AL8871QEV1 EVALUATION BOARD USER GUIDE

DESCRIPTION

The AL8871QEV1, Figure 1, is an evaluation board for the AL8871QEV1 LED driver chip. The board is in a Buck-Boost configuration with an input voltage range of 5.4-30 VDC and will drive a string of up to 5 LEDs. It is set for an output current of 680mA and offers convenient connections for external control inputs and monitoring. The board also includes filter components for conducted EMC.

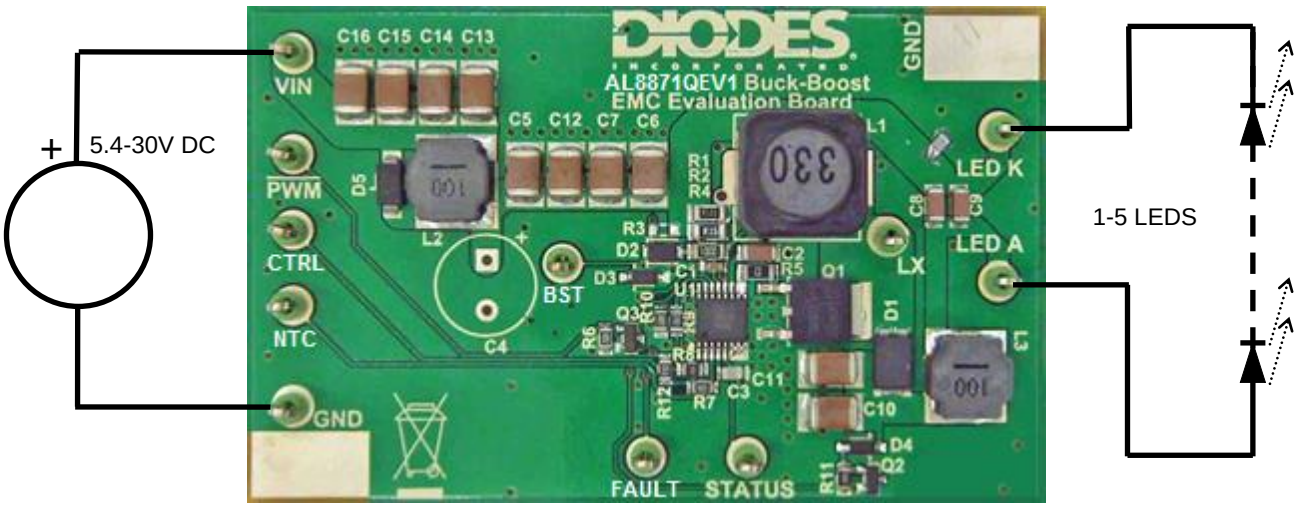

Figure 1: AL8871QEV1 evaluation board and connection diagram

QUICK START

1) Connect 12V 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 680mA, 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.

AL8871QEV1 Connection Point Definition	
Name	**Description**
VIN	Positive supply voltage. 5.4 to 30V
GND	Supply Ground (0V).
$\overline{\text{PWM}}$	External PWM dimming input (note that this input is inverted)
CTRL	External DC dimming input (Remove R8 for DC Dimming)
NTC	External thermal dimming input (NTC to GND)
BST	BST monitoring point
FAULT	FAULT pin monitoring point
STATUS	STATUS pin monitoring point
LX	LX monitoring point
LED K	LED Cathode connection
LED A	LED Anode connection

