Important Notice

Restrictions in Use

IDT's ZLED7015KIT-E1 Evaluation Kit hardware is designed for ZLED7015 demonstration, evaluation, laboratory setup, and module development only. The ZLED7015KIT-E1 Evaluation Kit hardware must not be used for module production or production test setups.

Disclaimer

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(ii) non-observance of instructions contained in this manual and in any other documentation provided to user, or
(iii) misuse, abuse, use under abnormal conditions or alteration by anyone other than IDT.

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1 Kit Contents

The ZLED7015KIT-E1 Evaluation Kit includes the following:

- ZLED7015-E1 Evaluation Board v.X
- Five ZLED7015 samples, MSOP10 with thermal pad package
- *ZLED7015KIT-E1 Evaluation Kit Start-up Information*
- *Kit Disclaimer*

The ZLED7015KIT-E1 Evaluation Kit is fully assembled and ready for immediate operation.

2 Kit Description

2.1. ZLED7015 Overview

The ZLED7015KIT-E1 Evaluation Kit provides a quick and easy method for evaluating the ZLED7015 within its basic application circuit. Reading the *ZLED7015 Data Sheet* before using the Evaluation Kit is recommended for understanding the operation of the ZLED7015 and the Evaluation Board.

The ZLED7015 is a constant current boost converter with an internal FET switch. The step-up converter topology allows series connection of multiple white LEDs so that the LED currents are identical for uniform brightness. The nominal output current can be set by an external resistor with the option to also dim the brightness of the LEDs with a PWM signal or DC voltage. A low 0.3V feedback voltage minimizes power loss in the current setting resistor for better efficiency. The over-voltage protection (OVP) circuit safeguards the chip and the system even if the load is not connected. The ZLED7015 is available in an MSOP-10 package.

The ZLED7015 IC is designed for LED current drive applications of up to 1.8A.

The main features of ZLED7015 driver are

- 6VDC to 30VDC supply voltage
- High efficiency: up to 95%
- PWM or DC voltage dimming control
- Fast 1.0MHz switching frequency
- Internal high power 35V MOSFET switch
- Adjustable over-voltage protection (including open LED string detection)
- Over-temperature protection

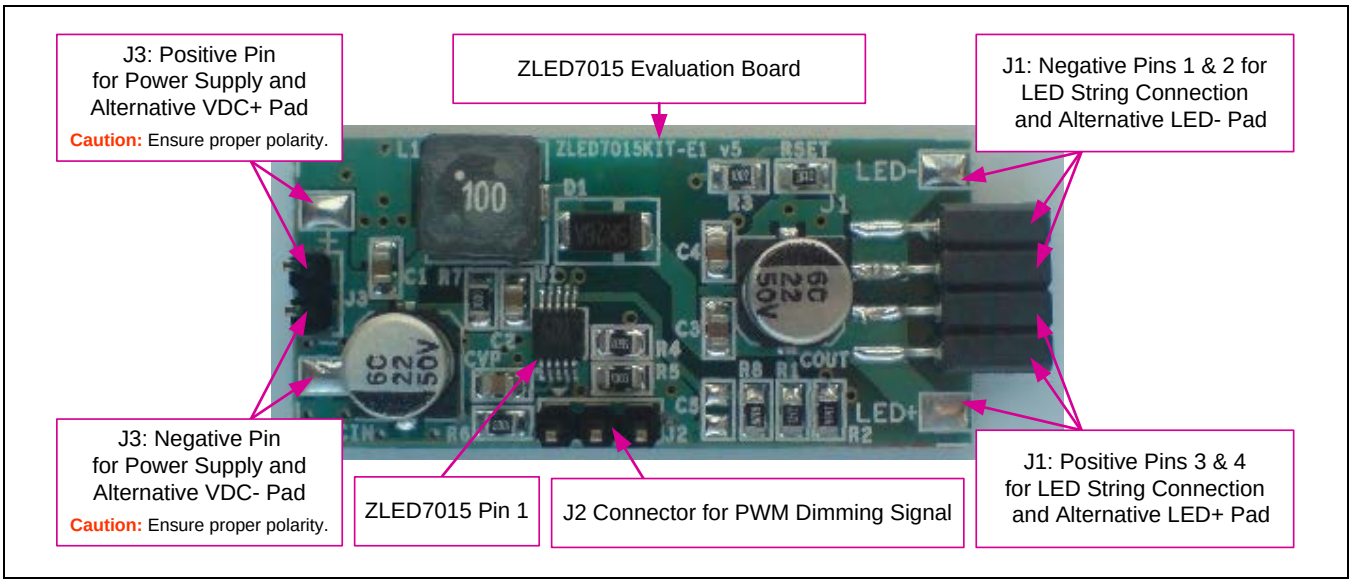
2.2. ZLED7015KIT-E1 Evaluation Board Overview

