

Low Trigger Voltage Silicon Controlled Rectifier Stacking Structure with High Holding Voltage for High Voltage Applications

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Abstract : A SCR stacking structure is proposed to have improved Latch-up immunity. In comparison with conventional SCR (Silicon Controlled Rectifier), the proposed Electrostatic Discharge (ESD) protection circuit has a lower trigger characteristic by using the LVTSCR (Low Voltage Trigger) structure. Also the proposed ESD protection circuit has improved Holding Voltage Characteristic by using N-stack technique. These characteristics enable to have latch-up immunity in operating conditions. The simulations are accomplished by using the Synopsys TCAD. It has a trigger voltage of 8.9V and a holding voltage of 1.8V in a single structure. And when applying the stack technique, 2-stack has the holding voltage of 3.8V and 3-stack has the holding voltage of 5.1 V.

Keywords : electrostatic discharge (ESD), low voltage trigger silicon controlled rectifier (LVTSCR), MVTSCR, power clamp, silicon controlled rectifier (SCR), latch-up

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