

TLD7002-16LITE_KIT

User guide

LITIX™ Pixel Rear
Multi-channel LED driver
Z8F80321004

About this document

Kit description

- TLD7002-16ES: 16 channel device with integrated and protected output stages
- 32 red LED load – 2 LED per output channel
- Set of cables

Scope and purpose

The scope of this user manual is to provide instructions on the use of the TLD7002-16LITE_KIT.

The TLD7002-16LITE_KIT is composed of a set of 2 different boards:

- TLD7002-16EVAL board (schematic version S02, PCB version P02)
- TLD7002-16EVAL – Load Tail Light (project version HW6)

A set of cables for connecting the boards is provided in the kit.

The TLD7002-16LITE_KIT is an evaluation platform for the TLD7002-16ES, which features:

- 16 channels
- 16 independent 6-bit current set from 5 mA to 76.5 mA
- Power stages can be paralleled for higher currents
- 16 independent 14 bits PWM duty cycles

Load Tail Light board is provided in the kit, to take various load conditions into account.

Intended audience

Hardware and Firmware engineers

Table of contents

	About this document	1
	Table of contents	2
1	Description	3
2	Quick start procedure	4
2.1	Direct UART connection without CAN transceiver	4
3	Electrical characteristics	5
4	Bill of material, layout and schematic	6
4.1	TLD7002-16EVAL BOM, layout and schematic	6
4.2	TLD7002-16EVAL – TailLoadLight BOM, layout and schematic	11
	Revision history	16
	Disclaimer	17

1 Description

1 Description

TLD7002-16LITE_KIT provides the full set of functionalities to enable the user to evaluate TLD7002-16ES in bus mode. [Figure 1](#) is a simplified schematic. For the complete schematic please refer to [Chapter 4.2](#).

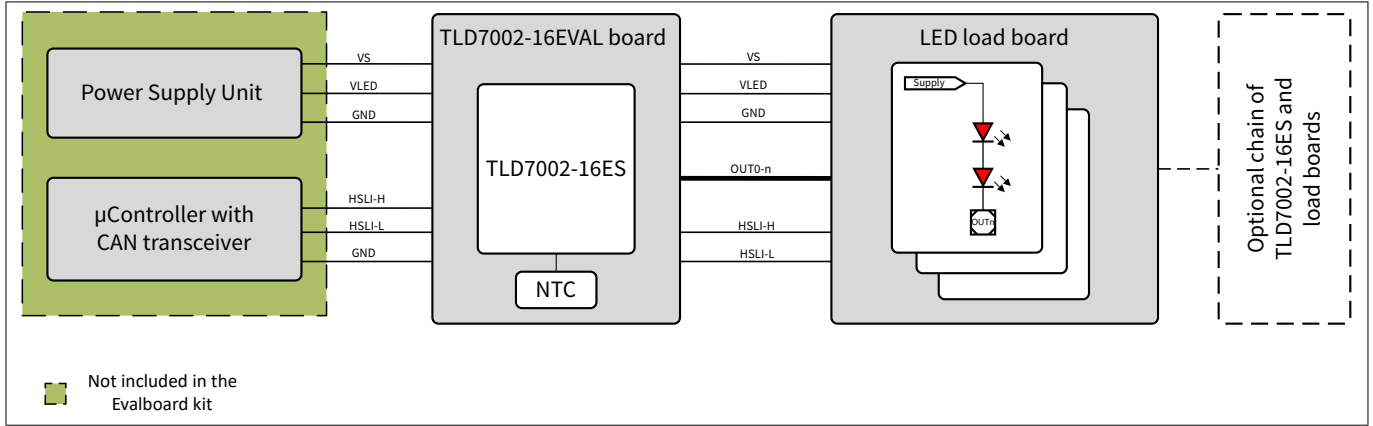


Figure 1 TLD7002-16LITE_KIT simplified schematic

Load animations are possible, but only when operating with an external microcontroller which is not provided in the kit.

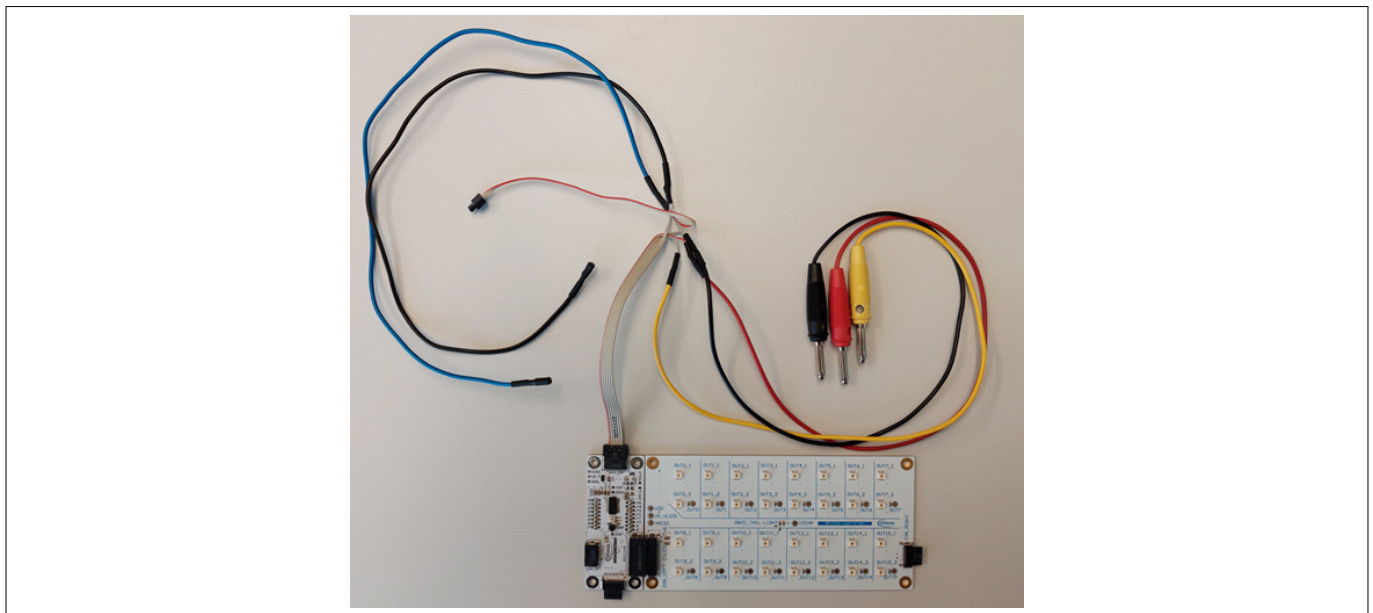


Figure 2 TLD7002-16LITE_KIT basic setup

The basic setup of TLD7002-16LITE_KIT can be seen in the figure above.

