

TLD5045EJ Evalkit

User manual

About this document

Scope and purpose

TLD5045EJ is an attractive device that allows to build up a LED driver for automotive application with a limited number of components on PCB. It is a buck converter with power stage and sensing resistor integrated and it is able to drive up to 700 mA.

This manual gives instructions on usage of the TLD5045EJ buck to battery evaluation board. In this configuration, the device works in a buck mode, then output voltage has to be lower than input voltage. With nominal battery voltage range from 8.5 V to 27 V, the system is able to provide 300 mA to 2 high power LEDs (maximum output voltage 6.5 V)

Intended audience

Hardware designer

About this document.....	1
1 Description.....	2
Performance summary.....	3
2 Quick start procedure	4
3 PWM dimming via external source.....	5
4 Current adjustment.....	6
5 PCB layout.....	7
6 Schematic	8
7 Bill of Material	9
8 Efficiency Measurements	10
Revision history.....	11

1 Description

TLD5045 is a highly integrated smart LED buck converter with built in power stage and with protection functions.

This evaluation board in buck to battery topology can be used to test the performances of the device with many test points available. The board can be easily tailored to other applications due to the usage of 0805 size as minimum footprint for all components. A picture of the board is depicted on Figure 1, while the block diagram is sketched in Figure 2.

This is a good solution for secondary daytime running light (DRL), front light for two wheeler application and other applications where the total number of LED does not exceed 2 pieces. The board can deliver up to 10 W to the load with an efficiency above 71%.

