

Test Report issued under the responsibility of:



TEST REPORT IEC 62776 Double-capped LED lamps designed to retrofit linear fluorescent lamps – Safety specifications	
Report Number :	SHES201002130501
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Name of Testing Laboratory preparing the Report	SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Applicant's name	Hangzhou Holux Lighting Technology Co., Ltd.
Address :	Room 407, No.47 Xiangyuan Road, Hangzhou 310015, China
Test specification:	
Standard	IEC 62776:2014
Test procedure :	SGS-CSTC
Non-standard test method	N/A
Test Report Form No.	IEC62776B
Test Report Form(s) Originator :	VDE Testing and Certification Institute
Master TRF	2018-08-16
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Test item description :	LED tube
Trade Mark :	N/A
Manufacturer	Same as applicant above
Model/Type reference	See General product information at page 6
Ratings	200-240V~; 50/60Hz; G13 cap; 3000K-6500K; ta: -20~45°C; More details see General product information at page 6
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):	
<input checked="" type="checkbox"/> Testing Laboratory:	SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Testing location/ address	588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China.
Tested by (name, function, signature) :	Philip Shi, PE <i>Philip Shi</i>
Approved by (name, function, signature) ...	Lisa Li, Reviewer <i>Lisa Li</i>
<input type="checkbox"/> Testing procedure: CTF Stage 1:	
Testing location/ address	
Tested by (name, function, signature) :	
Approved by (name, function, signature) ...	
<input type="checkbox"/> Testing procedure: CTF Stage 2:	
Testing location/ address	
Tested by (name + signature)	
Witnessed by (name, function, signature) .:	
Approved by (name, function, signature) ...	
<input type="checkbox"/> Testing procedure: CTF Stage 3:	
<input type="checkbox"/> Testing procedure: CTF Stage 4:	
Testing location/ address	
Tested by (name, function, signature) :	
Witnessed by (name, function, signature) .:	
Approved by (name, function, signature) ...	
Supervised by (name, function, signature) :	



<p>List of Attachments (including a total number of pages in each attachment): Attachment A: Photo documentation (7 pages in total). Attachment B: Circuit Diagrams (2 pages in total).</p>	
<p>Summary of testing:</p>	
<p>Tests performed (name of test and test clause):</p> <p>Full tests</p>	<p>Testing location:</p> <p>SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. 588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China</p>
<p>Summary of compliance with National Differences (List of countries addressed):</p> <ol style="list-style-type: none"> 1. EU Group Differences: 2. EU Special National Conditions: None 3. EU A-deviations: None <p><input checked="" type="checkbox"/> The product fulfils the requirements of <u>EN 62776: 2015</u>.</p>	

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective National Certification Body that own these marks.

Take T8-L06-7A2 for example:**Model: T8-L06-7A2**

200-240V~, 50/60Hz, 7W, 0,034A, G13, 6500K, ta: -20~45°C



This lamp is not suitable to be used in emergency luminaires designed for double-capped fluorescent lamp(s)

Hangzhou Holux Lighting Technology Co., Ltd.

Room 407, No.47 Xiangyuan Road, Hangzhou 310015, China

Note: 1. The height of graphical symbols shall not be less than 5 mm, and the height of letters and numerals shall not be less than 2 mm.

2. The marking plates of other models were the same as above one except for model name and ratings.

3. As declared by the applicant, the importer's name, registered trade name or registered trade mark and the postal address will be marked on the products before being place on the market. The contact details shall be in a language easily understood by end-users and market surveillance authorities.

4. Marking on the packaging or in a document accompanying the electrical equipment is only acceptable if it is not possible to place such markings on the product.

Test item particulars:	
Classification of installation and use: LED tube	
Supply Connection: G13 lamp cap:	
Possible test case verdicts:	
- test case does not apply to the test object.....: N/A	
- test object does meet the requirement.....: P (Pass)	
- test object does not meet the requirement.....: F (Fail)	
Testing:	
Date of receipt of test item: August 22, 2020	
Date (s) of performance of tests: August 22, 2020 – November 30, 2020	
General remarks:	
<p>"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.</p> <p>This document is issued by the Company subject to its General Conditions of Service, available on request or accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.</p> <p>Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.</p> <p>Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 1 month only.</p>	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC62776B:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies): Hangzhou Holux Lighting Technology Co., Ltd. Room 407, No.47 Xiangyuan Road, Hangzhou 310015, China	

General product information:

The products covered in this report are LED tube with G13 lamp cap, Max. Weight 260g with glass diffuser and plastic cap.

The LED tube intended for replacement of existing fluorescent tubes with G13 caps without modifying the existing construction of luminaire. Only the glow-starter will be replaced by LED starter mentioned in this report and user manual.

The LED tubes can replace the traditional fluorescent tube without modifying the existing luminaire according to the table in manual. However, the outer shape and dimension are not identical with traditional fluorescent tubes. Please refer to dimensions in user manual when installed into luminaire.

The two ends of LED tube are isolated and when one end is fitted the other end can't lead to electric shock.

The lamp shade cannot be dismantled without being permanently damaged.

All the models shared the same construction, appearance and lamp cap except the different dimension, circuit diagram, PCB layout, rated wattage, rated current and CCT.

For details please see following table.

