

Document Number	OBM-200-503/002
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Data Sheet

Product Name : KANEKA OLED Lighting Panel

[80x80mm 4000K High Color Rendering Type]


Product No. : KN-P-P4-BK-40-U

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- The content of this data sheet is subject to change without prior notice. The specifications and values are typical, and not guaranteed. Before start of volume production, Be sure to contact our sales person to receive our delivery specifications according to which the products should be designed.
- This product should be used in compliance with the usage conditions and safety precautions set forth in this Data Sheet. KANEKA Corporation is not liable in any way for damages attributable to the use of or any other action related to this product in deviation from the usage conditions set forth in this Product Specification or from the following precautions.
- This product is not satisfied IEC62868, OLED panels for general lighting – Safety requirements.
- To use this product properly, thoroughly read section 5 “Precaution for using OLED lighting panels properly” in this datasheet.

Safety Precautions

Please Be Sure to Observe the Following

Please be sure to observe the following in order to prevent personal injury and property damage.

 ALERT	Failure to observe the following may result in death or serious injuries.
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Things you SHOULD NOT DO

- Wash with water. Dismantle or modify the panels.
It may cause problems such as fire, electric shock and breakage.
- Use or store the panels in a location exposed to condensation, water drops or moisture.
Electric shock, short-circuits or damage could result.
- Replace or clean the panel or touch the power feeder in the on-state.
It may cause electric shock, failure and/or breakage.
- Touch the panel with wet hand.
It may cause electric shock, failure and/or breakage.
- Cover with paper or cloth. Place near flammable objects.
It may cause fire and/or burns.
- Use in an enclosed or essentially enclosed environment without implementing heat dissipation measures.



Things you MUST DO

- Be used below the absolute maximum rating to prevent accidents, fire, electric shock and burn injury. This panel is designed for using with a constant-current drive.
- Be sure not to mistake polarity (anode (+) and cathode (-)) when making connections.
- Install a power supply interruption circuit (protective circuit) for each panel in order to cut off the power supply in the event of abnormalities in panel operation, such as low resistance, short circuit, high resistance and disconnection.
- Ensure that the power feeder is free of dirt, dust and other foreign objects when assembling.
- Take measures to ensure that the power feeder remains free of dirt, dust and other foreign objects after assembling.



WARNING

Failure to observe the following may result in minor injury and/or property damage.



Things you SHOULD NOT DO

- Drop, throw objects at, push forcefully against, apply localized pressure on or place heavy objects on the panel.
The panel is made of glass.
- Heat or cool rapidly.
the panel is made of glass.
- Touch the panel while it is on or immediately after switching it off.
the panel will be hot.
- Use panels in such a way as to disturb the heat dissipation of the panel, such as covering with heat insulation material without heat dissipation measure.
- Wipe the light-emitting surface with organic solvents, detergents or other chemicals.
- Expose them to pressure from a fingernail, metal object, abrasive fiber cloth or the like could scratch them.
the light-emitting surface is covered with a special film which is easily damaged.
- Touch the electrical contact with bare hands.



Things you MUST DO

- Remove static electricity from your body before handling them.
- It is the sole responsibility of the user to ensure anti-UV measure and water proof measure on the panel when the KANEKA OLED lighting panel is used as the following location.
 - exposed to ultraviolet lighting such as outdoors, near windows or other locations.
 - exposed to water or high humidity such as outdoors, bathrooms, washrooms or other locations

- Use gloves or other protective gear when handling the panels.
Neither the edges nor the corners of the glass plates used in the panel are chamfered.
Should the panel be damaged, it avoids injury from fragments or the like.
- Follow the regulations of the relevant municipality on incombustibles when disposing of the panel. The panel is an incombustible.

* Please contact the KANEKA Sales Desk (contact information provided below) should there be any other questions concerning the panel.

<Contact information for inquiries>

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1 Product Summary

1.1 Name

KANEKA OLED Lighting Panel

1.2 Product Number, Dimensions and Weight

Product Number	Height	Width	Thickness*	Weight
KN-P-P4-BK-40-U/FU	90+0.2,-0.1mm	90+0.2,-0.1mm	1.21+0.25,-0.17mm	17.9±0.5g
KN-P-P4-BK-40-U/FI			1.11+0.25,-0.17mm	17.5±0.5g
KN-P-P4-BK-40-U/FC			3.29±0.28mm	18.0±0.5g
KN-P-P4-BK-40-U/FS			3.29±0.28mm	17.2±0.5g

* Typical measured values

1.3 Light output area

80mm (L) × 80mm (W)

1.4 Features

- Luminous flux: 60 lm
- Correlated color temperature (CCT): 4000K
- Average color rendering index (Ra) : 92
- Special color rendering index R9 : 90
- Average luminance lifetime LT70: 40000 hours

*When operated at a forward reted current of 290mA with an initial luminance of 3000cd/ m²,
@ambient temperature : Ta=25°C, Panel rear side temperature: Tc=37°C.

These data are estimated values by KANEKA calculation, not guaranteed values.

