

JEDEC STANDARD

Requirements for Handling Electrostatic-Discharge-Sensitive (ESDS) Devices

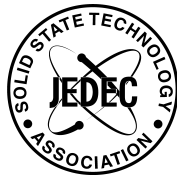
JESD625-A

(Revision of EIA-625)

DECEMBER 1999

ELECTRONIC INDUSTRIES ALLIANCE

JEDEC Solid State Technology Association



NOTICE

EIA/JEDEC standards and publications contain material that has been prepared, reviewed, and approved through the JEDEC Board of Directors level and subsequently reviewed and approved by the EIA General Counsel.

EIA/JEDEC standards and publications are designed to serve the public interest through eliminating misunderstandings between manufacturers and purchasers, facilitating interchangeability and improvement of products, and assisting the purchaser in selecting and obtaining with minimum delay the proper product for use by those other than JEDEC members, whether the standard is to be used either domestically or internationally.

EIA/JEDEC standards and publications are adopted without regard to whether or not their adoption may involve patents or articles, materials, or processes. By such action JEDEC does not assume any liability to any patent owner, nor does it assume any obligation whatever to parties adopting the EIA/JEDEC standards or publications.

The information included in EIA/JEDEC standards and publications represents a sound approach to product specification and application, principally from the solid state device manufacturer viewpoint. Within the JEDEC organization there are procedures whereby an EIA/JEDEC standard or publication may be further processed and ultimately become an ANSI/EIA standard.

No claims to be in conformance with this standard may be made unless all requirements stated in the standard are met.

Inquiries, comments, and suggestions relative to the content of this EIA/JEDEC standard or publication should be addressed to JEDEC Solid State Technology Association, 2500 Wilson Boulevard, Arlington, VA 22201-3834, (703)907-7560/7559 or www.jedec.org

Published by
©ELECTRONIC INDUSTRIES ALLIANCE 1999
Engineering Department
2500 Wilson Boulevard
Arlington, VA 22201-3834

This document may be downloaded free of charge, however EIA retains the copyright on this material. By downloading this file the individual agrees not to charge or resell the resulting material.

**PRICE: Please refer to the current
Catalog of JEDEC Engineering Standards and Publications or call Global Engineering
Documents, USA and Canada (1-800-854-7179), International (303-397-7956)**

Printed in the U.S.A.
All rights reserved

PLEASE!

DON'T VIOLATE
THE
LAW!

This document is copyrighted by the Electronic Industries Alliance and may not be reproduced without permission.

Organizations may obtain permission to reproduce a limited number of copies through entering into a license agreement. For information, contact:

JEDEC Solid State Technology Association
2500 Wilson Boulevard
Arlington, Virginia 22201-3834
or call (703) 907-7559

REQUIREMENTS FOR HANDLING ELECTROSTATIC-DISCHARGE-SENSITIVE (ESDS) DEVICES

CONTENTS

	Page
1 Purpose	1
2 Scope	1
2.1 Applicable users	1
2.2 Applicable part types	1
3 Related documents	2
3.1 Applicable documents	2
4 Terms and definitions	3
5 Inspection, measuring and test equipment	5
5.1 Calibration system	5
5.2 Recommended inspection, measuring and test equipment types	5
6 Facilities for ESD protected areas and workstations	6
6.1 Minimum acceptable requirements	6
6.2 ESD item check records	9
6.3 Personnel grounding	9
6.4 Wrist strap and ESD protective footwear resistance path checks	11
6.4.1 Wrist strap resistance measurement path	11
6.4.2 Heel/toe strap and conductive shoe resistance measurement paths	11
6.4.3 Wrist strap monitor	11
6.5 Electrostatic potential measurements	11
6.6 ESD signs and labels	11
6.6.1 Sign content and posting	11
6.6.2 ESD caution labels for packing and shipping	11
6.6.3 Package ESD caution label content	12
6.6.4 Commercial device package ESD caution label	12
6.6.5 Military device package ESD caution label	12
7 Grounding for protection of ESDS devices	12
7.1 ESD ground	12
7.1.1 Earth and equipment ESD grounds	13
7.1.2 Equipment grounding receptacle and conductor testing	13
7.2 ESD ground system safety review	13
7.3 ESD protected workstation ESD ground	13
7.4 ESD protected worksurfaces	13
7.4.1 Static dissipative ESD protective worksurfaces	13
7.4.2 Conductive ESD protective worksurfaces	13
7.5 ESD protective flooring/mats	14
7.6 ESD ground connections	14

