

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Semiconductor devices – Semiconductor devices for energy harvesting and generation –  
Part 4: Test and evaluation methods for flexible piezoelectric energy harvesting devices**

**Dispositifs à semiconducteurs – Dispositifs à semiconducteurs pour récupération et production d'énergie –  
Partie 4: Méthodes d'essai et d'appréciation pour les dispositifs de récupération d'énergie piézoélectrique souples**



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SEMICONDUCTOR DEVICES –  
SEMICONDUCTOR DEVICES FOR  
ENERGY HARVESTING AND GENERATION –**

**Part 4: Test and evaluation methods for  
flexible piezoelectric energy harvesting devices**

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

FDIS	Report on voting
47/2530/FDIS	47/2551/RVD

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 62830 series, published under the general title *Semiconductor devices – Semiconductor devices for energy harvesting and generation*, 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 "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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# SEMICONDUCTOR DEVICES – SEMICONDUCTOR DEVICES FOR ENERGY HARVESTING AND GENERATION –

## Part 4: Test and evaluation methods for flexible piezoelectric energy harvesting devices

### 1 Scope

This part of IEC 62830 describes terms, definitions, symbols, configurations, and test methods that can be used to evaluate and determine the performance characteristics of flexible piezoelectric energy harvesting devices for practical use. This document is applicable to energy harvesting devices for consumers, general industries, wearable electronics, military, and biomedical applications without any limitations of device technology and size.

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

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

### 3 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 General terms

##### 3.1.1

##### **flexible**

capability of being bent or flexed

##### 3.1.2

##### **flexible energy harvester**

energy transducer that transforms bending, stretching, or twisting energy into electric energy

Note 1 to entry: A flexible energy harvester which converts applied stress by bending, stretching or twisting to electricity using a piezoelectric transducer is comprised of a spring and a piezoelectric transducer as shown in Figure 1. The piezoelectric transducer contains two electrodes and a piezoelectric film or nano wires. The induced external stress introduces the bending, stretching or twisting motion to the flexible substrate as shown in Annex C. The flexible substrate is bent and the bending of the spring introduces tension and compression of the piezoelectric film. The top and bottom electrodes of the piezoelectric film harvest the generated charges resulting from the piezoelectric effect.