- RoHS compliant
- UL recognized component (E466566)

2 Absolute Maximum Ratings and Typical Characteristics

2.1 Absolute Maximum Ratings

Parameter	Unit	Absolute Maximum Rating
Reverse bias	V	-5.0
Forward current	mA	500
Peak current (duty10%, width 1ms)	mA	650
Operating temperature range	°C	Tc = 0 to +60
Operating humidity range	%RH	≤85
Storage temperature range	°C	Ta = -20 to +60
Storage humidity range	%RH	≤85

2.2 Typical Characteristics (Electrical and Optical)

Operating conditions: Ambient temperature: $T_a=25^{\circ}\text{C}$, Panel rear side temperature: $T_c=37^{\circ}\text{C}$;

During operation at a forward rated current of 290mA.

* Unless otherwise stated, the standard characteristic values under the above conditions apply.

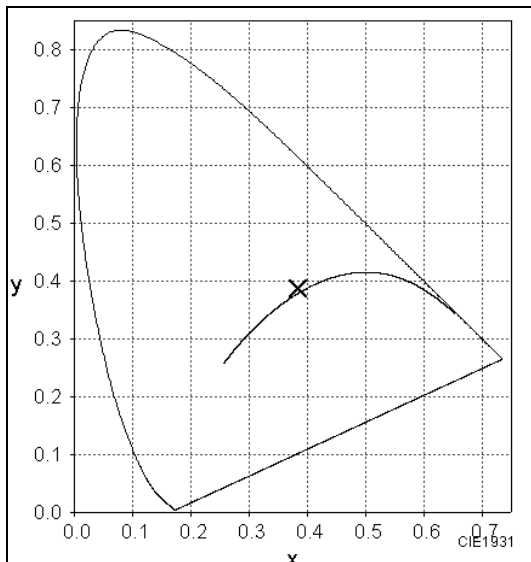
Parameter		Typical	Unit	Remarks
Forward voltage		7.0	V	5 minutes after the start of operation
Efficiency		29	lm/W	Value calculated from the total luminous flux and voltage
Average Luminance		3,000	cd/m ²	Spectral radiance meter / Measured at five points on the panel surface 5 minutes after the start of operation / average value
Total luminous flux		60	lm	Value calculated from luminance / 5 minutes after the start of operation
Chromaticity	x	0.381	—	Spectral radiance meter / Measured at the center point on the panel surface 5 minutes after the start of operation
	y	0.389	—	
In-plane uniformity (Luminance)		85	%	Spectral radiance meter / Measured at five points on the panel surface 5 minutes after the start of operation / [1-(max.-min.)/(max.+min.)]×100
In-plane distribution (Chromaticity)	x	0.0038	—	Spectral radiance meter / Measured at five points on the panel surface 5 minutes after the start of operation / Chromaticity Difference at x/y axis = max. - min.
	y	0.0158	—	
Angular dependence (Chromaticity)	x	0.0023	—	Spectral radiance meter / Measured at the center point on the panel surface 5 minutes after the start of operation / ±60° Chromaticity Difference at x/y axis = max. - min.
	y	0.0027	—	
Correlated color temperature		4,000	K	Measured at the center point on the panel surface 5 minutes after the start of operation
Average color rendering index(Ra)		92	—	Measured at the center point on the panel surface 5 minutes after the start of operation

* The values in this data sheet are standard values measured using KANEKA's measurement methods during operation at a forward rated current of 290 mA, but DO NOT indicate guaranteed performance.

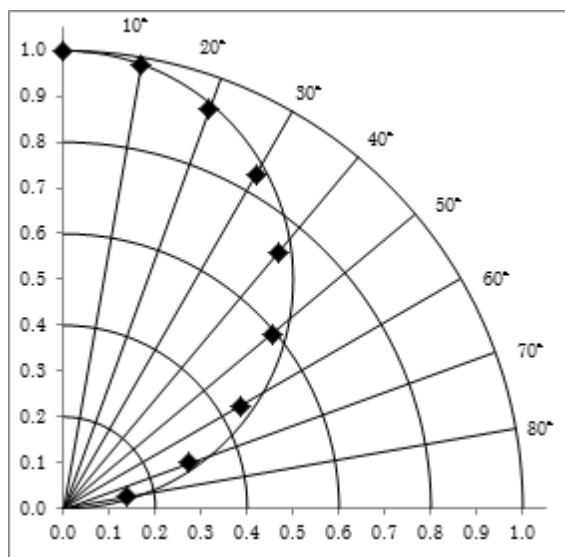
3 Design Specification

3.1 Typical Electrical and Optical Characteristics

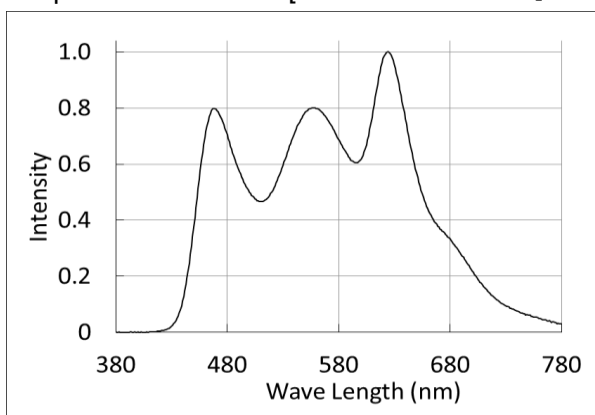
● Chromaticity coordinate [$I_f=290\text{mA}$ $T_a=25^\circ\text{C}$]



