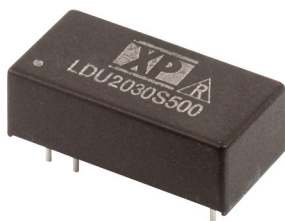


# LED Driver

## LDU20 Series



- Constant Current Output
- LED Drive Current up to 700 mA
- LED Strings from 2 V to 28 V
- PWM & Analog Dimming Control
- High Efficiency – up to 95%
- Open or Short Circuit LED Protection
- 3 Year Warranty

### Specification

#### Input

|               |                    |
|---------------|--------------------|
| Input Voltage | • 7-30 VDC         |
| Input Filter  | • Capacitor        |
| Input Surge   | • 40 VDC for 0.5 s |

#### Output

|                              |                                                                                                                                       |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Output Voltage               | • See tables<br>( $V_{in}$ must be at least 2 V greater than $V_{out}$ )                                                              |
| Output Current               | • See tables                                                                                                                          |
| Output Current Trim          | • 25-100%                                                                                                                             |
| Output Current Accuracy      | • $\pm 10$                                                                                                                            |
| Ripple & Noise               | • 450 mV pk-pk max,<br>measured with 20 MHz bandwidth                                                                                 |
| Short Circuit Protection     | • Current is limited to the rated output                                                                                              |
| Temperature Coefficient      | • $\pm 0.05\%/^{\circ}\text{C}$ max                                                                                                   |
| Remote On/Off                | • On = 0.3-1.25 V or open circuit<br>Off = $\leq 0.15$ V (applied to control pin)<br>Quiescent input current is 25 $\mu\text{A}$ max, |
| Remote On/Off Signal Current | • 1 mA max                                                                                                                            |

#### Dimming

|                           |                     |
|---------------------------|---------------------|
| <b>PWM</b>                |                     |
| 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        |
| <b>DC Voltage Control</b> |                     |
| Output Current Range      | • 25% to 100%       |
| Control Input             | • 0.3 to 1.25 V max |
| <b>Variable Resistor</b>  |                     |
| Output Current Range      | • 25% to 100%       |

#### General

|                     |                                                            |
|---------------------|------------------------------------------------------------|
| Efficiency          | • See tables                                               |
| Switching Frequency | • 70-450 kHz variable                                      |
| MTBF                | • >1.6 Mhrs to MIL-HDBK-217F at 25 $^{\circ}\text{C}$ , GB |

#### Environmental

|                       |                                                     |
|-----------------------|-----------------------------------------------------|
| Operating Temperature | • -40 $^{\circ}\text{C}$ to +70 $^{\circ}\text{C}$  |
| Storage Temperature   | • -40 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$ |
| Humidity              | • Up to 95%, non-condensing                         |
| Thermal Impedance     | • 40 $^{\circ}\text{C}/\text{W}$                    |

#### 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

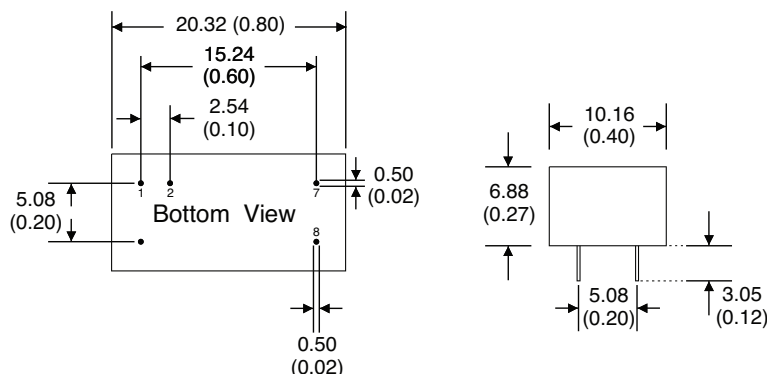
LDU20 XP

| Output Power | Input Voltage Range | Output Voltage | Output Current | Efficiency | Model Number  |
|--------------|---------------------|----------------|----------------|------------|---------------|
| 14 W         | 7-30 V              | 2-28 V         | 500 mA         | 95%        | LDU2030S500†^ |
| 17 W         | 7-30 V              | 2-28 V         | 600 mA         | 95%        | LDU2030S600†^ |
| 20 W         | 7-30 V              | 2-28 V         | 700 mA         | 95%        | LDU2030S700†^ |

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

^ Available from Newark. See pages 291-296

## Mechanical Details



| Pin Connections |           |                        |
|-----------------|-----------|------------------------|
| 1               | -V Input  | -DC supply             |
| 2               | Control   | PWM/ON/OFF or not used |
| 7               | -V Output | LED cathode connection |
| 8               | +V Output | LED anode connection   |
| 14              | +V Input  | +DC supply             |

**Note:** Do not connect pin 1 (-Vin) to pin 7 (-Vout)**Notes**

1. All dimensions are in inches (mm)
2. Weight: 0.006 lbs (2.6 g) approx.
3. Pin diameter: 0.02±0.002 (0.5±0.05)
4. Pin pitch tolerance: ±0.014 (±0.35)
5. Case tolerance: ±0.02 (±0.5)

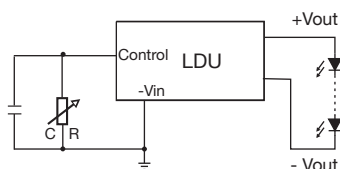
## Application Notes

**Output Current Adjustment by Variable Resistor**

By connecting a variable resistor between Control and GND, simple dimming can be achieved. Capacitor C is optional for HF noise rejection, recommended value is 0.22 μF.

The output current can be determined using the equation: 
$$I_{out} = \frac{\text{Rated Max } I \times R}{(R + 200 \text{ k})}$$

Where the value of R is between 0 and 2 MΩ, the maximum adjustment range of output current is 25% to 90% (For Vin-Vout < 20 VDC)

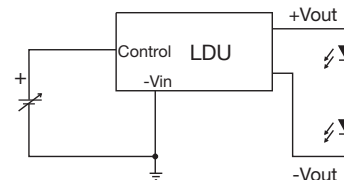


Shorting out the Control pin to GND will turn the output off.

**Output Current Adjustment by DC Voltage**

Control Voltage Range: 0.3 V to 1.25 VDC

The output current is given by: 
$$I_{out \text{ nom}} = \text{Rated Max } I \times \frac{\text{Control Voltage}}{1.25}$$



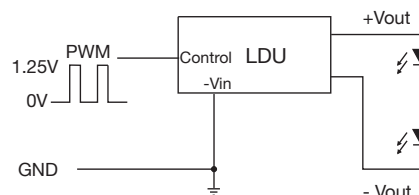
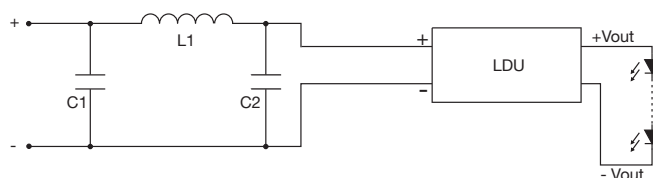
A Control Voltage lower than 0.15 V will turn the output off

**Output Current Adjustment by PWM**

A Pulse Width Modulated (PWM) signal with duty cycle DPWM can be applied to the control pin.

The output current can be determined using the equation: 
$$I_{out} = \text{Rated Max } I \times D_{pwm}$$

$D_{pwm}$  = PWM duty cycle

**Input Filter to meet Class B Conducted Emissions**

|    |       |
|----|-------|
| C1 | 10 μF |
| C2 | 47 μF |
| L1 | 68 μH |