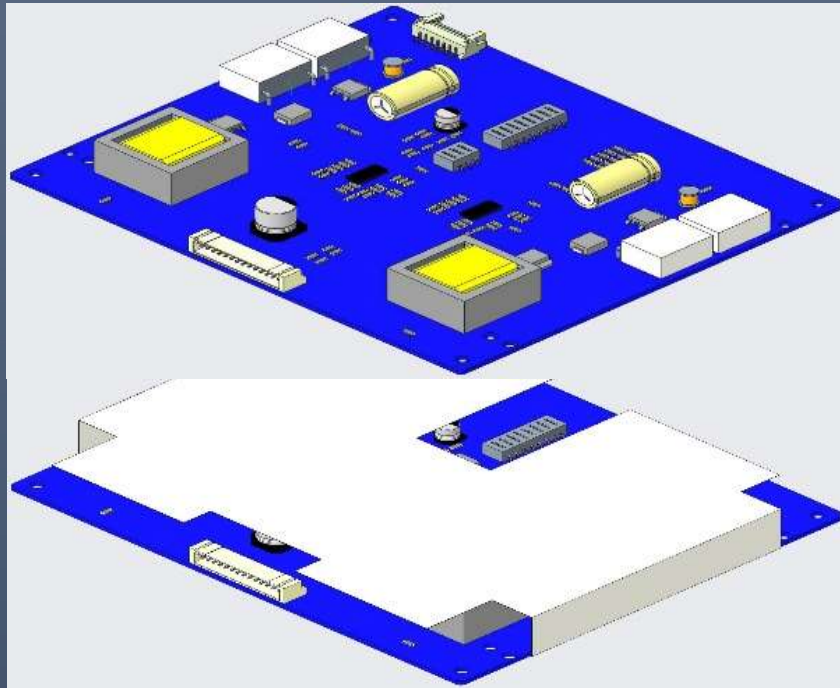


Data Sheet



*Product Name : LED Driver
(for Multi Panel Supportable Type)*

*Model No : CVT456-xx
(the “xx” means the hardware setting type depending
on target LCD model)*

Contents

| | |
|--|-----------|
| Revision History..... | 3 |
| 1. Spec Summary..... | 4 |
| 2. Output Voltage and Current for targeting LCD Models..... | 4 |
| 3. Absolute Rating | 8 |
| 3.1 Temperature | 8 |
| 3.2 Humidity..... | 8 |
| 3.3 Ripple and Noise..... | 8 |
| 4. Electrical Characteristics..... | 9 |
| 4.1 Input Requirement | 9 |
| 5. Block Diagram | 10 |
| 6. Connector and Pin Assignment..... | 11 |
| 7. Dimension and Picture | 13 |
| 7.1 Dimension (152.5 x 130 mm) | 13 |
| 7.2 Pictures | 14 |
| 8. Dip Switch Details | 16 |
| 8.1 Forwarding Current level Setting (SW 1 : Switch 1) | 16 |
| 9. Power Input Cable (Optional Accessory)..... | 17 |
| 9.1 Interconnection Cable..... | 17 |
| 10. Ordering Information | 18 |

Revision History

| PCB Version | Rev. date | Revision Details |
|-------------|-----------|--|
| ES1 | Aug. 2018 | <ul style="list-style-type: none"> ● Engineering Sample |
| R1 | Feb. 2019 | <ul style="list-style-type: none"> ● Initial version issued |
| | May 2019 | <ul style="list-style-type: none"> ● The 49", LD490EQE-FKA1 model has been verified by real panel test. |
| | May 2020 | <ul style="list-style-type: none"> ● The 40", Innolux, S400HJ6-LE8 model was adopted by setting type "E1" refer to page 5 |
| | Jun. 2020 | <ul style="list-style-type: none"> ● The 55", LG, LD550EQE-FPA1 model was adopted by setting type "C" refer to page 5 |
| | Jul. 2020 | <ul style="list-style-type: none"> ● The 49", LG, LD490EQE-FPA2 model was adopted by setting type "E2" refer to page 6 |
| | | <ul style="list-style-type: none"> ● The 55", LG, LD550EQE-FPA2 model was adopted by setting type "C" refer to page 5 |
| | | <ul style="list-style-type: none"> ● The 43", LG, LD430EQE-FPA2 model was adopted by setting type "E2" refer to page 5 |
| | | <ul style="list-style-type: none"> ● The 65", LG, LD650EQE-FPA2 model was adopted by setting type "E3" refer to page 6 |
| | | <ul style="list-style-type: none"> ● The LG 43", 49" & 55" models are adopted by setting type "E4" refer to page 6 : LD430EQE-FPA1, LD490EQE-FPA1, LD550EQE-FPA1 |
| | Aug 2020 | <ul style="list-style-type: none"> ● Changing the Product Part Numbering Style : from "CVT456-MULTI2" to "CVT456-xxx...xxx" (the "xxx...xxx" means the target LCD Part Number.) Refer to the page16 (Chapter 10) example of part numbering |
| | Nov 2020 | <ul style="list-style-type: none"> ● Addition of Channel numbers and power consumption ● Wrong data correction : relevant page - page4 ~ page6 : color in red ● Update the Pin Map Description for CN300 & CN301 : page 11 |
| | Jan 2021 | <ul style="list-style-type: none"> ● Changing the model numbering system CVT456B, CVT456C, CVT456D & CVT456E : relevant page - page4 ~ page6 |
| | Jul 2021 | <ul style="list-style-type: none"> ● Changing the Electrical spec per LG Display Spec change : from Preliminary LCD Spec to Final version spec (LD490EQE-FPA2, LD550EQE-FPA2, LD650EQE-FPA2) Refer to the page6 (Chapter 2) CVT456E2 & CVT456E3 |
| | | |
| | | |

1. Spec Summary

This specification defines all the technical figures as an users' manual regarding this LED driver supporting various type displays 40", 43", 49", 55" & 65" models indicated below which have not been built-in the mating LED driver..