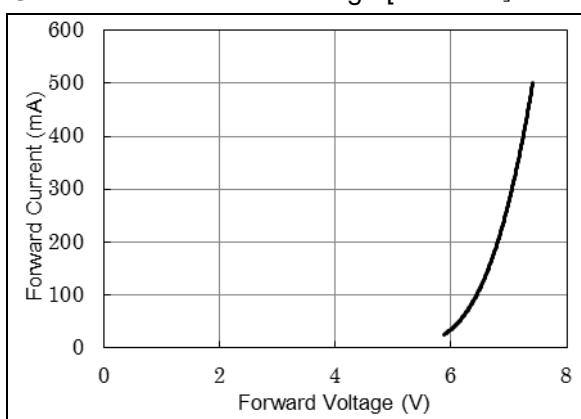
● Luminaire flux pattern [$I_f=290\text{mA}$ $T_a=25^\circ\text{C}$]



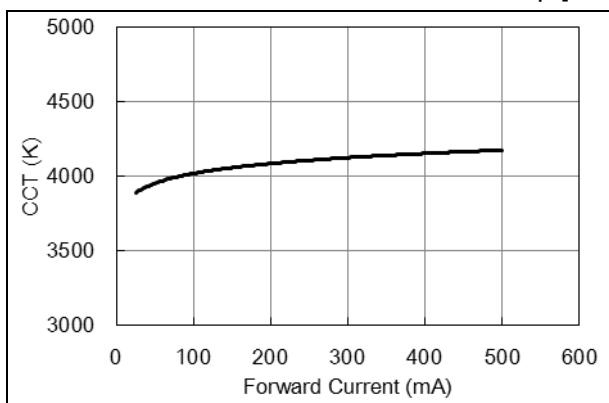
● Spectral distribution [$I_f=290\text{mA}$ $T_a=25^\circ\text{C}$]



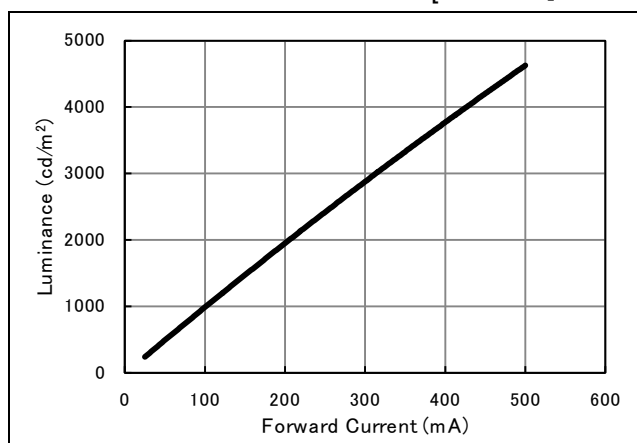
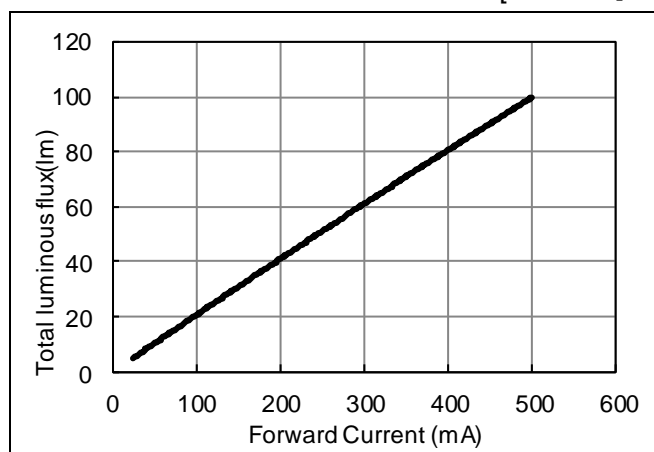
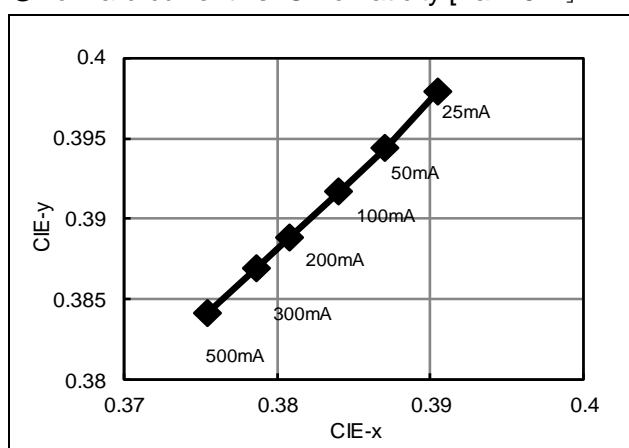
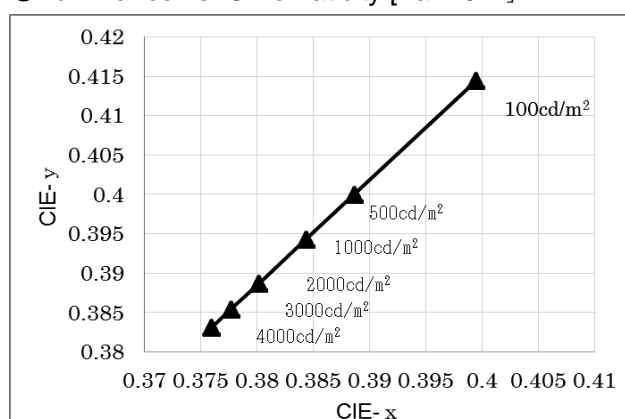
● Forward current vs. Voltage [$T_a=25^\circ\text{C}$]



