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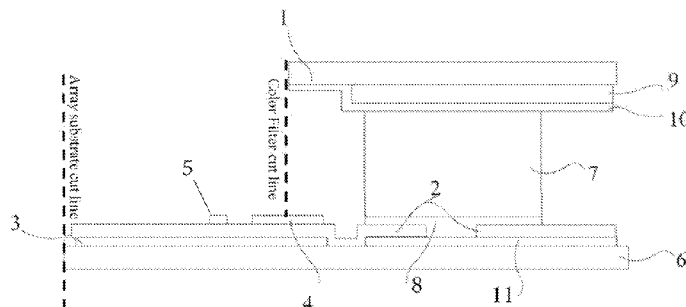
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(54) Title: ARRAY SUBSTRATE, DISPLAY PANEL HAVING THE SAME, AND METHOD THEREOF

FIG. 1



(57) Abstract: An array substrate comprises a base substrate (6); a plurality of peripheral wires (3) on the base substrate (6); an insulating layer (2) on a side of the plurality of peripheral wires (3) distal to the base substrate (6); and an electrostatic charge conductive layer (4) on a side of the insulating layer (2) distal to the plurality of peripheral wires (3) for conducting an electrostatic charge in the array substrate to ground.

# ARRAY SUBSTRATE, DISPLAY PANEL HAVING THE SAME, AND METHOD THEREOF

## CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to Chinese Patent Application No. 201510350473.9, filed June 23, 2015, the contents of which are incorporated by reference in the entirety.

## FIELD

[0002] The present invention relates to display technology, more particularly, to an array substrate, a display panel having the same, and a manufacturing method thereof.

## BACKGROUND

[0003] A liquid crystal display panel has an array substrate and a color filter substrate assembled together in a cell, and a liquid crystal layer sandwiched between the array substrate and the color filter substrate. Typically, the peripheral wires, the gate lines, and the data lines are disposed on the array substrate. When making a liquid crystal display panel, color filter substrate is cut along a cutting line for exposing metal wires disposed on the ends of the array substrate. The electrostatic charge generated by the color filter substrate cutting causes damages to the peripheral wires.

## SUMMARY

[0004] In one aspect, the present invention provides an array substrate comprising a base substrate; a plurality of peripheral wires on the base substrate; an insulating layer on a side of the plurality of peripheral wires distal to the base substrate; and an electrostatic charge conductive layer on a side of the insulating layer distal to the plurality of peripheral wires for conducting an electrostatic charge in the array substrate to ground.

[0005] Optionally, at least a portion of the electrostatic charge conductive layer shielding the plurality of peripheral wires along a line for cutting a color filter substrate.

[0006] Optionally, the electrostatic charge conductive layer configured to shield the plurality of peripheral wires from an electrostatic charge generated when the color filter substrate is cut along the line for cutting the color filter substrate.

[0007] Optionally, the electrostatic charge conductive layer comprises a charge receiving portion and a charge conductive portion, the charge receiving portion receives an electrostatic

charge in the array substrate, the charge conductive portion transmits the electrostatic charge received in the charge receiving portion to a ground wire.

[0008] Optionally, the charge receiving portion is disposed proximal to a projection of the line for cutting the color filter substrate.

[0009] Optionally, the charge receiving portion is facing the line for cutting the color filter substrate.

[0010] Optionally, the line for cutting the color filter substrate is aligned with a mid-line of the charge receiving portion on the array substrate.

[0011] Optionally, the charge receiving portion and the charge conductive portion are integrally formed as a single body.

[0012] Optionally, the charge receiving portion and the charge conductive portion are not connected.

[0013] Optionally, the charge receiving portion comprises a plurality of discharge tips, the charge conductive portion comprises a plurality of charge receiving tips, each of the plurality of discharge tips corresponds to each of the plurality of charge receiving tips in a one-to-one relationship.

[0014] Optionally, the charge receiving portion is disposed outside of an area enclosed by a sealant sealing the color filter substrate and the base substrate.

