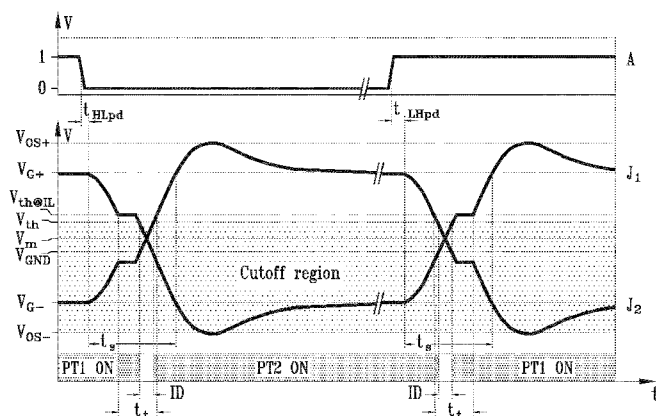
- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

19 December 2013

(54) Title: A METHOD AND APPARATUS FOR DRIVING HALF BRIDGE CONNECTED SEMICONDUCTOR POWER SWITCHES WITH A STABLE AND EXTREMELY SHORT INTERLOCK DELAY COMBINED WITH A SWITCHING TRANSITION SPEED INCREASE AND A DRIVING POWER CONSUMPTION REDUCTION

Fig 2



(57) Abstract: A driving circuit for driving half bridge connected electrically controlled power switches with a near zero interlock delay time between on-states of the power switches, wherein the driving circuit is configured to receive an input signal and to generate: - a first drive signal being adapted to switch a first power switch between the on and off state, - a second drive signal being adapted to switch a second power switch between the on and off state, wherein the signal curve of the first drive signal generated in response to a rising and falling edge of said input signal is mirrored with respect to the signal curve of the second drive signal along a time axis of a mirroring voltage value within a transition time, wherein the mirroring voltage value is adjusted such to be within the cutoff region of the power switches.

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2013/050869

A. CLASSIFICATION OF SUBJECT MATTER

INV. H03K17/00 H03K19/00

ADD. H02M3/00

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)

H03K H02M H02P

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 practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 41 10 633 A1 (MITSUBISHI ELECTRIC CORP [JP]) 17 October 1991 (1991-10-17)	1,14
A	column 1, line 3 - column 15, line 12; figures 1-9	2-13,15
X	US 2011/025397 A1 (WANG BO [US] ET AL) 3 February 2011 (2011-02-03)	1,14
A	paragraph [0008] - paragraph [0084]; figures 1-4,7,13	2-13,15
X	EP 0 760 552 A1 (SGS THOMSON MICROELECTRONICS [IT] ST MICROELECTRONICS SRL [IT]) 5 March 1997 (1997-03-05)	1,14
A	column 1, line 7 - column 7, line 54; figures 1-4a	2-13,15



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 application or patent 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

30 October 2013

Date of mailing of the international search report

07/11/2013

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

Kassner, Holger

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2013/050869

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
DE 4110633	A1	17-10-1991	DE	4110633 A1		17-10-1991
			JP	H03286619 A		17-12-1991
			US	5140201 A		18-08-1992

US 2011025397	A1	03-02-2011	NONE			

EP 0760552	A1	05-03-1997	DE	69523752 D1		13-12-2001
			DE	69523752 T2		29-08-2002
			EP	0760552 A1		05-03-1997
			JP	3831020 B2		11-10-2006
			JP	H09121591 A		06-05-1997
			US	5917720 A		29-06-1999