The Evaluation Board contains a standard 4-pin terminal connector to allow the user to easily connect and supply an LED's board. The Evaluation Board also has two LED power pads (LED+ and LED-) to provide more flexibility in supplying a power LED or LED string. A 10µH shielded inductor sets the nominal frequency around 300kHz. The shielded inductor has been selected to minimize radiated EMI. The layout with any switching regulator is crucial to minimize radiated EMI. This reference design keeps the critical track lengths to a minimum. Ground has been maximized around critical areas.

The Evaluation Board offers the following features and benefits:

- Wide input voltage range (see section 2.4).
- Standard 2.54mm 4-pin header for attaching of LEDs and additional duplicate SMD pads (LED- , LED+).
- Standard 2.54mm 2-pin male header and alternative duplicate SMD pads for power supply.
- Standard 2.54mm 3-pin male header for dimming the LED brightness with an external PWM signal.
- All devices are SMD and on the same side of the board (as shown in the top view given in Figure 2.1).
- Maximized power ground copper on top and bottom sides with thermal vias for good heat distribution.
- Track connecting R2 (current sense resistor) to ZLED7015 is as short as possible (sense tracks).
- The C3 filter capacitor and COUT are connected as close as possible to the LED output pins.
- The flyback current path is as short as possible to ensure system precision and efficiency.

Figure 2.1 ZLED7015KIT-E1 Evaluation Board (Top View)



2.3. Connections

Refer to Figure 2.1 for an illustration of the following set up for the Evaluation Board.

Table 2.1 Connections for the Evaluation Board

Connector	Description
J1	Standard 2.54mm 4-pin female header with the following connections. Pins 1 and 2: Negative pole for voltage output to drive the LED string (also see LED- pad) Pins 3 and 4: Positive pole for voltage output to drive the LED string (also see LED+ pad)
J2	Standard 2.54mm 3-pin male header for dimming the brightness of the LEDs with an external PWM signal or DC voltage.
J3	Standard 2.54mm 2-pin male header for power supply. Input voltage range: 6VDC to 30VDC. See section 2.4 for additional requirements.
VDC+	Positive pad for an optional alternative connection for the power supply (instead of J3).

Connector	Description
VDC-	Negative pad for an optional alternative connection for the power supply (instead of J3).
LED+	Positive pad for an optional alternative connection for the positive ZLED7015 driver supply voltage (instead of J1, pins 3 and 4).
LED-	Negative pad for an optional alternative connection for the negative ZLED7015 driver supply voltage (instead of J1, pins 1 and 2).

2.4. Power Supply

The Evaluation Board requires a DC power supply of ≥6V for the LED string, but it also must be 3V higher than the normally working output voltage (the total forward voltage of the LED or the LED string).

Caution: Ensure proper polarity when making connections. The system is not reverse polarity protected.

See section 2.3 for connection options for the power supply.

2.5. Circuit Operation

The reference current on the Evaluation Board has been set to 100mA but can be adjusted by changing the Rset set resistor according to the formula:

