

# TLD1211SJ evaluation board

## User Manual

### About this document

#### Scope and purpose

The scope of the TLD1211SJ\_EVAL (evaluation) board is to help designers evaluate the performance of the LITIX™ Linear TLD1211SJ, a single channel linear current source LED driver for automotive LED lighting applications. The LITIX™ Linear TLD1211SJ provides a simple and low-cost solution for low current applications up to 85 mA. When using additional external power stages as “booster” transistors, it can also be used to drive high currents up to 2.5 A.

This user manual provides the usage instructions of the TLD1211SJ\_EVAL board (schematic version S00, PCB version P00).

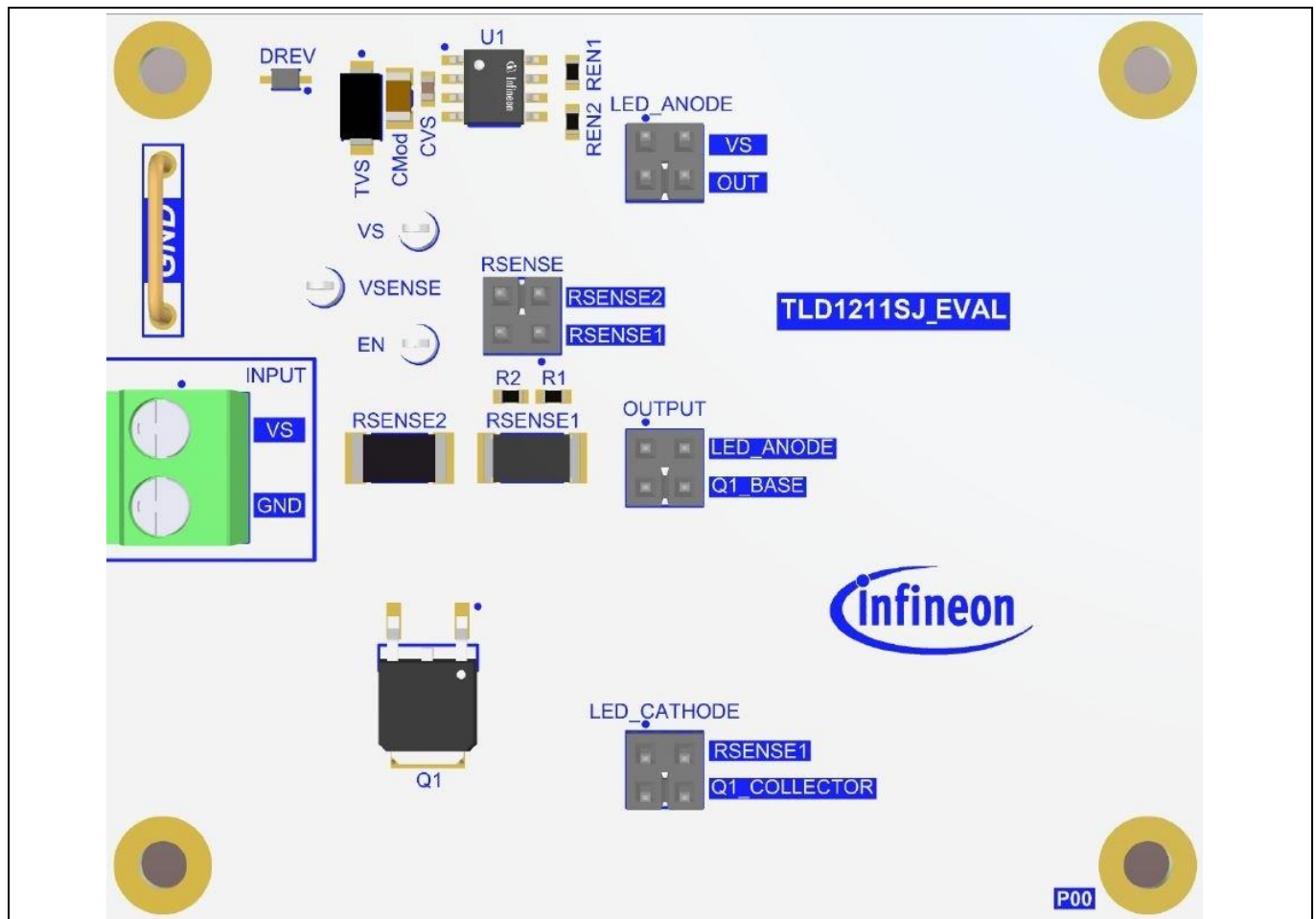


Figure 1 TLD1211SJ\_EVAL board

#### Intended audience

Hardware engineers, system architects

Related information

**Table 1 Supplementary links and document references**

Reference	Description
<a href="#">LITIX™ Linear TLD1211SJ product</a>	Product website which contains reference information for the LITIX™ Linear TLD1211SJ including datasheet, simulation models, board and relevant trainings
<a href="#">LITIX™ Linear family</a>	All information about LITIX™ Linear family products
<a href="#">LED driving concepts and Linear LED drivers</a>	Application note regarding the usage and design-in of the LITIX™ Linear and BCR LED drivers
<a href="#">LED rear lighting - application</a>	Application website for rear LED lighting

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# 1 TLD1211SJ\_EVAL description

The TLD1211SJ\_EVAL is an evaluation board equipped with one LITIX™ Linear TLD1211SJ and on-board LEDs for easy evaluation. The board can be used within the typical automotive voltage range, 8 V to 16 V. The jumpers available on the board offer the user the possibility to evaluate the LITIX™ Linear TLD1211SJ in both low and high current applications.

