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(54) **DRIVING CIRCUIT OF ORGANIC LIGHT
EMITTING DIODE DISPLAY PANEL AND
PRECHARGING METHOD USING THE SAME**

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(75) Inventors: **Seen Suk Kang**, Seoul (KR); **Seong
Ik Jeong**, Seoul (KR)

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Correspondence Address:
CANTOR COLBURN, LLP
20 Church Street, 22nd Floor
Hartford, CT 06103 (US)

(57) **ABSTRACT**

There is provided a driving circuit in which a voltage level can reach a full Vcc level when precharging and a precharging method using the same although a parasitic capacitance of an organic light emitting diode (OLED) panel increases.

(73) Assignee: **SYNCOAM CO., LTD**, Seongnam
City (KR)

A driving circuit of an OLED panel includes according to the present invention: a precharge channel which is applied with Vcc voltage and operates when precharging; a discharge channel which is connected to the precharge channel in series and is connected to ground (GND) and is turned off when precharging; and a time shift circuit which is connected to the precharge channel and controls a voltage level according to a time setting.

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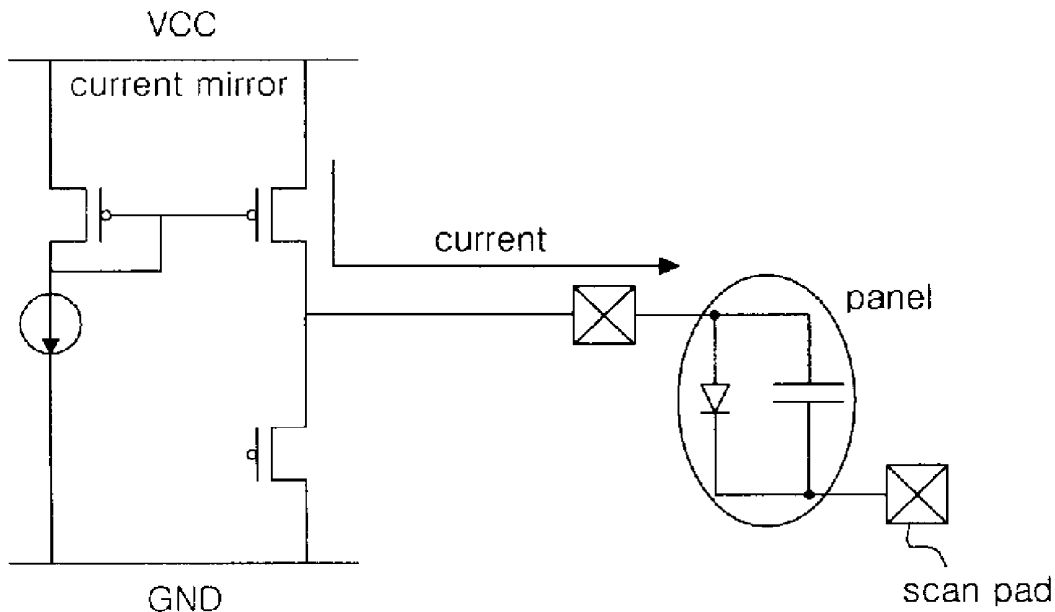
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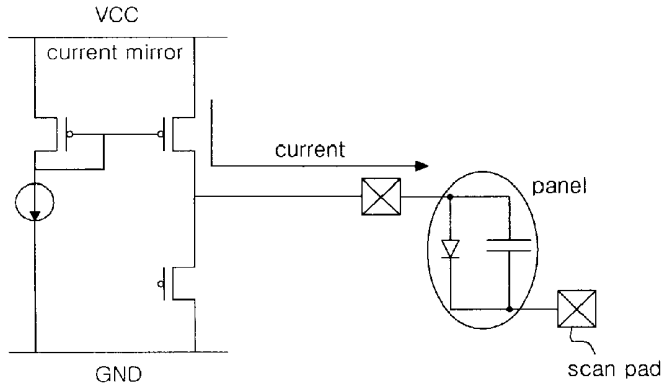
According to the present invention, a precharge voltage level can reach a full Vcc level according to a time setting although a parasitic capacitance of an OLED panel increases. Therefore, a driving circuit can be simply and easily implemented.

