LD48-17-300

0.3A Constant Current 7 - 60 VDC Input DC/DC LED Driver

Key Features:

- 300 mA Output Current
- Constant Current Output
- Wide 7V to 60V Input Range
- Efficiency to 97%
- Miniature MiniDIP Case
- Meets EN 60950
- 950 kHrs MTBF
- *Digital & Analog Dimming!*

Models Available with Wire Leads (IP67 Rated)

RoHS

CE
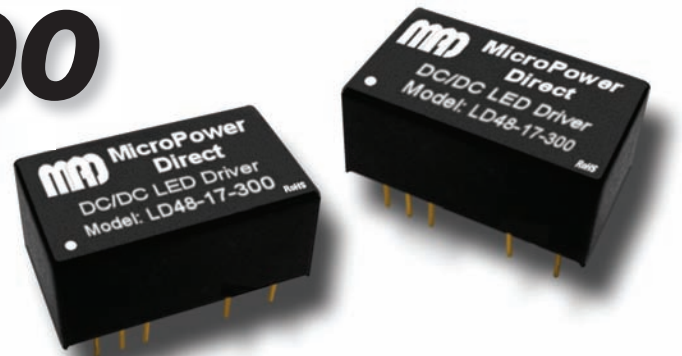
Electrical Specifications

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

Input

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Range		7.0		60.0	VDC
Max Input Voltage	0.5 Sec. Max			65.0	VDC
Input Filter	Internal Capacitor				

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Range	V_{IN} = 60V	2		57	VDC
Output Current	V_{IN} - V_{OUT} > 3V			300	mA
Output Current Accuracy	I_{OUT} = 300 mA		±5.0		%
Output Power				17	W
Efficiency	I_{OUT} = 300 mA		97		%
Capacitive Load				470	µF
Operating Frequency		20		500	kHz
Ripple & Noise (20 MHz)				500	mV P - P
Temperature Coefficient				±0.05	%/°C
Thermal Impedance	Natural Convection			+30	°C/W
Output Short Circuit	Regulated At Rated Output Current				

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+85	°C
Storage Temperature Range		-40		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%
Lead Temperature (Solder)	1.5 mm From Case For 10 Sec			260	°C

Physical

Parameter					
Case Size	1.25 x 0.80 x 0.49 Inches (31.75 x 20.32 x 12.45 mm)				
Case Material	Non-Conductive Black Plastic (UL94-V0)				
Weight	0.622 Oz (17.7g)				

Remote On/Off Control

Parameter	Conditions	Min.	Typ.	Max.	Units
DC/DC On		Open or 0.3V < V_{ADJ} <1.25V			
DC/DC Off		V_{ADJ} <0.15V			
Remote Pin Drive Current	V_{ADJ} = 1.25V			1	mA
Quiescent Input Current (Shutdown Mode)	V_{IN} = 60V			100	µA

PWM Dimming

Parameter	Conditions	Min.	Typ.	Max.	Units
Operation Frequency	Recommended Maximum			1.0	kHz
Switch On Time		200			nS
Switch Off Time		200			nS

Analog Dimming

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Range	At V_{ADJ} Input (Pin 4)	0.3		1.25	VDC
Output Current Adjustment		25		100	%
Control Voltage Range Limits	On	0.20		0.30	VDC
	Off	0.15		0.25	
Drive Current	V_{ADJ} = 1.25V			1.0	mA

EMC Compliance

Parameter	Conditions				
EMI/RFI	Radiated/Conducted	EN 55015 (CISPR22)			
Electrostatic Discharge (ESD)	Class A	IEC/EN 61000-4-2, -6, -8			
RF Field Susceptibility	Class A	IEC/EN 61000-4-3			
Electrical Fast Transients/Bursts On Mains	Class A	IEC/EN 61000-4-4			
EMS Immunity		EN61547			

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	950			kHours

Notes:
1. A reversed power source could damage the unit.
2. No connection should be made between input ground and the output.
3. These are step-down devices, the maximum output open voltage is equal to the input voltage.
4. The V_{ADJ} pin (Pin 3) should be left open if not used. Grounding V_{ADJ} will shut the unit down. Connecting V_{ADJ} to V_{IN} may damage the unit.
5. Exceeding the specified maximum output power could cause damage to the unit.