Table 1 Color coding of cables

Color	Type	Signal
black	banana	GND
red	banana	VS
yellow	banana	VLED
blue	pin header	HSLIH
black	pin header	HSLIL

2 Quick start procedure

2 Quick start procedure

A step-by-step procedure for the setup and running of the TLD7002-16LITE_KIT is as follows:

1. Connect VS and GND bananas to a power supply unit. Please refer to [Chapter 3 Electrical characteristics](#) for correct supply voltages
2. The LEDs on the Load Tail Light board will light up after 2 seconds from the power supply connections and an OTP pre-installed fail-safe configuration is shown (LEDs will light up with different brightness)
3. OPTIONAL: Connect a microcontroller to the HSLI wires to access to full potential of TLD7002-16ES
 - a. Connect HSLIH and HSLIL kit wires to CAN-H and CAN-L of a microcontroller with CAN transceiver
 - b. Alternatively it is possible to use a single-ended communication between microcontroller and the TLD7002-16ES (no transceiver needed). Please refer to the figure below

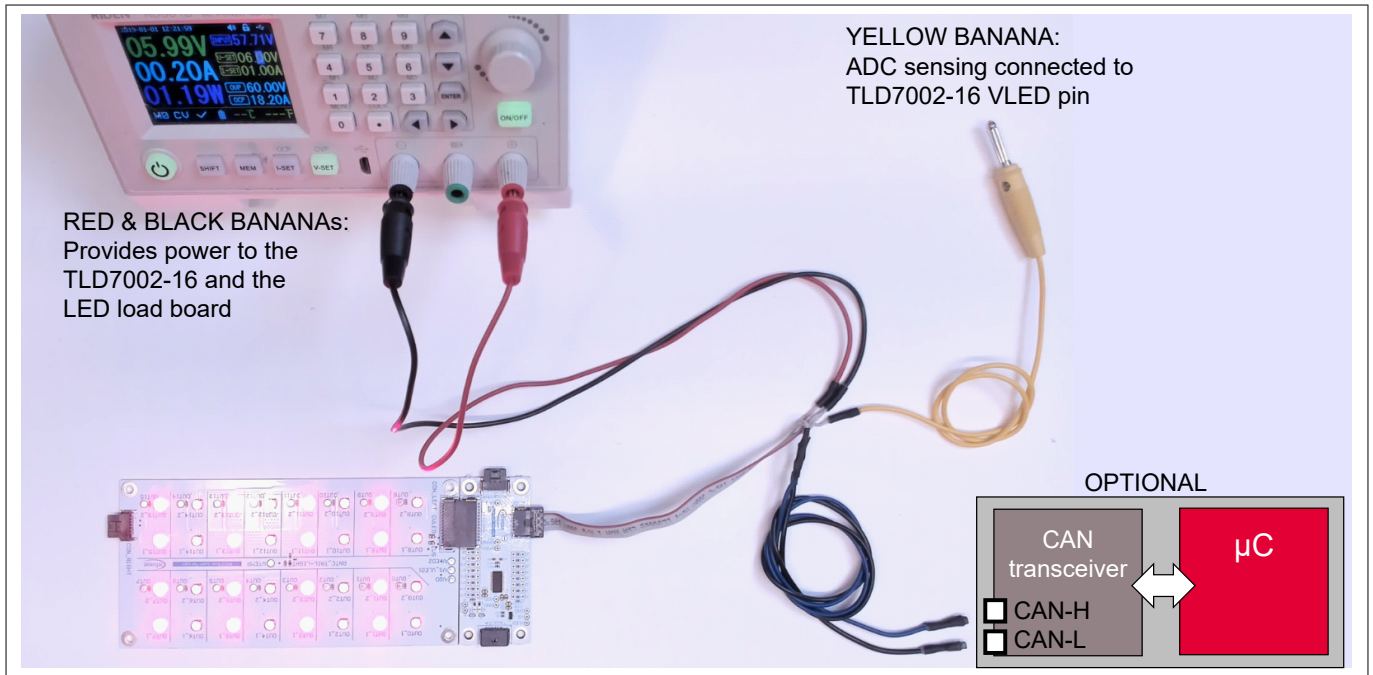


Figure 3 TLD7002-16LITE_KIT board wiring

2.1 Direct UART connection without CAN transceiver

The HSLI is a differential bus, but the TLD7002-16LITE_KIT can be connected directly to a 5 V RX and TX pin of the microcontroller with a simple workaround as shown on figure below (no transceiver needed).

