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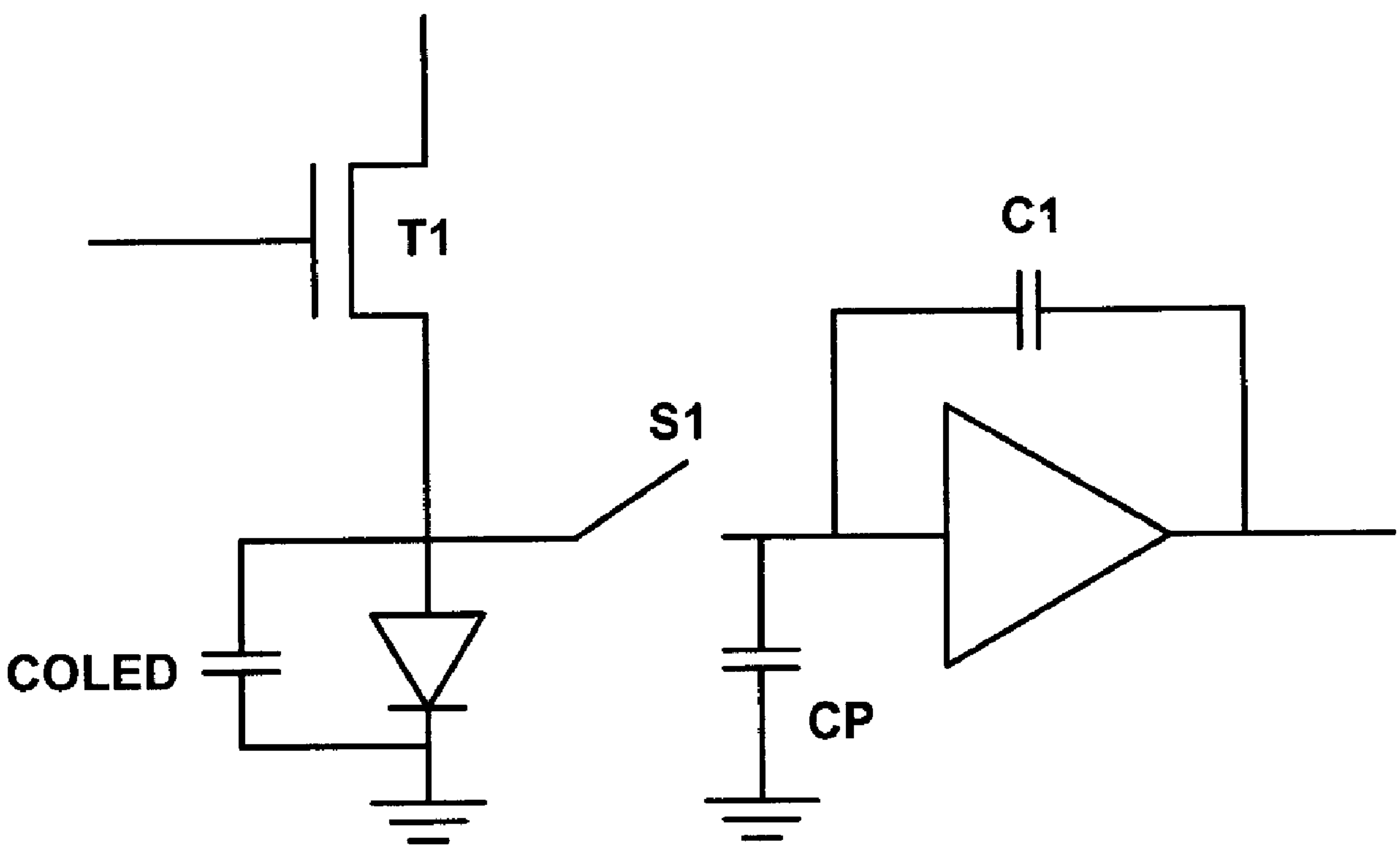
(54) Titre : TECHNIQUE DE COMPENSATION DE DIODES ELECTROLUMINESCENTES ORGANIQUES BASEE SUR LEUR CAPACITE

(54) Title: OLED COMPENSATION TECHNIQUE BASED ON OLED CAPACITANCE



(57) Abrégé/Abstract:
Disclosed is a technique for providing a stable OLED display using OLED capacitance as a feedback signal.

ABSTRACT

Disclosed is a technique for providing a stable OLED display using OLED capacitance as a feedback signal.

FIELD OF THE INVENTION

The present invention generally relates to displays in particular organic light emitting diode display.