REQUIREMENTS FOR HANDLING ELECTROSTATIC-DISCHARGE-SENSITIVE (ESDS) DEVICES

CONTENTS *(continued)*

	Page
7.7 Ground wire mechanical considerations	14
7.8 Storage areas	14
7.9 Mobile ESD protected workstation	14
8 ESD packaging requirements for ESDS devices	14
8.1 ESD device protective packaging requirement	14
8.2 Packing and filler materials	14
8.3 Antistatic tubes, trays, magazines and carriers	15
8.4 Individual Finished device carrier materials	15
8.5 ESDS device wafer and die packing	15
8.6 ESDS device shipping and receiving operations	15
9 Compliance verification	15
9.1 ESD coordinator	15
9.2 Auditing	15
9.3 Noncompliance	15
9.3.1 Noncompliant ESD protected areas and workstations	16
9.3.2 Mishandled ESDS device	16
9.3.3 Returning rejected ESDS devices to suppliers	16
9.4 Records	16
10 ESD handling training	16
10.1 Training program	16
10.2 Training records	16
11 Methods for minimizing static charging	17
11.1 Antistatic solution	17
11.2 Relative humidity control	17
11.3 Air ionizers	17
11.4 ESD protective smocks	18
11.5 Gloves/finger cots	18
ESD handling audit checklist	19
Annex A - Informational reference documents	22
Figure 1 - ESD protected workstation	8
Figure 2 - Example of ESD protected package caution label	12
Table 1 - Minimum requirements for ESD protected areas , workstations, and tools	7
Table 2 - ESD protective item checks	9

Foreword

This standard was prepared to standardize the requirements for a comprehensive Electrostatic Discharge (ESD) control program for handling ESD-Sensitive (ESDS) devices. The requirements within this standard were derived from existing industry standards, specifications, test methods, and input from various industry reviews.

The intent of this document is for users to incorporate these minimal requirements into their ESD control program to provide a consistent ESD protection level for their products.

This standard replaces JEDEC Standard No. 42 (formerly JEDEC Publication 108-B, Distributor Requirements for Handling Electrostatic-Discharge Sensitive (ESDS) Devices).

REQUIREMENTS FOR HANDLING ELECTROSTATIC-DISCHARGE-SENSITIVE (ESDS) DEVICES

(From JEDEC Board ballot JCB-98-134, formulated under the cognizance of JEDEC JC-14.1 Committee on Reliability Test Methods for Packaged Devices and the JC-13 Committee on Government Liaison.)

1 Purpose

This standard establishes the minimum requirements for Electrostatic Discharge (ESD) control methods and materials used to protect electronic devices that are susceptible to damage or degradation from electrostatic discharge (ESD). The passage of a static charge through an electrostatic-discharge-sensitive (ESDS) device can result in catastrophic failure or performance degradation of the part.

Device sensitivity to ESD is determined by test methods such as JESD22-A114. ESDS devices with human body model sensitivities of less than ± 200 volts may need additional protective measures beyond those specified in this standard.

2 Scope

2.1 Applicable users

- a) Semiconductor Manufacturers - from wafer electrical probe through shipment of finished devices except for in-process operations when all leads are shorted together.

NOTE — The requirements of this standard are not imposed prior to probe. Prior to probe, the manufacturer should take appropriate ESD precautions to minimize damage to devices.

- b) Semiconductor Distributors - from receipt through shipment of finished devices.
- c) Semiconductor Processing/Testing Facilities - from receipt through shipment of finished devices.
- d) ESDS Device Users – from receipt to installation in a higher assembly/card

2.2 Applicable device types

The device types for which these requirements are applicable include, but are not limited to, ESD-sensitive discrete and integrated circuit semiconductors, hybrid microcircuits, and thin film passive devices.

NOTE — ESD susceptibility/sensitivity may be determined and specified by the manufacturer or user.

3 Related documents

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

3.1 Applicable documents

ANSI/ASQC-Q9001	Quality Systems - Model for Quality Assurance in Design/Development, Production, Installation and Servicing (US version of ISO-9001)
ANSI/ASQC-Q9002	Quality Systems - Model for Quality Assurance in Production and Installation (US version of ISO-9002)
ANSI/EIA-471	Symbol and Label for Electrostatic Sensitive Devices (Formulated by JEDEC JC-10 Committee)
ANSI/EIA-541	Packaging Materials Standards for ESD sensitive Items
ANSI/EOS/ESD-S3.1	Standard for Protection of Electrostatic Discharge Susceptible Items - Ionization
ANSI/EOS/ESD-S4.1	Standard for Protection of Electrostatic Discharge Susceptible Items - Worksurfaces - Resistive Characterization
ANSI/EOS/ESD-S6.1	Standard for Protection of Electrostatic Discharge Susceptible Items - Grounding - Recommended Practice
ANSI/EOS/ESD-S7.1	Standard for Protection of Electrostatic Discharge Susceptible Items - Floor Materials - Resistive Characterization of Materials
ANSI/NCSL Z540-1	Calibration Laboratories and Measuring and Test Equipment - General Requirements
ANSI/EOS/ESD-S5.1	Human Body Model (HBM) Electrostatic Discharge (ESD) Sensitivity Testing Standard
JESD22-A114	Electrostatic Discharge (ESD) Sensitivity Testing - Human Body Model (HBM)
JESD22-A115	Electrostatic Discharge (ESD) Sensitivity Testing - Machine Model (MM)
JESD22-C101	Field Induced Charged Device Model Test Method for Electrostatic Discharge Withstand Threshold for Microelectronic Modules
IEC-101/61340-5-1	Specification for the Protection of Electronic Devices from Electrostatic Phenomena - Section 1: General Requirements.
IEC-101/61340-5-2	Specification for the Protection of Electronic Devices from Electrostatic Phenomena - Section 2: User Guide.