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INTERNATIONAL STANDARD

colour inside

Semiconductor devices –
Part 5-11: Optoelectronic devices – Light emitting diodes – Test method of radiative and nonradiative currents of light emitting diodes

IEC 60747-5-11:2019 (en)

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Part 5-11: Optoelectronic devices – Light emitting diodes – Test method of radiative and nonradiative currents of light emitting diodes

FOREWORD

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International Standard IEC 60747-5-11 has been prepared by subcommittee 47E: Discrete semiconductor devices, of IEC technical committee 47: Semiconductor devices.

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

CDV	Report on voting
47E/653/CDV	47E/678/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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SEMICONDUCTOR DEVICES –

Part 5-11: Optoelectronic devices – Light emitting diodes – Test method of radiative and nonradiative currents of light emitting diodes

1 Scope

This part of IEC 60747 specifies the measuring methods of radiative and nonradiative currents of single light emitting diode (LED) chips or packages without phosphor. White LEDs for lighting applications are out of the scope of this document. This document utilizes the internal quantum efficiency (IQE) as a function of current, whose measurement methods are discussed in other documents.

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 60747-5-6:2016, *Semiconductor devices – Part 5-6: Optoelectronic devices – Light emitting diodes*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
internal quantum efficiency
η_{IQE}
ratio of the number of photons emitted from the active region per unit time to the number of electrons injected into the LED per unit time

$$\eta_{IQE} = \frac{\Phi_{e,active} / h\bar{\nu}}{I_F / q}$$

where

$\Phi_{e,active}$ is the radiant power emitted from the active region

$h\bar{\nu}$ is the mean photon energy

I_F is the forward current

q is the elementary charge

[SOURCE: IEC 60747-5-8:2019, 3.2.4]