PLED-P-xxxLF

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PMLEDP-SERIES Rev.11-2010

- ✓ DIP24 Package
- ✓ **Step-Down** Converter
- ✓ **Constant Current**
- ✓ **High Efficiency**
- ✓ **Dimming** Function
- ✓ Remote Control

The PLED-P-xxxLF is a high efficiency step-down converter optimized to drive high current LEDs. The control algorithm allows highly efficient and accurate LED current regulation. The device operates from 7VDC up to 60VDC and provides an externally adjustable output current and output power up to 48 Watt. Compact DIP24 size allows designers to integrate this driver together with LED module. UL-94V0 grade molded case with high grade filling material provide excellent fire proof characters.

All specifications typical at Ta=25℃, nominal input voltage and full load unless otherwise specified

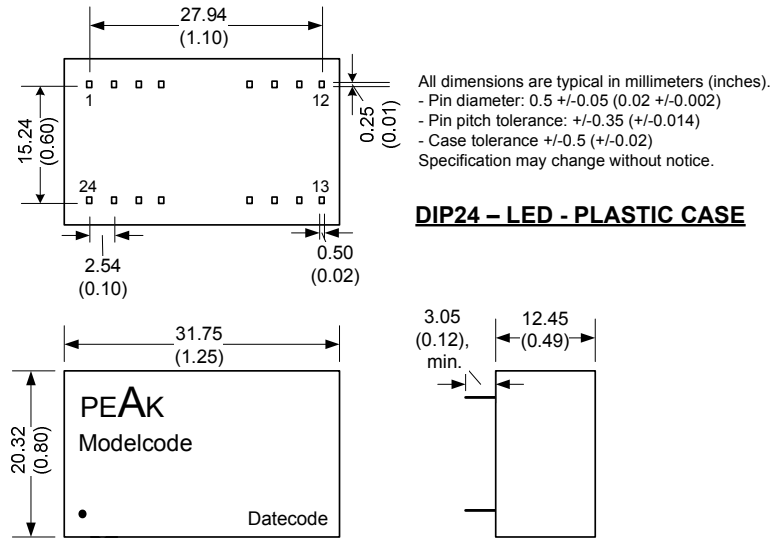
Input Specifications	
Voltage Range	7 – 60 VDC wide input
Input Filter	Capacitor
Output Specifications	
Voltage (Vin: 60V)	2 – 57 VDC
Current (Vin-Vout > 3V)	See table
Short Circuit Protection	Reg. at Rated Output Current
Ripple and Noise (20MHz limited)	See table
General Specifications	
Efficiency	See Table, typ.
Operating Frequency	20kHz – 500kHz
Capacitive Load	470 uF, max.
Humidity	95% rel H
Reliability Calculated MTBF (MIL-HDBK-217F)	> 950 Khrs
Safety Standard (designed to meet)	IEC / EN 60950-1
EMI (designed to meet)	EN55015 / CISPR22
Physical Specifications	
Case Material	Black Plastic (with Non-Conductive Base)
Potting Material	Epoxy / Silicon (UL94V-0 rated)
Weight	~ 17.7g, typ.
Environment Specifications	
Operating Temperature	-40 to +85 ℃, max. (for 100%)
Maximum Case Temperature	110℃
Storage Temperature	-40 to +125℃
Cooling	Free Air Convection (10mm distance required)
Thermal Inpedance (Free Air Convection)	+30℃ / W
Temperature Coefficient	± 0.03%/℃, max.
RoHS conform	Soldering 260℃, 10 sec. max.

Selection Guide

Order #	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Operating Power (Watt)	Ripple % Noise 8mV p-p, max)	Efficiency (%)
PLED-P-150LF	7-60	2-57	150 ±8%	9	150	97
PLED-P-250LF	7-60	2-57	250 ±7%	14	200	97
PLED-P-300LF	7-60	2-57	300 ±6%	17	250	97
PLED-P-350LF	7-60	2-57	350 ±5%	20	300	97
PLED-P-500LF	7-60	2-57	500 ±5%	29	400	97
PLED-P-600LF	7-60	2-57	600 ±5%	34	450	97
PLED-P-700LF	7-60	2-57	700 ±5%	40	500	97
PLED-P-1000LF	7-60	2-57	1000 ±5%	48	800	97

If you need other specifications, please ask.

