

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 | • LDU08 & 24: 7-30 VDC LDU48: 7-60 VDC |
| Input Filter | • Capacitor |
| Input Surge | • LDU08 & 24: 40 VDC for 0.5 s LDU48: 65 VDC for 0.5 s |

Output

| | |
|------------------------------|--|
| Output Voltage | • See tables (V_{in} must be at least 2 V greater than V_{out}) |
| Output Current | • See tables |
| Output Current Trim | • 25-100% |
| Output Current Accuracy | • LDU08: $\pm 6.0\%$ max LDU24: $\pm 8.0\%$ max LDU48: $\pm 8.0\%$ max |
| Ripple & Noise | • 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 | • Current is limited to the rated output |
| Temperature Coefficient | • 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 | • 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 | • 1 mA max |

Dimming

| | |
|----------------------|---------------|
| PWM | |
| Output Current Range | • 25% to 100% |
| Operating Frequency | • 1 kHz max |
| On Time | • 200 ns min |
| Off Time | • 200 ns min |
| Amplitude | • 1.25 V max |

DC Voltage Control

| | |
|----------------------|---------------------|
| Output Current Range | • 25% to 100% |
| Control Input | • 0.3 to 1.25 V max |

Variable Resistor

| | |
|----------------------|---------------|
| Output Current Range | • 25% to 100% |
|----------------------|---------------|

General

| | |
|---------------------|---|
| Efficiency | • See tables |
| Switching Frequency | • LDU08: 40-380 kHz variable LDU24: 50-330 kHz variable LDU48: 20-500 kHz variable |
| MTBF | • LDU08: >1.6 Mhrs LDU24: >1.6 Mhrs LDU48: >950 KHrs to MIL-HDBK-217F at 25 °C, GB |

Environmental

| | |
|---------------------------|---|
| Operating Temperature | • LDU08: -40 °C to +85 °C, LDU24: -40 °C to +85 °C, LDU24 1000 mA unit: -40 °C to +70 °C, LDU48: See derating curves |
| Case Temperature | • LDU08 & 24: +100 °C max LDU48: +110 °C max |
| Storage Temperature | • -40 °C to +125 °C |
| Humidity | • Up to 95%, non-condensing |
| Thermal Impedance | • 35-50 °C/W model dependant |
| Ingress Protection Rating | • IP67 (wired versions) |

EMC

| | |
|--------------------|---|
| Emissions | • EN55022 class B conducted & radiated with external components - see application notes |
| ESD Immunity | • EN61000-4-2, level 2 Perf Criteria A |
| Radiated Immunity | • EN61000-4-3, level 2 Perf Criteria A |
| EFT/Burst | • EN61000-4-4, level 2 Perf Criteria A |
| Surge | • EN61000-4-5, level 2 Perf Criteria A |
| Conducted Immunity | • EN61000-4-6, level 2 Perf Criteria A |

Models and Ratings

LDU08/24 XP

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)

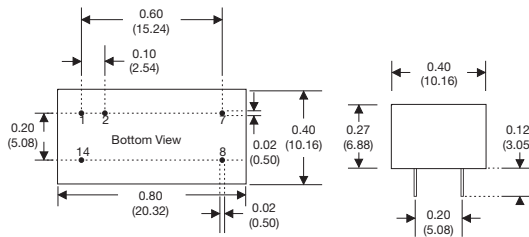
| Output Power | Input Voltage Range | Output Voltage | Output Current | Efficiency | Model Number |
|--------------|---------------------|----------------|----------------|------------|----------------|
| 8.0 W | 7 - 30 V | 2 - 28 V | 350 mA | 95% | LDU0830S350-W |
| 14.0 W | 7 - 30 V | 2 - 28 V | 500 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

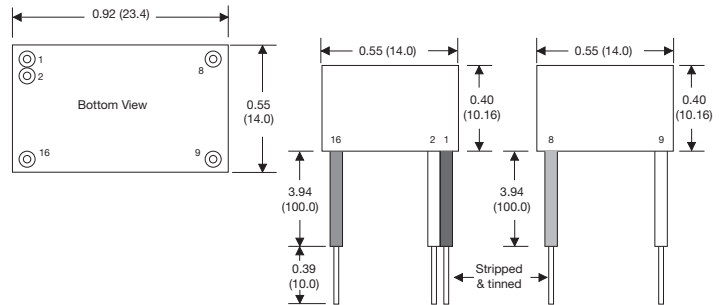
| Output Power | Input Voltage Range | Output Voltage | Output Current | Efficiency | Model Number |
|--------------|---------------------|----------------|----------------|------------|-----------------|
| 8.0 W | 7 - 30 V | 2 - 28 V | 350 mA | 95% | LDU0830S350-WD |
| 14.0 W | 7 - 30 V | 2 - 28 V | 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 |

Mechanical Details

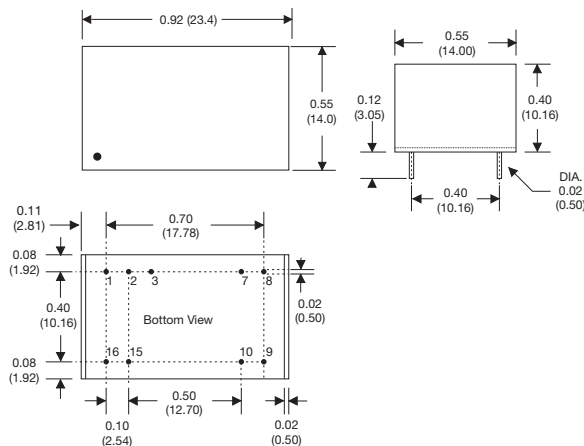
LDU08: 14 Pin DIL



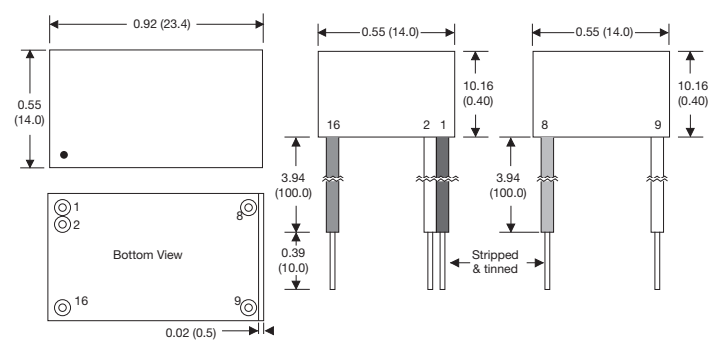
LDU08 - Wired Versions



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 | | | | | | |
|-----------------|------------|------------|---------|------------|------------|-------------------------------|
| LDU08 | LDU08-W | LDU08-WD | LDU24 | LDU24-W | LDU24-WD | Function |
| 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)

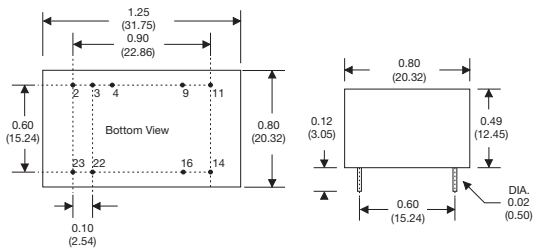
| Output Power | Input Voltage Range | Output Voltage | Output Current | Ripple & Noise (pk-pk) | Efficiency | Model Number |
|--------------|---------------------|----------------|----------------|------------------------|------------|----------------|
| 9.0 W | 7 - 60 V | 2 - 57 V | 150 mA | 150 mV | 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

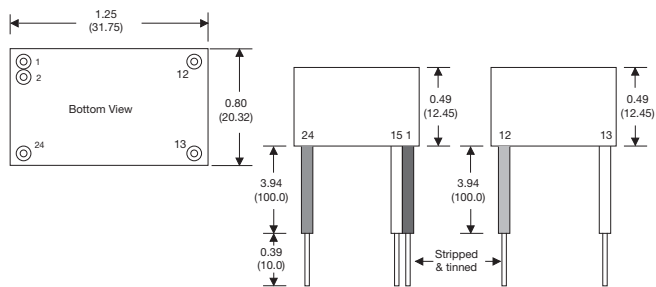
| Output Power | Input Voltage Range | Output Voltage | Output Current | Ripple & Noise (pk-pk) | Efficiency | Model Number |
|--------------|---------------------|----------------|----------------|------------------------|------------|-----------------|
| 9.0 W | 7 - 60 V | 2 - 57 V | 150 mA | 150 mV | 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

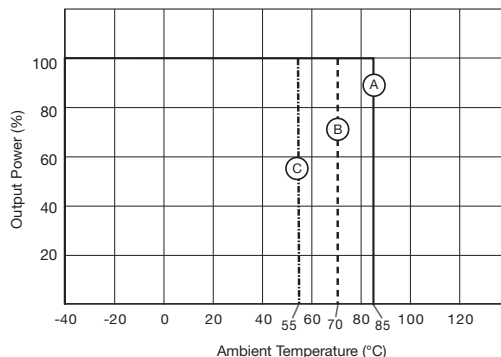


| LDU48 Connections | | | |
|-------------------|-------------|-------------|-------------------------------|
| LDU48 | LDU48-W | LDU48-WD | Function |
| 2 & 3 | 1 (Black) | 1 (Black) | -Vin: -DC supply |
| 4 | No Wire | 15 (White) | Control |
| 9 & 11 | 12 (Blue) | 12 (Blue) | -Vout: LED cathode connection |
| 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 for LDU48



LDU48 Models

- (A) 150 mA, 250 mA, 300 mA, 350 mA
- (B) 500 mA, 600 mA, 700 mA
- (C) 1000 mA

Notes

For LDU08 & LDU24 please see Operating Temperature Spec.

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:

For LDU08-24 $I_{out} = \frac{I_{out\ nom} \times R}{(R + 200\ k)}$ For LDU48 $I_{out} = \frac{I_{out\ nom} \times R}{(R + 50\ k)}$

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:

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

Output Current Adjustment by PWM

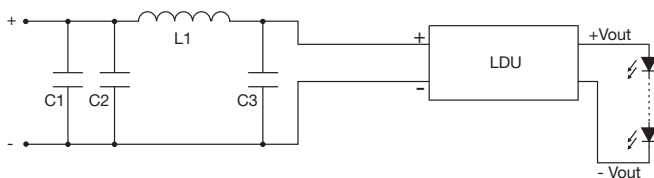
Directly driving control input

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

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



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 |



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