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Typical Connection: DC Input

Typical Connection: AC Input
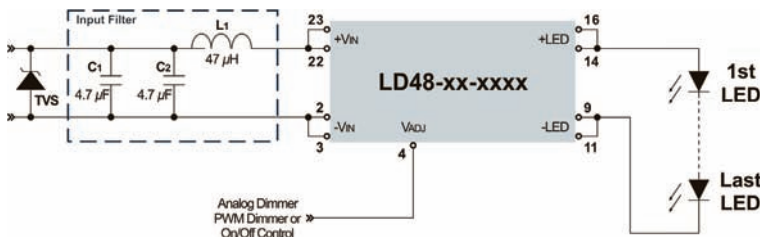
Connection Notes:
1. Input filter components (C₁, L₂ & L₁) are used to help meet the conducted emissions requirements for the unit.
2. To comply with EN61000-4-5, a TVS should be installed before the input filter components. The TVS max clamping voltage (@max peak pulse current Vc) must be ≦60V.

Analog Output Current Control
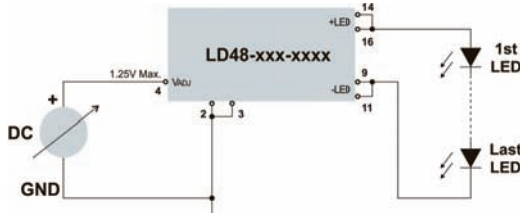
When driving the V$_{ADJ}$ pin directly from a DC source, the output current is derived by the formula:

$$I_{OUT} = 0.3 \times \frac{V_{ADJ}}{1.25}$$
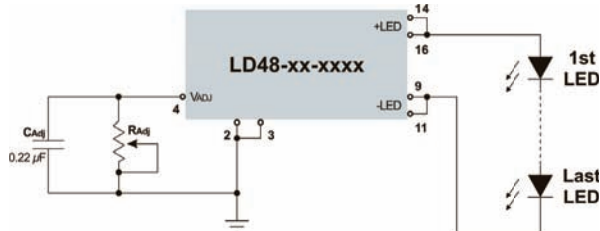
For simple dimming, a variable resister is connected as shown above. C$_{ADJ}$ improves HF noise rejection & helps prevent AC mains interference. Output current is derived by the formula:

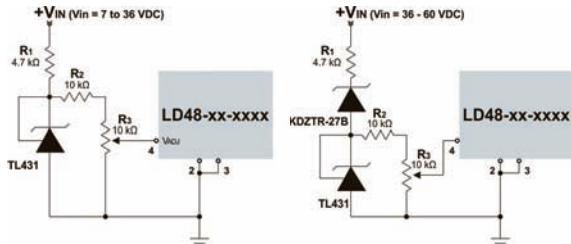$$I_{OUT} = \frac{0.3 \times R_{ADJ}}{(R_{ADJ} + 50k)}$$
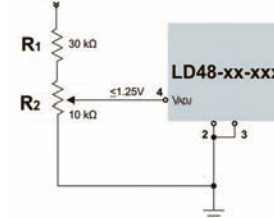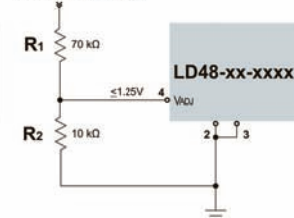
When setting the control voltage level at pin 4 (V$_{ADJ}$) through a resistor network, output current is derived by the formula:

$$I_{OUT} = 0.3 \times \frac{\left(\frac{R_2}{R_1+R_2} \times V_{CTRL}\right)}{1.25}$$
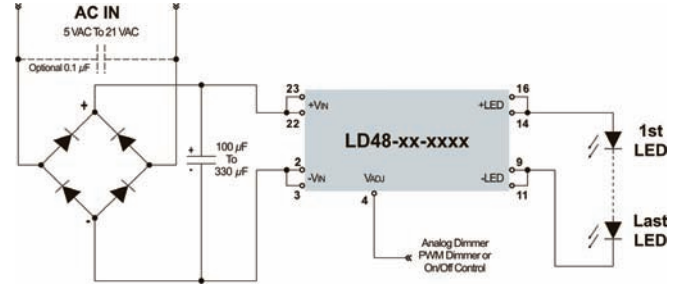
If The control voltage is derived from V$_{IN}$, the circuits shown above may be used. Output current is derived by the formula:

$$I_{OUT} = 0.3 \times \frac{\left(\frac{R_3}{R_2+R_3} \times 2.5\right)}{1.25}$$

