

ZXLD1371EV4 EVALUATION BOARD USER GUIDE

DESCRIPTION

The ZXLD1371EV4, Figure 1, is an evaluation board for the ZXLD1371 LED driver chip. The board is in a Buck configuration with an input voltage of 48 V_{DC} and will drive a string of 12 LEDs. It is set as a default standard for an output current of 1.5A and offers convenient connections for external control inputs and monitoring.

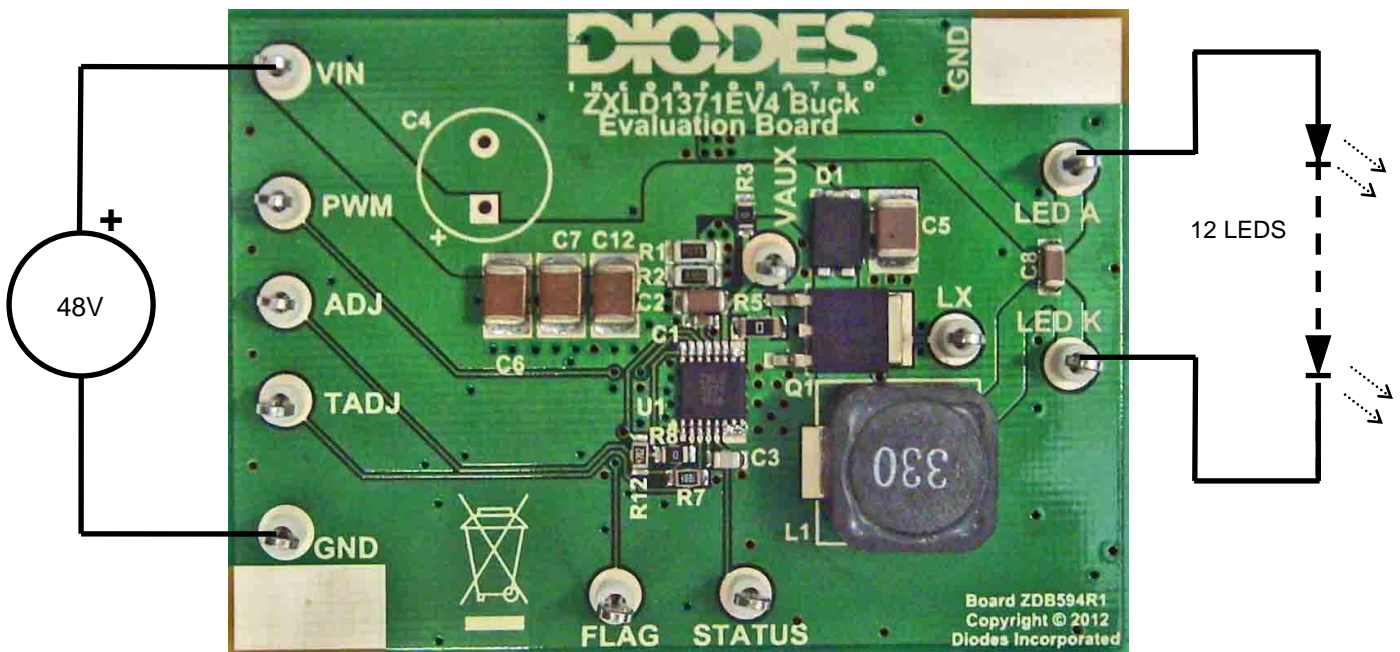


Figure 1: ZXLD1371EV4 evaluation board and connection diagram

QUICK START

- 1) Connect 48V DC supply across Vin and GND points (observe correct polarity).
- 2) Connect LED string across LED A and LED K points (observe correct polarity). LED current is set at 1.5A, so ensure LED string is capable of this current.
- 3) Cover LED string or wear eye protection. Do not look directly at LEDs in use.
- 4) Switch on DC power supply.

