

## **Pulsed Laser Single Event Transients in 0.18 $\mu\text{m}$ Partially-Depleted Silicon-On-Insulator Device**

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**Abstract :** The Single Event Transients (SETs) were investigated on 0.18 $\mu\text{m}$  PDSOI transistors and 100 series CMOS inverter chain using pulse laser. The effect of different laser energy and device bias for waveform on SET was characterized experimentally, as well as the generation and propagation of SET in inverter chain. In this paper, the effects of struck transistors type and struck locations on SETs were investigated. The results showed that when irradiate NMOSFETs from 100th to 2nd stages, the SET pulse width measured at the output terminal increased from 287.4 ps to 472.9 ps; and when irradiate PMOSFETs from 99th to 1st stages, the SET pulse width increased from 287.4 ps to 472.9 ps. When struck locations were close to the output of the chain, the SET pulse was narrow; however, when struck nodes were close to the input, the SET pulse was broadening. SET pulses were progressively broadened up when propagating along inverter chains. The SET pulse broadening is independent of the type of struck transistors. Through analysis, history effect induced threshold voltage hysteresis in PDSOI is the reason of pulse broadening. The positive pulse observed by oscilloscope, contrary to the expected results, is because of charging and discharging of capacitor.

**Keywords :** single event transients, pulse laser, partially-depleted silicon-on-insulator, propagation-induced pulse broadening effect

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