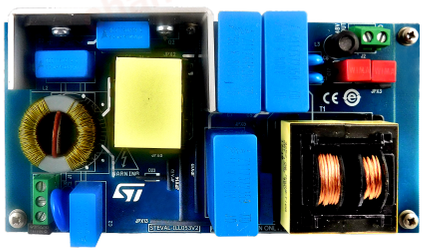
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STEVAL-ILL053V2

Data brief

48 V - 130 W high efficiency converter with PFC for LED street lighting applications based on L6562 and L6599





Features

- Extended input mains range: 85 to 305 V_{AC} - frequency 45 to 55 Hz
- Output voltage: 48 V at 2.7 A
- Long-life: electrolytic capacitors not used
- Mains harmonics in accordance with EN61000-3-2 Class C
- Efficiency at full load greater than 91% at 115 V_{AC}
- EMI in accordance with EN55022 Class B; EN55015
- Safety: double insulation, in accordance with EN60950, SELV
- Dimensions: 75 x 135 mm, 30 mm maximum component height
- PCB: single side, 35 µm, FR-4, mixed PTH/SMT
- RoHS compliant
- WEEE compliant

Description

The STEVAL-ILL053V2 evaluation board implements a 130 W LED power supply for street lighting.

The circuit is composed of two stages: a front-end PFC using the L6562AT, and an LLC resonant converter based on the L6599AT.

The strengths of this design are its very high efficiency; wide input mains range (85-305 V_{AC}) operation and long-term reliability.

Because mean time between failures (MTBF) in power supplies is typically affected by the high failure rate of common electrolytic capacitors, the STEVAL-ILL053V2 evaluation board offers an innovative design approach using film capacitors from EPCOS in place of electrolytic capacitors.

Thanks to the high efficiency achieved, only a small heatsink for the PFC stage is needed, while the other power components implement surface mount technology (SMT), which significantly lowers costs.

The STEVAL-ILL053V2 evaluation board also provides protection against overload, short-circuit and open-loop in each stage, and overvoltage protection on the input, with auto-restart.

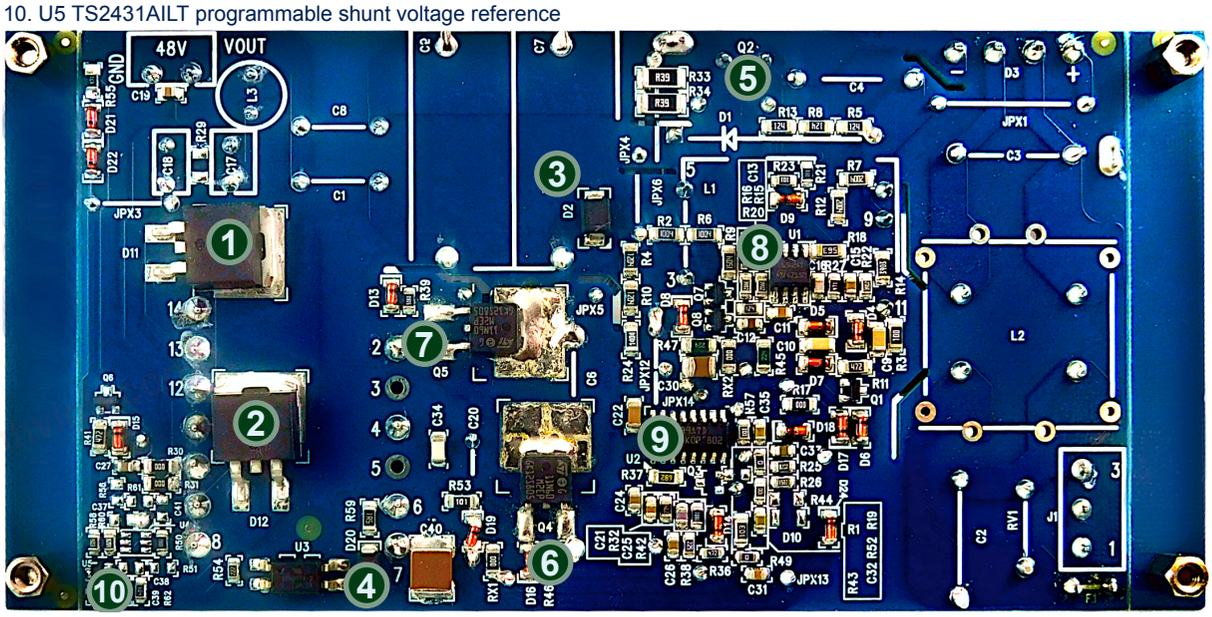
Summary table	
48 V - 130 W high efficiency converter with PFC for LED street lighting applications based on L6562 and L6599	STEVAL-ILL053V2
N-channel 600 V, 0.550 Ω typ., 7.5 A MDmesh M2 EP Power MOSFET in a DPAK package	STD11N60M2-EP
N-channel 600 V, 0.175 Ω typ., 18 A MDmesh M2 EP Power MOSFET in a TO-220FP package	STF25N60M2-EP
Transition-mode PFC controller	L6562AT
Improved high-voltage resonant controller	L6599AT

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1 STEVAL-ILL053V2 featured components

Figure 1. ST components on STEVAL-ILL053V2 board

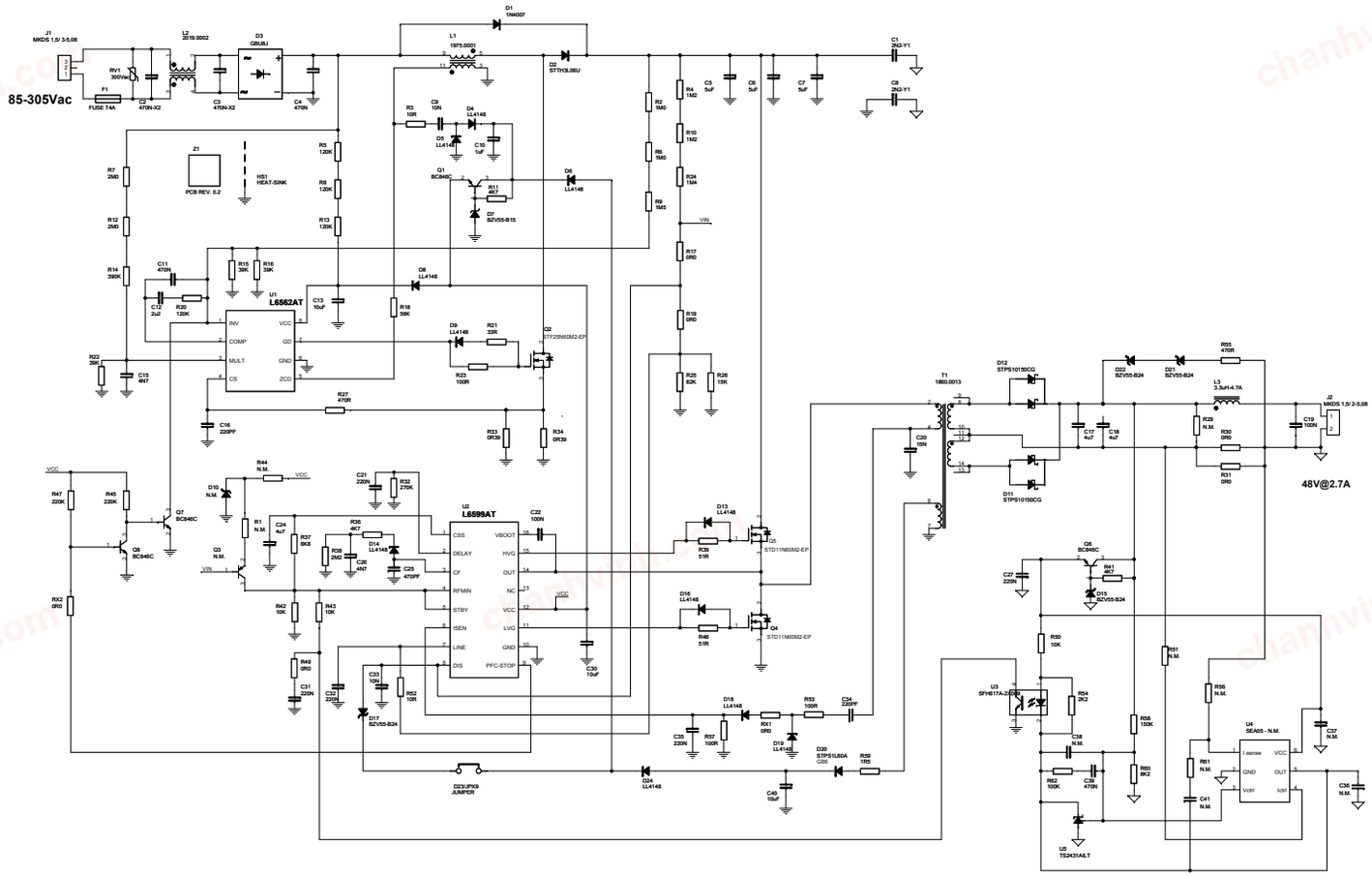
1. D11 STPS10150CG power schottky rectifier
2. D12 STPS10150CG power schottky rectifier
3. D2 STTH3L06U ultrafast high voltage rectifier
4. D20 STPS1L60A fast switching diode
5. Q2 STF25N60M2-EP N-channel power MOSFET
6. Q4 STD11N60M2-EP N-channel power MOSFET
7. Q5 STD11N60M2-EP N-channel power MOSFET
8. U1 L6562AT tm pfc controller
9. U2 L6599AT improved hv resonant controller
10. U5 TS2431AILT programmable shunt voltage reference



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2 Schematic diagram

Figure 2. **STEVAL-ILL053V2 board schematic**



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Revision history

Table 1. **Document revision history**

Date	Version	Changes
07-Dec-2018	1	Initial release.

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