2. Output Voltage and Current for targeting LCD Models

This LED Driver has been designed for the purpose of various LCD model by one hardware. However too many kinds of wide range spec requirement caused cannot to meet all LCD models by one hardware due to a certain technical (electrical rating) limitation.

Thus, this LED Driver model has been classified based on below key parameters.

1/. Firstly output connector type and model

2/. Secondly the OVP (Over Voltage Protection) level as indicated below.

- The 1st group : for up to **120V** model
: resister **R208, R508 by 6.2 kOhm** / F grade, 1% adoption
- The 2nd group : for from **120V to 180V** range model
: resister **R208, R508 by 4.2 kOhm** / F grade, 1% adoption
- The 3rd group : for from **180V to 250V** range model
: resister **R208, R508 by 3.0 kOhm** / F grade, 1% adoption

1) **CVT456B**

CVT456B1

- Output Connector: **CN200**, p/n - 20037WR-H07AA / Yeon-Ho

- OVP (Over Voltage Protection) Range : **120V ~ 180V**,

Relevant resister setting guide : **R208, R508 by 4.2 kOhm** / F grade, 1% model

| Panel Type | CH & Power Consumption | Setting guide (DIP Switch) | Output Voltage Range | | | Output Constant Current (mA) | | |
|---------------|------------------------|------------------------------|----------------------|-------|-------|------------------------------|------|-------|
| | | | Min. | Typ. | Max. | Min. | Typ. | Max. |
| LD430EUE-FHB1 | 2CH, 36.6W | #2 | - | 118.2 | 140 | 147.3 | 155 | 162.7 |
| LD430EUE-FHC1 | 2CH, 36.6W | #2 | 99 | 118.2 | 140 | 147.3 | 155 | 162.7 |
| LC430EUE-FHM1 | 2CH 43.4W | #4 | 110.9 | 120.5 | 129 | 171 | 180 | 189 |
| LC430EGE-FHM1 | 2CH, 50W | #4 | 127.8 | 139 | 150.3 | 171 | 180 | 189 |
| LD490EUE-FHB1 | 2CH, 43.9W | #3 | 138.2 | 129.2 | 147.2 | 160 | 170 | 180 |
| LD490EUE-FHC1 | 2CH, 43.9W | #3 | 138.2 | 129.2 | 147.2 | 160 | 170 | 180 |
| LD490EGE-FHM1 | 2CH, 56.9W | #4 | 145.4 | 158.1 | 170.9 | 171 | 180 | 189 |
| LC490EUE-FHM1 | 2CH, 47W | #3 | 129.2 | 138.2 | 147.2 | 160 | 170 | 180 |

LED Driver for Multi Panel Supportable

CVT456B2

- Output Connector: **CN200**, p/n - 20037WR-H07AA / Yeon-Ho
- OVP (Over Voltage Protection) Range : **180V ~ 252V**,
Relevant resister setting guide : R208, R508 by 3.0 kOhm / F grade, 1% model

| Panel Type | CH & Power Consumption | Setting guide (DIP Switch) | Output Voltage Range | | | Output Constant Current (mA) | | |
|---------------|------------------------|----------------------------|----------------------|-------|-------|------------------------------|------|-------|
| | | | Min. | Typ. | Max. | Min. | Typ. | Max. |
| LD490EUE-FHA1 | 2CH, 73.7W | #4 | 188.1 | 204.6 | 221.1 | 171 | 180 | 189 |
| LD550EUE-FHA1 | 2CH, 83.7W | #4 | 213.8 | 232.5 | 251.3 | 171 | 180 | 189 |
| LD550EUE-FHB1 | 2CH 59.37W | #2 | 175.8 | 191.5 | 207.3 | 147.3 | 155 | 162.7 |
| LD550EUE-FHC1 | 2CH 59.37W | #2 | 175.8 | 191.5 | 207.3 | 147.3 | 155 | 162.7 |
| LD550EGE-FHM1 | 2CH, 76.7W | #4 | 170.4 | 185.4 | 200.4 | 171 | 180 | 189 |
| LC550EGE-FHM1 | 2CH, 66.8W | #4 | 170.4 | 185.5 | 200.4 | 171 | 180 | 189 |
| LC550EUE-FJM1 | 2CH, 66.8W | #4 | 170.4 | 185.5 | 200.4 | 171 | 180 | 189 |
| LD650EGE-FHM1 | 2CH, 75.9W | #4 | 193.8 | 210.8 | 227.8 | 171 | 180 | 189 |
| LC650EGE-FHM1 | 2CH, 75.9W | #4 | 193.8 | 210.8 | 227.8 | 171 | 180 | 189 |
| LC650EUF-FHB1 | 2CH, 80.1W | #4 | 220.3 | 222.5 | 244.1 | 171 | 180 | 189 |

2) **CVT456D**

CVT456D1 (special OEM version)

- Output Connector: **CN500** and **CN501** p/n – 12505WR-12P / Yeon-Ho
- OVP (Over Voltage Protection) Range : **under 50V**, Needs to change not only the key resisters (R208, R508) but also many other components

| Panel Type | CH & Power Consumption | Setting guide (DIP Switch) | Output Voltage Range | | | Output Constant Current (mA) | | |
|--------------------------|------------------------|----------------------------|----------------------|-------|-------|------------------------------|------|------|
| | | | Min. | Typ. | Max. | Min. | Typ. | Max. |
| Innolux 40", S400DJ1-KS5 | 8CH, 54.64W | #1 | 34.83 | 37.94 | 41.92 | 171 | 180 | 189 |

