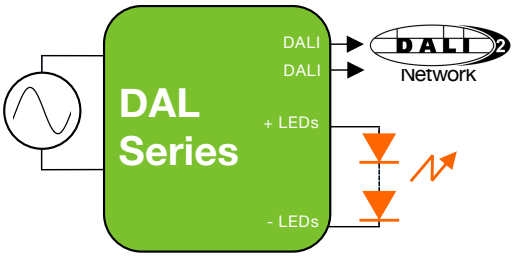
# DAL Series

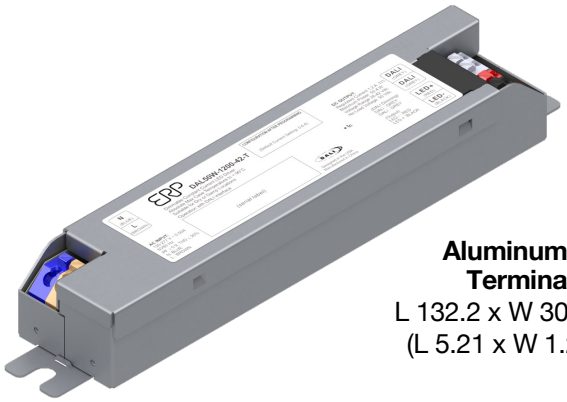
**DAL30 30 W**
**DAL50 50 W**

# 50 & 30 W Class 2/Class II CC LED Driver w/ DALI-2 Control

| Nominal Input Voltage | Max. Output Power | Efficiency | Max. Case Temperature | THD | Power Factor | Dimming Method | Dimming Range |
|---|---|---|---|---|---|---|---|
| 120 to 277 Vac | 50 W | up to 90% typical | 90°C (measured at the hot spot) | < 20% (from 100% to 60% of load | > 0.9 (from 100% to 60% of load) | DALI | 1 - 100% |



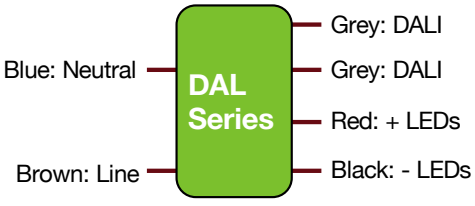

**Application Diagram**



**Aluminum Case with Terminal Blocks:**
L 132.2 x W 30.6 x H 20.7 mm
(L 5.21 x W 1.20 x H 0.81 in)

## FEATURES

- Universal input voltage range
- Ripple < 10% @ 20% & 100% load
- Turn-on: @ 1% Iout
- EMI: Compliant with FCC CFR Title 47 Part 15 Class B at 120 Vac & Class A at 277 Vac and with CE EN55015 (CISPR 15) at 220, 230, and 240 Vac
- Safety, Compliance
  - UL8750: Class 2 output, Class P
  - CB, CE
  - FCC, ENEC
  - DALI-2, Device Type 6 (parts 101, 102, 207)
- Standby power ≤ 0.5 W @ 120 Vac, 230 Vac
- IP20-rated case with silicone-based potting
- Lifetime: 50,000 hours min at 75°C case temperature
- Class II power supply per IEC 61140
- 90°C maximum case hot spot temperature




**Wiring Diagram**

## NFC PROGRAMMING

- Current: 100% to 50% in each voltage range
- Data log read: SKU, S/N, lot code, hours of operation, FW rev., power cycles

# 50 & 30 W Class 2/Class II CC LED Driver w/ DALI-2 Control

## 1 - ORDERING INFORMATION

| Part Number | Input Voltage (Vac) | Max Output Power (W) | Iout (mA)[1] | Default Programmed Current (mA)[3] | Vout Min. (Vdc) | Vout Nom. (Vdc) | Vout Max. (Vdc)[2] | Open Loop (No Load) Voltage (Vdc) |
|---|---|---|---|---|---|---|---|---|
| **DAL30W** | | | | | | | | |
| DAL30W-0600-42-T | 120 to 277 | 25.2 | 300 to 600 | 300 | 28 | 37.8 | 42 | 50 |
| **DAL50W** | | | | | | | | |
| DAL50W-0850-56-T | 120 to 277 | 47.6 | 425 to 850 | 425 | 38 | 50.4 | 56 | 60 |
| DAL50W-1200-42-T | 120 to 277 | 50.4 | 600 to 1200 | 600 | 28 | 37.8 | 42 | 50 |

***Notes:***

*(1) The ERP LED Driver Configuration Tool (ERP GUI) allows programming of the output current to values below the minimum limits specified in the table above. However, when the programmed output current is set below these minimum thresholds, the LED driver's Total Harmonic Distortion (THD) and Power Factor (PF) may not meet the values defined in the INPUT SPECIFICATION section of this datasheet.*

*(2) The forward voltage (Vf) of the LED load should not exceed Vout Max. of the driver under worst case field operating conditions which are the Vf max. of the LED load under lowest temperature and highest forward current conditions. As a general design guideline, the nominal LED load Vf measured at the operating current and at room temperature should be ≤ Vout Nom. of the driver.*

*(3) For each model, the default output current setting is the MINIMUM current.*
*Example: the default output current setting for the DAL50W-1200-42-T is 600 mA.*

## ACCESSORIES

**Programming Wand**
*Part number: NFC_WAND*

*Notes:*

- *Please order the programming wand using the part number NFC_WAND.*

# 50 & 30 W Class 2/Class II CC LED Driver w/ DALI-2 Control

## 2 - INPUT SPECIFICATION (@25ºC ambient temperature)

| | Units | Minimum | Typical | Maximum | Notes |
|---|---|---|---|---|---|
| **Input Voltage Range (Vin)** | Vac | 90 | 120, 220 to 240, 277 | 305 | •The rated output current for each model is achieved at Vin≥108 Vac, at Vin≥209 Vac, & at Vin≥249.<br>•At nominal load |
| **Input Frequency Range** | Hz | 47 | 50, 60 | 63 | |
| **Input Current (Iin)** | A | | | 0.5 A @ 120 Vac<br>0.28 A @ 230 Vac<br>0.23 A @ 277 Vac | |
| **Max Units on a 16 A Circuit Breaker** | | DAL30: 58 (120 Vac), 113 (230 Vac), 135 (277 Vac) units<br>DAL50: 29 (120 Vac), 58 (230 Vac), 69 (277 Vac) units | | | The maximum number of units allowed per 16 A circuit breaker is based on worst-case conditions at 100% output. |
| **Power Factor (PF)** | | 0.9 | > 0.9 | | •At nominal input voltage and with nominal LED voltage and no dimmer<br>•From 100% to 60% of rated power |
| **Inrush Current** | A | Meets NEMA-410 requirements | | | •At any point on the sine wave and 25°C |
| **Leakage Current** | mA | | | 0.3 mA @ 120 Vac<br>0.6 mA @ 230 Vac<br>0.7 mA @ 277 Vac | Measured per IEC60950-1 |
| **Input Harmonics** | Complies with IEC61000-3-2 for Class C equipment | | | | |
| **Total Harmonics Distortion (THD)** | | | | 20% | •At nominal input voltage and nominal LED voltage<br>•From 100% to 60% of rated power<br>•Complies with DLC (Design Light Consortium) technical requirements |
| **Efficiency** | % | - | up to 90% | - | Measured with nominal input voltage, a full sinusoidal wave form and without dimmer attached. |
| **Standby Power** | mW | | | 500<br>1000 | •At 120 Vac and 230 Vac<br>•At 277 Vac |
| **Isolation** | The AC input to the main DC output is isolated and meets Class II reinforced/double insulation (IEC 61140). | | | | |

## 3 - MAIN OUTPUT SPECIFICATION (@25ºC ambient temperature)

| | Units | Minimum | Typical | Maximum | Notes |
|---|---|---|---|---|---|
| **Output Voltage (Vout)** | Vdc | | | | See ordering information for details |
| **Output Current (Iout)** | A | | | | See ordering information for details |
| **Output Current Regulation** | % | -5 | ±2.5 | 5 | •At nominal AC line voltage<br>•Includes load and current set point variations. |
| **Output Current Overshoot** | % | - | - | 10 | The driver does not operate outside of the regulation requirements for more than 750 ms during power on with maximum load. |
| **Ripple Current** | ≤ 10% of rated output voltage for each model | | | | •Measured at maximum load and nominal input voltage.<br>•At 20% & 100% load |
| **Dimming Range** | % | 1 | | 100 | •When testing, if light is measured, dimming range is based on light output. If no light is measured, dimming range is based on percentage of output current.<br>•Dimming performance is optimal when the driver is operated at its nominal output voltage matching the LED nominal Vf (forward voltage). Dimming performance may vary when the driver is operated near its minimum output voltage. |
| **Start-up Time** | ms | | 550 | 750 | •Measured from application of AC line voltage to DALI command acceptance<br>•With DALI bus present |
| **Isolation** | The main DC output is certified and tested per UL8750 Class 2 or LED Class 2 | | | | |

# 50 & 30 W Class 2/Class II CC LED Driver w/ DALI-2 Control

## 4 - ENVIRONMENTAL CONDITIONS

| | Units | Minimum | Typical | Maximum | Notes |
|---|---|---|---|---|---|
| **Operating Ambient Temperature (Ta)** | °C | -10 | | 40 | 40°C is the non-derated temperature (Refer to section 7 'Output power de-rating at elevated temperatures'.) |
| **Maximum Case Temperature (Tc)** | °C | | | +90 | Case temperature measured at the hot spot •tc (see label on page 12) |
| **Storage Temperature** | °C | -40 | | +85 | |
| **Humidity** | % | 5 | - | 95 | Non-condensing |
| **Cooling** | Convection cooled | | | | |
| **Acoustic Noise** | dBA | | | 22 | Measured at a distance of 1 foot (30 cm), without dimmer |
| **Mechanical Shock Protection** | per EN60068-2-27 | | | | |
| **Vibration Protection** | per EN60068-2-6 & EN60068-2-64 | | | | |
| **MTBF** | > 200,000 hours when operated at nominal input and output conditions, and at Tc ≤ 75°C | | | | |
| **Lifetime** | 50,000 hours at Tc ≤ 75°C maximum case hot spot temperature (see hot spot •tc on label on page 12) | | | | |

## 5 - EMC COMPLIANCE AND SAFETY APPROVALS

| EMC Compliance | | | |
|---|---|---|---|
| **Conducted and Radiated EMI** | Compliant with FCC CFR Title 47 Part 15 Class B at 120 Vac & Class A at 277 Vac and with EN55015 (CISPR 15) at 220, 230, and 240 Vac | | |
| **Harmonic Current Emissions** | | IEC61000-3-2 | For Class C equipment |
| **Voltage Fluctuations & Flicker** | | IEC61000-3-3 | |
| **Immunity Compliance** | **ESD (Electrostatic Discharge)** | IEC61000-4-2 | 6 kV contact discharge, 8 kV air discharge, level 3 |
| | **RF Electromagnetic Field Susceptibility** | IEC61000-4-3 | 3 V/m, 80 - 1000 MHz, 80% modulated at a distance of 3 meters |
| | **Electrical Fast Transient** | IEC61000-4-4 | ± 2 kV on AC power port for 1 minute, ±1 kV on signal/control lines |
| | **Surge** | IEC61000-4-5 | ± 2 kV line to line (differential mode) /± 2 kV line to common mode ground |
| | | ANSI/IEEE c62.41.1-2002 & c62.41.2-2002 category A, 2.5 kV ring wave | |
| | **Conducted RF Disturbances** | IEC61000-4-6 | 3V, 0.15-80 MHz, 80% modulated |
| | **Voltage Dips** | IEC61000-4-11 | >95% dip, 0.5 period; 30% dip, 25 periods; 95% reduction, 250 periods |

| Safety Agency Approvals | |
|---|---|
| **UL** | UL8750 listed, Class 2, Class P, Supplement SF Dimming Isolation |
| **cUL** | CAN/CSA C22.2 No. 250.13-14 LED equipment for lighting applications |
| **CE** | IEC61347-2-13 electronic control gear for LED Modules & EN55015 (EMC compliance) |
| **CB** | |
| **ENEC** | |
| **DiiA** | DALI-2/IEC 62386 (parts 101, 102, 207) |

| Safety | | | | | |
|---|---|---|---|---|---|
| | **Units** | **Minimum** | **Typical** | **Maximum** | **Notes** |
| **Hi Pot (High Potential) or Dielectric voltage-withstand** | Vdc | 4400 | | | •Meets Class II reinforced/double insulation<br>•Tested at the RMS voltage equivalent of 3100 Vac |

# 50 & 30 W Class 2/Class II CC LED Driver w/ DALI-2 Control

## 6 - PROTECTION FEATURES

**Input Over Current Protection**

The DAL series incorporates a primary AC line fuse for input over current protection to prevent damage to the LED driver and meet product safety requirements as outlined in Section 5.

**Short Circuit and Over Current Protection**

The DAL series is protected against short-circuit such that a short from any output to return shall not result in a fire hazard or shock hazard. The driver shall hiccup as a result of a short circuit or over current fault. Removal of the fault will return the driver to within normal operation. The driver shall recover, with no damage, from a short across the output for an indefinite period of time.

**Internal Over temperature Protection**

The DAL series is equipped with internal temperature sensor on the primary power train. Failure to stay within the convection power rating will result in the power supply reducing the available current (fold back) below the programmed amount. The main output current will be restored to the programmed value when the temperature of the built-in temperature sensor cools adequately.

**Output Open Load Protection**

When the LED load is removed, the output voltage of the DAL series is typically limited to 1.3 times the maximum output voltage of each model.

## 7 - OUTPUT POWER DE-RATING AT ELEVATED TEMPERATURES

The DAL series can be operated with cooling air temperatures above 40°C by linearly de-rating the total maximum output power (or current) by 2.5%/°C typical until internal over temperature protection activates.

## 8 – DALI DIMMING CONTROL

Dimming is controlled by DALI from 1% to 100%. The DALI circuit is isolated from both the AC input and the main DC output and meets Class II reinforced/double insulation power supply.

# 50 & 30 W Class 2/Class II CC LED Driver w/ DALI-2 Control

## 9 - PROGRAMMING

The DAL series can be programmed by placing the programming wand over the NFC receiver area of the driver and by plugging the USB other end of the wand into a computer. ***The driver should not be powered on during the programming process.***

When ordering the DAL series, please make sure you order a programming wand. The part number for the programming wand is "NFC_WAND".

Programming is done by using the ERP LED Driver Configuration Tool (also known as ERP GUI), downloadable through the ERP website (https://www.erp-power.com/erp-light-engines/led-light-programming-software/), which enables the user to adjust the output current.

Please note that, for each model, the **default output current setting is listed on page 2 of this datasheet**.

Furthermore, when programming the driver with a computer using the programming wand, you can access the driver's internal data log and read the following information: SKU, serial number, manufacturing lot code, hours of operation, firmware revision, and power cycles.

While programming drivers in a lot, the ERP GUI can interface with a label printer, which enables the user to add configuration labels to driver labels in order to highlight programmed output current. Listed below is the equipment needed to print labels.

| Equipment | Part Number | Where to buy |
|---|---|---|
| Printer | TSC TC210 | barcodefactory.com/tsc/printers/tc210/99-059a001-54lf |
| Ribbon | TSC Prem. Resin, 60mm x 110mm | barcodefactory.com/tsc/35-r060110-23cf |
| Labels | BAR-.81x.28-1-TT | barcodefactory.com/barcodefactory/labels/bar-_81x_28-1-tt |

For more information, please refer to the ERP LED Driver Configuration Tool user's manual at: (https://www.erp-power.com/erp-light-engines/led-light-programming-software/).

**Programming Wand**

*Part number: NFC_WAND*

**Figure 1**

# 50 & 30 W Class 2/Class II CC LED Driver w/ DALI-2 Control

## 10 - PREDICTED LIFETIME VERSUS CASE AND AMBIENT TEMPERATURE

Lifetime is defined by the measurement of the temperatures of all the electrolytic capacitors whose failure would affect light output under the nominal LED load and worst case AC line voltage. The graphs in figures 2 and 3 are determined by the electrolytic capacitor with the shortest lifetime, among all electrolytic capacitors. It represents a worst case scenario in which the LED driver is powered 24 hours/day, 7 days/week. The lifetime of an electrolytic capacitor is measured when any of the following changes in performance are observed:

*1) Capacitance changes more than 20% of initial value*
*2) Dissipation Factor (tan δ): 150% or less of initial specified value*
*3) Equivalent Series Resistance (ESR): 150% or less of initial specified value*
*4) Leakage current: less of initial specified value*

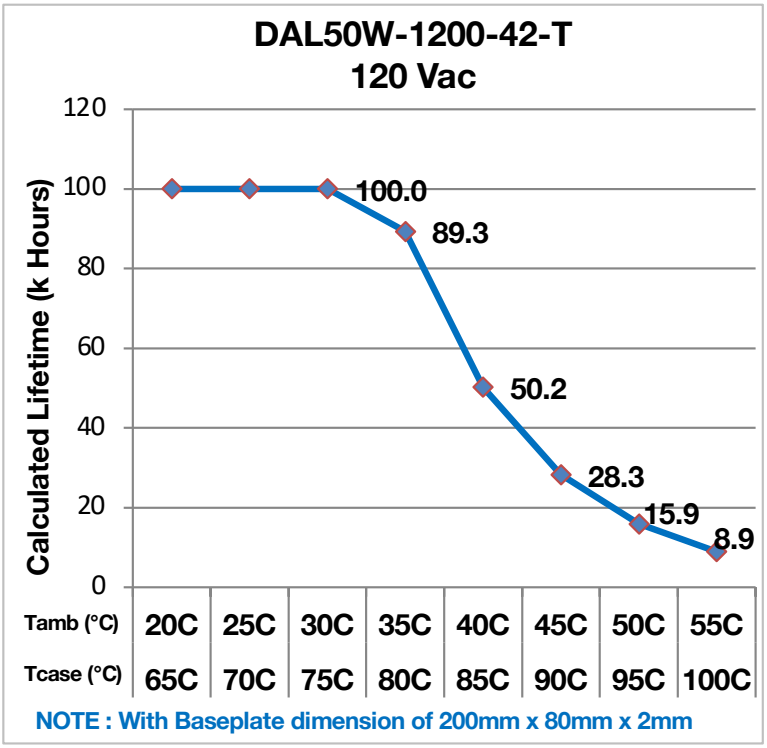



Figure 2

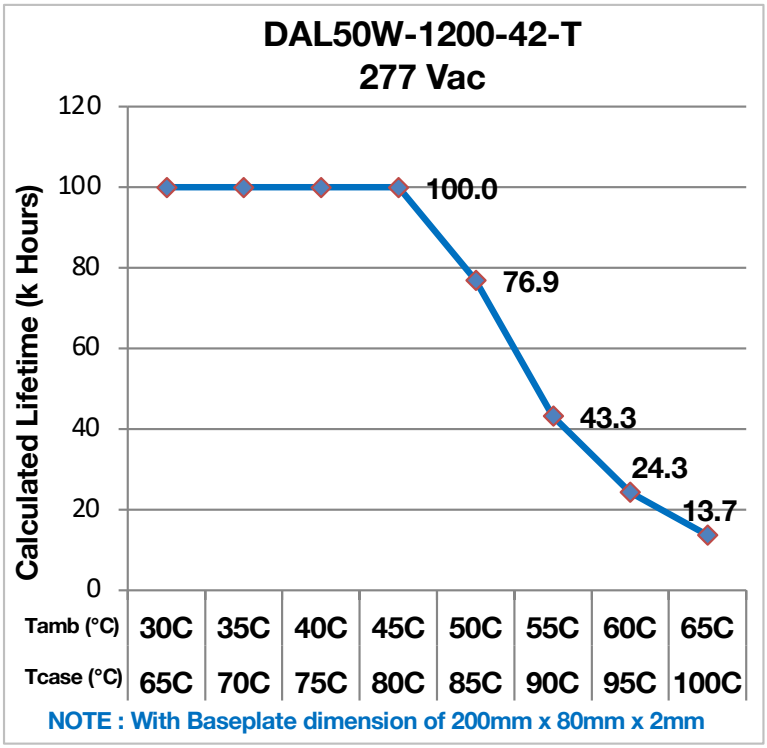



Figure 3

*Notes:*

- *The ambient temperature $T_{amb}$ and the differential between $T_{amb}$ and $T_{case}$ mentioned in the above graphs are relevant only as long as both the driver and the light fixture are exposed to the same ambient room temperature. If the LED driver is housed in an enclosure or covered by insulation material, then the ambient room temperature is no longer valid. In this situation, please refer only to the case temperature $T_{case}$.*
- *It should be noted the graph "Lifetime vs. Case/Ambient Temperature" may have an error induced in the final application if the mounting has restricted convection flow around the case. For applications where this is evident, the actual case temperature measured at the Tc point in the application should be used for reliability calculations.*

# 50 & 30 W Class 2/Class II CC LED Driver w/ DALI-2 Control

## 11 – EFFICIENCY VERSUS LOAD

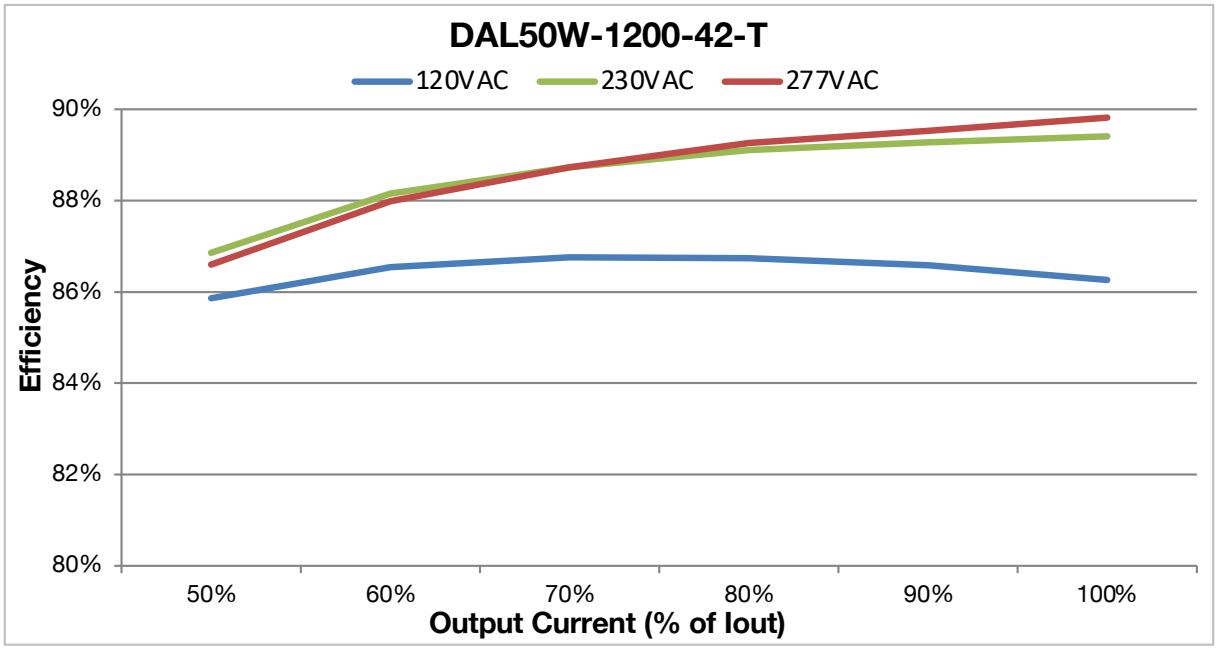



Figure 4

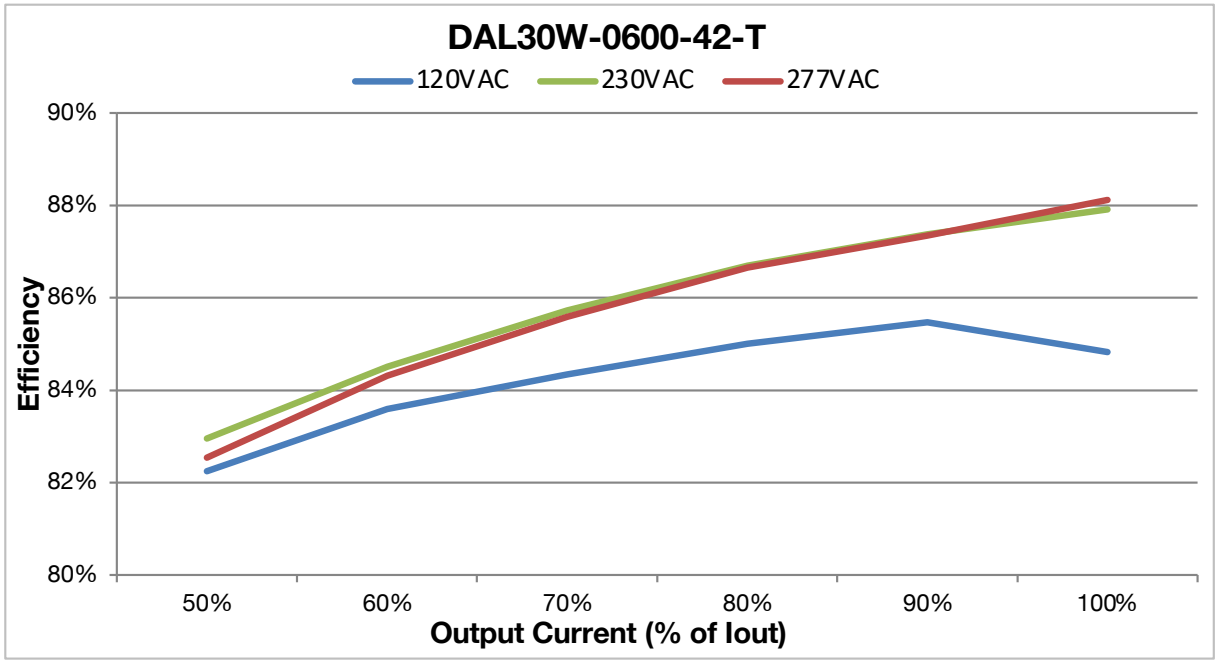



Figure 5

# 50 & 30 W Class 2/Class II CC LED Driver w/ DALI-2 Control

## 12 – POWER FACTOR VERSUS LOAD

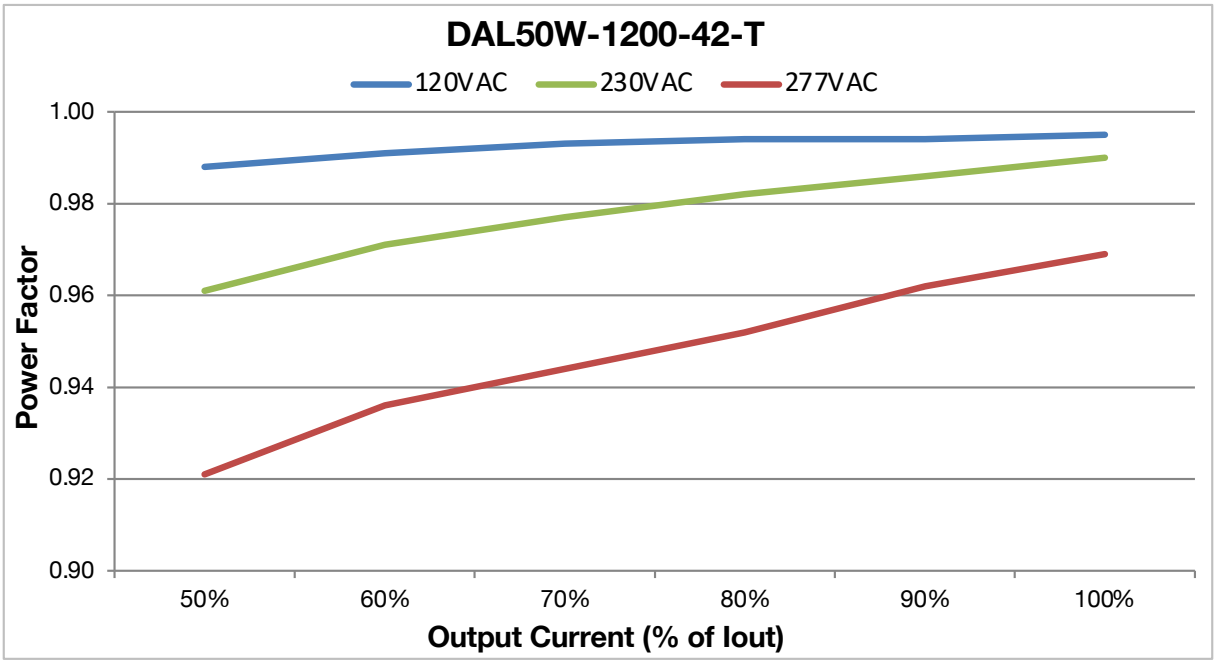



Figure 6

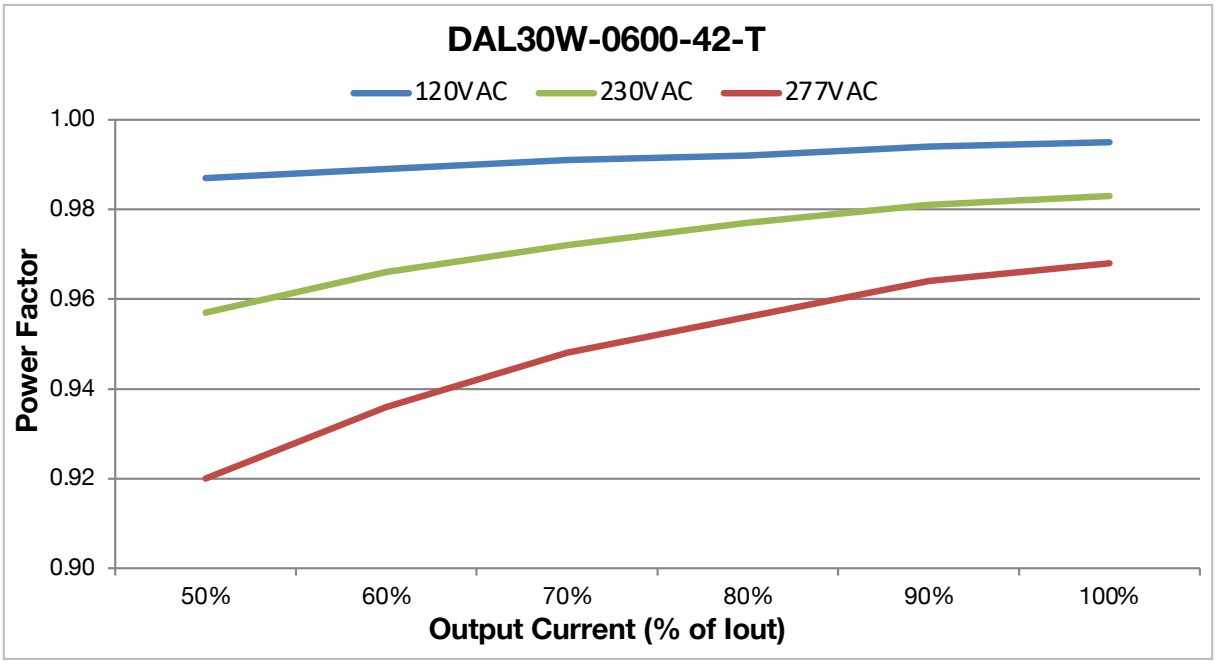



Figure 7

# 50 & 30 W Class 2/Class II CC LED Driver w/ DALI-2 Control

## 13 – TOTAL HARMONIC DISTORTION (THD) VERSUS LOAD

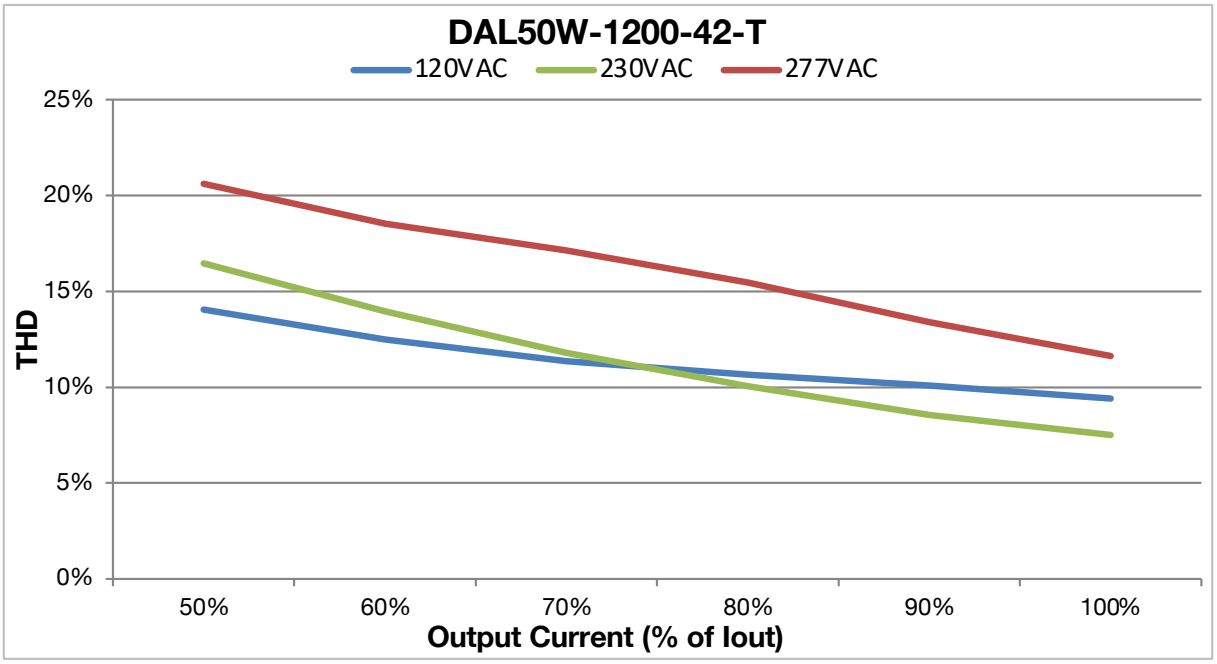



Figure 8

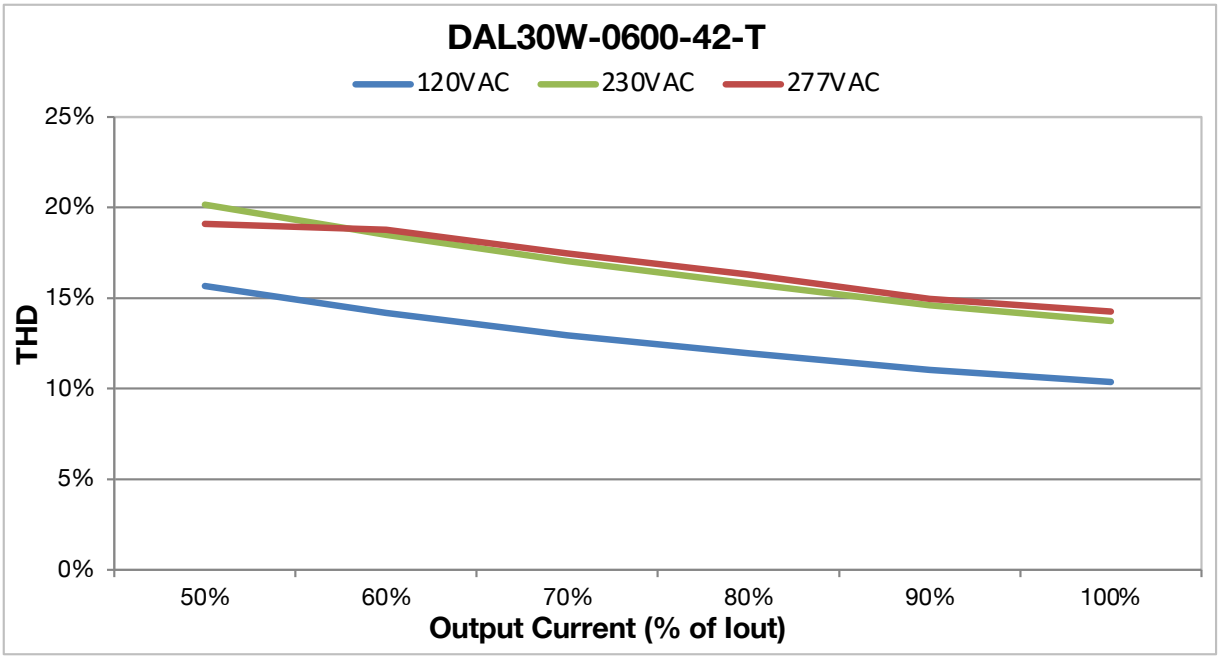



Figure 9

# 50 & 30 W Class 2/Class II CC LED Driver w/ DALI-2 Control

## 14 - MECHANICAL DETAILS

- **Packaging:** Aluminum case
- **Ingress Protection:** IP20 rated
- **Mounting Instructions**: The DAL series driver case must be secured on a flat surface through the two mounting tabs, shown here below in the case outline drawings.

## 15 - OUTLINE DRAWINGS

**Dimensions:** L 133.7 * W 30.6 * H 20.7 mm (L 5.26 * W 1.20 * H 0.81 in.)
**Volume:** 83.6 cm³ (5.06 in³)
**Weight:** 107 g (3.77 oz)

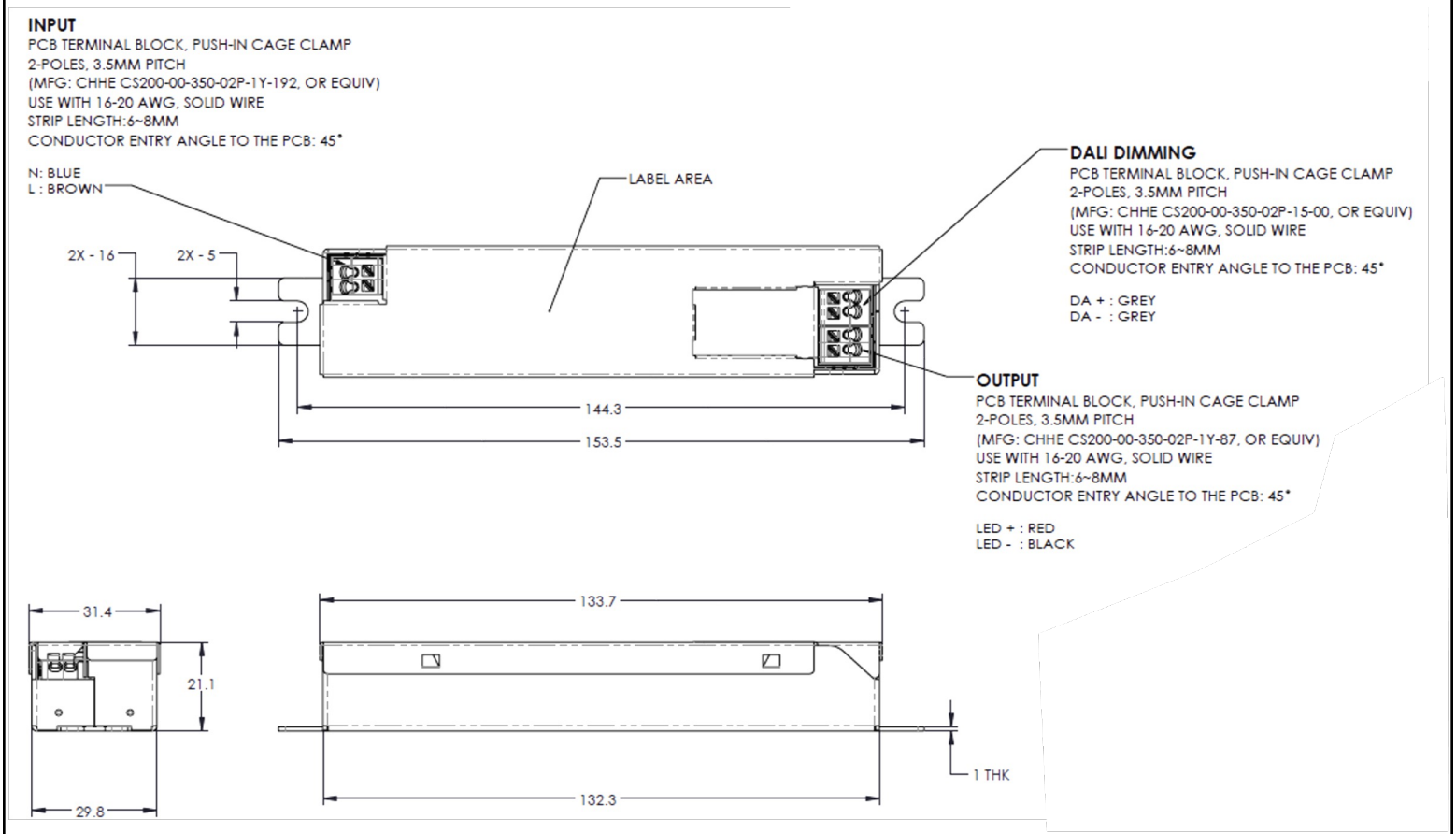



Figure 10

# 50 & 30 W Class 2/Class II CC LED Driver w/ DALI-2 Control

## 16 - LABELING

The DAL50W-1200-42-T is used in figure 11 as an example to illustrate a typical label.

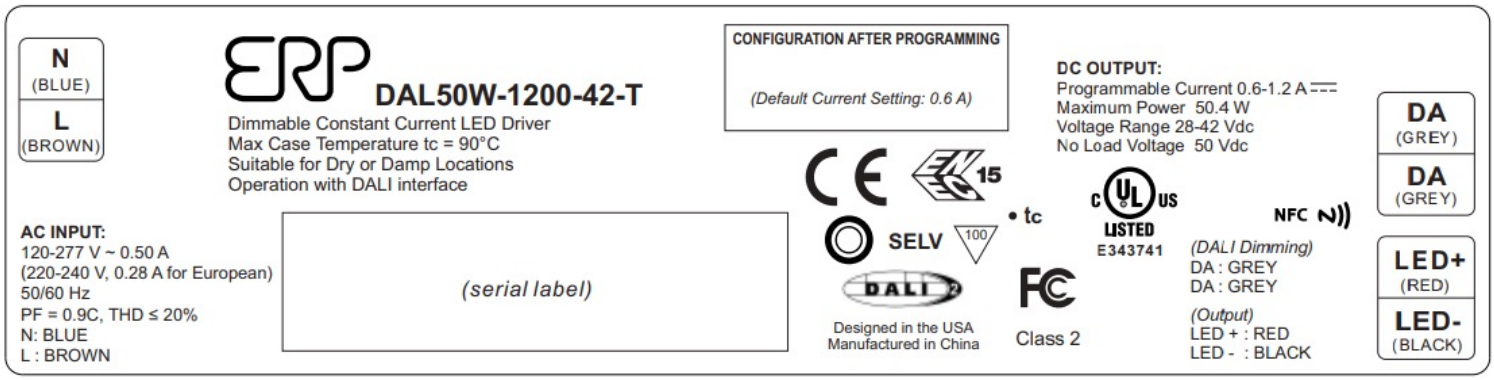



**Figure 11**

**USA Headquarters**
Tel: +1-805-517-1300
Fax: +1-805-517-1411
2625 Townsgate Road, Suite 106
Westlake Village, CA 91361, USA

**CHINA Operations**
Tel: +86-756-6266298
Fax: +86-756-6266299
No. 8 Pingdong Road 2
Zhuhai, Guangdong, China 519060

# 50 & 30 W Class 2/Class II CC LED Driver w/ DALI-2 Control

## Revision History

| Date | Comments |
|---|---|
| 30JUL2020 | • Initial release |
| 21SEP2020 | • Various grammar corrections |
| 08APR2021 | • Pg2: Added information regarding Vout max |
| 28MAR2023 | • Pg1: Added RoHS logo |
| 26JUN2025 | • Various grammar corrections |
| 04SEP2025 | • Added notes 1, 2 & 3 in the ORDERING INFORMATION section |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |