LEDs for high speed applications (above 100 Mbps)

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April 5, 2013

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But these techniques are *highly complex* compared to the simple on-off keying (OOK) direct modulation scheme.

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So, the only way to increase OOK modulation rate of LED is by *reducing the rise and decay times of the* **EL** *signal.*

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1. using highly-doped InGaAsP/InP Surface Emitting LED with high current density
2. using Novel LED's driver circuit

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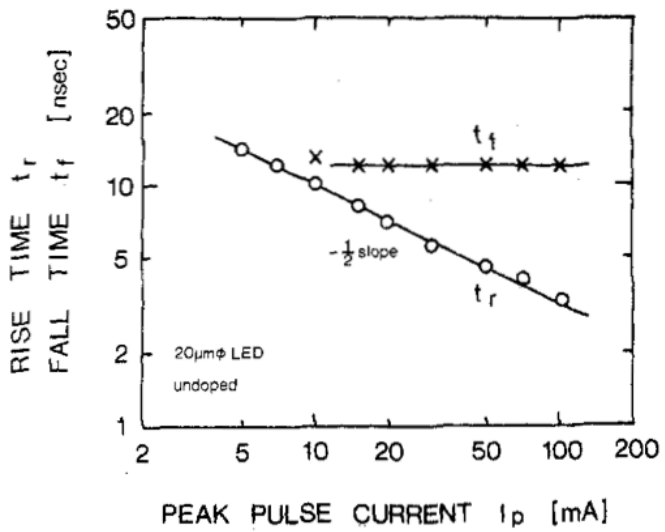

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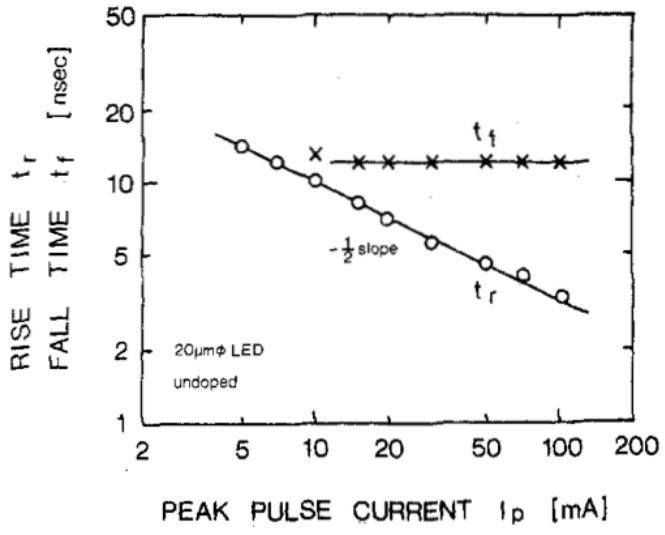

But with *heavy zinc-doping concentration* in the active layer and low impedance driving circuit the fall time decreases.

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A better option is to use Novel LED's driver circuit with a relatively lower speed.

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Thus, using this driver circuit we can transmit OOK signal with speed upto 500 Mbps.