CVT456D2 (special OEM version)

- Output Connector: **CN500** p/n – 12505WR-12P / Yeon-Ho
- OVP (Over Voltage Protection) Range : **under 50V**, Needs to change not only the key resisters (R208, R508) but also many other components

| Panel Type | CH & Power Consumption | Setting guide (DIP Switch) | Output Voltage Range | | | Output Constant Current (mA) | | |
|--------------------------|------------------------|----------------------------|----------------------|------|------|------------------------------|------|------|
| | | | Min. | Typ. | Max. | Min. | Typ. | Max. |
| Innolux 40", S400HJ6-LE8 | 8CH, 28.94W | #8 | 32.8 | 36 | 38.0 | 95 | 100 | 105 |

LED Driver for Multi Panel Supportable

3) **CVT456E**

CVT456E2

- Output Connector : **CN300** p/n – IS100-L08T-46-B / Yeon-Ho
and **CN301** p/n – IS100-L08T-46-C / Yeon-Ho

- OVP (Over Voltage Protection) Range : **120V ~ 180V**,

Relevant resister setting guide : R208, R508 by 4.2 kOhm / F grade, 1% model

| Panel Type | CH & Power Consumption | Setting guide (DIP Switch) | Output Voltage Range | | | Output Constant Current (mA) | | |
|---------------|------------------------|----------------------------|----------------------|-------|-------|------------------------------|------|------|
| | | | Min. | Typ. | Max. | Min. | Typ. | Max. |
| LD430EQE-FPA2 | 6CH, 47.7W | #8 | 150 | 159 | 169 | 47.5 | 50 | 52.5 |
| LD490EQE-FPA2 | 6CH, 72.5W | #6 | 123.2 | 134.2 | 145.2 | 85.5 | 90 | 94.5 |
| LD550EQE-FPA2 | 6CH, 78.7W | #6 | 133.7 | 145.7 | 157.7 | 85.5 | 90 | 94.5 |
| LD430EQE-FLA1 | 6CH, 52.8W | #7 | 151.1 | 160.1 | 170.1 | 52.2 | 55 | 57.7 |
| LD550EQE-FKA1 | 6CH, 82W | #5 | - | 148 | - | 90.2 | 95 | 99.7 |

CVT456E3

- Output Connector : **CN300** p/n – IS100-L08T-46-B / Yeon-Ho
and **CN301** p/n – IS100-L08T-46-C / Yeon-Ho

- OVP (Over Voltage Protection) Range : **180V ~ 252V**,

Relevant resister setting guide : R208, R508 by 3.0 kOhm / F grade, 1% model

| Panel Type | CH & Power Consumption | Setting guide (DIP Switch) | Output Voltage Range | | | Output Constant Current (mA) | | |
|---------------|------------------------|----------------------------|----------------------|--------|--------|------------------------------|------|------|
| | | | Min. | Typ. | Max. | Min. | Typ. | Max. |
| LD650EQE-FPA2 | 6CH, 102.1W | #5 | 170.23 | 178.93 | 187.63 | 90.2 | 95 | 99.7 |
| LD650EQE-FJA1 | 6CH, 102W | #5 | 170 | 179 | 188 | 90.2 | 95 | 99.7 |

CVT456E4

- Output Connector : **CN300** p/n – IS100-L08T-46-B / Yeon-Ho
and **CN301** p/n – IS100-L08T-46-C / Yeon-Ho

- OVP (Over Voltage Protection) Range : **51V ~ 120V**,

Relevant resister setting guide : R208, R508 by 6.2 kOhm / F grade, 1% model

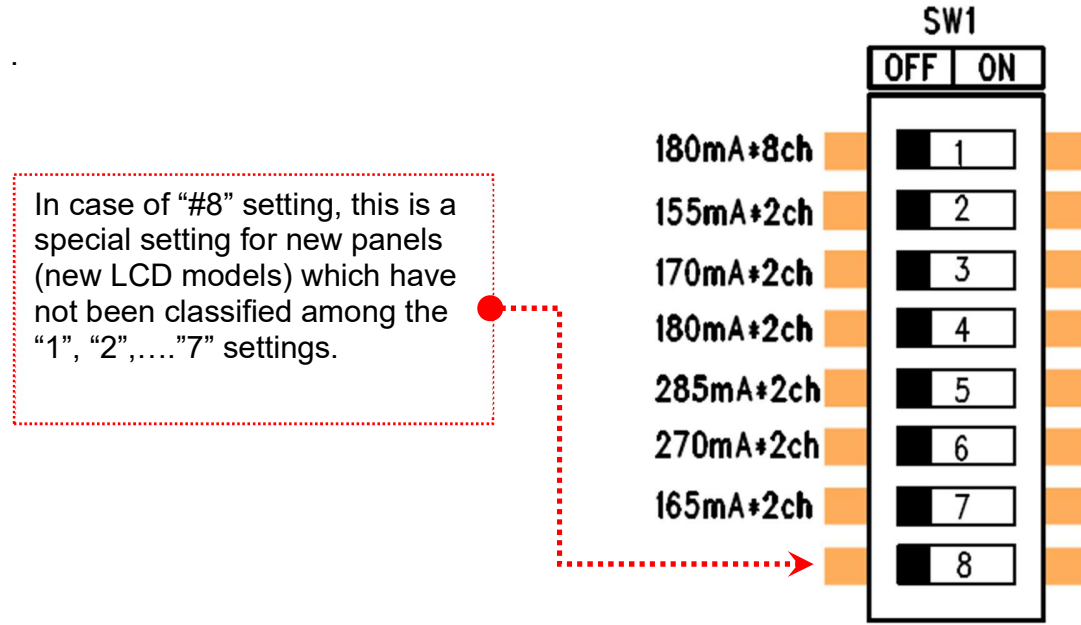
| Panel Type | CH & Power Consumption | Setting guide (DIP Switch) | Output Voltage Range | | | Output Constant Current (mA) | | |
|---------------|------------------------|----------------------------|----------------------|-------|-------|------------------------------|------|------|
| | | | Min. | Typ. | Max. | Min. | Typ. | Max. |
| LD430EQE-FPA1 | 12CH, 71.7W | #8 | 75.2 | 79.7 | 84.5 | 71.3 | 75 | 78.8 |
| LD490EQE-FPA1 | 12CH, 87.8W | #8 | 89.7 | 97.5 | 103.0 | 71.3 | 75 | 78.8 |
| LD550EQE-FPA1 | 12CH, 95.7W | #8 | 97.9 | 106.3 | 112.3 | 71.3 | 75 | 78.8 |

