





Amendment to Test Report	
This Amendment is valid only together with the main Test Report	
Report No	270292
Main Report No	261294
Date of issue	September 23, 2014
Total number of pages	6
Applicant's Name	Power Integrations, Inc.
Address	5245 Hellyer Avenue, San Jose, CA 95138, U.S.A.
Test specification	
Standard	IEC 62368-1:2014 (Second Edition)
Test procedure	CB scheme
Non-standard test method	N/A
<p>Copyright © 2010 Worldwide System for Conformity Testing and Certification of Electrotechnical Equipment and Components (IECEE), Geneva, Switzerland. All rights reserved.</p> <p>This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.</p> <p>If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.</p> <p>This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.</p>	
Test item description	IC including capacitor discharge function (ICX)
Trade Mark	CAPZero
Manufacturer	Power Integrations, Inc.
Model/Type reference	CAP002DG; CAP003DG; CAP004DG; CAP005DG; CAP006DG; CAP007DG; CAP008DG; CAP009DG; CAP012DG; CAP013DG; CAP014DG; CAP015DG; CAP016DG; CAP017DG; CAP018DG; CAP019DG; SC1143
Ratings	230V AC nominal (tested for 85-265V AC, 47-63Hz)

Testing procedure and testing location:		
<input checked="" type="checkbox"/>	Testing Laboratory:	Nemko A/S
Testing location/ address		Gaustadalléen 30, NO - 0373 Oslo, Norway
<input type="checkbox"/>	Associated Testing Laboratory:	
Testing location/ address		
Tested by (name + signature)		Ole Morten Aaslund 
Approved by (name + signature)		Hans-Eirik Lie 
<input type="checkbox"/>	Testing procedure: Elsewhere:	
Testing location/ address		
Tested by (name + signature)		
Approved by (name + signature)		

List of Attachments (including a total number of pages in each attachment):

Photos (2 pages)

Summary of testing:

The following additional tests were performed due to the introduction of different minimum and maximum X-capacitance and resistance values:

- 100 positive impulses and 100 negative impulses between line and neutral using a capacitor with the largest capacitance and a resistor with the smallest resistance specified by the manufacturer of the ICX; and repeated with a capacitor with the smallest capacitance and the resistor with the largest resistance. The time between any two impulses shall not be less than 1 s. The impulse shall be as specified in circuit 2 of Table N.1 (60950-1) / 1.2/50µs in Table K.1 (60065), with Uc equal to the transient voltage.

Refer Annex G.16 b)

- 10 000 cycles of power on and off using a capacitor with the smallest capacitance and a resistor with the largest resistance as specified by the manufacturer of ICX. The power on and off cycles time shall not be less than 1 s.

Refer Annex G.16 d)

After tests described above were performed the capacitor discharge tests were performed according to clause 5.5.2.2 on models CAP002DG, CAP009DG, CAP012DG and CAP019DG. The circuit tested continues to comply with 5.5.2.2. Refer clause 5.5.2.2 for details.

Tests performed (name of test and test clause):

5.5.2.2 Safeguards against capacitor discharge after disconnection of a connector

G.16 IC including capacitor discharge function (ICX)

Testing location:

Nemko A/S
Gaustadalléen 30, NO-0373 Oslo, Norway

Summary of compliance with National Differences

Refer main report.

Copy of marking plate

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Refer main report.

Calibration	All instruments used in the tests given in this test report are calibrated and traceable to national or international standards. Further information about traceability will be given on request.
Measurement uncertainty	Measurement uncertainties are calculated for all instruments and instrument set-ups given in this report. Calculations are based on the principles given in the standard EA-4/02 (Dec. 1999), IEC Guide 115:2007 and other relevant internal Nemko-procedures. Further information about measurement uncertainties will be given on request.
Evaluation of results	If not explicitly stated otherwise in the standard, the test is passed if the measured value is equal to or below (above) the limit line, regardless of the measurement uncertainty. If the measured value is above (below) the limit line, the test is not passed - ref IEC Guide 115:2007. The instrumentation accuracy is within limits agreed by IECCE-CTL.