SUMMARY OF INVENTION

Disclosed technique uses the OLED capacitance change overtime as a feedback signal to stabilize the OLED luminance degradation.

ADVANTAGES

Compared to optical feedback, this technique does not require extra component. Thus, yield, aperture ratio, and resolution increases significantly.

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FIG. 1 shows the OLED capacitance after and before aging.

FIG. 2 shows a charge-pump amplifier used to extract the OLED capacitance.

FIG. 3 shows simulation results of the circuit depicted in **FIG. 2**.

FIG. 1 shows the CV measurement results of an OLED sample before and after stress. The OLED was stressed at 20 mA/cm^2 for a week. These results show the possibility of using OLED capacitance as an indictor for OLED aging, and so compensate for OLED luminance degradation accordingly.

The change in the OLED capacitance can be detected using a charge-pump amplifier as shown in **FIG 2**. Drive TFT, T1, and switch TFT, S1, can be fabricated in different technologies including organic, poly silicon, amorphous silicon, nano/macro crystalline silicon, and CMOS.

Here, the OLED capacitance is charged to an initial voltage (V1), and then the switch S1 turns off. After that the parasitic capacitance is charged to another voltage (V2). Waiting for few micro second, the leakage current can be measured and deducted from the final voltage. Finally, S1 turns on, and so C_{OLED} is charge to a voltage. The voltage across C1 changes as the following

$$\Delta V_{C1} = -\frac{C_{OLED}}{C_1}(V1 - V2)$$

Therefore, as C_{OLED} decreases the Δ_{C1} decreases as well. Moreover, the gain is determined by (V1-V2) and C1, and so it can results in a high conversion gain.

The simulation results are shown in **FIG. 3**. It is evident that the change in OLED capacitance can be detected with the proposed circuit in **FIG. 2**.

