

# LED Driver

## LNP-C 35W Series / LNP-□A35WBC□



# LNP-C

### Highlights & Features

- Constant current design
- Input voltage from 198-264Vac
- Up to 89.5% efficiency
- Independent or built-in type
- Meets IEC/EN 61000-3-2, Class C
- Fixed output current
- IP20 assembly for indoor applications

#### Independent:



#### Built-in:



### Safety Standards



#### Model Number:

LNP-□A35WBC□

#### Unit Weight:

**Independent:** 0.18 kg (0.4 lb)

**Built-in:** 0.175 kg (0.39 lb)

#### Dimensions (L x W x D):

115 x 45 x 29 mm  
(4.52 x 1.77 x 1.14 inch)

### General Description

Delta LNP-C series of fixed output current LED drivers comes with affordable and reliable features. Compatible with COB and mid-power LEDs from any LED manufacturer. Independent type housing design for stand-alone installations. Various output current selection for different lumen application. Meet major Europe safety certifications and are compliant with EN55015 Immunity/Emissions/Harmonic requirements. The products are designed and rigorously tested to work in various indoor LED lighting conditions.

### Model Information

#### LNP-C LED Driver

| Model Number    | Input Voltage Range | Rated Output Voltage | Rated Output Current |
|-----------------|---------------------|----------------------|----------------------|
| LNP-07A35WBCA/B | 220-240Vac Typical  | 24-43Vdc             | 700mA                |
| LNP-08A35WBCA   | 198-264Vac Range    | 24-43Vdc             | 800mA                |
| LNP-09A35WBCA   |                     | 24-38Vdc             | 900mA                |
| LNP-10A35WBCA/B |                     | 24-38Vdc             | 1050mA               |

### Model Numbering

| LNP –               | □A  | 35W                                | B                          | C                           | □  |
|---------------------|---|------------------------------------|----------------------------|-----------------------------|--|
| LED Driver Series P | Output Current<br>07A – 700mA<br>08A – 800mA<br>09A – 900mA<br>10A – 1050mA | Output Power<br>(35W series model) | Function<br>B – Fixed type | Region<br>C – EMEA & Others | Product Type<br>A – Independent<br>B – Built-in* |

\*Options

# LED Driver

## LNP-C 35W Series / LNP-□A35WBC□

### Specifications

| Model Number | LNP-07A35WBCA/B | LNP-08A35WBCA | LNP-09A35WBCA | LNP-10A35WBCA/B |
|--------------|-----------------|---------------|---------------|-----------------|
|--------------|-----------------|---------------|---------------|-----------------|

#### Input Ratings / Characteristics

|   |  |            |            |            |
|---|--|------------|------------|------------|
| Normal Input Voltage                          | 220-240Vac   |            |            |            |
| Input Voltage Range                           | 198-264Vac   |            |            |            |
| Normal Input Frequency                        | 50/60 Hz   |            |            |            |
| Input Frequency Range                         | 47-63 Hz   |            |            |            |
| Normal Input Current                          | 0.19A  | 0.21A      | 0.22A      | 0.25A      |
| Efficiency <sup>1)</sup>                      | 230Vac   | 89.5% typ. | 89.5% typ. | 89.5% typ. |
| No load Power Consumption                     | < 0.6W @ 230Vac  |            |            |            |
| Inrush Current<br>(Apk / 50%-us) (Cold Start) | 10A/250us @ 230Vac   |            |            |            |
| Max. no. of LED Driver for<br>Circuit Breaker | 45 pcs for MCB (B type 16A 100% Relative number) / (C type 16A 100% Relative number) |            |            |            |
| Power Factor                                  | > 0.95 @ 230Vac/50Hz at > 20W load   |            |            |            |
| Total Harmonic Distortion                     | < 20% @ 230Vac/50Hz at > 20W load  |            |            |            |
| Leakage Current                               | < 0.7mA @ 230Vac   |            |            |            |

1) 100% Load (typical) and tested after 30 minutes warm up.

#### Output Ratings / Characteristics

|                             |   |            |            |          |
|-----------------------------|---|------------|------------|----------|
| Nominal Output Current      | 700mA   | 800mA      | 900mA      | 1050mA   |
| Output Voltage Range        | 24-43Vdc  | 24-43Vdc   | 24-38Vdc   | 24-38Vdc |
| Max. No Load Output Voltage | 50Vdc   |            |            |          |
| Output Power Range          | 16.8-30.1W  | 19.2-34.4W | 21.6-34.2W | 25.2-40W |
| Output Current Tolerance    | ± 10%   |            |            |          |
| Line Regulation             | ± 5%  |            |            |          |
| Load Regulation             | ± 5%  | ± 5%       | ± 7%       | ± 7%     |
| Output Current Ripple       | Low frequency, 30% @ max load, 40% @ 20W load (ripple = (pk-avg)/avg) |            |            |          |
| Rise Time                   | < 80ms @ 230Vac   |            |            |          |
| Start-up Time               | < 250ms @ 230Vac  |            |            |          |
| Hold-up Time                | 0.5ms typ. @ 230Vac (100% load)                                       |            |            |          |

