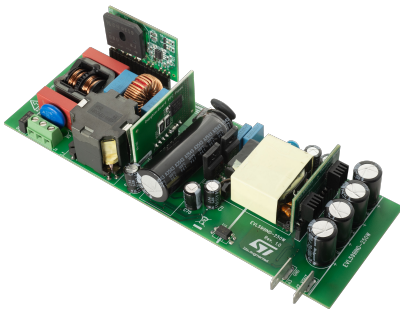


250W-24V AC-DC converter using L6462A, STNRG599A, and SRK2001A



Features

- High-efficiency solution for AC-DC conversion using L6462A, STNRG599A, and SRK2001A controllers ICs
- Input voltage: 90 ÷ 265 Vac / 45 ÷ 65 Hz
- Output voltage: 24 V
- Maximum output power: 250 W
- Max. peak output power: 300 W
- Efficiency (at 25, 50, 75, 100% of full load): > 90% at 115/230 Vac
- Open load input power: < 140 mW at 115/230 Vac
- Mains harmonics: meets EN-61000-3-2 Class-D and JEITA-MITI Class-D
- EMI: according to EN55022 Class-B
- Board size: 165 mm x 65 mm (W x L). Max. height: 30 mm.

Application

- Industrial AC-DC applications
- Adapters
- Consumer SMPS

Description

The **EVL599IND-250W** demonstration board is a 250 W-24 V AC-DC converter dedicated to any kind of industrial application where minimum size and high efficiency are required. The architecture is based on a two-stage approach: a front end transition mode PFC preregulator and a downstream LLC resonant half bridge converter. At secondary, the synchronous rectification allows an overall efficiency improvement with a very low external component count. The converter consists of a motherboard with a power factor correction stage and an LLC resonant tank stage, and three daughterboards. Two daughterboards are at the primary side: one with the active bridge and one with the PFC power MOSFET. The third daughterboard, on the secondary side, is for the SRK2001A and its synchronous rectification MOSFETs.

The power factor correction stage is based on the L6462A, a new transition mode power factor controller, without input voltage sensing. The LLC resonant tank stage is based on STNRG599A, a novel resonant controller based on a proprietary phase shift methodology. The board has no heat sink on the primary side and has a very reduced dimension. The high efficiency and small size make the board very suitable when available space is limited.

The main features of L6462A are a minimal component count, a simple design, high efficiency, and very low input current distortion (THD) under all operating conditions. It includes a set of protections to ensure a high level of reliability: output overvoltage, overcurrent, inductor saturation detection, and feedback failure detection.

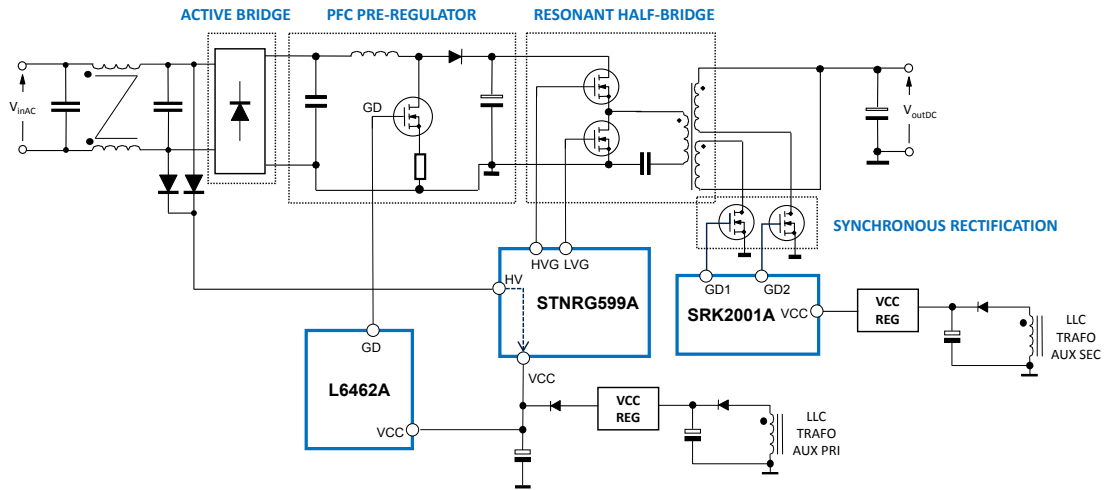
The STNRG599A integrated HV startup allows powering both ICs from AC mains for proper power-up, without the need of auxiliary standby supplies. It includes a set of protections and functions: overcurrent and short-circuit, an input voltage monitor that allows LLC converter startup with correct sequencing (DC brown-in), prevention of operation with too low input voltage (DC brown-out), hard switching prevention and anti-capacitive protection, safe start procedure, and adaptive dead time.

Product status link

[EVL599IND-250W](#)
[STNRG599A](#)
[L6462A](#)
[SRK2001A](#)

1 Architecture of the board

Figure 1. EVL599IND-250W: architecture of the board



2 Main performances of converter

2.1 Total harmonic distortion and power factor

Table 1. Total harmonic distortion and power factor

Output load [%] (100% = 10.4 A)	230 Vac / 50 Hz		115 Vac / 60 Hz	
	THD [%]	PF [.]	THD [%]	PF [.]
20	11.7	0.84	6.0	0.98
25	8.9	0.88	5.3	0.99
50	6.4	0.96	5.0	0.99
100	4.7	0.99	3.7	0.99

