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(54) **Organic light emitting display and method of driving the same**

Organische lichtemittierende Anzeige und Verfahren zu deren Antrieb

Affichage électroluminescent organique et son procédé de commande

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Description

BACKGROUND

1. **Field**

[0001] The present invention relates to an organic light emitting display and a method of driving the same.

2. **Description of the Related Art**

[0002] Recently, various flat panel displays (FPDs) having reduced weight and volume compared to that of cathode ray tube (CRT) devices have been developed. The FPDs include liquid crystal displays (LCDs), field emission displays (FEDs), plasma display panels (PDPs), and organic light emitting displays.

[0003] Among the FPDs, the organic light emitting displays display images using organic light emitting diodes (OLEDs) that generate light by recombination of electrons and holes. The organic light emitting display has a high response speed and is driven with low power consumption.

[0004] In general, the organic light emitting display is divided into a passive matrix type (PMOLED) and an active matrix type (AMOLED) in accordance with a method of driving the OLEDs. The AMOLED display includes a plurality of scan lines, a plurality of data lines, a plurality of power source lines, and a plurality of pixels coupled to the wiring lines and arranged in a matrix.

[0005] A DC-DC converter for generating power sources required for driving the pixels by boosting or dropping the voltage of an external power source may be provided in the organic light emitting display. The DC-DC converter supplies the generated power sources to the pixels for displaying an image through the power source lines. Detecting short circuits in such displays is an important safety concern.

[0006] US 2008/174287 and US 2012/032938 disclose an organic light emitting display according to the precharacterizing portion of Claim 1.

SUMMARY

[0007] Accordingly, the present invention provides an organic light emitting display capable of sensing whether or not short circuits exist in power source lines, and a method of driving the organic light emitting display. Further aspects provide for an organic light emitting display capable of preventing or reducing additional damage (such as to the pixels, or from fire) caused by short circuits in the power source lines, and a method of driving the organic light emitting display.

[0008] A first aspect of the present invention provides an organic light emitting display according to Claim 1. Optional features of this aspect of the invention are set out in Claims 2 to 6.

[0009] The present invention also provides, a method of driving an organic light emitting display according to Claim 7. Optional features of this aspect of the invention are set out in Claims 8 to 10.

[0010] As described above, according to embodiments the present invention, it is possible to provide an organic light emitting display capable of sensing whether or not short circuits exist in power source lines, and a method of driving the organic light emitting display. In addition, it is possible to provide an organic light emitting display capable of preventing additional damage (such as to the pixels, or from fire) caused by short circuits in the power lines, and a method of driving the same.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The accompanying drawings, together with the specification, illustrate embodiments of the present invention, and, together with the description, serve to explain aspects and principles of the present invention.

FIG. 1 is a schematic view illustrating an organic light emitting display according to an embodiment of the present invention;
FIG. 2 is a circuit view illustrating a pixel of the organic light emitting display of FIG. 1;
FIG. 3 is a block diagram illustrating a DC-DC converter of the organic light emitting display of FIG. 1;
FIG. 4 is a schematic view illustrating a circuit structure of the DC-DC converter of FIG. 3;
FIG. 5 is a waveform chart illustrating a method of driving an organic light emitting display when there is no short circuit in power source supply wiring lines;
FIG. 6 is a waveform chart illustrating a method of driving an organic light emitting display when wiring lines for supplying a first power source are short circuited with other wiring lines; and
FIG. 7 is a waveform chart illustrating a method of driving an organic light emitting display when wiring lines for supplying a second power source are short-circuited with the wiring lines for supplying the first power source or with the other wiring lines.

DETAILED DESCRIPTION

[0012] Hereinafter, embodiments of the present invention will be described with reference to the accompanying drawings. Here, when a first element is described as being coupled to a second element, the first element may be directly coupled (e.g., connected) to the second element or indirectly coupled (e.g., electrically connected) to the second element via one or more third elements. Further, some of the elements that are not essential to the complete understanding of the invention may be omitted for clarity. In addition, like reference numerals refer to like elements throughout, the descriptions of which may only be provided once (such as at their first appearance). The invention may, however, be embodied in many different forms and should not be construed as being limited to the embodiments set forth herein.

[0013] Embodiments of an organic light emitting display according to the present invention and a method of driving the organic light emitting display will be described with reference to the drawings. In the organic light emitting display, a DC-DC converter for generating power sources (e.g., power) for driving the pixels is provided. For example, the DC-DC converter can generate a first power source (ELVDD) by boosting the voltage of an external power source, and a second power source (ELVSS) by lowering the voltage of the external power source.

[0014] The DC-DC converter supplies the generated power sources to the pixels (for displaying an image) through power source wiring lines. However, the power source wiring lines may be short circuited with each other or with other wiring lines due to, for example, a failure during the manufacturing process, or from ordinary use. When such a short circuit takes place, and the DC-DC converter is driven, additional damage, such as pixel failure or from fire, may take place. Accordingly, the display of the present invention senses whether or not short circuits exist in the power source lines.

[0015] FIG. 1 is a schematic view illustrating an organic light emitting display according to an embodiment of the present invention.

[0016] Referring to FIG. 1, the organic light emitting display includes a display unit 20 including pixels 10 coupled to scan lines S1 to Sn and data lines D1 to Dm, a scan driver 30 for supplying scan signals to the pixels 10 through the scan lines S1 to Sn, a data driver 40 for supplying data signals to the pixels 10 through the data lines D1 to Dm, and a DC-DC converter 60 for supplying a first power source ELVDD and a second power source ELVSS to the pixels 10. The organic light emitting display further includes a timing controller 50 for controlling the scan driver 30 and the data driver 40.

[0017] The pixels 10 that receive the first power source ELVDD and the second power source ELVSS from the DC-DC converter 60 generate light components corresponding to the data signals. The data signals control corresponding currents that flow from the first power source ELVDD to the second power source ELVSS via organic light emitting diodes (OLEDs).

[0018] The scan driver 30 generates the scan signals under the control of the timing controller 50 and supplies the generated scan signals to the scan lines S1 to Sn. The data driver 40 generates the data signals under the control of the timing controller 50 and supplies the generated data signals to the data lines D1 to Dm. When the scan signals are sequentially supplied to the scan lines S1 to Sn, the pixels 10 are sequentially selected by lines and the selected pixels 10 receive the data signals transmitted from the data lines D1 to Dm

[0019] FIG. 2 is a circuit view illustrating a pixel 10 of the organic light emitting display of FIG. 1. In particular, in FIG. 2, for convenience of illustration, the pixel 10 is coupled to the nth scan line Sn and the mth data line Dm.

[0020] Referring to FIG. 2, the pixel 10 includes a pixel circuit 12 for controlling an OLED, the pixel circuit 12 being coupled to the OLED, the data line Dm, and the scan line Sn. The anode electrode of the OLED is coupled to the pixel circuit 12 and the cathode electrode of the OLED is coupled to the second power source ELVSS. The OLED generates light of a particular brightness (for example, a predetermined brightness) to correspond to the current supplied from the pixel circuit 12.

[0021] The pixel circuit 12 controls the amount of current supplied to the OLED to correspond to the data signal supplied to the data line Dm when the scan signal is supplied to the scan line Sn. To accomplish this, the pixel circuit 12 includes a second transistor T2 coupled between the first power source ELVDD and the OLED; a first transistor T1 coupled between the second transistor T2, the data line Dm, and the scan line Sn; and a storage capacitor Cst coupled between the gate electrode of the second transistor T2 and the first electrode of the second transistor T2.

[0022] The gate electrode of the first transistor T1 is coupled to the scan line Sn and the first electrode of the first transistor T1 is coupled to the data line Dm. The second electrode of the first transistor T1 is coupled to one terminal of the storage capacitor Cst. Throughout this description, the first electrode may be set to one of a source electrode or a drain electrode, while the second electrode is set to an electrode different from the first electrode. For example, when the first electrode is set to the source electrode, the second electrode is set to the drain electrode, and vice versa.

[0023] The first transistor T1 is turned on when the scan signal is supplied from the scan line Sn. The first transistor T1 then supplies the data signal supplied from the data line Dm to the storage capacitor Cst. The storage capacitor Cst then charges a voltage corresponding to the data signal.

[0024] The gate electrode of the second transistor T2 is coupled to one terminal of the storage capacitor Cst, and the first electrode of the second transistor T2 is coupled to the other terminal of the storage capacitor Cst and the first power source ELVDD. The second electrode of the second transistor T2 is coupled to the anode electrode of the OLED. The second transistor T2 controls the amount of current that flows from the first power source ELVDD to the second power source ELVSS via the OLED to correspond to the voltage value stored in the storage capacitor Cst. The OLED then generates light corresponding to the amount of current supplied from the second transistor T2.

[0025] Since the above described structure of the pixel 10 of FIG. 2 is only an embodiment of the present invention, the structure of the pixel 10 according to the present invention is not limited to the above-described structure.

[0026] Referring back to FIG. 1, the DC-DC converter 60 receives an input power source Vin from a power source unit 70 and converts the input power source Vin to generate the first power source ELVDD and the second power source ELVSS supplied to the pixels 10. For example, the first power source ELVDD may be set to a positive polarity voltage and the second power source ELVSS may be set to a negative polarity voltage.

