

TLD5541-2 B2G Demo

TLD5541-2QV

Description

Evaluation board for high power LED applications with the TLD5541-2QV product.

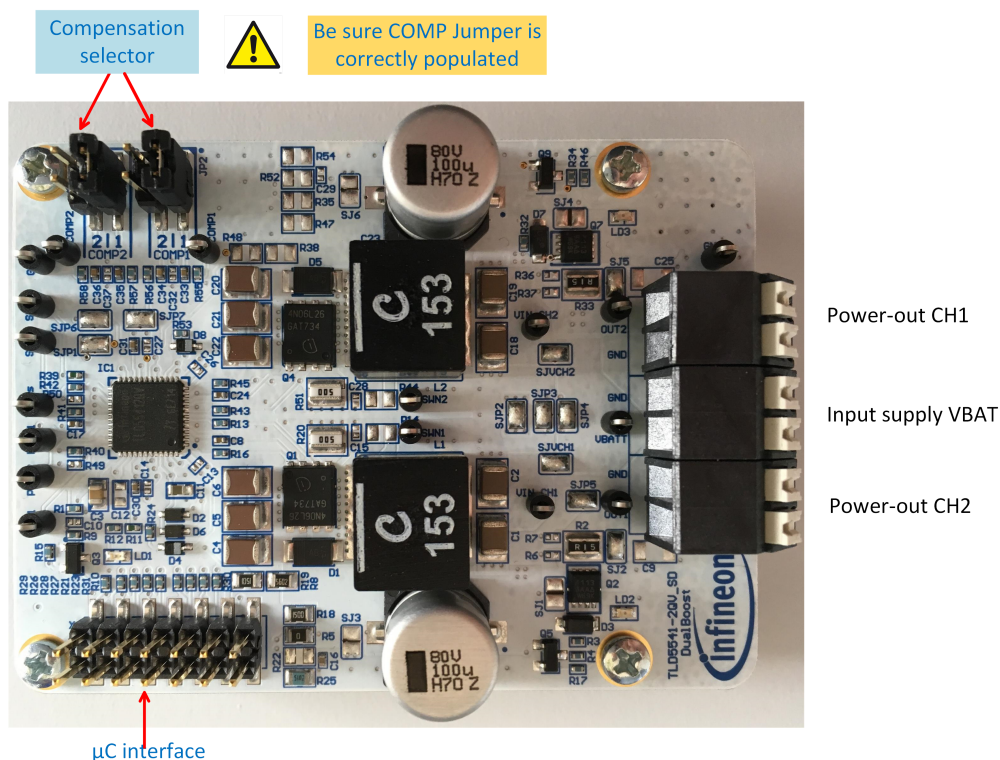
The TLD5541-2 B2G DEMO is optimized to drive high power LED applications.

The default configuration of the board is “Dual boost parallel voltage regulator” in multiphase topology that allows to provide up to 80 W to the load with an efficiency above 94%.

The board can be configured to different topologies like “Dual boost independent voltage regulators”, “Dual boost independent current regulators” and “Single boost independent voltage regulator plus single boost independent current regulator”.

The board contains a 2x7 pin header to connect the TLD55xx MICROKIT (SP001802790) board. This interface allows to control the TLD5541-2 B2G DEMO board through a LabVIEW GUI installed on the PC.

Board photo



Performance summary

Table 1 Performance summary

Parameter	Conditions	Value
Input supply voltage VBAT range	R1 = 39 kΩ, R9 = 20 kΩ	5.75 V to 40 V
Input supply voltage VINCH1/2 range	SJVCH1 closed, SJVCH2 closed, R1 = 39 kΩ, R9 = 20 kΩ	5.75 V to 40 V
Input supply voltage VINCH1/2 range	SJVCH1 open, SJVCH2 open	4.5 V to 55 V
Maximum output power per channel	$V_{in} = 12\text{ V}$	40 W
Maximum output power in multiphase	$V_{in} = 12\text{ V}$	80 W