PWM Output Current Control

Output current may be adjusted by using a pulse width modulated (PWM) signal. By varying the signal duty cycle (as shown at right) the output current is adjusted up or down. To avoid visible flicker, the PWM signal should be greater than 100 Hz.
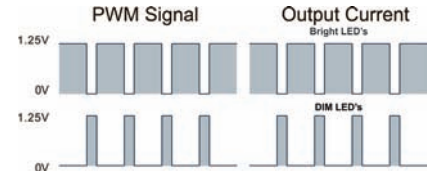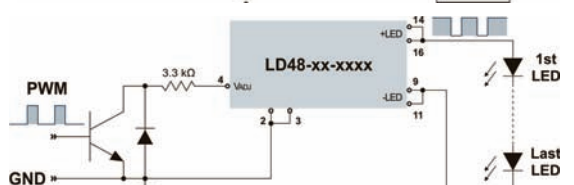
For duty cycles (D$_{PWM}$) between 0 and 1, the output current is derived by the formula:
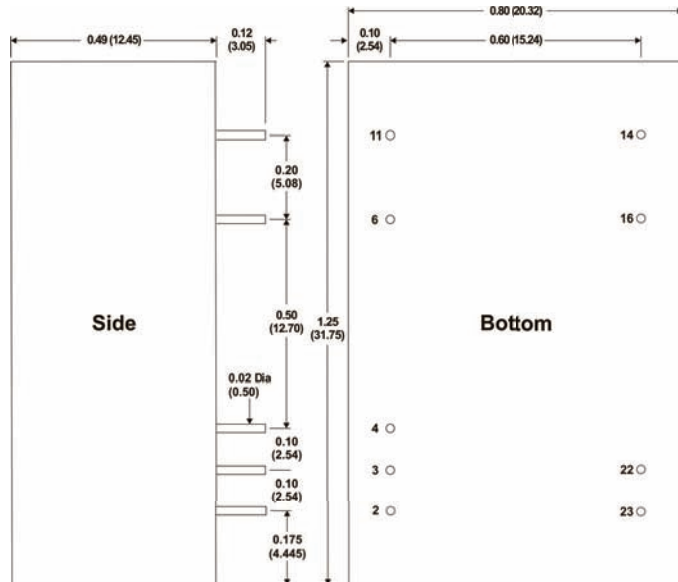
$$I_{OUT} = 0.3 \times D_{PWM}$$

The V$_{ADJ}$ input may be driven via an open collector transistor. The diode and resistor suppress high amplitude negative spikes that may be caused by the drain-source capacitance of the transistor. Negative spikes on the input of the unit could cause errors in output current or erratic operation.
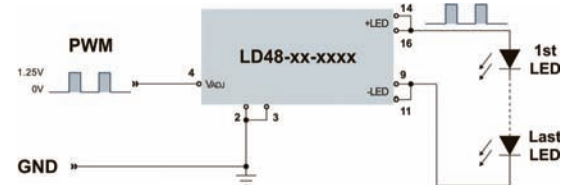
The V$_{ADJ}$ input can also be driven by the open drain output of a microcontroller. Again, the diode and resistor suppress high amplitude negative spikes that may be caused by the drain-source capacitance of the FET.

Mechanical Dimensions

Pin Connections

Pin	Function			
2	-V$_{IN}$	-DC Supply	14	+LED	LED Anode Conn.
3	-V$_{IN}$	-DC Supply	16	+LED	LED Anode Conn.
4	V$_{ADJ}$	PWM, On/Off	22	+V$_{IN}$	+DC Supply
9	-LED	LED Cathode Conn.	23	+V$_{IN}$	+DC Supply
11	-LED	LED Cathode Conn.			

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Notes:
- All dimensions are typical in inches (mm)
- Tolerance x.xx = ±0.02 (±0.50)
- Pin 1 is marked by a "dot" or indentation on the top of the unit