[0027] The power source unit 70 may be, for example, a battery for providing a DC power source or a rectifying apparatus for converting an alternating current (AC) power source into a DC power source and outputting the DC power source. However, the power source unit 70 is not limited to the above.

[0028] FIG. 3 is a block diagram illustrating an exemplary DC-DC converter of the organic light emitting display of FIG. 1. FIG. 4 is a schematic view illustrating an exemplary circuit structure of the DC-DC converter of FIG. 3.

[0029] Referring to FIGs. 3 and 4, the DC-DC converter 60 includes a first power source generating unit 110, a second power source generating unit 120, a controller 130, a first short sensing unit 140, and a second short sensing unit 150.

[0030] The first power source generating unit 110 receives an input power source Vin to generate the first power source ELVDD, and outputs the first power source ELVDD to a first output end OUT1. For example, the first power source generating unit 110 may boost the voltage of the input power source Vin using internal elements to generate the first power source ELVDD.

[0031] In a similar fashion, the second power source generating unit 120 receives the input power source Vin to generate the second power source ELVSS, and outputs the second power source ELVSS to a second output end OUT2. For example, the second power source generating unit 120 may lower the voltage of the input power source Vin using internal elements to generate the second power source ELVSS. The first power source ELVDD and the second power source ELVSS output to the first output end OUT1 and the second output end OUT2, respectively, are supplied to the pixels 10 included in the display unit 20.

[0032] The controller 130 controls the driving of the first power source generating unit 110 and the second power source generating unit 120. When a short circuit is sensed by the first short sensing unit 140 or the second short sensing unit 150, the controller 130 supplies a driving stop signal Fst to the first power source generating unit 110 and/or the second power source generating unit 120 to stop the driving of the first power source generating unit 110 and/or the second power source generating unit 120. In addition, the operation of the controller 130 is controlled by an actuation signal EL_ON supplied from the timing controller 50.

[0033] The first short sensing unit 140 detects the voltage of the first output end OUT1 and compares it with a first reference voltage Vref1 (see FIG. 4). When the voltage of the first output end OUT1 is greater than or equal to (or not less than) the first reference voltage Vref1, the first short sensing unit 140 outputs a first short sensing signal Ds1 to the controller 130. The first short sensing unit 140 may operate, for example, to correspond to a first operation signal En1 supplied from the controller 130.

[0034] In a similar fashion, the second short sensing unit 150 detects the voltage of the second output end OUT2 and compares it with a second reference voltage Vref2 (see FIG. 4). When the voltage of the second output end OUT2 is greater than or equal to the second reference voltage Vref2, the second short sensing unit 150 outputs a second short sensing signal Ds2 to the controller 130. The second short sensing unit 150 may operate, for example, to correspond to a second operation signal En2 supplied from the controller 130.

[0035] When the first short sensing signal Ds1 is received from the first short sensing unit 140 or the second short sensing signal Ds2 is received from the second short sensing unit 150, the controller 130 supplies the driving stop signal Fst to the first power source generating unit 110 and the second power source generating unit 120 to stop the driving of the first power source generating unit 110 and the second power source generating unit 120. Therefore, when a short circuit in a power source line is sensed, the driving of the first power source generating unit 110 and the second power source generating unit 120 is stopped to reduce or prevent additional damage, such as pixel damage or damage from fire.

[0036] In further detail, and with particular reference to FIG. 4, the DC-DC converter further includes a first pull down resistor Rpd1, a first pull down switch Mpd1, a second pull down resistor Rpd2, and a second pull down switch Mpd2. The first pull down resistor Rpd1 and the first pull down switch Mpd1 are serially coupled between the first output end OUT1 and a ground power source. The second pull down resistor Rpd2 and the second pull down switch Mpd2 are serially coupled between the second output end OUT2 and the ground power source.

[0037] The first pull down switch Mpd1 and the second pull down switch Mpd2 are turned on and off by the controller 130, and may be realized as transistors as illustrated in FIG. 4. In particular, the first pull down switch Mpd1 may be turned on to correspond to (for example, in response to) a first driving signal Gon1 supplied from the controller 130. In a similar fashion, the second pull down switch Mpd2 may be turned on to correspond to (for example, in response to) a second driving signal Gon2 supplied from the controller 130.

[0038] Referring to FIG. 4, the structures of the first power source generating unit 110 and the second power source generating unit 120 will be described in further detail. The first power source generating unit 110 includes a first inductor L1 coupled between the power source unit 70 and a first node N1, a first transistor M1 coupled between the first node N1 and the ground power source, a second transistor M2 coupled between the first node N1 and the first output end OUT1, and a first switch driver 180 for controlling the turning on and off of the first transistor M1 and the second transistor M2.

[0039] The first switch driver 180 receives a first feedback voltage Vfb1 from resistors R1 and R2 serially coupled between the first output end OUT1 and the ground power source. The first switch driver 180 stops the driving of the first power source generating unit 110 when the driving stop signal Fst is transmitted from the controller 130. For example, when the driving stoop signal Fst is transmitted from the controller 130, the first switch driver 180 maintains the first transistor M1 and the second transistor M2 in a turn off state to stop the driving of the first power source generating unit 110. A first capacitor C1 is further coupled to the first output end OUT1 from which the first power source ELVDD is output, as shown in FIG. 4.

[0040] In a similar fashion, the second power source generating unit 120 includes a third transistor M3 coupled between the power source unit 70 and a second node N2, a fourth transistor M4 coupled between the second node N2 and the second output end OUT2, a second inductor L2 coupled between the second node N2 and the ground power source, and a second switch driver 190 for controlling the turning on and off of the third transistor M3 and the fourth transistor M4.

[0041] The second switch driver 190 receives a second feedback voltage Vfb2 from resistors R3 and R4 serially coupled between the second output end OUT2 and the ground power source. The second switch driver 190 stops the driving of the second power source generating unit 120 when the driving stop signal Fst is transmitted from the controller 130. For example, when the driving stop signal Fst is transmitted from the controller 130, the second switch driver 190 maintains the third transistor M3 and the fourth transistor M4 in the turn off state to stop the driving of the second power source generating unit 120. A second capacitor C2 is further coupled to the second output end OUT2 from which the second power source ELVSS is output, as shown in FIG. 4.

[0042] The above-described structures of the first power source generating unit 110 and the second power source generating unit 120 are only an embodiment of the present invention. The present invention is not limited to the above. For example, the first power source generating unit 110 may be realized by a previously published boost type converter and the second power source generating unit 120 may be realized by a previously published drop type converter.

[0043] FIG. 5 is a waveform chart illustrating a method of driving an organic light emitting display when there is no short circuit in power source supply wiring lines. In particular, FIG. 5 illustrates the case in which there is no short circuit in the supply wiring line of the first power source ELVDD and the supply wiring line of the second power source ELVSS.

[0044] Referring to FIG. 5, when the actuation signal EL_ON is supplied to the controller 130 of the DC-DC converter 60 together with the supply of a vertical synchronizing signal Vsync that distinguishes a frame, the actuation of the DC-DC converter 60 starts. In order to prevent or lessen the likelihood of a change in the voltages of the first power source ELVDD and the second power source ELVSS from affecting an image displayed on the display unit 20, in initial frames (for example, a first frame and a second frame), a black image is displayed. Therefore, the data driver may supply black data to the pixels 10 included in the display unit 20 in the initial frame periods. In addition, the first period P1 in which the first short sensing unit 140 operates and the second period P2 in which the second short sensing unit 150 operates are performed while the display unit 20 displays the black image.

[0045] The first power source generating unit 110 boosts the voltage of the first power source ELVDD output to the first output end OUT1 from the ground voltage VGND to a target voltage (for example, a predetermined target voltage) having positive polarity in accordance with the control of the controller 130. In addition, the first power source generating unit 110 maintains the voltage of the first power source ELVDD as the ground voltage VGND in the first period P1 when the first short sensing unit 140 operates. Next, the first power source generating unit 110 sequentially raises (for example, in steps) the voltage of the first power source ELVDD from the ground voltage VGND to the target voltage in a period between the first period P1 and the second period P2. This allows the first power source generating unit 110 to uniformly output the first power source ELVDD at the target voltage during the second period P2 when the second short sensing unit 150 operates.

[0046] In a similar fashion, the second power source generating unit 120 lowers the voltage of the second power source ELVSS output to the second output end OUT2 from the ground voltage VGND to a target voltage (for example, a predetermined target voltage) having negative polarity in accordance with the control of the controller 130. In addition, the second power source generating unit 120 maintains the voltage of the second power source ELVSS as the ground voltage VGND in the second period P2 when the second short sensing unit 150 operates. Next, the second power source generating unit 120 lowers the voltage of the second power source ELVSS to the target voltage when a short circuit is not sensed by the second short sensing unit 150.