LED Driver for Multi Panel Supportable

[Note - 1] The above list will be updated for future upcoming new models continuously.

[Note - 2]: forwarding current setting

-. When user settle a target LED Driver spec depending the LCD model, users can use the selection switch of forwarding current level which is reserved on the top middle position of PCB as below picture.



3. Absolute Rating

3.1 Temperature

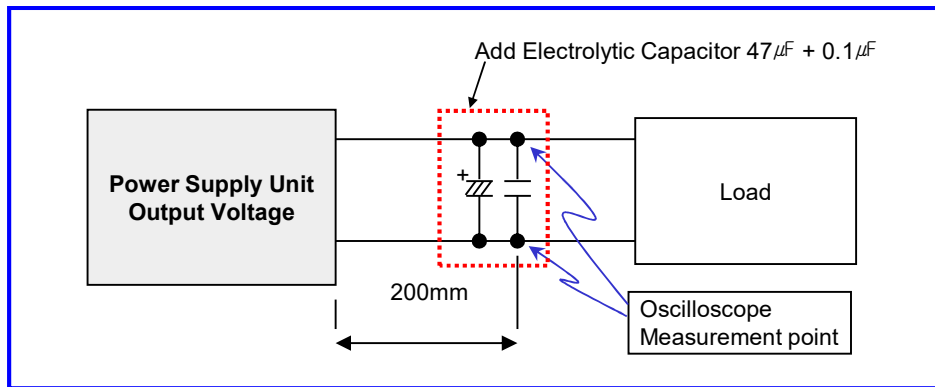
- Operating Temp. : -10 ~ 50 °C
- Storage Temp. : -20 ~ 65 °C

3.2 Humidity

- Operation humidity : 30 ~ 85% non-condensing
- Storage humidity : 5 ~ 90% non-condensing

3.3 Ripple and Noise

Ripple and noise are defined as periodic or random signal over frequency band of 10Hz to 20MHz. Measurements shall be made with an oscilloscope with 20MHz bandwidth.



| Output Voltage | LED Output |
|---------------------------|------------|
| Ripple Voltage Range (mV) | 1200 |

Ripple & Noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uF & 47uF parallel capacitor.

☞ Test condition

Temperature: 25 °C room temperature

Test equipment: No dimming

☞ Over Shoot

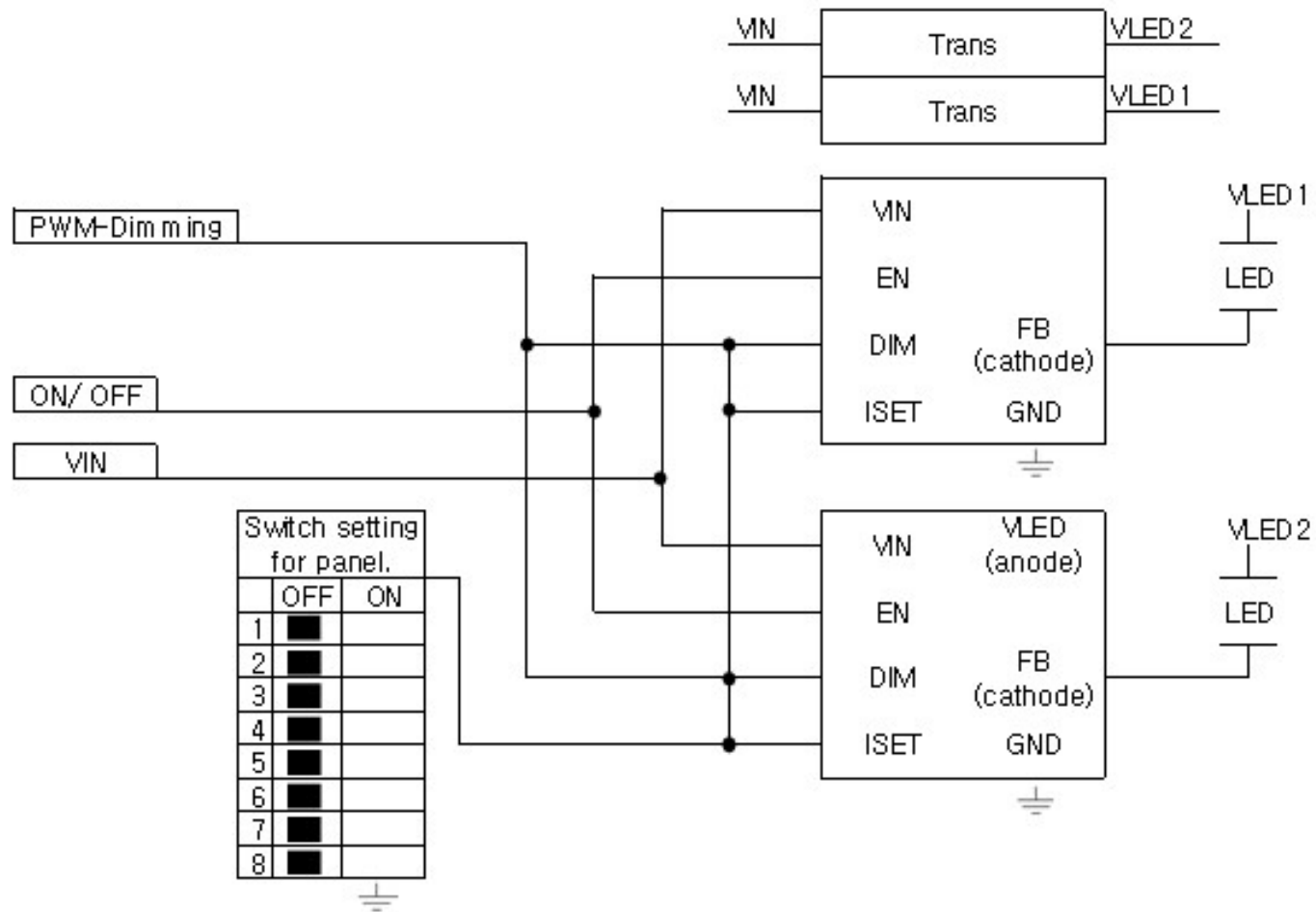
The output overshoot at turn-on shall not exceed 25% of normal voltage value with or without the load connected.

