

ESD SP5.2-2019

Revision and Redesignation of ANSI/ESD STM5.2-2012

ESD SP5.2-2019

ESD Association Standard Practice

*For Electrostatic Discharge
Sensitivity Testing –*

*Machine Model (MM) –
Component Level*



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for Electrostatic Discharge Sensitivity Testing –*

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Component Level*

Approved February 22, 2019
EOS/ESD Association, Inc.



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FOREWORD

This document defines a standard practice¹ that was originally intended to simulate an electrostatic discharge (ESD) event occurring from a low resistance source. However, component damage caused by the machine model (MM) described herein is similar to that caused by the human body model (HBM), but this damage occurs at a significantly lower voltage. Other forms of ESD-related component damage, such as that induced by the charged device model (CDM), may result in a different failure signature for some components.

To fully characterize a component's electrostatic discharge susceptibility, it should be tested to the following two ESD test standards:

- Human Body Model
- Charged Device Model

EOS/ESD Association, Inc. standards ANSI/ESDA/JEDEC JS-001 and ANSI/ESDA/JEDEC JS-002 contain the requirements for HBM and CDM testing, respectively.

It should be noted that contact of devices to charged metal can occur, and is a threat if proper precautions are not taken. The CDM test method is the better method for simulating metal-metal discharges arising from the discharging of charged metal objects to devices at different potentials.

This model can be useful for producing HBM-like ESD effects at lower voltages and for failure mode determination. The method produces results which are closely related to HBM and produces similar failure modes.

This document was originally designated ESD S5.2-1994 and approved on June 22, 1994. ANSI/ESD STM5.2-1999 was a revision, re-designation of ESD S5.2-1994, and approved on May 16, 1999. ANSI/ESD S5.2-2009 was a revision, re-designation of ANSI/ESD STM5.2-1999, and approved on September 16, 2009. ANSI/ESD STM5.2-2012 was a revision, re-designation of ANSI/ESD S5.2-2009 and approved on February 3, 2012. ESD SP5.2-2019 is a revision, re-designation of ANSI/ESD STM5.2-2012 and approved on February 22, 2019.

¹ **ESD Association Standard Practice:** A procedure for performing one or more operations or functions that may or may not yield a test result. Note, if a test result is obtained it may not be reproducible.

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ESD Association Work in Progress for Electrostatic Discharge (ESD) Sensitivity Testing – Machine Model (MM) – Component Level

1.0 PURPOSE AND SCOPE

1.1 Purpose

The purpose of this document is to establish a test method for characterizing a component's reaction to MM waveform stimulus.

1.1 Scope

This document establishes the procedure for testing and characterizing the electrostatic discharge (ESD) sensitivity (withstand voltage) of components subjected to the defined machine model (MM).

2.0 REFERENCED PUBLICATIONS

Unless otherwise specified, the following documents of the latest issue, revision or amendment, form a part of this standard to the extent specified herein:

ESD ADV1.0, ESD Association Glossary of Terms¹

ANSI/ESDA/JEDEC JS-001, Human Body Model (HBM) – Component Level¹

3.0 DEFINITION OF TERMS

The terms used in the body of this document are in accordance with the definitions found in ESD ADV1.0, ESD Association's Glossary of Terms available for complimentary download at www.esda.org.

4.0 PERSONNEL SAFETY

THE PROCEDURES AND EQUIPMENT DESCRIBED IN THIS DOCUMENT MAY EXPOSE PERSONNEL TO HAZARDOUS ELECTRICAL CONDITIONS. USERS OF THIS DOCUMENT ARE RESPONSIBLE FOR SELECTING EQUIPMENT THAT COMPLIES WITH APPLICABLE LAWS, REGULATORY CODES, AND BOTH EXTERNAL AND INTERNAL POLICY. USERS ARE CAUTIONED THAT THIS DOCUMENT CANNOT REPLACE OR SUPERSEDE ANY REQUIREMENTS FOR PERSONNEL SAFETY.

GROUND FAULT CIRCUIT INTERRUPTERS (GFCI) AND OTHER SAFETY PROTECTION SHOULD BE CONSIDERED WHEREVER PERSONNEL MIGHT COME INTO CONTACT WITH ELECTRICAL SOURCES.

ELECTRICAL HAZARD REDUCTION PRACTICES SHOULD BE EXERCISED AND PROPER GROUNDING INSTRUCTIONS FOR EQUIPMENT SHOULD BE FOLLOWED.

THE RESISTANCE MEASUREMENTS OBTAINED THROUGH THE USE OF THIS TEST METHOD SHALL NOT BE USED TO DETERMINE THE RELATIVE SAFETY OF PERSONNEL EXPOSED TO HIGH AC OR DC VOLTAGES.

5.0 REQUIRED EQUIPMENT

5.1 MM ESD Tester

An acceptable tester is composed of equipment meeting the requirements of this document (schematically represented in Figure 1 and producing pulses meeting the waveform characteristics represented in Figures 1 and 2 and specified in Tables 1 and 2).

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