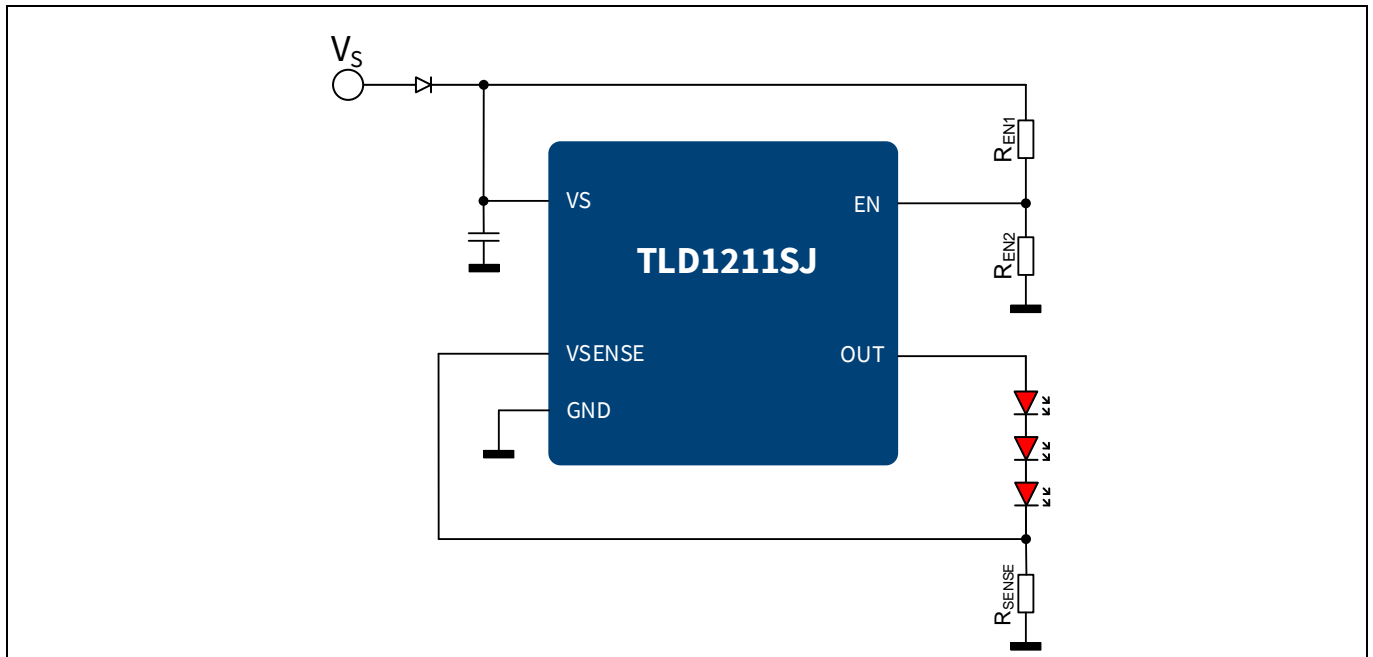


Figure 2 Low current application with LITIX™ Linear TLD1211SJ

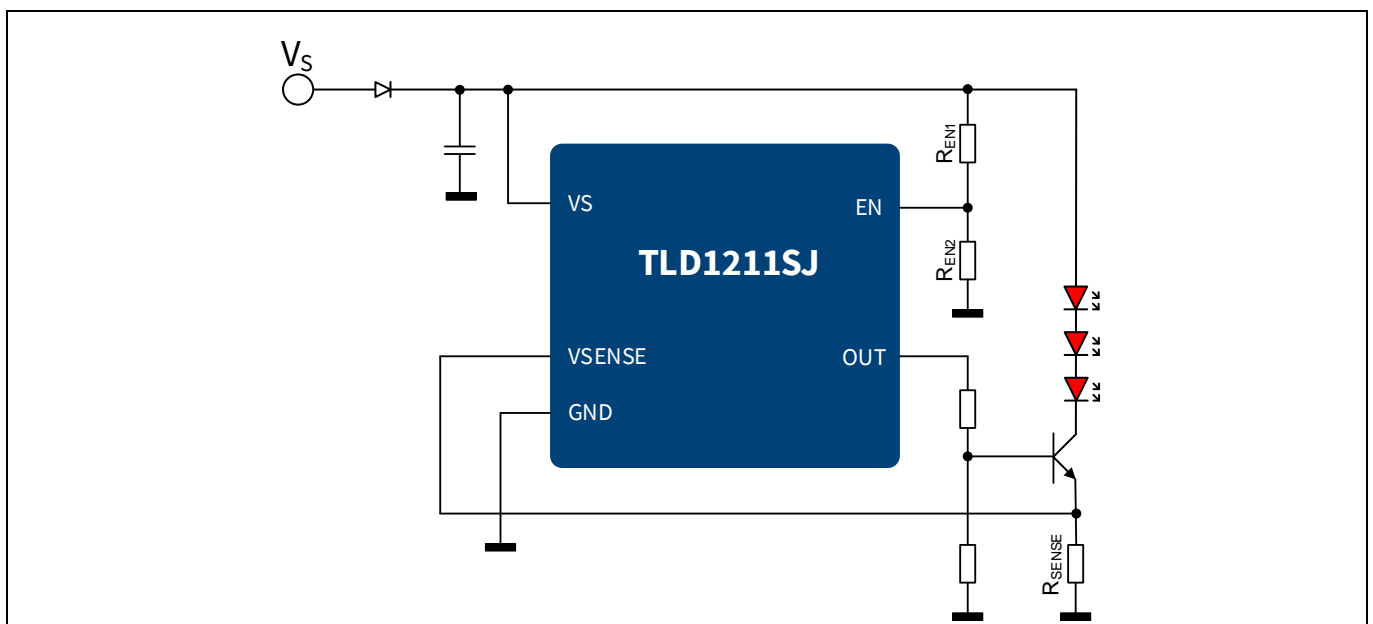


Figure 3 High current application with LITIX™ Linear TLD1211SJ and “booster” transistor

### TLD1211SJ\_EVAL description

## 1.1 Key features

The TLD1211SJ\_EVAL has the following features:

- Equipped with one LITIX™ Linear TLD1211SJ
- Typical supply voltage range 8 V to 16 V
- Equipped with jumpers that provide the possibility to evaluate TLD1211SJ in two different current configurations:
  - $I_{OUT} = 50 \text{ mA}$
  - $I_{OUT} = 300 \text{ mA}$
- On-board LED load, 3 red LEDs
- 7.4 cm x 6.1 cm 2-layer PCB

## 1.2 Connectors and jumpers

The TLD1211SJ\_EVAL board connectors are described in Table 2.