4. Electrical Characteristics

4.1 Input Requirement

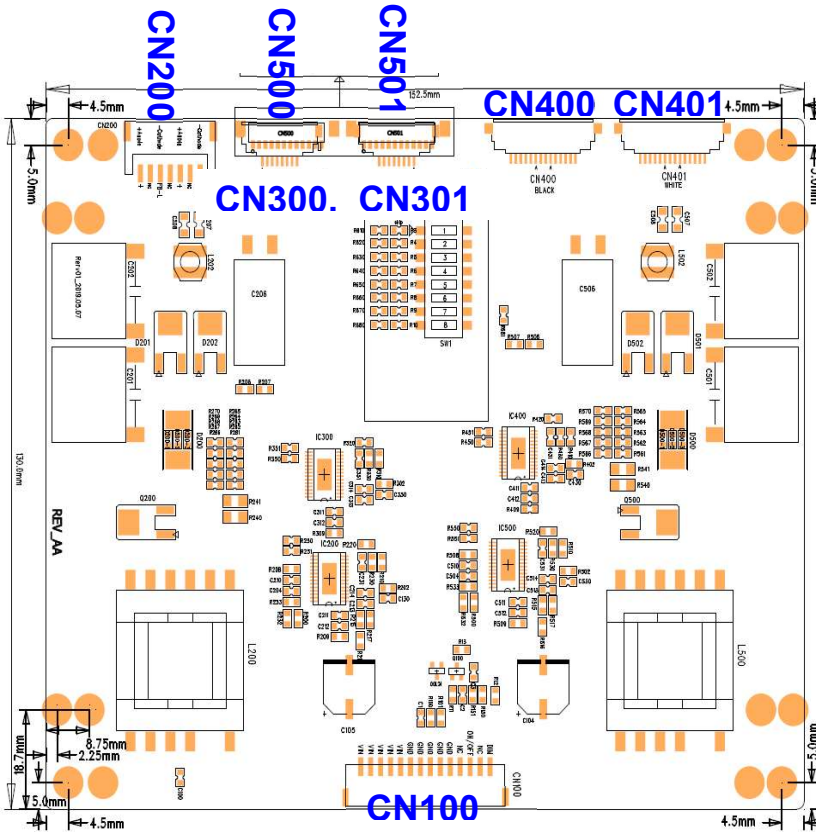
| Parameter | | Symbol | | | | Unit | Remark | |
|--|------------------------|---------|------------|------|-------|------|--------|----------------------------------|
| | | | MIN | TYP | MAX | | | |
| Power Supply Input Voltage | | VBL | 21.6 | 24 | 26.4V | Vdc | | |
| Power Supply Input Current | | IBL | - | - | 5 | A | | |
| Power Supply Input Current (In-rush) | | In-rush | - | - | 10 | A | | |
| Power Consumption | | PBL | - | - | 120 | W | | |
| Input VoltageForControl System Signals | On/Off | On | V on | 2.5 | - | 5.25 | Vdc | |
| | | Off | V off | -0.3 | - | 0.8 | Vdc | |
| | Brightness Adjust | | ExtVBR-B | 10 | - | 100 | % | On Duty |
| | Pulse Duty Level (PWM) | | High Level | 2.5 | - | 5.25 | Vdc | HIGH : On duty LOW : Off duty |
| | | | Low Level | 0 | - | 0.7 | Vdc | |
| | | | PWM Freq. | 100 | - | 1K | Hz | |
| | | | Duty | 10 | - | 100 | % | |

5. Block Diagram



LED Driver for Multi Panel Supportable

6. Connector and Pin Assignment



CN200 : 20037WR-H07AA (YEON-HO)
Panel Type : LG

| Pin No. | Symbol | Description |
|---------|--------|-----------------------------|
| 1 | FB-R | LED Output Current(cathode) |
| 2 | N.C | No Connection |
| 3 | VLED | LED Input Current(anode) |
| 4 | NC | No Connection |
| 5 | FB-L | LED Output Current(cathode) |
| 6 | NC | No Connection |
| 7 | VLED | LED Input Current(anode) |