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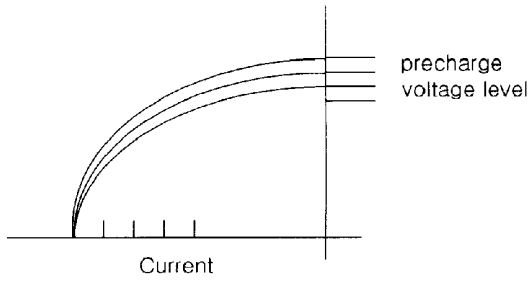
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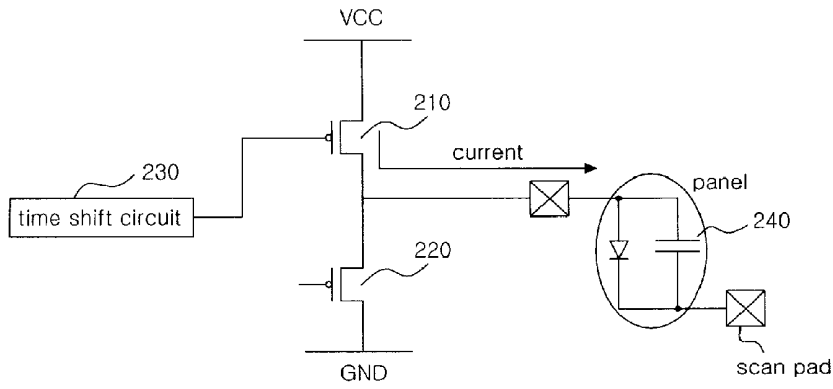
[Fig. 1]



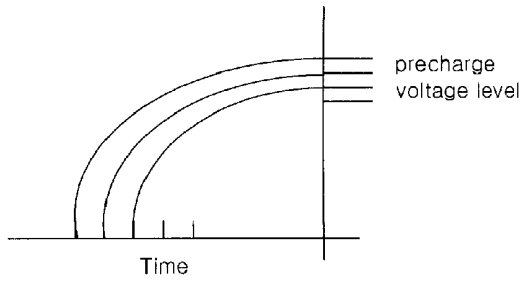
[Fig. 2]



[Fig. 3]



[Fig. 4]



**DRIVING CIRCUIT OF ORGANIC LIGHT
EMITTING DIODE DISPLAY PANEL AND
PRECHARGING METHOD USING THE SAME**

TECHNICAL FIELD

[0001] The present invention relates to an organic light emitting diode (OLED), and more particularly, to a driving circuit of an OLED.

BACKGROUND ART

[0002] As an image display apparatus for TVs, computers, or mobile phones, a liquid crystal display (LCD) has been widely used. However, since the LCD needs a backlight, there are problems in that, the LCD is heavy-weight and thick, and a response speed thereof is slow. As a next generation image display apparatus replacing the LCD, an organic light emitting diode (OLED) display panel has been proposed. The OLED panel includes an organic thin film having a very thin thickness less than 0.1 μ m.

[0003] When a current is passed through the organic thin film, an electron and a hole recombine near the interface between an electron transport layer and a hole transport layer to emit light. The light emission has a very fast response speed less than hundreds of nanoseconds.

[0004] The OLED is constructed with two electrodes: an anode and a cathode, similarly to an inorganic light emitting diode. Due to voltage and current differences between individual OLEDs constituting the panel, current can be driven.

[0005] FIG. 1 is a view showing a current driving mode of a conventional OLED to explain a precharging method used in a driving integrated circuit (IC) of the OLED panel.

[0006] In the precharging method using a current mirror, a current is set to be flown according to a needed voltage level.

[0007] FIG. 2 is a graph showing a voltage level which is adjusted by a current setting.

[0008] The current precharging method in which a voltage level is adjusted by a current setting shown in FIGS. 1 and 2 has a problem in that, when a panel parasitic capacitance increases, the voltage level cannot reach a needed level within a pre-determined time. That is, a full Vcc level is difficult to reach.

DISCLOSURE OF INVENTION

Technical Problem

[0009] In order to solve the aforementioned problems, an object of the present invention is to provide a driving circuit in which a voltage level can reach a full Vcc level when precharging and a precharging method using the same although a parasitic capacitance of an organic light emitting diode (OLED) panel increases.

Technical Solution

[0010] According to an aspect of the present invention, there is provided a driving circuit using a precharging method for driving an organic light emitting diode (OLED) panel, the driving circuit including: a precharge channel which is applied with Vcc voltage and operates when precharging; a discharge channel which is connected to the precharge channel in series and is connected to ground (GND) and is turned off when precharging; and a time shift circuit which is connected to the precharge channel and controls a voltage level according to a time setting.