**Table 2 TLD1211SJ\_EVAL connectors**

Connector	Description
<b>INPUT</b>	
VS	Power supply, typical 8 V to 16 V
GND	Ground

The TLD1211SJ\_EVAL board jumpers are described in Table 3:

**Table 3 TLD1211SJ\_EVAL board jumpers**

Jumper	Description and configuration
LED_ANODE	Select the connection of the LED string anode: <ul style="list-style-type: none"> <li>• VS: connect to the VS line, configuration for <math>I_{OUT} = 300 \text{ mA}</math></li> <li>• OUTPUT: connect directly to the OUT-pin of LITIX™ Linear TLD1211SJ, configuration for <math>I_{OUT} = 50 \text{ mA}</math></li> </ul>
RSENSE	Select the sense resistor connected to the VSENSE-pin of LITIX™ Linear TLD1211SJ: <ul style="list-style-type: none"> <li>• RSENSE1: connect to 3 Ω resistor to set <math>I_{OUT} = 50 \text{ mA}</math></li> <li>• RSENSE2: connect to 500 mΩ resistor to set <math>I_{OUT} = 300 \text{ mA}</math></li> </ul>
LED_CATHODE	Select the connection of the LED string cathode: <ul style="list-style-type: none"> <li>• RSENSE1: connect to RSENSE1, configuration for <math>I_{OUT} = 50 \text{ mA}</math></li> <li>• Q1_COLLECTOR: connect to the collector of Q1 transistor, configuration for <math>I_{OUT} = 300 \text{ mA}</math></li> </ul>
OUTPUT	Select the output configuration of LITIX™ Linear TLD1211SJ: <ul style="list-style-type: none"> <li>• LED_AN: connect to the anode of the LED string, configuration for <math>I_{OUT} = 50 \text{ mA}</math></li> <li>• Q1_BASE: connect to the base of Q1 transistor, configuration for <math>I_{OUT} = 300 \text{ mA}</math></li> </ul>

### 1.3 On-board load

The TLD1211SJ\_EVAL board is equipped with on-board LED load for easy evaluation. Three red OSOLON® Black Flat LEDs on the bottom side of the board can be used for both current level configurations. See Figure 4.

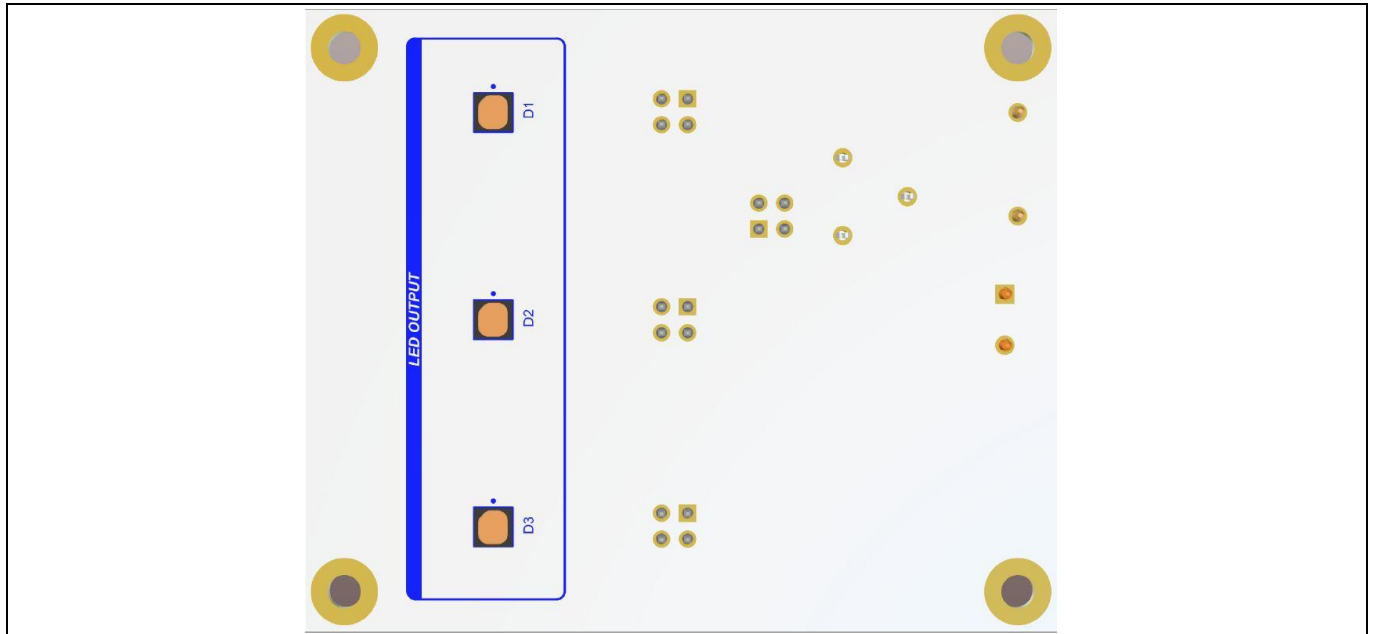


Figure 4 On-board LED load

### 1.4 Test points

The TLD1211SJ\_EVAL board is equipped with several test points and one ground terminal for easy monitoring of significant voltages. See Figure 5.