Possible test case verdicts:

- test case does not apply to the test object : N/A
- test object does meet the requirement..... : P (Pass)
- test object does not meet the requirement : F (Fail)

Testing :

Date of receipt of test item : September 17, 2014

Date(s) of performance of tests : September 17 – September 23, 2014

Manufacturer’s Declaration per sub-clause 6.2.5 of IECCE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :

Yes

Not applicable

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) : Millenium Microtech Shanghai
No. 351 Guo Shou Jing Rd., Z.J. Hi Tech Park
Pudong New Area, Shanghai,
201203 CHINA

General product information:

The update concerned in this amendment report covers the introduction of different minimum and maximum X-capacitance and resistance values as follows:

X-capacitance: Min. 100nF, max. 6µF

Resistance: Min. 142kΩ, max. 7.5MΩ

In addition it covers update to included Amd 2:2013 of IEC 60950-1(ed2).

Models covered by this amendment report are listed in table below. Models CAP002DG, CAP009DG, CAP012DG and CAP019DG were chosen to represent all models. During testing the ICX was mounted on a PCB together with a mains fuse (1A), X-capacitor and discharge resistors, refer attached photos. Values of X-capacitor and discharge resistors are as per recommendation from the manufacturer. Refer table below.

Model/Part No. (ICX)	BV _{DSS}	Total X-capacitance - range	Total series resistance - range (R1+R2)
CAP002DG	825V	100nF–600nF	7.5MΩ–1.42MΩ
CAP003DG	825V	100nF–900nF	7.5MΩ–970kΩ
CAP004DG	825V	100nF–1.2µF	7.5MΩ–740kΩ
CAP005DG	825V	100nF–1.8µF	7.5MΩ–456kΩ
CAP006DG	825V	100nF–2.4µF	7.5MΩ–342kΩ
CAP007DG	825V	100nF–3.0µF	7.5MΩ–285kΩ
CAP008DG	825V	100nF–4.2µF	7.5MΩ–190kΩ
CAP009DG	825V	100nF–6µF	7.5MΩ–142kΩ
CAP012DG	1000V	100nF–600nF	7.5MΩ–1.42MΩ
CAP013DG	1000V	100nF–900nF	7.5MΩ–970kΩ
CAP014DG	1000V	100nF 1.2µF	7.5MΩ–740kΩ
CAP015DG	1000V	100nF–1.8µF	7.5MΩ–456kΩ
CAP016DG	1000V	100nF–2.4µF	7.5MΩ–342kΩ
CAP017DG	1000V	100nF–3.0µF	7.5MΩ–285kΩ
CAP018DG	1000V	100nF–4.2µF	7.5MΩ–190kΩ
CAP019DG	1000V	100nF–6µF	7.5MΩ–142kΩ
SC1143	1000V	100nF–6µF	7.5MΩ–142kΩ

Project history:

Nemko Report/ Order No.:	Modification to the appliances:	Changes/ Modifications in clause(s):
261294	Main Test Report	N/A
270292	Introduction of different minimum and maximum X-capacitance and resistance values: X-capacitance: Min. 100nF, max. 6µF Resistance: Min. 142kΩ, max. 7.5MΩ Refer also General product information.	Summary of testing, General product information, 5.5, G.16 and Table 5.5.2.2.

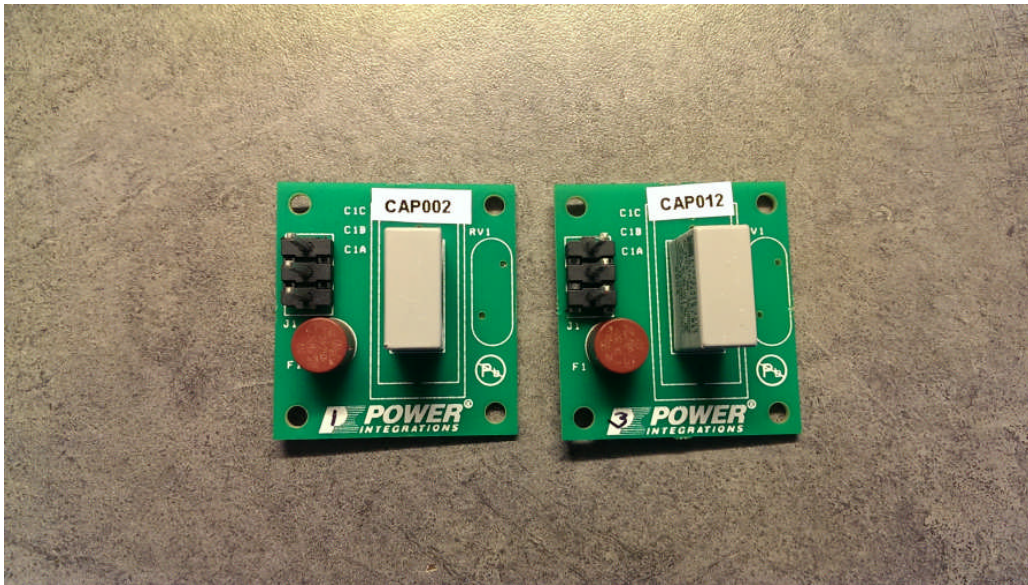
5.5	Components as safeguards		
5.5.1	General		P
5.5.2	Capacitors and RC units	ICX is tested and complies with Annex G.16.	P
5.5.2.1	General requirement	ICX is tested and complies with Annex G.16.	P
5.5.2.2	Safeguards against capacitor discharge after disconnection of a connector	(See appended table 5.5.2.2)	P