2.2 Open load input power

Table 2. EVL599IND-250W: Open load input power

Vac [V]	Pin [mW]
90	105
115	110
230	125
265	130

2.3 Efficiency

Figure 2. EVL599IND-250W efficiency at medium/heavy loads

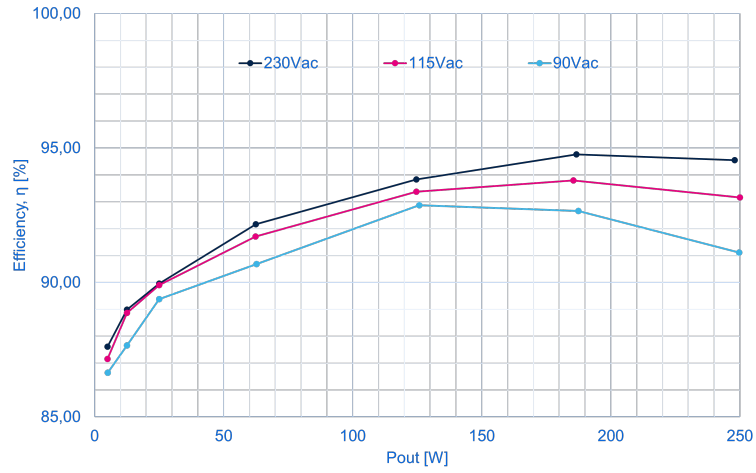
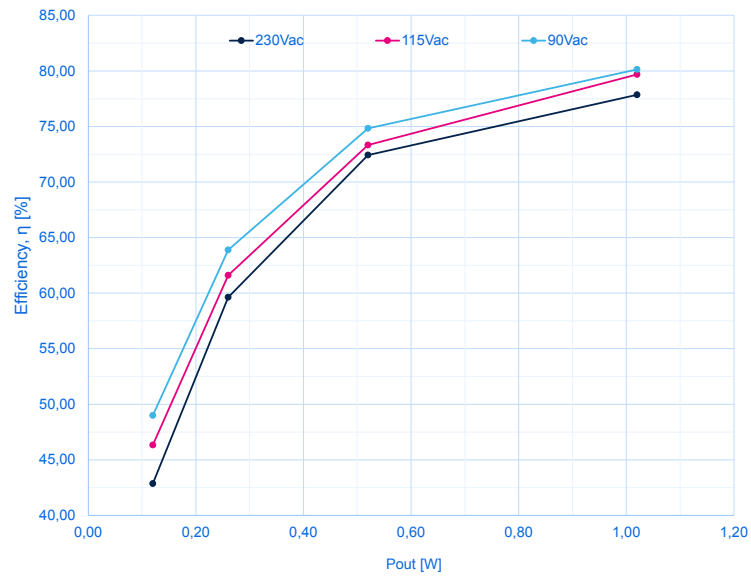


Figure 3. EVL599IND-250W efficiency at light loads



3 Evaluation board schematics

Figure 4. EVL599IND-250W motherboard schematic

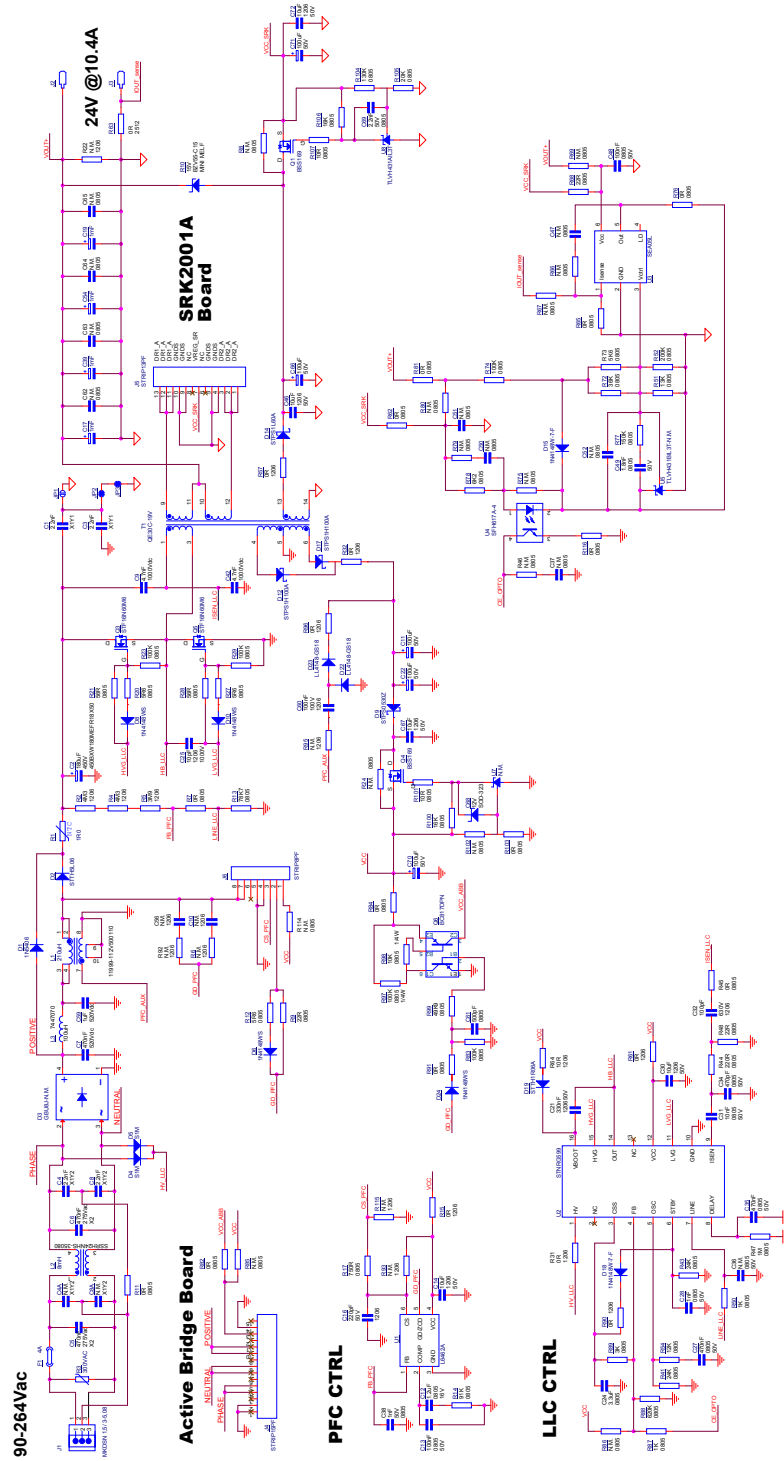


Table 3. EVL599IND-250W connectors

Reference	Type	Description
J1	Screw connector terminal	AC input voltage (90-264 Vac)
J2	Male "faston" connector	Output voltage: positive terminal
J3	Male "faston" connector	Output voltage: negative terminal