[0047] In further detail and with reference to FIG. 5, in the first period P1, when the first operation signal En1 is supplied from the controller 130, the first short sensing unit 140 detects the voltage of the first output end OUT1 of the first power source generating unit 110 to compare the detected voltage with the first reference voltage Vref1. If the voltage of the first output end OUT1 is greater than or equal to the first reference voltage Vref1, the first short sensing unit 140 transmits the first short sensing signal Ds1 to the controller 130.

[0048] If, however, as in FIG. 5, the voltage of the first output end OUT1 maintains the ground voltage VGND in the first period P1 so that the voltage of the first output end OUT1 is lower than the first reference voltage Vref1, the first short sensing unit 140 determines that there is no short circuit in the supply wiring line of the first power source ELVDD, and outputs a normal signal to the controller 130. The controller 130 (that receives a normal signal from the first short sensing unit 140) then controls the first power source generating unit 110 to boost the voltage of the first power source ELVDD output to the first output end OUT1 to the target voltage.

[0049] In the first period P1 when the first short sensing unit 140 operates, in order to stabilize the voltage of the first output end OUT1 to the ground voltage GND, the first pull down switch Mpd1 is turned on in the first period P1. Therefore, the controller 130 supplies the first driving signal Gon1 to the first pull down switch Mpd1 in the first period P1 to maintain the turn on state of the first pull down switch Mpd1 in the first period P1. Accordingly, the correctness of the determination of a short circuit performed by the first short sensing unit 140 may increase.

[0050] Next, since in FIG. 5, the first short sensing signal Ds1 is not generated by the first short sensing unit 140, the second short sensing unit 150 operates in the second period P2. That is, when the second operation signal En2 is supplied from the controller 130, the second short sensing unit 150 detects the voltage of the second output end OUT2 of the second power source generating unit 120 to compare the detected voltage with the second reference voltage Vref2. If the voltage of the second output end OUT2 is greater than or equal to the second reference voltage Vref2, the second short sensing unit 150 transmits the second short sensing signal Ds2 to the controller 130.

[0051] If, however, as in FIG. 5, the voltage of the second output end OUT2 maintains the ground voltage VGND in the second period P2 so that the voltage of the second output end OUT2 is lower than the second reference voltage Vref2, the second short sensing unit 150 determines that there is no short circuit in the supply wiring line of the second power source ELVSS, and outputs a normal signal to the controller 130. The controller 130 (that receives the normal signal from the second short sensing unit 150) then controls the second power source generating unit 120 to lower the voltage of the second power source ELVSS output to the second output end OUT2 to the target voltage.

[0052] In order to stabilize the voltage of the second output end OUT2 to the ground voltage VGND in the second period P2 when the second short sensing unit 150 operates, the second pull down switch Mpd2 isturned on in the second period P2. Therefore, the controller 130 supplies the second driving signal Gon2 to the second pull down switch Mpd2 in the second period P2 to maintain the turn on state of the second pull down switch Mpd2 in the second period P2. Accordingly, the correctness of the determination of a short circuit performed by the second short sensing unit 150 may increase.

[0053] Through the first period P1 and the second period P2 that sequentially proceed, it is determined in the first period P1 whether or not a short circuit exists between the supply wiring line of the first power source ELVDD and other wiring lines (for example, scan lines and data lines). In addition, it is determined in the second period P2 whether or not a short circuit exists between the supply wiring line of the second power source ELVSS and the supply wiring line of the first power source ELVDD, and whether or not a short circuit exists between the supply wiring line of the second power source ELVSS and the other wiring lines (for example, the scan lines and the data lines).

[0054] FIG. 6 is a waveform chart illustrating a method of driving an organic light emitting display when wiring lines for supplying the first power source are short circuited with other wiring lines.

[0055] Since FIG. 6 illustrates the case in which the supply wiring line of the first power source ELVDD is short circuited with the other wiring lines, the voltage of the first output end OUT1 is the same as or similar to the voltages of the other wiring lines. Accordingly, the first short sensing unit 140 that operates in the first period P1 determines that there is a short circuit in the supply wiring line of the first power source ELVDD since the voltage of the first output end OUT1 is higher than the first reference voltage Vref1. The first short sensing unit 140 then supplies the first short sensing signal Ds1 to the controller 130.

[0056] The controller 130 then supplies the driving stop signal Fst to the first power source generating unit 110 and the second power source generating unit 120 to correspond to the first short sensing signal Ds1. Therefore, the first power source generating unit 110 and the second power source generating unit 120 stop driving.

[0057] When the determination that a short circuit exists is made by the first short sensing unit 140, the second short sensing unit 150 does not need to operate. Therefore, when the controller 130 receives the first short sensing signal Ds1 from the first short sensing unit 140, the controller 130 does not transmit the second operation signal En2 to the second short sensing unit 150 so that the second short sensing unit 150 does not operate.

[0058] In addition, since the second short sensing unit 150 does not operate, the second pull down switch Mpd2 does not need to be turned on. Therefore, when the controller 130 receives the first short sensing signal Ds1 from the first short sensing unit 140, the controller 130 does not transmit the second driving signal Gon2 to the second pull down switch Mpd2 so that the turn off state of the second pull down switch Mpd2 may be maintained. As a result, when it is determined by the first short sensing unit 140 that the supply wiring line of the first power source ELVDD is short circuited, the second short sensing unit 150 does not operate and the second pull down switch Mpd2 is not turned on in the second period P2.

[0059] FIG. 7 is a waveform chart illustrating a method of driving an organic light emitting display when wiring lines for supplying the second power source are short circuited with the wiring lines for supplying the first power source or with the other wiring lines.

[0060] First, the voltage of the first output end OUT1 maintains the ground voltage VGND in the first period

P1, so the first short sensing unit 140 determines that the voltage of the first output end OUT1 is lower than the first reference voltage Vref1 and thus, there is no short circuit in the supply wiring line of the first power source ELVDD. As described above, the first pull down switch Mpd1 may maintain the turn on state in the first period P1. Since the first short sensing unit 140 does not sense a short circuit of the supply wiring line of the first power source ELVDD, the normal signal is output to the controller 130. The controller 130 may then operate the second short sensing unit 150 in the second period P2 to correspond to the normal signal supplied from the first short sensing unit 140.

[0061] Since FIG. 7 illustrates the case in which the supply wiring line of the second power source ELVSS is short circuited with the supply wiring line of the first power source ELVDD or the other wiring lines, the voltage of the second output end OUT2 is the same as or similar to the voltage of the supply wiring line of the first power source ELVDD or the voltages of the different wiring lines. Accordingly, the second short sensing unit 150 that operates in the second period P2 determines that there is a short circuit in the supply wiring line of the second power source ELVSS since the voltage of the second output end OUT2 is higher than the second reference voltage Vref2. The second short sensing unit 150 then supplies the second short sensing signal Ds2 to the controller 130.

[0062] The controller 130 then supplies the driving stop signal Fst to the first power source generating unit 110 and the second power source generating unit 120 to correspond to the second short sensing signal Ds2. Therefore, the first power source generating unit 110 and the second power source generating unit 120 stop driving. At this point, the voltage of the first power source ELVDD output by the first power source generating unit 110 is lowered to the ground voltage VGND.

[0063] While the present invention has been described in connection with certain embodiments, it is to be understood that the invention is not limited to the disclosed embodiments, but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the scope of the appended claims, and equivalents thereof.

Claims

1. An organic light emitting display comprising:

a display unit (20) coupled to scan lines and data lines, and including pixels (10) configured to receive a first power source (ELVDD) and a second power source (ELVSS); and

a DC-DC converter (60) configured to generate the first power source and the second power source, the DC-DC converter comprising:

a first power source generating unit (110) configured to generate the first power source from an input power source (70) and to output the first power source to a first output end;

a second power source generating unit (120) configured to generate the second power source from the input power source (70) and to output the second power source to a second output end;

a controller (130) configured to control driving of the first power source generating unit (110) and the second power source generating unit (120);

a first short-circuit sensing unit (140) configured to output a first short sensing signal (Ds1) to the controller (130) when a voltage of the first output end is greater than or equal to a first reference voltage (Vref1), said first short sensing signal being indicative of a short-circuit at the output end; and

a second short sensing unit (150) configured to output a second short sensing signal (Ds2) to the controller when a voltage of the second output end is greater than or equal to a second reference voltage (Vref2), said second short sensing signal being indicative of a short-circuit at the second output end;

characterized by:

a first pull down resistor (Rpd1) and a first pull down switch (Mpd1) serially coupled between the first output end and a ground power source; and

a second pull down resistor (Rpd2) and a second pull down switch (Mpd2) serially coupled between the second output end and the ground power source;

wherein the first short-circuit sensing unit (140) is configured to operate when a first operation signal (En1) is supplied from the controller (130), and

the second short-circuit sensing unit (150) is configured to operate when a second operation signal (En2) is supplied from the controller (130), wherein the controller (130) is configured to transmit the first operation signal (En1) to the first short-circuit sensing unit (140) in a first period (P1), and to transmit the second operation signal (En2) to the second short-circuit sensing unit (150) in a second period (P2), the second period taking place after the first period, and wherein the controller is configured, during the first period (P1), to maintain the first power source generating unit (110) turned off, and to

turn on the first pull down switch (Mpd1), so as to maintain the voltage of the first power source as a ground voltage, and
wherein the controller is configured, during the second period (P2), to maintain the second power source generating unit (120) turned off, and to turn on the second pull down switch (Mpd2), so as to maintain the voltage of the second power source as the ground voltage.

