ALT80800 Evaluation Board User Guide

DESCRIPTION

The ALT80800 Evaluation Board is designed to help system designers evaluate the operation and performance of the ALT80800 2.0 A synchronous buck LED driver. The regulated output current is easily configurable to 1 A or 1.5 A, with additional control by applying external analog dimming (ADIM) and/or PWM signals. The maximum forward voltage drop of the driven LED string is limited by V_{IN}.

FEATURES

- ALT80800 2.0 A Synchronous Buck LED Driver
- User-selectable Enable, LED current, Fault pull-up to VCC and ADIM pull-up to VCC
- Optional ADIM and PWM inputs for additional LED current level control

Figure 1: ALT80800 Evaluation Board

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Table 1: ALT80800 Evaluation Board Configurations

Configuration Name	Part Number	Output Current
ALT80800	APEK80800KLP-01-T	Selectable (1 A or 1.5 A)

Table 2: General Specifications

Specification	Min	Nom	Max	Units
Absolute Maximum Input Voltage	−0.3	–	60	V
Operating Input Voltage Range	4.5	–	55	V
V_{IN} START Threshold, V_{IN} rising	–	–	4.3	V
V_{IN} UVLO Hysterisis	100	–	300	mA
LED regulation current	–	–	2	A
Enable Input	−0.3	–	VIN+0.3	V
pin VCC, ADIM, TON, FDSET, FFn, PWM	−0.3		7	V

USING THE EVALUATION BOARD

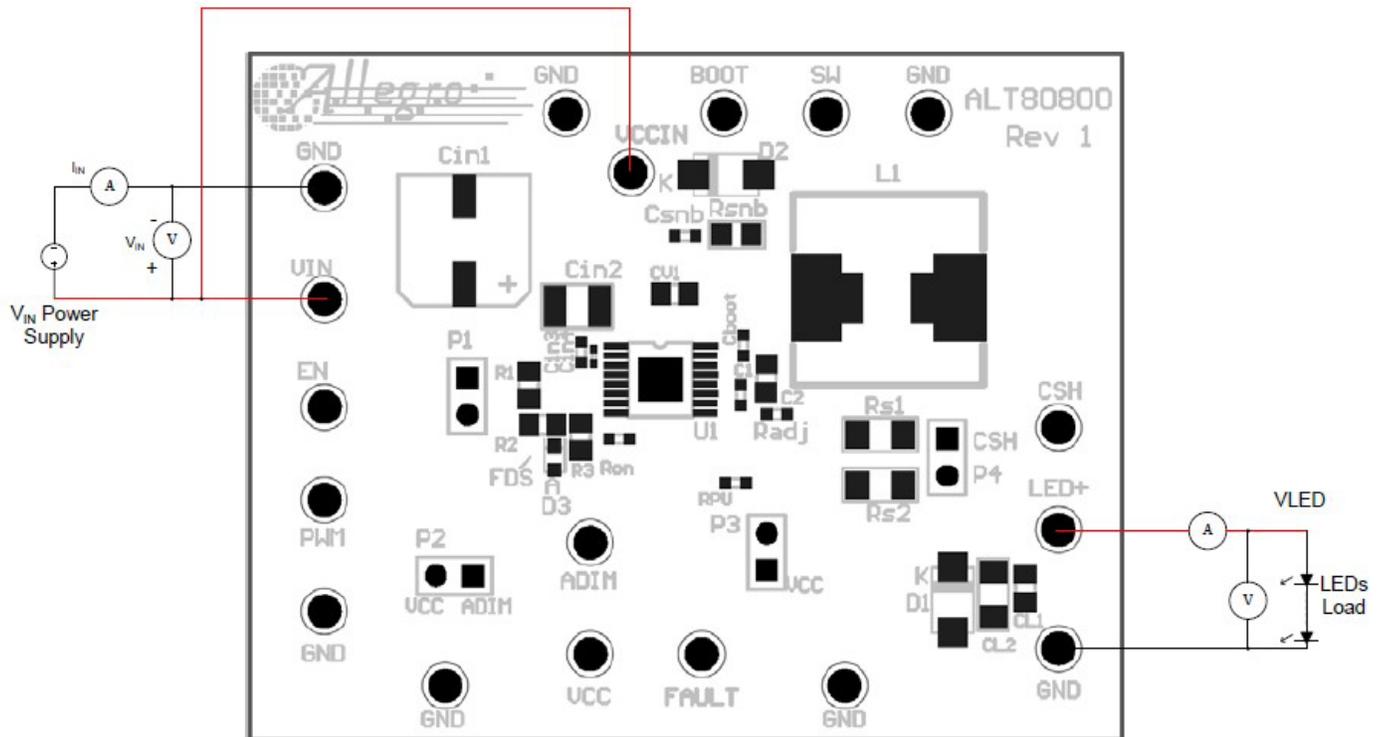Figure 2 illustrates the basic setup of the evaluation board.