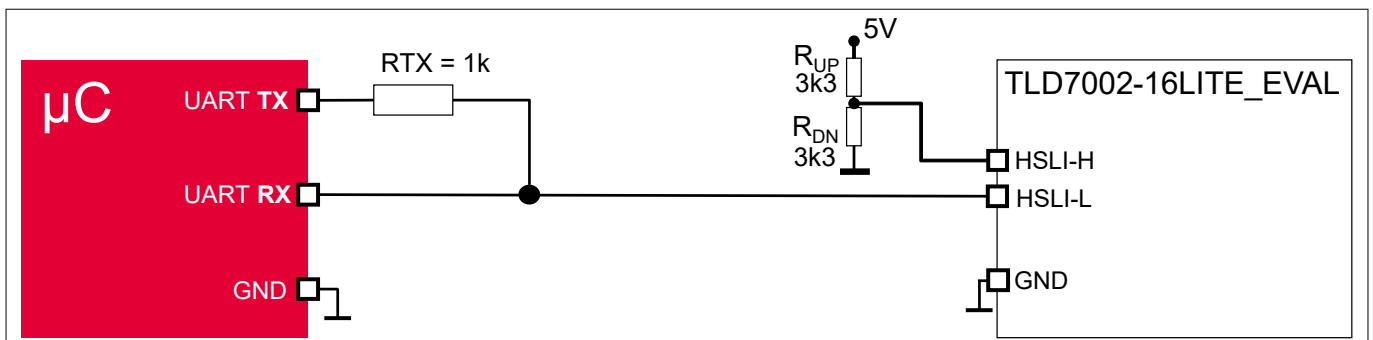


Figure 4 Single-ended UART communication block diagram

3 Electrical characteristics

3 Electrical characteristics

Table 2 Electrical characteristics

Parameter	Symbol	Values			Unit	Note or test condition
		Min.	Typ.	Max.		
TLD7002-16ES power supply	V_S	6	–	20	V	VS yellow banana powers TLD7002-16ES and LED load
ADC input (VLED pin)	V_{LED}	0	–	20	V	10-bit ADC input

4 Bill of material, layout and schematic

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4.1 TLD7002-16EVAL BOM, layout and schematic

Table 3 TLD7002-16EVAL BOM

Designator	Value	Footprint	Quantity
C1, C3	47pF	CAPC2013X94N	2
C2	4.7nF	CAPC1608X90N	1
CNTC	10nF	CAPC1608X90N	1
CO0, CO1, CO2, CO3, CO4, CO5, CO6, CO7, CO8, CO9, CO10, CO11, CO12, CO13, CO14, CO15	not mounted	CAPC1005X55N-0	16
CVDD1, CVLED1, CVLED2, CVS1, CVS2	470nF	CAPC2013X140N	5
CVDD2	4.7uF	CAPC2013X135N	1
J0, J1, J2, J3, J4, J5, J6, J7, J8, J9, J10, J11, J12, J13, J14, J15, R3	0R	RESC1609X50N	17
JH, JL, JVS_VLED	Open	SOLDER_BRIDGE_0.7X1.299PAD	3
LOAD_LEFT, TLD7002-16ES_TOP	214013	CON-M-SMD-214013	2
TLD7002-16ES_BOTTOM	384804	CON-SMD-384804	1
TLD7002-16ES_LOAD	154764	CON-M-SMD-154764	1
Q1	BSS84PH6327XTSA2	SOT95P240X110-3N-1	1
R1, R2	59R	RESC1609X50N	2
R4, R6, R17	7.5k	RESC1609X50N	3
R5	4.7k	RESC1608X55N-1	1
RNTC	15k	RESC1608X95N	1
U1	TLD7002-16ES	SOP65P600X115-25N-V	1