G.16	IC including capacitor discharge function (ICX)		P
b)	Impulse test using circuit 2 with $U_c =$ to transient voltage	Impulse tests as described performed on models CAP002DG, CAP009DG, CAP012DG and CAP019DG. $U_c = 2500V_{peak}$.	P
D1)	10,000 cycles on and off using capacitor with smallest capacitance resistor with largest resistance specified by manufacturer	10 000 cycles of power on and off (cycle time is 1 s) performed on models CAP002DG and CAP012DG.	P
D2)	Capacitance	Min. 100nF, max. 6 μ F	—
D3)	Resistance	Min. 142k Ω , max. 7.5M Ω	—

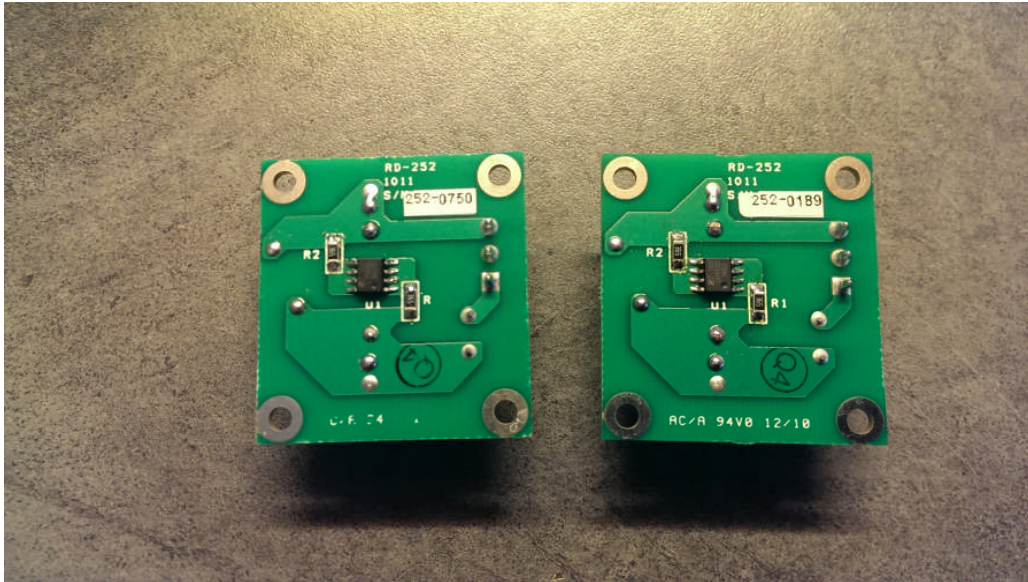
5.5.2.2	TABLE: Stored discharge on capacitors					P
Supply Voltage (V), Hz	Test Location	Operating Condition (N, S)	Switch position On or off	Measured Voltage (after 2 seconds)	ES Classification	
CAP002DG: $V_{peak}: 358V / 50Hz$	Phase to Phase	N	No switch	19V	ES1	
CAP009DG: $V_{peak}: 352V / 50 Hz$	Phase to Phase	N	No switch	32V	ES1	
CAP012DG: $V_{peak}: 356V / 50 Hz$	Phase to Phase	N	No switch	22V	ES1	
CAP019DG: $V_{peak}: 355V / 50 Hz$	Phase to Phase	N	No switch	33V	ES1	
Supplementary information:						
X-capacitors installed for testing are: Refer General product information for values of X-capacitance						
<input type="checkbox"/> bleeding resistor rating:						
<input type="checkbox"/> ICX: Equipment under test is an ICX component						
Notes:						
A. Test Location:						
Phase to Neutral; Phase to Phase; Phase to Earth; and/or Neutral to Earth						
B. Operating condition abbreviations:						
N – Normal operating condition (e.g., normal operation, or open fuse); S –Single fault condition						