2. An organic light emitting display according to claim 1, wherein the controller (130) is configured to not transmit the second operation signal (En2) to the second short-circuit sensing unit (150) after the first short sensing signal (En1) is received.

3. An organic light emitting display according to claim 2, wherein the second pull down switch (Mpd2) is configured to not turn on if the first short sensing signal (Ds1) is transmitted to the controller (130) before the second period (P2).

4. An organic light emitting display according to any one of the preceding claims, wherein the display unit (20) is configured to display a black image in a period spanning the first period through the second period.

5. An organic light emitting display according to any one of the preceding claims, wherein the controller (130) is configured to stop driving the first power source generating unit (110) and the second power source generating unit (120) after the first short sensing signal (Ds1) or the second short sensing signal (Ds2) is received.

6. An organic light emitting display according to any one of the preceding claims,
wherein the first power source (ELVDD) is configured to have a positive polarity voltage, and
wherein the second power source (ELVSS) is configured to have a negative polarity voltage.

7. A method of driving an organic light emitting display according to claim 1, the said method comprising:

a) during the first period (P1),

- maintaining the first power source generating unit (110) turned off, and turning on the first pull down switch (Mpd1), so as to maintain voltage the at the first output end of the first power source generating unit coupled to a ground power source through the first pull down resistor (Rpd1) and the first pull down switch (Mpd1) serially coupled to each other;
- detecting the voltage at the first output end of the first power source generating unit (110) by the first short-circuit sensing unit (140);
- comparing the detected voltage of the first output end with a first reference voltage (Vref1); and
- transmitting a first short sensing signal (DS1) to the controller when the voltage at the first output end is greater than or equal to the first reference voltage (Vref1);

b) during the second period (P2) that takes place after the first period (P1),

- maintaining the second power source generating unit (120) turned off, and turning on the second pull down switch (Mpd2), so as to maintain the voltage at the second output end of the second power source generating unit coupled to the ground power source through the second pull down resistor (Rpd2) and the second pull down switch (Mpd2) serially coupled to each other;
- detecting the voltage at the second output end of the second power source generating unit (120) by the second short-circuit sensing unit (150);
- comparing the detected voltage at the second output end with a second reference voltage (Vref2), and
- transmitting a second short sensing signal (DS2) to the controller when the voltage at the second output end is greater than or equal to the second reference voltage (Vref2); and

c) determining whether or not to stop driving the first power source generating unit (110) and the second power source generating unit (120) in accordance with the first short sensing signal and the second short sensing signal.

8. A method according to claim 7, further comprising stopping the driving of the first power source generating unit (110) and the second power source generating unit (120) after the controller (130) receives the first short sensing signal (Ds1) or the second short sensing signal (Ds2).

9. A method according to claim 7 or 8, further comprising displaying a black image on a display unit (20) in a period spanning from the first period (P1) through the second period (P2) when the display unit receives a first power source (ELVDD) and a second power source (ELVSS) from the first power source generating unit (110) and the second power source generating unit (120), respectively.

10. A method according to claim 7, 8 or 9, further comprising:

supplying the first power source (ELVDD) as a positive polarity voltage; and
supplying the second power source (ELVSS) as a negative polarity voltage.

Patentansprüche

1. Organische lichtemittierende Anzeige, die Folgendes umfasst:

eine Anzeigeeinheit (20), die an Abtastlinien und Datenlinien gekoppelt ist und Pixel (10) beinhaltet, die dazu ausgelegt sind, eine erste Stromquelle (ELVDD) und eine zweite Stromquelle (ELVSS) zu empfangen; und
einen DC-DC-Wandler (60), der dazu ausgelegt ist, die erste Stromquelle und die zweite Stromquelle zu erzeugen, wobei der DC-DC-Wandler Folgendes umfasst:

eine erste Stromquellenerzeugungseinheit (110), die dazu ausgelegt ist, die erste Stromquelle aus einer Eingangsstromquelle (70) zu erzeugen und die erste Stromquelle zu einem ersten Ausgangsende auszugeben;
eine zweite Stromquellenerzeugungseinheit (120), die dazu ausgelegt ist, die zweite Stromquelle aus der Eingangsstromquelle (70) zu erzeugen und die zweite Stromquelle zu einem zweiten Ausgangsende auszugeben;
eine Steuerung (130), die dazu ausgelegt ist, das Antreiben der ersten Stromquellenerzeugungseinheit (110) und der zweiten Stromquellenerzeugungseinheit (120) zu steuern;
eine erste Kurzschlusserkennungseinheit (140), die dazu ausgelegt ist, ein erstes Kurzschlusserkennungssignal (Ds1) an die Steuerung (130) auszugeben, wenn eine Spannung des ersten Ausgangsendes größer oder gleich einer ersten Referenzspannung (Vref1) ist, wobei das erste Kurzschlusserkennungssignal einen Kurzschluss am Ausgangsende anzeigt; und
eine zweite Kurzschlusserkennungseinheit (150), die dazu ausgelegt ist, ein zweites Kurzschlusserkennungssignal (Ds2) an die Steuerung auszugeben, wenn eine Spannung des zweiten Ausgangsendes größer oder gleich einer zweiten Referenzspannung (Vref2) ist, wobei das zweite Kurzschlusserkennungssignal einen Kurzschluss am zweiten Ausgangsende anzeigt; und

gekennzeichnet durch:

einen ersten Pull-down-Widerstand (Rpd1) und einen ersten Pull-down-Schalter (Mpd1), die zwischen dem ersten Ausgangsende und einer Massestromquelle in Reihe gekoppelt sind; und
einen zweiten Pull-down-Widerstand (Rpd2) und einen zweiten Pull-down-Schalter (Mpd2), die zwischen dem zweiten Ausgangsende und der Massestromquelle in Reihe gekoppelt sind;
wobei die erste Kurzschlusserkennungseinheit (140) dazu ausgelegt ist, betrieben zu werden, wenn ein erstes Betriebssignal (En1) von der Steuerung (130) geliefert wird, und
wobei die zweite Kurzschlusserkennungseinheit (150) dazu ausgelegt ist, betrieben zu werden, wenn ein zweites Betriebssignal (En2) von der Steuerung (130) geliefert wird,
wobei die Steuerung (130) dazu ausgelegt ist, das erste Betriebssignal (En1) in einer ersten Periode (P1) zur ersten Kurzschlusserkennungseinheit (140) und das zweite Betriebssignal (En2) in einer zweiten Periode (P2) zur zweiten Kurzschlusserkennungseinheit (150) zu übertragen, wobei die zweite Periode nach der ersten Periode stattfindet, und
wobei die Steuerung dazu ausgelegt ist, während der ersten Periode (P1) die erste Stromquellenerzeugungseinheit (110) ausgeschaltet zu lassen und den ersten Pull-down-Schalter (Mpd1) einzuschalten, um die Spannung der ersten Stromquelle als Massespannung beizubehalten, und
wobei die Steuerung dazu ausgelegt ist, während der zweiten Periode (P2) die zweite Stromquellenerzeugungseinheit (120) ausgeschaltet zu lassen und den zweiten Pull-down-Schalter (Mpd2) einzuschalten, um die Spannung der zweiten Stromquelle als Massespannung beizubehalten.

2. Organische lichtemittierende Anzeige nach Anspruch 1, wobei die Steuerung (130) dazu ausgelegt ist, das zweite Betriebssignal (En2) nicht zur zweiten Kurzschlusserkennungseinheit (150) zu übertragen, nachdem das erste Kurzschlusserkennungssignal (En1) empfangen wurde.

3. Organische lichtemittierende Anzeige nach Anspruch 2, wobei der zweite Pull-down-Schalter (Mpd2) dazu ausgelegt ist, nicht einzuschalten, wenn das erste Kurzschlusserkennungssignal (Ds1) vor der zweiten Periode (P2) zur Steuerung (130) übertragen wird.

4. Organische lichtemittierende Anzeige nach einem

der vorhergehenden Ansprüche, wobei die Anzeigeeinheit (20) dazu ausgelegt ist, in einer Periode, in der sich die erste Periode durch die zweite Periode erstreckt, ein schwarzes Bild anzuzeigen.

5. Organische lichtemittierende Anzeige nach einem der vorhergehenden Ansprüche, wobei die Steuerung (130) dazu ausgelegt ist, das Antreiben der ersten Stromquellenerzeugungseinheit (110) und der zweiten Stromquellenerzeugungseinheit (120) zu beenden, nachdem das erste Kurzschlusserkennungssignal (Ds1) oder das zweite Kurzschlusserkennungssignal (Ds2) empfangen wurde.

6. Organische lichtemittierende Anzeige nach einem der vorhergehenden Ansprüche,
wobei die erste Stromquelle (ELVDD) dazu ausgelegt ist, eine Spannung positiver Polarität aufzuweisen, und
wobei die zweite Stromquelle (ELVSS) dazu ausgelegt ist, eine Spannung negativer Polarität aufzuweisen.