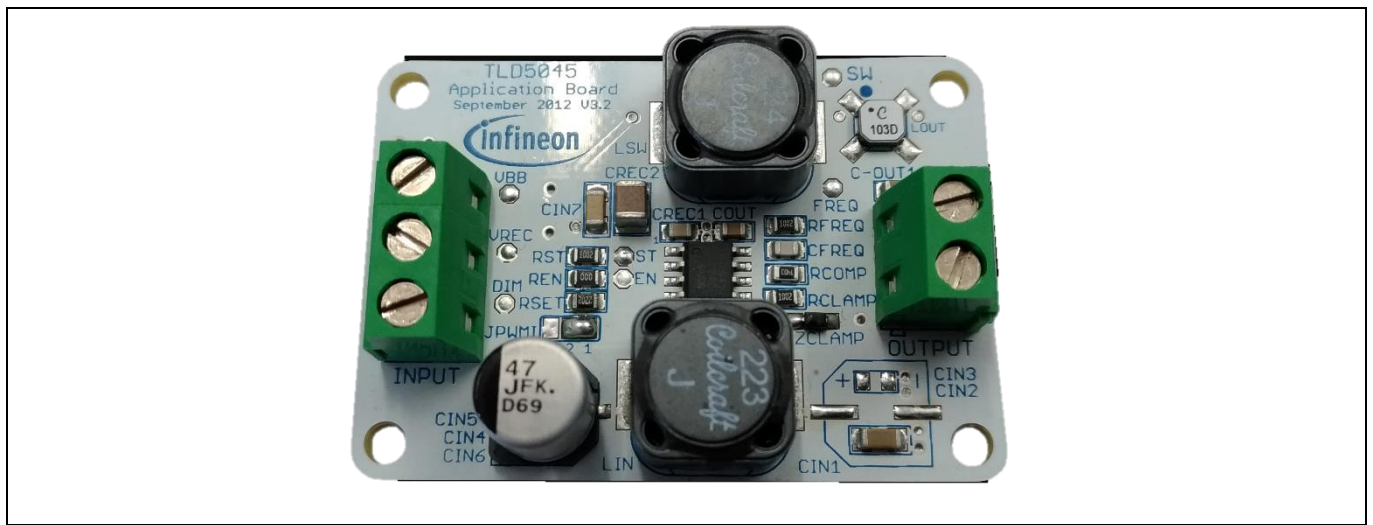


Figure 1 **Picture of the evaluation kit**

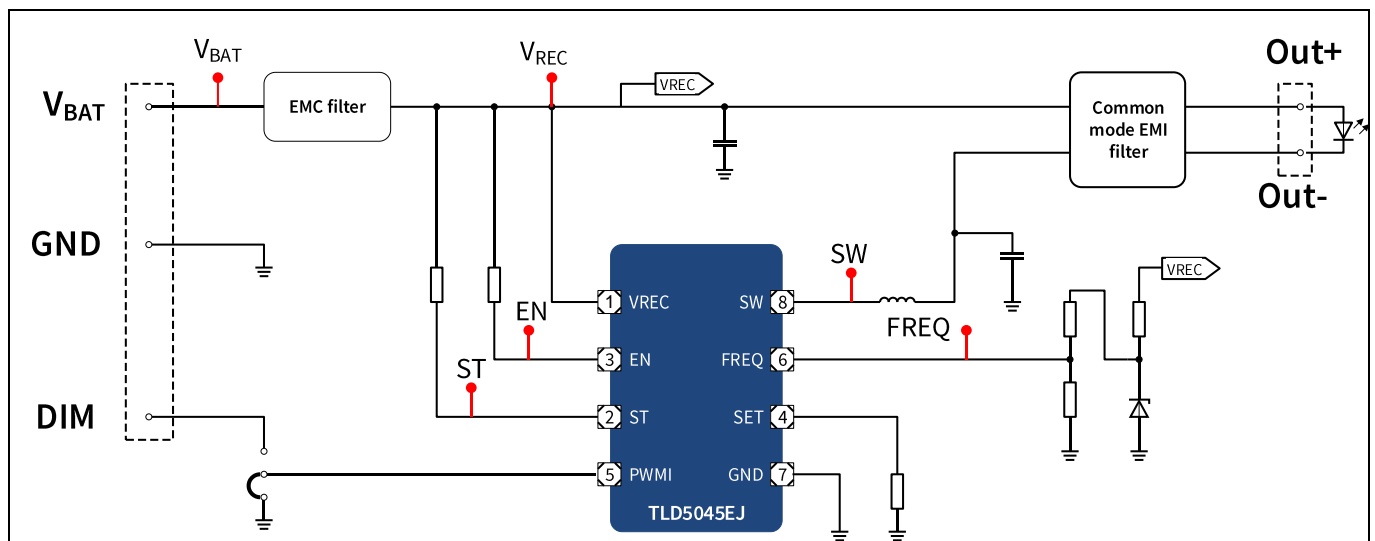


Figure 2 **Simplified schematic of TLD5045EJ Evaluation kit**

Performance summary

Parameter	Conditions	Value
Input supply voltage		8V to 27 V
Output current		300 mA
Switching frequency	V _{in} = 13.2 V	150 kHz
Efficiency	Measured with 2 white standard LED 3V @ 300 mA output current.	> 71%
Output voltage range	Output voltage related to positive input.	2.5 V to 6.5 V

2 Quick start procedure

The default configuration of the board has the PWM engine disabled. Jumper JPWMI has to be soldered in position 2-1 closed. The default configuration is shown in Figure 3