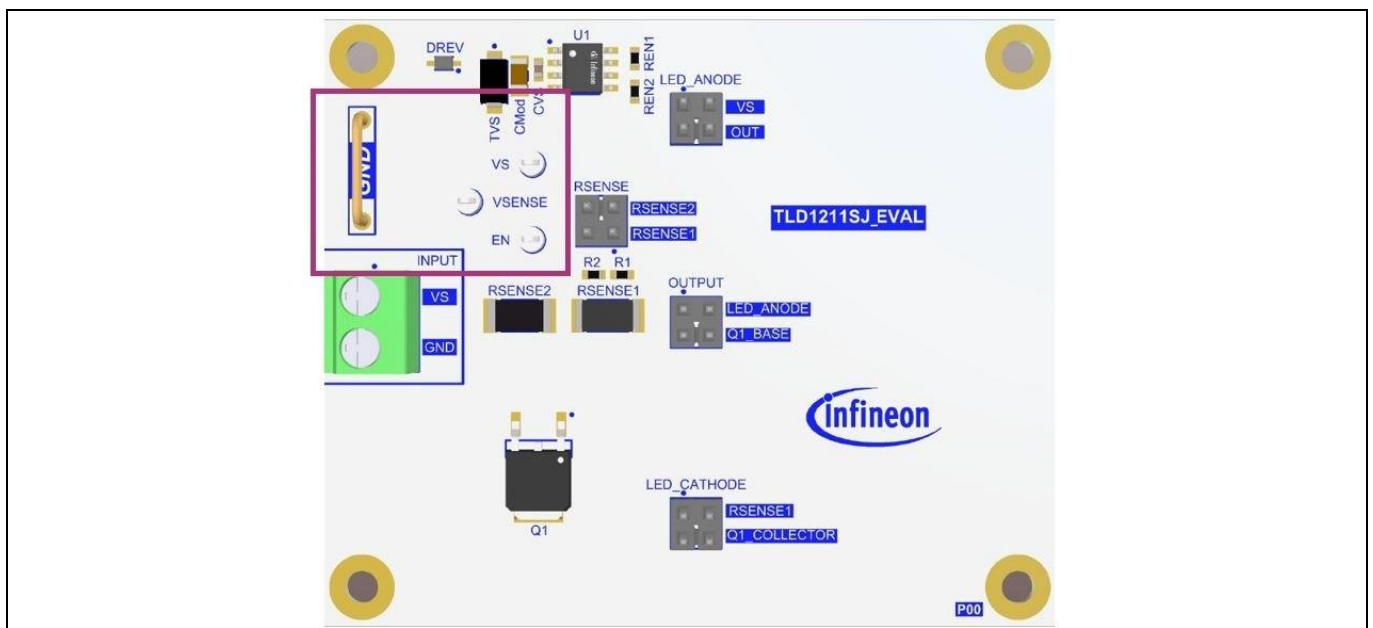


Figure 5 Test points and ground terminal

## 2 Quick start

The TLD1211SJ\_EVAL board offers two possible current level configurations,  $I_{OUT} = 50 \text{ mA}$  and  $I_{OUT} = 300 \text{ mA}$ . The steps for a quick start, for either of the above configurations, are described in this chapter.

### 2.1 Low current configuration, $I_{OUT} = 50 \text{ mA}$

- Connect a voltage source to VS and GND, typically 8 V to 16 V
- Select the connection of the LED string anode (LED\_ANODE): place jumper on OUTPUT
- Select the sense resistor connected to the VSENSE-pin of LITIX™ Linear TLD1211SJ (RSENSE): place jumper on RSENSE1
- Select the connection of the LED string cathode (LED\_CATHODE): place jumper on RSENSE1
- Select the output configuration of LITIX™ Linear TLD1211SJ (OUTPUT): place jumper on LED\_ANODE