[0011] According to another aspect of the present invention, there is provided a precharging method used in a driving circuit for driving an OLED panel, the precharging method including: setting time in a time shift circuit which is connected to a precharge channel constructed with a metal oxide semiconductor (MOS) transistor; and controlling a voltage level of the precharge channel by driving the time shift circuit in which time is set.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The above and other features and advantages of the present invention will become more apparent by describing in detail exemplary embodiments thereof with reference to the attached drawings in which:

[0013] FIG. 1 is a view showing a current driving mode of a conventional organic light emitting diode (OLED) to explain a precharging method used in a driving integrated circuit (IC) of the OLED panel.

[0014] FIG. 2 is a graph showing a voltage level which is adjusted by a current setting;

[0015] FIG. 3 is a view showing a driving circuit of an OLED panel according to an embodiment of the present invention; and

[0016] FIG. 4 is a graph showing a change in voltage level according to a time setting.

BEST MODE FOR CARRYING OUT THE
INVENTION

[0017] Hereinafter, the present will be described in detail with reference to accompanying drawings.

[0018] FIG. 3 is a view showing a driving circuit of an organic light emitting diode (OLED) panel to explain a precharging method used in a driving integrated circuit (IC) of the OLED panel according to an embodiment of the present invention.

[0019] A precharge channel **210** constructed with a positive-channel metal oxide semi-conductor (PMOS) transistor and a discharge channel **220** constructed with a negative-channel metal oxide semiconductor (NMOS) are connected in series. The precharge channel **210** is applied with a Vcc voltage. The discharge channel **220** is connected to ground (GND).

[0020] The precharge channel **210** is connected to a time shift circuit **230** in which a voltage level is controlled by a time setting. The time shift circuit **230** is set so as to change a precharge voltage level according to the time setting.

[0021] The discharge channel **220** is turned off when precharging.

[0022] Therefore, in the driving circuit of the OLED panel according to the present invention, the precharge voltage level can reach a full Vcc voltage although a parasitic capacitance of the OLED panel increases.

[0023] FIG. 4 is a graph showing a change in voltage level according to a time setting.

[0024] In the time shift circuit **230**, the precharge voltage level of the precharge channel **210** changes according to the time setting. More specifically, in the time shift circuit **230**, time is set to be long, the precharge voltage level of the precharge channel **210** increases.

[0025] While the present invention has been particularly shown and described with reference to exemplary embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the appended claims.

INDUSTRIAL APPLICABILITY

[0026] According to the present invention, a precharge voltage level can reach a full Vcc level according to a time setting although a parasitic capacitance of an organic light emitting diode (OLED) panel increases. Therefore, a driving circuit can be simply and easily implemented.

1. A driving circuit using a precharging method for driving an OLED (organic light emitting diode) panel, the driving circuit comprising:

- a precharge channel which is applied with Vcc voltage and operates when precharging;
- a discharge channel which is connected to the precharge channel in series and is connected to GND (ground) and is turned off when precharging; and

a time shift circuit which is connected to the precharge channel and controls a voltage level according to a time setting.

2. The driving circuit according to claim 1, wherein the precharge channel is constructed with a MOS (metal oxide semiconductor) transistor.

3. A precharging method used in a driving circuit for driving an OLED panel, the precharging method comprising:
setting time in a time shift circuit which is connected to a precharge channel constructed with a MOS transistor; and
controlling a voltage level of the precharge channel by driving the time shift circuit in which time is set.

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| [标]申请(专利权)人(译) | SYNCOAM | | |
| 申请(专利权)人(译) | SYNCOAM CO. , LTD. | | |
| 当前申请(专利权)人(译) | SYNCOAM CO. , LTD. | | |
| [标]发明人 | KANG SEEN SUK JEONG SEONG IK | | |
| 发明人 | KANG, SEEN SUK JEONG, SEONG IK | | |
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摘要(译)

提供了一种驱动电路，其中当预充电时电压电平可以达到完全Vcc电平，并且尽管有机发光二极管（OLED）面板的寄生电容增加，但是使用该驱动电路的预充电方法也是如此。根据本发明的OLED面板的驱动电路包括：预充电通道，其施加Vcc电压并在预充电时操作；放电通道，与预充电通道串联连接，接地（GND），预充电时关闭；时移电路，连接到预充电通道，并根据时间设定控制电压电平。根据本发明，尽管OLED面板的寄生电容增加，但是预充电电压电平可以根据时间设置达到全Vcc电平。因此，可以简单且容易地实现驱动电路。