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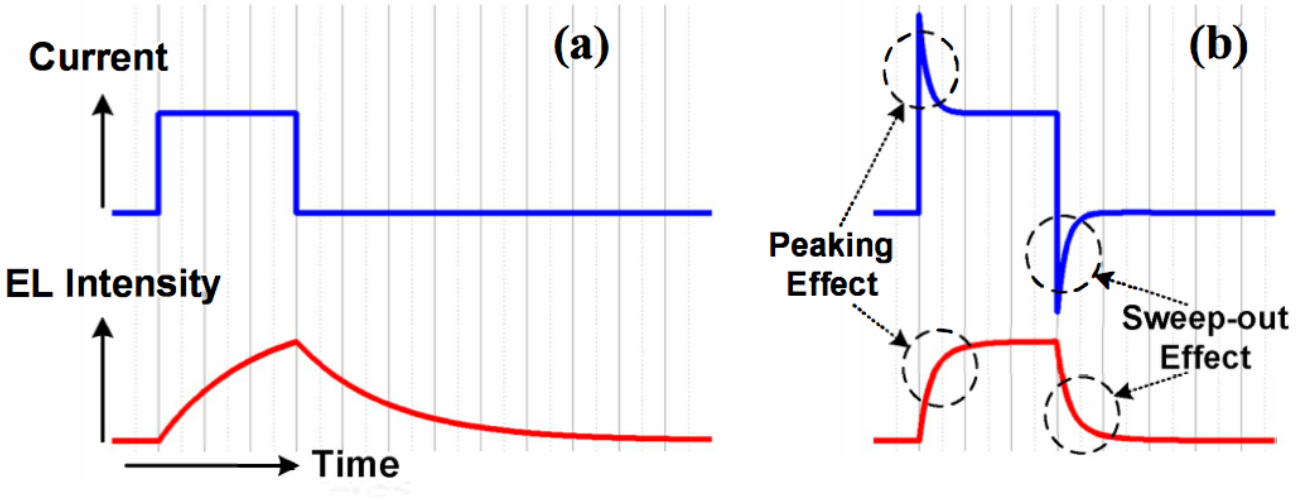

Figure : (a) EL pulse excited by current pulse. (b) Peaking effect and sweep-out effect

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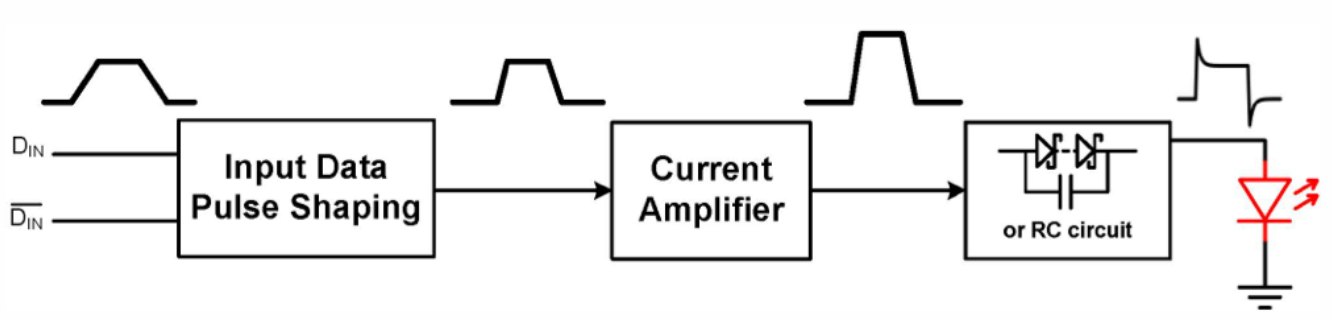

Figure : Proposed novel LED driver diagram

SD-C circuit vs RC circuit

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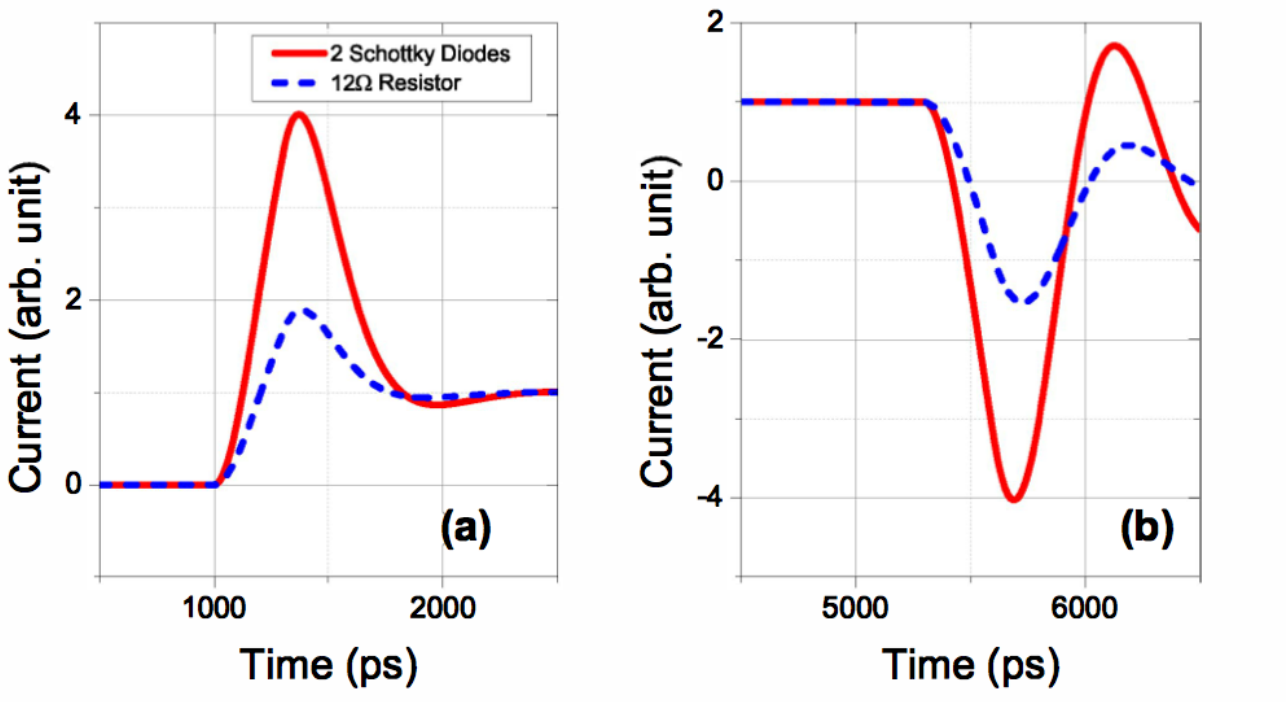

Figure : Simulation of (a) peaking current (b) reverse current of LED in SD-C and RC circuits. Parallel capacitors are 22 pF. Excitation pulse is 3 V_{p-p}, rise and fall times of 300 ps.

Experimental results

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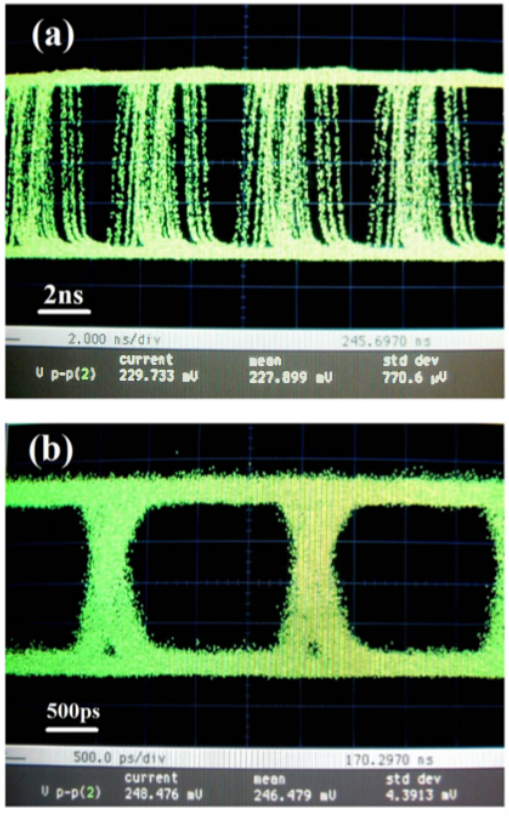

Figure : Optical eye diagrams using MC2042-4 with (a) RC circuit at 200 Mbps (b) SD-C circuit at 500 Mbps

References

References

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