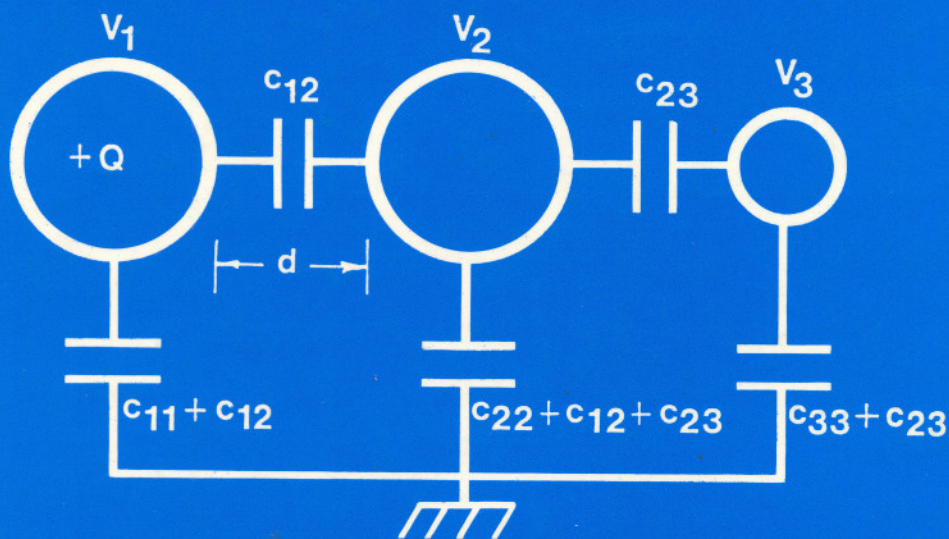


# Electrostatic Damage in Electronics: Devices and Systems

William D. Greason



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# Electrostatic Damage in Electronics: Devices and Systems

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Electrostatic Discharges are susceptible to direct, indirect and latent damage when subjected to ESD (Electrostatic Discharges). Direct energy results from physical destruction or degradation of a part of a device and can be classified as a hard failure since it is irreversible. Both voltage and power related direct failure mechanisms are possible. An indirect failure results when a device changes state due to conduction or induction of electromagnetic interference caused by the discharge. This can be classified as a soft error since the device can be electrically reset to its proper state. Latent failures are time dependent phenomena and result when a discharge or affects a device but it shows no apparent damage until later with time or subsequent discharges, causes a hard failure to occur. The physics of latent damage mechanisms and the failure mechanism and test methods to determine the probability of latent damage in a device, are not clearly defined.

At the device level, the ESD event is usually classified by three different models, namely: the human body model, the charged device model and the field induced model. Intended protection measures



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