ICS 31.080.99 SLOVENSKÁ TECHNICKÁ NORMA Marec 2025

STN

Polovodičové súčiastky
Časť 15: Diskrétne súčiastky
Polovodičové výkonové súčiastky s izolovaným púzdrom

STN
EN IEC 60747-15

35 8797

Semiconductor devices - Part 15: Discrete devices - Isolated power semiconductor devices

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 02/25

Obsahuje: EN IEC 60747-15:2024, IEC 60747-15:2024

Oznámením tejto normy sa od 30.11.2027 ruší
STN EN 60747-15 (35 8797) z augusta 2012

140111

Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2025
Slovenská technická norma a technická normalizačná informácia je chránená zákonom č. 60/2018 Z. z. o technickej normalizácii v znení neskorších predpisov.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN IEC 60747-15

November 2024

ICS 31.080.99

Supersedes EN 60747-15:2012

English Version

Semiconductor devices - Part 15: Discrete devices - Isolated power semiconductor devices (IEC 60747-15:2024)

Dispositifs à semiconducteurs - Partie 15: Dispositifs discrets - Dispositifs de puissance à semiconducteurs isolés
(IEC 60747-15:2024)

Halbleiterbauelemente - Einzel-Halbleiterbauelemente - Teil 15: Isolierte Leistungshalbleiter
(IEC 60747-15:2024)

This European Standard was approved by CENELEC on 2024-11-26. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

CENELEC
European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

© 2024 CENELEC All rights of exploitation in any form and by any means reserved worldwide for CENELEC Members.

European foreword

The text of document 47E/832/FDIS, future edition 3 of IEC 60747-15, prepared by SC 47E "Discrete semiconductor devices" of IEC/TC 47 "Semiconductor devices" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60747-15:2024.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2025-11-30
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2027-11-30

This document supersedes EN 60747-15:2012 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60747-15:2024 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 60112:2020 NOTE Approved as EN IEC 60112:2020 (not modified)

IEC 61287-1:2014 NOTE Approved as EN 61287-1:2014 (not modified)

IEC 62368-1:2018 NOTE Approved as EN IEC 62368-1:2020 (not modified) +A11:2020

IEC 62477-1:2022 NOTE Approved as EN IEC 62477-1:2023 (not modified)

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60068-2-1	2007	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	2001
IEC 60270	2000	High-voltage test techniques - Partial discharge measurements	EN 60270	2001
+ A1	2015		+ A1	2016
IEC 60664-1	2020	Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests	EN IEC 60664-1	2020
IEC 60721-3-3	2019	Classification of environmental conditions - Part 3-3: Classification of groups of environmental parameters and their severities - Stationary use at weather protected locations	EN IEC 60721-3-3	2019
IEC 60747-1	2006	Semiconductor devices - Part 1: General	-	-
+ A1	2010		-	-
IEC 60747-2	2016	Semiconductor devices - Discrete devices and integrated circuits - Part 2: Rectifier diodes	-	-
IEC 60747-6	2016	Semi conductor devices - Part 6: Thyristors	-	-
IEC 60747-7	2019	Semiconductor discrete devices and integrated circuits - Part 7: Bipolar transistors	-	-
IEC 60747-8	2021	Semiconductor devices - Part 8: Field-effect transistors	-	-
IEC 60747-9	2019	Semiconductor devices - Discrete devices - Part 9: Insulated-gate bipolar transistors (IGBTs)	-	-
IEC 60748	series	Semiconductor devices - Integrated circuits	-	-
IEC 60749-5	2017	Semiconductor devices - Mechanical and climatic test methods - Part 5: Steady-state temperature humidity bias life test	EN 60749-5	2017

IEC 60749-6	2017	Semiconductor devices - Mechanical and climatic test methods - Part 6: Storage at high temperature	EN 60749-6	2017
IEC 60749-10	2002	Semiconductor devices - Mechanical and climatic test methods - Part 10: Mechanical shock	EN 60749-10	2002
IEC 60749-12	2017	Semiconductor devices - Mechanical and climatic test methods - Part 12: Vibration, variable frequency	EN IEC 60749-12	2018
IEC 60749-15	2020	Semiconductor devices - Mechanical and climatic test methods - Part 15: Resistance to soldering temperature for through-hole mounted devices	EN IEC 60749-15	2020
IEC 60749-21	2011	Semiconductor devices - Mechanical and climatic test methods - Part 21: Solderability	EN 60749-21	2011
IEC 60749-25	2003	Semiconductor devices - Mechanical and climatic test methods - Part 25: Temperature cycling	EN 60749-25	2003
IEC 60749-34	2010	Semiconductor devices - Mechanical and climatic test methods - Part 34: Power cycling	EN 60749-34	2010

IEC 60747-15

Edition 3.0 2024-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Semiconductor devices –
Part 15: Discrete devices – Isolated power semiconductor devices