Figure 5. Active bridge daughterboard schematic

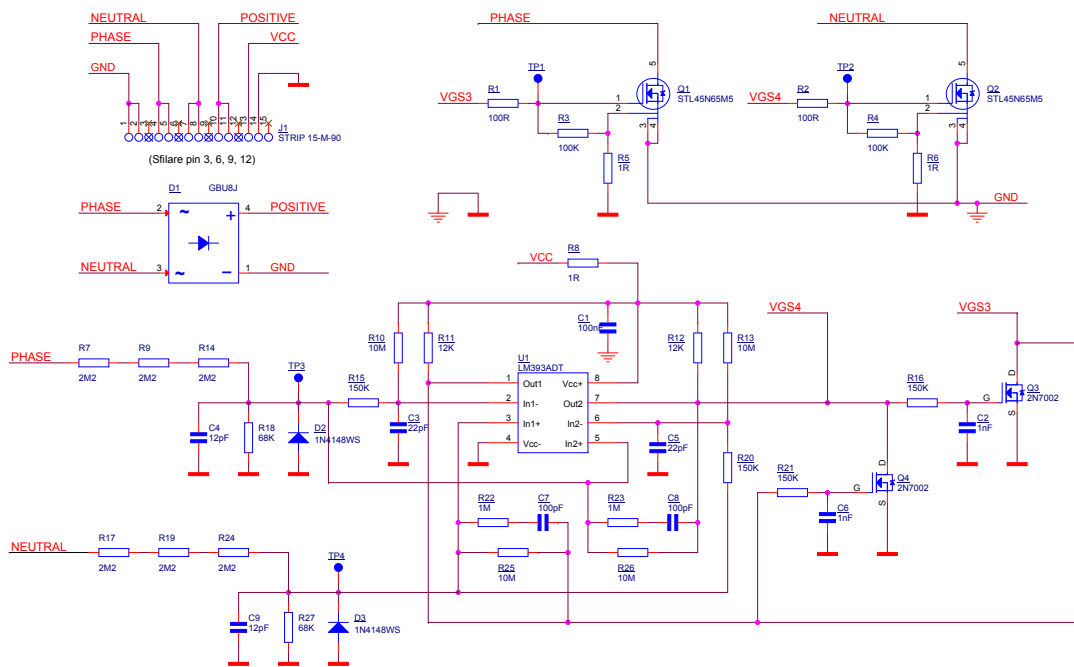


Figure 6. PFC power MOSFET daughterboard schematic

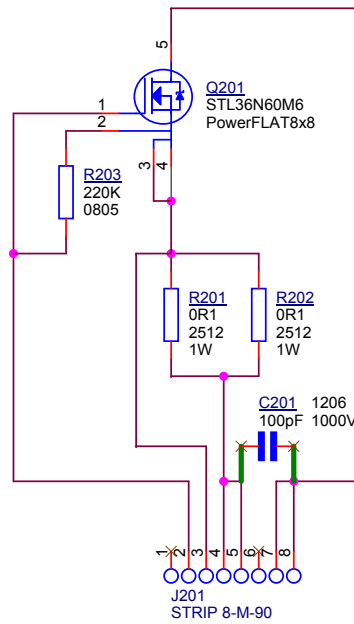
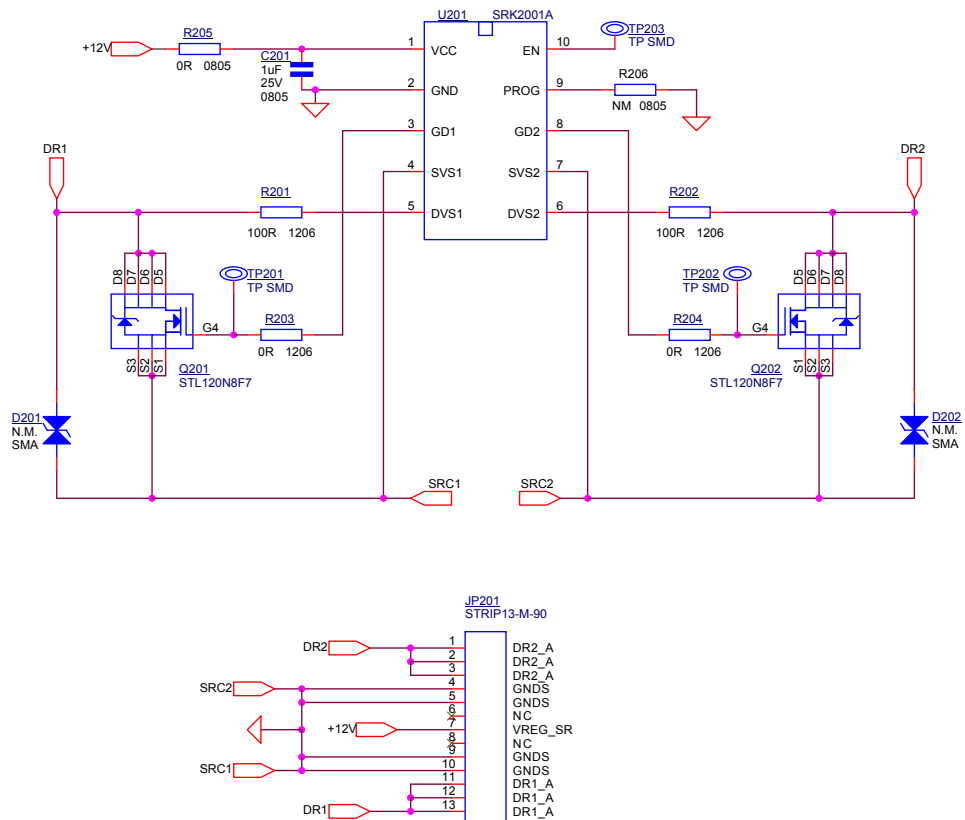