ZXLD1371EV4 Connection Point Definition

| Name | Description |
|--------|--|
| Vin | Positive supply voltage. 48V _{DC} |
| GND | Supply Ground (0V). |
| PWM | External PWM dimming input |
| ADJ | External DC dimming input (Remove R8 for DC Dimming) |
| TADJ | External thermal dimming input (NTC to GND) |
| VAUX | VAUX monitoring point |
| FLAG | FLAG pin monitoring point |
| STATUS | STATUS pin monitoring point |
| LX | LX monitoring point |
| LED K | LED Cathode connection |
| LED A | LED Anode connection |

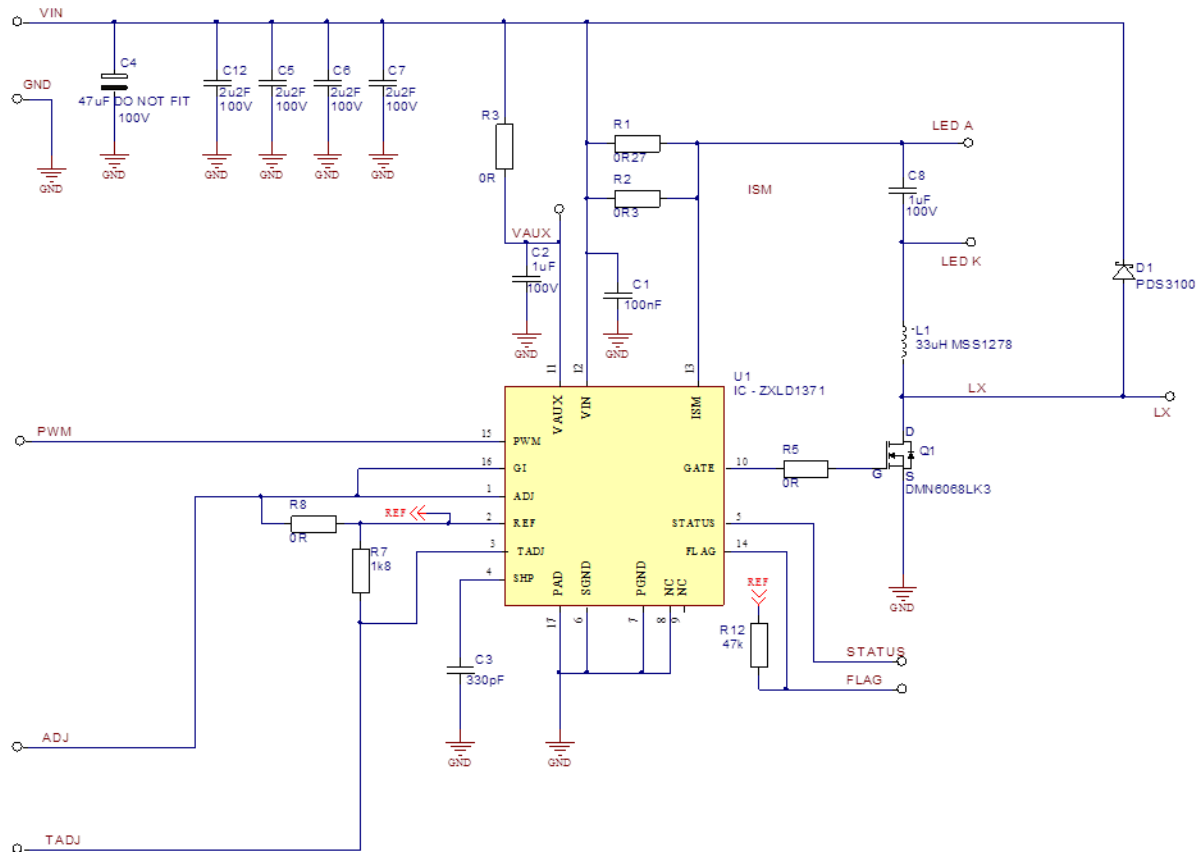


Figure 2: ZXLD1371EV4 evaluation board Schematic

ZXLD1371EV4 EVALUATION BOARD REFERENCE DESIGN

The ZXLD1371EV4 is a Buck reference design, based around the ZXLD1371 lighting IC. The circuit will accept an input voltage of $48V_{DC}$ and can drive an output string of 12 LEDs at 1.5A. The board has three control inputs and multiple signal monitoring points.

