Supplementary Information (S1) - Board Design and Setup

A schematic illustration of the switching principle is depicted in Fig. S1(a). The driver supports two current paths that are controlled by fast high power MOSFET switches. The notations of the series path and the parallel path are given with regard to the connection relation with the OLED. In steady-state, the parallel switch (M2) is open and no current flows through this path. On the other hand, the series switch (M1) closes a loop and current flows in this path through the OLED, and emission is obtained. In order to drive the OLED to an off-state, an alternative path for the current is opened that shorts the OLED. This is achieved by opening the series switch, M1, and closing the parallel switch, M2. The parallel path enables a short path with a resistance of ~20m ohm compared to ~1k ohm of the series path. With the aim of preventing discharging of the OLED by reverse current during the switching, a fast Schottky diode was added to the series path. This diode blocks the current flow in the reverse direction through the OLED and allows minimal discharging during the switching. The measured switching time is shown in Fig. S1(b). The switching time was estimated according to a reduction of 90% from the on-state value. It is worth mentioning that when a resistor was connected instead of an OLED, the measured switching time was 300ps. A detailed circuit design of the switching board is shown in Fig. S2.

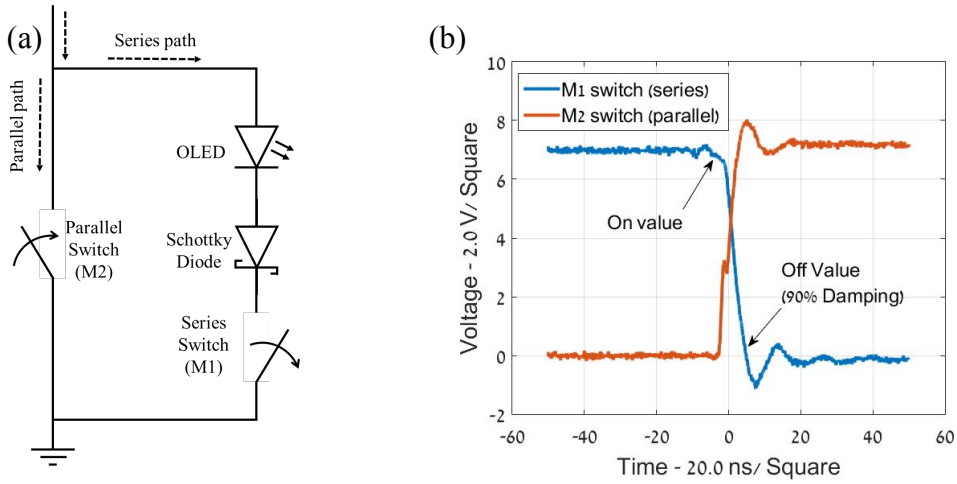

FIG. S1. a) Schematic illustration of the switching principle. M1 and M2 denote the series and parallel fast high power MOSFET switches, respectively, controlling the current path in the driver. b) The switching time of the driver components. The switching occurs within the time range of ~5 nano-seconds, and was estimated according to a reduction of 90% from the on-state value.

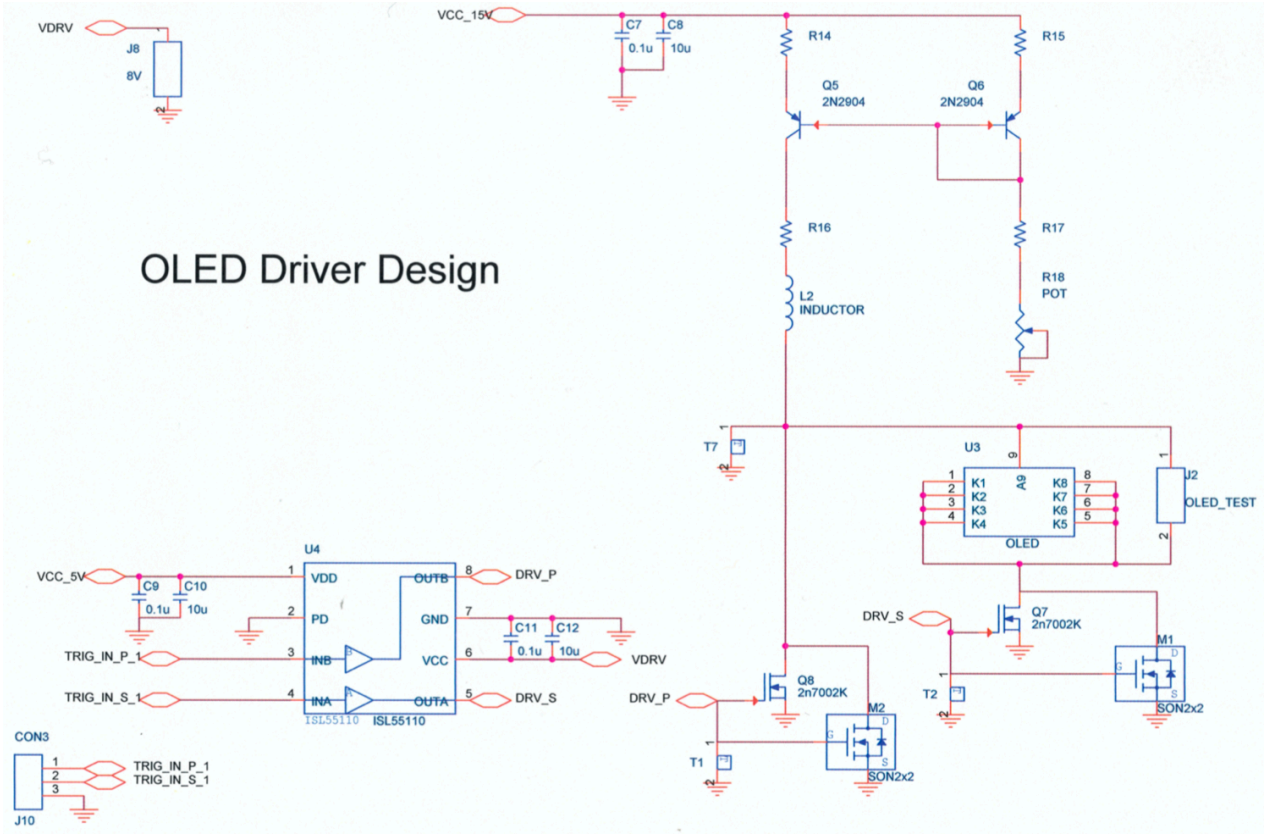

FIG. S2. Circuit design of the switching driver.