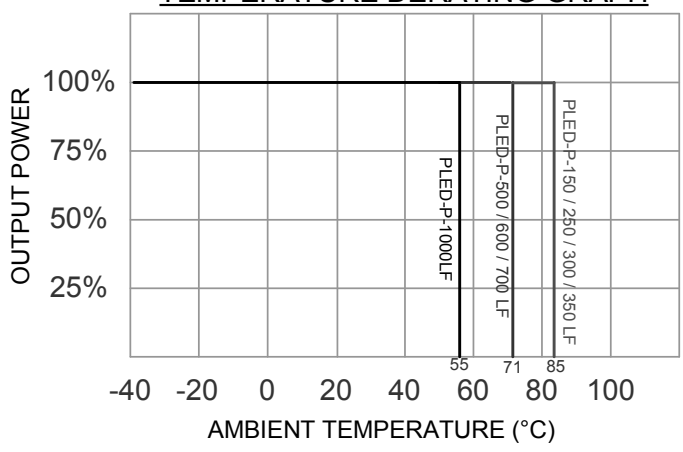
Package / Pinning / Derating



All dimensions are typical in millimeters (inches).
- Pin diameter: 0.5 +/-0.05 (0.02 +/-0.002)
- Pin pitch tolerance: +/-0.35 (+/-0.014)
- Case tolerance +/-0.5 (+/-0.02)
Specification may change without notice.

DIP24 – LED - PLASTIC CASE

TEMPERATURE DERATING GRAPH



PIN CONNECTIONS	
#	SINGLE
2, 3	- Vin
4	PWM/ON/OFF
9, 11	- LED
14, 16	+ LED
22, 23	+ Vin
Others	Omitted

No connection between input and output!

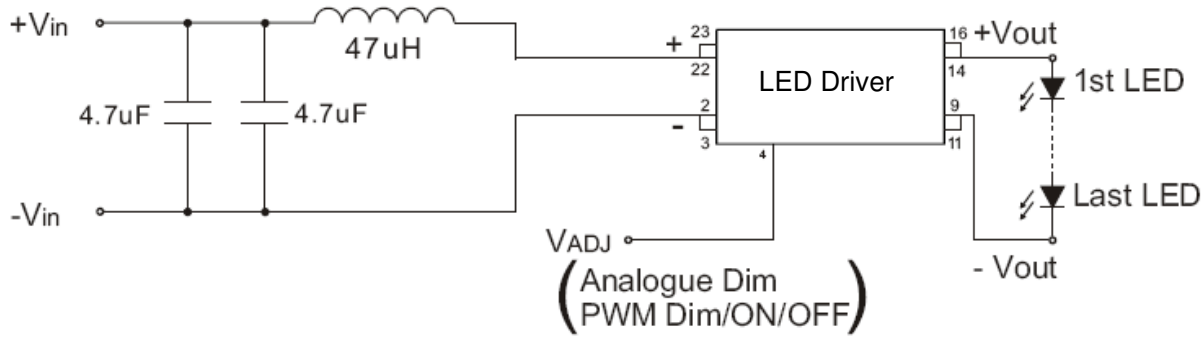
App Notes

PWM DIMMING AND REMOTE ON/OFF CONTROL:
(Leave it open if not used.)
DC ON: Open or 0.3V<Vadj<1.25V
DC OFF: Vadj<0.15V (Shutdown)
Max. Remote Pin Drive Current: < **1 mA**
Max. Quiescent Input Current in Shutdown Mode (Vin=60V) **100 uA**
Recommended max. Operation Frequency: **1 kHz**
Adjust Output Current (PWM Fequency < 300Hz): **0.1% - 100%**

ANALOG DIMMING CONTROL:
Input Voltage Range: **0.3V to 1.25V**
Adjust Output Current (Vin – Vout <30V): **25% - 100%**
Control Voltage Limits
ON: **0.2V – 0.3V**
OFF: **0.15V – 0.25V**
Max. Analog Pin Drive Current (Vadj = 1.25V): **1 mA**