4 Bill of material, layout and schematic

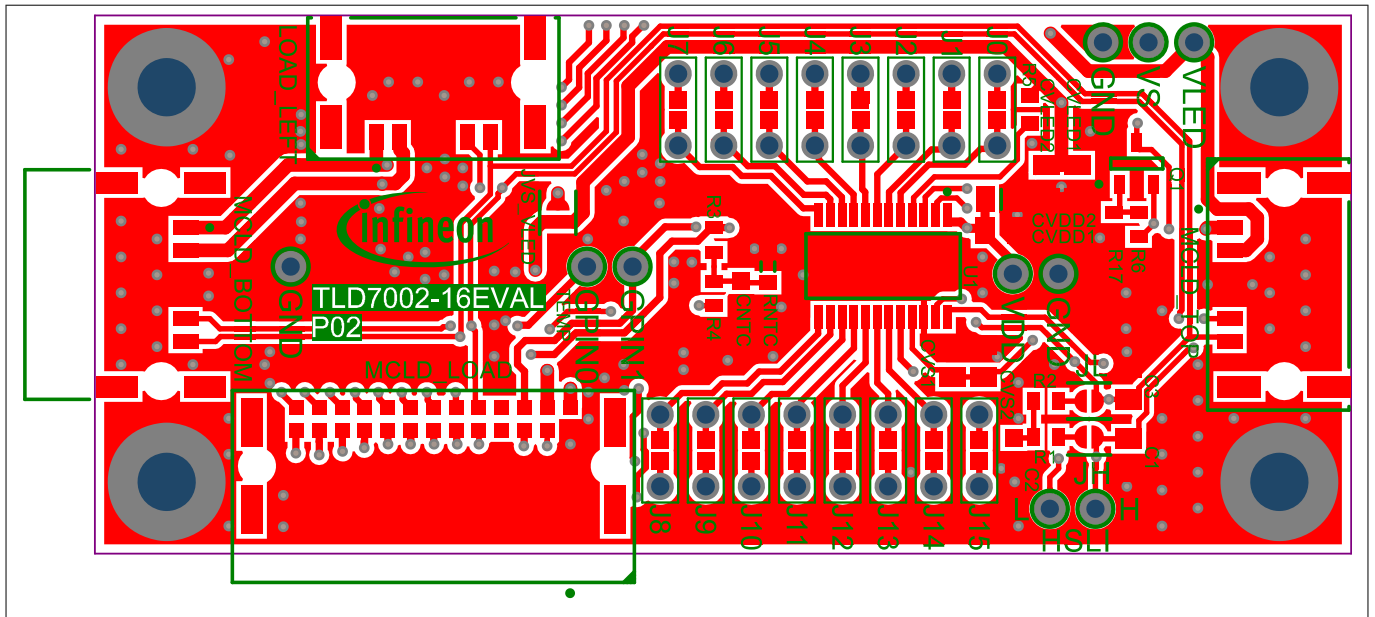


Figure 5 TLD7002-16EVAL layout top view

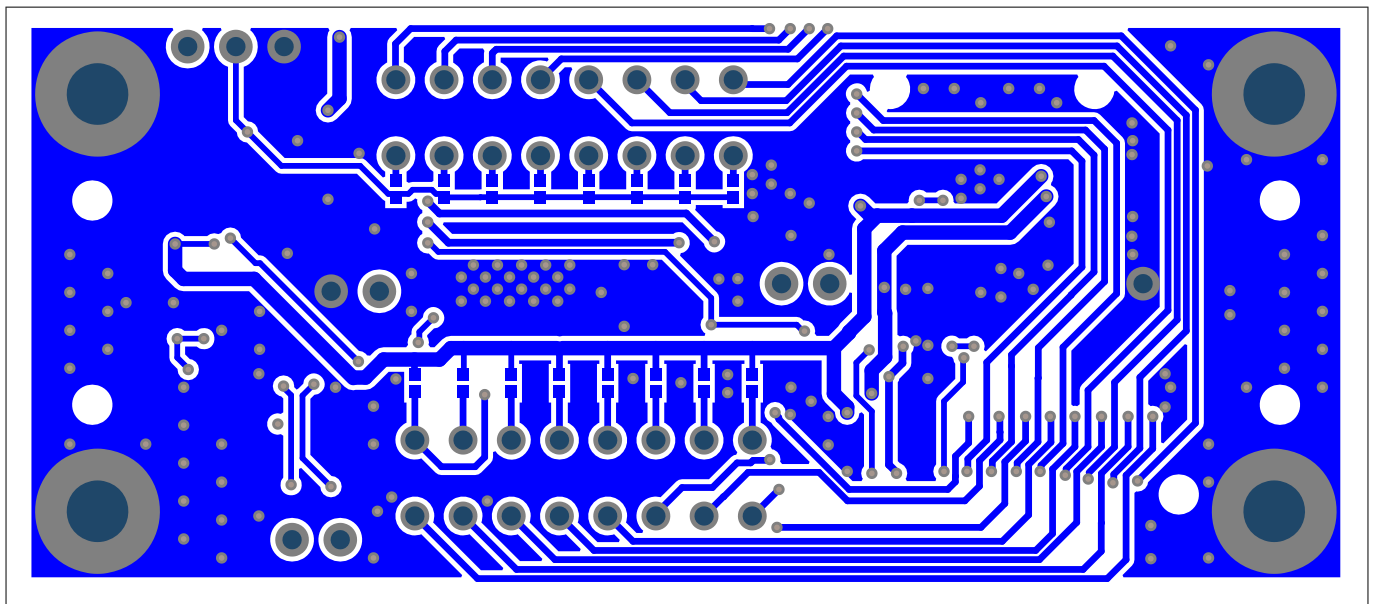


Figure 6 TLD7002-16EVAL layout bottom view

4 Bill of material, layout and schematic

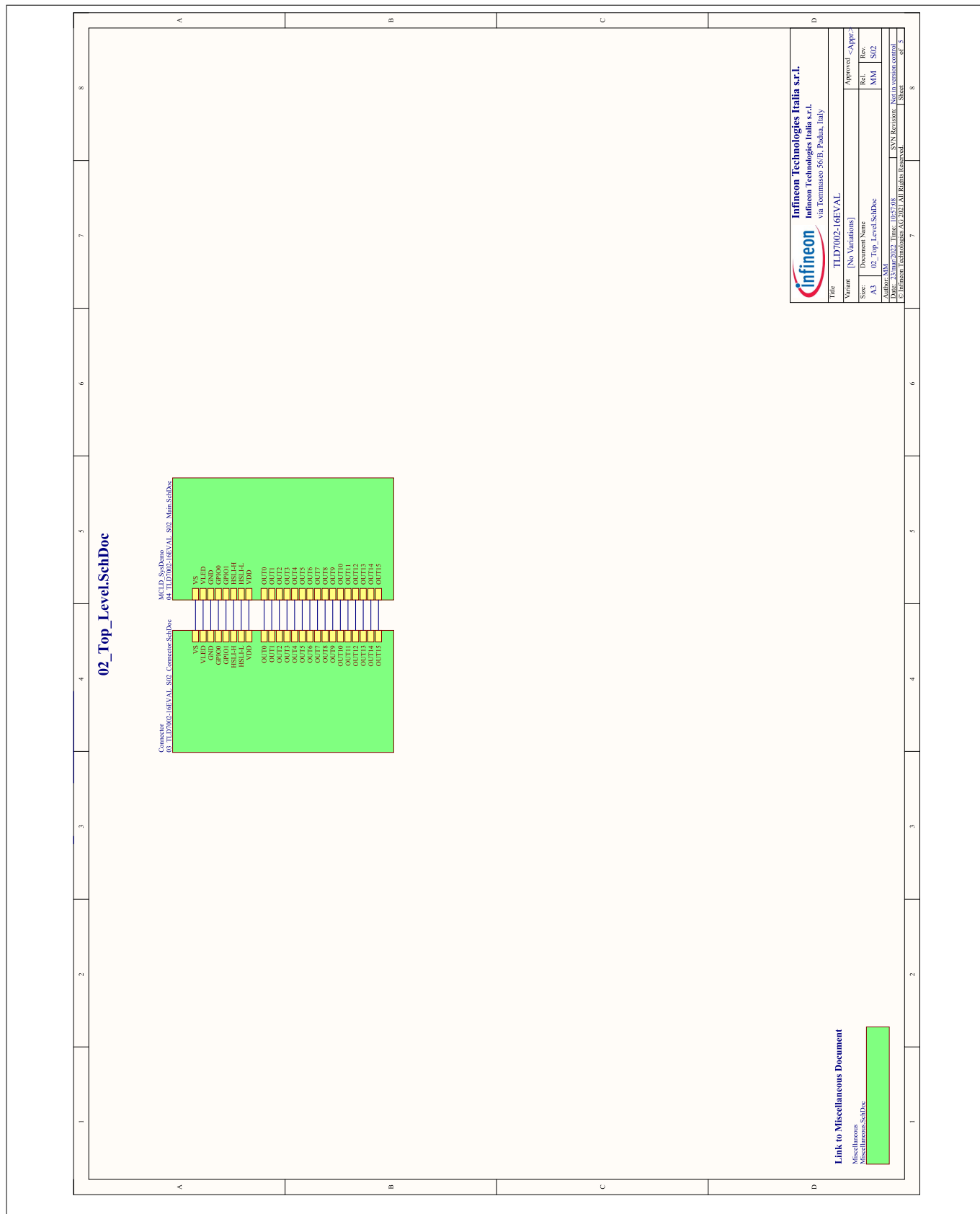


Figure 7 TLD7002-16EVAL top level schematic view

4 Bill of material, layout and schematic

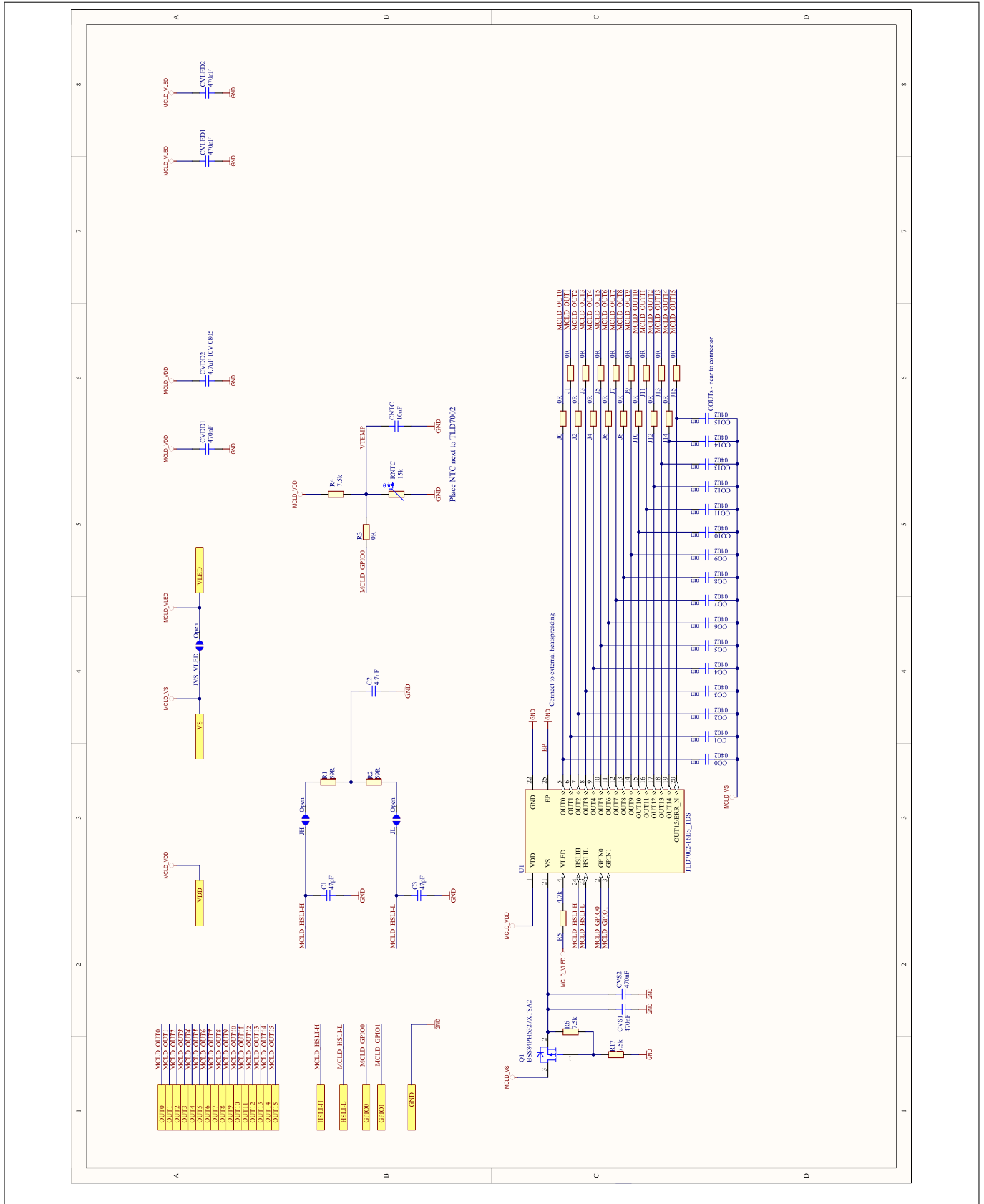


Figure 9 TLD7002-16EVAL schematic view

4 Bill of material, layout and schematic

4.2 TLD7002-16EVAL – TailLoadLight BOM, layout and schematic

Table 4 TLD7002-16EVAL - Tail Load Light BOM

Designator	Value	Footprint	Quantity