CN100: 20022WR(YEON-HO)
(YEON-HO / 2mm Pitch, 14Pin)

| Pin No. | Sym- bol | Description |
|---------|----------|--------------------------------|
| 1~5 | VIN | Voltage input (24V) |
| 6~10 | GND | Ground |
| 11 | NC | No Connection |
| 12 | ON/OFF | LED Driver on/off(Active High) |
| 13 | NC | No Connection |
| 14 | DIM | PWM |

| Panel Type : INNOLUX /S400DJ1-KS5 | | | | | |
|-----------------------------------|--------|---------------|----------------------|--------|---------------|
| CN500 : | | | CN501 : | | |
| 12505WR-12P(YEON-HO) | | | 12505WR-12P(YEON-HO) | | |
| Pin No | Symbol | Description | Pin No | Symbol | Description |
| 1 | VLED | ANODE | 1 | VLED | ANODE |
| 2 | VLED | ANODE | 2 | VLED | ANODE |
| 3 | VLED | ANODE | 3 | VLED | ANODE |
| 4 | N.C | No Connection | 4 | N.C | No Connection |
| 5 | N.C | No Connection | 5 | N.C | No Connection |
| 6 | N.C | No Connection | 6 | N.C | No Connection |
| 7 | N.C | No Connection | 7 | N.C | No Connection |
| 8 | N.C | No Connection | 8 | N.C | No Connection |
| 9 | N1 | CATHODE | 9 | N1 | CATHODE |
| 10 | N2 | CATHODE | 10 | N2 | CATHODE |
| 11 | N3 | CATHODE | 11 | N3 | CATHODE |
| 12 | N4 | CATHODE | 12 | N4 | CATHODE |

LED Driver for Multi Panel Supportable

CN300 : IS100-L08T-C46-B

(UJU / Black color)

| Pin No. | Symbol | Description |
|---------|--------|-------------------------------|
| 1 | FB-R1 | LED Output current(Cathode 1) |
| 2 | FB-R2 | LED Output Current(Cathode 2) |
| 3 | FB-R3 | LED Output Current(Cathode 3) |
| 4 | NC | Option : Cathode 4 |
| 5 | NC | Option : Cathode 5 |
| 6 | NC | Option : Cathode 6 |
| 7 | NC | NC |
| 8 | VLED | LED Input Current(anode) |

CN301 : IS100-L08T-C46-C

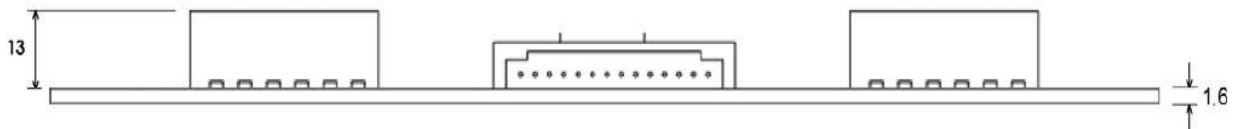
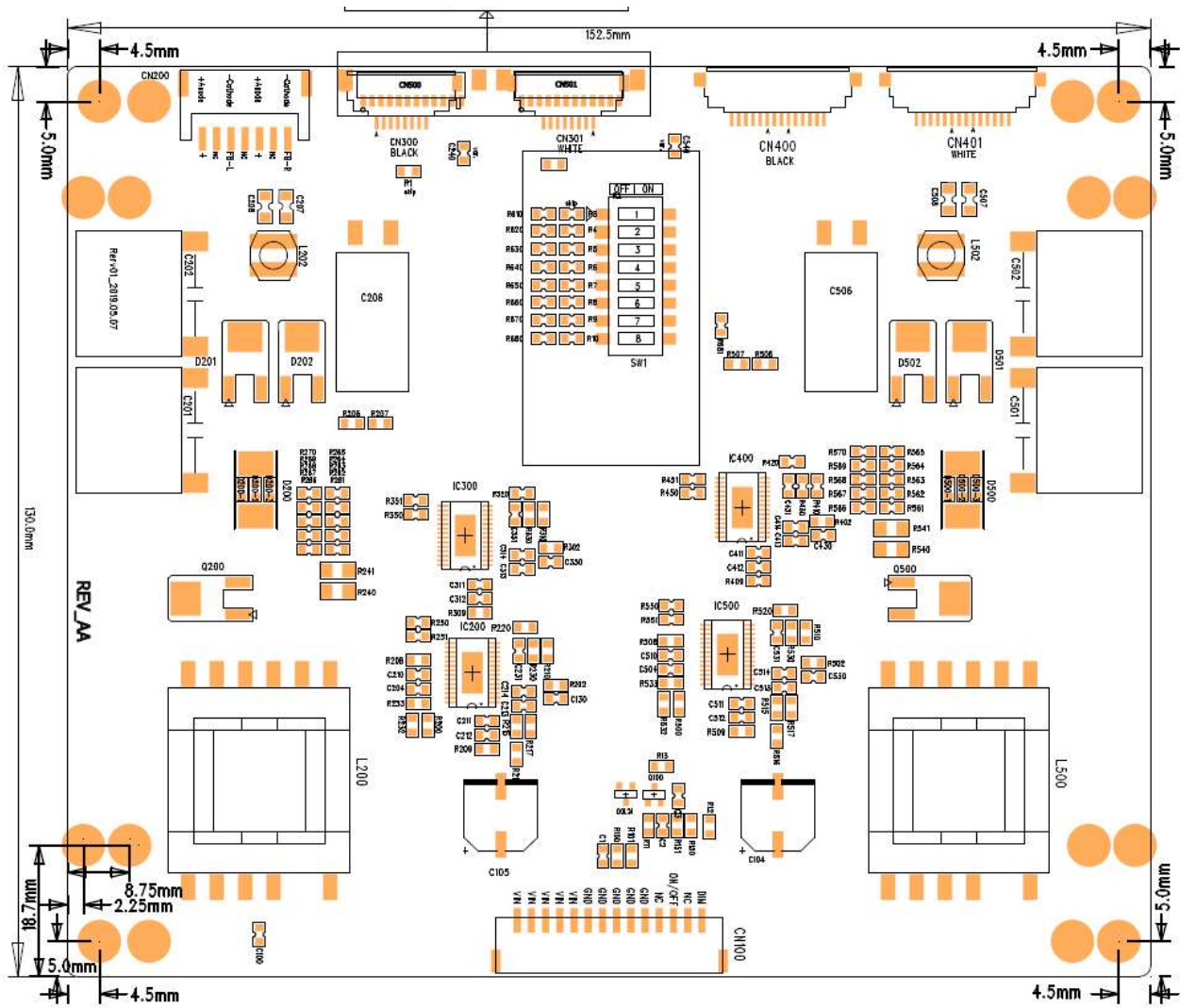
(UJU / Natural color)