[0015] Optionally, the charge conductive portion is disposed within an area enclosed by a sealant sealing the color filter substrate and the base substrate.

[0016] Optionally, the charge conductive portion is connected to the ground wire through a via in the insulating layer.

[0017] Optionally, the electrostatic charge conductive layer comprises indium tin oxide.

[0018] Optionally, the array substrate further comprises a surface electrode layer comprising a plurality of electrodes, wherein the electrostatic charge conductive layer is disposed in the same layer as the surface electrode layer.

[0019] The present invention also provides a method of manufacturing a display panel. Optionally, the method includes providing an array substrate described herein; providing a color filter substrate; assembling the array substrate and the color filter substrate in a cell; and cutting the color filter substrate along a line for cutting the color filter substrate.

[0020] In another aspect, the present invention further provides a display panel comprising a color filter substrate assembled together in a cell with an array substrate described herein or manufactured by a method described herein.

#### BRIEF DESCRIPTION OF THE FIGURES

[0021] The following drawings are merely examples for illustrative purposes according to various disclosed embodiments and are not intended to limit the scope of the present invention.

[0022] FIG. 1 is a diagram illustrating the structure of a display panel in an embodiment.

[0023] FIG. 2 is a diagram illustrating the structure of an electrostatic charge conductive layer comprising integrally formed a charge receiving portion and a charge conductive portion in an embodiment.

[0024] FIG. 3 is a diagram illustrating the structure of an electrostatic charge conductive layer comprising a plurality of discharge tips in an embodiment.

#### DETAILED DESCRIPTION OF THE EMBODIMENTS

[0025] The disclosure will now describe more specifically with reference to the following embodiments. It is to be noted that the following descriptions of some embodiments are presented herein for purpose of illustration and description only. It is not intended to be exhaustive or to be limited to the precise form disclosed.

[0026] FIG. 1 is a diagram illustrating the structure of a display panel in an embodiment. Referring to FIG. 1, an array substrate of the display panel in the embodiment includes a base substrate 6, a plurality of peripheral wires 3 on the base substrate 6, an insulating layer 2 disposed on a side of the plurality of peripheral wires 3 distal to the base substrate 6, and an electrostatic charge conductive layer 4 disposed on a side of the insulating layer 2 distal to the plurality of peripheral wires 3. The electrostatic charge conductive layer 4 conducts the electrostatic charge in the array substrate to a ground wire 5. As shown in FIG. 1, the color filter substrate is cut along a color filter cut line, and the array substrate is cut along an array substrate cut line. The cutting along the color filter cut line cut only the color filter substrate, and does not cut any part of the array substrate. The cutting along the array substrate cut line cut the array substrate. Two cuttings can be performed sequentially or in parallel. For example, the array substrate may be cut first, or the color filter substrate may be cut first.

[0027] In making a liquid crystal display panel, color filter substrate is cut along a line for cutting color filter substrate (see “color filter cut line” FIG. 1) for exposing metal wires disposed on the ends of the array substrate. In some embodiments, at least a portion of the electrostatic charge conductive layer 4 shields the peripheral wires 3 from the line for cutting the color filter substrate when the array substrate is assembled together with the color filter substrate in a cell. For example, the electrostatic charge conductive layer 4 shields the peripheral wires 3 from an electrostatic charge generated when the color filter substrate is cut along the line for cutting the color filter substrate.

[0028] In some embodiments, the electrostatic charge conductive layer 4 includes a charge receiving portion 41 for receiving an electrostatic charge and a charge conductive portion 42 for conducting the electrostatic charge received by the charge receiving portion 41 to ground (e.g., a ground wire 5). The ground wire 5 is connected to a ground signal wire external to the array substrate. Other components in the array substrate may also be connected to ground via the ground wire 5. The peripheral wires 3 may include output contacts or input contacts.

[0029] In some embodiments, a portion of the electrostatic charge conductive layer 4 (e.g., the charge receiving portion 41) is disposed proximal to a projection of a line for cutting the color filter substrate 1 on the array substrate when the array substrate is assembled together with the color filter substrate in a cell. Optionally, the line for cutting the color filter substrate 1 is aligned with the mid-line of the charge receiving portion 41 in plan view of the array substrate. Optionally, the line for cutting the color filter substrate 1 is not aligned with the mid-line of the charge receiving portion 41, but the projection of the line for cutting the color filter substrate on the array substrate is within the area of the charge receiving portion 41. Optionally, the projection of the line for cutting the color filter substrate on the array substrate is at least partially within the charge receiving portion 41. Optionally, the charge receiving portion 41 is facing the line for cutting a color filter substrate 1.

[0030] In some embodiments, the electrostatic charge is generated by cutting the color filter substrate 1 along the line for cutting the color filter substrate, for example, due to the friction occurred during the cutting. The electrostatic conductive layer 4 is disposed on the side of the insulating layer 2 distal to the base substrate 6. Thus, the electrostatic conductive layer 4 can conduct the electrostatic charge to the ground wire 5 before it reaches the peripheral wires 3. Damages to the peripheral wires 3 can be prevented or minimized.

[0031] FIG. 2 is a diagram illustrating the structure of an electrostatic charge conductive layer 4 comprising integrally formed a charge receiving portion 41 and a charge conductive

portion 42 in an embodiment. Referring to FIGs. 1 and 2, the charge receiving portion 41 and the charge conductive portion 42 in the embodiment are integrally formed as a single body. The charge receiving portion 41 receives an electrostatic charge, e.g., during the color filter cutting. The electrostatic charge received by the charge receiving portion 41 is directly transmitted to the charge conductive portion 42 because they are integrally formed in a single body. The charge conductive portion 42 is in turn connected to the ground wire 5. The electrostatic charge is dissipated to ground before it causes damages to the peripheral wires 3.

**[0032]** FIG. 3 is a diagram illustrating the structure of an electrostatic charge conductive layer 4 comprising a plurality of discharge tips in an embodiment. Referring to FIGs. 1 and 3, the charge receiving portion 41 includes a plurality of discharge tips, and the charge conductive portion 42 includes a plurality of charge receiving tips. Each of the discharge tips corresponds to each of the charge receiving tips in a one-to-one relationship. When the electrostatic charge in the charge receiving portion 41 accumulates to a certain level, the electrostatic charge is discharged through the discharge tips to the charge receiving tips in the charge conductive portion 42. Because the charge conductive portion 42 is connected to the ground wire 5, the electrostatic charge can be effectively dissipated to ground before it causes damages to the peripheral wires 3. In FIG. 3, the charge receiving portion 41 and the charge conductive portion 42 are not directly connected. The distances between the discharge tips and the charge receiving tips can be set to a predetermined value such that the electrostatic charge in the charge receiving portion 41 can be dissipated to ground before it reaches a predetermined level.

**[0033]** Optionally, the charge conductive portion 42 is connected to the ground wire 5 through a via in the insulating layer 2.

**[0034]** A sealant 7 seals the color filter substrate and the base substrate 6 together, and forms an enclosed area. Optionally, the charge receiving portion 41 is disposed outside of the enclosed area. Optionally, the charge conductive portion 42 is disposed within the enclosed area.

**[0035]** In some embodiments, the peripheral wires 3 are insulated from the charge receiving portion 41 by the insulating layer 2. The peripheral wires 3 are disposed on the base substrate 6. The insulating layer 2 is disposed on the peripheral wires 3, and the charge receiving portion 41 is then disposed on the insulating layer 2. Therefore, the peripheral wires 3 are disposed on a side of the charge receiving portion 41 proximal to the base substrate 6. The electrostatic charge is generated by cutting the color filter 1 along the line

for cutting the color filter substrate. The electrostatic charge is transmitted through the charge receiving portion 41 to the charge conductive portion 42, and eventually to the ground wire 5. The charge conductive portion 42 is disposed within the area enclosed by the sealant 7. The charge conductive portion 42 is connected to the ground wire 5 through a via in the insulating layer 2. The electrostatic charge received by the charge receiving portion 41 is dissipated to ground before it reaches the peripheral wires 3. The electrostatic damages to the peripheral wires 3 can be prevented or minimized.

**[0036]** Any suitable conductive material may be used for making the electrostatic charge conductive layer 4. Optionally, a transparent conductive material is used for making the electrostatic charge conductive layer 4. Optionally, the electrostatic charge conductive layer 4 contains indium tin oxide.

**[0037]** Optionally, the array substrate further includes a surface electrode layer having a plurality of electrodes. Optionally, the electrostatic charge conductive layer 4 is disposed in the same layer as the surface electrode layer.

**[0038]** The present disclosure also provides a display panel having a color filter substrate 1 assembled together in a cell with an array substrate described herein. The display panel may further include a black matrix 9 disposed on a side of the color filter substrate 1 proximal to the sealant 7. Optionally, a conductive layer 10 is disposed between the black matrix 9 and the sealant 7.

**[0039]** The present disclosure further provides a method of manufacturing a display panel. In some embodiments, the method includes providing an array substrate described herein, providing a color filter substrate, assembling the array substrate and the color filter substrate in a cell, and cutting the color filter substrate along a line for cutting the color filter substrate. In some embodiments, the method includes forming a pattern having the ground wire on the base substrate, forming a pattern having the plurality of peripheral wires on the base substrate, forming a pattern having the insulating layer disposed on the side of the plurality of peripheral wires distal to the base substrate, and having a pattern comprising the electrostatic charge conductive layer disposed on a side of the insulating layer distal to the base substrate. Optionally, the method further includes assembling the array substrate and the color filter substrate in the cell. Optionally, the method further includes cutting the color filter substrate along the cutting line. The electrostatic charge conductive layer conducts the electrostatic charge generated during the cutting to ground.

[0040] The foregoing description of the embodiments of the invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form or to exemplary embodiments disclosed. Accordingly, the foregoing description should be regarded as illustrative rather than restrictive. Obviously, many modifications and variations will be apparent to practitioners skilled in this art. The embodiments are chosen and described in order to best explain the principles of the invention and its best mode practical application, thereby to enable persons skilled in the art to understand the invention for various embodiments and with various modifications as are suited to the particular use or implementation contemplated. It is intended that the scope of the invention be defined by the claims appended hereto and their equivalents in which all terms are meant in their broadest reasonable sense unless otherwise indicated. Therefore, the term “the invention”, “the present invention” or the like does not necessarily limit the claim scope to a specific embodiment, and the reference to exemplary embodiments of the invention does not imply a limitation on the invention, and no such limitation is to be inferred. The invention is limited only by the spirit and scope of the appended claims. Moreover, these claims may refer to use “first”, “second”, etc. following with noun or element. Such terms should be understood as a nomenclature and should not be construed as giving the limitation on the number of the elements modified by such nomenclature unless specific number has been given. Any advantages and benefits described may not apply to all embodiments of the invention. It should be appreciated that variations may be made in the embodiments described by persons skilled in the art without departing from the scope of the present invention as defined by the following claims. Moreover, no element and component in the present disclosure is intended to be dedicated to the public regardless of whether the element or component is explicitly recited in the following claims.

WHAT IS CLAIMED IS:

1. An array substrate comprising:  
a base substrate;  
a plurality of peripheral wires on the base substrate;  
an insulating layer on a side of the plurality of peripheral wires distal to the base substrate; and  
an electrostatic charge conductive layer on a side of the insulating layer distal to the plurality of peripheral wires for conducting an electrostatic charge in the array substrate to ground.
2. The array substrate of claim 1, wherein at least a portion of the electrostatic charge conductive layer shielding the plurality of peripheral wires along a line for cutting a color filter substrate.
3. The array substrate of claim 2, wherein the electrostatic charge conductive layer configured to shield the plurality of peripheral wires from an electrostatic charge generated when the color filter substrate is cut along the line for cutting the color filter substrate.
4. The array substrate of claim 1, wherein the electrostatic charge conductive layer comprises a charge receiving portion and a charge conductive portion, the charge receiving portion receives an electrostatic charge in the array substrate, the charge conductive portion transmits the electrostatic charge received in the charge receiving portion to a ground wire.
5. The array substrate of claim 4, wherein the charge receiving portion is disposed proximal to a projection of the line for cutting the color filter substrate.
6. The array substrate of claim 4, wherein the charge receiving portion is facing the line for cutting the color filter substrate.
7. The array substrate of claim 6, wherein the line for cutting the color filter substrate is aligned with a mid-line of the charge receiving portion on the array substrate.
8. The array substrate of claim 4, wherein the charge receiving portion and the charge conductive portion are integrally formed as a single body.