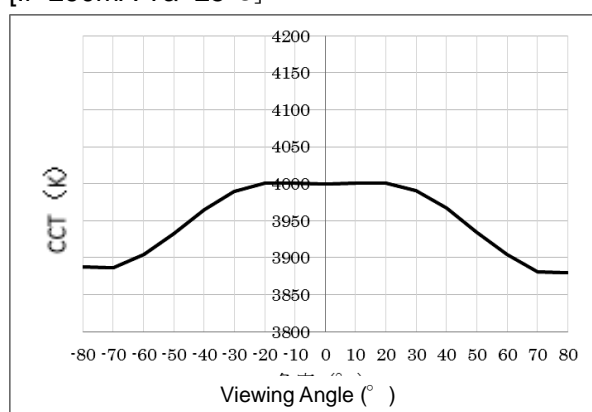
● Forward current vs. Correlated color temp [$T_a=25^\circ\text{C}$]



* The values on this page are actual measurement values measured using KANEKA measurement methods, but DO NOT indicate guaranteed performance.

● Forward current vs. Luminance [$T_a=25^{\circ}\text{C}$]● Forward current vs. Total luminous flux [$T_a=25^{\circ}\text{C}$]● Forward current vs. Chromaticity [$T_a=25^{\circ}\text{C}$]● Luminance vs. Chromaticity [$T_a=25^{\circ}\text{C}$]

● Angular dependence in correlated color temperature

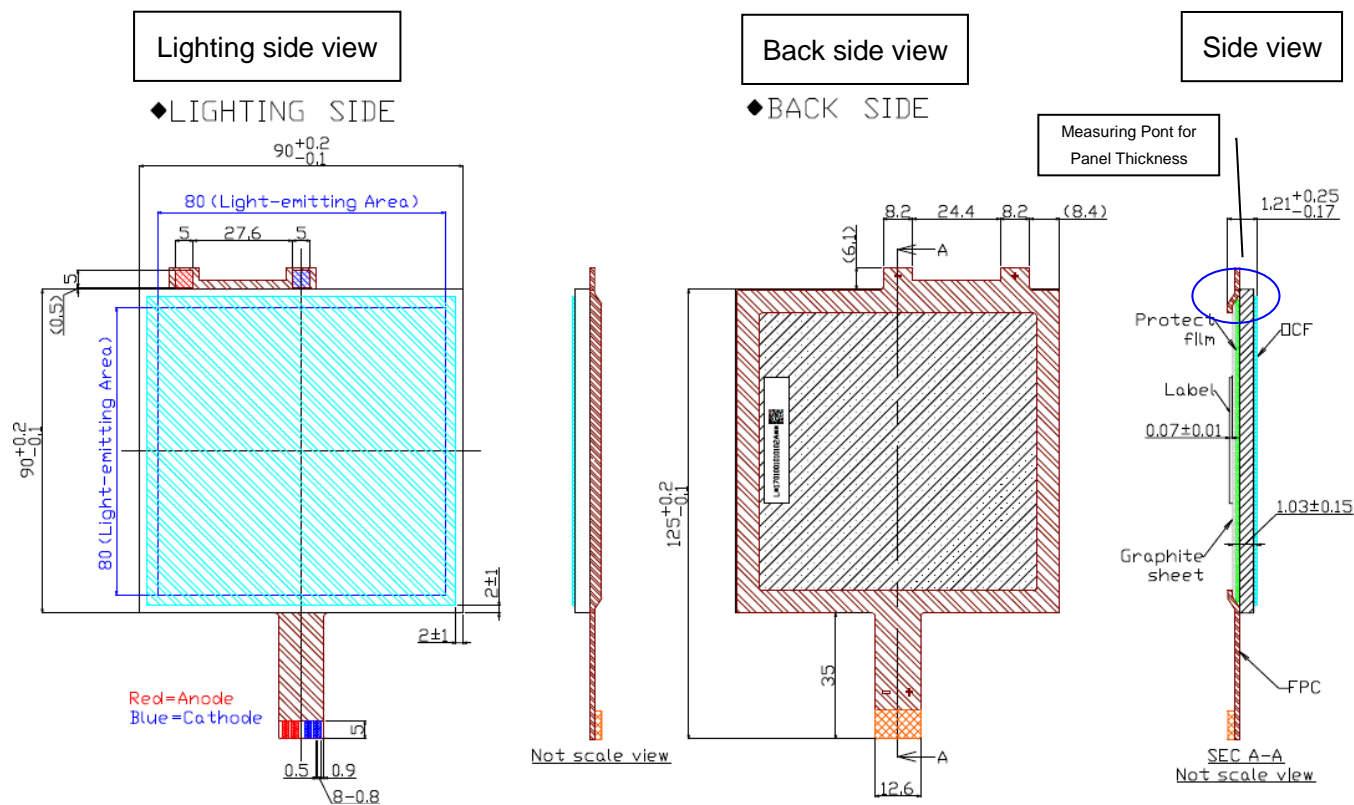
[$I_f=290\text{mA}$ $T_a=25^{\circ}\text{C}$]

* The values on this page are actual measurement values measured using KANEKA measurement methods, but DO NOT indicate guaranteed performance.

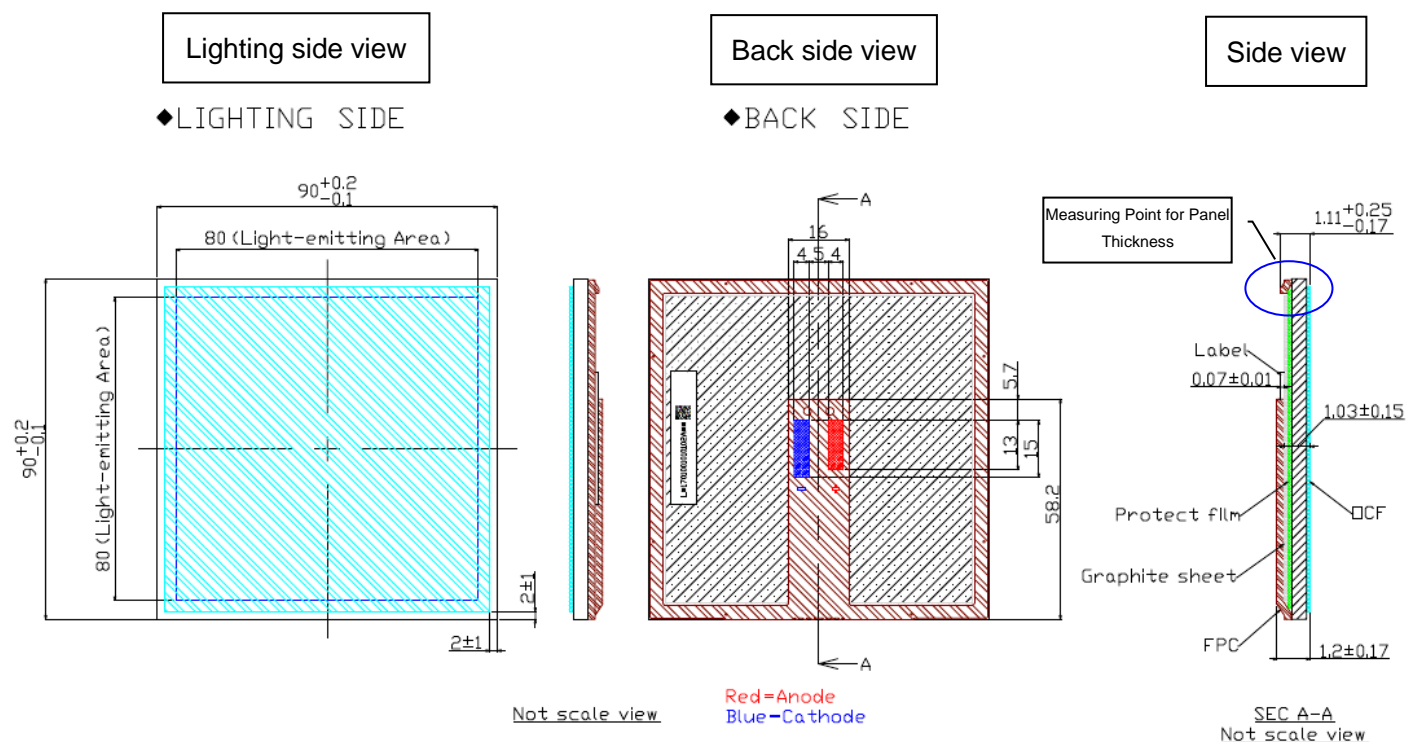
4 Product Diagrams

4.1 Product Appearance and Dimensions (Unit: mm)

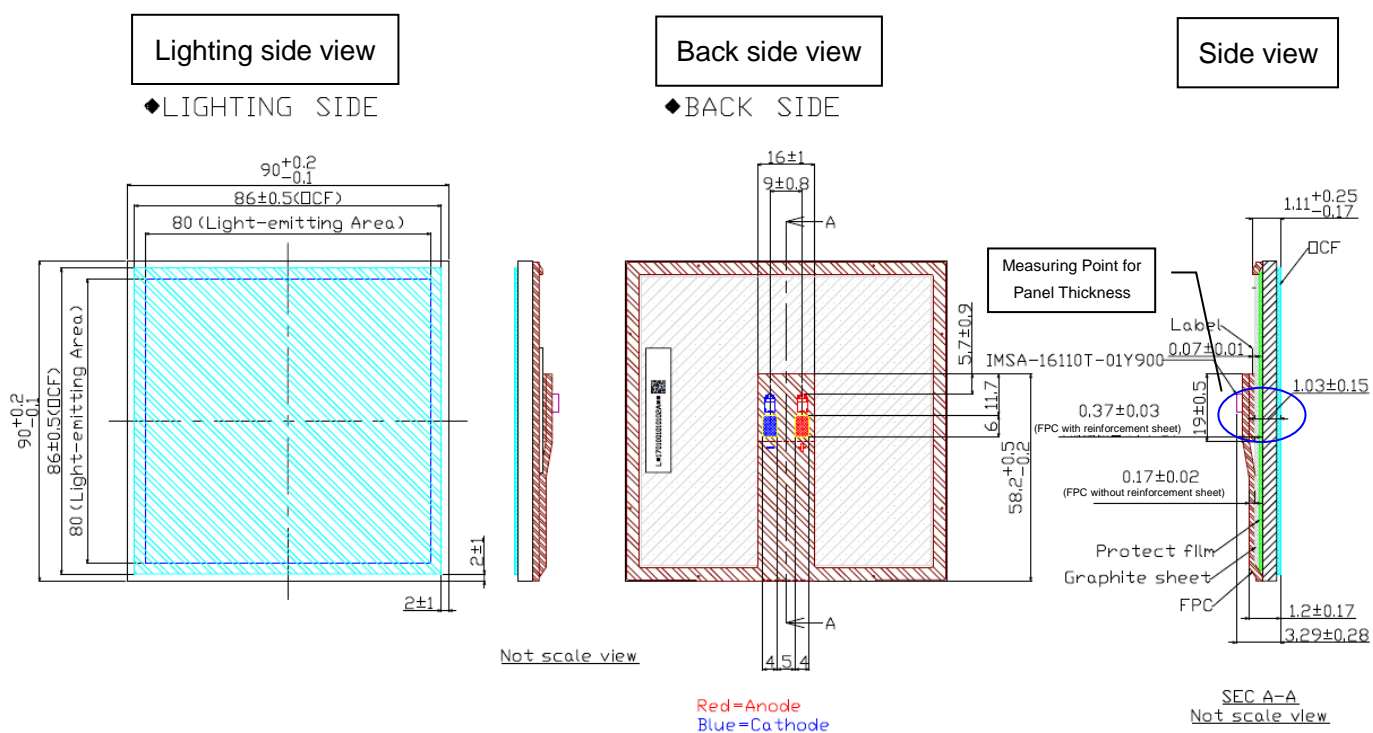
