



# IEEE Standard for Test Methods and Preferred Values for Silicon PN-Junction Clamping Diodes

IEEE Power and Energy Society

Developed by the  
Surge Protective Devices Committee

IEEE Std C62.59™-2019



**STANDARDS**

# IEEE Standard for Test Methods and Preferred Values for Silicon PN-Junction Clamping Diodes

Developed by the

**Surge Protective Devices Committee**  
of the  
**IEEE Power and Energy Society**

Approved 5 September 2019

**IEEE-SA Standards Board**

**Abstract:** The basic electrical parameters to be met by silicon PN junction voltage clamping components used for the protection of telecommunications equipment or lines from surges are defined in this standard. It is intended that this standard be used for the harmonization of existing or future specifications issued by PN diode surge protective component manufacturers, telecommunication equipment manufacturers, administrations, or network operators.

**Keywords:** avalanche breakdown, electrical characteristics, electrical ratings, foldback, forward conduction, IEEE C62.59™, overvoltage protection, punch-through, surge protective component (SPC), test methods, Zener breakdown

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## Participants

At the time this IEEE standard was completed, the 3.6.2 Low Voltage Solid State Surge Protective Components Working Group had the following membership:

**Michael J. Maytum, *Chair***  
**Albert Martin, *Vice Chair***

Tim Ardley  
Robert Ashton  
Frank Basciano  
Leonard Drewes

Ernest Gallo  
Phillip Havens  
Bogdan Klobassa  
Peter Kobsa

Wolfgang Oertel  
Thomas Tran

The following members of the individual balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

Frank Basciano  
Demetrio Bucaneg Jr.  
Randall Groves  
Raymond Hill

Werner Hoelzl  
Albert Martin  
Wolfgang Oertel  
James Timperley

John Vergis  
Matthew Wakeham  
Lisa Ward

When the IEEE-SA Standards Board approved this standard on 5 September 2019, it had the following membership:

**Gary Hoffman, *Chair***  
**Ted Burse, *Vice Chair***  
**Jean-Philippe Faure, *Past Chair***  
**Konstantinos Karachalios, *Secretary***

Masayuki Ariyoshi  
Stephen D. Dukes  
J. Travis Griffith  
Guido Hiertz  
Christel Hunter  
Thomas Koshy  
Joseph L. Koepfinger\*  
John D. Kulick

David J. Law  
Joseph Levy  
Howard Li  
Xiaohui Liu  
Kevin Lu  
Daleep Mohla  
Andrew Myles  
Annette D. Reilly

Dorothy Stanley  
Sha Wei  
Phil Wennblom  
Philip Winston  
Howard Wolfman  
Feng Wu  
Jingyi Zhou

\*Member Emeritus

## Introduction

This introduction is not part of IEEE Std C62.59–2019, IEEE Standard for Test Methods and Preferred Values for Silicon PN-Junction Clamping Diodes.

IEEE Std C62.35™-2010 covered only voltage clamping components using avalanche breakdown PN-junctions. This standard covers all the voltage clamping technology types: Zener, avalanche, foldback, and punch-through, implemented by using PN-junctions. The content is structured to harmonize with the document structure of recent IEC diode standards, IEC 60747-2:2016 and IEC 69747-3:2013. The companion guide standard to this test standard is IEEE Std C62.42.3™-2017.



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# IEEE Standard for Test Methods and Preferred Values for Silicon PN-Junction Clamping Diodes

## 1. Overview

### 1.1 Scope

This standard sets terms, test methods, test circuits, measurement procedures and preferred result values for diodes with one or more silicon PN-junctions used for surge voltage clamping in low-voltage systems.

The technology types covered are:

- Forward biased diodes
- Zener breakdown diodes
- Avalanche breakdown diodes
- Punch-through diodes
- Foldback diodes

This standard does not cover thyristor surge protective components; see IEEE Std C62.37 [B18].<sup>1</sup>

### 1.2 Word usage

The word *shall* indicates mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (shall equals is required to).<sup>2,3</sup>

The word *should* indicates that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required (should equals is recommended that).

The word *may* is used to indicate a course of action permissible within the limits of the standard (may equals is permitted to).

<sup>1</sup>The numbers in brackets correspond to those of the bibliography in Annex A.

<sup>2</sup>The use of the word *must* is deprecated and cannot be used when stating mandatory requirements, *must* is used only to describe unavoidable situations.

<sup>3</sup>The use of *will* is deprecated and cannot be used when stating mandatory requirements, *will* is only used in statements of fact.