Dispositifs à semiconducteurs –
Partie 15: Dispositifs discrets – Dispositifs de puissance à semiconducteurs isolés

IEC 60747-15:2024-10(en-fr)

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2024 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, …). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, …). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications, symboles graphiques et le glossaire. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org
Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 500 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 25 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

IEC 60747-15

Edition 3.0 2024-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Semiconductor devices –
Part 15: Discrete devices – Isolated power semiconductor devices

Dispositifs à semiconducteurs –
Partie 15: Dispositifs discrets – Dispositifs de puissance à semiconducteurs isolés

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 31.080.99 ISBN 978-2-8322-9789-6

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

® Registered trademark of the International Electrotechnical Commission
Marque déposée de la Commission Electrotechnique Internationale

CONTENTS

FOREWORD 5
1 Scope 7
2 Normative references 7
3 Terms and definitions 8
4 Letter symbols 9
  4.1 General 9
  4.2 Additional subscripts/symbols 9
  4.3 List of letter symbols 9
    4.3.1 Voltages and currents 9
    4.3.2 Mechanical symbols 10
    4.3.3 Other symbols 10
5 Essential ratings (limiting values) and characteristics 10
  5.1 General 10
  5.2 Ratings (limiting values) 10
    5.2.1 Isolation voltage or isolation test voltage (V_{isol}) 10
    5.2.2 Peak case non-rupture current (where appropriate) 10
    5.2.3 Terminal current (I_{tRMS}) (where appropriate) 10
    5.2.4 Temperatures 11
    5.2.5 Mechanical ratings 11
    5.2.6 Climatic ratings (where appropriate) 11
  5.3 Characteristics 12
    5.3.1 Mechanical characteristics 12
    5.3.2 Parasitic inductance (L_{p}) 12
    5.3.3 Parasitic capacitances (C_{p}) 12
    5.3.4 Partial discharge inception voltage (V_{iM} or $V_{\text{i(RMS)}}$) (where appropriate) 12
    5.3.5 Partial discharge extinction voltage (V_{eM} or $V_{\text{e(RMS)}}$) (where appropriate) 12
    5.3.6 Thermal resistances 12
    5.3.7 Transient thermal impedance (Z_{th}) 13
6 Measurement methods 13
  6.1 Verification of isolation voltage rating 13
    6.1.1 Verification of isolation voltage rating between terminals and base plate (V_{isol}) 13
    6.1.2 Verification of isolation voltage rating between temperature sensor and terminals (V_{isol1}) 15
  6.2 Methods of measurement 15
    6.2.1 Partial discharge inception and extinction voltages (V_{i}) (V_{e}) 15
    6.2.2 Parasitic inductance (L_{p}) 15
    6.2.3 Parasitic capacitance terminal to case (C_{p}) 17
    6.2.4 Thermal characteristics 18
7 Acceptance and reliability 21
  7.1 General requirements 21
  7.2 List of endurance tests 21
  7.3 Acceptance defining criteria 21
  7.4 Type tests and routine tests 22

7.4.1 Type tests 22
7.4.2 Routine tests 23
Annex A (informative) Test method of peak case non-rupture current 24
A.1 Purpose 24
A.2 Circuit diagram 24
A.3 Test procedure 26
A.4 Post test measurements and criteria 26
A.5 Specified conditions 26
Annex B (informative) Measuring method of the thickness of thermal compound paste 27
B.1 General 27
B.2 Measuring method 27
Annex C (informative) Intelligent power semiconductor modules (IPMs) 28
C.1 General 28
C.2 Control terminals of IPM 28
C.3 Essential ratings (limiting value) and characteristics 29
C.3.1 General 29
C.3.2 Ratings (limiting value) and testing method 29
C.3.3 Characteristics and measuring method 34
Bibliography 57

Figure 1 – Basic circuit diagram for isolation breakdown withstand voltage test ("high pot test") with V_{isol} 14
Figure 2 – Basic circuit diagram for isolation voltage test between temperature sensor and terminals (V_{isol1}) 15
Figure 3 – Circuit diagram for measurement of parasitic inductances (L_{p}) 16
Figure 4 – Wave forms 17
Figure 5 – Circuit diagram for measurement of parasitic capacitance (C_{p}) 18
Figure 6 – Cross-section of an isolated power device with reference points for temperature measurement of T_{c} and T_{s} 19
Figure A.1 – Circuit diagram for test of peak case non-rupture current 25
Figure B.1 – Example of a measuring gauge for a layer of thermal compound paste of a thickness between 5 µm and 150 µm 27
Figure C.1 – Example of internal circuit configuration block diagram of IPM 28
Figure C.2 – Testing circuit for supply voltage, input voltage / input signal voltage, and fault output voltage / alarm signal voltage 30
Figure C.3 – Testing circuit for fault output current / alarm signal current 31
Figure C.4 – Testing circuit for main circuit DC bus voltage at short circuit 33
Figure C.5 – Waveforms of short circuit protection function 34
Figure C.6 – Measurement circuit for switching times and switching energy at inductive load (lower arm device measurement) 35
Figure C.7 – Switching waveforms at inductive load 36
Figure C.8 – Measurement circuit for control circuit current 39
Figure C.9 – Measurement circuit for input threshold voltage 40
Figure C.10 – Measuring circuit for over current protection level/short circuit trip level 42
Figure C.11 – Waveforms during over current protection / short circuit protection 43