| Pin No. | Symbol | Description |
|---------|--------|-------------------------------|
| 1 | VLED | LED Input Current(anode) |
| 2 | NC | NC |
| 3 | NC | Option : Cathode 6 |
| 4 | NC | Option : Cathode 5 |
| 5 | NC | Option : Cathode 4 |
| 6 | FB-L3 | LED Output Current(Cathode 3) |
| 7 | FB-L2 | LED Output Current(Cathode 2) |
| 8 | FB-L1 | LED Output Current(Cathode 1) |

LED Driver for Multi Panel Supportable

7. Dimension and Picture

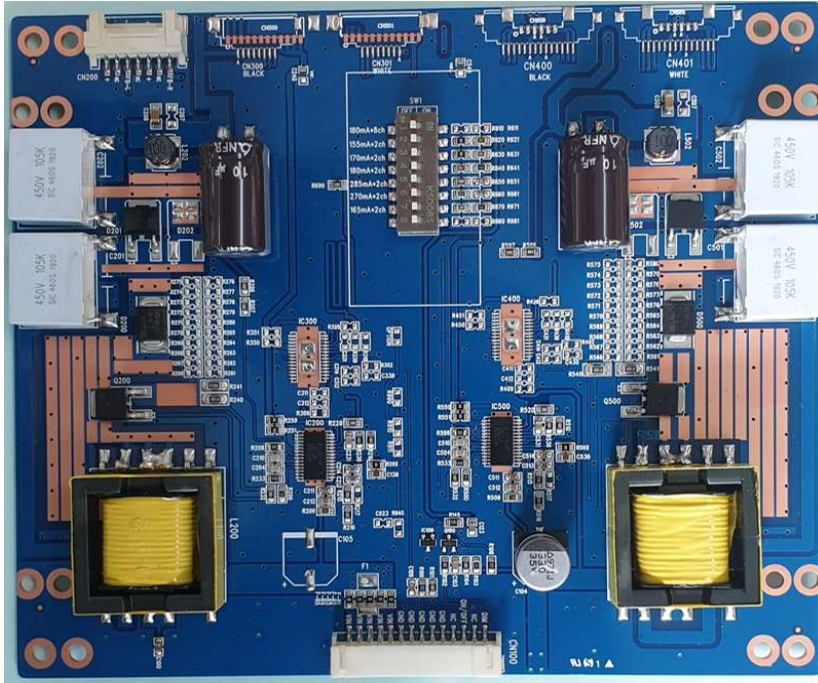
7.1 Dimension (152.5 x 130 mm)