7. Verfahren zum Antreiben einer organischen lichtemittierenden Anzeige nach Anspruch 1, wobei das Verfahren Folgendes umfasst:

a) während der ersten Periode (P1),

- Ausgeschaltethalten der ersten Stromquellenerzeugungseinheit (110) und Einschalten des ersten Pull-down-Schalters (Mpd1), um Spannung am ersten Ausgangsende der ersten Stromquellenerzeugungseinheit durch den ersten Pull-down-Widerstand (Rpd1) und den ersten Pull-down-Schalter (Mpd1), die in Reihe aneinander gekoppelt sind, an eine Massestromquelle gekoppelt zu halten;
- Detektieren der Spannung am ersten Ausgangsende der ersten Stromquellenerzeugungseinheit (110) durch die erste Kurzschlusserkennungseinheit (140);
- Vergleichen der detektierten Spannung des ersten Ausgangsendes mit einer ersten Referenzspannung (Vref1) und
- Übertragen eines ersten Kurzschlusserkennungssignals (DS1) zur Steuerung, wenn die Spannung am ersten Ausgangsende größer oder gleich einer ersten Referenzspannung (Vref1) ist;

b) während der zweiten Periode (P2), die nach der ersten Periode (P1) stattfindet,

- Ausgeschaltethalten der zweiten Stromquellenerzeugungseinheit (120) und Einschalten des zweiten Pull-down-Schalters (Mpd2), um die Spannung am zweiten Ausgangsende der zweiten Stromquellenerzeugungseinheit durch den zweiten Pull-down-Widerstand (Rpd2) und den zweiten Pull-down-Schalter (Mpd2), die in Reihe aneinander gekoppelt sind, an die Massestromquelle gekoppelt zu halten;
- Detektieren der Spannung am zweiten Ausgangsende der zweiten Stromquellenerzeugungseinheit (120) durch die zweite Kurzschlusserkennungseinheit (150);
- Vergleichen der detektierten Spannung am zweiten Ausgangsende mit einer zweiten Referenzspannung (Vref2) und
- Übertragen eines zweiten Kurzschlusserkennungssignals (DS2) zur Steuerung, wenn die Spannung am zweiten Ausgangsende größer oder gleich der zweiten Referenzspannung (Vref2) ist; und

c) Bestimmen, ob das Antreiben der ersten Stromquellenerzeugungseinheit (110) und der zweiten Stromquellenerzeugungseinheit (120) gemäß dem ersten Kurzschlusserkennungssignal und dem zweiten Kurzschlusserkennungssignal beendet werden soll oder nicht.

8. Verfahren nach Anspruch 7, das ferner das Beenden des Antreibens der ersten Stromquellenerzeugungseinheit (110) und der zweiten Stromquellenerzeugungseinheit (120) umfasst, nachdem die Steuerung (130) das erste Kurzschlusserkennungssignal (Ds1) oder das zweite Kurzschlusserkennungssignal (Ds2) empfängt.

9. Verfahren nach Anspruch 7 oder 8, das ferner das Anzeigen eines schwarzen Bildes auf einer Anzeigeeinheit (20) in einer Periode, die von der ersten Periode (P1) durch die zweite Periode (P2) reicht, wenn die Anzeigeeinheit eine erste Stromquelle (ELVDD) und eine zweite Stromquelle (ELVSS) von der ersten Stromquellenerzeugungseinheit (110) bzw. von der zweiten Stromquellenerzeugungseinheit (120) empfängt.

10. Verfahren nach Anspruch 7, 8 oder 9, das ferner Folgendes umfasst:

Liefern der ersten Stromquelle (ELVDD) als Spannung positiver Polarität und
Liefern der zweiten Stromquelle (ELVSS) als Spannung negativer Polarität.

Revendications

1. Affichage électroluminescent organique comprenant :

une unité d'affichage (20) reliée à des lignes de balayage et des lignes de données, et comprenant des pixels (10) configurés pour recevoir une première source d'énergie (ELVDD) et une seconde source d'énergie (ELVSS) ; et
un convertisseur CC-CC (60) configuré pour générer la première source d'énergie et la seconde source d'énergie, le convertisseur CC-CC comprenant :

une unité de génération de première source d'énergie (110) configurée pour générer la première source d'énergie à partir d'une source d'énergie d'entrée (70) et pour fournir la première source d'énergie à une première extrémité de sortie ;
une unité de génération de seconde source d'énergie (120) configurée pour générer la seconde source d'énergie à partir de la source d'énergie d'entrée (70) et pour fournir la seconde source d'énergie à une seconde extrémité de sortie ;
un contrôleur (130) configuré pour contrôler l'entraînement de l'unité de génération de première source d'énergie (110) et de l'unité de génération de seconde source d'énergie (120) ;
une première unité de détection de court-circuit (140) configurée pour fournir un premier signal de détection de court-circuit (Ds1) au contrôleur (130) lorsqu'une tension de la première extrémité de sortie est supérieure ou égale à une première tension de référence (Vref1), ledit premier signal de détection de court-circuit indiquant un court-circuit au niveau de l'extrémité de sortie ; et
une seconde unité de détection de court-circuit (150) configurée pour fournir un second signal de détection de court-circuit (Ds2) au contrôleur lorsqu'une tension de la seconde extrémité de sortie est supérieure ou égale à une seconde tension de référence (Vref2), ledit second signal de détection de court-circuit indiquant un court-circuit au niveau de la seconde extrémité de sortie ;

caractérisé par :

une première résistance de rappel à la masse (Rpd1) et un premier commutateur de rappel à la masse (Mpd1) reliés en série entre la première extrémité de sortie et une source d'énergie de masse ; et
une seconde résistance de rappel à la masse (Rpd2) et un second commutateur de rappel à la masse (Mpd2) reliés en série entre la seconde extrémité de sortie et la source d'énergie de masse ;
dans lequel la première unité de détection de court-circuit (140) est configurée pour fonctionner lorsqu'un premier signal de fonctionnement (En1) est fourni par le contrôleur (130), et
la seconde unité de détection de court-circuit (150) est configurée pour fonctionner lorsqu'un second signal de fonctionnement (En2) est fourni par le contrôleur (130),
dans lequel le contrôleur (130) est configuré pour transmettre le premier signal de fonctionnement (En1) à la première unité de détection de court-circuit (140) pendant une première période (P1), et pour transmettre le second signal de fonctionnement (En2) à la seconde unité de détection de court-circuit (150) pendant une seconde période (P2), la seconde période ayant lieu après la première période, et
dans lequel le contrôleur est configuré, pendant la première période (P1), pour maintenir l'unité de génération de première source d'énergie (110) désactivée, et pour activer le premier commutateur de rappel à la masse (Mpd1), de façon à maintenir la tension de la première source d'énergie comme tension de masse, et
dans lequel le contrôleur est configuré, pendant la seconde période (P2), pour maintenir l'unité de génération de seconde source d'énergie (120) désactivée, et pour activer le second commutateur de rappel à la masse (Mpd2), de façon à maintenir la tension de la seconde source d'énergie comme tension de masse.

2. Affichage électroluminescent organique selon la revendication 1, dans lequel le contrôleur (130) et configuré pour ne pas transmettre le second signal de fonctionnement (En2) à la seconde unité de détection de court-circuit (150) après que le premier signal de détection de court-circuit (En1) a été reçu.

3. Affichage électroluminescent organique selon la revendication 2, dans lequel le second commutateur de rappel à la masse (Mpd2) est configuré pour ne pas s'activer si le premier signal de détection de court-circuit (Ds1) est transmis au contrôleur (130) avant la seconde période (P2).

4. Affichage électroluminescent organique selon l'une quelconque des revendications précédentes, dans lequel l'unité d'affichage (20) est configurée pour afficher une image noire pendant une période couvrant la première période et la seconde période.

5. Affichage électroluminescent organique selon l'une quelconque des revendications précédentes, dans lequel le contrôleur (130) est configuré pour arrêter d'entraîner l'unité de génération de première source d'énergie (110) et l'unité de génération de seconde

source d'énergie (120) après que le premier signal de détection de court-circuit (Ds1) ou le second signal de détection de court-circuit (Ds2) a été reçu.

6. Affichage électroluminescent organique selon l'une quelconque des revendications précédentes,
dans lequel la première source d'énergie (ELVDD) est configurée pour avoir une tension à polarité positive, et
dans lequel la seconde source d'énergie (ELVSS) est configurée pour avoir une tension à polarité négative.

7. Procédé d'entraînement d'un affichage électroluminescent organique selon la revendication selon la revendication 1, ledit procédé comprenant :

a) pendant la première période (P1),

- le maintien de l'unité de génération de première source d'énergie (110) désactivée, et l'activation du premier commutateur de rappel à la masse (Mpd1), de façon à maintenir la tension au niveau de la première extrémité de sortie de l'unité de génération de première source d'énergie reliée à une source d'énergie de masse par le biais de la première résistance de rappel à la masse (Rpd1) et du premier commutateur de rappel à la masse (Mpd1) reliés en série l'un à l'autre ;
- la détection de la tension au niveau de la première extrémité de sortie de l'unité de génération de première source d'énergie (110) par la première unité de détection de court-circuit (140) ;
- la comparaison de la tension détectée de la première extrémité de sortie avec une première tension de référence (Vref1) ; et
- la transmission d'un premier signal de détection de court-circuit (DS1) au contrôleur lorsque la tension au niveau de la première extrémité de sortie est supérieure ou égale à la première tension de référence (Vref1) ;

b) pendant la seconde période (P2) qui a lieu après la première période (P1),

- le maintien de l'unité de génération de seconde source d'énergie (120) désactivée, et l'activation du second commutateur de rappel à la masse (Mpd2), de façon à maintenir la tension au niveau de la seconde extrémité de sortie de l'unité de génération de seconde source d'énergie reliée à la source d'énergie de masse par le biais de la seconde résistance de rappel à la masse (Rpd2) et du second commutateur de rappel à la masse (Mpd2) reliés en série l'un à l'autre ;
- la détection de la tension au niveau de la seconde extrémité de sortie de l'unité de génération de seconde source d'énergie (120) par la seconde unité de détection de court-circuit (150) ;
- la comparaison de la tension détectée au niveau de la seconde extrémité de sortie avec une seconde tension de référence (Vref2), et
- la transmission d'un second signal de détection de court-circuit (DS2) au contrôleur lorsque la tension au niveau de la seconde extrémité de sortie est supérieure ou égale à la seconde tension de référence (Vref2) ; et

c) la détermination du fait d'arrêter ou non d'entraîner l'unité de génération de première source d'énergie (110) et l'unité de génération de seconde source d'énergie (120) selon le premier signal de détection de court-circuit et le second signal de détection de court-circuit.

8. Procédé selon la revendication 7, comprenant en outre l'arrêt de l'entraînement de l'unité de génération de première source d'énergie (110) et de l'unité de génération de seconde source d'énergie (120) après que le contrôleur (130) a reçu le premier signal de détection de court-circuit (Ds1) ou le second signal de détection de court-circuit (Ds2).

9. Procédé selon la revendication 7 ou 8, comprenant en outre l'affichage d'une image noire sur une unité d'affichage (20) pendant une période couvrant la première période (P1) et la seconde période (P2) lorsque l'unité d'affichage reçoit une première source d'énergie (ELVDD) et une seconde source d'énergie (ELVSS) de la part de l'unité de génération de première source d'énergie (110) et de l'unité de génération de seconde source d'énergie (120), respectivement.

10. Procédé selon la revendication 7, 8 ou 9, comprenant en outre :

la fourniture de la première source d'énergie (ELVDD) comme une tension de polarité positive ; et
la fourniture de la seconde source d'énergie (ELVSS) comme une tension à polarité négative.

FIG. 1

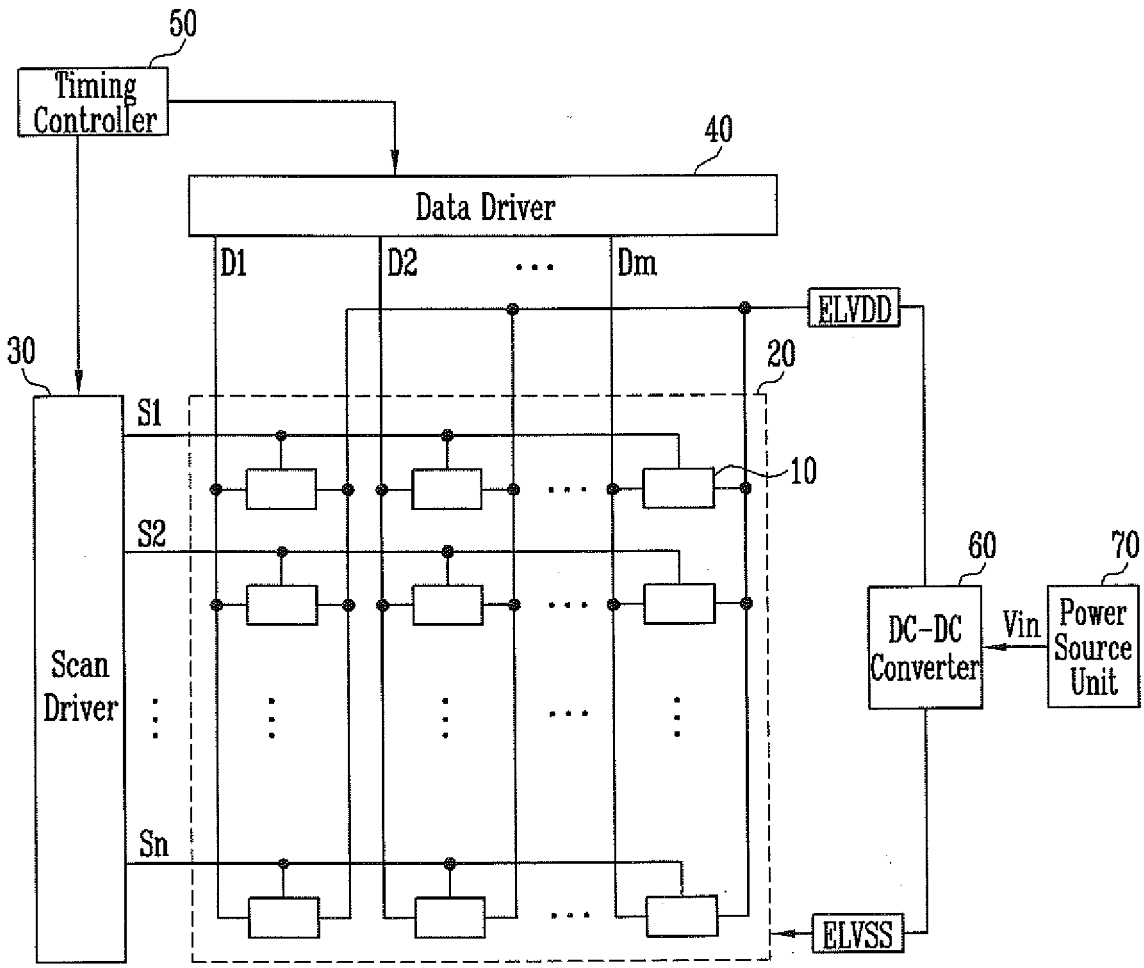

50
Timing Controller
40
Data Driver
D1
D2
Dm
ELVDD
30
20
S1
10
S2
60
70
Scan Driver
DC-DC Converter
Vin
Power Source Unit
Sn
ELVSS

FIG. 2

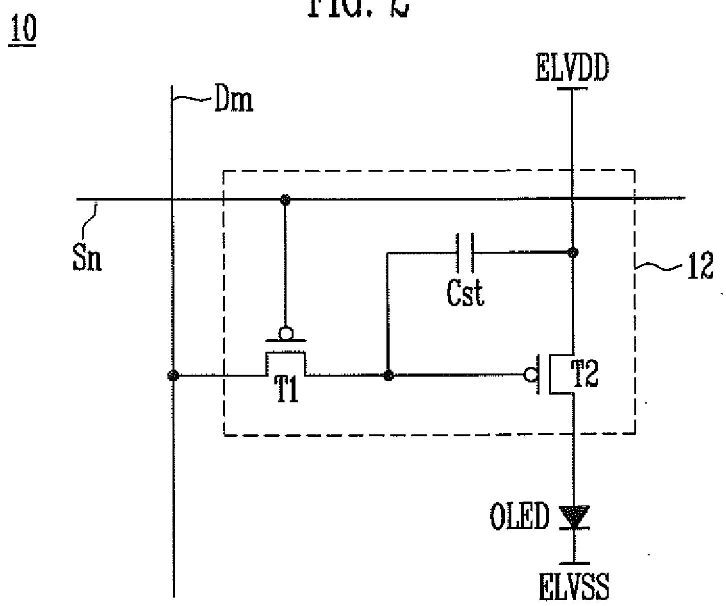

10
Dm
ELVDD
Sn
Cst
12
T1
T2
OLED
ELVSS

FIG. 3

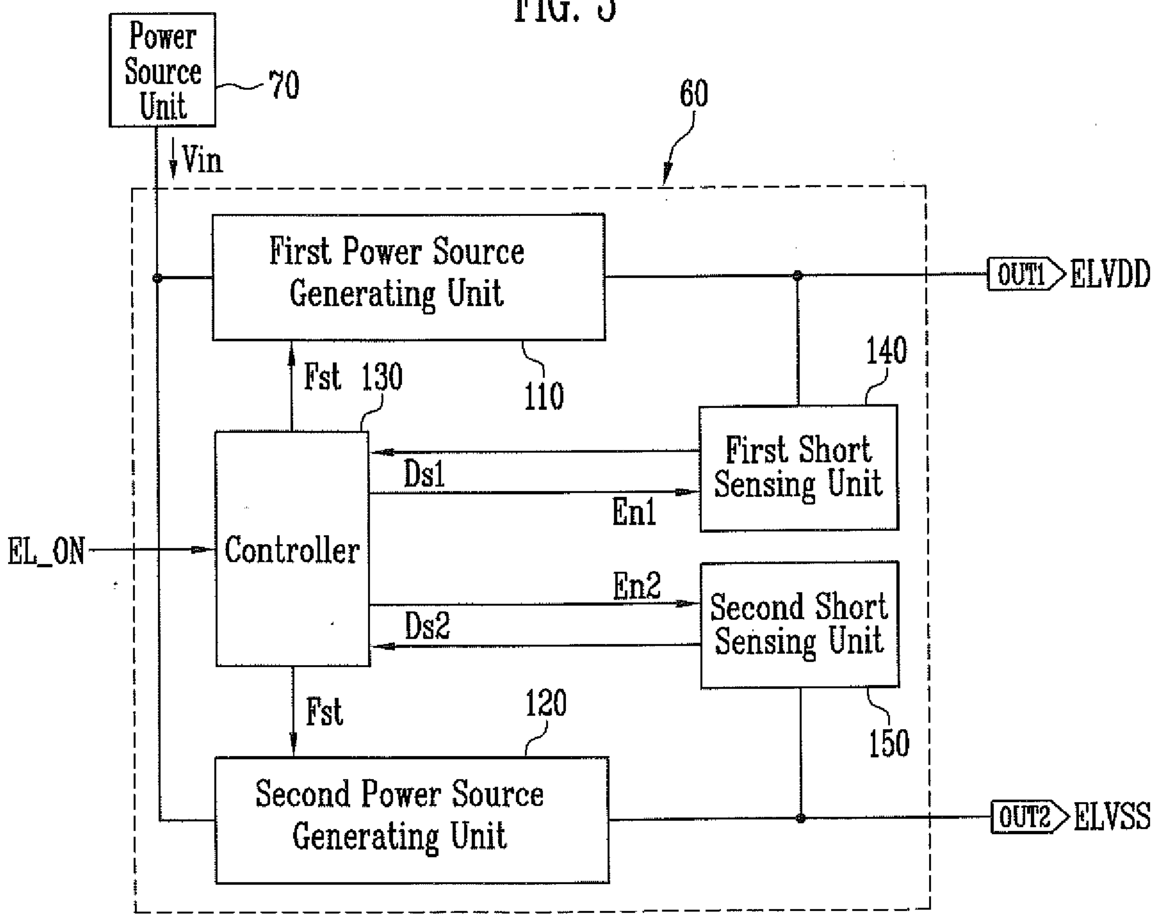

Power Source Unit
70
Vin
60
First Power Source Generating Unit
OUT1
ELVDD
Fst
130
110
140
Controller
Ds1
En1
First Short Sensing Unit
EL_ON
En2
Ds2
Second Short Sensing Unit
Fst
120
150
Second Power Source Generating Unit
OUT2
ELVSS

FIG. 4

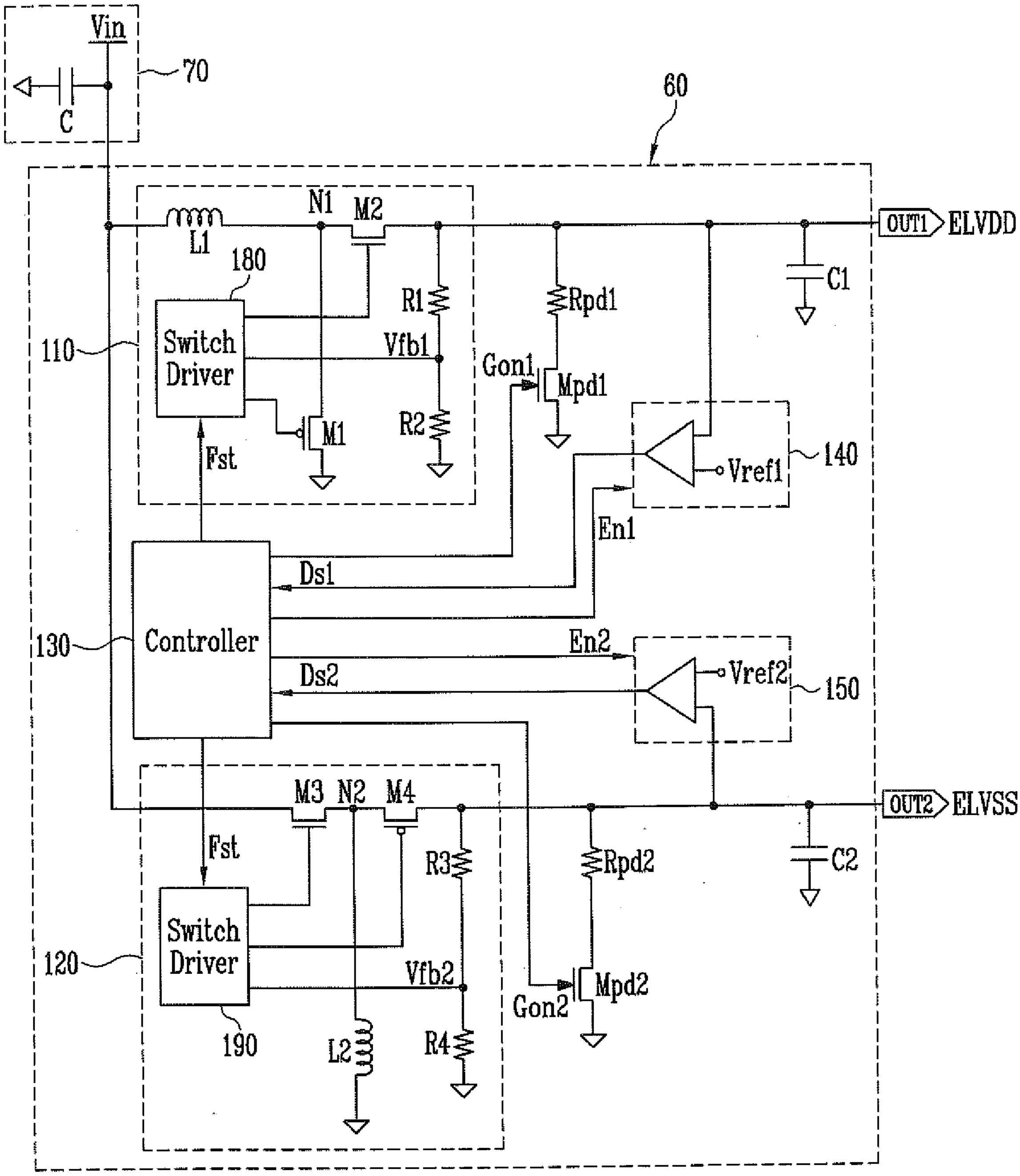

Vin
70
C
60
N1
M2
L1
180
OUT1
ELVDD
R1
Rpd1
C1
110
Switch Driver
Vfb1
Gon1
Mpd1
M1
R2
140
Vref1
Fst
En1
Ds1
130
Controller
En2
Ds2
Vref2
150
M3
N2
M4
OUT2
ELVSS
Fst
R3
Rpd2
C2
120
Switch Driver
Vfb2
Mpd2
Gon2
190
L2
R4

FIG. 5

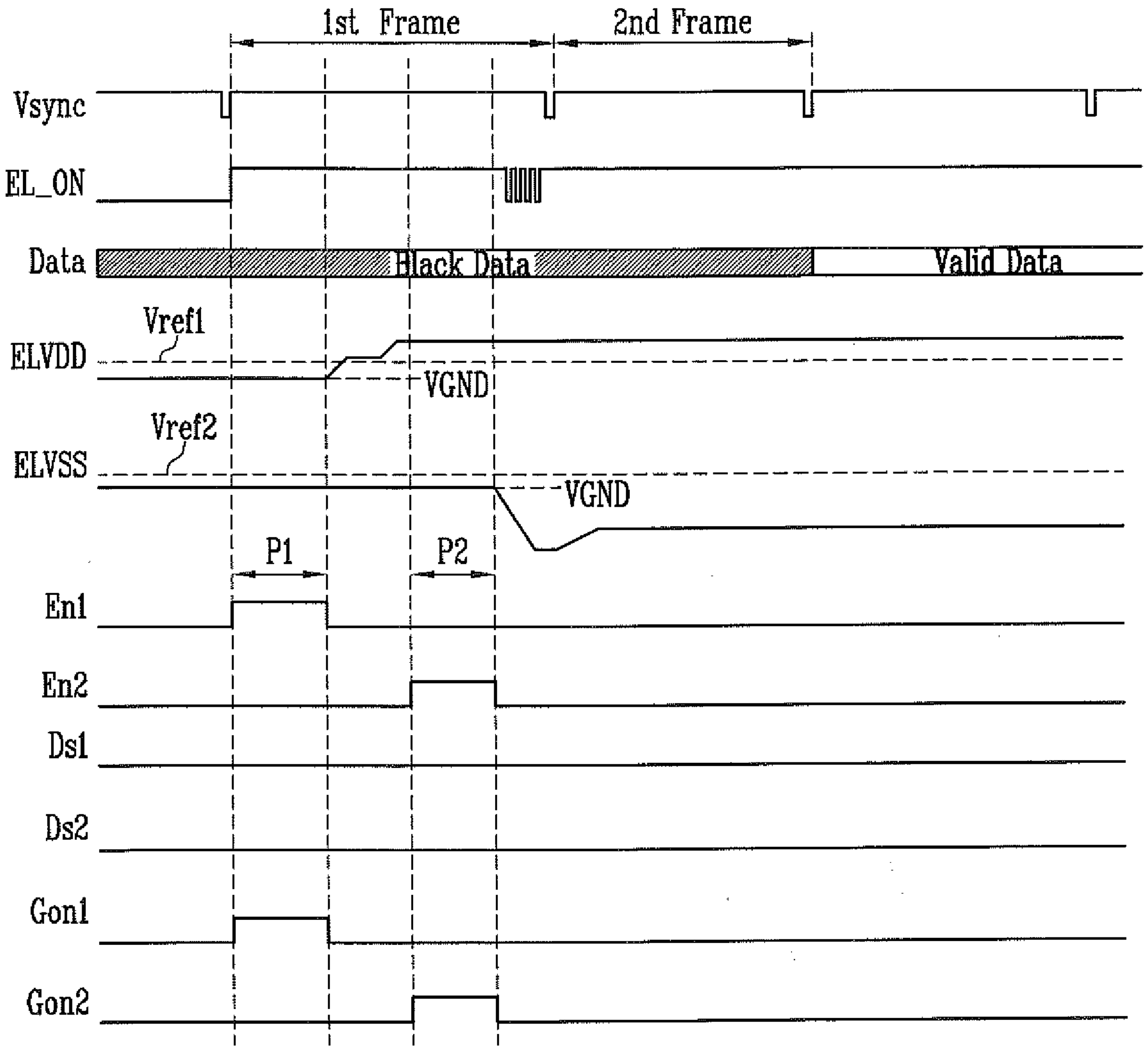

1st Frame
2nd Frame
Vsync
EL_ON
Data
Black Data
Valid Data
Vref1
ELVDD
VGND
Vref2
ELVSS
VGND
P1
P2
En1
En2
Ds1
Ds2
Gon1
Gon2

FIG. 6

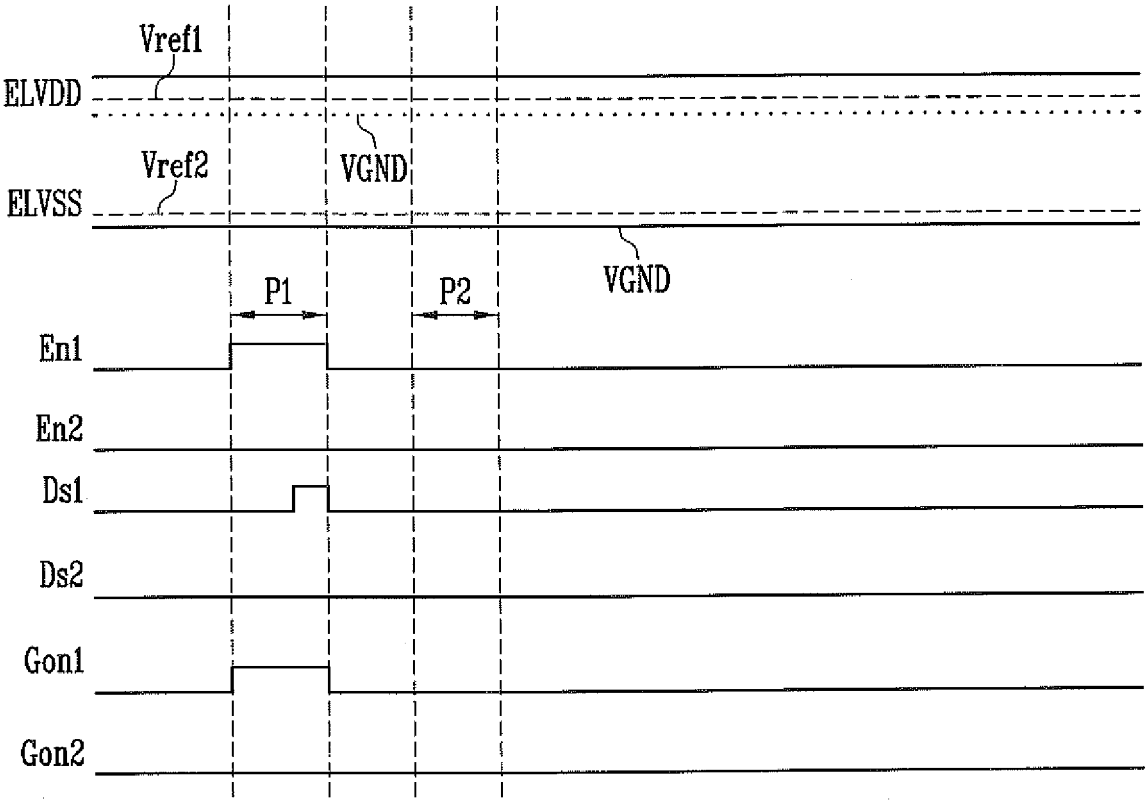
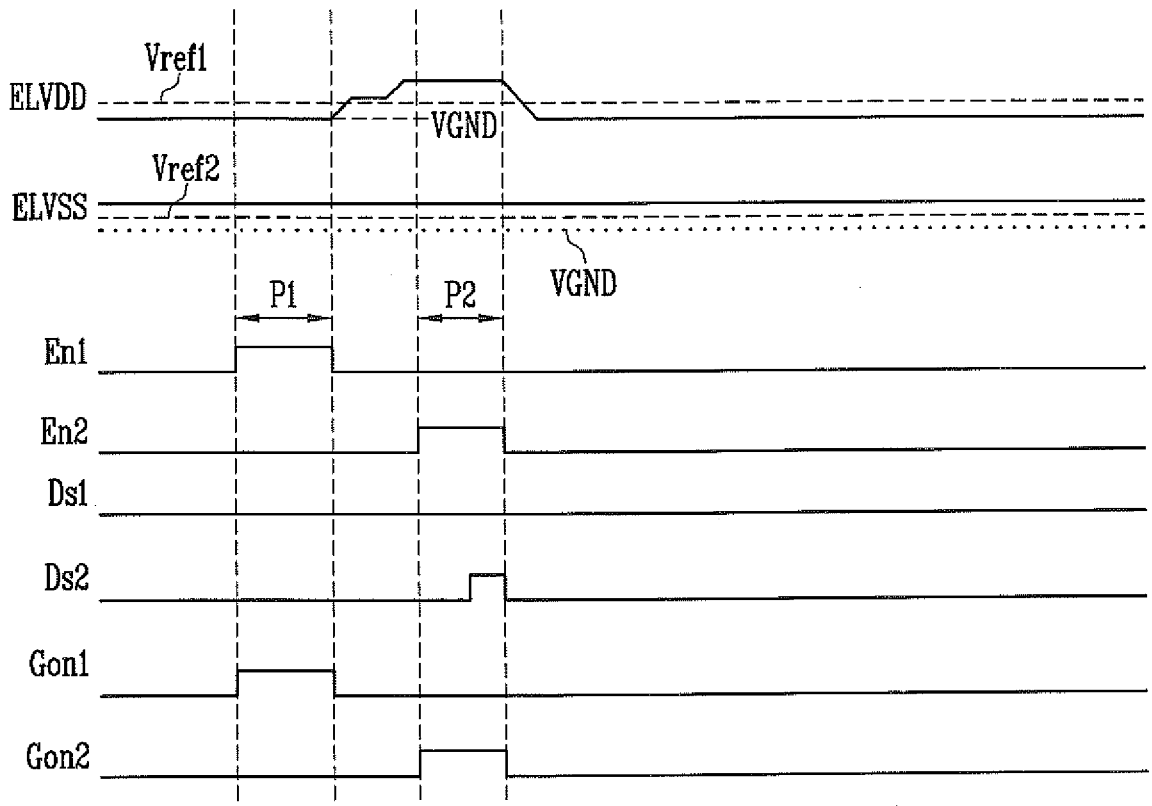

Vref1
ELVDD
Vref2
VGND
ELVSS
VGND
P1
P2
En1
En2
Ds1
Ds2
Gon1
Gon2

FIG. 7


Vref1
ELVDD
VGND
Vref2
ELVSS
VGND
P1
P2
En1
En2
Ds1
Ds2
Gon1
Gon2

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 2008174287 A **[0006]**
- US 2012032938 A **[0006]**

专利名称(译)	有机发光显示器及其驱动方法		
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摘要(译)

提供一种有机发光显示器。有机发光显示器包括显示单元，其耦合到扫描线和数据线并且包括被配置为接收第一和第二电源的像素，以及用于产生第一和第二电源的DC-DC转换器。 DC-DC转换器包括第一和第二电源产生单元，用于从输入电源产生第一和第二电源，并用于将第一和第二电源输出到第一和第二输出端，控制器，用于控制第一和第二输出端的驱动第二和第二电源产生单元，以及第一和第二短路检测单元，用于当第一和/或第二输出端的电压大于或等于相应的第一和第二参考电压时，向控制器输出第一和第二短路检测信号。

FIG. 1