US 20190013307A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2019/0013307 A1**

Wu et al. (43) **Pub. Date: Jan. 10, 2019**

(54) **MICROLED DISPLAY PANEL**

(71) Applicant: **Prilit Optronics, Inc.**, Tainan City (TW)

(72) Inventors: **Biing-Seng Wu**, Tainan City (TW); **Fa-Ming Chen**, Tainan City (TW)

(21) Appl. No.: **16/128,287**

(22) Filed: **Sep. 11, 2018**

Related U.S. Application Data

(63) Continuation-in-part of application No. 15/703,458, filed on Sep. 13, 2017.

(30) **Foreign Application Priority Data**

Sep. 26, 2016 (TW) 105131054
Jun. 7, 2017 (TW) 106118892

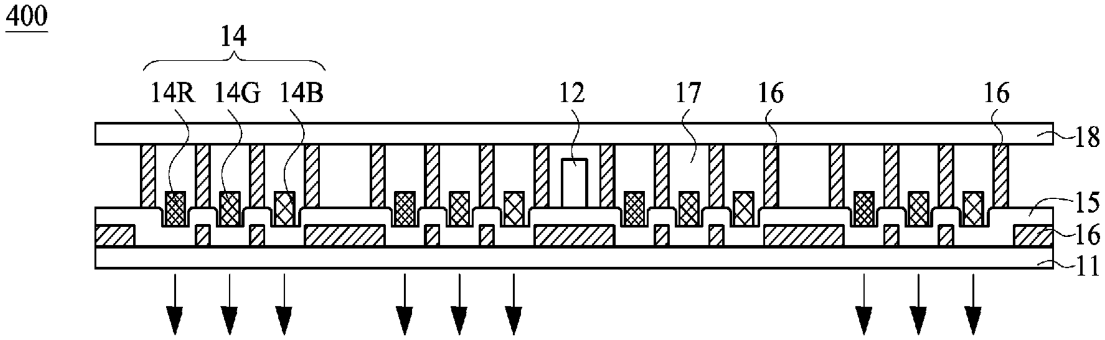
Publication Classification

(51) **Int. Cl.**
H01L 25/16 (2006.01)
H01L 25/075 (2006.01)
H01L 23/538 (2006.01)

(52) **U.S. Cl.**
CPC ***H01L 25/167*** (2013.01); *H01L 33/58* (2013.01); ***H01L 23/5387*** (2013.01); ***H01L 25/0753*** (2013.01)

(57) **ABSTRACT**

A micro light-emitting diode (microLED) display panel includes microLEDs; a substrate for supporting the microLEDs, the substrate being divided into a plurality of sub-regions; and a plurality of chip-on-film (COF) packages mounted on surfaces of the sub-regions respectively, a plurality of drivers being disposed on the COF packages respectively.



