

ANSI/ESD SP27.1-2018

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ESD Association Standard Practice

*For the Recommended Information Flow
for Potential EOS Issues between
Automotive OEM, Tier 1, and
Semiconductor Manufacturers*



*Electrostatic Discharge Association
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Recommended Information Flow
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Automotive OEM, Tier 1, and
Semiconductor Manufacturers***

Approved November 30, 2017
EOS/ESD Association, Inc.



ANSI/ESD SP27.1-2018

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FOREWORD

Electrical Overstress (EOS) is one of the most commonly assigned categories of returns sent back to suppliers (original equipment manufacturer (OEM), Tier 1, etc.) for failure analysis. EOS results from an electrical stress of an electronic component or system outside the allowed specification resulting in pre-damage or even immediate damage of a device. In the past, a deep analysis indicating the clear root cause of failure for every returned part was expected. Such an analysis is challenging, very time consuming, and often root cause finding is not possible. Since the same failure signature can be created by several different stress situations, the success rate of finding a possible root cause event depends on information-sharing and close cooperation between the different tier levels and the OEM.

During discussions between the automotive OEMs, Tier 1s, and semiconductor manufacturers it became obvious that all parties involved see EOS-related cases as a huge opportunity for improvement throughout the automotive industry value chain.

This standard practice¹ document was created to establish a standard information flow process to help solve and reduce EOS problems in the automotive industry in a fast and harmonized way. The work was initiated within USCAR (The United States Council for Automotive Research). USCAR is an umbrella organization of FCA US, Ford, and General Motors, which was formed to conduct cooperative, pre-competitive research. The document was then provided to the ESDA for publication.

Historically, EOS is the result of an unexpected event. The information gathered through this standard practice helps to define what is known about the event. Having this information increases the ability to identify what is unknown and which areas should be further investigated to identify root cause.

The common objective of all parties involved in writing this document turned out to be focusing on the right things to be more efficient in the EOS root cause finding process.

This document was designated ANSI/ESD SP27.1-2018 and approved on November 30, 2017.

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 that if a test result is obtained, it may not be reproducible.

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ESD Association Standard Practice for the Recommended Information Flow Regarding Potential EOS Issues between Automotive OEM, Tier 1, and Semiconductor Manufacturers

1.0 PURPOSE AND SCOPE

1.1 Purpose

This document provides guidance based on a two-level approach that describes what necessary and important information should be shared between automotive original equipment manufacturer (OEM), Tier 1, and semiconductor manufacturers to solve electrical overstress (EOS) issues.

NOTE: Subcontractors are considered to be under the responsibility of the Tier 1 as defined in the OEM statement of work (SoW).

1.2 Scope

This document applies to any electronic component, module, or assembly exhibiting electrically induced physical damage (EIPD) that is suspected to be a result of EOS.

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 ADV 1.0, ESD Association's Glossary of Terms.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.

design validation or design verification (DV). Verifying the design of the electronic component or the module without including the effects of automotive manufacturing induced variations in the module and vehicle production.

diagnostic trouble code (DTC). DTC codes that are described by Society of Automotive Engineers (SAE) standards to help track problems in a vehicle detected by its on-board computer.

electronic control unit (ECU). An embedded electronic system that controls one or more electrical systems or subsystems in a vehicle.

NOTE: An ECU typically includes one or more printed circuit board assemblies (PCBA's).

electrically induced physical damage (EIPD). Damage to an electronic component due to electrical/thermal stress beyond the level which the materials could sustain.

NOTE: This would include melting of silicon, fusing of metal interconnects, thermal damage to package material, fusing of bond wires and other damage caused by excess current or voltage.

NOTE: The term EIPD has to be used during initial failure analysis/failure investigation until a more comprehensive joint analysis between supplier and customer has confirmed a potential EOS event.

NOTE: Thermal stress is assumed to be a consequence of electrical stimulation.

electronic component. In the context of this document an electronic component describes an integrated circuit (IC), a semiconductor device, a passive device, or a discrete device.

electrical overstress (EOS). An electrical device suffers electrical overstress when a maximum limit for either the voltage across, the current through, or the power dissipated in the device is exceeded and causes immediate damage or malfunction, or latent damage resulting in an unpredictable reduction of its lifetime.

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