### 2.2 High current configuration, $I_{OUT} = 300 \text{ mA}$

- Connect a voltage source to VS and GND, typically 8 V to 16 V
- Select the connection of the LED string anode (LED\_ANODE): place jumper on VS
- Select the sense resistor connected to the VSENSE-pin of LITIX™ Linear TLD1211SJ (RSENSE): place jumper on RSENSE2
- Select the connection of the LED string cathode (LED\_CATHODE): place jumper on Q1\_COLLECTOR
- Select the output configuration of LITIX™ Linear TLD1211SJ (OUTPUT): place jumper on Q1\_BASE

### 3 Schematics, layout and bill of material

For the calculation of the external components required for the LITIX™ Linear TLD1211SJ and used on the TLD1211SJ\_EVAL board refer to the following documentation:

- [LITIX™ Linear TLD1211SJ datasheet](#)
- [LED driving concepts and Linear LED drivers](#)

#### 3.1 Schematics

The schematic of the TLD1211SJ\_EVAL board is shown in Figure 6.

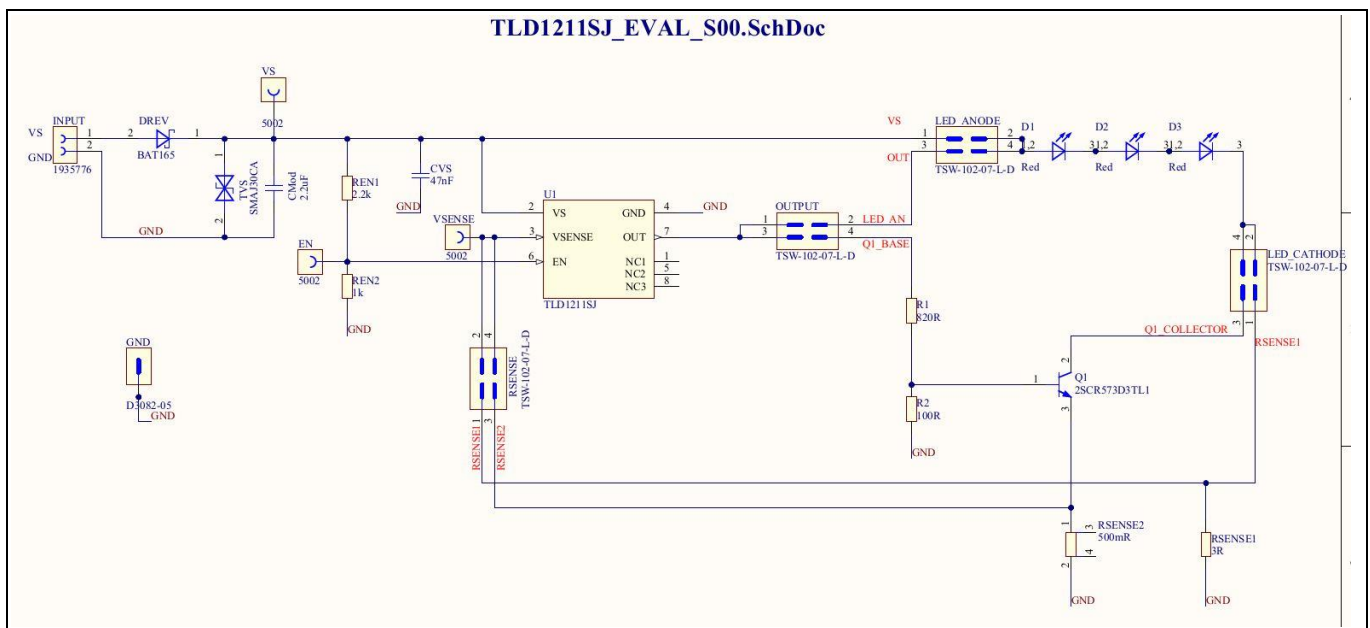


Figure 6 Schematic of TLD1211SJ\_EVAL board

### 3.2 Layout

Figure 7 and Figure 8 show the layout of the TLD1211SJ\_EVAL board.