Figure 7. SRK2001A daughterboard schematic



4 Bill of materials

Table 4. EVL599IND-250W motherboard

Ref.	Value	Package	Description	Manufacturer
C1	2.2nF	Pitch 10.0 mm	Radial X1, Y1 safety ceramic capacitor - 250 V - DE1E3RA222MN4AN01F	Murata
C2	180µF	D18 - P7.5 - H50mm	Radial electrolytic capacitor - 450 V - 450BXW180MEFR18X50 Radial electrolytic capacitor - 450 V - S8602414810301	Rubycon Würth Elektronik
C3	2.2nF	Pitch 10.0 mm	Radial X1, Y1 safety ceramic capacitor - 250 V - DE1E3RA222MN4AN01F	Murata
C4	2.2nF	2211	SMD X1Y2 safety ceramic capacitor - 250 V - 8853522130151	Würth Elektronik
C4A	N.M.	2211		
C5	470nF	7.0×26.0x14.5mm p.22.5mm	Radial polypropylene metallized capacitor - 275 Vac - 890324026014	Würth Elektronik
C6	470nF	7.0×26.0x14.5mm p.22.5mm	Radial polypropylene metallized capacitor - 275 Vac - 890324026014	Würth Elektronik
C7	470nF	9.0 × 18.0 p.15mm	Radial polypropylene metallized capacitor - 520 Vdc - B32672Z5474K000	EPCOS
C8	2.2nF	2211	SMD X1Y2 safety ceramic capacitor - 250 V - 8853522130151	Würth Elektronik
C8A	N.M.	2211		
C9	4.7nF	4.0 x 13.0 p10mm	Radial polypropylene metallized capacitor - 1000 Vdc - B32641B0472K	EPCOS
C10	N.M.	1206	Ceramic capacitor 1 kV, general purpose	
C11	100µF	D8.0 - H11.5 - P3.5 mm	Radial electrolytic capacitor Low ESR - 50 V - 50YXJ100M8X11.5 Radial electrolytic capacitor Low ESR - 50 V - 860040674004	Rubycon Würth Elektronik
C12	1.2µF	0805	SMD multilayer ceramic capacitor - 16 V - C0805C125K4RACTU	KEMET
C13	100nF	0805	SMD multilayer ceramic capacitor - 50 V - C0805C104K5RACTU	KEMET
C14	10µF	1206	SMD multilayer ceramic capacitor - 50 V - CL31B106KBHNNNE	SAMSUNG
C16	220pF	1206	SMD multilayer ceramic capacitor - 50 V - 12065A221JAT2A	AVX
C17	1mF	Radial 12.5x20mm	Radial electrolytic capacitor - 35 V - 35ZLJ1000M12.5X20 Radial electrolytic capacitor - 35 V - 860040577031	Rubycon Würth Elektronik
C19	1mF	Radial 12.5x20mm	Radial electrolytic capacitor - 35 V - 35ZLJ1000M12.5X20 Radial electrolytic capacitor - 35 V - 860040577031	Rubycon Würth Elektronik
C21	330nF	1206	SMD multilayer ceramic capacitor - 50 V - C1206C334K5RACTU	KEMET
C22	100µF	D8.0 - H11.5 - P3.5 mm	Radial electrolytic capacitor Low ESR - 50 V - 50YXJ100M8X11.5	Rubycon Würth Elektronik

Ref.	Value	Package	Description	Manufacturer
			Radial electrolytic capacitor Low ESR - 50 V - 860040674004	
C24	3.3µF	0805	SMD multilayer ceramic capacitor - 50 V - C2012X6S1H335K125AC	TDK
C25	10pF	1206	SMD multilayer ceramic capacitor - 1000 V - CC1206JKNPOCBN100	Yageo
C27	470nF	0805	SMD multilayer ceramic capacitor - 50 V - C0805C474K5RACTU	KEMET
C28	1nF	0805	SMD multilayer ceramic capacitor - 50 V - C0805C102K5RACTU	KEMET
C30	10µF	1206	SMD multilayer ceramic capacitor - 50 V - CL31B106KBHNNNE	SAMSUNG
C31	1 nF	0805	SMD multilayer ceramic capacitor - 50 V	
C32	100pF	1206	SMD multilayer ceramic capacitor - 630 V - GRM31A7U2J101JW31D	Murata
C34	470pF	0805	SMD multilayer ceramic capacitor - 50 V - C0805C471J5GACTU	KEMET
C35	470nF	0805	SMD multilayer ceramic capacitor - 50 V - C0805C474K5RACTU	KEMET
C36	N.M.	0805	SMD multilayer ceramic capacitor - 50 V	
C37	N.M.	0805	SMD multilayer ceramic capacitor - 50 V	
C38	1nF	0805	SMD multilayer ceramic capacitor - 50 V - C0805C102K5RACTU	KEMET
C39	1mF	Radial 12.5x20mm	Radial electrolytic capacitor - 35 V - 35ZLJ1000M12.5X20 Radial electrolytic capacitor - 35 V - 860040577031	Rubycon Würth Elektronik
C42	4.7nF	4.0 x 13.0 p10mm	Radial polypropylene metallized capacitor - 1000 Vdc - B32641B0472K	EPCOS
C46	10µF	1206	SMD multilayer ceramic capacitor - 50 V - CL31B106KBHNNNE	SAMSUNG
C47	N.M.	0805	SMD multilayer ceramic capacitor - 50 V	
C48	100nF	0805	SMD multilayer ceramic capacitor - 50 V - C0805C104K5RACTU	KEMET
C49	1.8nF	0805	SMD multilayer ceramic capacitor - 50 V	
C50	N.M.	0805	SMD multilayer ceramic capacitor - 50 V	
C51	N.M.	0805	SMD multilayer ceramic capacitor - 50 V	
C52	N.M.	0805	SMD multilayer ceramic capacitor - 50 V	
C54	1mF	Radial 12.5x20mm	Radial electrolytic capacitor - 35 V - 35ZLJ1000M12.5X20 Radial electrolytic capacitor - 35 V - 860040577031	Rubycon Würth Elektronik
C56	N.M.	1206	Ceramic capacitor, 1 kV, general purpose	
C59	1µF	11.0 × 18.0 p.15mm	Radial polypropylene film capacitor - 520 Vdc - B32672Z5105K000	EPCOS
C60	100nF	1206	SMD multilayer ceramic capacitor - 100 V - CGA5H2X8R2A104K115AA	TDK
C61	500pF	0805	SMD multilayer ceramic capacitor - 50 V - 08055A501GAT2A	AVX

Ref.	Value	Package	Description	Manufacturer
C62	N.M.	0805	Ceramic capacitor, 50 V, X7R, 10%	
C63	N.M.	0805	Ceramic capacitor, 50 V, X7R, 10%	
C64	N.M.	0805	Ceramic capacitor, 50 V, X7R, 10%	
C65	N.M.	0805	Ceramic capacitor, 50 V, X7R, 10%	
C66	100µF	D 8.0 - H 11.5 - P. 3.5 mm	Radial electrolytic capacitor Low ESR - 50V - 50YXJ100M8X11.5 Radial electrolytic capacitor Low ESR - 50V - 860040674004	Rubycon Würth Elektronik
C67	10µF	1206	SMD multilayer ceramic capacitor - 50V - CL31B106KBHNNNE	SAMSUNG
C68 ⁽¹⁾	BZX384	SOD-323	SMD zener diode - 12V - 0.3 W	Nexperia
C69	2.2nF	0805	SMD multilayer ceramic capacitor - 50 V - GRM2165C1H222JA01D	Murata
C70	100µF	D 8.0 - H 11.5 - P. 3.5mm	Radial electrolytic capacitor Low ESR - 50 V - 50YXJ100M8X11.5 Radial electrolytic capacitor Low ESR - 50V - 860040674004	Rubycon Würth Elektronik
C71	100µF	D 8.0 - H 11.5 - P. 3.5mm	Radial electrolytic capacitor Low ESR - 50V - 50YXJ100M8X11.5 Radial electrolytic capacitor Low ESR - 50V - 860040674004	Rubycon Würth Elektronik
C72	10µF	1206	SMD multilayer ceramic capacitor - 50V - CL31B106KBHNNNE	SAMSUNG
D1	1N5406	DO-201A	Rectifier - 3A - 600V	Vishay Semiconductors
D2	STTH5L06	DO-201AD	Fast rectifier - 5A - 600V	STMicroelectronics
D3	N.M.	STYLE GBU	Single phase bridge rectifier - 600V - GBU8J	ONSEMI
D4	S1M	SMA (DO-214AC)	General purpose rectifier - 1000V	FAIRCHILD
D5	S1M	SMA (DO-214AC)	General purpose rectifier - 1000V	FAIRCHILD
D6	1N4148WS	SOD-323	SMD Fast switching rectifier - 0.35A - 100V	On semi
D8	1N4148WS	SOD-323	SMD Fast switching rectifier - 0.35A - 100V	On semi
D9	STPS0530Z	SOD-123	SMD Schottky rectifier - 0.5A - 30V	STMicroelectronics
D10	1N4148WS	SOD-323	SMD Fast switching rectifier - 0.35A - 100V	On semi
D12	STPS1H100A	SMA (DO-214AC)	SMD Schottky rectifier - 1A - 100V	STMicroelectronics
D14	STPS1L60A	SMA (DO-214AC)	SMD low drop power Schottky rectifier - 1A - 60V	STMicroelectronics
D15	1N4148W-7-F	SOD-123	SMD rectifier - 0.3A - 100V	DIODES
D17	STPS1H100A	SMA (DO-214AC)	SMD Schottky rectifier - 1A - 100V	STMicroelectronics
D18	1N4148W-7-F	SOD-123	SMD rectifier - 0.3A - 100V	DIODES
D19	STTH1R06A	SMA (DO-214AC)	SMD rectifier - 1A - 600V	STMicroelectronics
D22	LL4148-GS18	MiniMELF	SMD rectifier - 0.30A - 100V	Vishay Semiconductors
D23	LL4148-GS18	MiniMELF	SMD rectifier - 0.30A - 100V	Vishay Semiconductors
D24	1N4148WS	SOD-323	SMD fast switching rectifier - 0.35A - 100V	On semi
F1	4A	8.5X4 mm	Radial lead time-lag fuse - 4A - 300V - 36914000000	Littelfuse

Ref.	Value	Package	Description	Manufacturer
JP1	SMD jumper	2p MEDIUM	Jumper_SMD	
JP2	SMD jumper	2p MEDIUM	Jumper_SMD	
JP3	SMD jumper	2p MEDIUM	Jumper_SMD	
J1	MKDSN 1,5/ 3-5,08	P. 5.08mm	Screw connector terminal, single row - 400V - 1729131	Phoenix Contact
J2	Faston_90_6.35	DWG	Connector faston male 6,35mm right Angle - 928814-1	TE Connectivity
J3	Faston_90_6.35	DWG	Connector faston male 6,35mm right angle - 928814-1	TE Connectivity
L1	210µH	DWG	PFC inductor - QP2925V - 11999-112V500110	YUJING
L2	8mH	DWG	Common-mode power Line choke - 3.5A - 250V - SSRH24NHS-35080	KEMET
L3	100µH	Radial	WE-FI leaded toroidal Line choke - 6A - 7447070	Würth Elektronik
Q1	BSS169H6327XTSA1	SOT23	SMD N-channel MOSFET depletion mode - 0.17A - 100V	Infineon Technologies
Q3	STF16N60M6	TO220FP	N-channel power MOSFET - 12A	STMicroelectronics
Q4	BSS169H6327XTSA1	SOT23	SMD N-channel MOSFET - 0.17A	Infineon technologies
Q5	STF16N60M6	TO220FP	N-channel power MOSFET - 12A	STMicroelectronics
Q6	BC817DPN	TSOP6	SMD NPN/PNP general-purpose double transistor - 0.5A - 45V	Nexperia
R1	1R0	D. 15 x 7 pitch 7.5mm	Radial thermistor NTC - 9A - 3W - B57237S0109M	EPCOS
R2	4M3	1206	SMD resistor - 1/4W - RC1206FR-074M3L	Yageo
R3	300Vac	14mm-DISC	Metal oxide radial varistor - 300V - B72214S0301K101	EPCOS
R4	4M3	1206	SMD resistor - 1/4W - RC1206FR-074M3L	Yageo
R5	3M9	1206	SMD resistor - 1/4W - RC1206FR-073M9L	Yageo
R6	N.M.	1206	SMD resistor - 1/4W	
R7	0R	0805	SMD resistor - 1/8W - RC0805JR-070RL	Yageo
R8	N.M.	0805	SMD resistor - 150V - 1/8W	
R9	22R	0805	SMD resistor - 150V - 1/8W	
R10 ⁽¹⁾	BZV55-C15	DO-213AA-2	SMD zener diode - 15V - 0.5W	NXP
R11	0R	0805	SMD resistor - 1/8W - RC0805JR-070RL	Yageo
R12	5R6	0805	SMD resistor - 150V - 1/8W	
R13	78K7	0805	SMD resistor - 1/8W - RC0805FR-0778K7L	Yageo
R14	91K	0805	SMD resistor - 150V - 1/8W - RC0805FR-0791KL	Yageo
R15	0R	1206	SMD resistor - 200V - 1/4W - RC1206JR-070RL	Yageo
R17	750R	0805	SMD resistor - 150V - 1/8W	
R20	5R6	0805	SMD resistor - 150V - 1/8W	
R21	56R	0805	SMD resistor - 150V - 1/8W	
R22	N.M.	1206	SMD resistor - 1/4W	

Ref.	Value	Package	Description	Manufacturer
R23	100K	0805	SMD resistor - 150V - 1/8W - RC0805FR-07100KL	
R24	N.M.	0805	SMD resistor - 1/8W	Vishay
R27	5R6	0805	SMD resistor - 150V - 1/8W	
R28	56R	0805	SMD resistor - 150V - 1/8W	
R29	100K	0805	SMD resistor - 150V - 1/8W - RC0805FR-07100KL	
R31	0R	1206	SMD resistor - 200V - 1/4W - RC1206JR-070RL	Yageo
R32	0R	1206	SMD resistor - 200V - 1/4W - RC1206JR-070RL	Yageo
R41	24K	0805	SMD resistor - 150V - 1/8W	
R43	24K	0805	SMD resistor - 150V - 1/8W	
R44	220R	0805	SMD resistor - 150V - 1/8W - RC0805FR-07220RL	Yageo
R45	0R	0805	SMD resistor - 150V - 1/8W - RC0805JR-070RL	Yageo
R46	N.M.	0805	SMD resistor - 150V - 1/8W	
R47	1M	0805	SMD resistor - 150V - 1/8W - RC0805FR-071ML	Yageo
R48	22R	0805	SMD resistor - 150V - 1/8W	
R50	1K	0805	SMD resistor - 150V - 1/8W - RC0805FR-071KL	Yageo
R51	13K	0805	SMD resistor - 150V - 1/8W - RC0805FR-0713KL	Yageo
R52	200K	0805	SMD resistor - 150V - 1/8W - CRCW0805200KFKEA	Vishay Semiconductors
R54	12K	0805	SMD resistor - 150V - 1/8W	
R57	0R	1206	SMD resistor - 200V - 1/4W - RC1206JR-070RL	Yageo
R61	0R	1206	SMD resistor - 200V - 1/4W - RC1206JR-070RL	Yageo
R62	0R	0805	SMD resistor - 150V - 1/8W - RC0805JR-070RL	Yageo
R63	0R	2512	SMD resistor - 250V - 3W - 3522ZR	TE Connectivity
R64	10R	1206	SMD resistor - 200V - 1/4W	
R65	0R	0805	SMD resistor - 150V - 1/8W - RC0805JR-070RL	Yageo
R66	N.M.	0805	SMD resistor - 150V - 1/8W	
R67	N.M.	0805	SMD resistor - 150V - 1/8W	
R68	22R	0805	SMD resistor - 150V - 1/8W	
R69	N.M.	0805	SMD resistor - 150V - 1/8W	
R72	36K	0805	SMD resistor - 150V - 1/8W - RC0805FR-0736KL	Yageo
R73	5K6	0805	SMD resistor - 150V - 1/8W	
R74	100K	0805	SMD resistor - 150V - 1/8W - RC0805FR-07100KL	

Ref.	Value	Package	Description	Manufacturer
R75	N.M.	0805	SMD resistor - 150V - 1/8W	
R76	0R	0805	SMD resistor - 150V - 1/8W - RC0805JR-070RL	Yageo
R77	150K	0805	SMD resistor - 1/10W - MC01W08051150K	MULTICOMP
R78	6K2	0805	SMD resistor - 150V - 1/8W	
R79	N.M.	0805	SMD resistor - 150V - 1/8W	
R80	N.M.	0805	SMD resistor - 150V - 1/8W	
R81	0R	0805	SMD resistor - 150V - 1/8W - RC0805JR-070RL	Yageo
R82	0R	0805	SMD resistor - 1/8W - RC0805JR-070RL	Yageo
R83	100K	0805	SMD resistor - 150V - 1/8W - RC0805FR-07100KL	
R84	0R	0805	SMD resistor - 1/8W - RC0805JR-070RL	Yageo
R85	N.M.	0805	SMD resistor - 1/8W	Vishay
R86	N.M.	0805	SMD resistor - 1/8W	Vishay
R87	1K	0805	SMD resistor - 150V - 1/8W - RC0805FR-071KL	Yageo
R88	620K	0805	SMD resistor - 150V - 1/8W - RC0805FR-07620KL	Yageo
R89	3K	0805	SMD resistor - 1/8W - RC0805FR-073KL	Yageo
R90	0R	1206	SMD resistor - 200V - 1/4W - RC1206JR-070RL	Yageo
R91	0R	0805	SMD resistor - 1/8W - RC0805JR-070RL	Yageo
R92	N.M.	1206	SMD resistor - 1/4W	
R93	N.M.	1206	SMD resistor - 1/4W	
R95	N.M.	1206	SMD resistor - 200V - 1/4W	
R96	0R	1206	SMD resistor - 200V - 1/4W - RC1206JR-070RL	Yageo
R97	100K	0805	SMD resistor automotive - 1/4W - ERJ-P06F1003V	PANASONIC
R98	10K	0805	SMD resistor - 1/4W - RNCP0805FTD10K0	Stackpole Electronics
R99	49K9	0805	SMD resistor - 1/10W	
R100	16K	0805	SMD resistor - 150V - 1/8W	
R101	10R	0805	SMD resistor - 150V - 1/8W	
R102	N.M.	0805	SMD resistor - 1/10W	
R103	0R	0805	SMD resistor - 150V - 1/8W - RC0805JR-070RL	Yageo
R104	130K	0805	SMD resistor - 150V - 1/8W	
R105	20K	0805	SMD resistor - 150V - 1/8W - RC0805FR-0720KL	Yageo
R106	16K	0805	SMD resistor - 150V - 1/8W	
R107	10R	0805	SMD resistor - 150V - 1/8W	
R114	N.M.	0805	SMD resistor - 1/8W	Vishay
R115	N.M.	1206	SMD resistor - 1/4W	
R116	0R	0805	SMD resistor - 150V - 1/8W - RC0805JR-070RL	Yageo

Ref.	Value	Package	Description	Manufacturer
T1	QE30C-19V	DWG	Resonant transformer - 11999-348V500110	YUJING
U1	L6462A	SOT23-6L	Single-Phase transition-mode PFC controller	STMicroelectronics
U2	STNRG599	SOIC16	LLC resonant controller	STMicroelectronics
U3	SEA05L	SOT23-6L	Advanced CV/CC controller with LED driver	STMicroelectronics
U4	SFH617A-4	DIP4	Optocoupler	Vishay Semiconductors
U5	N.M.	SOT23	Volt. Ref. adjustable shunt - 0.06A - TLVH431BIL3T	STMicroelectronics
U7	N.M.	SOT23	Volt. Ref. adjustable shunt - 0.06A - TLVH431AIL3T	STMicroelectronics
U8	TLVH431AIL3T	SOT23	Volt. Ref. adjustable shunt - 0.06A	STMicroelectronics

1. Zener diode mounted on resistor or capacitor footprint

Table 5. Active Bridge daughterboard

Reference	Value	Description	Package	Manufacturer
C1	100nF	SMD multilayer ceramic capacitor: 50V +/-20% - C0603C104M5RACTU	0603	KEMET
C2	1nF	SMD multilayer ceramic capacitor: 50V +/-10%	0603	
C3	22pF	SMD multilayer ceramic capacitor: 50V +/-5%	0603	
C4	12pF	SMD multilayer ceramic capacitor: 50V +/-5% - C1608C0G1H120J080AA	0603	TDK
C5	22pF	SMD multilayer ceramic capacitor: 50V +/-5%	0603	
C6	1nF	SMD multilayer ceramic capacitor: 50V +/-10%	0603	
C7	100pF	SMD multilayer ceramic capacitor: 50V +/-5% - C1608NP01H101J080AA	0603	TDK
C8	100pF	SMD multilayer ceramic capacitor: 50V +/-5% - C1608NP01H101J080AA	0603	TDK
C9	12pF	SMD multilayer ceramic capacitor: 50V +/-5% - C1608C0G1H120J080AA	0603	TDK
D1	GBU8J	Single phase bridge rectifier: 600V 8A	STYLE GBU	On semi
D2	1N4148WS	SMD fast switching rectifier: 100V 0.35A	SOD-323	On semi
D3	1N4148WS	SMD fast switching rectifier: 100V 0.35A	SOD-323	On semi
J1	STRIP 15-M-90	Male strip 1x15 pins 90° pitch 2,54mm: - 61301511021		Würth Elektronik
Q1	STL45N65M5	SMD N-channel power MOSFET: 650V 22.5A	PowerFLAT8x8	STMicroelectronics
Q2	STL45N65M5	SMD N-channel power MOSFET: 650V 22.5A	PowerFLAT8x8	STMicroelectronics
Q3	2N7002	SMD N-channel MOSFET: 0.18A	SOT23	On semi
Q4	2N7002	SMD N-channel MOSFET: 0.18A	SOT23	On semi
R1	100R	SMD resistor: 1/10W 1% - RC0603FR-07100RL	0603	Yageo
R2	100R	SMD resistor: 1/10W 1% - RC0603FR-07100RL	0603	Yageo
R3	100K	SMD resistor: 150V 1/10W 1% - CRG0603F100K	0603	TE Connectivity
R4	100K	SMD resistor: 150V 1/10W 1% - CRG0603F100K	0603	TE Connectivity
R5	1R	SMD resistor: 1/16W 1%	0603	
R6	1R	SMD resistor: 1/16W 1%	0603	
R7	2M2	SMD resistor: 1/8W 1% - RC0805FR-072M2L	0805	Yageo

Reference	Value	Description	Package	Manufacturer
R8	1R	SMD resistor: 150V 1/8W 1% - WR08W1R00FTL	0805	Walsin
R9	2M2	SMD resistor: 1/8W 1% - RC0805FR-072M2L	0805	Yageo
R10	10M	SMD resistor: 1/10W 1% - CRCW060310M0FKEA	0603	Vishay Semiconductors
R11	12K	SMD resistor: 50V 1/16W 1% - MC0063W0603112K	0603	MULTICOMP
R12	12K	SMD resistor: 50V 1/16W 1% - MC0063W0603112K	0603	MULTICOMP
R13	10M	SMD resistor: 1/10W 1% - CRCW060310M0FKEA	0603	Vishay Semiconductors
R14	2M2	SMD resistor: 1/8W 1% - RC0805FR-072M2L	0805	Yageo
R15	150K	SMD resistor: 200V 1/4W 1% - RC1206FR-07150KL	1206	Yageo
R16	150K	SMD resistor: 1/10W 1% - CRCW0603150KFKEA	0603	Vishay Semiconductors
R17	2M2	SMD resistor: 1/8W 1% - RC0805FR-072M2L	0805	Yageo
R18	68K	SMD resistor: 1/10W 1% - RC0603FR-0768KL	0603	Yageo
R19	2M2	SMD resistor: 1/8W 1% - RC0805FR-072M2L	0805	Yageo
R20	150K	SMD resistor: 200V 1/4W 1% - RC1206FR-07150KL	1206	Yageo
R21	150K	SMD resistor: 1/10W 1% - CRCW0603150KFKEA	0603	Vishay Semiconductors
R22	1M	SMD resistor: 150V 1/10W 1% - CRG0603F1M0	0603	TE Connectivity
R23	1M	SMD resistor: 150V 1/10W 1% - CRG0603F1M0	0603	TE Connectivity
R24	2M2	SMD resistor: 1/8W 1% - RC0805FR-072M2L	0805	Yageo
R25	10M	SMD resistor: 1/10W 1% - CRCW060310M0FKEA	0603	Vishay Semiconductors
R26	10M	SMD resistor: 1/10W 1% - CRCW060310M0FKEA	0603	Vishay Semiconductors
R27	68K	SMD resistor: 1/10W 1% - RC0603FR-0768KL	0603	Yageo
U1	LM393ADT	SMD low-power, dual-voltage comparator: 2V to 36V	SO-8	STMicroelectronics

Table 6. PFC power MOSFET daughterboard

Reference	Value	Description	Package	Manufacturer
C201	100pF	SMD multilayer ceramic capacitor: 1000V 10% - 102R18W101KV4E	1206	Johanson
J201	STRIP 8-M-90	Male strip 1x8 pins 90° pitch 2,54mm: - 61300811021		Würth Elektronik
Q201	STL36N60M6	SMD N-channel power MOSFET: 600V 25A	PowerFLAT8x8	STMicroelectronics
R201	0R1	SMD resistor: 1W 1% - PT2512FK-070R1L	2512	Yageo
R202	0R1	SMD resistor: 1W 1% - PT2512FK-070R1L	2512	Yageo
R203	220K	SMD resistor: 150V 1/8W 1%	0805	

Table 7. SRK2001A daughterboard

Reference	Value	Description	Package	Manufacturer
C201	1μF	SMD multilayer ceramic capacitor: 25V +/-10%	0805	
D201	N.M.	SMD transient bidirectional voltage rectifier	SMA	
D202	N.M.	SMD transient bidirectional voltage rectifier	SMA	
HS1	HEATSINK	Heatsink black anodized aluminum 71°K/W for SMD (8x10x6mm): - ICK SMD F 10 SA		Fischer Elektronik

Reference	Value	Description	Package	Manufacturer
HS2	HEATSINK	Heatsink black anodized aluminum 71°K/W for SMD (8x10x6mm): - ICK SMD F 10 SA		Fischer Elektronik
JP201	STRIP13-M-90	13p right Angle Male header: - 61304011021_G		Würth Elektronik
Q201	STL120N8F7	N-channel power MOSFET: 80V 120A	PowerFLAT 5x6	STMicroelectronics
Q202	STL120N8F7	N-channel power MOSFET: 80V 120A	PowerFLAT 5x6	STMicroelectronics
R201	100R	SMD resistor: 200V 1/4W 1% - RC1206FR-07100RL	1206	Yageo
R202	100R	SMD resistor: 200V 1/4W 1% - RC1206FR-07100RL	1206	Yageo
R203	0R	SMD resistor: 200V 1/4W 5% - RC1206JR-070RL	1206	Yageo
R204	0R	SMD resistor: 200V 1/4W 5% - RC1206JR-070RL	1206	Yageo
R205	0R	SMD resistor: 150V 1/8W 5% - RC0805JR-070RL	0805	Yageo
R206	N.M.	SMD resistor: 1/8W 1%	0805	Yageo
U201	SRK2001A	SRK2001A SR controller	SSOP10	STMicroelectronics

Revision history

Table 8. Document revision history

Date	Version	Changes
25-May-2026	1	Initial release.

Contents

1	Architecture of the board	2
2	Main performances of converter	3
2.1	Total harmonic distortion and power factor	3
2.2	Open load input power	3
2.3	Efficiency	4
3	Evaluation board schematics	5
4	Bill of materials	8
	Revision history	17
	List of tables	19
	List of figures	20



List of tables

Table 1.	Total harmonic distortion and power factor	3
Table 2.	EVL599IND-250W: Open load input power	3
Table 3.	EVL599IND-250W connectors	6
Table 4.	EVL599IND-250W motherboard	8
Table 5.	Active Bridge daughterboard	14
Table 6.	PFC power MOSFET daughterboard	15
Table 7.	SRK2001A daughterboard	15
Table 8.	Document revision history	17

List of figures

Figure 1.	EVL599IND-250W: architecture of the board	2
Figure 2.	EVL599IND-250W efficiency at medium/heavy loads	4
Figure 3.	EVL599IND-250W efficiency at light loads	4
Figure 4.	EVL599IND-250W motherboard schematic	5
Figure 5.	Active bridge daughterboard schematic	6
Figure 6.	PFC power MOSFET daughterboard schematic	7
Figure 7.	SRK2001A daughterboard schematic	7

IMPORTANT NOTICE – READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice.

In the event of any conflict between the provisions of this document and the provisions of any contractual arrangement in force between the purchasers and ST, the provisions of such contractual arrangement shall prevail.

The purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgment.

The purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of the purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

If the purchasers identify an ST product that meets their functional and performance requirements but that is not designated for the purchasers’ market segment, the purchasers shall contact ST for more information.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2026 STMicroelectronics – All rights reserved