The PWM input allows the user to input a PWM brightness signal. It is recommended to be between 100Hz and 500Hz for maximum LED current dynamic range.

The ADJ input allows for DC dimming input, with a voltage between 0.125V and 1.25V for full brightness. In order to use an external control on ADJ, R8 must be removed.

The TADJ input is for connection of an external 10k NTC thermistor which will dim the LEDs as temperature increases, for maximizing LED lifetime. With a 10k NTC and $R7 = 1.8k\Omega$, the thermal trip point will be around $70^{\circ}C$.

The VAUX monitoring point allows easy connection to the chip auxiliary power supply and measurement of the bootstrap circuit where used. It can also be used to feed in an external source of VAUX if R3 and R4 are removed. R4 connects VAUX to LX through D2 as a bootstrap circuit, allowing for operation at low V_{in} values (5-8V). If bootstrapping is not required, remove R4 and fit $R3 = 0\Omega$.

FLAG and STATUS monitoring points allow these outputs of the chip to be monitored. For further information on output information on these pins see the ZXLD1371 datasheet.

The LX switching point can be monitored on the test point, in order to easily monitor the output PWM.

The LED string load can be connected across the LED A and LED K points.

ZXLD1371EV4 (1.5A default standard version) Performance Test Data

| Vin (DC) | PF | I _{in} (A) | P _{in} (W) | P _{out} (W) | Vout (V) | Iout (A) | Efficiency (%) | # of LEDs |
|----------|-------|---------------------|---------------------|----------------------|----------|----------|----------------|-----------|
| 46 | 0.999 | 1.461 | 67.300 | 61.151 | 39.30 | 1.556 | 90.86 | 12 |
| 48 | 0.999 | 1.440 | 68.400 | 61.875 | 39.74 | 1.557 | 90.46 | |
| 50 | 0.997 | 1.340 | 67.300 | 60.598 | 39.02 | 1.553 | 90.04 | |

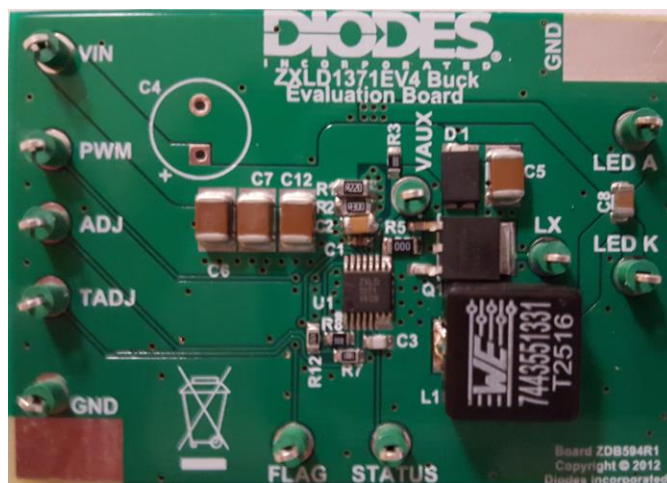
ZXLD1371EV4 (1.5A default standard version) Component list