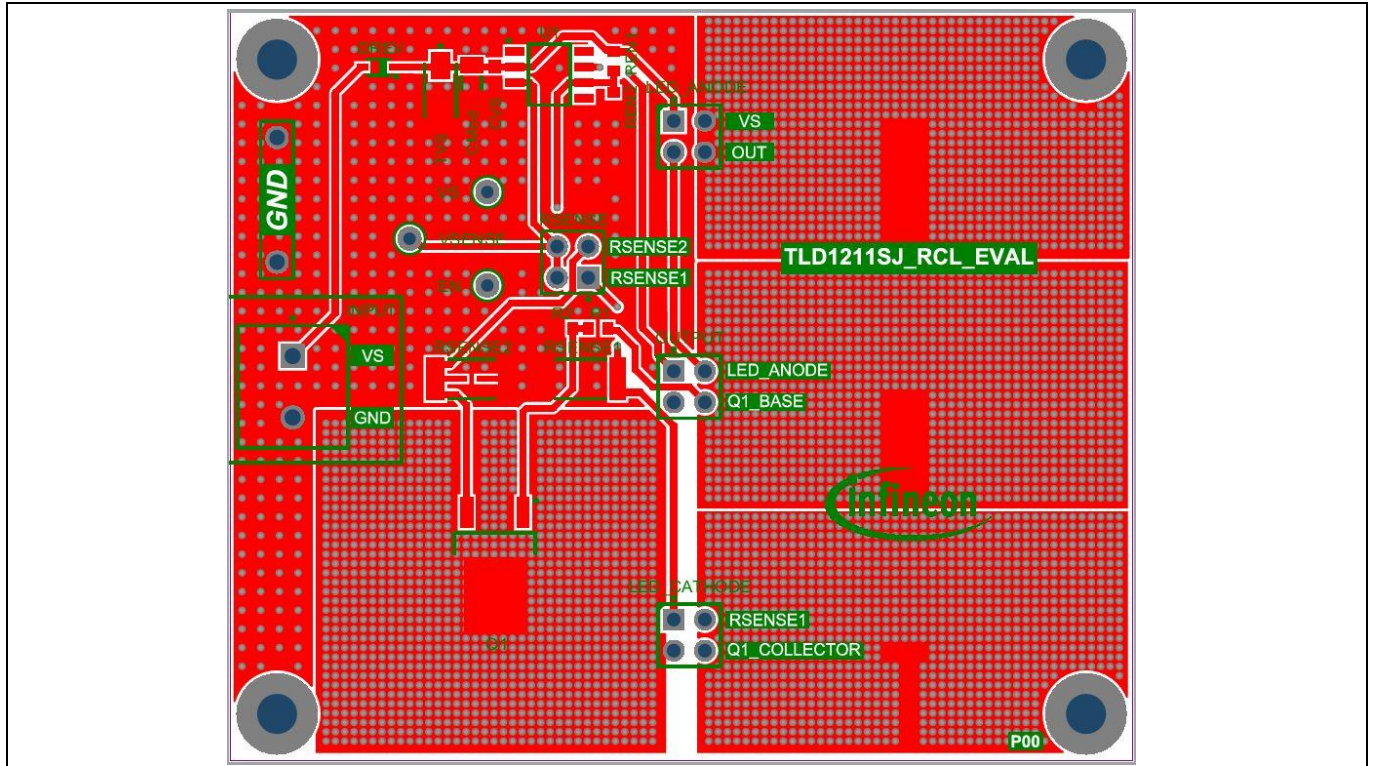


Figure 7 Layout of TLD1211SJ\_EVAL board – top layer

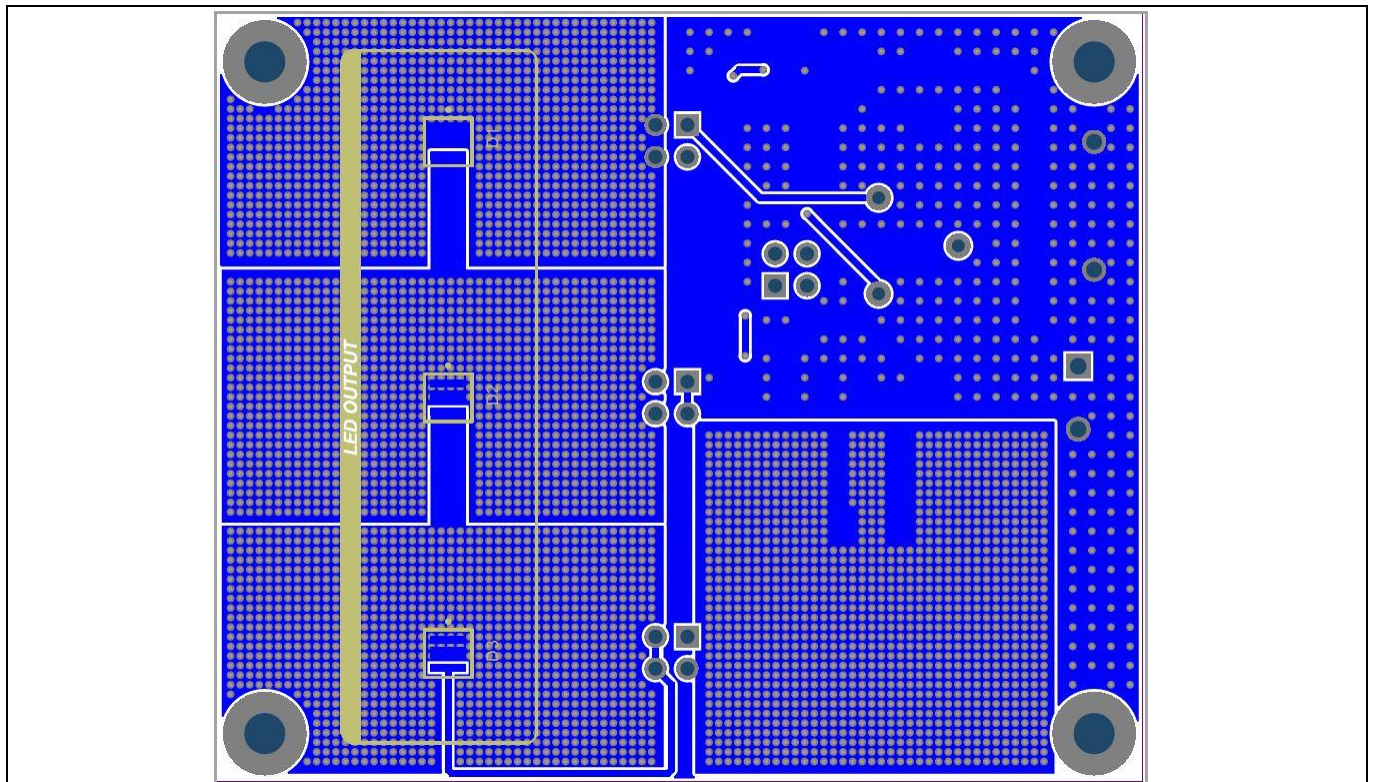


Figure 8 Layout of TLD1211SJ\_EVAL board – bottom layer



### 3.3 Bill of materials

Table 4 shows the TLD1211SJ\_EVAL board bill of material.

**Table 4 Bill of material**

Designator	Value	Manufacturer	Manufacturer order number
CMod	2.2 $\mu$ F	MuRata	GRM31CR71H225KA88
CVS	47 nF	TDK Corporation	CGA3E2X8R1H473K080AA
D1, D2, D3	Red	OSRAM Opto Semiconductors	LR H9PP-HZJZ-1-1
DREV	BAT165	Infineon Technologies AG	BAT165
EN, VS, VSENSE	5002	Keystone Electronics Corp.	5002
GND	D3082-05	Harwin	D3082-05
INPUT	1935776	Phoenix Contact	1935776
LED_ANODE, LED_CATHODE, OUTPUT, RSENSE	TSW-102-07-L-D	Samtec	TSW-102-07-L-D
Q1	2SCR573D3TL1	ROHM Semiconductors	2SCR573D3TL1
R1	820 $\Omega$	Yageo	RC0603FR-07820RL
R2	100 $\Omega$	Yageo	RC0603FR-07100RL
REN1	2.2 k $\Omega$	Yageo	RC0603FR-072K2L
REN2	1 k $\Omega$	Yageo	RC0603FR-071KL
RSENSE1	3 $\Omega$	Panasonic	ERJ-1TRQF3R0V
RSENSE2	500 m $\Omega$	Vishay	WSL2512R5000DEA
TVS	SMAJ30CA	Littelfuse	SMAJ30CA
U1	TLD1211SJ	Infineon Technologies AG	TLD1211SJ

### 3.4 PCB design data

The Altium project is available on the [TLD1211SJ\\_EVAL](#) website.

### Revision history

Document version	Date of release	Description of changes
V 1.0	2021-01-13	Initial release

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