CLED_OUT0, CLED_OUT1, CLED_OUT2, CLED_OUT3, CLED_OUT4, CLED_OUT5, CLED_OUT6, CLED_OUT7, CLED_OUT8, CLED_OUT9, CLED_OUT10, CLED_OUT11, CLED_OUT12, CLED_OUT13, CLED_OUT14, CLED_OUT15, CNTC	10nF	CAPC1608X90N	17
CON_LEFT	154741	CON-F-SMD-154741	1
CON_RIGHT	384804	CON-SMD-384804	1
CVLED, CVS	470nF	CAPC2013X120N	2
OUT0_1, OUT0_2, OUT1_1, OUT1_2, OUT2_1, OUT2_2, OUT3_1, OUT3_2, OUT4_1, OUT4_2, OUT5_1, OUT5_2, OUT6_1, OUT6_2, OUT7_1, OUT7_2, OUT8_1, OUT8_2, OUT9_1, OUT9_2, OUT10_1, OUT10_2, OUT11_1, OUT11_2, OUT12_1, OUT12_2, OUT13_1, OUT13_2, OUT14_1, OUT14_2, OUT15_1, OUT15_2	Red	LED-SMD-Q65111A0536-V1	32
RNTC	7.5k	RESC1609X50N	1
RNTC_TAIL-LIGHT	15k	RESC1608X95N	1
RSER	0R	RESC1005X40N	1

