BSI Standards Publication

Photovoltaic devices

Part 1-2: Measurement of current-voltage characteristics of bifacial photovoltaic (PV) devices

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National foreword

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The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by A1 A1.

The UK participation in its preparation was entrusted to Technical Committee GEL/82, Photovoltaic Energy Systems.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Date	Text affected
31 March 2026	Implementation of IEC amendment 1:2026

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FOREWORD

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systems. It is a Technical Specification.

This second edition cancels and replaces the first edition published in 2019. This edition constitutes a technical revision.

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

a) The scope has been updated and refers to IEC TS 63202-3 for the measurement of non-encapsulated solar cells.
b) The requirements for the non-uniformity of irradiance have been updated and now refer to classifications introduced in IEC 60904-9.
c) The requirement for non-irradiated background has been revised.
d) Spectral mismatch corrections are no longer mandatory, unless required by another standard. Spectral mismatch would have to be considered in the measurement uncertainty.
e) The requirement regarding the calculation of bifaciality has been modified: Equivalent irradiance shall not be calculated based on the minimum bifaciality value between I_{SC} and P_{max}, but on the bifaciality of I_{SC}.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
82/2278/DTS	82/2309/RVDTS

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 Technical Specification 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.

A list of all parts in the IEC 60904 series, published under the general title *Photovoltaic devices*, can be found on the IEC website.

The committee has decided that the contents of this document and its amendment 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.

This part of IEC 60904 describes procedures for the measurement of the current-voltage (I-V) characteristics of single junction bifacial photovoltaic devices in natural or simulated sunlight. It is applicable to encapsulated solar cells, sub-assemblies of such cells or entire PV modules. For measurements of I-V characteristics of non-encapsulated solar cells, IEC TS 63202-3 applies.

The requirements for measurement of I-V characteristics of standard (monofacial) PV devices are covered by IEC 60904-1, whereas this document describes the additional requirements for the measurement of I-V characteristics of bifacial PV devices.

This document can be applicable to PV devices designed for use under concentrated irradiation if they are measured without the optics for concentration, and irradiated using direct normal irradiance and a mismatch correction with respect to a direct normal reference spectrum is performed.

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 60891, *Photovoltaic devices – Procedures for temperature and irradiance corrections to measured I-V characteristics*

IEC 60904-1, *Photovoltaic devices – Part 1: Measurement of photovoltaic current-voltage characteristics*

IEC 60904-2, *Photovoltaic devices – Part 2: Requirements for photovoltaic reference devices*

IEC 60904-3, *Photovoltaic devices – Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data*

IEC 60904-4, *Photovoltaic devices – Part 4: Photovoltaic reference devices – Procedures for establishing calibration traceability*

IEC 60904-7, *Photovoltaic devices – Part 7: Computation of the spectral mismatch correction for measurements of photovoltaic devices*

IEC 60904-8, *Photovoltaic devices – Part 8: Measurement of spectral responsivity of a photovoltaic (PV) device*

IEC 60904-9, *Photovoltaic devices – Part 9: Classification of solar simulator characteristics*

IEC TS 61836, *Solar photovoltaic energy systems – Terms, definitions and symbols*

IEC 62788-1-4, *Measurement procedures for materials used in photovoltaic modules – Part 1-4: Encapsulants – Measurement of optical transmittance and calculation of the solar-weighted photon transmittance, yellowness index, and UV cut-off wavelength*