(Figure 1) KN-P-P4-BK-40-U/FU (External FPC)



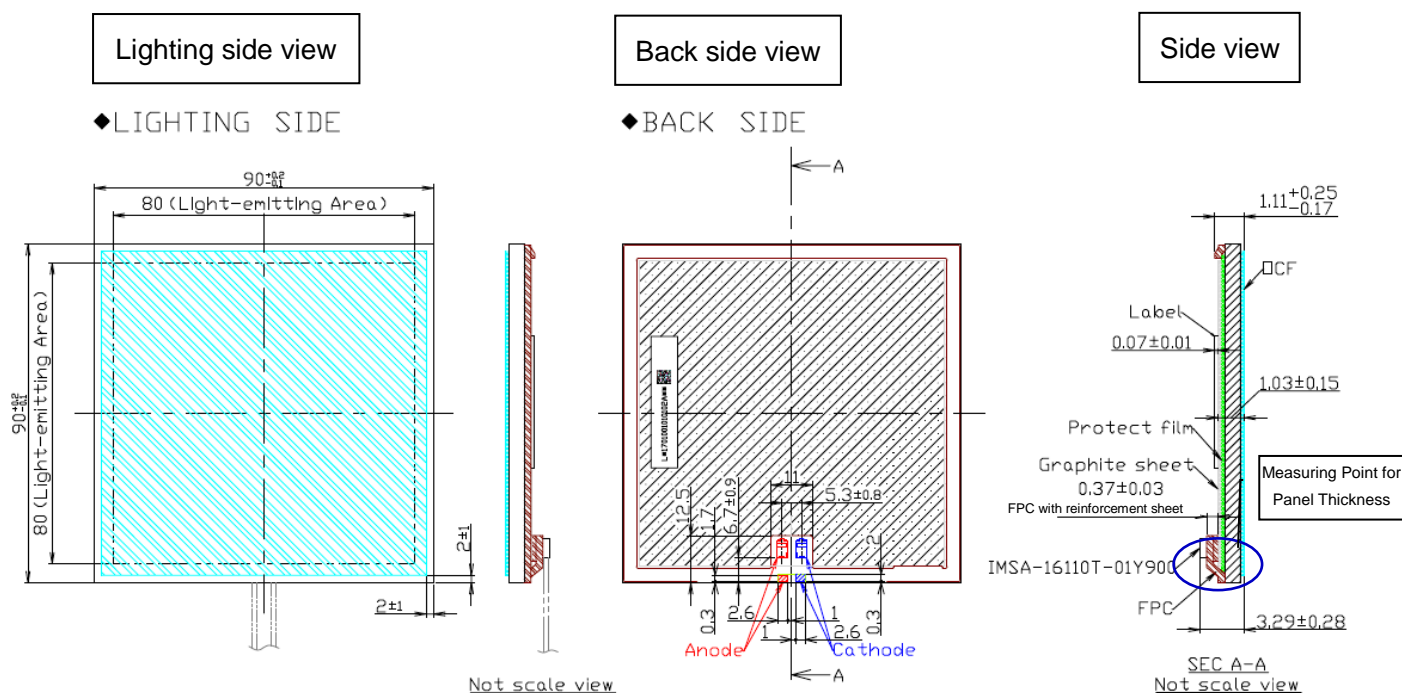
(Figure 2) KN-P-P4-BK-40-U/FI (Internal FPC)