4 Bill of material, layout and schematic

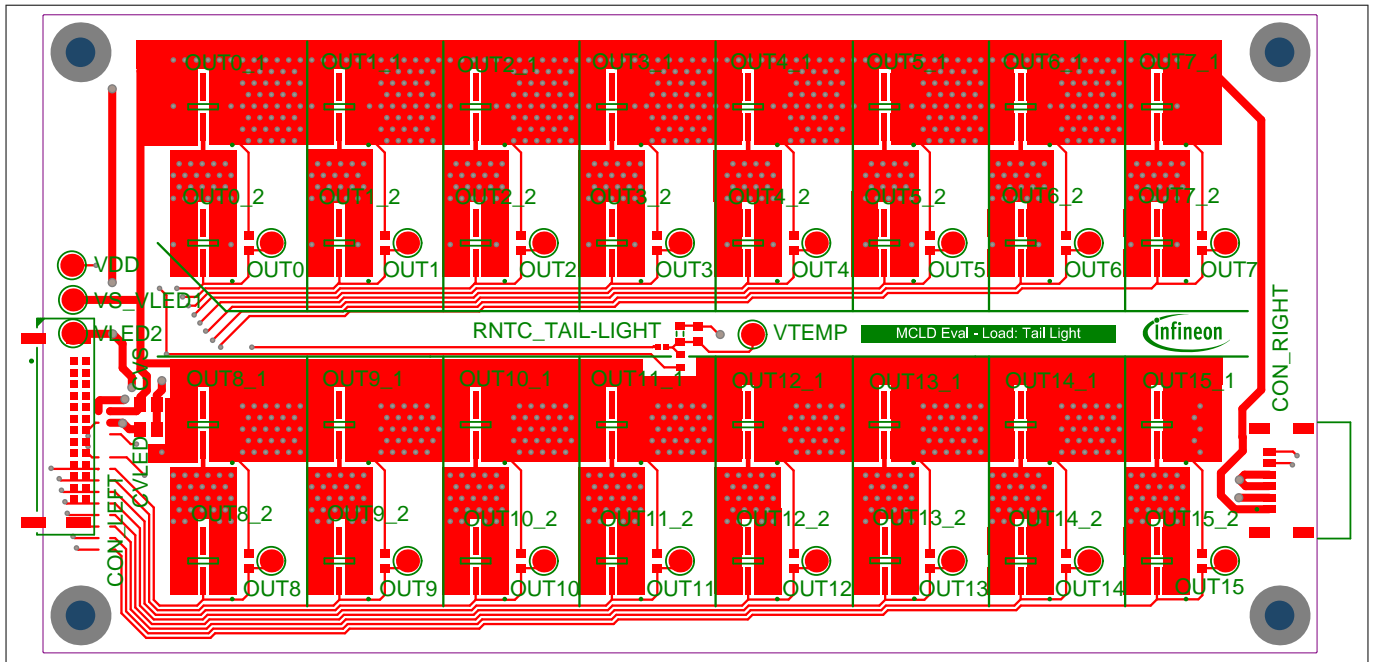


Figure 10 TLD7002-16EVAL Load Tail Light layout top view

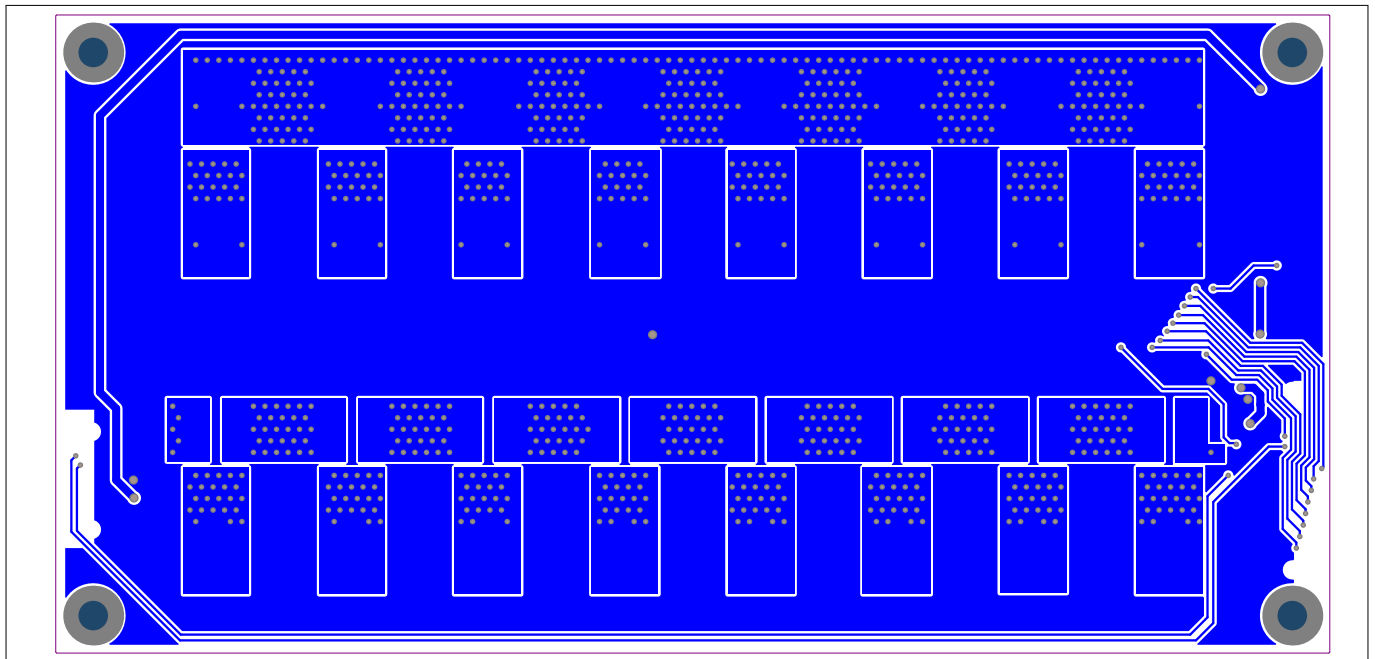


Figure 11 TLD7002-16EVAL Load Tail Light layout bottom view

4 Bill of material, layout and schematic

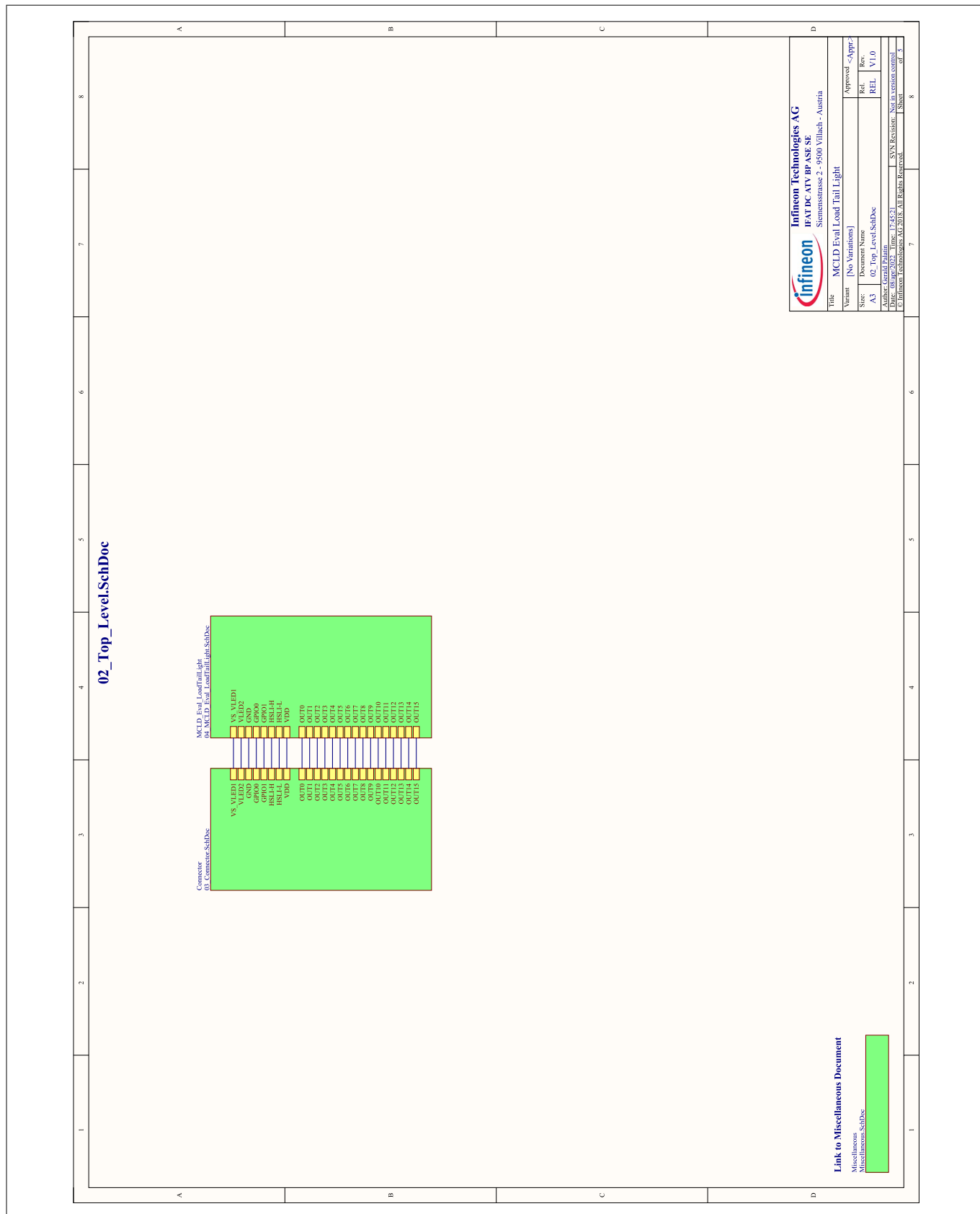