#### Mechanical

|                        |   |
|------------------------|---|
| Casing                 | Plastic, Color: White, Potting by Asphalt   |
| Dimensions (L x W x D) | 115 x 45 x 29 mm (4.53 x 1.77 x 1.14 inch)  |
| Unit Weight            | Independent: 0.18 kg (0.4 lb)<br>Built-in: 0.175 kg (0.39 lb)   |
| Cooling System         | Convection  |
| Input Connector        | Terminal, 2-pole (L & N), pin spacing 3.5mm, push-button, 0.75~1.5mm <sup>2</sup> , stripping 9-10mm  |
| Output Connector       | Terminal, 2-pole (LED+/-), pin spacing 3.5mm, push-button, 0.75~1.5mm <sup>2</sup> , stripping 9-10mm |

# LED Driver

## LNP-C 35W Series / LNP-□A35WBC□

| Model Number                |               | LNP-07A35WBCA/B  | LNP-08A35WBCA  | LNP-09A35WBCA  | LNP-10A35WBCA/B |
|-----------------------------|---------------|--|----------------|----------------|-----------------|
| <b>Environment</b>          |               |  |                |                |                 |
| Ambient Temperature         | Operating     | -25°C to +55°C   | -25°C to +50°C | -25°C to +55°C | -25°C to +50°C  |
|                             | Storage       | -25°C to +85°C   |                |                |                 |
| Maximum Case Temperature    |               | +85°C  |                |                |                 |
| Lifetime Case Temperature   |               | +80°C  | +85°C          | +80°C          | +85°C           |
| Maximum Housing Temperature |               | +110°C   |                |                |                 |
| Relative Humidity           | Operating     | 10 to 90% RH (Non-Condensing)  |                |                |                 |
|                             | Storage       | 5 to 95% RH (Non-Condensing)   |                |                |                 |
| Drop Test                   | Non-Operating | According to ASTM D-775, 40cm height. Drop to concrete floor as below drawing, total 10 times. |                |                |                 |
|                             |               |  |                |                |                 |
| Vibration                   | Non-Operating | IEC 60068-2-6, Random: 5 Hz to 10 Hz (1G); 30 min per axis for all X, Y, Z direction           |                |                |                 |

### Protections

|                                   |   |          |          |          |
|-----------------------------------|---|----------|----------|----------|
| Over Voltage                      | 44-50Vdc  | 44-50Vdc | 39-50Vdc | 39-50Vdc |
|                                   | Auto-Recovery when the fault is removed           |          |          |          |
| Open Load                         | Auto-Recovery when the fault is removed           |          |          |          |
| Short Circuit                     | Auto-Recovery when the fault is removed           |          |          |          |
| Over Temperature                  | Auto-Recovery when the fault is removed           |          |          |          |
| Ingress Protection Classification | 20  |          |          |          |
| Suitable for Luminaires Class     | Class II. Insulation Class according to IEC 60598 |          |          |          |

### Reliability Data

|          |  |
|----------|--|
| Lifetime | 50,000 hrs. at lifetime case temperature                       |
| MTBF     | 500,000 hrs. as per Telcordia SR-332 (ta: +50°C (700-1050mA)); |

### Safety Standards / Directives

|                    |   |                                     |
|--------------------|---|-------------------------------------|
| Electrical Safety  | CB scheme   | IEC 61347-1, IEC 61347-2-13         |
|                    | ENEC  | EN 61347-1, EN 61347-2-13, EN 62384 |
|                    | SELV  | SELV                                |
| CE                 | In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU |                                     |
| Material and Parts | RoHS Directive 2011/65/EU Compliant   |                                     |
| Galvanic Isolation | Input to Output   | 3.75kVac                            |

# LED Driver

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| Model Number | LNP-07A35WBCA/B | LNP-08A35WBCA | LNP-09A35WBCA | LNP-10A35WBCA/B |
|--------------|-----------------|---------------|---------------|-----------------|
|--------------|-----------------|---------------|---------------|-----------------|