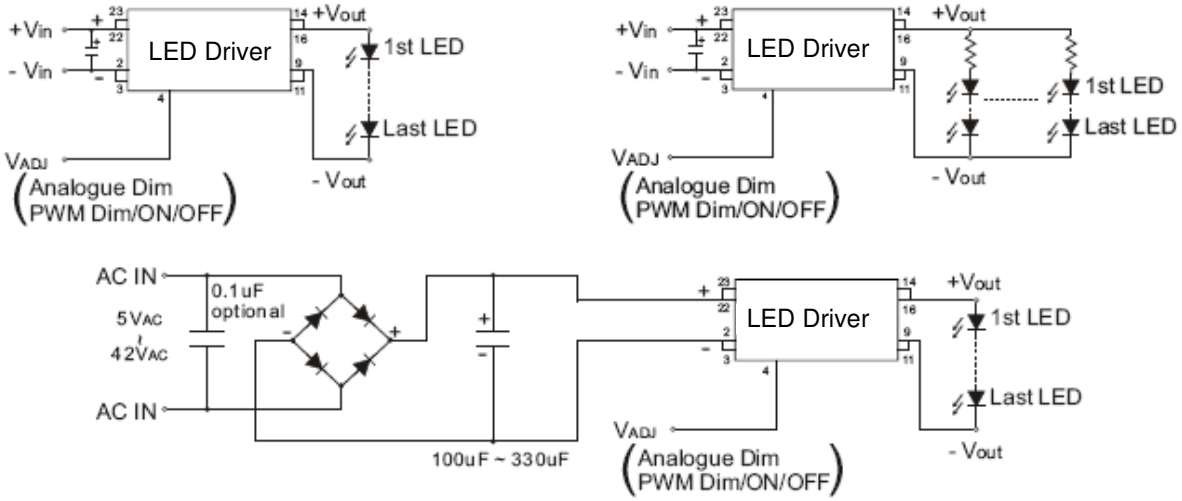
Note:
1.Reversed power source damages the circuit. No connection is allowed between input ground and output .
2.DO NOT operate the driver over output power.
3.Leave pin VADJ open if not in use, ground pin to shut down the converter. Connecting VADJ to Vin damages the circuit.
4.Maximum output open voltage is equal to input voltage .

Recommended additional input filter:



App Notes

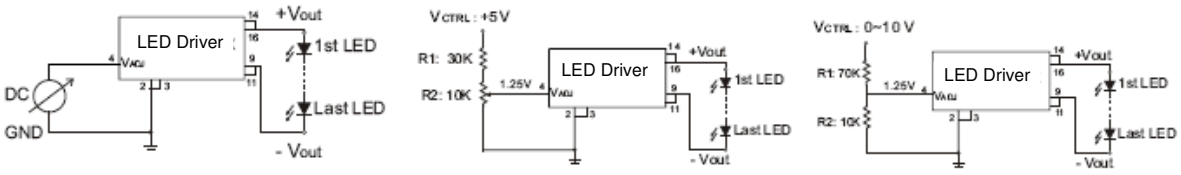
Typical application:



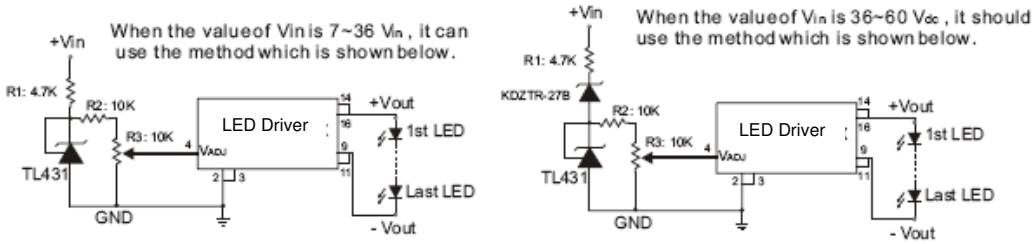
Output current adjustment by external DC control voltage:

$V_{ADJ}=V_{CTRL}$ [If V_{CTRL}=0~1.25Vdc]

$V_{ADJ} = \frac{R2}{R1+R2} \times V_{CTRL}$ [If V_{CTRL} > 1.25 Vdc]



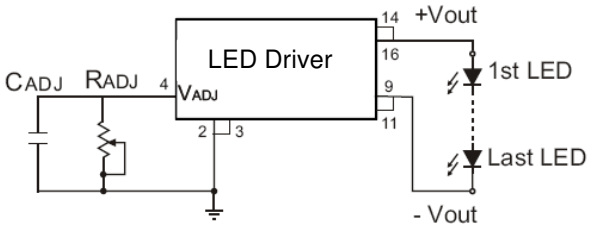
$V_{ADJ} = \frac{R3}{R2+R3} \times 2.5$ [If V_{CTRL}= V_{in}]



The nominal output current Ioutnom is given by: $Iout_{nom} \approx Iout \times \frac{V_{ADJ}}{1.25}$

Resistor dimming:

By connecting a variable resistor between ADJ and GND, simple dimming can be achieved. Capacitor Cadj is optional for better AC mains interference and HF noise rejection. Recommend value of Cadj is 0.22uF.



