

# LED Pulser

This document summarizes the performance characteristics of the proposed LED Pulser (Figure 1) taken at the Physics Department – Nuclear and Particle Sector, University of Athens, on 22-2-2008.

## **Equipment used:**

**Oscilloscope:** TDS3024B Tektronix DPO (200MHz, 2.5 GS/s)

**Photomultiplier:** (specs)

**Pulser PCB construction:** SMT (1206, 0805 form factors), single-sided board

**DC Voltmeter:** (specs)

**Function Generator:** 5 MHz

## Circuit 01b – Capacitor discharge via LED

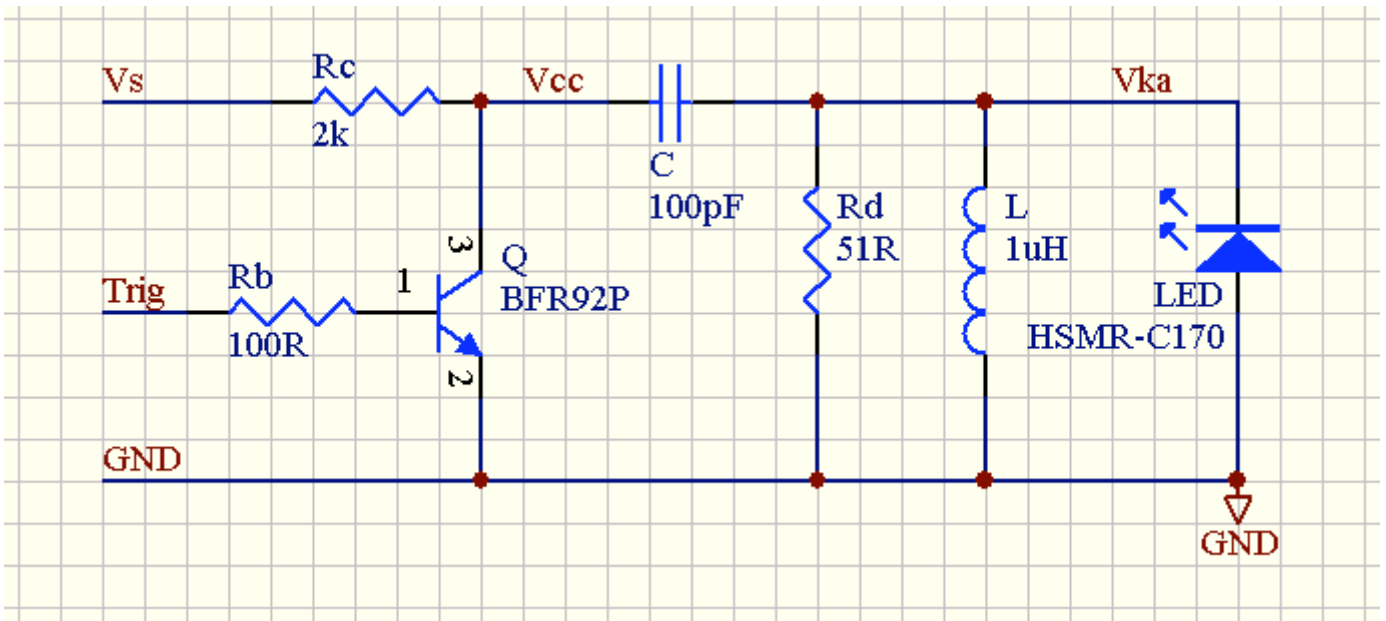


Figure 1: Proposed LED Pulser (version 01b)

### Operation

The source voltage ( $V_s$ ) is applied. After the capacitor has charged up to  $V_s$  (via  $R_c$  and  $R_d$ ), a trigger signal (Trig) is applied to the transistor switch (Q). On the leading edge of the trigger, the capacitor is discharged via the LED to produce a short light pulse.

### Components

#### Blue LED

Avago HSMR-C170, SMT,  $V_f = 3.4 - 3.9V$ , 20mA, 18mcd,  $V_R = 5V$ , 110pF @ 1MHz, High emission, InGaN, Package: untinted, diffused. Peak wavelength (typ)  $\lambda_{peak} = 469nm$ . Luminous intensity  $I_v(mcd) @ 20 mA = 18$  (min) to 55 (typ). Viewing angle  $2\theta_{1/2} = 140^\circ$ , Luminous efficiency  $\eta_v (lm/W) = 88$  (typ).

#### Green LED

Data not available.

#### BFR92P

NPN RF, Infineon, SOT-23,  $V_{CEO} = 15V$ ,  $V_{CES} = 20V$ ,  $V_{CBO} = 20V$ ,  $V_{EBO} = 2.5V$ ,  $I_C = 45mA$ ,  $I_B = 4mA$ ,  $f_T = 3.5 - 5 GHz$ ,  $TR = 1.2ns$ ,  $TF = 27ps$ ,  $h_{FE} = 70-100-140 @ I_C = 15mA$ ,  $V_{CE} = 8V$ .