Figure 2: Evaluation board setup

1. To start using the evaluation board, connect the power supply, cables and LED string as indicated in Figure 2. The ammeters and voltmeters are not required for operation.

2. To enable the ALT80800, short header P1 with a jumper, or apply a voltage between 1.8 V and V_{IN} to the EN test point.

Configuring the Evaluation Board

1. The regulation LED current level is determined by the current sensing resistor on the evaluation board, demonstrated by the following equation:

$$i_{LED} = \frac{0.2}{R_{sense}} \text{ A}$$

On the evaluation board, there are two current sensing resistors, designated Rs1 and Rs2, with measurements of 0.2 Ω and 0.39 Ω respectively. When connector P4 is open, current sensing resistance is 0.2 Ω, resulting in a 1 A regulation current; when P4 is shorted, current sensing resistance becomes 0.13 Ω, resulting in a 1.5 A regulation current.

2. If analog dimming is desired, leave connector P2 open and apply an appropriate voltage to the ADIM test point. If analog dimming is unused, short connector P2, which ties ADIM to VCC, commanding full LED current. Do not leave ADIM test point floating with connector P2 open.

2

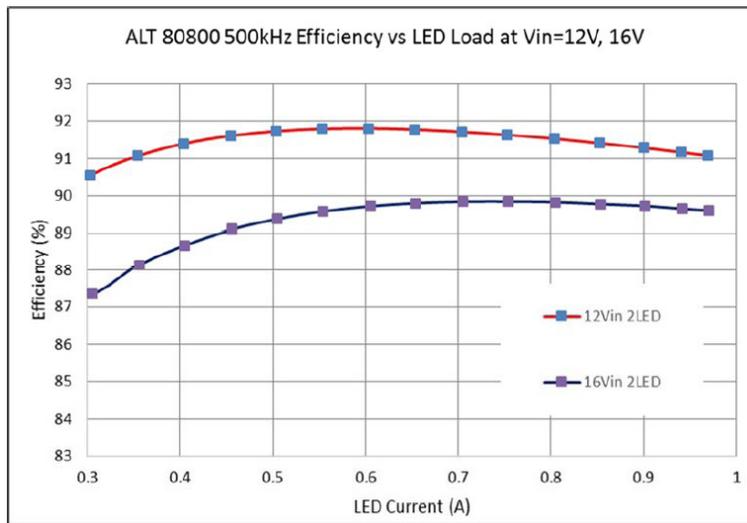## EVALUATION BOARD PERFORMANCE DATA

Efficiency

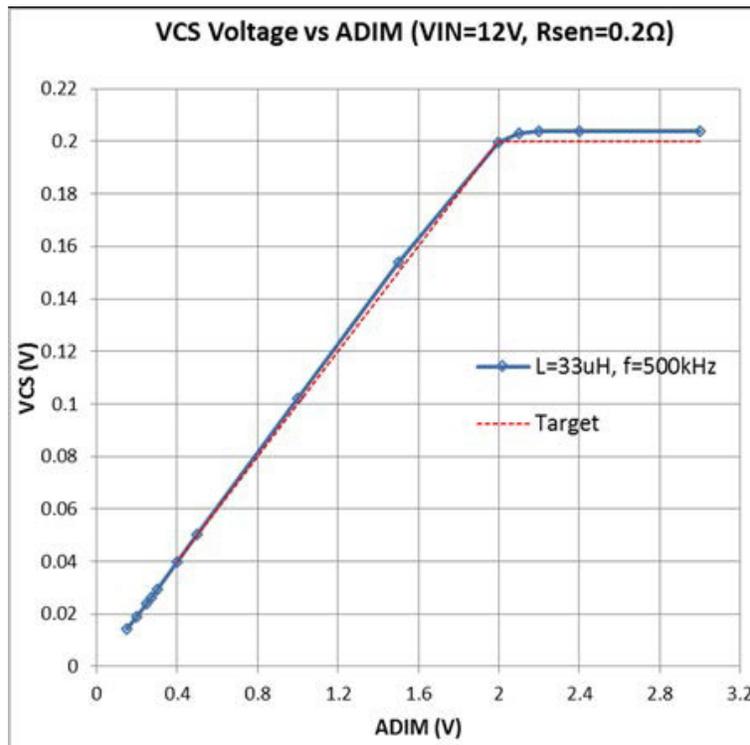**Figure 3: Efficiency vs Load**

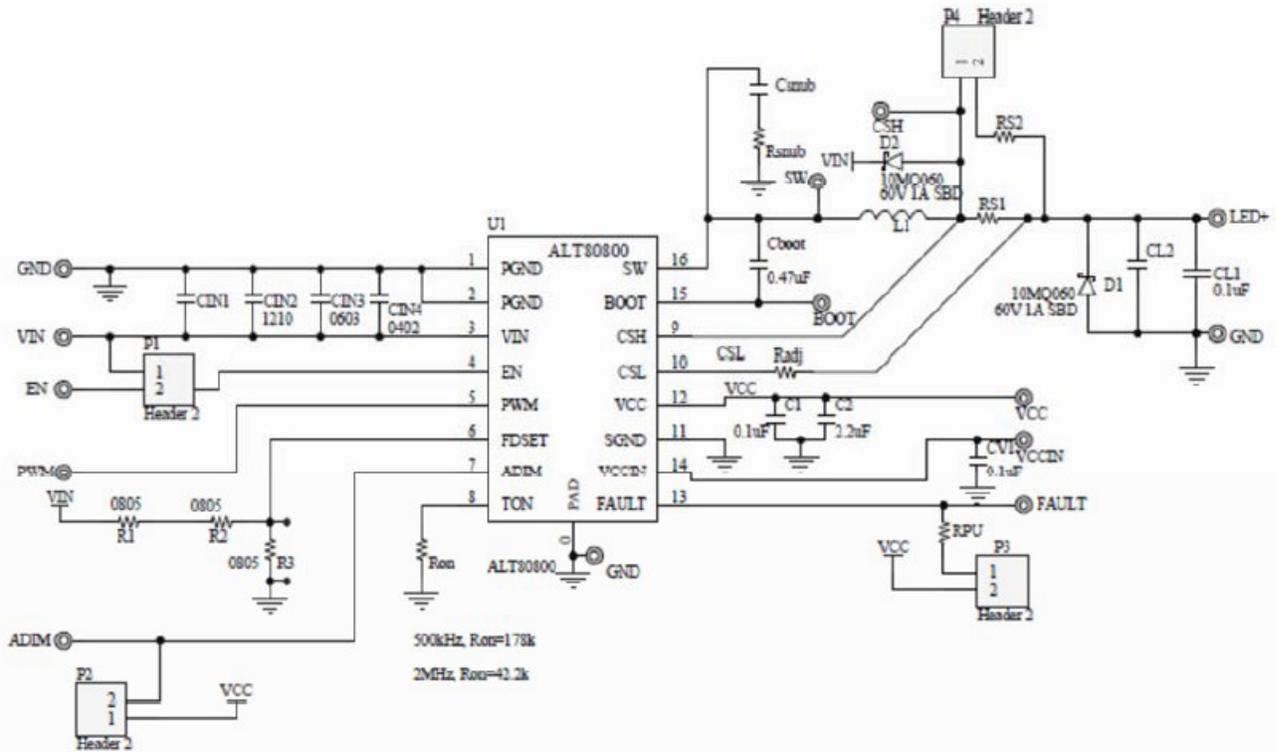## ADIM Performance

Figure 4: ADIM performance

SCHEMATIC

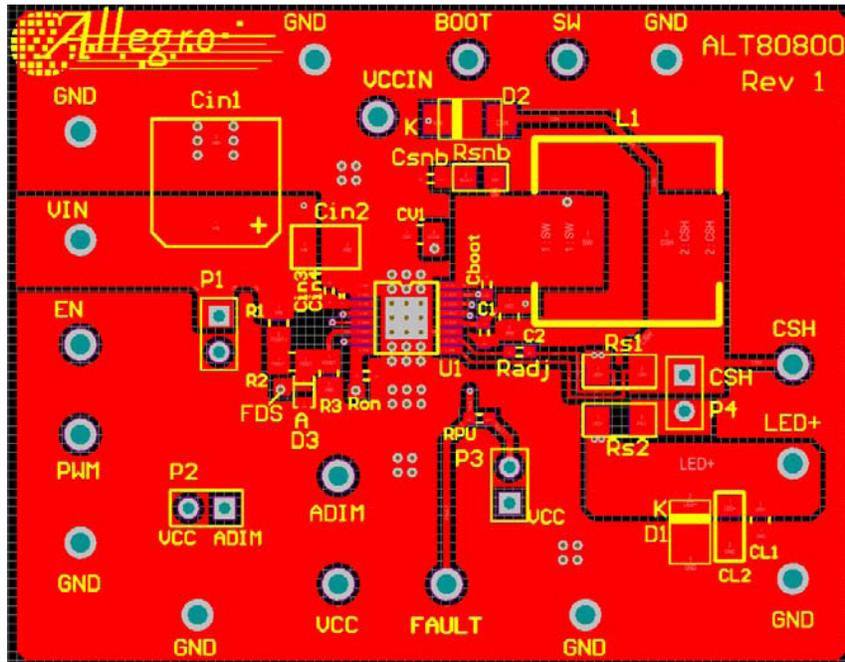**Figure 5: ALT80800 evaluation board schematic**