9. The array substrate of claim 4, wherein the charge receiving portion and the charge conductive portion are not connected.
10. The array substrate of claim 4, wherein the charge receiving portion comprises a plurality of discharge tips, the charge conductive portion comprises a plurality of charge receiving tips, each of the plurality of discharge tips corresponds to each of the plurality of charge receiving tips in a one-to-one relationship.
11. The array substrate of claim 4, wherein the charge receiving portion is disposed outside of an area enclosed by a sealant sealing the color filter substrate and the base substrate.
12. The array substrate of claim 4, wherein the charge conductive portion is disposed within an area enclosed by a sealant sealing the color filter substrate and the base substrate.
13. The array substrate of claim 4, wherein the charge conductive portion is connected to the ground wire through a via in the insulating layer.
14. The array substrate of any one of claims 1-15, wherein the electrostatic charge conductive layer comprises indium tin oxide.
15. The array substrate of claim 14, further comprising a surface electrode layer comprising a plurality of electrodes, wherein the electrostatic charge conductive layer is disposed in the same layer as the surface electrode layer.
16. A display panel comprising a color filter substrate assembled together in a cell with an array substrate of any one of claims 1-15.
17. A method of manufacturing a display panel of claim 16, comprising:
  - providing an array substrate of any one of claims 1-15;
  - providing a color filter substrate;
  - assembling the array substrate and the color filter substrate in a cell; and
  - cutting the color filter substrate along a line for cutting the color filter substrate.

FIG. 1

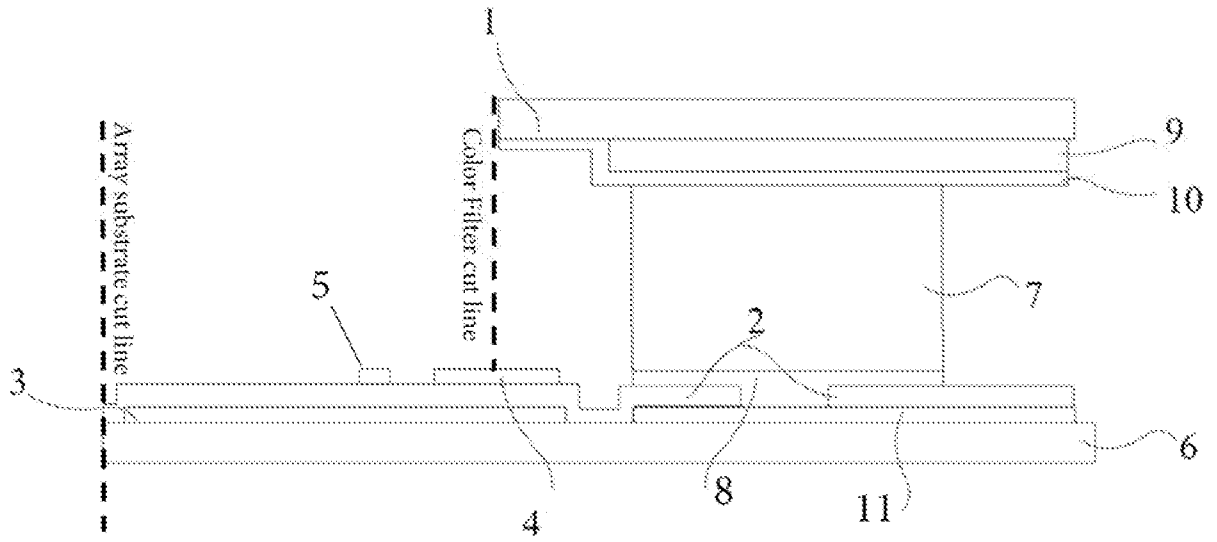


FIG. 2

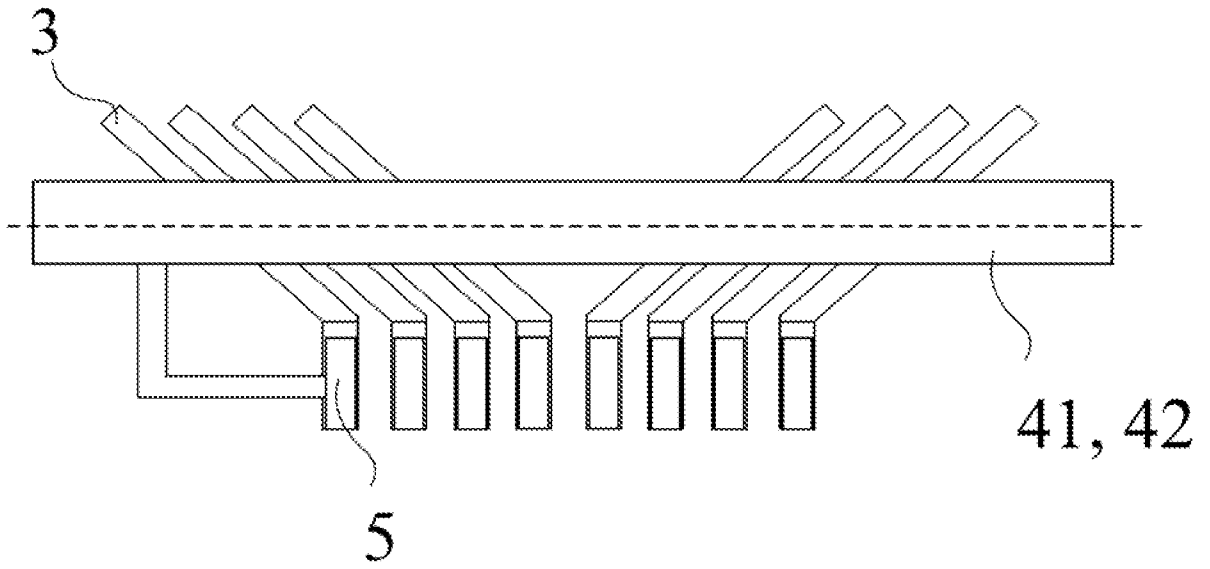
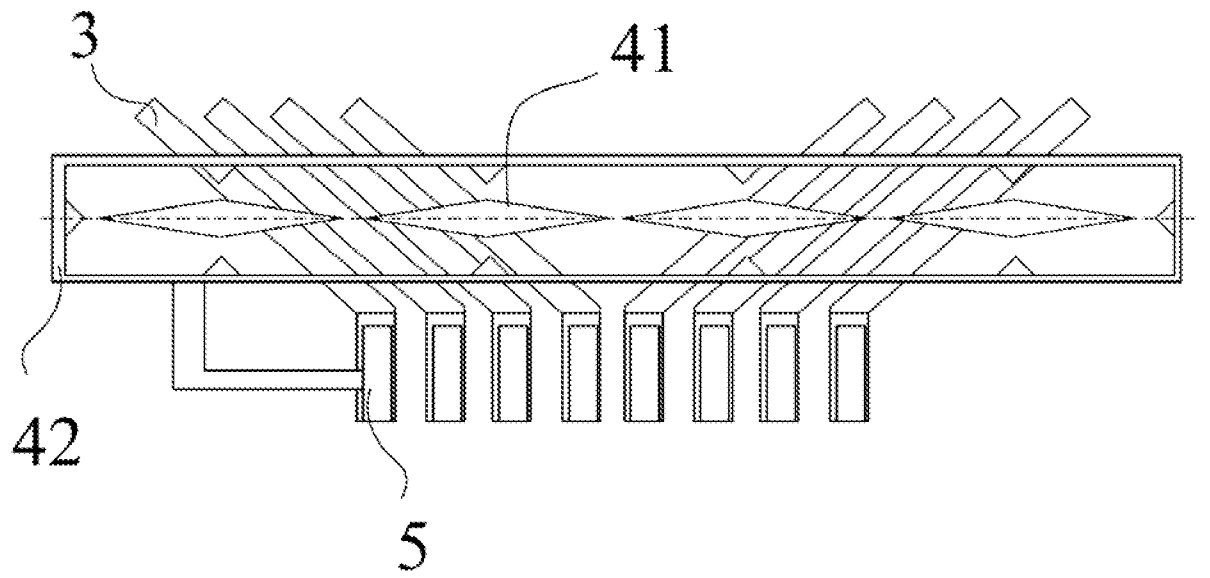