$$I_{LED} = V_{FB} / R_{SET}, [A]$$

Where

I_{LED} = Average output current through the LED(s) in amperes

V_{FB} = Internal feedback reference voltage of the ZLED7015: approx. 0.3V

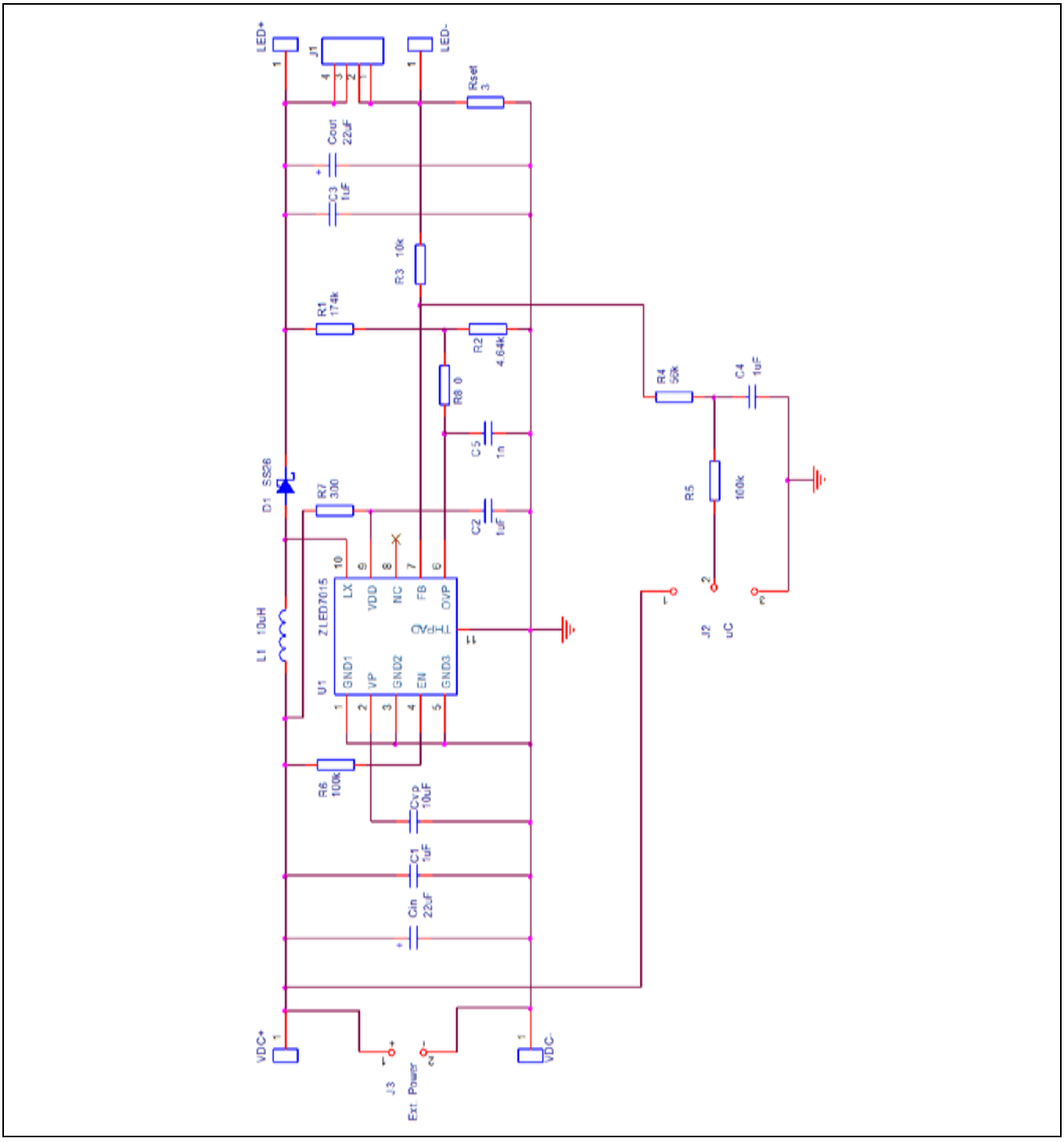
R_{SET}= Nominal current output setting resistor, which is approx.3Ω on the Evaluation Board

For R_{SET} = 3.0Ω → I_{LED} = 0.1A

For detailed calculations about dimming control, PWM signal control, and setting the over-voltage protection level, refer to the ZLED7015 datasheet.

2.6. Schematic Diagram

Figure 2.2 ZLED7015KIT-E1 Schematic Diagram



3 Ordering Information

Product Sales Code	Description
ZLED7015KIT-E1	ZLED7015KIT-E1 Evaluation Kit VX.x including 5 IC samples

4 Related Documents

Document
ZLED7015 Datasheet

Visit www.IDT.com/ZLED7015 or contact your nearest sales office for the latest version of these documents.

5 Glossary

Term	Description
LED	Light Emitted Diode
EMI	Electromagnetic Interference
MOSFET	Metal–Oxide–Semiconductor Field Effect Transistor
PCB	Printed Circuit Board
PWM	Pulse Width Modulation
MSOP10	Mini Small Outline Package

6 Document Revision History

Revision	Date	Description
1.00	March 6, 2013	First release.
	April 20, 2016	Changed to IDT branding.

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