Figure 12 TLD7002-16EVAL Load Tail Light top level schematic view

4 Bill of material, layout and schematic

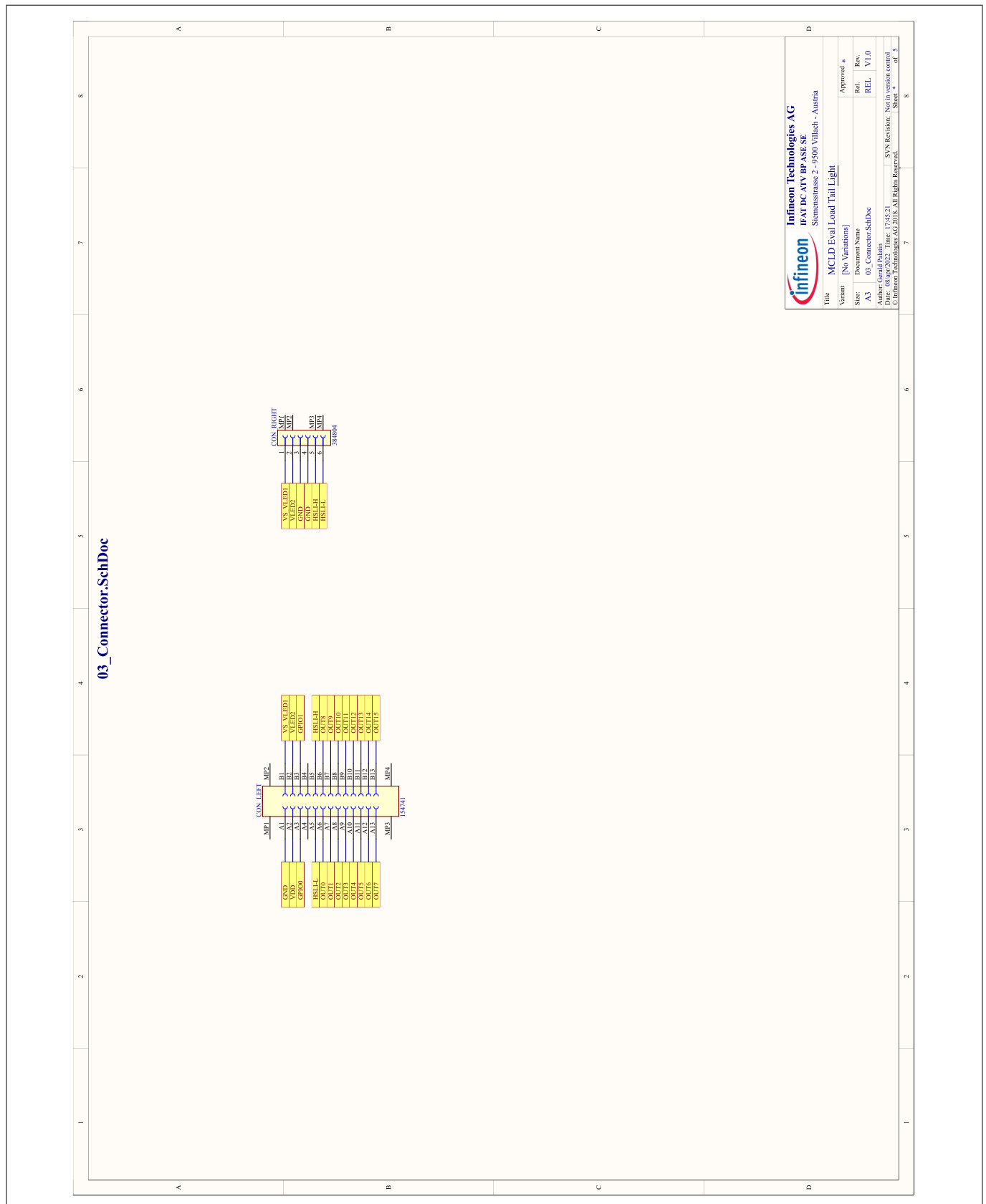


Figure 13 TLD7002-16EVAL Load Tail Light connector schematic view

4 Bill of material, layout and schematic

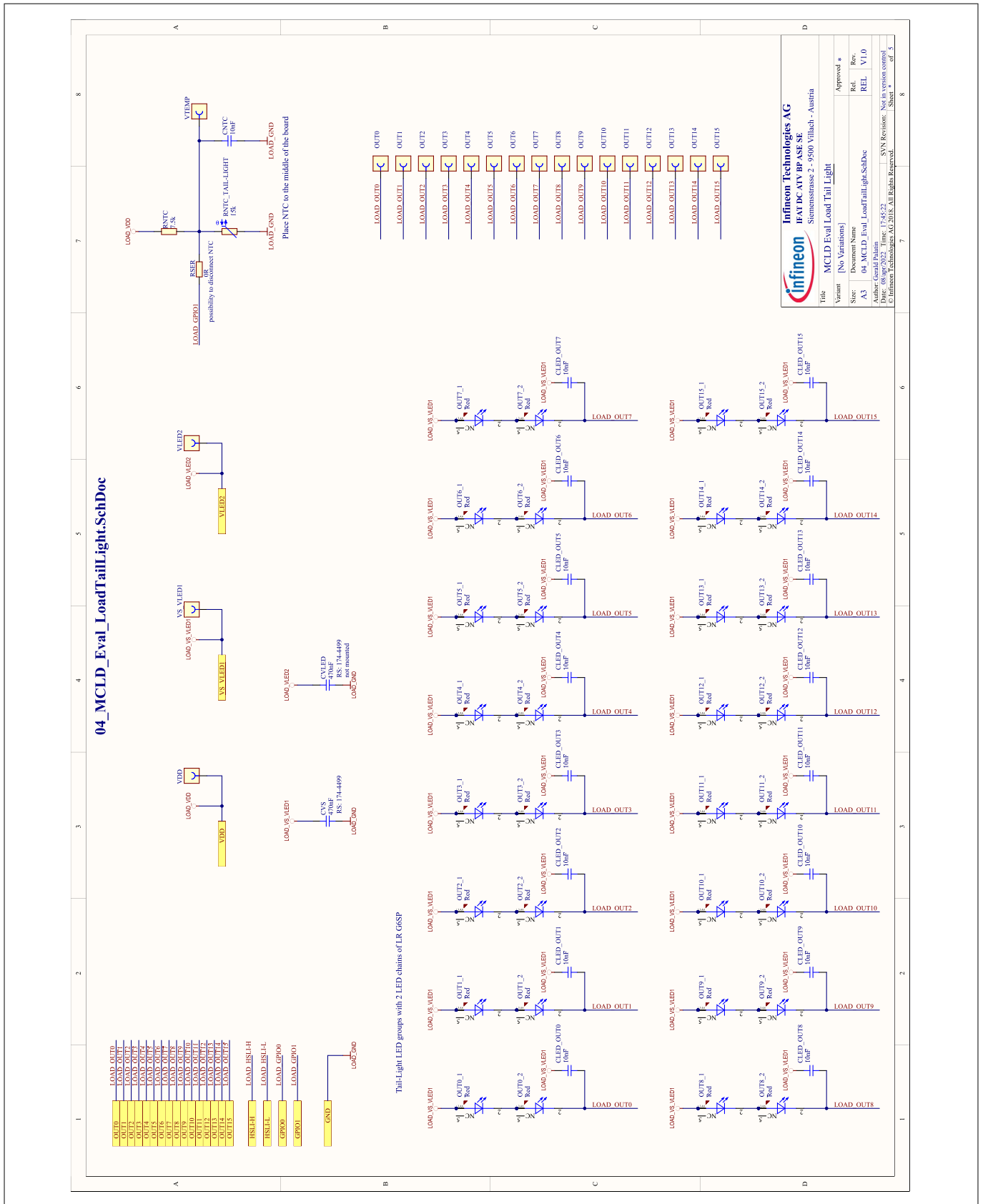


Figure 14 TLD7002-16EVAL Load Tail Light schematic view

Revision history

Revision history

Document version	Date of release	Description of changes
Rev.1.01	2022-09-22	<ul style="list-style-type: none">Updated Figure 1
Rev.1.00	2022-08-04	<ul style="list-style-type: none">Initial release

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