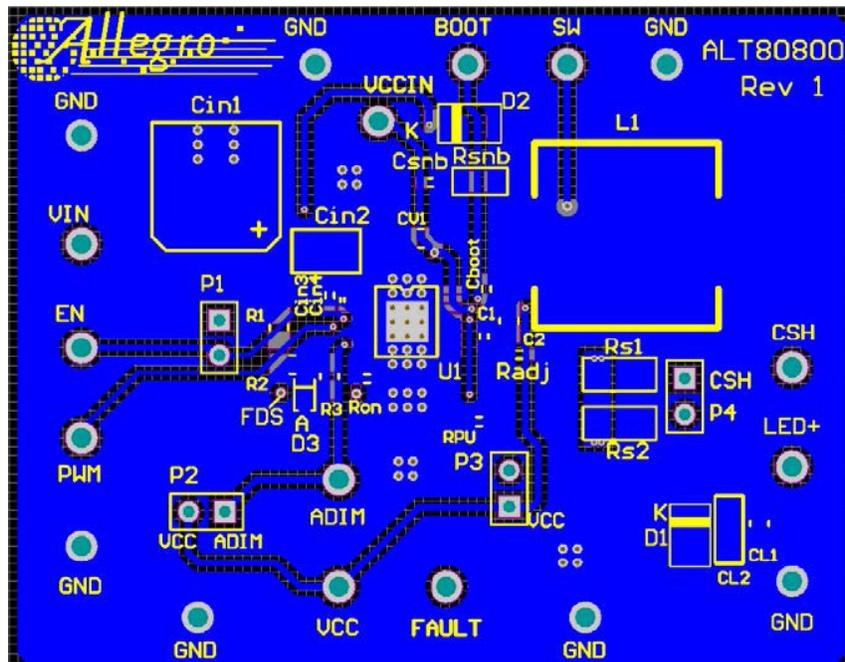# LAYOUT

Figure 6: Top layer and top silkscreen

Figure 7: Bottom layer and top silkscreen

BILL OF MATERIALS

Table 3: ALT80800 Evaluation Board Bill of Materials

ELECTRICAL COMPONENTS				
Designator	Quantity	Description	Manufacturer	Manufacturer Part Number
PCB	1	ALT80800 EVAL PCB, Rev 1	Allegro MicroSystems	
U1	1	ALT80800	Allegro MicroSystems	
RS1	1	Resistor, 0.2 Ω, 1/2 W, 1%	Susumu	RL1632R-R200-F
RS2	1	Resistor, 0.39 Ω, 1/2W, 1%	Susumu	RL1632R-R390-F
R1, R2	2	Resistor, 187 kΩ, 1/10W, 1%		
R3	1	Resistor, 100 kΩ, 1/10 W, 1%		
RON	1	Resistor, 178 kΩ, 1/10 W, 1%		
RADJ	1	Resistor, 0 Ω, 1/10 W		
RPU	1	Resistor, 10 kΩ, 1/10 W, 1%		
CBOOT	1	Capacitor, Ceramic, 0.47 µF, 50 V, 10%, X7R	TDK	CGA3E3X7R1H474K080AE
C1	1	Capacitor, Ceramic, 0.1 µF, 50 V, 10%, X7R	Murata	GRM188R71H104KA93D
C2	1	CAP CER 2.2 µF 50 V X7R	TDK	C2012X7R1H225M125AC
CV1, CL1	2	CAP CER 0.1 µF 100 V X7R 0805	Murata TDK	GCM21BR72A104KA37L CGA4J2X7R2A104M125AA
RSNB, CSNB, CL2	0	EMPTY		
CIN1	1	Capacitor, 33 µF, 63 V, Elect HXA SMD	United Chemi-Con	HHXA630ARA330MHA0G
