IEC 60747-15

Edition 3.0 2024-10
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 31.080.99

ISBN 978-2-8322-9946-3

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SEMICONDUCTOR DEVICES – ~~DISCRETE DEVICES –~~

Part 15: Discrete devices – Isolated power semiconductor devices

FOREWORD

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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.

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SEMICONDUCTOR DEVICES – ~~DISCRETE DEVICES –~~

Part 15: Discrete devices – Isolated power semiconductor devices

1 Scope

This part of IEC 60747 gives the requirements for isolated power semiconductor devices ~~excluding devices with incorporated control circuits~~. 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:~~2007~~2020, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60721-3-3:~~1994~~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*

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)

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SEMICONDUCTOR DEVICES –

Part 15: Discrete devices – Isolated power semiconductor devices

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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*

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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DISPOSITIFS À SEMICONDUCTEURS –

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

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L'IEC 60747-15 a été établie par le sous-comité 47E: Dispositifs discrets à semiconducteurs, du comité d'études 47 de l'IEC: Dispositifs à semiconducteurs. Il s'agit d'une Norme internationale.

Cette troisième édition annule et remplace la deuxième édition parue en 2010. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) les modules de puissance à semiconducteurs intelligents (IPM, Intelligent Power semiconductor Module), qui étaient auparavant exclus des première et deuxième éditions, sont désormais inclus dans le présent document (Annexe C);
b) la résistance thermique est décrite pour chaque interrupteur (6.2.4);
c) ajout d'un essai d'isolement entre le capteur de température et les bornes, en cas d'accord avec l'utilisateur (6.1.2).

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
47E/832/FDIS	47E/844/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

La version française de la norme n'a pas été soumise au vote.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/publications.

La présente Norme internationale est à utiliser conjointement avec l'IEC 60747-1:2006 et son Amendement 1:2010.

Une liste de toutes les parties de la série IEC 60747, publiées sous le titre général *Dispositifs à semiconducteurs*, se trouve sur le site Web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site Web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. À cette date, le document sera:

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- révisé.

DISPOSITIFS À SEMICONDUCTEURS –

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

1 Domaine d'application

Le présent document spécifie les exigences relatives aux dispositifs de puissance à semiconducteurs isolés. Ces exigences s'ajoutent à celles qui figurent dans d'autres parties de l'IEC 60747 pour les dispositifs de puissance non isolés correspondants et dans des parties de l'IEC 60748 pour les circuits intégrés.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60068-2-1:2007, *Essais d'environnement – Partie 2-1: Essais – Essai A: Froid*

IEC 60270:2015, *Techniques des essais à haute tension – Mesures des décharges partielles*

IEC 60664-1:2020, *Coordination de l'isolement des matériels dans les réseaux d'énergie électrique à basse tension – Partie 1: Principes, exigences et essais*

IEC 60721-3-3:2019, *Classification des conditions d'environnement – Partie 3-3: Classification des groupements des agents d'environnement et de leurs sévérités – Utilisation à poste fixe, protégé contre les intempéries*

IEC 60747-1:2006 *Dispositifs à semiconducteurs – Partie 1: Généralités*
IEC 60747-1:2006/AMD1:2010

IEC 60747-2:2016, *Dispositifs à semiconducteurs – Partie 2: Dispositifs discrets – Diodes de redressement*

IEC 60747-6:2016, *Dispositifs à semiconducteurs – Partie 6: Dispositifs discrets – Thyristors*

IEC 60747-7:2019, *Dispositifs à semiconducteurs – Dispositifs discrets – Partie 7: Transistors bipolaires*

IEC 60747-8:2021, *Semiconductor devices – Part 8: Field-effect transistors (disponible en anglais seulement)*

IEC 60747-9:2019, *Dispositifs à semiconducteurs – Partie 9: Dispositifs discrets – Transistors bipolaires à grille isolée (IGBT)*

IEC 60748 (toutes les parties), *Dispositifs à semiconducteurs – Circuits intégrés*

IEC 60749-5:2017, *Dispositifs à semiconducteurs – Méthodes d'essais mécaniques et climatiques – Partie 5: Essai continu de durée de vie sous température et humidité avec polarisation*

IEC 60749-6:2017, *Dispositifs à semiconducteurs – Méthodes d'essais mécaniques et climatiques – Partie 6: Stockage à haute température*

IEC 60749-10:2003, *Dispositifs à semiconducteurs – Méthodes d'essais mécaniques et climatiques – Partie 10: Chocs mécaniques*

IEC 60749-12:2017, *Dispositifs à semiconducteurs – Méthodes d'essais mécaniques et climatiques – Partie 12: Vibrations, fréquences variables*

IEC 60749-15:2020, *Dispositifs à semiconducteurs – Méthodes d'essais mécaniques et climatiques – Partie 15: Résistance à la température de brasage pour dispositifs par trous traversants*

IEC 60749-21:2011, *Dispositifs à semiconducteurs – Méthodes d'essais mécaniques et climatiques – Partie 21: Brasabilité*

IEC 60749-25:2003, *Dispositifs à semiconducteurs – Méthodes d'essais mécaniques et climatiques – Partie 25: Cycles de température*

IEC 60749-34:2010, *Dispositifs à semiconducteurs – Méthodes d'essais mécaniques et climatiques – Partie 34: Cycles en puissance*