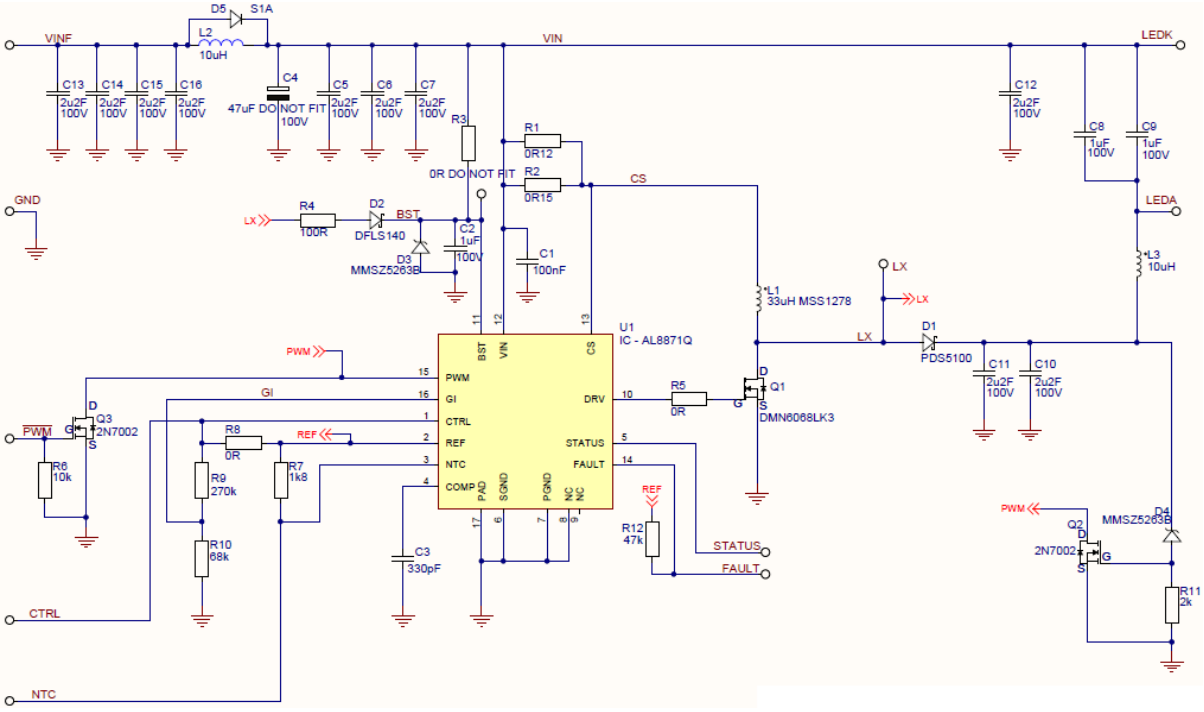

Figure 2: AL8871QEV1 evaluation board Schematic

AL8871QEV1 EVALUATION BOARD REFERENCE DESIGN

The AL8871QEV1 is a Buck-Boost reference design, based around the AL8871Q lighting IC. The circuit will accept an input voltage from 5.4 to 30 VDC and can drive an output string of up to 5 LEDs at 680mA. The board has three control inputs and multiple signal monitoring points.

The $\overline{\text{PWM}}$ 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. Note that the PCB includes a circuit that inverts the signal fed onto this input, in order that the input can be wire-ORed with the over-voltage protection circuit.

The CTRL 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 CTRL, R8 must be removed.

The NTC 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 = 1.8kΩ, the thermal trip point will be around 70ºC.

The BST 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 BST if R3 and R4 are removed. R4 connects BST to LX through D2 as a bootstrap circuit, allowing for operation at low VIN values (5-8V). If bootstrapping is not required, remove R4 and fit R3 = 0Ω.

FAULT and STATUS monitoring points allow these outputs of the chip to be monitored. For further information on output information on these pins see the AL8871Q 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.

In Buck-Boost configuration the switching voltage at LX is the sum of the input and load voltages, which can therefore approach 50V when driving up to 5 LEDs.

AL8871QEV1 Component list

QTY	PCB IDENT	VALUE	DESCRIPTION
1	**U1**	**AL8871Q**	**TSSOP16EP LED driver IC – Diodes Inc.**
1	**Q1**	**DMN6068LK3**	**60V N-Channel Enhancement Mode MOSFET – Diodes Inc.**
2	**Q2, Q3**	**2N7002**	**SOT23 FET - Diodes Inc.**
1	**D1**	**PDS5100**	**Freewheeling diode 5A, 100V – Diodes Inc.**
1	**D2**	**DFLS140**	**Schottky diode 1A, 40V – Diodes Inc.**
2	**D3, D4**	**MMSZ5263B**	**Zener, 51V 400mW SOD123 – Diodes Inc.**
1	**D5**	**S1A**	**Diode, 1A SMA – Diodes Inc.**
1	R1	0R15	Resistor 1206 1% thick film 250ppm generic
1	R2	0R12	Resistor 1206 1% thick film 250ppm generic
0	R3	DO NOT FIT	Resistor 0805
1	R4	100R	Resistor 1206 1% thick film 250ppm generic
1	R5	0R0	Resistor 1206 1% thick film 250ppm generic
1	R6	10k	Resistor 0805 1% thick film 250ppm generic
1	R7	1k8	Resistor 0805 1% thick film 250ppm generic
1	R8	0R	Resistor 0805 1% thick film 250ppm generic
1	R9	270k	Resistor 0805 1% thick film 250ppm generic
1	R10	68k	Resistor 0805 1% thick film 250ppm generic
1	R11	2k	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
3	C2, C8, C9	1uF	Capacitor 1206, 100V X7R generic
1	C3	330pF	Capacitor 0805, 100v C0G generic
0	C4	DO NOT FIT	Electrolytic capacitor P5D10
10	C5, C6, C7, C10, C11, C12, C13, C14, C15, C16	2u2F	Capacitor, 1812, 100V X7R generic Murata GRM43ER72A225KA01L
1	C17 (no ident)	1n5	Capacitor 0805, 100v C0G generic
1	L1	33uH	Coilcraft MSS1278-333MLB NIC Components NPIS27H330MTRF
2	L2, L3	10uH	Murata LQH88PN100M38L
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.

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