Performance summary

Table 1 Performance summary (continued)

Parameter	Conditions	Value
Maximum output current per channel in current regulator mode	Set by R2 = R33 = 150 mΩ SJ2 open, SJ5 open	1 A
Switching frequency	Set by R42 = 39 kΩ	287 kHz
Efficiency (multiphase)	$V_{in} = 12\text{ V}$, $V_{out} = 14\text{ V to } 47\text{ V}$, $I_{out} = 0.5\text{ A to } 1.7\text{ A}$	> 94%
Output voltage	Set by R5 = 0 Ω, R18 = 150 Ω, R25 = 51 kΩ, ADIM = 100%	51 V
Overvoltage protection threshold	Set by R8 = 56 kΩ, R19 = 1.5 kΩ	56 V
S2G protection threshold	Set by R8 = 56 kΩ, R19 = 1.5 kΩ, MFSSETUP_CH1,2.LEDCHAIN_CH1,2 = 2	3.5 V
Peak switch current limit	Set by R20 = R51 = 5 mΩ	10 A

Quick start procedure

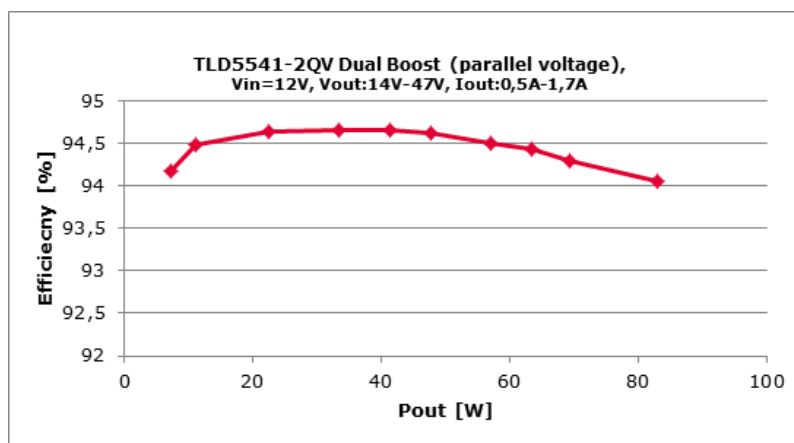
1 Quick start procedure

The default configuration of the board is “Dual boost parallel voltage regulator” in multiphase topology that allows to provide up to 80 W to the load with an efficiency above 94%.

The input voltage range is from 5.75 V to 40 V, the default regulated output voltage is set to 51 V.