Photos

Report No. 270292



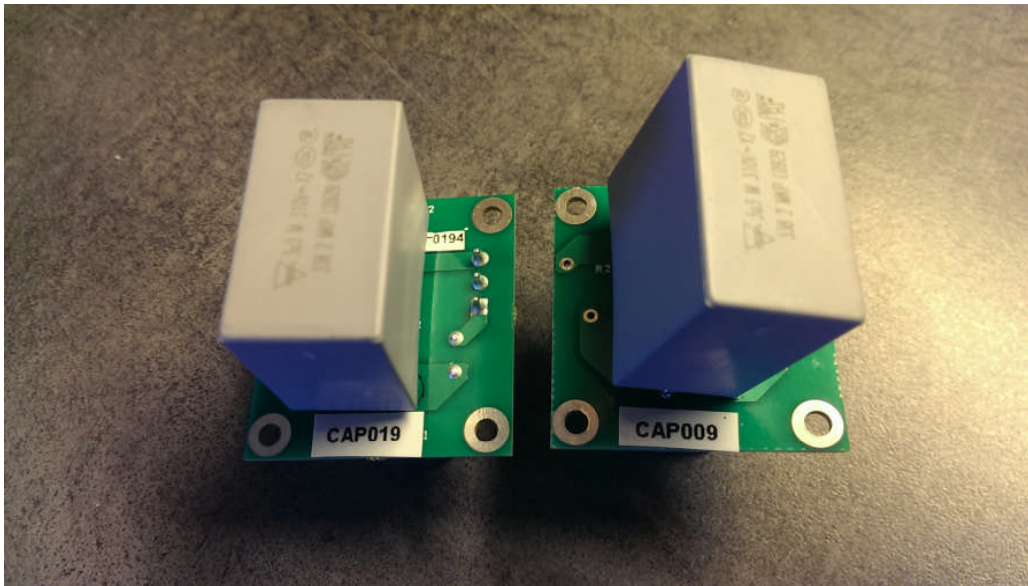
Test board of CAP002DG and CAP012DG



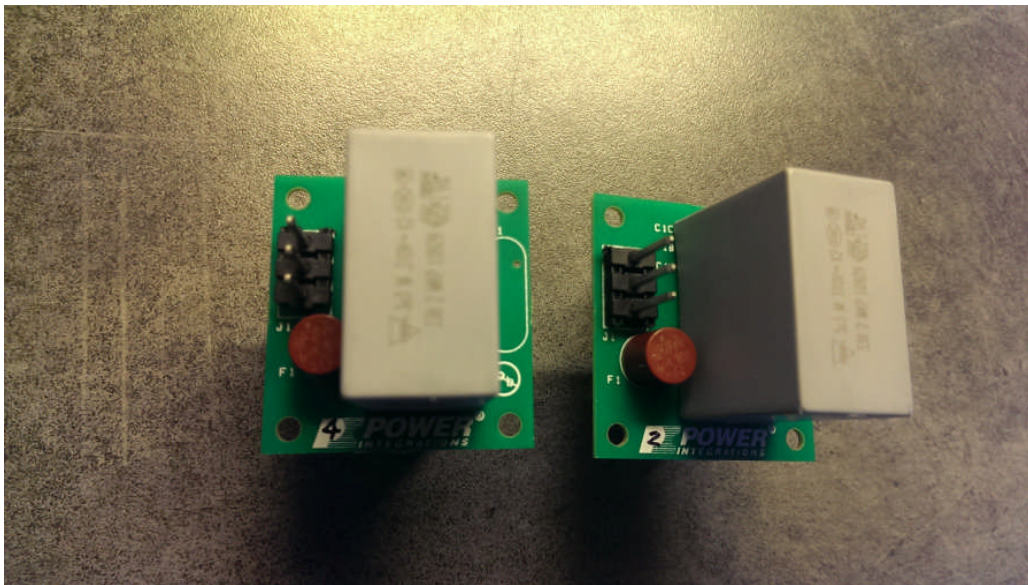
Test board of CAP002DG and CAP012DG

Photos

Report No. 270292



Test board of CAP009DG and CAP019DG



Test board of CAP009DG and CAP019DG