FIG. 3



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2015/097025

**A. CLASSIFICATION OF SUBJECT MATTER**

G02F 1/1362(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

G02F; H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT;CNKI;WPI;EPODOC:substrate?, peripheral w wire?, insulat+, electrostatic w charge, ground, cut+, color w filter?, colour w filter?

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 104880880 A (HEFEI BOE OPTOELECTRONICS TECH. ET AL) 02 September 2015 (2015-09-02) description paragraphs 0025-0040 and figures 1-3	1-17
X	CN 103034008 A (BOE TECHNOLOGY GROUP CO., LTD. ET AL) 10 April 2013 (2013-04-10) description paragraphs 0034-0070 and figures 1-5	1-6, 8, 11, 13, 16-17
A	CN 103676345 A (SHANGHAI AVIC. OPTOELECTRONICS) 26 March 2014 (2014-03-26) the whole document	1-17
A	CN 104460070 A (HEFEI XINSHENG OPTOELECTRONIC TECHNOLOGY CO., LTD. ET AL.) 25 March 2015 (2015-03-25) the whole document	1-17
A	CN 104704546 A (SHARP K.K.) 10 June 2015 (2015-06-10) the whole document	1-17
A	US 2006278929 A1 (LIU, PO YUAN ET AL.) 14 December 2006 (2006-12-14) the whole document	1-17

 Further documents are listed in the continuation of Box C. See patent family annex.

\* Special categories of cited documents:

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“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

01 February 2016

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24 February 2016

Name and mailing address of the ISA/CN

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**INTERNATIONAL SEARCH REPORT**

International application No.

**PCT/CN2015/097025****C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2008265250 A1 (CHUNGHWA PICTURE TUBES, LTD.) 30 October 2008 (2008-10-30) the whole document	1-17
A	US 2006244892 A1 (NEC LCD TECHNOLOGIES, LTD.) 02 November 2006 (2006-11-02) the whole document	1-17

**INTERNATIONAL SEARCH REPORT**  
**Information on patent family members**

International application No.

**PCT/CN2015/097025**

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	103034008	A	10 April 2013	CN	103034008	B	02 September 2015
CN	103676345	A	26 March 2014	None			
CN	104460070	A	25 March 2015	None			
CN	104704546	A	10 June 2015	WO	2014054482	A1	10 April 2014
				EP	2905768	A1	12 August 2015
				US	2015241744	A1	27 August 2015
				KR	20150046311	A	29 April 2015
				TW	201417302	A	01 May 2014
US	2006278929	A1	14 December 2006	US	7304351	B2	04 December 2007
				TW	I260094	B	11 August 2006
				TW	200644252	A	16 December 2006
US	2008265250	A1	30 October 2008	US	8045119	B2	25 October 2011
				TW	200842472	A	01 November 2008
				TW	I402594	B	21 July 2013
US	2006244892	A1	02 November 2006	CN	1854832	A	01 November 2006
				CN	100428006	C	22 October 2008
				JP	2006308803	A	09 November 2006