| QTY | PCB IDENT | VALUE | DESCRIPTION |
|-----|---|------------|--|
| 1 | U1 | ZXLD1371 | TSSOP16EP LED driver IC – Diodes Inc. |
| 1 | Q1 | DMN6068LK3 | 60V N-Channel Enhancement Mode MOSFET – Diodes Inc. |
| 1 | D1 | PDS3100 | Freewheeling diode 3A, 100V – Diodes Inc. |
| 1 | R1 | 0R27 | Resistor 1206 1% thick film 250ppm generic |
| 1 | R2 | 0R3 | Resistor 1206 1% thick film 250ppm generic |
| 2 | R3, R8 | 0R | Resistor 0805 1% thick film 250ppm generic |
| 1 | R5 | 0R0 | Resistor 1206 1% thick film 250ppm generic |
| 1 | R7 | 1k8 | Resistor 0805 1% thick film 250ppm generic |
| 1 | R12 | 47k | Resistor 0805 1% thick film 250ppm generic |
| 1 | C1 | 100nF | Capacitor 0603, 100V X7R generic |
| 2 | C2, C8 | 1uF | Capacitor 1206, 100V X7R generic |
| 1 | C3 | 330pF | Capacitor 0805, 100v C0G generic |
| 0 | C4 | DO NOT FIT | |
| 4 | C5, C6, C7, C12 | 2u2F | Capacitor, 1812, 100V X7R generic Murata GRM43ER72A225KA01L |
| 1 | L1 (for 1.5A application) | 33uH/3.1A | Coilcraft MSS1278-333MLB NIC Components NPIS27H330MTRF |
| 11 | TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11 | Test Point | 2.15mm dia. test loops, green, generic, Hughes 100-108 |

Note: The component values and part numbers are correct at the time of publication. Diodes Inc. reserves the right to substitute other parts where necessary, without further notification.

ZXLD1371EV4 EVALUATION BOARD REFERENCE DESIGN (2.4A output current version)

The ZXLD1371EV4 is a Buck reference design, and it will accept an input voltage of 12 V_{DC} and can drive an output string of 2 LEDs at 2.4A with 3 components change (L1, D1, and R1).



For the 2.4A output current application, use the higher current rating inductor (L1) and higher current rating of D1 as specified in the component list below and add a 0.22 Ω resistor parallel to the existing R1 on the board.

ZXLD1371EV4 (2.4A output current version) Performance Test Data

| Vin (DC) | PF | I _{in} (A) | P _{in} (W) | P _{out} (W) | Vout (V) | I _{out} (A) | Efficiency (%) | # of LEDs |
|----------|-------|---------------------|---------------------|----------------------|----------|----------------------|----------------|-----------|
| 11 | 0.901 | 2.061 | 19.672 | 15.552 | 6.815 | 2.282 | 79.06 | 2 |
| 12 | 0.828 | 1.994 | 19.950 | 15.180 | 6.424 | 2.363 | 76.09 | |
| 13 | 0.746 | 2.027 | 20.610 | 16.123 | 6.823 | 2.363 | 78.23 | |

ZXLD1371EV4 (2.4A output current version) Component list

| QTY | PCB IDENT | VALUE | DESCRIPTION |
|-----|---|------------|--|
| 1 | U1 | ZXLD1371 | TSSOP16EP LED driver IC – Diodes Inc. |
| 1 | Q1 | DMN6068LK3 | 60V N-Channel Enhancement Mode MOSFET – Diodes Inc. |
| 1 | D1 | PDS5100 | Freewheeling diode 5A, 100V – Diodes Inc. |
| 1 | R1 | 0R27//0R22 | Resistor 1206 1% thick film 250ppm generic |
| 1 | R2 | 0R3 | Resistor 1206 1% thick film 250ppm generic |
| 2 | R3, R8 | 0R | Resistor 0805 1% thick film 250ppm generic |
| 1 | R5 | 0R0 | Resistor 1206 1% thick film 250ppm generic |
| 1 | R7 | 1k8 | Resistor 0805 1% thick film 250ppm generic |
| 1 | R12 | 47k | Resistor 0805 1% thick film 250ppm generic |
| 1 | C1 | 100nF | Capacitor 0603, 100V X7R generic |
| 2 | C2, C8 | 1uF | Capacitor 1206, 100V X7R generic |
| 1 | C3 | 330pF | Capacitor 0805, 100v C0G generic |
| 0 | C4 | DO NOT FIT | |
| 4 | C5, C6, C7, C12 | 2u2F | Capacitor, 1812, 100V X7R generic Murata GRM43ER72A225KA01L |
| 1 | L1 | 33uH/5.5A | Würth 7443551331 |
| 11 | TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11 | Test Point | 2.15mm dia. test loops, green, generic, Hughes 100-108 |

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