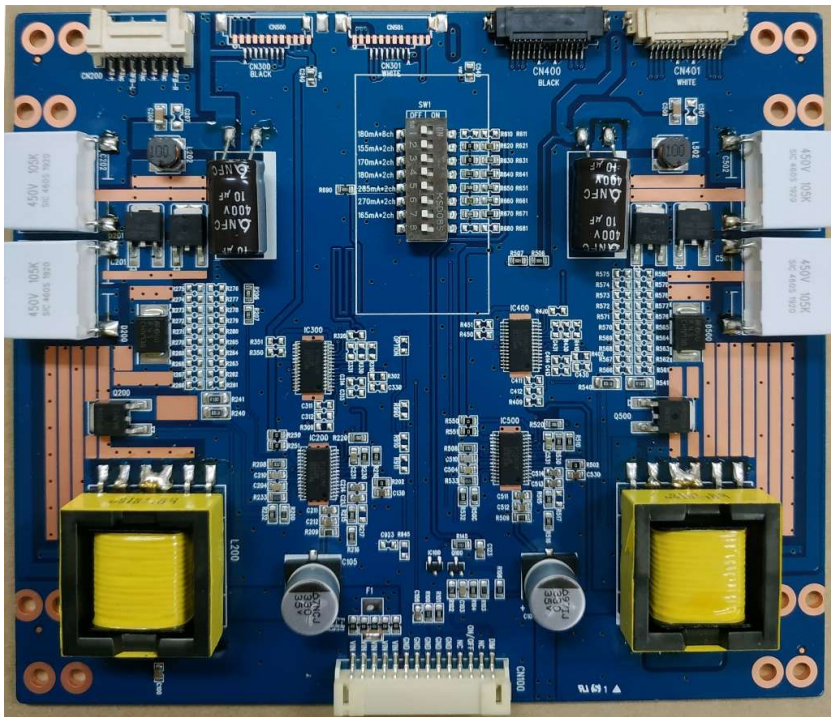
LED Driver for Multi Panel Supportable

7.2 Pictures

CN200 type Connector Model

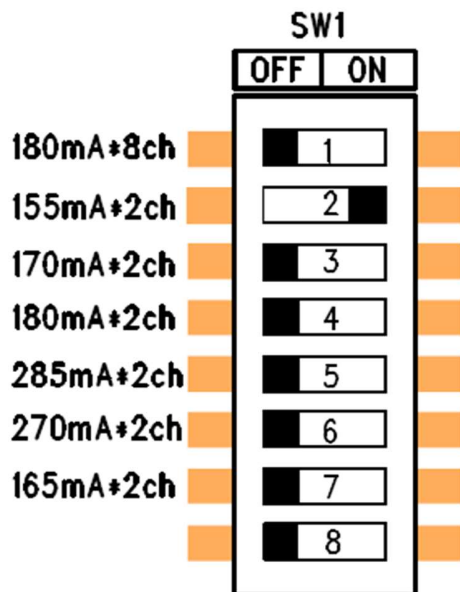
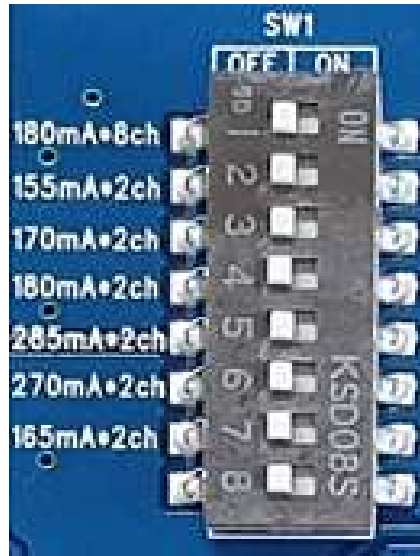
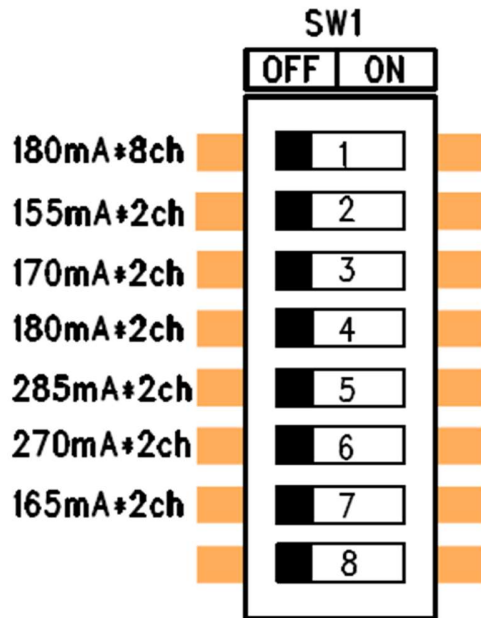


CN400 / CN401 type Connector Model



8. Dip Switch Details

8.1 Forwarding Current level Setting (SW 1 : Switch 1)



Setting example
: LG / 155mA x 2ch

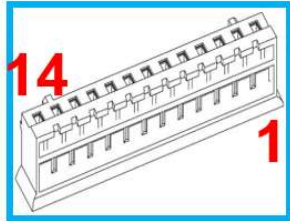
LED Driver for Multi Panel Supportable

9. Power Input Cable (Optional Accessory)

9.1 Interconnection Cable

(between this LED Driver and user's SMPS & user's Driving Board)

PN : CBL501-MULTI2-OPEN-STD



500mm

| LED Driver / GH688A / CN1 | | | |
|-------------------------------|-----|--------|-------|
| WAFER : 20022WR-14AML(YEONHO) | | | |
| HOUSING : 20022HS-14(YEONHO) | | | |
| FLYING LEAD | WHT | 24V | 1 |
| FLYING LEAD | WHT | 24V | 2 |
| FLYING LEAD | WHT | 24V | 3 |
| FLYING LEAD | WHT | 24V | 4 |
| FLYING LEAD | WHT | 24V | 5 |
| FLYING LEAD | WHT | GND | 6 |
| FLYING LEAD | WHT | GND | 7 |
| FLYING LEAD | WHT | GND | 8 |
| FLYING LEAD | WHT | GND | 9 |
| FLYING LEAD | WHT | GND | 10 |
| - | - | NC | 11 NC |
| FLYING LEAD | WHT | ON/OFF | 12 |
| - | - | NC | 13 NC |
| FLYING LEAD | WHT | DIM | 14 |



LED Driver for Multi Panel Supportable

10. Ordering Information

This is an example how can user use a relevant product part number for their PO issuance.

| Order Code | Description | Status |
|-----------------|---|--|
| CVT456B | LED Driver for LG 43", LD430EUE-FHB1 | |
| CVT456E2 | LED Driver for LG 43", LD430EQE-FLA1 | |
| CVT456D | LED Driver for Innolux 40", S400DJ1-KS5 | |
| CVT456D2 | LED Driver for Innolux 40", S400HJ6-LE8 | |
| CVT456E2 | LED Driver for LG 43", LD430EQE-FPA2 | |
| CVT456E3 | LED Driver for LG 65", LD650EQE-FPA2 | |
| CVT456E4 | LED Driver for LG 43", 49" & 55" : LD430EQE-FPA1, LD490EQE-FPA1, LD550EQE-FPA1 | One hardware supports 3 different models |
| | | |