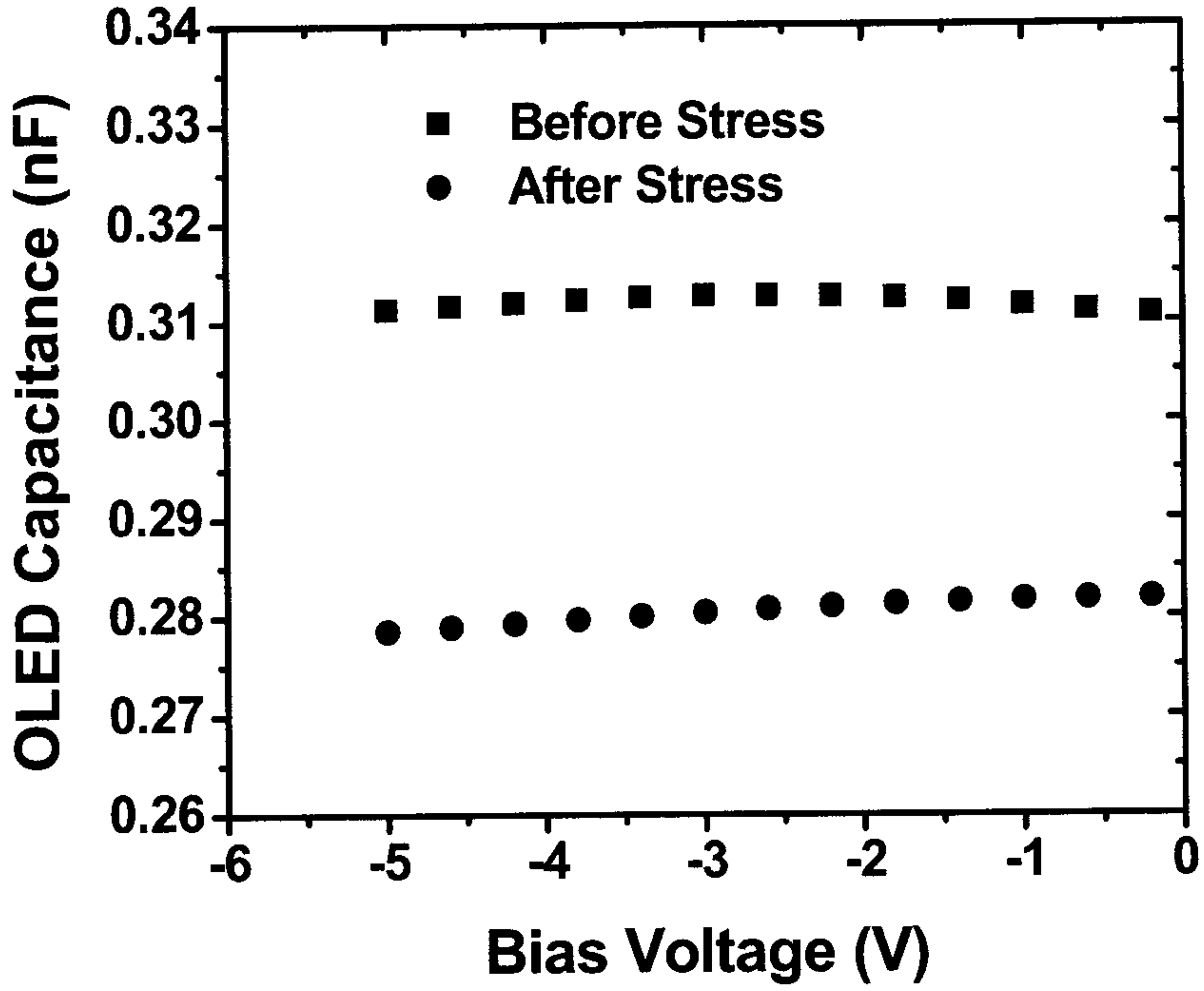

OLED Capacitance (nF)
0.34
0.33
0.32
0.31
0.30
0.29
0.28
0.27
0.26
Before Stress
After Stress
-6
-5
-4
-3
-2
-1
0
Bias Voltage (V)

