

LED Driver

LDU Series



- Constant Current Output
- LED Drive Current up to 1000 mA
- LED Strings from 2 V to 57 V
- PWM & Analog Dimming Control
- High Efficiency – up to 95%
- Open or Short Circuit LED Protection
- 3 Year Warranty

Specification

Input

Input Voltage	<ul style="list-style-type: none"> • LDU08 & 24: 7-30 VDC • LDU48: 7-60 VDC
Input Filter	<ul style="list-style-type: none"> • Capacitor
Input Surge	<ul style="list-style-type: none"> • LDU08 & 24: 40 VDC for 0.5 s • LDU48: 65 VDC for 0.5 s

Output

Output Voltage	<ul style="list-style-type: none"> • See tables (V_{in} must be at least 2 V greater than V_{out})
Output Current	<ul style="list-style-type: none"> • See tables
Output Current Trim	<ul style="list-style-type: none"> • 25-100%
Output Current Accuracy	<ul style="list-style-type: none"> • LDU08: $\pm 6.0\%$ max • LDU24: $\pm 8.0\%$ max • LDU48: $\pm 8.0\%$ max
Ripple & Noise	<ul style="list-style-type: none"> • LDU08: 200 mV pk-pk max • LDU24: 250 mV pk-pk max (except 1000 mA units: 300 mV pk-pk max) • LDU48: See tables measured with 20 MHz bandwidth
Short Circuit Protection	<ul style="list-style-type: none"> • Current is limited to the rated output
Temperature Coefficient	<ul style="list-style-type: none"> • LDU08: $\pm 0.03\%/^{\circ}\text{C}$ max • LDU24: $\pm 0.08\%/^{\circ}\text{C}$ max • LDU48: $\pm 0.03\%/^{\circ}\text{C}$ max
Remote On/Off	<ul style="list-style-type: none"> • On = 0.3-1.25 V or open circuit • Off = ≤ 0.15 V (applied to control pin) • LDU08 & 24: Quiescent input current is 25 μA max, • LDU48: Quiescent input current is 100 μA max
Remote On/Off Signal Current	<ul style="list-style-type: none"> • 1 mA max

Dimming

PWM	
Output Current Range	<ul style="list-style-type: none"> • 25% to 100%
Operating Frequency	<ul style="list-style-type: none"> • 1 kHz max
On Time	<ul style="list-style-type: none"> • 200 ns min
Off Time	<ul style="list-style-type: none"> • 200 ns min
Amplitude	<ul style="list-style-type: none"> • 1.25 V max
DC Voltage Control	
Output Current Range	<ul style="list-style-type: none"> • 25% to 100%
Control Input	<ul style="list-style-type: none"> • 0.3 to 1.25 V max
Variable Resistor	
Output Current Range	<ul style="list-style-type: none"> • 25% to 100%

General

Efficiency	<ul style="list-style-type: none"> • See tables
Switching Frequency	<ul style="list-style-type: none"> • LDU08: 40-380 kHz variable • LDU24: 50-330 kHz variable • LDU48: 20-500 kHz variable
MTBF	<ul style="list-style-type: none"> • LDU08: >1.6 Mhrs • LDU24: >1.6 Mhrs • LDU48: >950 KHrs to MIL-HDBK-217F at 25 $^{\circ}\text{C}$, GB

Environmental

Operating Temperature	<ul style="list-style-type: none"> • LDU08: -40 $^{\circ}\text{C}$ to +85 $^{\circ}\text{C}$, • LDU24: -40 $^{\circ}\text{C}$ to +85 $^{\circ}\text{C}$, • LDU24 1000 mA unit: -40 $^{\circ}\text{C}$ to +70 $^{\circ}\text{C}$, • LDU48: See derating curves
Case Temperature	<ul style="list-style-type: none"> • LDU08 & 24: +100 $^{\circ}\text{C}$ max • LDU48: +110 $^{\circ}\text{C}$ max
Storage Temperature	<ul style="list-style-type: none"> • -40 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$
Humidity	<ul style="list-style-type: none"> • Up to 95%, non-condensing
Thermal Impedance	<ul style="list-style-type: none"> • 35-50 $^{\circ}\text{C}/\text{W}$ model dependant
Ingress Protection Rating	<ul style="list-style-type: none"> • IP67 (wired versions)