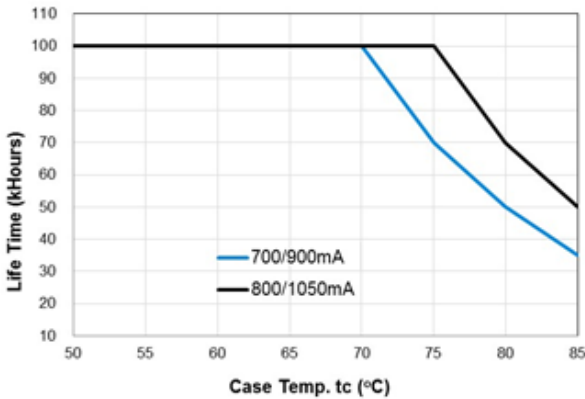
### EMC

|                                   |                                     |  |
|-----------------------------------|-------------------------------------|--|
| Emissions (CE & RE)               | Compliance to EN 55015:2013 Class B |  |
| Immunity                          | Compliance to EN 61547:2009         |  |
| Electrostatic Discharge           | IEC 61000-4-2:2008 Ed.2.0           | ESD, Criteria A <sup>1)</sup> or B <sup>2)</sup><br>Air Discharge: 8kV; Contact Discharge: 4kV   |
| Radiated Field                    | IEC 61000-4-3:2010 Ed.3.2           | RS, Criteria A1 80MHz-1GHz, 3V/m with 1kHz Sine Wave / 80% AM Modulation   |
| Electrical Fast Transient / Burst | IEC 61000-4-4:2012 Ed.3.0           | EFT, Criteria A <sup>1)</sup> or B <sup>2)</sup> 1kV   |
| Surge                             | IEC 61000-4-5:2014 Ed.3.0           | Criteria A <sup>1)</sup> or B <sup>2)</sup><br>Common Mode <sup>3)</sup> : 2kV; Differential Mode <sup>4)</sup> : 1kV<br>1.2/50µs, 8/20µs Combination Wave with 2ohms (L-N), 12ohms (L-PE & N-PE) source impedance |
| Conducted                         | IEC 61000-4-6:2013 Ed.4.0           | CS, Criteria A <sup>1)</sup> 150kHz-80MHz, 3Vrms   |
| Power Frequency Magnetic Fields   | IEC 61000-4-8:2009-Ed.2.0           | PFMF, Criteria A <sup>1)</sup> 3A/Meter  |
| Voltage Dips                      | IEC 61000-4-11:2004 Ed.2.0          | Criteria A <sup>1)</sup> or B <sup>2)</sup> ; 100% dip; 0.5 cycle; Self Recoverable<br>30% dip; 10 cycle; Self Recoverable   |
| Harmonic Current Emission         | IEC 61000-3-2:2014                  | Class C (230Vac @ 100% load)   |
| Voltage Fluctuation & Flicker     | IEC 61000-3-3:2013                  |  |

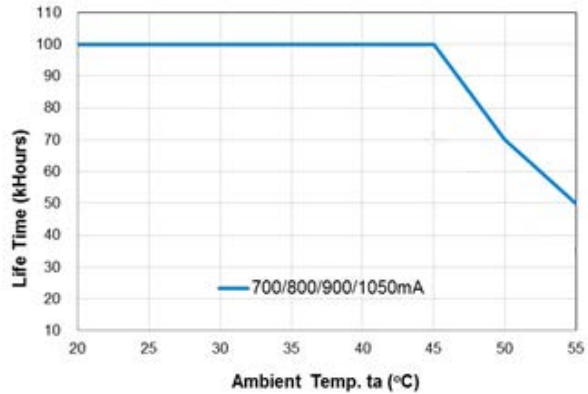
1) Criteria A: Normal performance within the specification limits  
2) Criteria B: Temporary degradation or loss of function which is self-recoverable

3) Asymmetrical: Common mode (Line to earth)  
4) Symmetrical: Differential mode (Line to line)