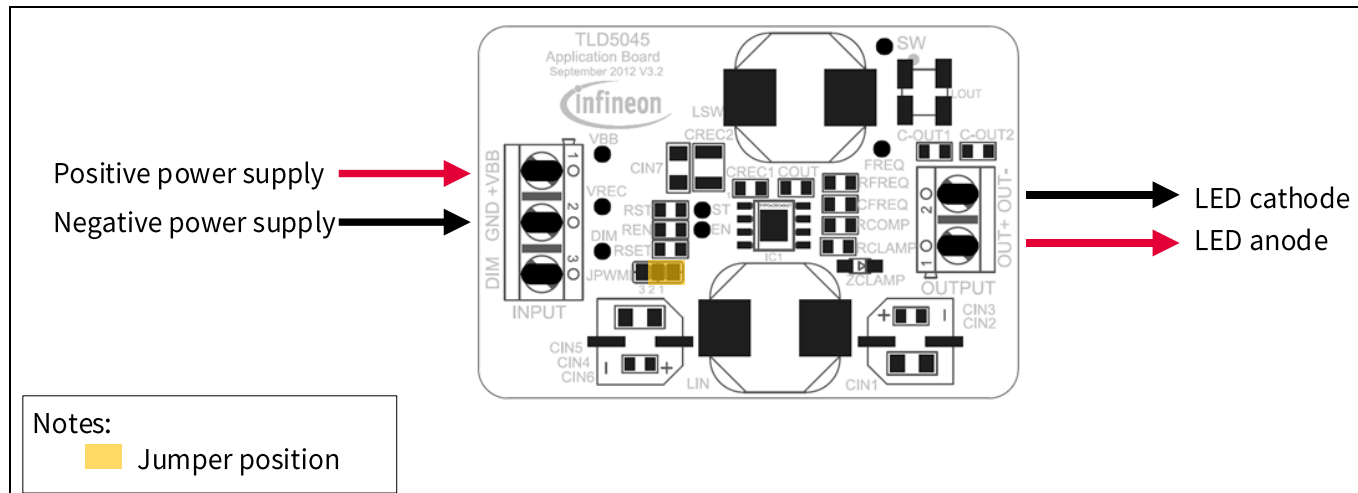


Figure 3 Default configuration

3 PWM dimming via external source

The PWM signal is provided by the input connector. With this solution, also dimming via power line can be enabled (just connecting together positive power supply with PWM dimming input). To enable the feature, jumper JPWMI is soldered in position 2-2. Sketch of the board is illustrated on Figure 4.

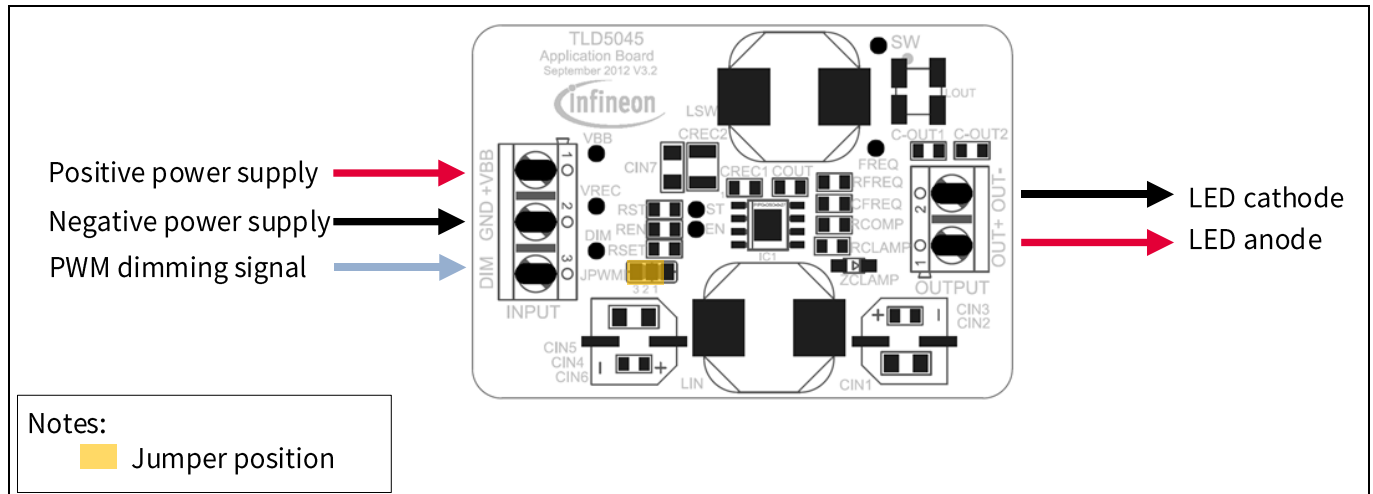


Figure 4 External PWM dimming configuration

4 Current adjustment

Output current adjustment can be performed by changing the value of the resistor RSET according to equation 8.1 and Figure 10 of the datasheet. Copy of Figure 10 of the datasheet is also reported on Figure 6 of this document for completeness. The connection sketch where RSET is placed is shown in Figure 5.

Jumper JPWMI is soldered in position 1-2 if external PWM signal is not used, while it is soldered in position 2-3 if PWM signal is provided by an external source.