EMC

Emissions	<ul style="list-style-type: none"> • EN55022 class B conducted & radiated with external components - see application notes
ESD Immunity	<ul style="list-style-type: none"> • EN61000-4-2, level 2 Perf Criteria A
Radiated Immunity	<ul style="list-style-type: none"> • EN61000-4-3, level 2 Perf Criteria A
EFT/Burst	<ul style="list-style-type: none"> • EN61000-4-4, level 2 Perf Criteria A
Surge	<ul style="list-style-type: none"> • EN61000-4-5, level 2 Perf Criteria A
Conducted Immunity	<ul style="list-style-type: none"> • EN61000-4-6, level 2 Perf Criteria A

Models and Ratings

With Dimming Control

Output Power	Input Voltage Range	Output Voltage	Output Current	Efficiency	Model Number
8.0 W	7 - 30 V	2 - 28 V	300 mA	95%	LDU0830S300†^
8.0 W	7 - 30 V	2 - 28 V	350 mA	95%	LDU0830S350†^
14.0 W	7 - 30 V	2 - 28 V	500 mA	95%	LDU2430S500†^
17.0 W	7 - 30 V	2 - 28 V	600 mA	95%	LDU2430S600†^
20.0 W	7 - 30 V	2 - 28 V	700 mA	95%	LDU2430S700†^
24.0 W	7 - 30 V	2 - 28 V	1000 mA	95%	LDU2430S1000†^

Wired Versions (No Dimming Control)

Output Power	Input Voltage Range	Output Voltage	Output Current	Efficiency	Model Number
8.0 W	7 - 30 V	2 - 28 V	350 mA	95%	LDU0830S350-W
14.0 W	7 - 30 V	2 - 28 V	500 mA	95%	LDU2430S500-W
20.0 W	7 - 30 V	2 - 28 V	700 mA	95%	LDU2430S700-W
24.0 W	7 - 30 V	2 - 28 V	1000 mA	95%	LDU2430S1000-W

Wired Version with Dimming Control

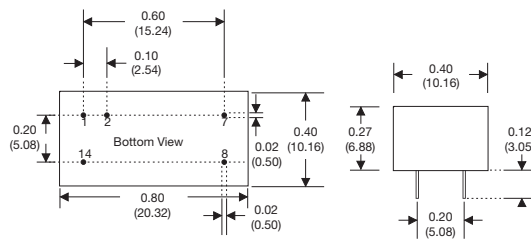
Output Power	Input Voltage Range	Output Voltage	Output Current	Efficiency	Model Number
8.0 W	7 - 30 V	2 - 28 V	350 mA	95%	LDU0830S350-WD
14.0 W	7 - 30 V	2 - 28 V	500 mA	95%	LDU2430S500-WD
20.0 W	7 - 30 V	2 - 28 V	700 mA	95%	LDU2430S700-WD
24.0 W	7 - 30 V	2 - 28 V	1000 mA	95%	LDU2430S1000-WD

† Available from Farnell & element14. See pages 284-290.

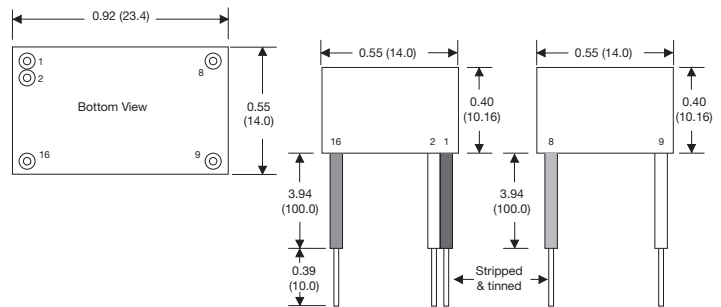
^ Available from Newark. See pages 291-296.

Mechanical Details

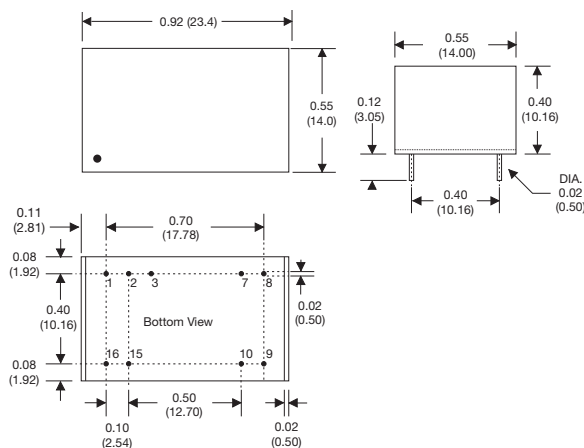
LDU08: 14 Pin DIL



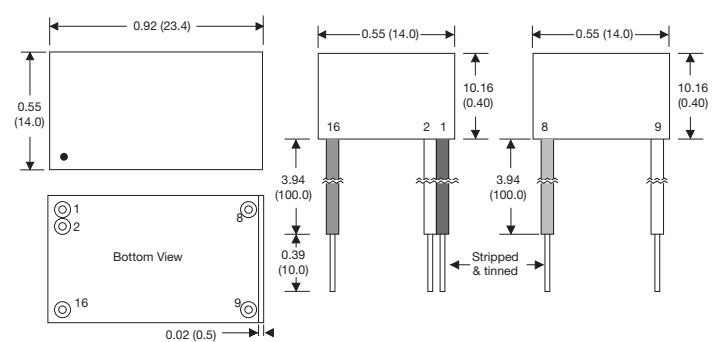
LDU08 - Wired Versions



LDU24- 16 Pin DIL



LDU24 - Wired Versions



Notes

- All dimensions are in inches (mm)
- Weight: LDU08 - 0.006 lbs (2.6 g) approx.
LDU08 (wired version) - 0.02 lbs (11.1 g) approx.
LDU24 - 0.014 lbs (6.2 g) approx.
LDU24 (wired version) - 0.02 lbs (11.1 g) approx.
- Pin diameter: 0.02±0.002 (0.5±0.05)
- Pin pitch tolerance: ±0.014 (±0.35)
- Case tolerance: ±0.02 (±0.5)

LDU Connections						Function
LDU08	LDU08-W	LDU08-WD	LDU24	LDU24-W	LDU24-WD	
1	1 (Black)	1 (Black)	1 & 2	1 (Black)	1 (Black)	-Vin: -DC supply
2	No Wire	2 (White)	3	No Wire	2 (White)	Control
7	8 (Blue)	8 (Blue)	7 & 8	8 (Blue)	8 (Blue)	-Vout: LED cathode connection
8	9 (Yellow)	9 (Yellow)	9 & 10	9 (Yellow)	9 (Yellow)	+Vout: LED anode connection
14	16 (Red)	16 (Red)	15 & 16	16 (Red)	16 (Red)	+Vin: +DC supply

Note: LDU08: Do not connect Pin 1 (-Vin) to Pin 7 (-Vout).
LDU24: Do not connect Pins 1 & 2 (-Vin) to Pins 7 & 8 (-Vout).

Models and Ratings

With Dimming Control

Output Power	Input Voltage Range	Output Voltage	Output Current	Ripple & Noise (pk-pk)	Efficiency	Model Number
9.0 W	7 - 60 V	2 - 57 V	150 mA	150 mV	97%	LDU4860S150
14.0 W	7 - 60 V	2 - 57 V	250 mA	200 mV	97%	LDU4860S250
17.0 W	7 - 60 V	2 - 57 V	300 mA	250 mV	97%	LDU4860S300
20.0 W	7 - 60 V	2 - 57 V	350 mA	300 mV	97%	LDU4860S350
29.0 W	7 - 60 V	2 - 57 V	500 mA	400 mV	97%	LDU4860S500
34.0 W	7 - 60 V	2 - 57 V	600 mA	450 mV	97%	LDU4860S600
40.0 W	7 - 60 V	2 - 57 V	700 mA	500 mV	97%	LDU4860S700
48.0 W	7 - 60 V	2 - 48 V	1000 mA	800 mV	97%	LDU4860S1000

Wired Versions (No Dimming Control)

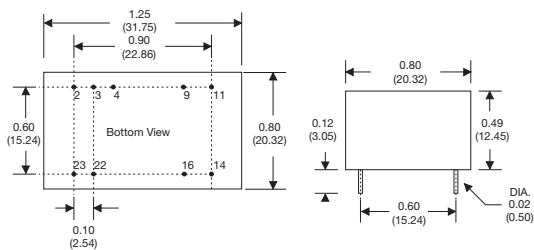
Output Power	Input Voltage Range	Output Voltage	Output Current	Ripple & Noise (pk-pk)	Efficiency	Model Number
9.0 W	7 - 60 V	2 - 57 V	150 mA	150 mV	97%	LDU4860S150-W
14.0 W	7 - 60 V	2 - 57 V	250 mA	200 mV	97%	LDU4860S250-W
17.0 W	7 - 60 V	2 - 57 V	300 mA	250 mV	97%	LDU4860S300-W
20.0 W	7 - 60 V	2 - 57 V	350 mA	300 mV	97%	LDU4860S350-W
29.0 W	7 - 60 V	2 - 57 V	500 mA	400 mV	97%	LDU4860S500-W
34.0 W	7 - 60 V	2 - 57 V	600 mA	450 mV	97%	LDU4860S600-W
40.0 W	7 - 60 V	2 - 57 V	700 mA	500 mV	97%	LDU4860S700-W
48.0 W	7 - 60 V	2 - 48 V	1000 mA	800 mV	97%	LDU4860S1000-W

Wired Version with Dimming Control

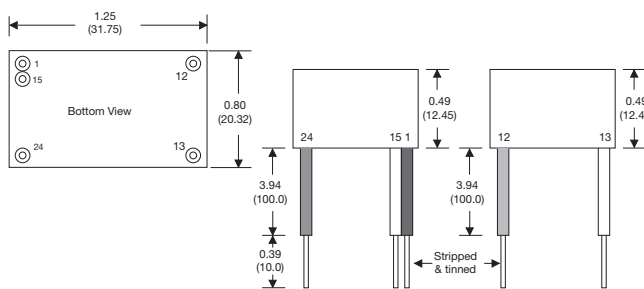
Output Power	Input Voltage Range	Output Voltage	Output Current	Ripple & Noise (pk-pk)	Efficiency	Model Number
9.0 W	7 - 60 V	2 - 57 V	150 mA	150 mV	97%	LDU4860S150-WD
14.0 W	7 - 60 V	2 - 57 V	250 mA	200 mV	97%	LDU4860S250-WD
17.0 W	7 - 60 V	2 - 57 V	300 mA	250 mV	97%	LDU4860S300-WD
20.0 W	7 - 60 V	2 - 57 V	350 mA	300 mV	97%	LDU4860S350-WD
29.0 W	7 - 60 V	2 - 57 V	500 mA	400 mV	97%	LDU4860S500-WD
34.0 W	7 - 60 V	2 - 57 V	600 mA	450 mV	97%	LDU4860S600-WD
40.0 W	7 - 60 V	2 - 57 V	700 mA	500 mV	97%	LDU4860S700-WD
48.0 W	7 - 60 V	2 - 48 V	1000 mA	800 mV	97%	LDU4860S1000-WD

Mechanical Details

LDU48 - 24 Pin DIL



LDU48 - Wired Versions

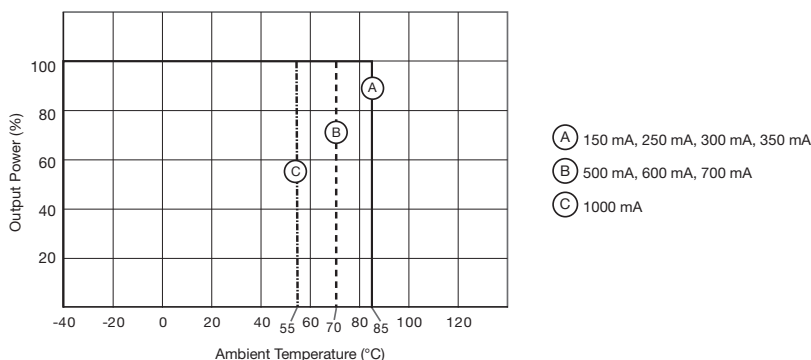


LDU48 Connections			
LDU48	LDU48-W	LDU48-WD	Function
2 & 3	1 (Black)	1 (Black)	-Vin: -DC supply
4	No Wire	15 (White)	Control
9 & 11	12 (Blue)	12 (Blue)	-Vout: LED cathode connection
14 & 16	13 (Yellow)	13 (Yellow)	+Vout: LED anode connection
22 & 23	24 (Red)	24 (Red)	+Vin: +DC supply

Notes

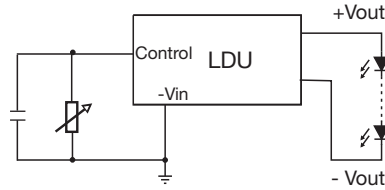
- All dimensions are in inches (mm)
- Weight: LDU48 - 0.04 lbs (17.7 g) approx.
LDU48 (wired version) - 0.04 lbs (18.0 g) approx.
- Pin diameter: 0.02±0.002 (0.5±0.05)
- Pin pitch tolerance: ±0.014 (±0.35)
- Case tolerance: ±0.02 (±0.5)

Derating Curve



Output Current Adjustment by Variable Resistor

By connecting a variable resistor between control and GND, simple dimming can be achieved. Capacitor is optional for HF noise rejection. Recommended value is 0.22 μ F.



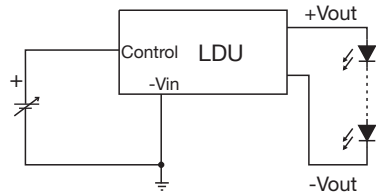
The output current can be determined using the equation:

$$I_{out} = \frac{I_{out} \times R}{(R + 200\text{ k})}$$

Where the value of R is between 0 and 2 M Ω , the maximum adjustment range of output current is 25% to 90% (For Vin-Vout, LDU08 & 24: <20 VDC, LDU48: <30 VDC)

Output Current Adjustment by DC Voltage

Control Voltage Range: 0.3 V to 1.25 VDC



The output current is given by:

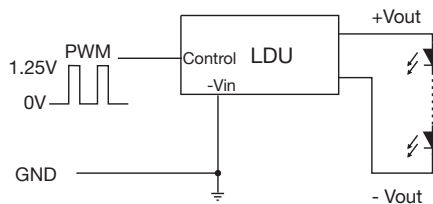
$$I_{out\text{ nom}} = \frac{I_{out} \times \text{Control}}{1.25}$$

Output Current Adjustment by PWM

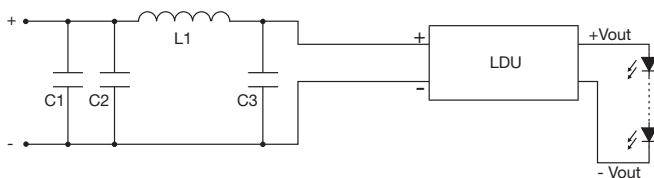
Directly driving control input

A Pulse Width Modulated (PWM) signal with duty cycle DPWM can be applied to the control pin, as shown:

$$I_{out\text{ nom}} = I_{out} \times D_{pwm} \text{ (} D_{pwm} = \text{PWM duty cycle)}$$



Input Filter to meet Class B Conducted Emissions



	LDU08	LDU24	LDU48
C1	10 μ F	10 μ F	4.7 μ F
C2	Not Fitted	Not Fitted	4.7 μ F
C3	47 μ F	47 μ F	Not Fitted
L1	68 μ H	68 μ H	47 μ H