Lifetime VS Case Temperature



Lifetime VS Ambient Temperature

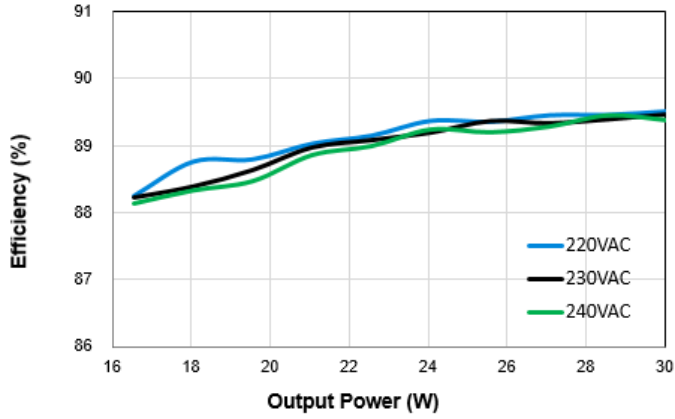


# LED Driver

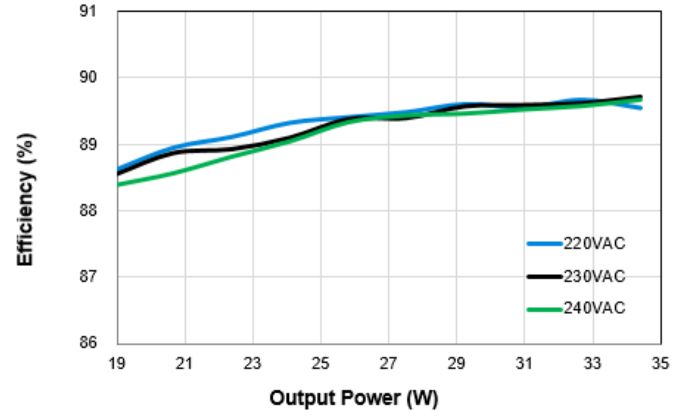
## LNP-C 35W Series / LNP-□A35WBC□

### Efficiency VS Output Power

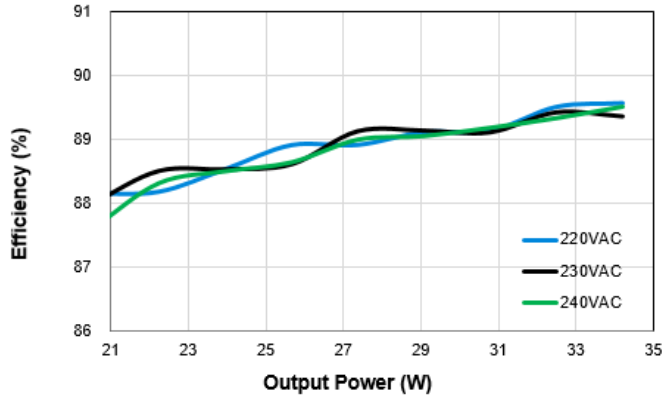
LNP-07A35WBCA/B – 700mA



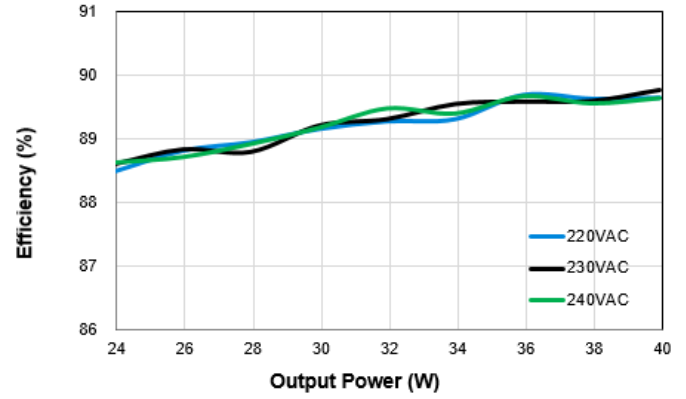
LNP-08A35WBCA – 800mA



LNP-09A35WBCA – 900mA



LNP-10A35WBCA/B – 1050mA

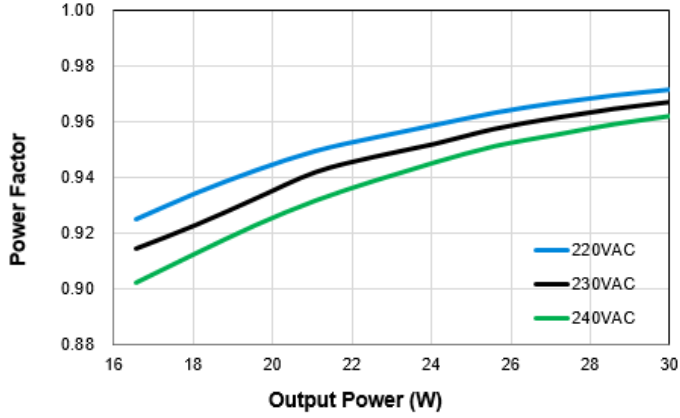


# LED Driver

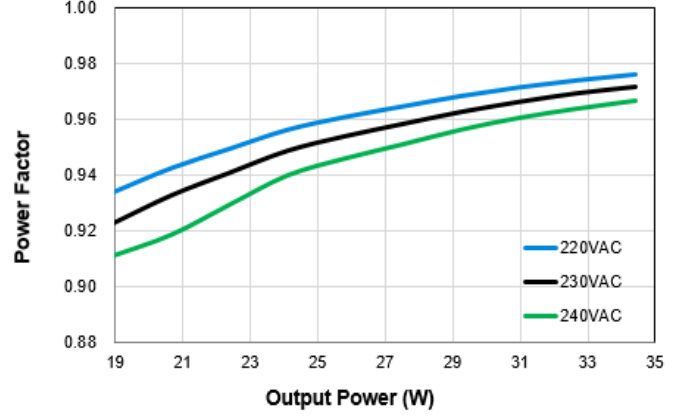
## LNP-C 35W Series / LNP-□A35WBC□

### Power Factor VS Output Power

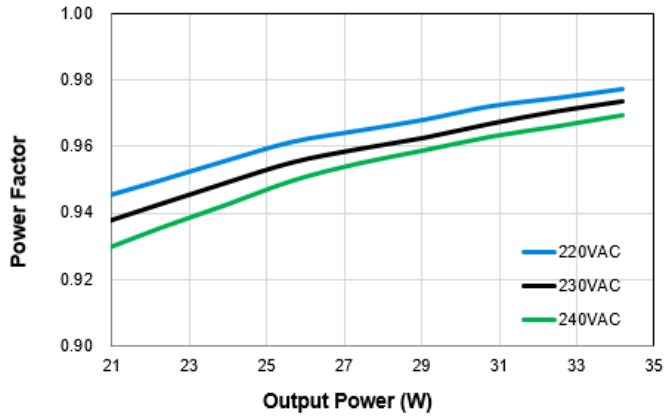
LNP-07A35WBCA/B – 700mA



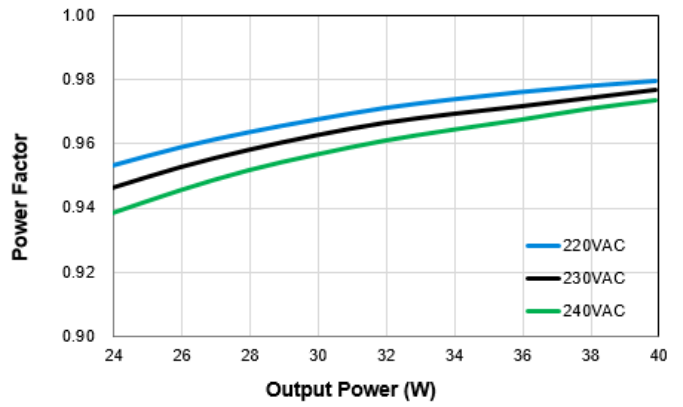
LNP-08A35WBCA – 800mA



LNP-09A35WBCA – 900mA



LNP-10A35WBCA/B – 1050mA

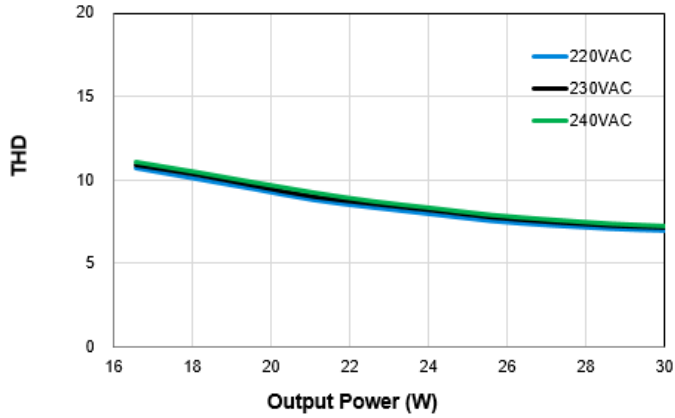


# LED Driver

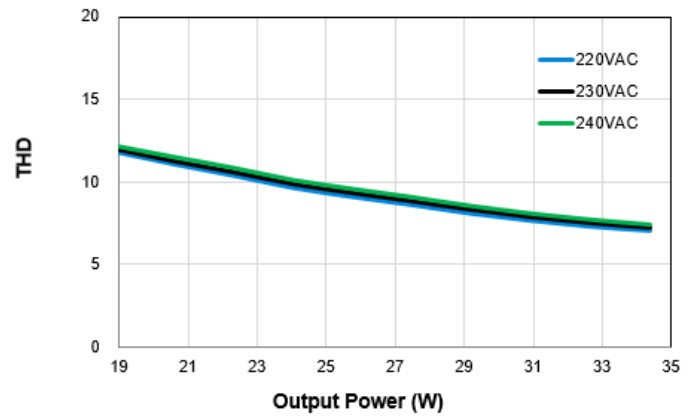
## LNP-C 35W Series / LNP-□A35WBC□

### Total Harmonic Distortion VS Output Power

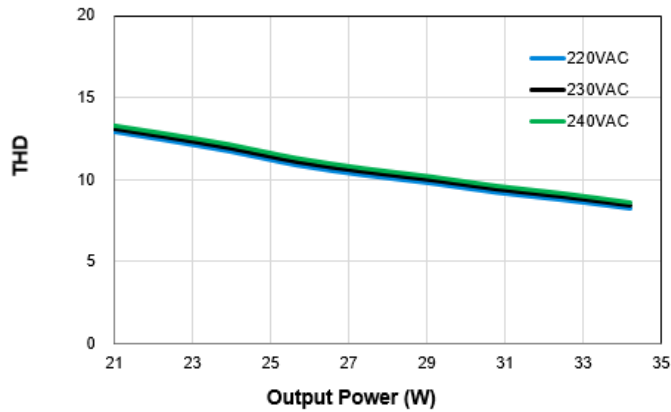
LNP-07A35WBCA/B – 700mA



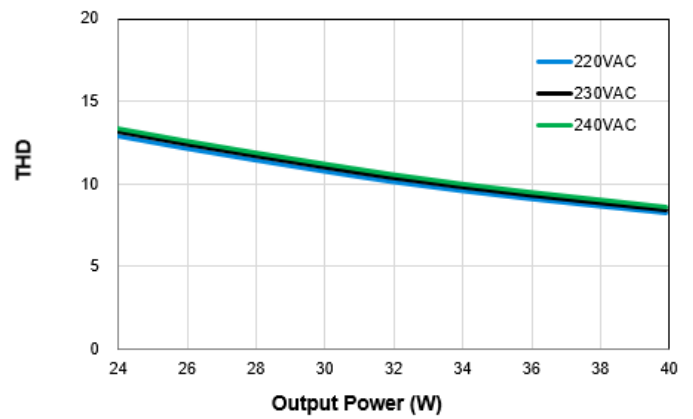
LNP-08A35WBCA – 800mA



LNP-09A35WBCA – 900mA



LNP-10A35WBCA/B – 1050mA



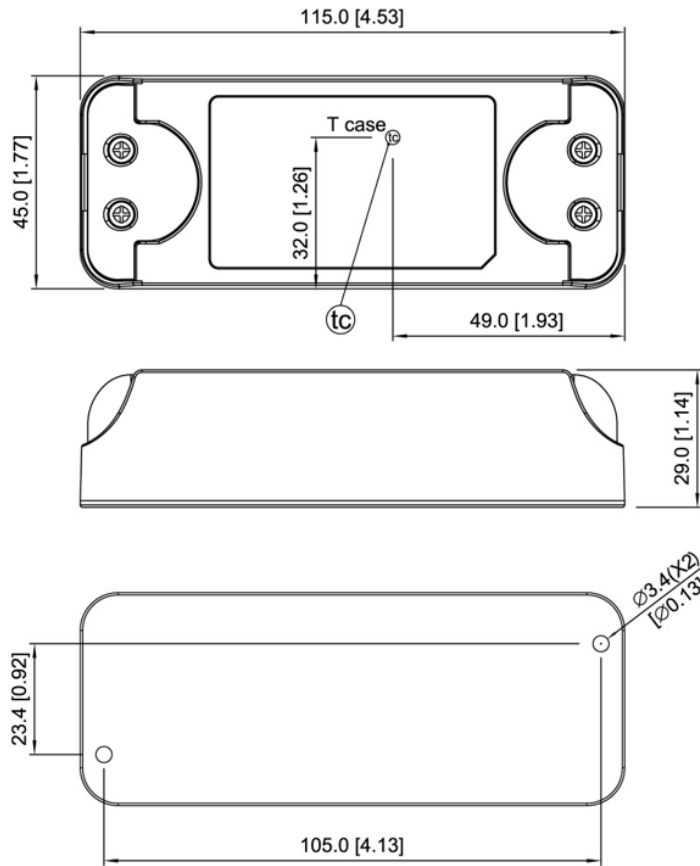
# LED Driver

## LNP-C 35W Series / LNP-□A35WBC□

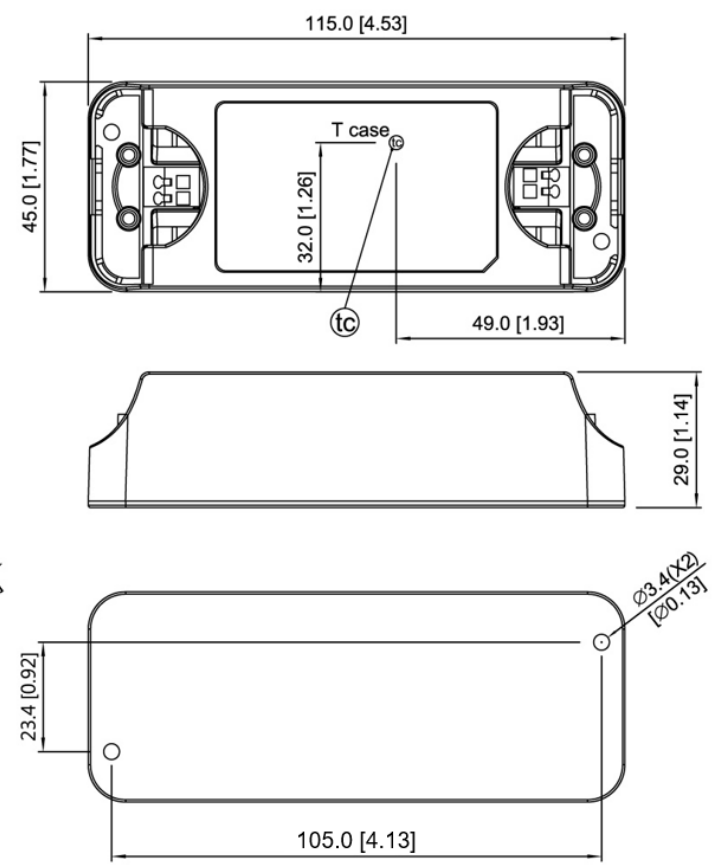
### Dimensions

L x W x D: 115 x 45 x 29 mm (4.53 x 1.77 x 1.14 inch)

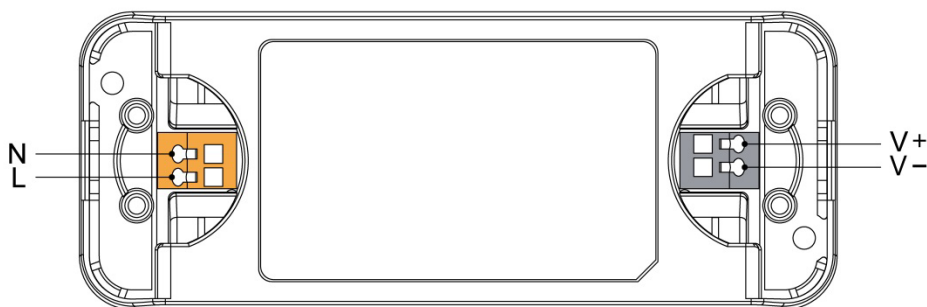
Independent Type



Built-in Type



### Wiring Connection





# LED Driver

## LNP-C 35W Series / LNP-□A35WBC□

### Assembly & Installation

Mounting holes for LED driver assembly onto the mounting surface.

- |             |  |
|-------------|--|
| <p>Ⓐ, Ⓑ</p> | <p>Mounting holes for the LED driver (device). There are 1 mounting holes at either end of the device (locations Ⓐ and Ⓑ in Fig.1). The device shall be mounted using 1 mounting hole on both sides. Mounting shall be done using M3 screws with minimum length of 4mm. If customer's end system or panel where the device is mounted does not have screw threads, please use suitable metal screw and nut to secure the device.</p> |
| <p>Ⓒ</p>    | <p>Surface Ⓒ belongs to customer's end product or panel where the device is mounted. The device should be mounted on a sturdy heat conducting surface with minimum of 2 mounting holes, as detailed above.</p>   |

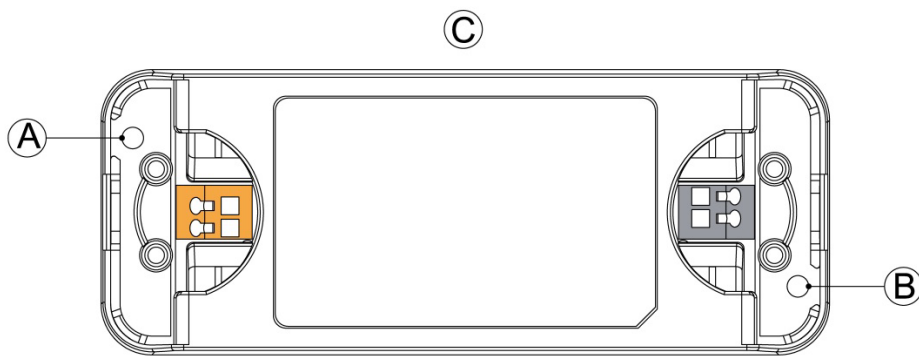


Fig. 1 Mounting Hole Locations

### Safety Instructions

- ALWAYS switch mains of input power OFF before connecting and disconnecting the input voltage to the device. If mains are not turned OFF, there is risk of explosion / severe damage.
- To guarantee sufficient convection cooling, keep a distance of 50mm above and lateral distance to nearby objects.
- The device is not recommended to be placed on low thermal conductive surfaces. For example, plastics.
- DO NOT insert any objects into the device.
- Note that the enclosure of the device can become very hot depending on the surrounding air temperature and output load connected to the device. Risk of burns!
- The current rating for the all wires, connected to the input and output wires of the device, must be rated higher than or equal to the input and output current of the power supply. Please refer to the product specifications.
- For device with dimming function, always ensure the dimming control is working properly.
- Please ensure the correct tools are used for all adjustments and installations of the device. If in doubt, please consult your local Delta support or contact us via info@DeltaPSU.com.

# LED Driver

## LNP-C 35W Series / LNP-□A35WBC□

### Functions

#### Start-up Time

The time required for the output voltage to reach 90% of its final steady state set value, after the input voltage is applied.

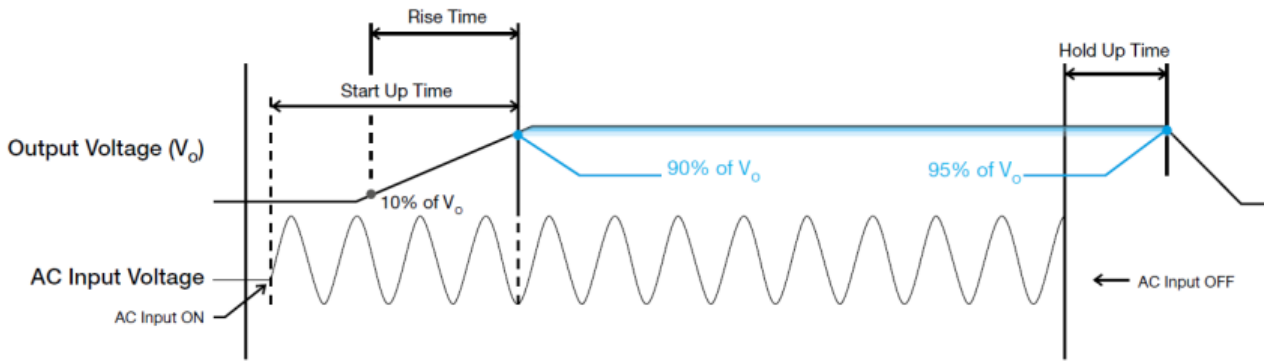
#### Rise Time

The time required for the output voltage to change from 10% to 90% of its final steady state set value.

#### Hold-up Time

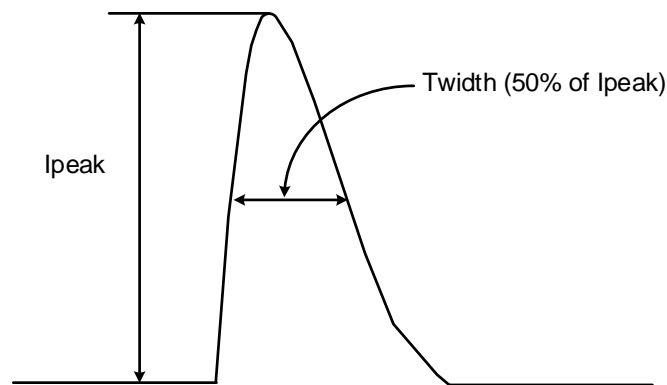
Time between the collapse of the AC input voltage, and the output falling to 95% of its steady state set value.

#### ■ Graph illustrating the Start-up Time, Rise Time, and Hold-up Time



#### Inrush Current

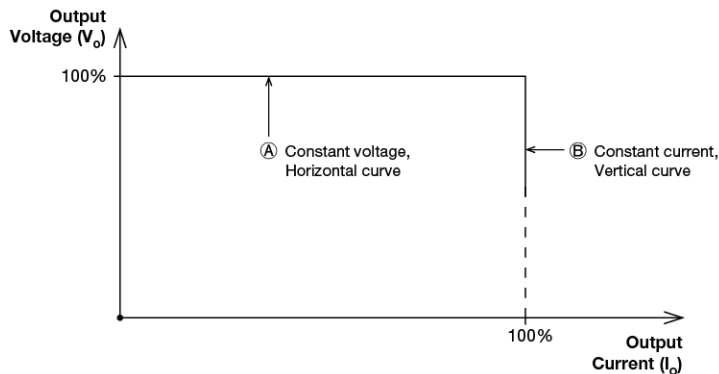
Inrush current is the peak, instantaneous, input current measured and, occurs when the input voltage is first applied. For AC input voltages, the maximum peak value of inrush current will occur during the first half cycle of the applied AC voltage. This peak value decreases exponentially during subsequent cycles of AC voltage.



# LED Driver

## LNP-C 35W Series / LNP-□A35WBC□

### Operating Methods of LED Modules-CV and CC Operation



A typical LED power supply is able to either work in "constant voltage mode (CV) or constant current mode (CC)" to drive the LEDs. Delta's LED drivers integrate CV+CC characteristics; so operation in CV mode (with external LED driver), in region (A) or CC mode (direct drive, at area (B)).

In the constant current region, the highest voltage at the output of the driver depends on the configuration of the end systems.

Should there be any compatibility issues or other questions with these adjustment methods, please contact with Delta.

### Over Voltage Protections (Auto-Recovery)

The LED driver's Overvoltage Protections (OVP) will be activated when output voltage is achieved trigger point defined at OVP range. Upon such an occurrence, the  $I_o$  (output current) will start to droop.

### Short Circuit Protection (Auto-Recovery)

The LED driver's output OLP function also provides protection against short circuits. When a short circuit is applied, the LED driver will operate in "hiccup mode". It will return to normal operation after the short circuit is removed.

### Overload & Overcurrent Protection (Auto-Recovery)

The power supply's Overload (OLP) and Overcurrent (OCP) Protections will be activated when output is between 95% and 108% of  $I_o$  (max load). Upon such an occurrence, the  $V_o$  (output voltage) will start to droop. Once the power supply has reached its maximum power limit, the protection will be activated; and, the power supply will operate in "CC mode". The power supply will recover once the fault condition once the cause of OLP or OCP is removed, and  $I_o$  is back within the specified range.

### Over Temperature Protection (Auto-Recovery)

As mentioned above, the power supply also has Over Temperature Protection (OTP). In the event of a higher operating temperature at 100% load, the power supply will run into OTP when the operating temperature is beyond what is recommended in the de-rating graph. When activated, the output voltage will go into bouncing mode until the temperature drops to its normal operating temperature as recommended in the de-rating graph.

## Others

### Delta RoHS Compliant



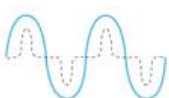
#### Restriction of the usage of hazardous substances

The European directive 2011/65/EU limits the maximum impurity level of homogeneous materials such as lead, mercury, cadmium, chrome, polybrominated flame retardants PBB and PBDE for the use in electrical and electronic equipment. RoHS is the abbreviation for "Restriction of the use of certain hazardous substances in electrical and electronic equipment".

This product conforms to this standard.

### PFC – Norm EN 61000-3-2

#### Line Current Harmonic content



Typically, the input current waveform is not sinusoidal due to the periodical peak charging of the input capacitor. In industrial environment, complying with EN 61000-3-2 is only necessary under special conditions. Complying with this standard can have some technical drawbacks, such as lower efficiency as well as some commercial aspects such as higher purchasing costs. Frequently, the user does not profit from fulfilling this standard, therefore, it is important to know whether it is mandatory to meet this standard for a specific application.