(Figure 3) KN-P-P4-BK-40-U/FC (Connector premounted FPC)



(Figure 4) KN-P-P4-BK-40-U/FS (Connector premounted FPC)



4.2 Connectors for Connector premounted FPC type

○ Mount connector types

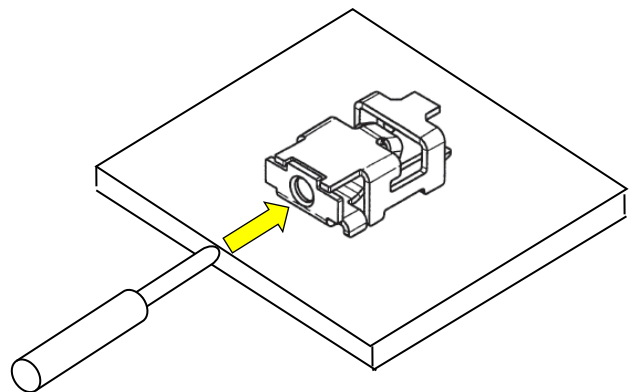
Iriso Electronics Co., Ltd. Model No.: IMSA-16110T-01Y900

Please have the following lead cables ready, as the connector is a direct cable insertion type.

- (1) Mating cable: $\phi 0.645 \pm 0.02 \text{mm}$ (AWG22 single wire)
- (2) Mating cable: $\phi 0.645 \pm 0.04 \text{mm}$ (AWG24 twisted; *after solder coating)

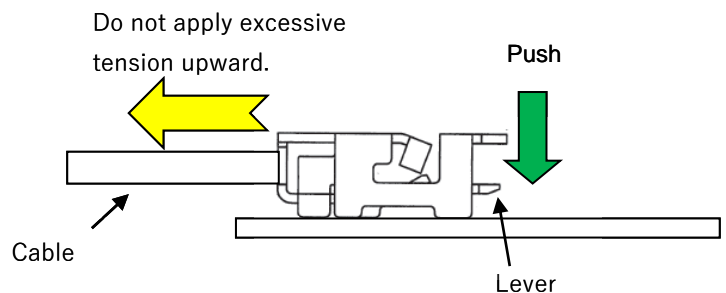
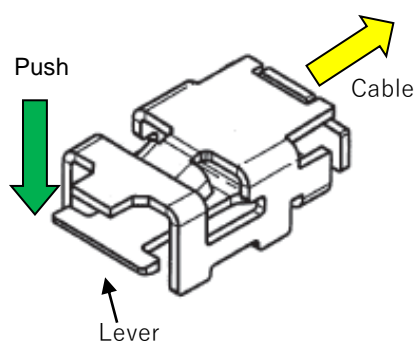
○ Cable Insertion Method

- (1) Insert the cable from the direction indicated by the arrow in the diagram on the right.
- (2) Ensure that the cable core is 5 mm or longer. Use a straight cable core.



○ Cable Removal Method

- (1) Pull out the cable horizontally while pushing down on the levers shown in the diagram below with a tool or the like. Applying upward or otherwise unreasonable force in the process may cause damage to the connector.
- (2) It is recommended that a cable that has been removed once be replaced with a new one.



○ Other

- (1) Avoid applying excessive upward force after inserting a cable.
- (2) Although the repeated insertion and removal of a cable has no adverse impact on the electrical connection, it may result in a decline in cable retention.
- (3) Ensure that the cable is sufficiently long in order to avoid placing a load on the connector.
- (4) When bending the cable, be sure to bend at the insulation.

5 Precautions for using OLED lighting panels properly

5.1 OLED lighting panel driver design/selection

This panel must be used below the forward current and peak current in 2.1 Absolute Maximum Rating.

This panel is designed for using with, and must be used with a constant current driver (power supply).

The drive must be operated with a protection circuit.

Pay attention to polarity (anode (+) and cathode (-)) when making connections.

5.1.1 Detection of increasing voltage in OLED lighting panel, and shut down of panel current

As a countermeasure to ensure that heat generated by a voltage increase is dissipated, use a constant-current driver (power supply) with the functions described below or add appropriate protection circuits to each panel.

- When it is detected that voltage exceeding 13 V is applied to a single panel, current to the panel should be shut down.
- When it is detected that voltage exceeding 13 V is applied to a single panel, the applied voltage should be lowered to ensure that panel power consumption does not increase.

5.1.2 When driving a single OLED lighting panel

Refer to Figure 5.1.1.

Use constant-current driver (power supply) with the functions described below or add an appropriate protection circuit that provides the functions described below.

- As indicated in 5.1.1, current should be shut down or the panel voltage should be reduced to prevent from increasing power consumption by detecting panel voltage increase.
- When panel damage results in lower resistance or a short-circuit, the voltage drop should be detected and current should be shut down.

5.1.3 When driving multiple OLED lighting panels connected in series

Refer to Figure 5.1.2.

Install an appropriate protection circuit that provides the functions described below for each panel connected in series.