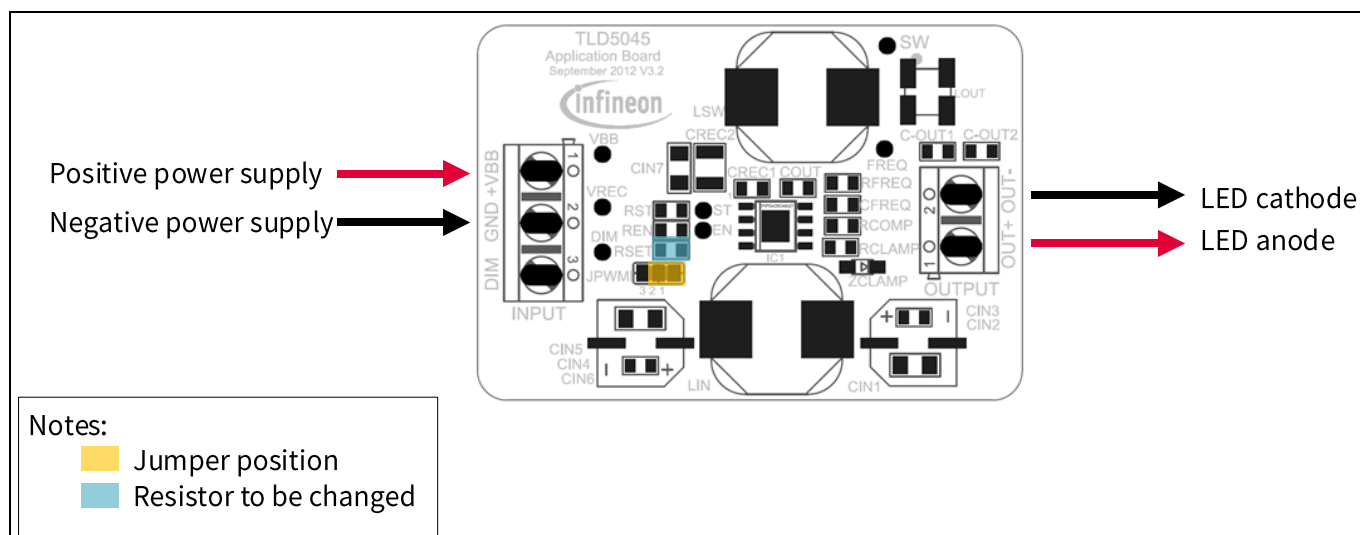


Figure 5 Modification of Evaluation kit to change the output current

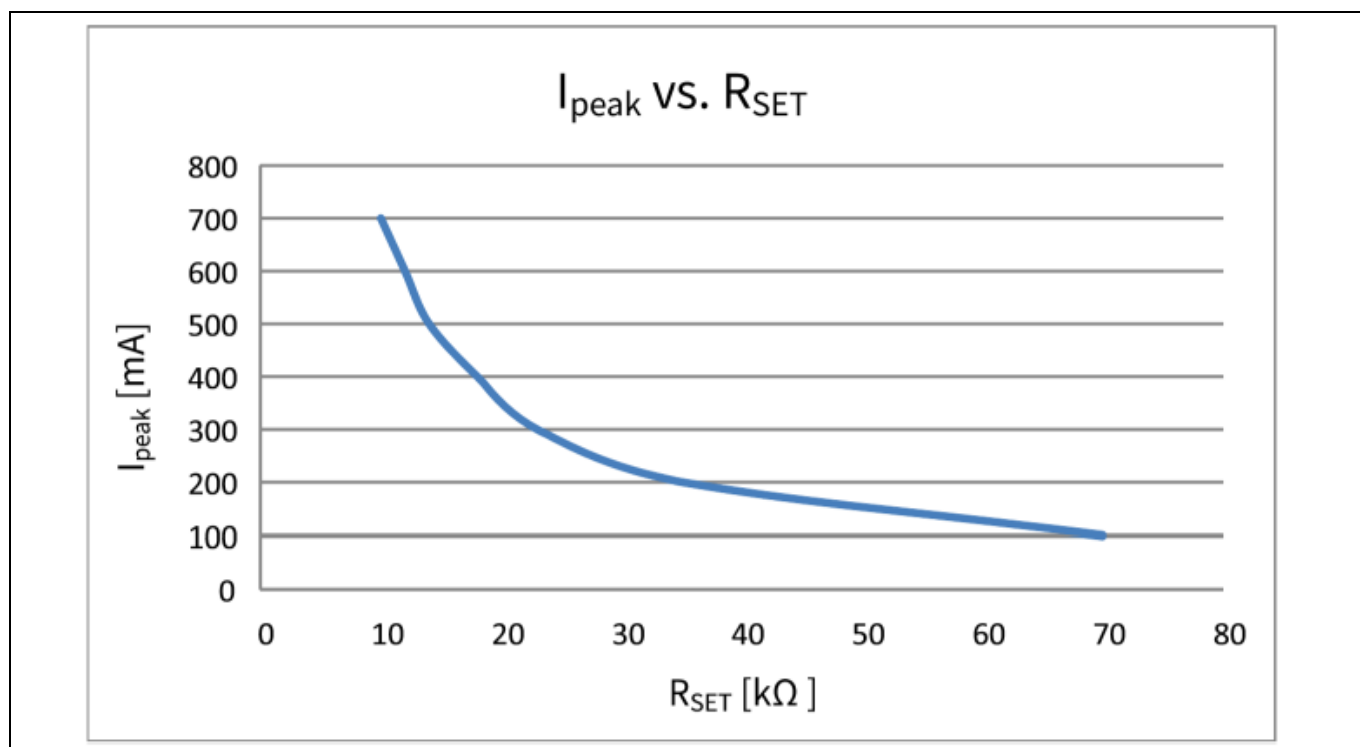


Figure 6 Output current variation related to resistor on SET pin

5 PCB layout

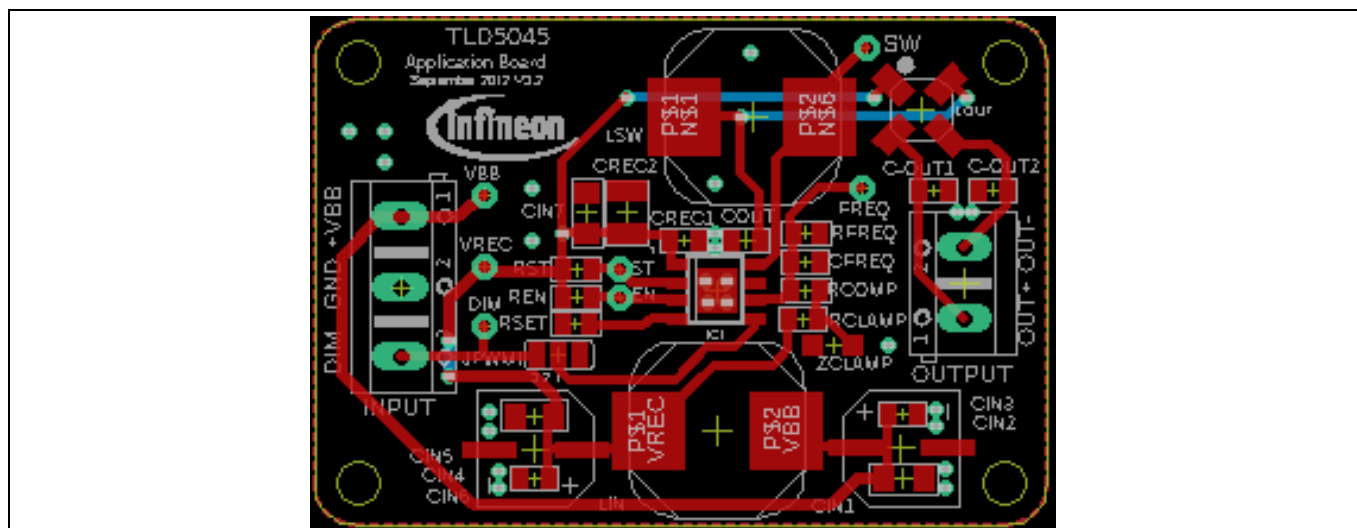
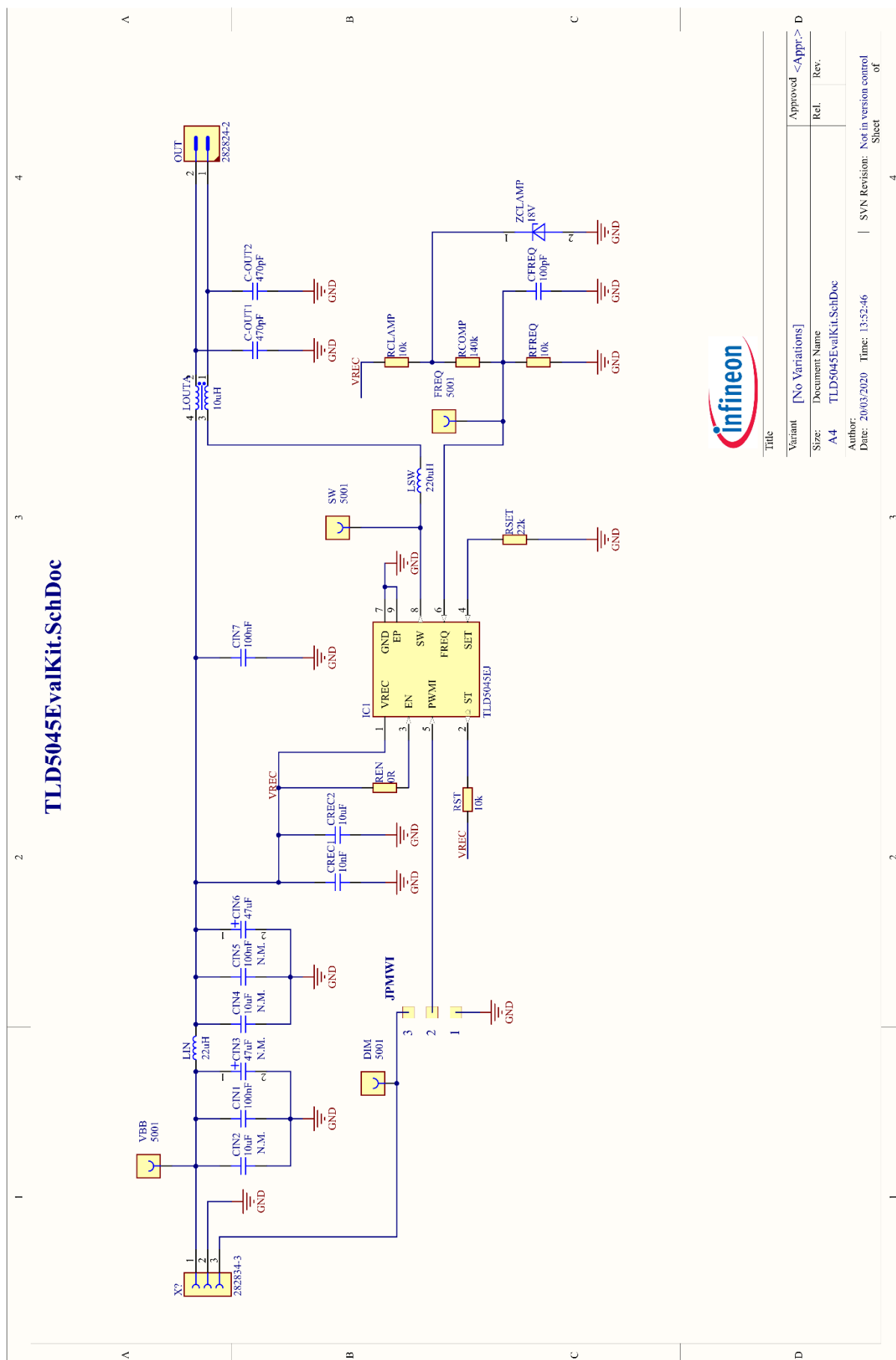


Figure 7 PCB routing on 2 layer board

6 Schematic

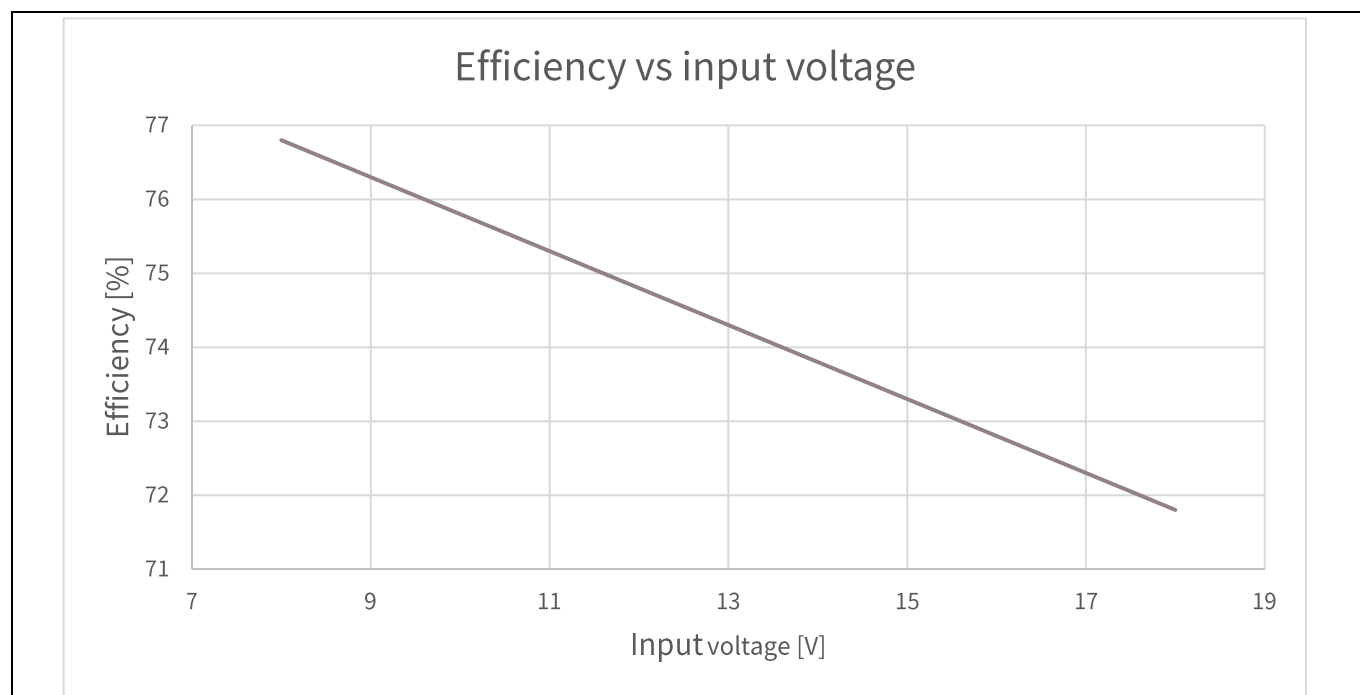


7 Bill of Material

Table 1

Designator	Value	Manufacturer	Manufacturer part number
CFREQ	100 pF	Kemet	C0805C101K5GACTU
CIN1, CIN5, CIN7	100 nF	TDK Corporation	CGA4J2X7R2A104M125AE
CIN2, CIN4, CREC2	10 uF	Kemet	C1210C106M5R2CAUTO
CIN3, CIN6	47 uF	Panasonic	EEEFK1H470P
C-OUT1, C-OUT2	470 pF	Kemet	C0603C471G5GAC
CREC1	10 nF	Kemet	C0805C103K5RACAUTO
IC1	TLD5045EJ	Infineon Technologies	TLD5045EJXUMA1
LIN	22 uH	TDK Corporation	SPM10054T-220M-HZ
LOUT	10 uH	Bourns	SRF1280A-100M
LSW	220 uH	Epcos	B82477P4224M000
RCLAMP, RFREQ, RST	10 k Ω	Vishay	
RCOMP	140 k Ω	Vishay	
REN	0 Ω	Yageo	AC0805JR-070RL
RSET	22 k Ω	Vishay	
ZCLAMP	18 V	Vishay	BZT52C18-HE3-08

8 Efficiency Measurements



Efficiency has been measured in the following conditions:

- Output load: Series of 2 high power white LED with $V_f = 3\text{ V}$ kept cooled with forced air
- EMI filter: included
- Dimming PWM: OFF (jumper JPWMI soldered in position 1-2)

Revision history

Document version	Date of release	Description of changes
Rev. 1.0	2020-03-20	First release

1

Trademarks

All referenced product or service names and trademarks are the property of their respective owners.

Edition 2019-10-09

Published by

Infineon Technologies AG

81726 Munich, Germany

© 2020 Infineon Technologies AG.

All Rights Reserved.

Do you have a question about this document?

Email: erratum@infineon.com

Document reference

IMPORTANT NOTICE

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffheitsgarantie").

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology delivery terms and conditions and prices please contact your nearest Infineon Technologies office (www.infineon.com).

WARNINGS

Due to technical requirements products may contain dangerous substances. For information on the type: in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.