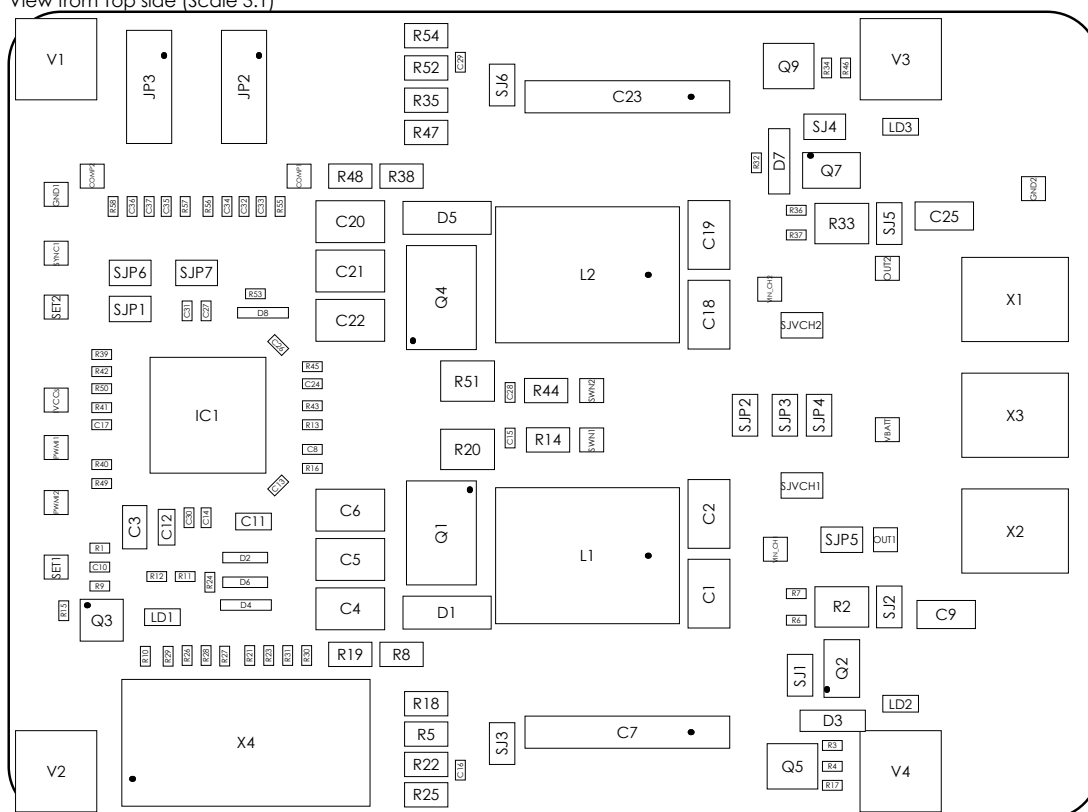
The Overvoltage and Short to GND protections thresholds are set to 56 V and 3.5 V respectively.

All the power inputs (VBAT, VINCH1, VINCH2) are connected together by SJVCH1 and SJVCH2 and they are accessible to the VBAT connector.



The board can be configured to different topologies like, “Dual boost independent voltage regulators”, “Dual boost independent current regulators” and “Single boost independent voltage regulator plus Single boost independent current regulator”.

View from Top side (Scale 3:1)

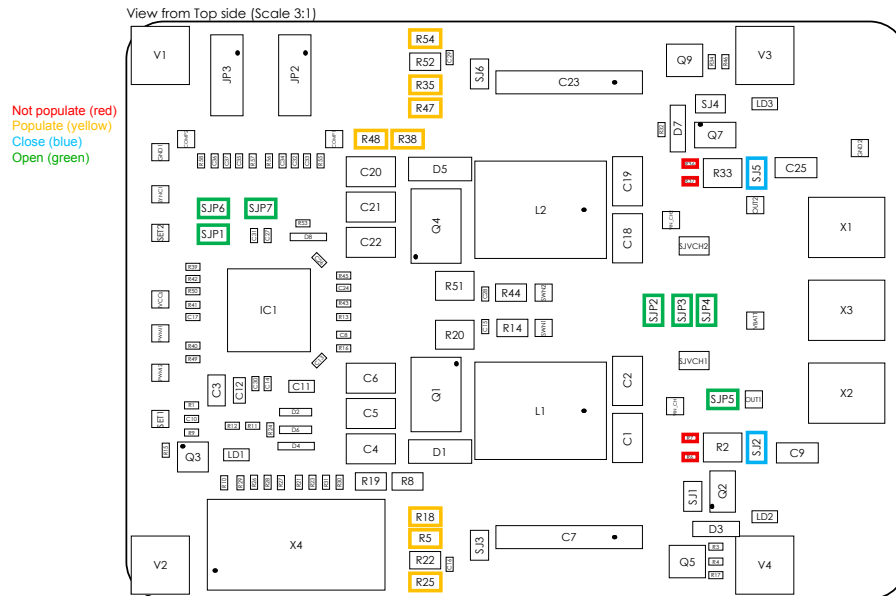


Dual boost independent voltage regulator

2 Dual boost independent voltage regulator

The dual boost independent voltage regulator has the following jumpers configuration:

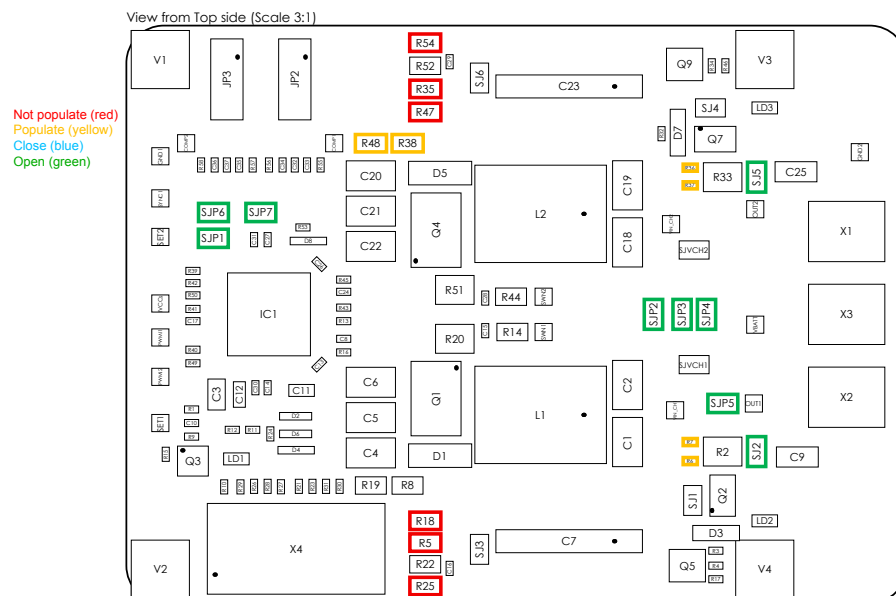
- Not-populate: R6-R7-R36-R37
- Populate: R5-R18-R25-R35-R47-R54-R38-R48
- Optional: closed SJ3-SJ6 (increase C_{out}), close SJ1-SJ4 (remove S2G PMOS protection)
- Open: SJP1-SJP2-SJP3-SJP4-SJP5-SJP6-SJP7



3 Dual boost independent current regulators

The dual boost independent current regulators has the following jumpers configuration:

- Not-populate: R5-R18-R25-R35-R47-R54
- Populate: R6-R7-R36-R37-R38-R48
- Optional: close SJ1-SJ4 (remove S2G pmos protection)
- Open: SJP1-SJP2-SJP3-SJP4-SJP5-SJP6-SJP7

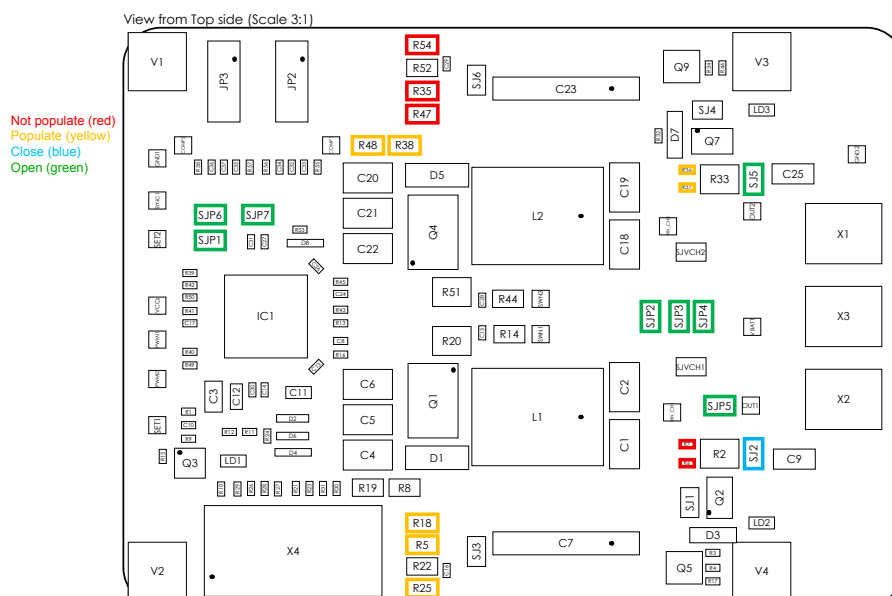


Single boost independent I/V regulators

4 Single boost independent I/V regulators

The single boost independent voltage regulator plus single boost independent current regulator has the following jumpers configuration:

- Not-populate: R6-R7-R35-R47-R54
- Populate: R5-R18-R25-R36-R37-R38-R48
- Optional: closed SJ3 (increase C_{out}), close SJ1-SJ4 (remove S2G PMOS protection)
- Open: SJP1-SJP2-SJP3-SJP4-SJP5-SJP6-SJP7



LabVIEW GUI

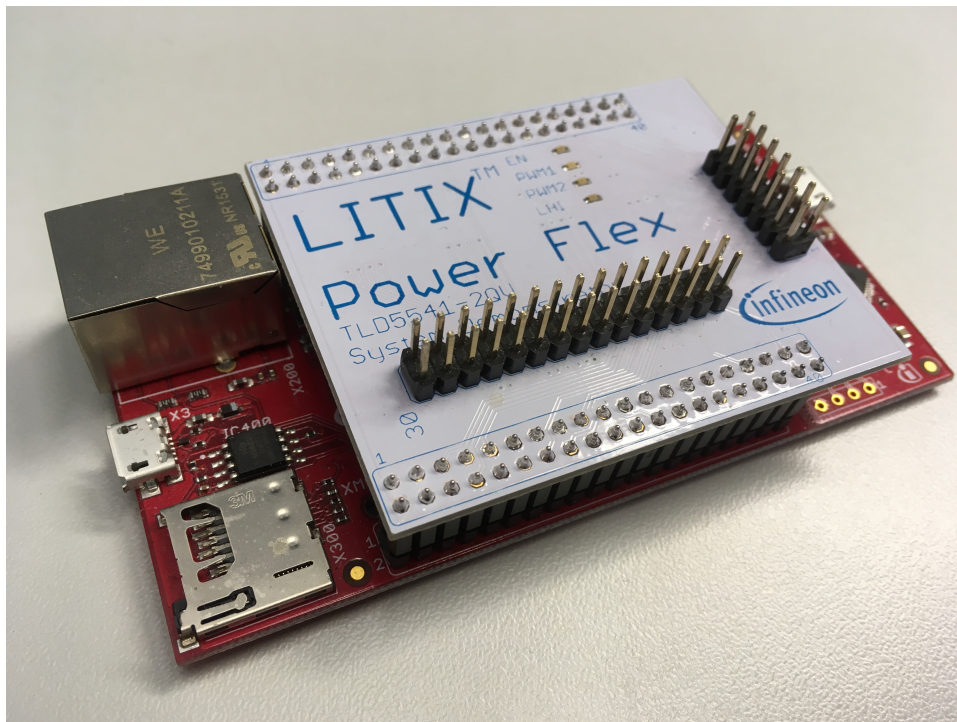
5 LabVIEW GUI

A LabVIEW GUI is available to control and retrieve the status of the two channels:

The screenshot shows the LITIX™ Power Flex Dual Channel GUI. Red arrows point from text boxes to specific features in the interface:

- COM configuration:** Points to the VISA resource name field set to %COM5.
- AUTO spread spectrum control:** Points to the AUTO SPREAD Spectrum control, which is currently OFF.
- Channel 1 control:** Points to the Channel 1 control panel, which includes:
 - PWM control (OFF)
 - Digital dimming (PWM1 200 [Hz], DCpwm1 0 %)
 - Analog dimming (LED Current % 0 to 100)
 - LED current monitor (START, Routine Completed, LED Current, LED current between Target)
 - Current Calibration Routine (START, Calibration Completed)
- Channel 2 control:** Points to the Channel 2 control panel, which includes:
 - PWM control (OFF)
 - Digital dimming (PWM2 200 [Hz], DCpwm2 0 %)
 - Analog dimming (LED Current % 0 to 100)
 - LED current monitor (START, Routine Completed, LED Current, LED current between Target)
 - Current Calibration Routine (START, Calibration Completed)
- Power state control and feedback:** Points to the Power States Control (ENAB, LHI, PARALLEL) and Power States Feedback (Active, Idle, Limp Home, Sleep) sections.
- Diagnosis status:** Points to the Diagnosis / Monitoring section, which includes a row of status LEDs and a Fault Diagnosis section for CH1 and CH2.

To connect the TLD5541-2QV DEMO V1 demo to host control (PC), in order to run the LabView GUI, the following demo kit is needed (TLD55xx MICRO KIT):



Bill of material

6 Bill of material

Table 2 Bill of material

Designator	Value	Manufacturer	Part number	Type
C1, C2, C18, C19	10 μ F	TDK EPCOS	X7R	Capacitor
C3, C8, C17, C24	100 nF	TDK EPCOS	X7R	Capacitor
C4, C5, C6, C20, C21, C22	3.3 μ F	TDK EPCOS	X7R	Capacitor
C7, C23	100 μ F	TDK EPCOS	Aluminum electrolytic capacitor	Capacitor
C11	10 μ F/6.3 V	TDK EPCOS	X7R	Capacitor
C16	22 nF/100 V	TDK EPCOS	X7R	Capacitor
C30, C31, C33, C35	22 nF	TDK EPCOS	X7R	Capacitor
C34, C36	10 nF	TDK EPCOS	X7R	Capacitor
D2, D6, D4, D8		NXP	BAT46WJ	Diode
D3, D7		ON Semiconductor	MMSZ5229B	Diode
IC1		Infineon	TLD5541-2QV	IC
L1, L2	15 μ H	Coilcraft or TDK	XAL1010-153ME or SPM10065VT-150M-D	Inductor
Q1, Q4	Dual MOSFET: 60 V / 26 m Ω N-ch	Infineon	IPG20N06S4L-26	Transistor
Q2, Q7	P-Channel 100-V (D-S) MOSFET	Vishay	Si7113DN	Transistor
Q3	30 V / 57 m Ω N-ch	Infineon	BSS306N	Transistor
Q5, Q9	OptiMOS Small-Signal-Transistor, VDS 30V	Infineon	BSS123N	Transistor
R1, R42	39 k Ω	Panasonic		Resistor
R2, R33	150 m Ω	Panasonic		Resistor
R3, R32	15 k Ω	Panasonic		Resistor
R4, R34	10 k Ω	Panasonic		Resistor
R5, R11, R39	0 Ω	Panasonic		Resistor
R8	56 k Ω	Panasonic		Resistor
R9	20 k Ω	Panasonic		Resistor
R10	50 Ω	Panasonic		Resistor
R12, R17, R46	3.3 k Ω	Panasonic		Resistor
R13, R16, R43, R45	10 Ω	Panasonic		Resistor
R15, R55, R56, R57, R58	2 k Ω	Panasonic		Resistor

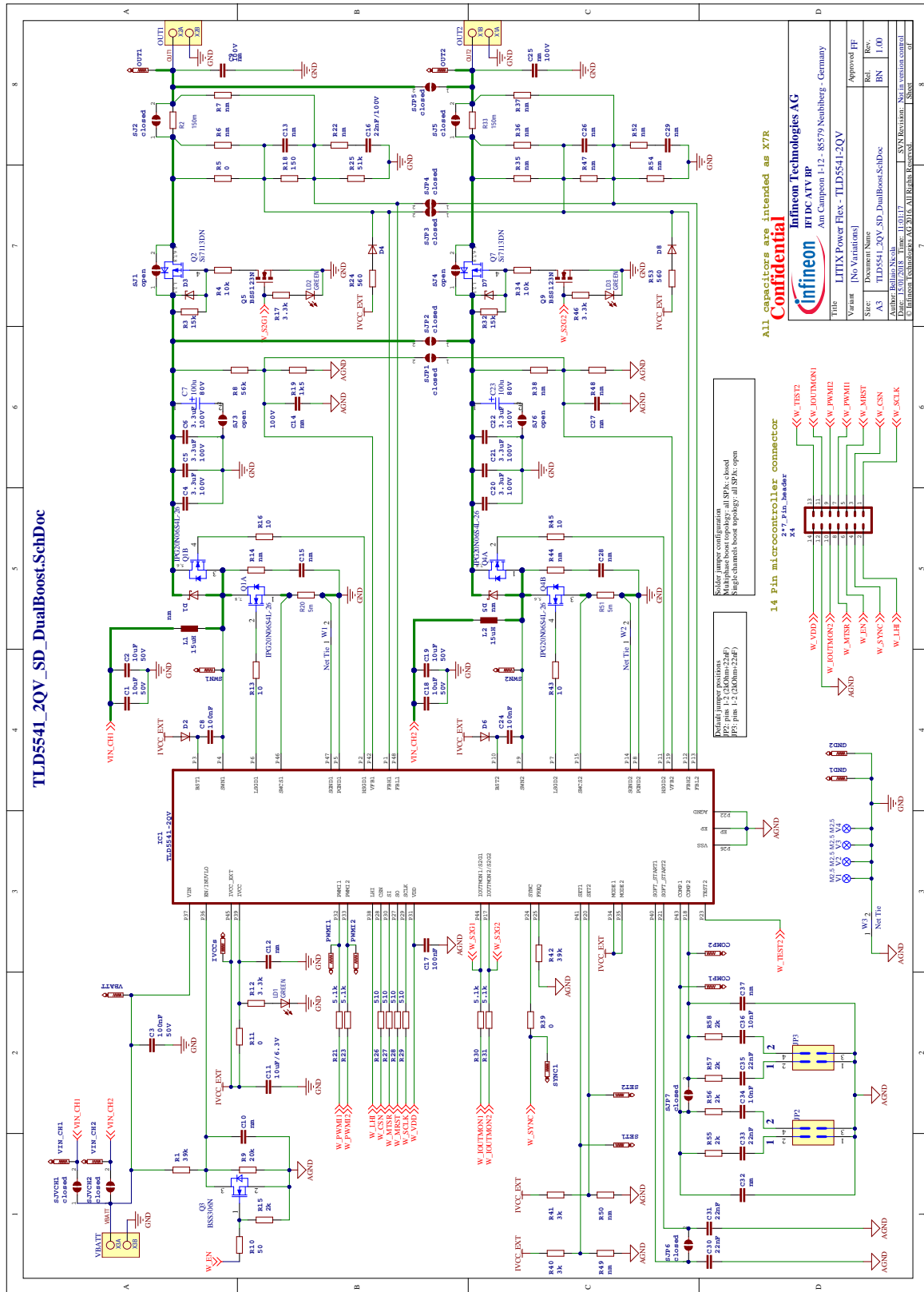
Bill of material

Table 2 Bill of material (continued)

Designator	Value	Manufacturer	Part number	Type
R18	150 Ω	Panasonic		Resistor
R19	1.5 k Ω	Panasonic		Resistor
R20, R51	5 m Ω	Panasonic		Resistor
R21, R23, R30, R31	5.1 k Ω	Panasonic		Resistor
R24, R53	560 Ω	Panasonic		Resistor
R25	51 k Ω	Panasonic		Resistor
R26, R27, R28, R29	510 Ω	Panasonic		Resistor
R40, R41	3 k Ω	Panasonic		Resistor

Schematic diagram

7 Schematic diagram



Revision history

Revision history

Document version	Date of release	Description of changes
Rev. 1.0	2018-03-23	<ul style="list-style-type: none">• User Manual is available

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