- As indicated in 5.1.1, when it is detected that a voltage increases on each panel in series connection of multiple panels, current to each panel should be shut down or the panel voltage should be reduced to prevent from increasing power consumption.
- When damage or other causes in some panels connected in series result in lower resistance or a short-circuit, the voltage drop should be detected and current should

be shut down.

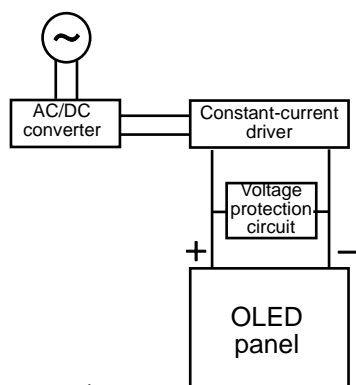
5.1.4 When driving multiple OLED lighting panels connected in parallel

Refer to Figure 5.1.3.

Including the situation when the circuits connected in series as in 5.1.3 are connected in parallel.

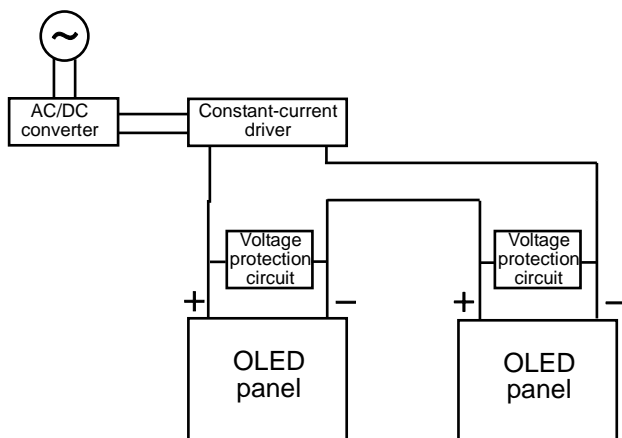
Each parallel connected line in the circuit should be provided with a constant-current driver (power supply) preparing against lower resistance, a short-circuit, high resistance or an open circuit, which are caused by the panel damage. The same precautions described in 5.1.3 are applied on each parallel connection lines.

5.1.5 Examples of Recommended Circuit Connection



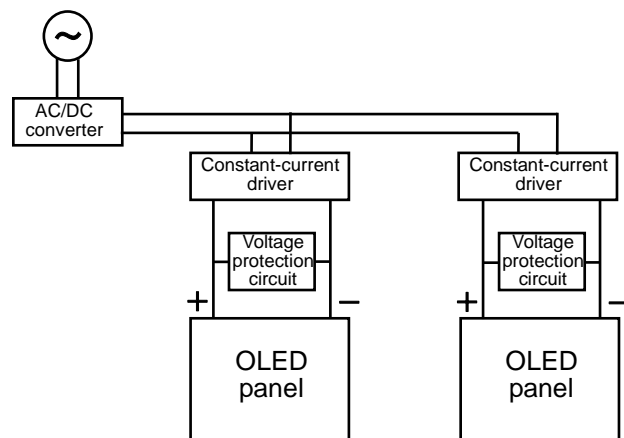
(Figure 5.1.1)

Operation of Single OLED Lighting Panel



(Figure 5.1.2)

Operation of Multiple OLED Lighting Panels Connected in Series



(Figure 5.1.3)

Operation of Multiple OLED Lighting Panels Connected in Parallel

5.2 Prevention from Dark Spot

5.2.1 OLED lighting material and encapsulation technology

Organic materials constituting OLED device easily degrade by moisture, and this degradation causes non-light emitting area, called "Dark Spot".

OLED lighting panels have the encapsulation technology to prevent moisture from outside.

For more detailed information, refer our web site;

<http://www.kanekaoled.jp/enstrength/technology.html>

5.2.2 OLED lighting panels handling to prevent Dark Spot

KANEKA OLED lighting panels form the encapsulation film on the back side of the light-emitting surface. This is to prevent moisture from outside. The protection film (the film color is black) is glued on the encapsulation film.

When a force is applied to the OLED lighting panel locally, the encapsulation film would be damaged. And the Dark Spot would be produced as the result.

The force examples are; pushing the back side surface by a finger, scratching or pushing the back side surface by sharp edge materials, pushing down OLED lighting panel on the small rigid particles, etc.

To prevent Dark Spot

Please hold the side edges by fingers gently when you treat OLED lighting panels. Do not push the OLED lighting panels surface.

Please clean both the OLED lighting panel back side and its casing surface when you install the OLED lighting panel in the casing. When Dust or Burr exists between OLED lighting panel back side and its casing, the encapsulation can be damaged by pushing the panel on the casing surface. Also, if the OLED lighting panel casing surface is too rough, then it would damage the encapsulation. The encapsulation damage allows the moisture to penetrate into the organic material.

5.2.3 Dark Spot Example



(Figure 5.2.1)

Dark Spot on the light-emitting surface: Dark Spot diameter is about 8mm



(Figure 5.2.2)

Point dent at back side: the point dent is on the protection film at back side of the Dark Spot.



(Figure 5.2.3)

Enlargement of the point dent shown in Figure 5.2.2. The diameter of the dent is about 0.6mm.