ANSI/ESD STM5.2-2012

Revision and Redesignation of ANSI/ESD S5.2-2009

ESD Association Standard Test Method

For Electrostatic Discharge Sensitivity Testing –

Machine Model (MM) – Component Level

ANSI/ESD STM5.2-2012

Electrostatic Discharge Association
7900 Turin Road, Bldg. 3
Rome, NY 13440

An American National Standard
Approved July 29, 2013

ESD Association Standard Test Method for Electrostatic Discharge Sensitivity Testing –

Machine Model (MM) – Component Level

Approved February 3, 2012
ESD Association

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FOREWORD

This document defines a standard test method that simulates an electrostatic discharge (ESD) event occurring from a low resistance source. Component damage caused by the Machine Model (MM) is often similar to that caused by the Human Body Model (HBM), but 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

Requirements for HBM and CDM testing are contained in the ESD Association Standards ANSI/ESDA/JEDEC JS-001 and ANSI/ESD S5.3.1, respectively.

Users of this MM standard test method[1] document should understand that the data obtained when stress testing the components does not necessarily mean that the components will be unaffected if subjected to a lower level actual ESD. This MM standard test method document is intended to minimize test data correlation problems due to variations between testers.

It should be noted that contact of devices to charged metal can occur, and is a threat if proper precautions are not taken. This model can be useful for producing Human-Body Model (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 was approved on May 16, 1999. ANSI/ESD S5.2-2009 was a revision, re-designation of ANSI/ESD STM5.2-1999, and was approved on September 16, 2009. ANSI/ESD STM5.2-2012 is a revision, re-designation of ANSI/ESD S5.2-2009, and was approved on February 3, 2012.

[1] **ESD Association Standard Test Method (STM):** A definitive procedure for the identification, measurement and evaluation of one or more qualities, characteristics, or properties of a material, product, system, or process that yield a **reproducible test** results.

At the time ANSI/ESD STM5.2-2012 was prepared, the 5.2 Device Testing (MM) Subcommittee had the following members:

Leo G. Henry, Chair
ESD & TLP Consultants, LLC

Robert Ashton ON Semiconductor	Andrea Boroni STMicroelectronics	Michael Chaine Micron Technology, Inc.
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The following individuals contributed significantly to the development of ANSI/ESD S5.2-2009:

David Tremouilles
IMEC

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Stuart Schwartz Ford Microelectronics	Michael Stevens Motorola	Sam Twerefore Ford Microelectronics
Joseph Veltri Digital Equipment Corp.		Terry Welsher Lucent Technologies

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1.0 SCOPE AND PURPOSE

1.1 Scope

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

1.1.1 Existing Data

Data previously generated with testers meeting all waveforms criteria of this standard test method document shall be considered valid test data.

1.2 Purpose

The purpose of this document is to establish a test method that will produce MM failures and provide reliable, repeatable results from tester to tester, regardless of component type. Repeatable data will allow accurate comparisons of MM ESD sensitivity levels.

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 Terms[2]

ANSI/ESDA/JEDEC JS-001, Human Body Model (HBM) – Component Level[2]

ANSI/ESDA/MM5.2.1 -2012, Machine Model (MM) – Alternative Test Method: Supply Pin Ganging - Component Level[2]

ANSI/ESDA/MM5.2.2 -2012, Machine Model (MM) – Alternative Test Method: Split Signal Pin - Component Level[2]

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.

[2] ESD Association, 7900 Turin Road, Bldg. 3, Rome, NY, 13440; Ph: 315-339-6937; FAX: 315-339-6793; www.esda.org