Figure C.12 – Measurement circuit for over current protection delay time/Short circuit current delay time 45
Figure C.13 – Waveforms of protection delay time during over current protection / short circuit protection 46
Figure C.14 – Measurement circuit for over temperature protection and its hysteresis 48
Figure C.15 – Waveforms during the overheating protection operation and the fault output 50
Figure C.16 – Waveforms during the under-voltage protection operation and the fault output 51
Figure C.17 – Measurement circuit for fault output current 52
Figure C.18 – Measurement circuit for common mode noise withstand capability 54
Figure C.19 – Waveforms during the common mode noise withstand capability measurement 55

Table 1 – Endurance tests 21
Table 2 – Acceptance defining characteristics for endurance and reliability tests 21
Table 3 – Minimum type and routine tests for isolated power semiconductor devices 22
Table C.1 – Acceptance defining criteria for the IPM control circuit after rating tests.............34

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SEMICONDUCTOR DEVICES –

Part 15: Discrete devices – Isolated power semiconductor devices

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.

3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.

8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60747-15 has been prepared by subcommittee 47E: Discrete semiconductor devices, of IEC technical committee 47: Semiconductor devices. It is an International Standard.

This third edition cancels and replaces the second edition published in 2010. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) The intelligent power semiconductor modules (IPM), which was previously excluded from the first and second edition, is now included in this document (Annex C);

b) The thermal resistance is described for each switch (6.2.4);

c) Added isolation test between temperature sensor and terminals, in case there is an agreement with the user (6.1.2).

The text of this International Standard is based on the following documents:

Draft	Report on voting
47E/832/FDIS	47E/844/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

This International Standard is to be used in conjunction with IEC 60747-1:2006 and Amendment 1: 2010.

A list of all parts in the IEC 60747 series, published under the general title *Semiconductor devices*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

SEMICONDUCTOR DEVICES –

Part 15: Discrete devices – Isolated power semiconductor devices

1 Scope

This part of IEC 60747 gives the requirements for isolated power semiconductor devices. These requirements are additional to those given in other parts of IEC 60747 for the corresponding non-isolated power devices and parts of IEC 60748 for ICs.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60270:2015, *High-voltage test techniques – Partial discharge measurements*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60721-3-3:2019, *Classification of environmental conditions – Part 3-3: Classification of groups of environmental parameters and their severities – Stationary use at weather protected locations*

IEC 60747-1:2006, *Semiconductor devices – Part 1: General*
IEC 60747-1:2006/AMD1:2010

IEC 60747-2:2016, *Semiconductor devices – Discrete devices and integrated circuits – Part 2: Rectifier diodes*

IEC 60747-6:2016, *Semiconductor devices – Part 6: Thyristors*

IEC 60747-7:2019, *Semiconductor discrete devices and integrated circuits – Part 7: Bipolar transistors*

IEC 60747-8:2021, *Semiconductor devices – Part 8: Field-effect transistors*

IEC 60747-9:2019, *Semiconductor devices – Discrete devices – Part 9: Insulated-gate bipolar transistors (IGBTs)*

IEC 60748 (all parts), *Semiconductor devices – Integrated circuits*

IEC 60749-5:2017, *Semiconductor devices – Mechanical and climatic test methods – Part 5: Steady-state temperature humidity bias life test*

IEC 60749-6:2017, *Semiconductor devices – Mechanical and climatic test methods – Part 6: Storage at high temperature*

IEC 60749-10:2003, *Semiconductor devices – Mechanical and climatic test methods – Part 10: Mechanical shock*

IEC 60749-12:2017, *Semiconductor devices – Mechanical and climatic test methods – Part 12: Vibration, variable frequency*

IEC 60749-15:2020, *Semiconductor devices – Mechanical and climatic test methods – Part 15: Resistance to soldering temperature for through-hole mounted devices*

IEC 60749-21:2011, *Semiconductor devices – Mechanical and climatic test methods – Part 21: Solderability*

IEC 60749-25:2003, *Semiconductor devices – Mechanical and climatic test methods – Part 25: Temperature cycling*

IEC 60749-34:2010, *Semiconductor devices – Mechanical and climatic test methods – Part 34: Power cycling*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN