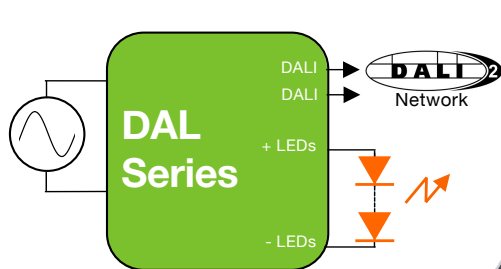


DAL Series

DAL30 30 W
DAL50 50 W

50 & 30 W Class 2/Class II CC LED Driver w/ DALI Dimming

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 50% of load)	> 0.9 (from 100% to 50% of load)	DALI	1 - 100%



Models with Terminal Blocks, Aluminum Case:

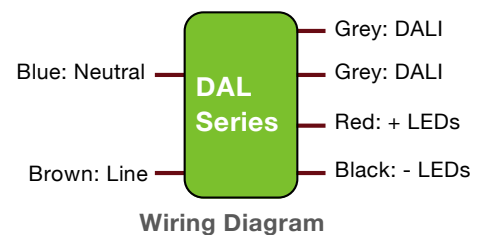
L 132.2 x W 30.6 x H 20.7 mm
(L 5.21 x W 1.20 x H 0.81 in)

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
 - UL: Class 2 output, Class P
 - CB, CE
 - FCC, ENEC
 - DALI2, Device Type 6 (parts 101, 102, 207)
- Standby power < 0.5 W @ 120, 240 Vac
- IP20-rated case with silicone-based potting
- Lifetime: 50,000 hours min at 75°C case temperature
- Class II power supply
- 90°C maximum case hot spot temperature

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



DAL Series

DAL30 30 W
DAL50 50 W

50 & 30 W Class 2/Class II CC LED Driver w/ DALI Dimming

1 - ORDERING INFORMATION

Part Number	Nominal Input Voltage (Vac)	Max Output Power (W)	Iout (mA)	Default Programmed Current (mA)	Vout Min. (Vdc)	Vout Nom. (Vdc)	Vout Max. (Vdc)*	Open Loop (No Load) Voltage (Vdc)	Comments
DAL30W									
DAL30W-0600-42-T	120 to 277	25.2	300 to 600	300	28	37.8	42	50	DALI only, Terminal Blocks
DAL50W									
DAL50W-0850-56-T	120 to 277	47.6	425 to 850	425	38	50.4	56	60	DALI only, Terminal Blocks
DAL50W-1200-42-T	120 to 277	50.4	600 to 1200	600	28	37.8	42	50	DALI only, Terminal Blocks

* 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 \leq Vout Nom. of the driver.

Programming Wand

Part number: NFC_WAND



Notes:

1. Please order the programming wand using the part number NFC_WAND.

DAL Series

DAL30 30 W
DAL50 50 W

50 & 30 W Class 2/Class II CC LED Driver w/ DALI Dimming

2 - INPUT SPECIFICATION (@25°C ambient temperature)

	Units	Minimum	Typical	Maximum	Notes
Input Voltage Range (Vin)	Vac	90	120, 220 to 240, 277	305	<ul style="list-style-type: none"> The rated output current for each model is achieved at $V_{in} \geq 108$ Vac, at $V_{in} \geq 209$ Vac, & at $V_{in} \geq 249$. At nominal load
Input Frequency Range	Hz	47	50, 60	63	
Input Current (Iin)	A			0.5 A @ 120 Vac 0.28 A @ 230 Vac 0.23 A @ 277 Vac	
Max Units on a 16 A Circuit Breaker		DAL30: 58 (120 Vac), 113 (230 Vac), 135 (277 Vac) units 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		<ul style="list-style-type: none"> At nominal input voltage and with nominal LED voltage and no dimmer From 100% to 50% 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 0.6 mA @ 230 Vac 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%	<ul style="list-style-type: none"> At nominal input voltage and nominal LED voltage From 100% to 50% of rated power 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 1000	<ul style="list-style-type: none"> At 120 Vac and 230 Vac At 277 Vac
Isolation	The AC input to the main DC output is isolated and meets Class II reinforced/double insulation.				

3 - MAIN OUTPUT SPECIFICATION (@25°C 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	<ul style="list-style-type: none"> At nominal AC line voltage 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				<ul style="list-style-type: none"> Measured at maximum load and nominal input voltage. At 20% & 100% load
Dimming Range	%	1		100	<ul style="list-style-type: none"> 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. 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	<ul style="list-style-type: none"> Measured from application of AC line voltage to DALI command acceptance With DALI bus present
Isolation	The main DC output is certified and tested per UL8750 Class 2 or LED Class 2				

DAL Series

DAL30 30 W
DAL50 50 W

50 & 30 W Class 2/Class II CC LED Driver w/ DALI Dimming

4 - ENVIRONMENTAL CONDITIONS

	Units	Minimum	Typical	Maximum	Notes
Operating Ambient Temperature (Ta)	°C	-10		40	
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	5 years 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	DALI2 (parts 101, 102, 207)

Safety

	Units	Minimum	Typical	Maximum	Notes
Hi Pot (High Potential) or Dielectric voltage-withstand	Vdc	4400			<ul style="list-style-type: none"> •Meets Class II reinforced/double insulation  •Tested at the RMS voltage equivalent of 3100 Vac

DAL Series

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50 & 30 W Class 2/Class II CC LED Driver w/ DALI Dimming

■ 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 6.

Short Circuit and Over Current Protection

The DAL50/30 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 DAL50/30 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 DAL50/30 series is typically limited to 1.3 times the maximum output voltage of each model.

■ 7 - OUTPUT POWER DE-RATING AT ELEVATED TEMPERATURES

The DAL50/30 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.

DAL Series

DAL30 30 W
DAL50 50 W

50 & 30 W Class 2/Class II CC LED Driver w/ DALI Dimming

■ 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 does not need to 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 GUI (Graphical User Interface), which enables the user to adjust output current from 100% to 50%.

Please note that, for each model, the **default output current setting is 50% of max current**. For example, the default output current setting for the DAL50W-1200-42-T is 600 mA.

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.



Figure 1

DAL Series

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DAL50 50 W

50 & 30 W Class 2/Class II CC LED Driver w/ DALI Dimming

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 ($\tan \delta$): 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

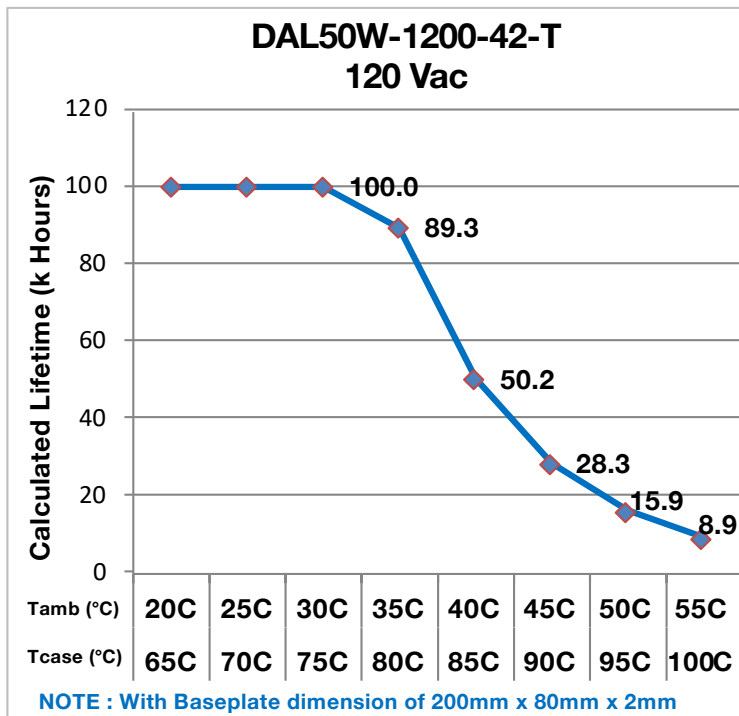


Figure 2

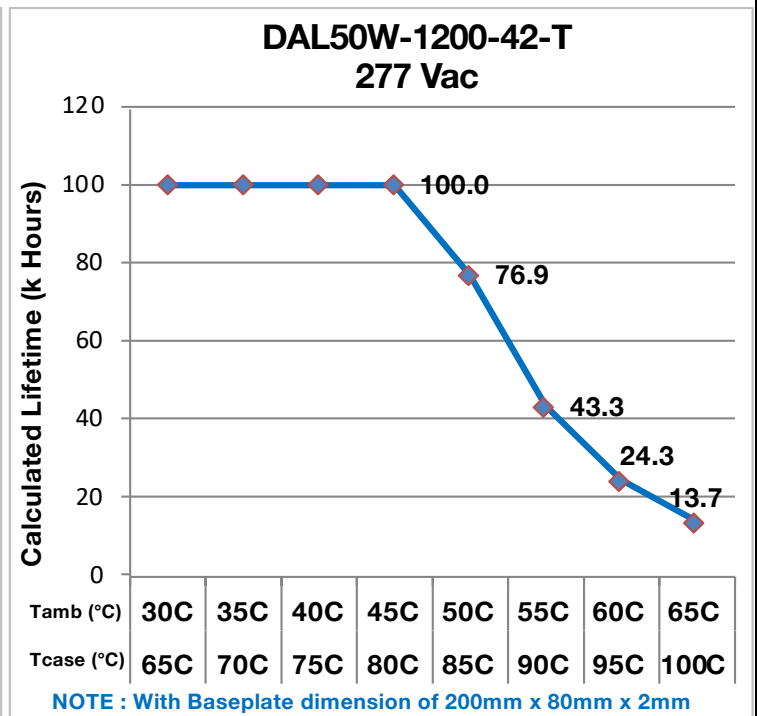


Figure 3

Notes:

- The ambient temperature $T_{ambient}$ and the differential between $T_{ambient}$ 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. 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 T_c point in the application should be used for reliability calculations.

DAL Series

DAL30 30 W
DAL50 50 W

50 & 30 W Class 2/Class II CC LED Driver w/ DALI Dimming

11 – EFFICIENCY VERSUS LOAD

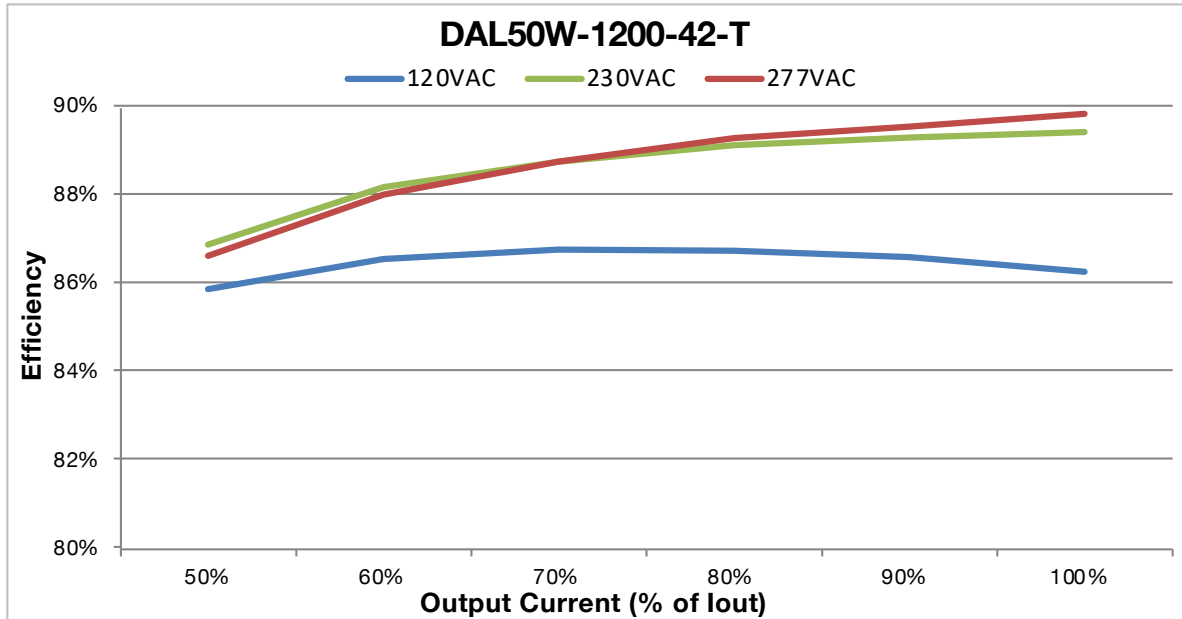


Figure 4

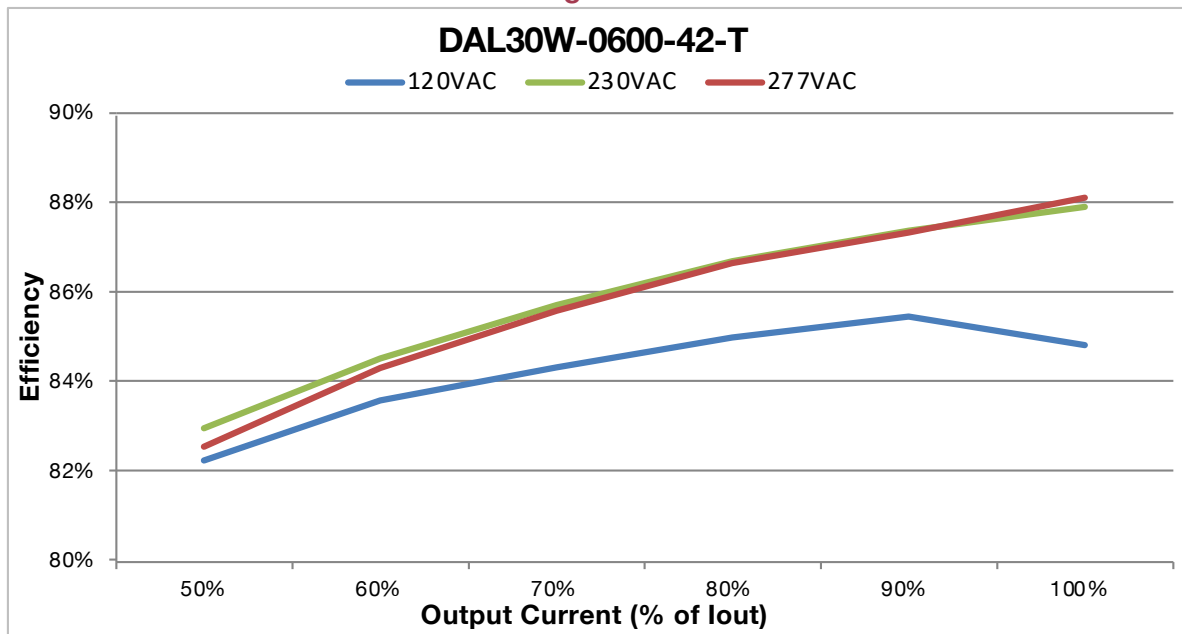


Figure 5

DAL Series

DAL30 30 W
DAL50 50 W

50 & 30 W Class 2/Class II CC LED Driver w/ DALI Dimming

12 – POWER FACTOR VERSUS LOAD

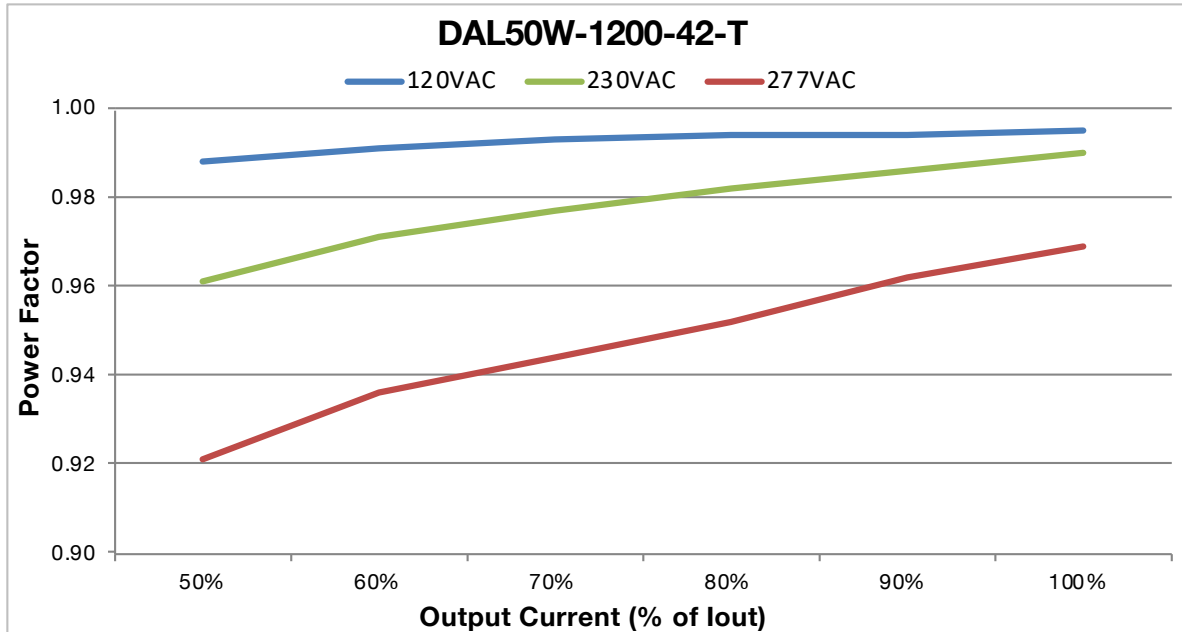


Figure 6

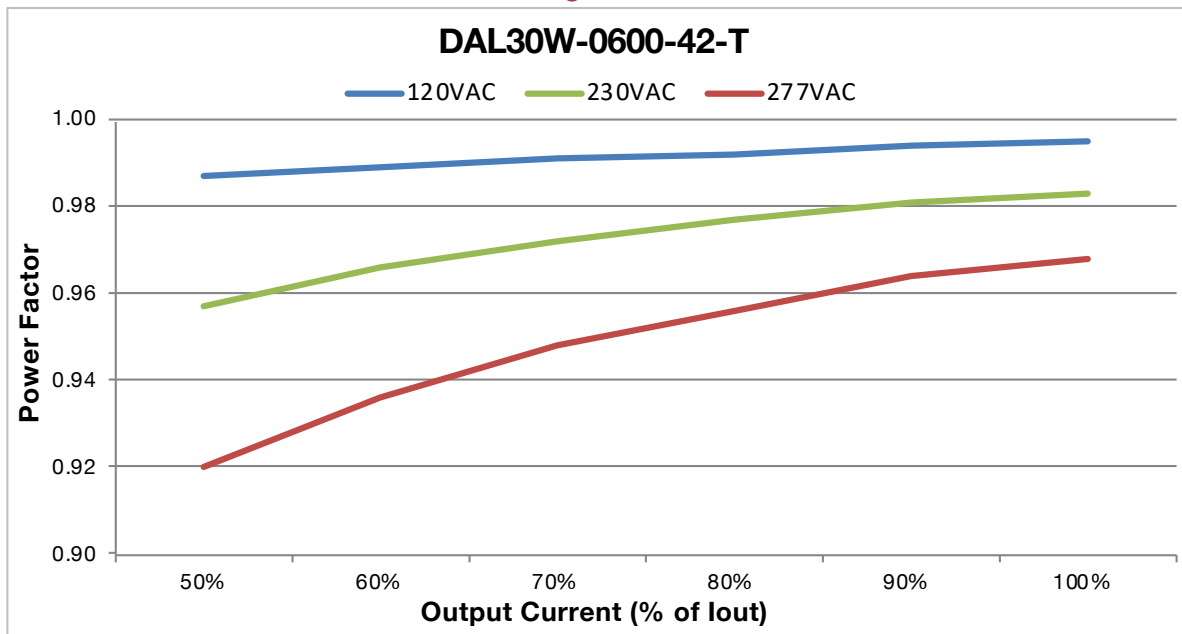


Figure 7

DAL Series

DAL30 30 W
DAL50 50 W

50 & 30 W Class 2/Class II CC LED Driver w/ DALI Dimming

13 – TOTAL HARMONIC DISTORTION (THD) VERSUS LOAD

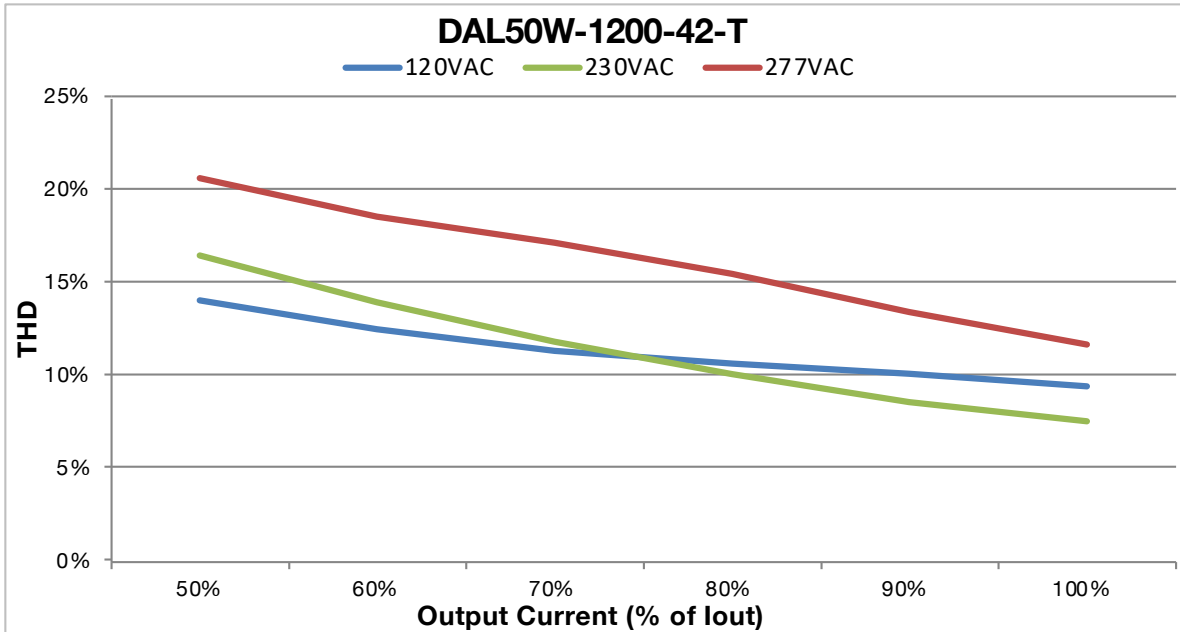


Figure 8

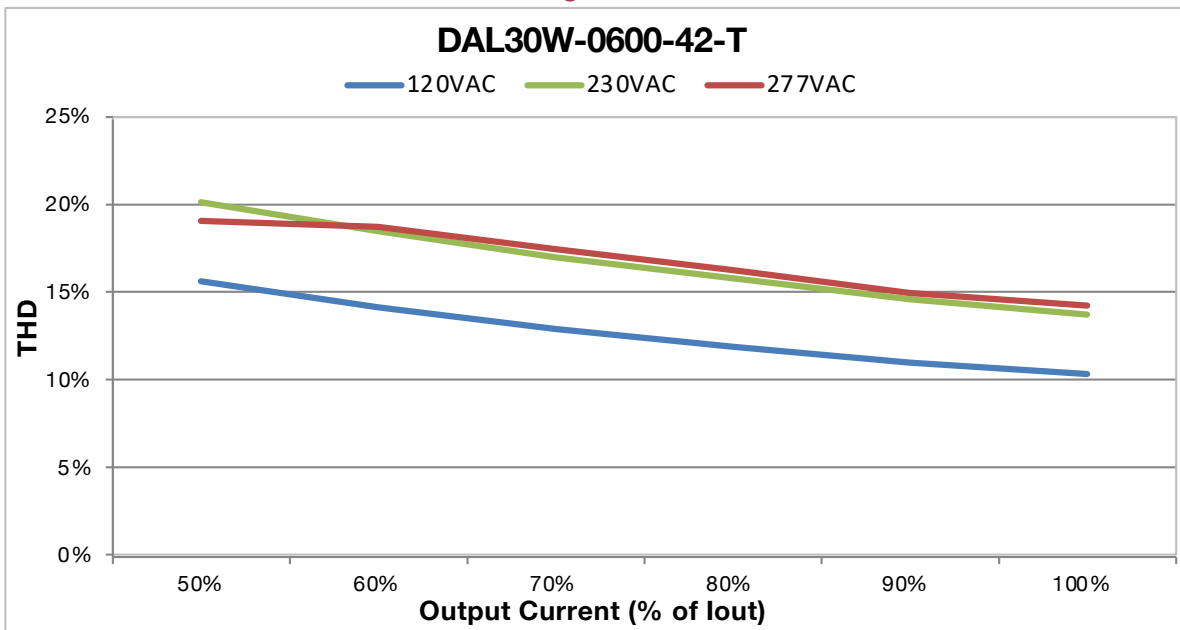


Figure 9

DAL Series

DAL30 30 W
DAL50 50 W

50 & 30 W Class 2/Class II CC LED Driver w/ DALI Dimming

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)

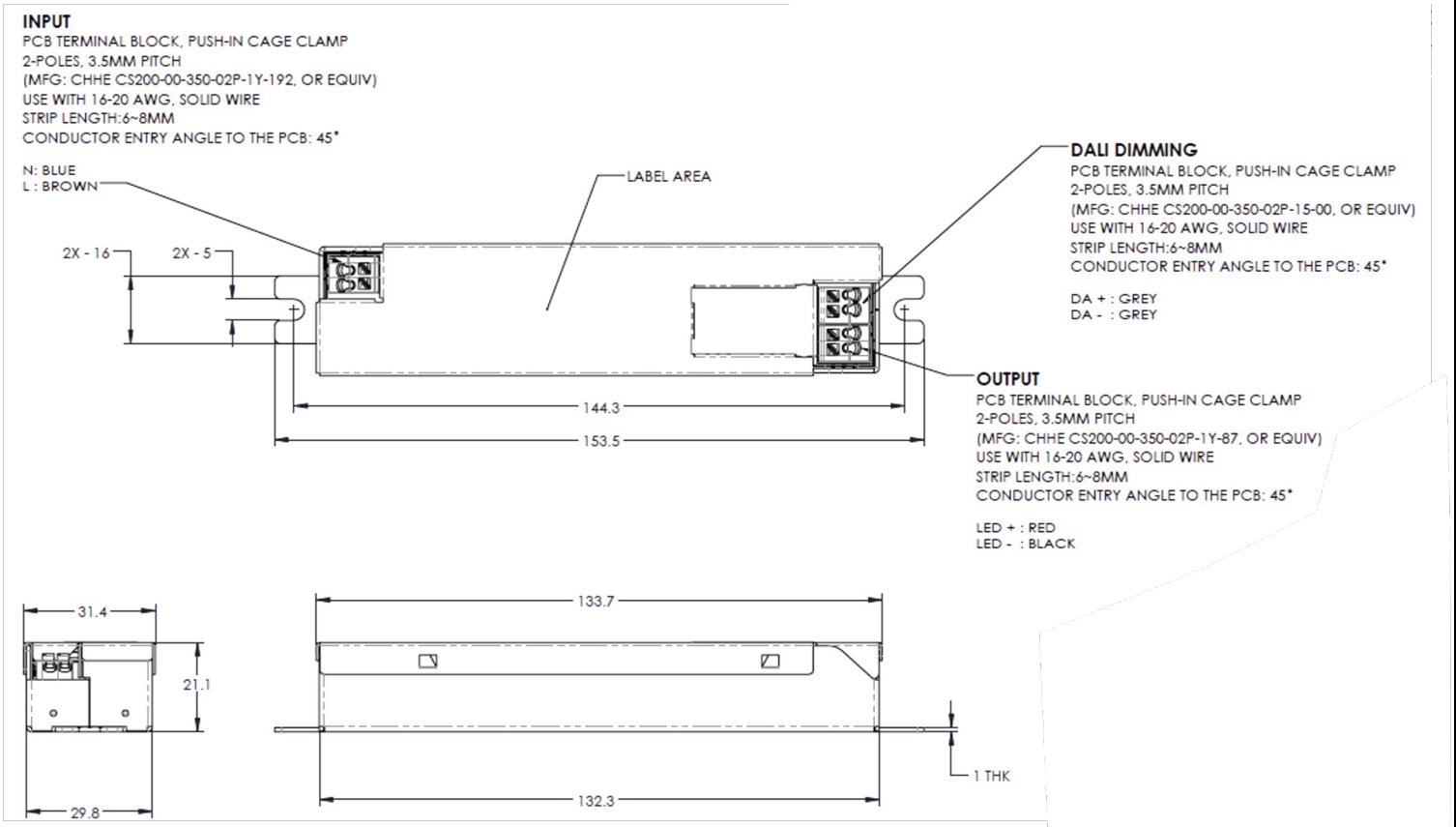


Figure 10

DAL Series

DAL30 30 W
DAL50 50 W

50 & 30 W Class 2/Class II CC LED Driver w/ DALI Dimming

16 - LABELING

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

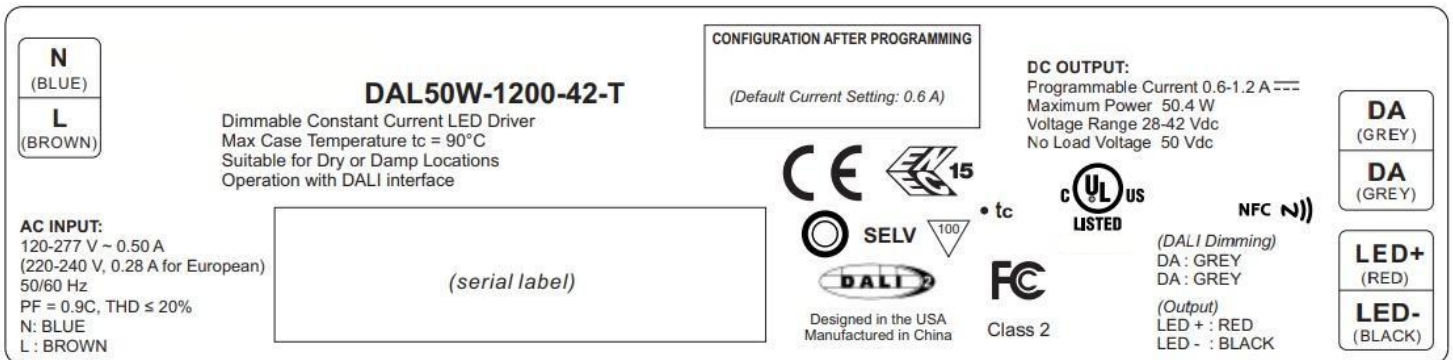


Figure 11

