

IEEE Standard Test Specifications for Avalanche Junction Semiconductor Surge Protective Devices

Sponsor
**Surge Protective Devices Committee
of the
IEEE Power Engineering Society**

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IEEE Standards Board

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Foreword

(This Foreword is not a part of IEEE C62.35-1987, IEEE Standard Test Specifications for Avalanche Junction Semiconductor Surge-Protective Devices.)

This test specification has been developed for the purpose of testing and evaluating avalanche junction semiconductor type surge protective devices.

These devices are used as a surge diverter for limiting transient overvoltages in power and communications circuits. These devices are similar to a standard Zener diode except that they provide a sharper avalanche characteristic than the Zener and they are designed for short time-frame occurrences than continuous regulation.

The interest in low-voltage avalanche junction semiconductor surge protective devices has grown with the trend to highly sophisticated electrical and electronic devices which are exposed to surges from the environment. Initially, there were a few standard terms or tests to define or compare these devices. The IEEE Surge Protection Devices Committee formed its Low Voltage Surge Protection Devices Working Group in 1970 to define these parameters.

Experts were drawn from many fields in communications and power utilities, electronic manufacturers and users, test equipment manufacturers and laboratories, and producers of avalanche junction semiconductor surge protective devices. The requirements, experiences, and vocabularies of these representatives were melded to produce this document as a guide to potential users of these devices.

At the time this document was approved by the Low-Voltage Surge Protection Devices Committee of the Power Engineering Society of the IEEE, members on the Low-Voltage Solid-State Surge Protective Devices Working Group 3.6.2 had the following membership who contributed to the writing of this document:

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1. Scope

1.1

This standard applies to a two terminal avalanche junction surge suppressor for surge protective application on systems with dc to 420 Hz frequency and voltages equal to or less than 1000 V rms or 1200 V dc. The avalanche junction surge suppressor is a semiconductor diode which can operate in either the forward or reverse direction of its V-I characteristic. The device is a single package which may be assembled from any combination of series and/or parallel diode chips. This standard contains definitions, service conditions, and a series of test criteria for determining the electrical characteristics of these semiconductor avalanche junction surge suppressors. If the characteristics differ with the direction of conduction, then each direction of conduction shall be separately specified.¹ Arresters are covered in ANSI/IEEE C62.1-1984 [1]^{2,3} and ANSI/IEEE C62.33-1982 [2].

1.2

The tests in this standard are intended as design tests as defined in ANSI/IEEE Std 100-1988 [4] and provide a means of comparison among various avalanche junction surge-protective devices.

1.3

Semiconductor avalanche junction surge suppressors are a class of diodes that are designed to conduct the surge currents necessary to provide transient overvoltage protection in electrical circuits. Other types of diodes may exhibit surge capability. Unless their surge characteristics have been defined according to this specification, they should not be used as surge suppressors. Avalanche junction surge suppressors exhibit a relatively high impedance at normal system voltages before and after the surge. They limit surge voltages on equipment by providing a low impedance to conduct

¹Diodes used in the forward direction only for the purpose of surge protection may also be tested in accordance with these specifications.

²The numbers in brackets correspond to the standards listed in the Bibliography, Section 7 of this standard.

³ANSI/IEEE publications can be obtained from the Sales Department, American National Standards Institute, 1430 Broadway, New York, NY 10018, or from the Institute of Electrical and Electronics Engineers, Service Center, Piscataway, NJ 08854.