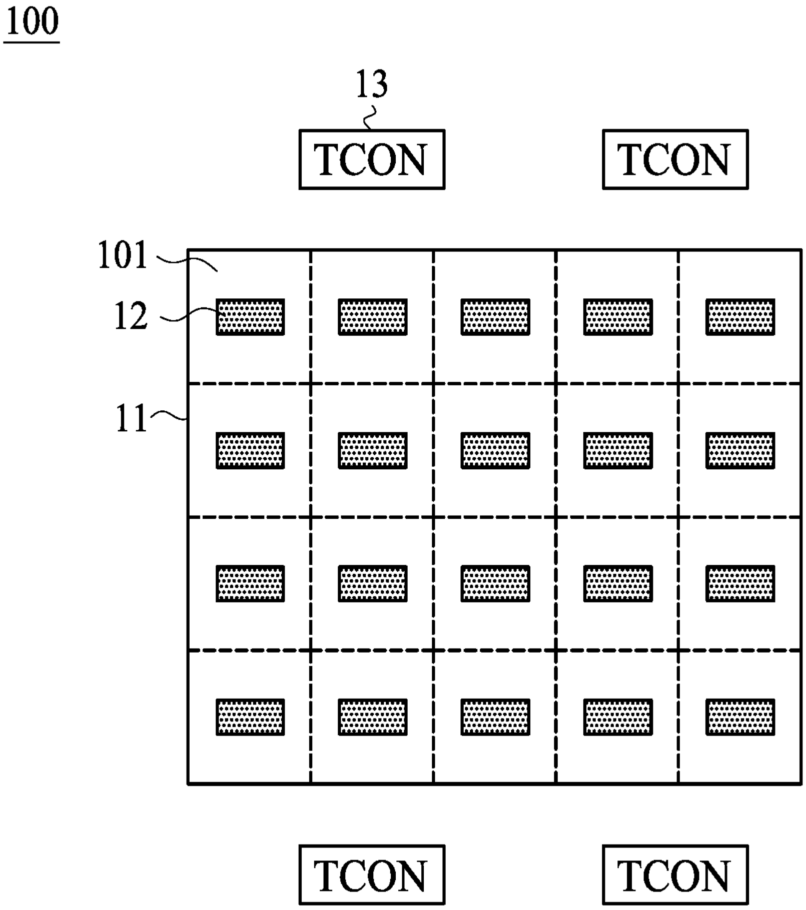


FIG. 1A

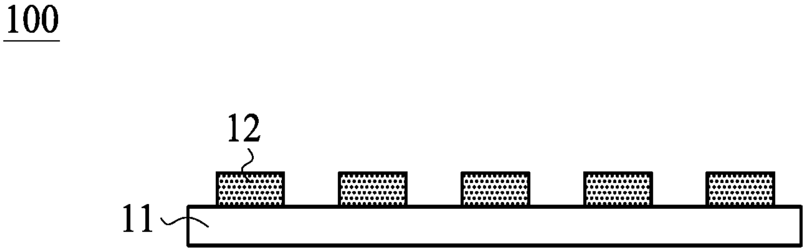


FIG. 1B

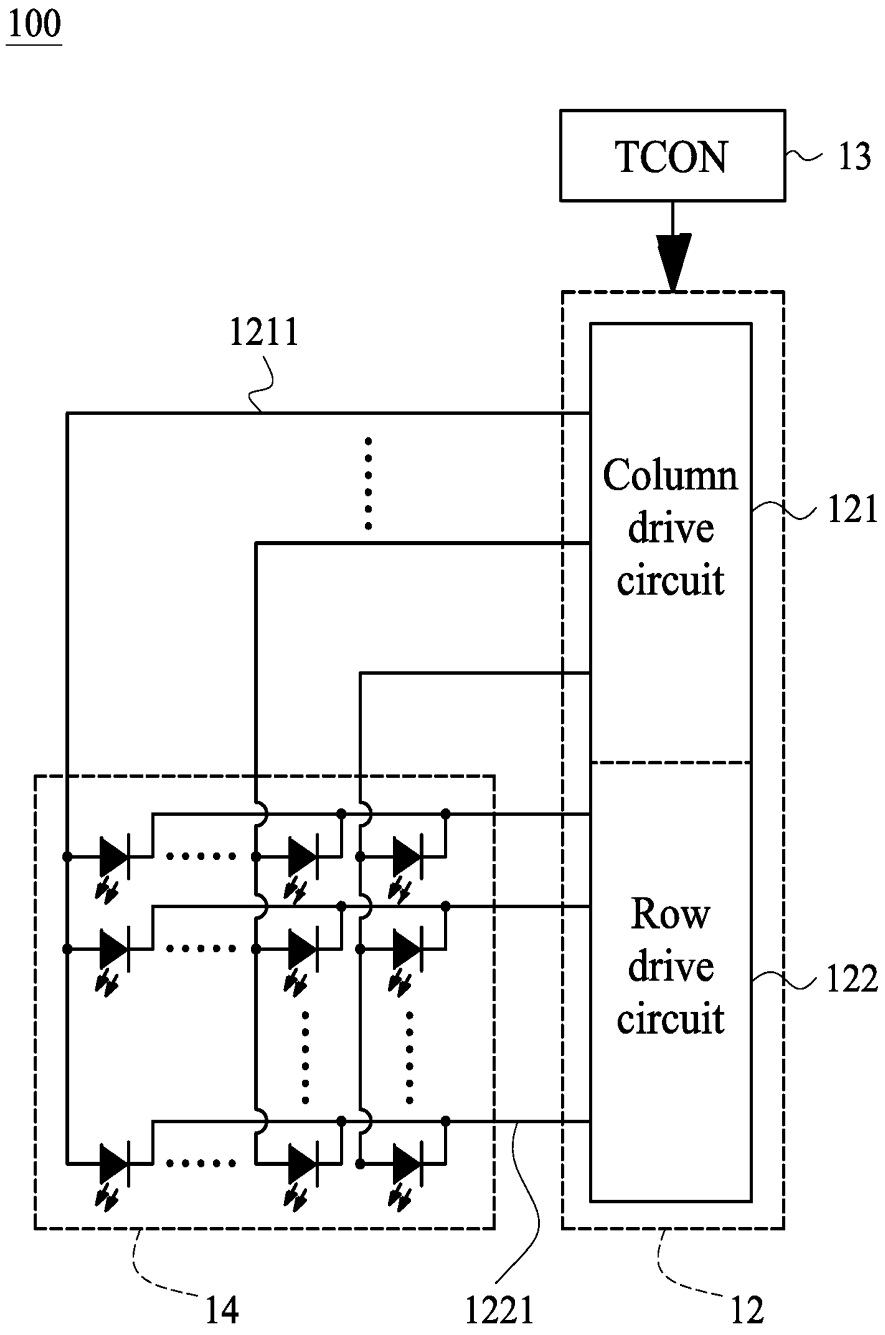

100
TCON
13
1211
Column drive circuit
121
Row drive circuit
122
14
1221
12

FIG. 2

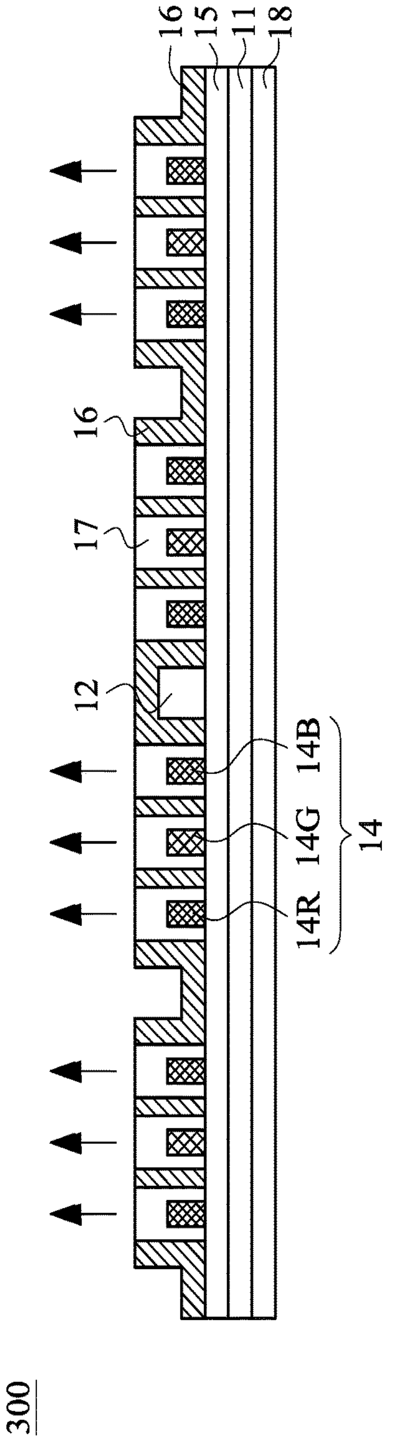

16
15
11
18
16
17
12
14B
14G
14R
14
300

FIG. 3

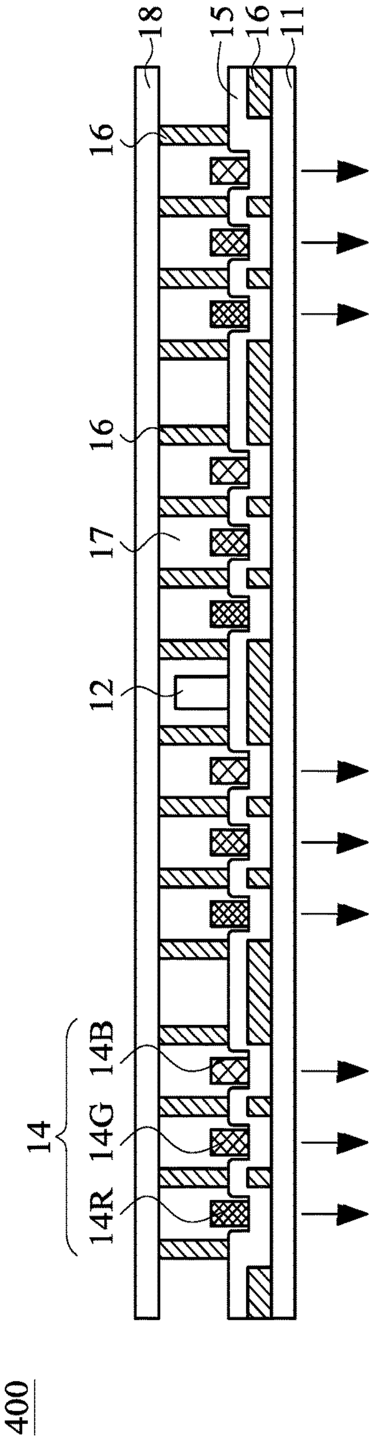

18
15
16
11
16
16
17
12
14
14R
14G
14B
400

FIG. 4

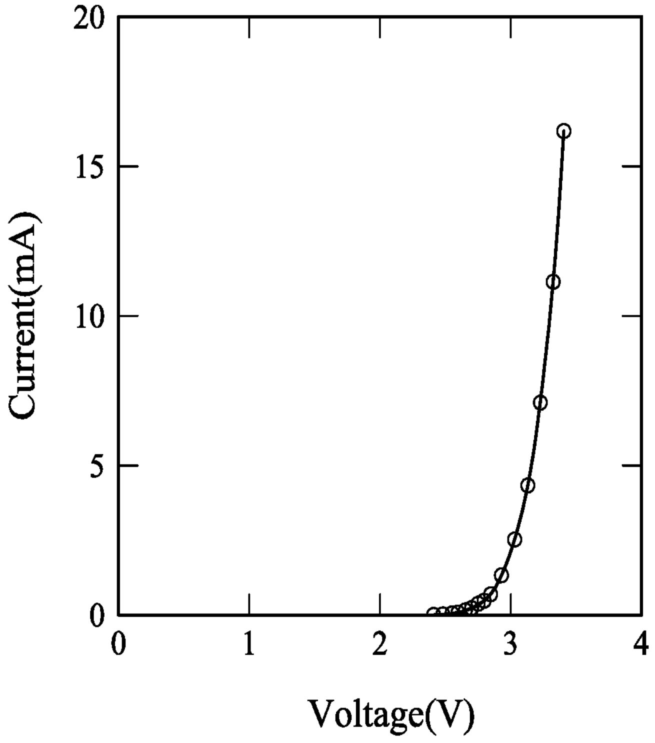


FIG. 5

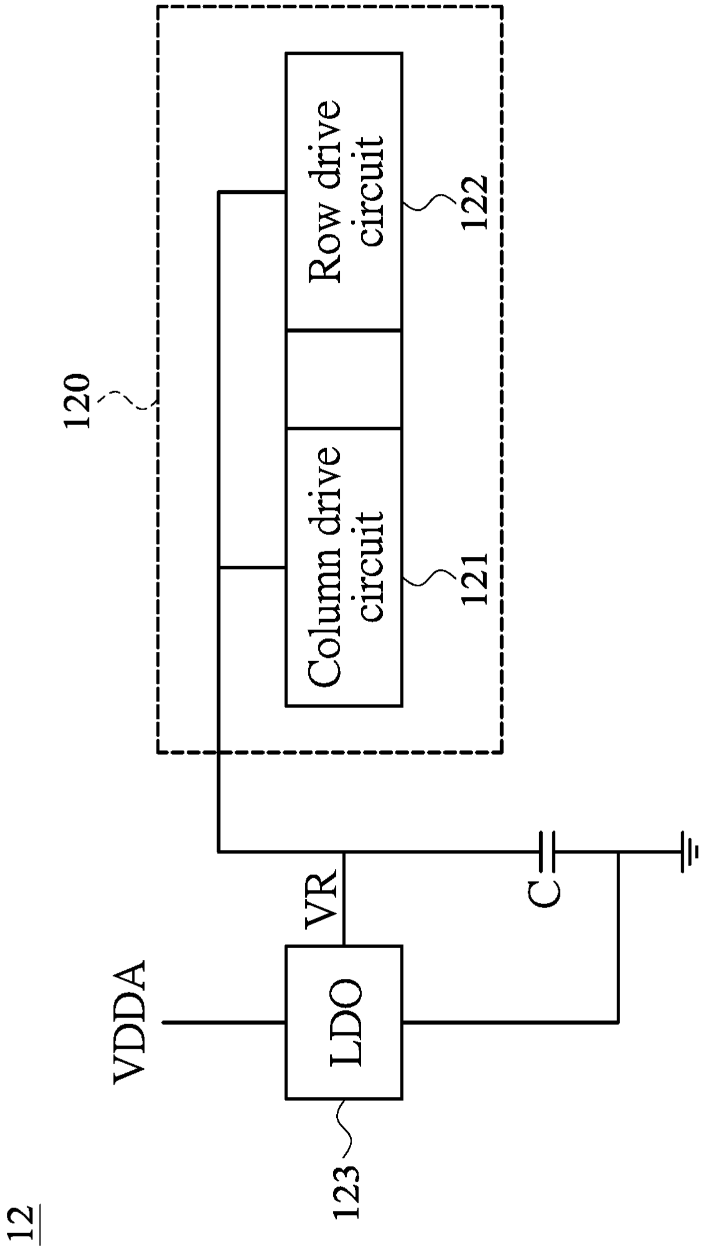

12
120
Row drive circuit
122
Column drive circuit
121
VDDA
LDO
123
VR
C

FIG. 6

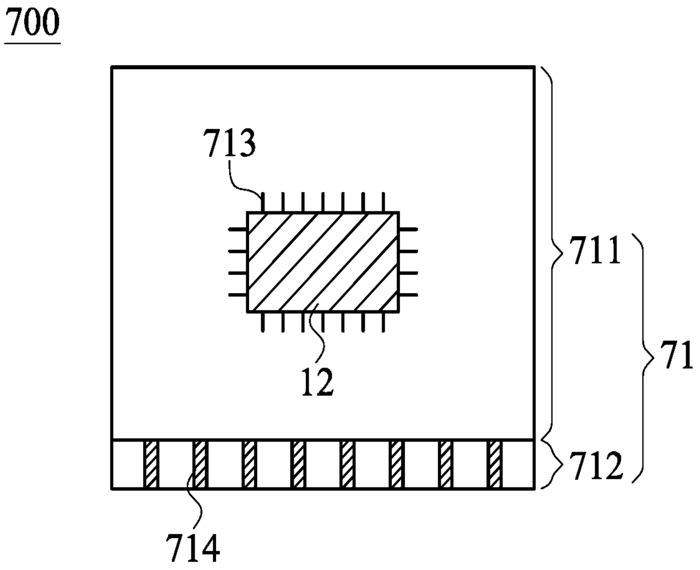


FIG. 7A

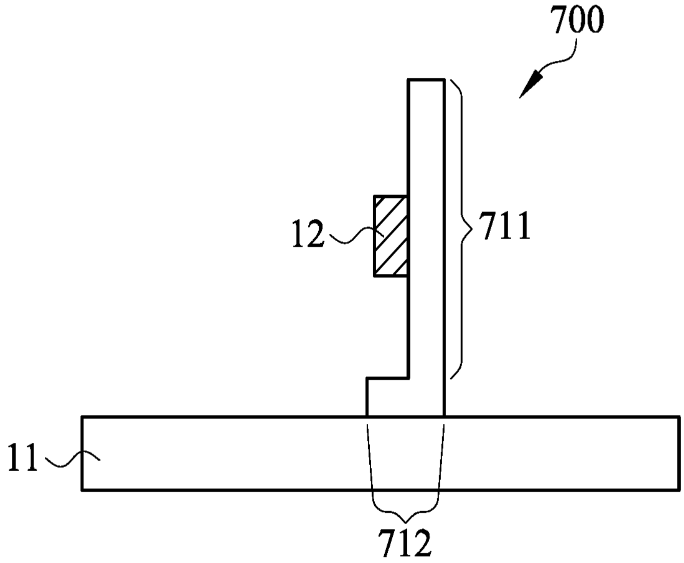


FIG. 7B

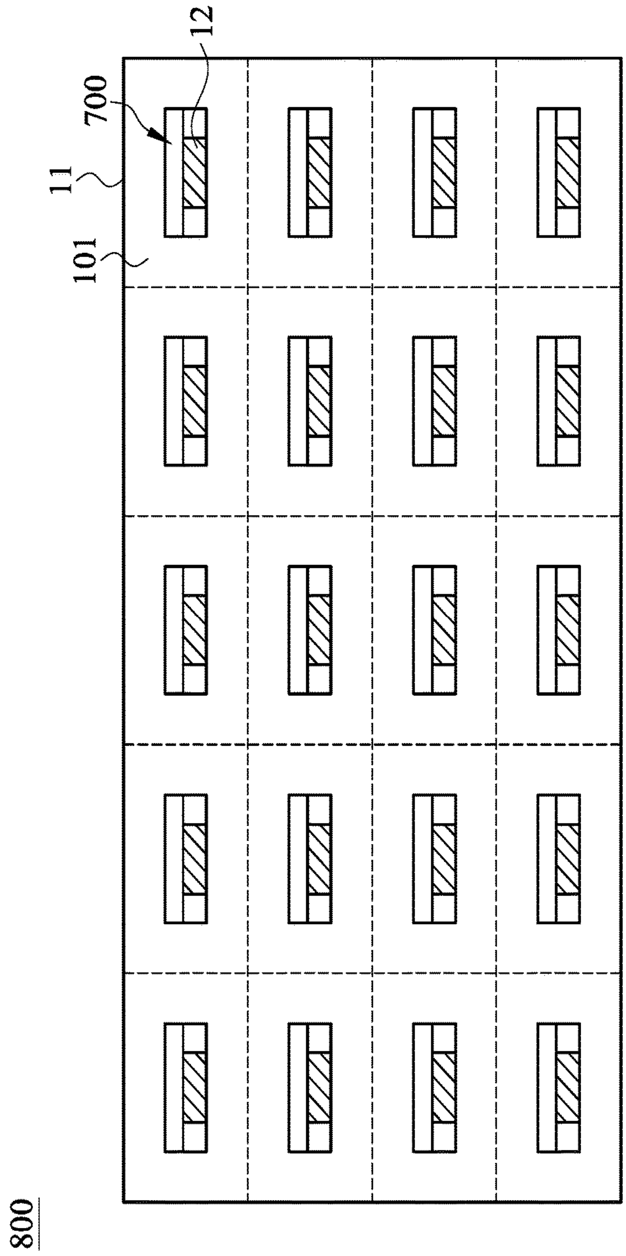


FIG. 8A

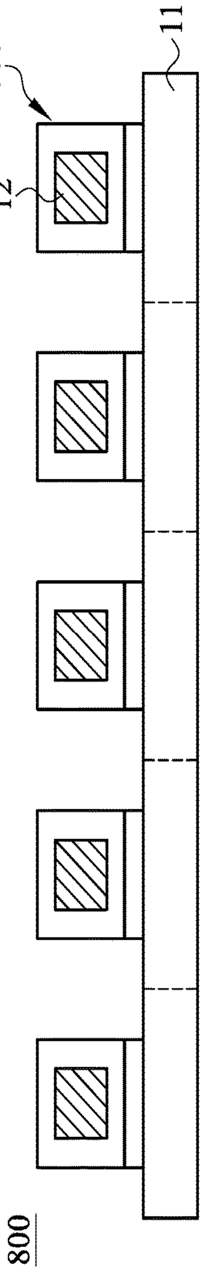


FIG. 8B

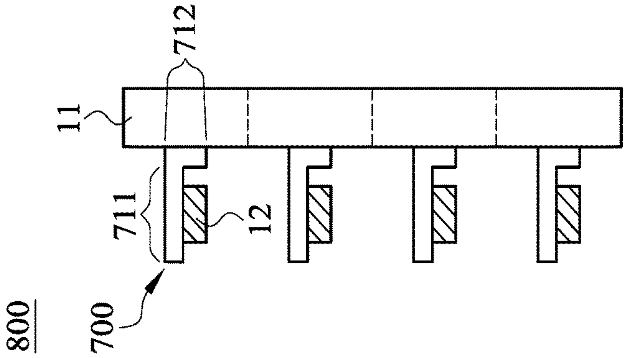


FIG. 8C

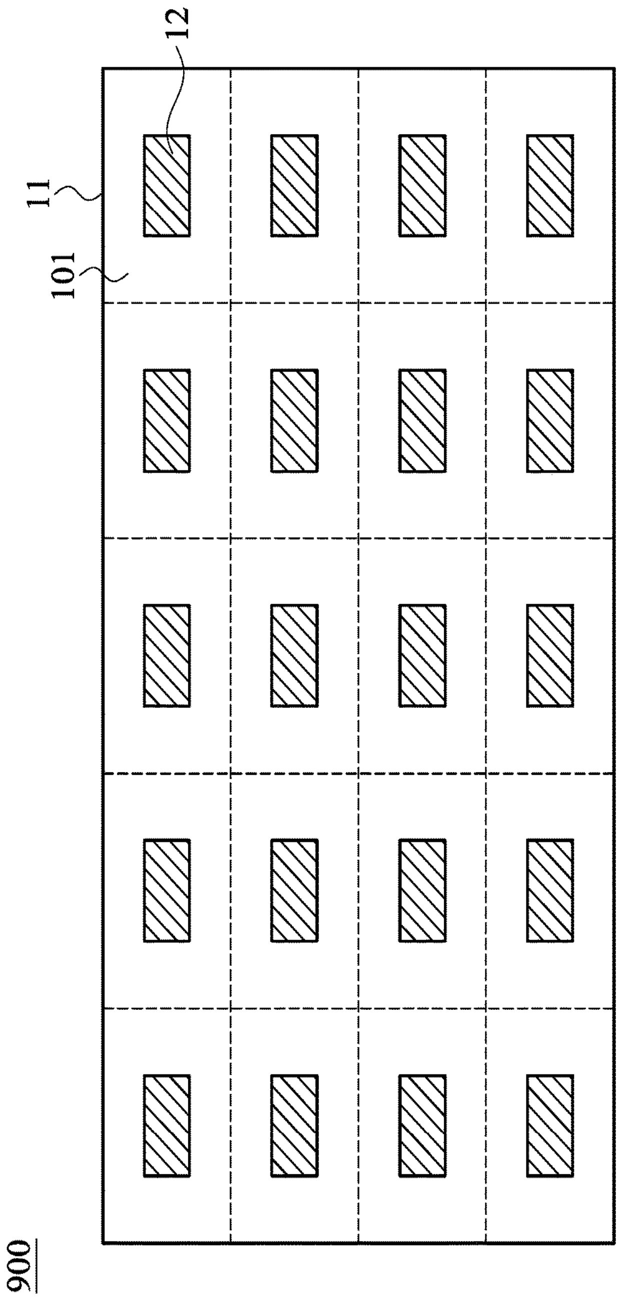


FIG. 9A

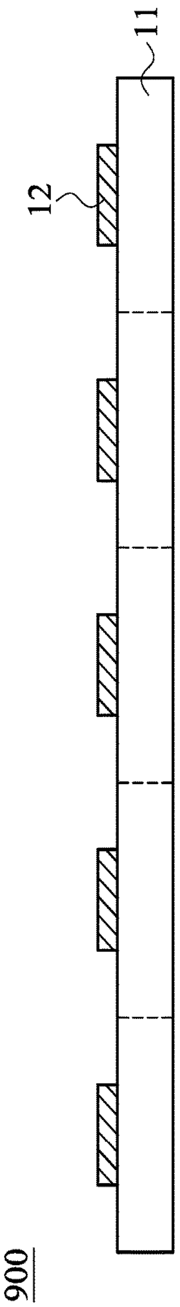


FIG. 9B

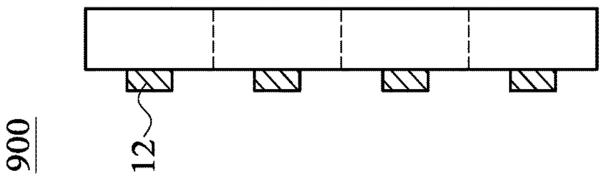


FIG. 9C

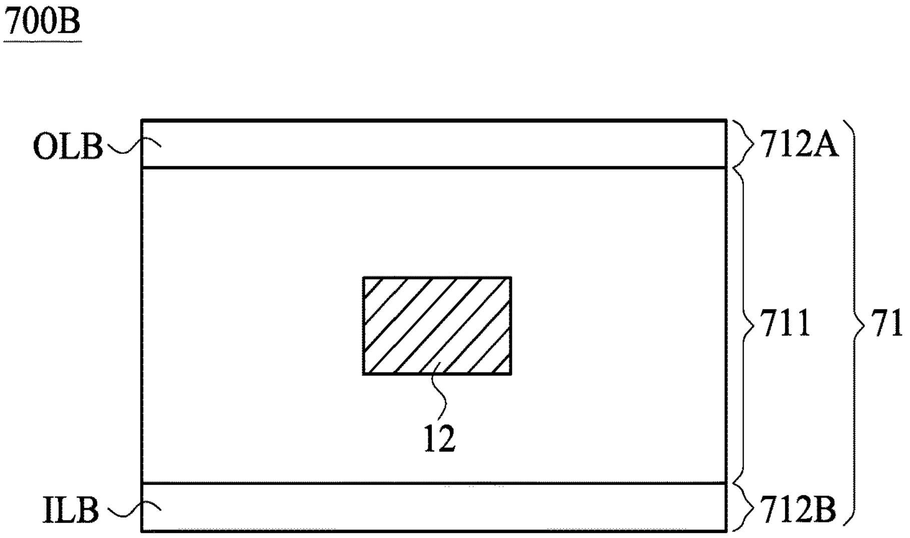


FIG. 10A

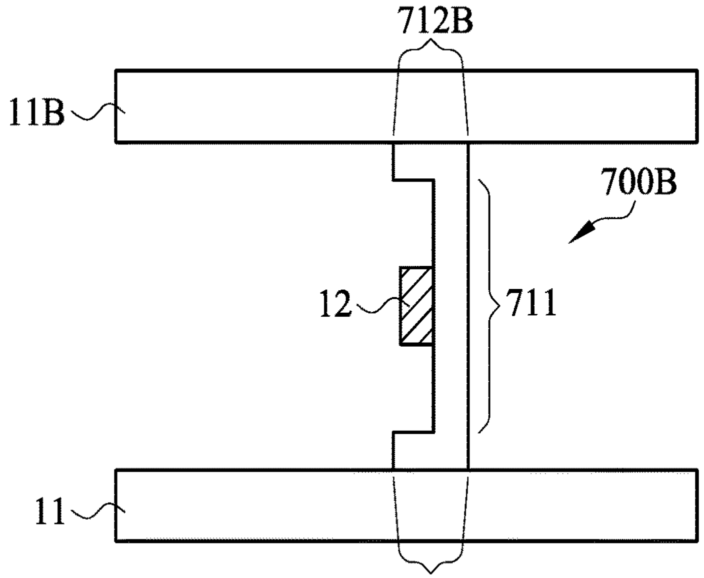


FIG. 10B

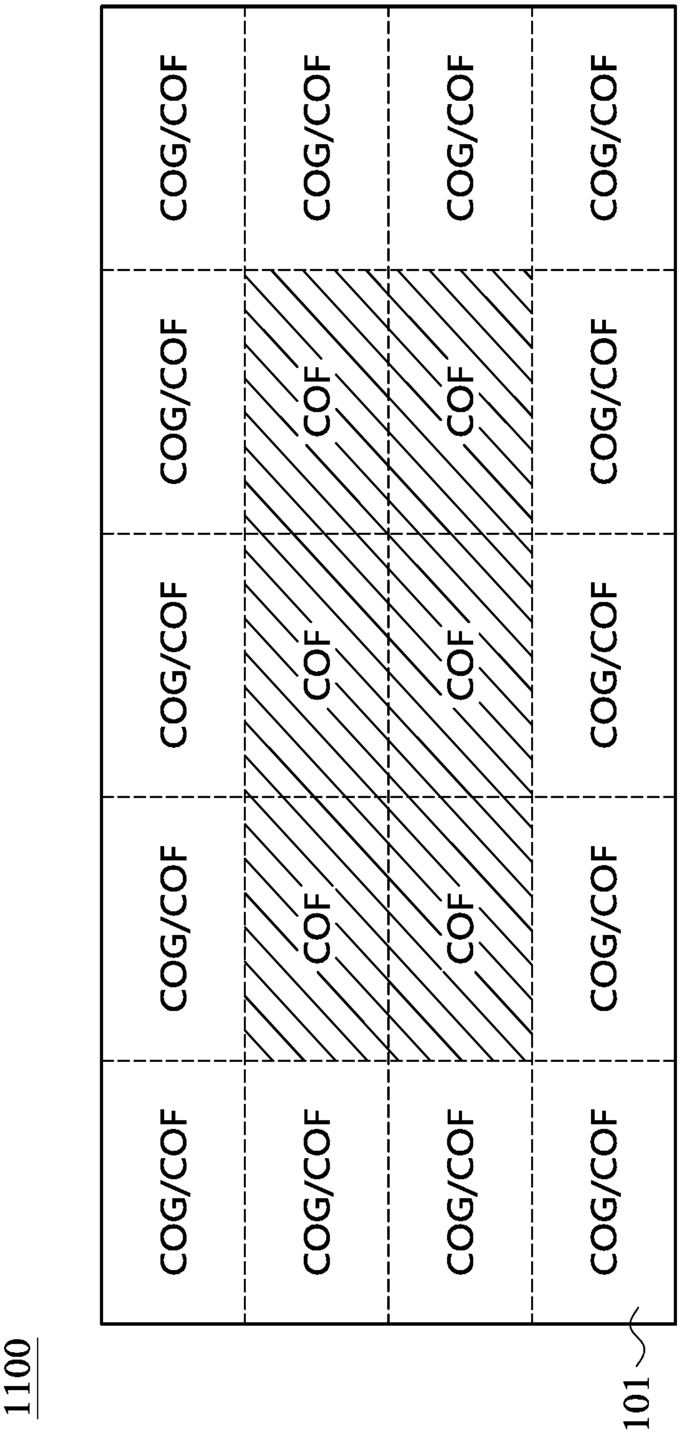

1100
COG/COF
COG/COF
COG/COF
COG/COF
COG/COF
COG/COF
COF
COF
COF
COG/COF
COG/COF
COF
COF
COF
COG/COF
COG/COF
COG/COF
COG/COF
COG/COF
COG/COF
101

FIG. 11

MICROLED DISPLAY PANEL

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part application of US application Ser. No. 15/703,458, filed on Sep. 13, 2017, which claims priority to Taiwan Application No. 105131054, filed on Sep. 26, 2016, and Taiwan Application No. 106118892, filed on Jun. 7, 2017. The entire contents of all of the foregoing applications are herein expressly incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention generally relates to a display panel, and more particularly to a microLED display panel.

2. Description of Related Art

[0003] A micro light-emitting diode (microLED, mLED or μLED) display panel is one of flat display panels, which is composed of microscopic microLEDs each of a size of 1-10 micrometers. Compared to conventional liquid crystal display panels, the microLED display panels offer better contrast, response times and energy efficiency. Although both organic light-emitting diodes (OLEDs) and microLEDs possess good energy efficiency, the microLEDs, based on group III/V (e.g., GaN) LED technology, offer higher brightness, higher luminous efficacy and longer lifespan than the OLEDs.

[0004] Active matrix using thin-film transistors (TFT) may be used in companion with microLEDs to drive a display panel. However, microLED is made by flip chip technology, while TFT is made by complementary metal-oxide-semiconductor (CMOS) process which is more complex than flip chip technology. These two distinct technologies may cause thermal mismatch. A drive current of the microLED is small in gray display, which may be significantly affected by leakage current.

[0005] Passive matrix is another driving method performed by a row drive circuit and a column drive circuit, which are disposed on the periphery of a display panel. When the size or the resolution of the display panel increases, output loading and delay of the drive circuits increase accordingly, causing the display panel to malfunction. Therefore, passive matrix is not suitable for large-size microLED display panels.

[0006] A need has thus arisen to propose a novel microLED display panel, particularly a large-size or high-resolution display panel, which is capable of maintaining advantages of microLEDs and overcoming disadvantages of driving schemes.

SUMMARY OF THE INVENTION

[0007] In view of the foregoing, it is an object of the embodiment of the present invention to provide a microLED display panel capable of effectively reducing loading of drivers, thereby making whole large-size high-resolution microLED display panel feasible.

[0008] According to one embodiment, a micro light-emitting diode (microLED) display panel includes microLEDs, a substrate and chip-on-film (COF) packages. The substrate supports the microLEDs and is divided into a plurality of sub-regions. The COF packages are mounted on surfaces of the sub-regions respectively, and a plurality of drivers are disposed on the COF packages respectively.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. **1**A shows a top view illustrated of a microLED display panel according to one embodiment of the present invention;

[0010] FIG. **1**B shows a side view illustrated of the microLED display panel of FIG. **1**A;

[0011] FIG. **2** shows a schematic diagram illustrated of passive driving the microLED display panel;

[0012] FIG. **3** shows a cross-sectional view illustrated of a frontside illuminating microLED display panel according to a first specific embodiment of the present invention;

[0013] FIG. **4** shows a cross-sectional view illustrated of a backside illuminating microLED display panel according to a second specific embodiment of the present invention;

[0014] FIG. **5** shows an exemplary current-voltage curve of a microLED;

[0015] FIG. **6** shows a system block diagram illustrated of a driver according to one embodiment of the present invention;

[0016] FIG. **7**A shows a schematic diagram illustrating a chip-on-film (COF) package for a driver according to one embodiment of the present invention;

[0017] FIG. **7**B shows a side view illustrating the COF package of FIG. **7**A mounted on a substrate of a microLED display panel according to one embodiment of the present invention;

[0018] FIG. **8**A to FIG. **8**C schematically show a top view, a front side view and a right-hand side view, respectively, illustrating a microLED display panel with COF packages mounted thereon;

[0019] FIG. **9**A to FIG. **9**C schematically show a top view, a front side view and a right-hand side view, respectively, illustrating a microLED display panel with drivers mounted thereon by COG technique;

[0020] FIG. **10**A shows a schematic diagram illustrating a chip-on-film (COF) package for a driver according to another embodiment of the present invention;

[0021] FIG. **10**B shows a side view illustrating the COF package of FIG. **10**A mounted on a substrate and a printed circuit board of a microLED display panel according to one embodiment of the present invention; and

[0022] FIG. **11** schematically shows a top view illustrating a microLED display panel.

DETAILED DESCRIPTION OF THE INVENTION

[0023] FIG. **1**A shows a top view illustrated of a micro light-emitting diode (microLED) display panel **100** according to one embodiment of the present invention, and FIG. **1**B shows a side view illustrated of the microLED display panel **100** of FIG. **1**A. The microLED display panel of the embodiment is preferably adaptable to a large-size and high-resolution (e.g., 3840RGB×2160) display panel. In the specification, the size range of the microLED is between 1 and 10 micrometers. However, the size of the microLED may be even smaller due to specific applications or technological advance. In the specification, "large-size" display panel is currently and commonly referred to 10 inches or above display panel. However, "large-size" display panel may be referred to other display size due to specific applications or technological advance. In the specification, “high-resolution” display panel is currently and commonly referred to a display panel with 1080 or above scan lines. However, “high-resolution” display panel may be referred to other amount of scan lines due to specific applications or technological advance.

[0024] In the embodiment, the microLED display panel **100** may include a substrate **11** for supporting a plurality of microLEDs (not shown). The substrate **11** may be preferably made of an insulating material (e.g., glass or Acrylic) or other materials suitable for supporting the microLEDs.

[0025] According to one aspect of the embodiment, a surface of the substrate **11** is divided into a plurality of sub-regions **101**. It is noted that the divided sub-regions **101** are not physically cut through, and the substrate **11** is not made by integrating the sub-regions **101**. In other words, the substrate **11** or the microLED display panel **100** is a single or whole entity, or an uncut entity. FIG. **1**A shows a simplified example of how the substrate **11** is divided into sub-regions **101**. Take a microLED display panel **100** with resolution 3840RGB×2160 as an example, the substrate **11** may be divided into 80×54 sub-regions **101**, each having resolution 48RGB×40. Nevertheless, this microLED display panel **100** may be divided into more or less sub-regions **101**.

[0026] According to another aspect of the embodiment, the microLED display panel **100** may include a plurality of drivers **12**, which are correspondingly disposed on (e.g., top) surfaces of the sub-regions **101** respectively. The driver **12** as exemplified in FIG. **1**A may, but not necessarily, be disposed in the center of the surface of corresponding sub-region **101**. Each sub-region **101** as exemplified in FIG. **1**A has one corresponding driver **12**. However, in other embodiments, each sub-region **101** may have plural corresponding drivers **12**. The driver **12** of the embodiment may be manufactured as an integrated circuit or chip, which is then bonded on the surface of the sub-region **101**, for example, by surface-mount technology (SMT) such as chip-on-glass (COG) or flip chip. In one example, the drivers **12** and the microLEDs are disposed on the same surface of the substrate **11**.

[0027] The microLED display panel **100** of the embodiment may further include a plurality of timing controllers (TCON) **13**, which are electrically connected with the substrate **11**, for example, via a flexible printed circuit board (FPCB), and are further electrically connected with corresponding drivers **12**, for example, via signal traces (not shown) disposed on the substrate **11**. In the embodiment, one timing controller **13** may be electrically connected with at least two drivers **12**. In other words, the amount of the timing controllers **13** may be less than the amount of the drivers **12**. The timing controller **13** may be electrically connected directly with corresponding drivers **12** via signal traces. Alternatively, the timing controller **13** may be electrically connected to one driver **12** via signal traces, and, after signal buffering, then be electrically connected to another driver **12** via signal traces.

[0028] According to a further aspect of the embodiment, the microLED display panel **100** may adopt passive driving method for driving the microLEDs. FIG. **2** shows a schematic diagram illustrated of passive driving the microLED display panel **100**. The timing controller **13** transmits timing control signals and data signals to the driver **12**. The driver **12** may include a column drive circuit **121** and a row (or scan) drive circuit **122**. The column drive circuit **121** transmits column drive signals to first electrodes (e.g., anodes) of the microLEDs **14** on the same columns via column conductive wires **1211**, and the row drive circuit **122** transmits row drive signals to second electrodes (e.g., cathodes) of the microLEDs **14** on the same rows via row conductive wires **1221**. In the embodiment, the column drive circuit **121** and the row drive circuit **122** are made in a single integrated circuit.

[0029] According to the embodiment discussed above, the substrate **11** of the microLED display panel **100** is divided into sub-regions **101**, each of which has a corresponding driver **12**. Therefore, loading of the column drive circuit **121** and the row drive circuit **122** may be effectively reduced, thereby making whole large-size high-resolution microLED display panel feasible. Moreover, the microLED display panel **100** of the embodiment adopts a passive driving method (instead of active driving method using thin-film transistors) for driving the microLEDs **14**, thereby simplifying the process of making display panels, reducing turn-on time of the microLEDs **14**, increasing drive current, and effectively minimizing effect on gray display due to leakage current.

[0030] FIG. **3** shows a cross-sectional view illustrated of a frontside illuminating microLED display panel **300** according to a first specific embodiment of the present invention. In the embodiment, the microLEDs **14** and the driver **12** are disposed above a top surface of the substrate **11**. Light generated by the microLEDs **14** primarily emits upward (i.e., frontside illuminating) from the top surface of the substrate **11** as indicated by arrows.

[0031] As exemplified in FIG. **3**, each pixel may include a red microLED **14**R, a green microLED **14**G and a blue microLED **14**B. A trace layer **15** is disposed between a (e.g., top) surface of the substrate **11** and the microLEDs **14** and the driver **12**. The trace layer **15** is configured to electrically connect the driver **12**, the microLEDs **14** and the timing controller **13**. A light blocking layer **16** is disposed between adjacent pixels and above the trace layer **15**. The light blocking layer **16** of the embodiment may be made of black matrix (BM) or other materials suitable for blocking light. In one embodiment, the light blocking layer **16** may be optionally disposed among the red microLED **14**R, the green microLED **14**G and the blue microLED **14**B of the same pixel.

[0032] A light guide layer **17** may be disposed above the red microLED **14**R, the green microLED **14**G and the blue microLED **14**B. The frontside illuminating microLED display panel **300** of the embodiment may further include a cover plate **18** disposed on a bottom surface of the substrate **11**. The cover plate **18** of the embodiment may be made of an opaque material.

[0033] FIG. **4** shows a cross-sectional view illustrated of a backside illuminating microLED display panel **400** according to a second specific embodiment of the present invention. In the embodiment, the microLEDs **14** and the driver **12** are disposed above a top surface of the substrate **11**. Light generated by the microLEDs **14** primarily emits downward (i.e., backside illuminating) from the bottom surface of the substrate **11** as indicated by arrows.

[0034] As exemplified in FIG. **4**, each pixel may include a red microLED **14**R, a green microLED **14**G and a blue microLED **14**B. A light blocking layer **16** is disposed between adjacent pixels and above a (e.g., top) surface of the substrate **11**. The light blocking layer **16** of the embodiment may be made of black matrix (BM) or other materials suitable for blocking light. A trace layer **15** is disposed above the light blocking layer **16** for electrically connecting the driver **12**, the microLEDs **14** and the timing controller **13**. In one embodiment, the light blocking layer **16** may be optionally disposed among the red microLED **14**R, the green microLED **14**G and the blue microLED **14**B of the same pixel.

[0035] A light guide layer **17** may be disposed above the red microLED **14**R, the green microLED **14**G and the blue microLED **14**B. The backside illuminating microLED display panel **400** of the embodiment may further include a cover plate **18** disposed above the driver **12**, the trace layer **15**, the light blocking layer **16** and the light guide layer **17**. The cover plate **18** of the embodiment may be made of an opaque material.

[0036] FIG. **5** shows an exemplary current-voltage curve of a microLED **14**. When an operating voltage is greater than a turn-on voltage Vf (e.g., 3 volts), a current greater than a predetermined value may be obtained to normally operate and turn on the micro-LED **14**. For the microLED display panel **100** shown in FIG. **1**A, a system power for the drivers **12** is VDDA. However, a voltage drop ΔV exists in the center of the microLED display panel **100** due to impedance in the conductive wire for transferring the power. Accordingly, the drivers **12** disposed in the center of the microLED display panel **100** in fact receive power of VDDA−ΔV, although the drivers **12** disposed on the periphery of the microLED display panel **100** receive power of VDDA. For example, assume the voltage drop ΔV is 1 volt and the turn-on voltage Vf is 3 volts. The condition under which the drivers **12** may be normally operated is VDDA−1>3, that is, VDDA>4 (e.g., VDDA of 5 volts is required). In this situation, the drivers **12** may be made by low-voltage metal-oxide-semiconductor (MOS) process.

[0037] Nevertheless, as the amount of microLEDs **14** increases, consumed current then increases and a voltage drop ΔV significantly increases accordingly (e.g., increases to 4 volts). The condition under which the drivers **12** may be normally operated is VDDA−4>3, that is, VDDA>7 (e.g., VDDA of 8 volts is required). In this situation, the drivers **12** should be made by high-voltage metal-oxide-semiconductor (MOS) process, which results in larger circuit area that is unfavorable for making large-size high-resolution (e.g., 3840RGB×2160) display panel. For overcoming the problems, an architecture of a novel driver **12** is proposed.

[0038] FIG. **6** shows a system block diagram illustrated of a driver **12** according to one embodiment of the present invention. In the embodiment, the driver **12** may include a low-dropout (LDO) regulator **123** and a drive circuit **120**. The LDO regulator **123** receives a system power VDDA, according to which a regulated power VR (e.g., 5 volts) is generated and provided as a power for the drive circuit **120**. The LDO regulator **123** of the embodiment may be implemented according to circuit design of conventional LDO regulators, and details of which are thus omitted for brevity. The drive circuit **120** of the embodiment may include a column drive circuit **121** and a row drive circuit **122**. The LDO regulator **123** is one of direct-current (DC) linear regulators, which are configured to generate a regulated power VR substantially equal to the system power VDDA. Compared to a switching regulator, the LDO regulator **123** occupies less circuit area with simpler circuit design and without switching noise. In the embodiment, a smoothing capacitor C may be interposed between the regulated power VR and earth, thereby filtering out high-frequency noise. The smoothing capacitor C may be formed with a metal layer process (instead of extra process) commonly used in display panel manufacturing.

[0039] According to the driver **12** of the embodiment as discussed above, only the LDO regulator **123** should be made by high-voltage (e.g., greater than 8 volts) MOS process, while the drive circuit **120** may be made by low-voltage (e.g., less than 8 volts) MOS process. On the contrary, for a driver without LOD regulator **123**, entire driver **12** should be made by high-voltage MOS process. As a result, the driver **12** of the embodiment may significant reduce circuit area and facilitate making large-size or high-resolution display panels.

[0040] FIG. **7**A shows a schematic diagram illustrating a chip-on-film (or chip-on-flex) (COF) package **700** for a driver **12** (a display driver integrated circuit (DDIC) in this case) according to one embodiment of the present invention. The COF package **700** may include a flexible printed circuit board (FPCB) **71**, which may include at least a main region **711** and a bonding region **712**. The bonding region **712** is substantially smaller in size than the main region **711**, and the bonding region **712** is adjacent to one edge of the main region **711**.

[0041] The COF package **700** of the embodiment may include a driver **12** mounted on the main region **711**. Specifically, a chip, such as the driver **12** in this case, has connection pins **713** disposed on four edges of the chip. The connection pins **713** of the chip are then electrically routed to finger connectors **714** of the bonding region **712** via traces (not shown) on the main region **711**. Accordingly, connection pins **713** on four edges of the chip are thus transformed to the finger connectors **714** disposed on only one edge of the FPCB **71**, that is, on the bonding region **712**.

[0042] FIG. **7**B shows a side view illustrating the COF package **700** of FIG. **7**A mounted on a substrate **11** of a microLED display panel according to one embodiment of the present invention. Specifically, in the embodiment, the bonding region **712** is bent along a boundary between the bonding region **712** and the main region **711**, and the bonding region **712** is then mounted on the substrate **11**. Accordingly, the driver **12** is hanging in the air above the substrate **11**. Although the main region **711** of the FPCB **71** stands at a 90 degree angle as exemplified in FIG. **7**B, it is appreciated that, generally speaking, the FPCB **71** may stand on the substrate **11** at an angle between 0 and 180 degrees.

[0043] FIG. **8**A to FIG. **8**C schematically show a top view, a front side view and a right-hand side view, respectively, illustrating a microLED display panel **800** with COF packages **700** mounted thereon. In the embodiment, the microLED display panel **800** may preferably be a backside illuminating microLED display panel, as exemplified in FIG. **4**, that generates light emitting downward from the bottom surface of the substrate **11**.

[0044] In the embodiment, the microLED display panel **800** may include a substrate **11** for supporting a plurality of microLEDs (not shown). The substrate **11** may be preferably made of an insulating material (e.g., glass or Acrylic) or other materials suitable for supporting the microLEDs. The surface of the substrate **11** is divided into a plurality of sub-regions **101**. According to one aspect of the embodiment, the microLED display panel **800** may include a plurality of COF packages **700** respectively mounted on a top surface of the sub-regions **101** the substrate **11**. The microLED display panel **800** of the embodiment may include a plurality of drivers **12** mounted on the main regions **711** of the COF packages **700**, respectively. As described above in connection with FIG. 7B, the COF package **700** is mounted on (or bounded with) the substrate **11** via the bonding region **712** such that the driver **12** is hanging above the substrate **11**. As the bonding region **712** requires substantially less area compared to the main region **711** or the driver **12**, the COF package **700** occupies only a substantially small area of the substrate **11**, and majority of the precious area of the substrate **11** may thus be provided for placing, among others, microLEDs.

[0045] Compared with chip-on-glass (COG) technique adopted in other embodiments, in which (connection pins of) the chips (i.e., the drivers **12**) are directly mounted on the surface of the substrate **11**, the COF packages **700** of the present embodiment occupy substantially less area than the COG embodiments. FIG. **9**A to FIG. **9**C schematically show a top view, a front side view and a right-hand side view, respectively, illustrating a microLED display panel **900** with drivers **12** mounted thereon by COG technique. As the drivers **12** are directly mounted on the substrate **11**, the drivers **12** occupy substantive area of the precious area of the substrate **11** with less area left for placing the microLEDs. In this concern, the drivers **12** need be fabricated smaller but with more technical difficulties and higher cost. Moreover, the COF package **700** can substantially overcome voltage-drop effect caused by long trace in large-size microLED display panels. Further, trace width may be shrank, thus effectively increasing resolution of the microLED display panels.

[0046] FIG. **10**A shows a schematic diagram illustrating a chip-on-film (COF) package **700**B for a driver **12** according to another embodiment of the present invention. The COF package **700**B is similar to the COF package **700** of FIG. 7A, with the exception that, in the COF package **700**B, the flexible printed circuit board (FPCB) **71** may include a main region **711**, a first bonding region **712**A and a second bonding region **712**B. The first bonding region **712**A and the second bonding region **712**B are adjacent to opposite edges of the main region **711**, respectively. In the embodiment, the first bonding region **712**A adopts outer lead bonding (OLB) technique for bonding with a glass, and the second bonding region **712**B adopts inner lead bonding (ILB) technique for bonding with a printed circuit board.

[0047] FIG. **10**B shows a side view illustrating the COF package **700**B of FIG. **10**A mounted on a substrate **11** (e.g., glass) of a microLED display panel via the first bonding region **712**A and mounted on a printed circuit board **11**B (e.g., FPCB) via the second bonding region **712**B according to one embodiment of the present invention. In one example, the printed circuit board **11**B is electrically connected to a control system such as timing controllers (TCON).

[0048] FIG. **11** schematically shows a top view illustrating a microLED display panel **1100**. In the embodiment, drivers (not shown) may be mounted on (non-shaded) boundary sub-regions **101** by using either COG or COF technique, while other drivers may be mounted on (shaded) center sub-regions **101** by using COF technique, thereby facilitating connecting the drivers mounted on the center sub-regions **101** to the timing controllers.

[0049] Although specific embodiments have been illustrated and described, it will be appreciated by those skilled in the art that various modifications may be made without departing from the scope of the present invention, which is intended to be limited solely by the appended claims.

What is claimed is:

1. A micro light-emitting diode (microLED) display panel, comprising:

a plurality of microLEDs;

a substrate for supporting the microLEDs, the substrate being divided into a plurality of sub-regions; and

a plurality of chip-on-film (COF) packages mounted on surfaces of the sub-regions respectively, a plurality of drivers being disposed on the COF packages respectively.

2. The microLED display panel of claim **1**, wherein the COF package comprises a flexible printed circuit board (FPCB), which includes at least a main region and a bonding region, the driver being disposed on the main region.

3. The microLED display panel of claim **2**, wherein the bonding region is substantially smaller in size than the main region, and the bonding region is adjacent to one edge of the main region.

4. The microLED display panel of claim **2**, wherein the driver has connection pins disposed on four edges of the driver, and the connection pins are then electrically routed to finger connectors disposed on the bonding region.

5. The microLED display panel of claim **2**, wherein the bonding region is bent along a boundary between the bonding region and the main region, and the bonding region is then mounted on the substrate.

6. The microLED display panel of claim **2**, wherein the FPCB stands on the substrate at an angle between 0 and 180 degrees.

7. The microLED display panel of claim **1**, wherein the microLED display panel is a backside illuminating microLED display panel that generates light emitting downward from a bottom surface of the substrate.

8. The microLED display panel of claim **1**, wherein the substrate comprises an insulating material.

9. The microLED display panel of claim **8**, wherein the substrate comprises glass or Acrylic.

10. The microLED display panel of claim **1**, wherein the COF package comprises a main region, a first bonding region and a second bonding regions, the first bonding region and the second bonding region being adjacent to opposite edges of the main region, respectively.

11. The microLED display panel of claim **10**, wherein the first bonding region adopts outer lead bonding (OLB) technique, and the second bonding region adopts inner lead bonding (ILB) technique.

12. The microLED display panel of claim **1**, wherein some of the drivers are mounted on boundary sub-regions of the substrate by using either chip-on-glass (COG) or COF technique, while others of the drivers are mounted on center sub-regions of the substrate by using COF technique.

* * * * *

专利名称(译)	微型显示面板		
公开(公告)号	US20190013307A1	公开(公告)日	2019-01-10
申请号	US16/128287	申请日	2018-09-11
[标]发明人	WU BIING SENG CHEN FA MING		
发明人	WU, BIING-SENG CHEN, FA-MING		
IPC分类号	H01L25/16 H01L25/075 H01L23/538		
CPC分类号	H01L25/167 H01L25/0753 H01L23/5387 H01L33/58 G09G2310/0275 G09G2310/08 G09G2300/06 G09G2310/0267 G09G3/32 H01L33/486		
优先权	105131054 2016-09-26 TW 106118892 2017-06-07 TW		
其他公开文献	US10529701		
外部链接	Espacenet USPTO		

摘要(译)

微型发光二极管（microLED）显示面板包括microLED;用于支撑微LED的基板，基板被分成多个子区域;分别安装在子区域表面上的多个芯片上薄膜（COF）封装，多个驱动器分别设置在COF封装上。