The output current can be determined using the equation:

$$Iout(nom) = \frac{IoutxRadj}{(Radj + 200k)}$$

If the value of RADJ is 0 to 2M ohm, the maximum adjust range of output current is 25% to 90%. (For Vin-Vout < 30V)

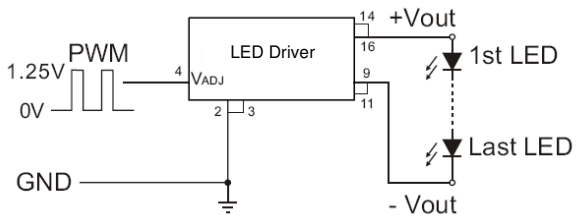
App Notes

Output current adjustment by PWM control:

Directly driving ADJ input

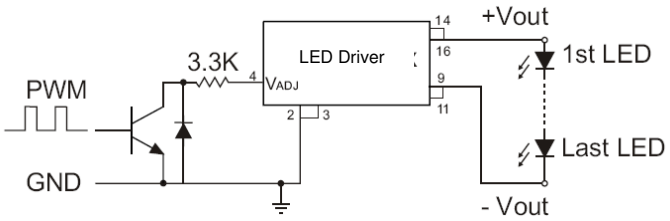
A pulse width modulated (PWM) signal with duty cycle DPWM can be applied to the ADJ pin, as shown below:

$Iout_{nom} = Iout \times D_{PWM}$ [If PWM frequency <300Hz, for $0.001<D_{PWM}<1$



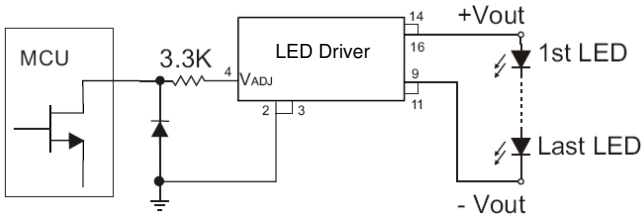
Driving the ADJ input via open collector transistor

The diode and resistor suppress possible high amplitude negative spikes on the ADJ input resulting from the drain-source capacitance of the transistor. Negative spikes at the input to the device should be avoided as they may cause errors in output current, or erratic device operation.



Driving the ADJ input from a microcontroller:

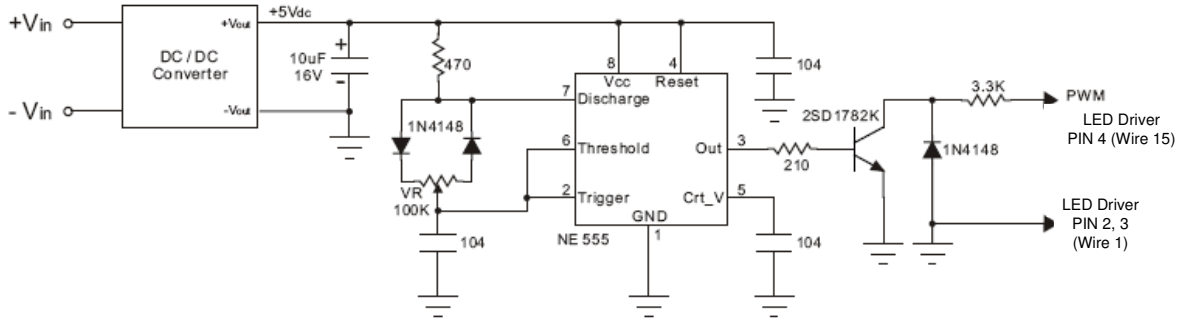
Another possibility is to drive the device from the open drain output of a microcontroller. The diagram below shows one method of doing this:



The diode and resistor suppress possible high amplitude negative spikes on the ADJ input resulting from the drain-source capacitance of the FET. Negative spikes at the input to the device should be avoided as they may cause errors in output current or erratic device operation.

Output current adjustment by PWM control (Dimming):

To avoid visible flicker the PWM signal must be greater than 100Hz.



Output current adjustment by PWM control (Flash):