

A LOW VOLTAGE CONTROLLABLE TRANSIENT TRIGGER NETWORK
FOR ESD PROTECTION

ABSTRACT

This Sheet Has Been Replaced



A transient protection circuit is described which provides electrostatic discharge (ESD) protection for an internal circuit of an IC. The transient protection circuit comprises two Zener diodes connected in series between the input pad and the internal circuit of the IC. A sufficiently large ESD pulse will drive one of the two Zener diodes into breakdown mode, thereby reducing the magnitude of the ESD pulse to the remainder of the circuit. Resistive means are paralleled with the Zener diodes to provide a signal path at non-ESD voltages. To help shunt the ESD current away from the internal circuit, PMOS and NMOS transistors are connected in parallel between the positive and the negative voltage supply and their junction is connected to the internal circuit. Negative ESD pulses cause the PMOS transistors to turn on, dumping the ESD energy into the positive voltage supply, while positive ESD pulses cause the NMOS transistors to turn on, dumping the ESD energy into the negative voltage supply. Voltage changes, caused by currents flowing through the resistive means, trigger parasitic SCRs into conduction to provide the bulk of the ESD protection.