CIN2	1	Capacitor, Ceramic, 4.7 µF, 100 V, 20%, X7S	TDK	C3225X7S2A475M200AB
CIN3	1	Capacitor, Ceramic, 0.1 uF, 100 V, 20%, X7S	TDK	CGA3E3X7S2A104M080AB
CIN4	1	Capacitor, Ceramic, 100 pF, 100 V, 5%, COG		
D1	1	DIODE SCHOTTKY 60 V 1 A SMA	Vishay	VS-10MQ060NTRPBF
D2	1	DIODE SCHOTTKY 60 V 1 A SMA	Vishay	VS-10MQ060NTRPBF
D3	0	Empty		
L1 (FSW = 500 Khz)	1	Inductor, 33 µH, I_R=4.2 A, ISAT=5.5 A, 45 mΩ	Wurth Electronics	7447709330
VIN, LED+	2	Test Points, Red, 0.063" diameter	Keystone	5010
EN, PWM, VCC, FAULT, ADIM, CSH, BOOT, SW, VCCIN	9	Test Points, White, 0.063" diameter	Keystone	5012
GND	7	Test Points, Black, 0.063" diameter	Keystone	5011
P1, P2, P3	3	Header, Male, 2 position (shorting 1 & 2)	Sullins	PEC36SAAN
P4	1	Header, Male, 2 position (open)	Sullins	PEC36SAAN
OTHER COMPONENTS				
Designator	Quantity	Description	Manufacturer	Manufacturer Part Number
Rubber Feet	4	Self stick rubber feet	3M	SJ-5303 (CLEAR)
PCB LABEL:		ALT80800 500 kHz		

RELATED LINKS

https://www.allegromicro.com/en/products/regulate/led-drivers/led-drivers-for-lighting/alt80800

Revision History

Number	Date	Description
–	May 19, 2023	Initial release