FIG. 1

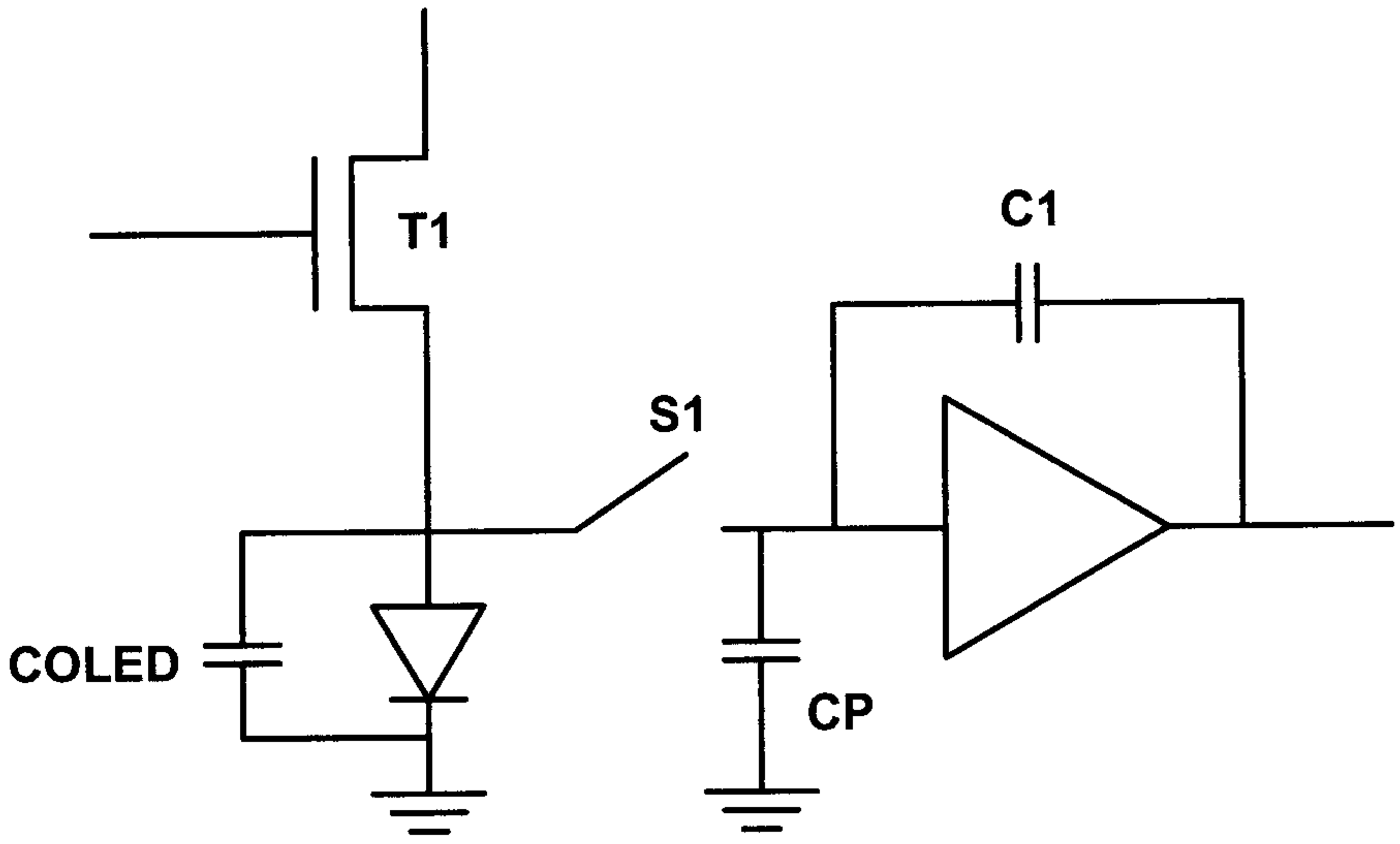


FIG. 2

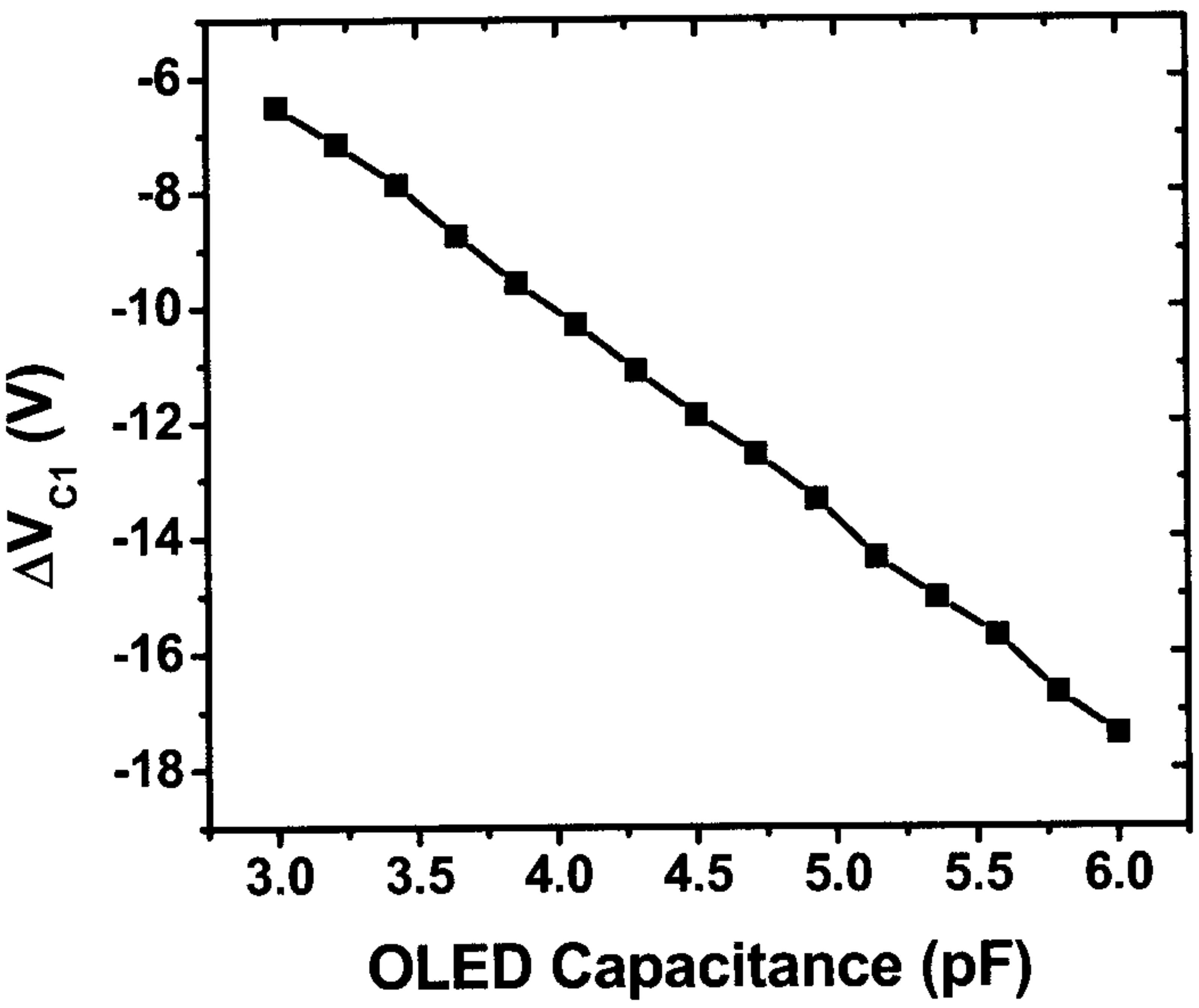
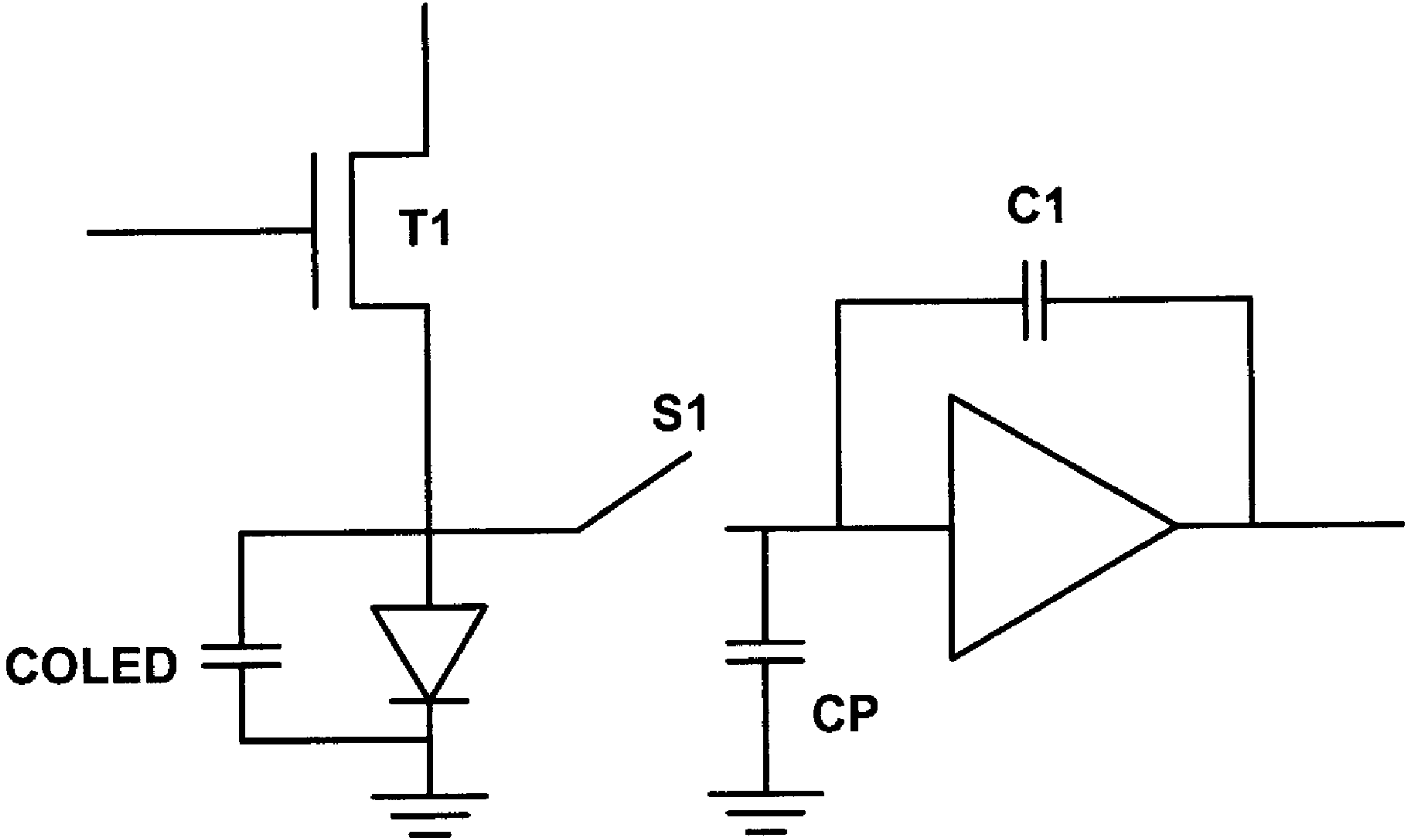

-6
-8
-10
-12
-14
-16
-18
ΔV_{C1} (V)
3.0
3.5
4.0
4.5
5.0
5.5
6.0
OLED Capacitance (pF)

FIG. 3



T1
C1
S1
COLED
CP