Model list:

Model	Power	CCT	Dimension	SCH	PCB
T8-L06-ax	a	3000K~6500K	589mm	SCH1	PCB1
T8-L12-bx	b	3000K~6500K	1199mm	SCH1	PCB1
T8-L15-cx	c	3000K~6500K	1500mm	SCH1	PCB1
T8-L06-aD2	a	3000K~6500K	589mm	SCH2	PCB2
T8-L12-bD2	b	3000K~6500K	1199mm	SCH2	PCB2
T8-L15-cD2	c	3000K~6500K	1500mm	SCH2	PCB2
T8-L15-dy	d	3000K~6500K	1500mm	SCH2	PCB2

In the model name:

a could be 7, 7.5, 8, 9, 10, indicating wattage.

b could be 12, 15, 16, 18, indicating wattage.

c could be 10, 16.5, 18, indicating wattage.

d could be 20, 22, 24, 25, indicating wattage.

x could be A2, B2, C2.

y could be A2, B2, C2, D2.

The relationship between power and current:

Rated wattage (W)	7	7,5	8	9	10	12	15	16
Rated current (A)	0,034	0,036	0,039	0,043	0,048	0,058	0,072	0,077

Rated wattage (W)	16,5	18	20	22	24	25
Rated current (A)	0,080	0,087	0,097	0,106	0,116	0,121

All review, T8-L15-25A2 and T8-L15-18A2 were selected to perform the full tests.

T8-L12-18A2 and T8-L06-10A2 were selected to performed Clause 6.3 Dimensions test.

Model T8-L15-25A2 was classified as RG0 at 200 mm according to IEC / TR 62778.

According clause 4.2.2 of EN 62493:2015, lighting equipment deemed to comply with the requirements of EN 62493:2015 without testing.

IEC 62776			
Clause	Requirement + Test	Result - Remark	Verdict
4	GENERAL REQUIREMENTS		P
4.1	The lamp shall be so designed and constructed that in normal use cause no danger to the user or surroundings		P
4.2	Double-capped LED lamps shall be specially prepared for fault condition. Opened lamps to verify conformity with clause 11, 12 and 14 of this standard.		P
4.3	All tests are carried out on each type or each power or representative selection of lamps.		P
4.4	When the lamp fails safely during one of the tests, it is replaced if no fire, smoke or flammable gas is produced.		P
4.5	Internal wiring shall be carried out as in Clause 5.3 of IEC 60598-1.		P
4.6	For construction of electrical circuit, cl.15.1, 15.2 of IEC 61347-1. For other parts, cl.4.11, 4.12, 4.25 of IEC 60598-1 shall be regarded.		P
5	MARKING		P
5.1	Marking on the lamp		
a)	– mark of origin		P
b)	– rated supply voltage (V).....: 200-240V~		P
c)	– rated power (W).....: See model list		P
d)	– rated frequency (Hz).....: 50 / 60Hz		P
e)	– marked with symbol fig. 1.		N/A
	– marked with symbol fig 2.		P
f)	– symbol acc. to Fig.3 and “This lamp is not suitable to be used in emergency luminaires...”		P
g)	– replaced starter, tube marking “type ref”, starter marking “LED”, Fig.4		P
h)	– information on the ingress of dust and water marked with Fig. 5		P
i)	– rated ambient temperature range of the lamp.		P
5.2	Marking on the lamp, on the immediate lamp wrapping or in the instructions		
	– explanation of Fig. 1 and Fig. 2 shall be given in instruction manual		P
a)	– rated current (A).....: See model list		P
b)	– special conditions or restrictions; not suitable for dimming, symbol fig.6		P
5.3	Instruction manual		
5.3.1	General		

IEC 62776			
Clause	Requirement + Test	Result - Remark	Verdict
	– instruction, describing all necessary steps for replacement LED lamp, replacement of starter.		P
	– required instructions shall be given either on the lamp,		N/A
	– on the product packaging		P
	– or in the manufacturer’s instructions provided with the lamp		N/A
	– explanation of the symbols in the instruction manual		P
5.3.2	Declaration of the product		
(1)	– list of all supplied parts		P
(2)	– declaration of the replaced fluorescent lamps		P
(3)	– Warning that no modification of the luminaire is to be made.		P
(4)	– The ambient temperature range shall be declared.		P
	– if higher than -20°C or lower than +60°C, additional information necessary		P
	– sentence “The lamp may not be suitable for use in all application ...”		P
(5)	– Declare: “This lamp is designed for general lighting service (excluding explosive atmospheres)”		P
5.3.3	Graphical instruction		
	– Graphical instruction, Fig.7 or description		P
5.3.4	Mounting		
	– Described steps instead of graphical instruction 5.3.3		N/A
5.4	Compliance		
	rubbing 15 s water, 15 s petroleum; marking legible		P
6	INTERCHANGEABILITY		P
6.1	Interchangeability of the cap		
	Cap interchangeability in accordance with IEC 60061-1	See appended table 2	
	Gauge in accordance with IEC 60061-3, G5/G13		P
	LED replacement starter in accordance with the dimensions, electrical, mechanical and thermal tests required in Section 1 of IEC 60155		P
6.2	Mass		
	G5-capped lamp: limit 200g G13-capped lamp: limit 500g	G13: Max. Weight 260g	P

IEC 62776			
Clause	Requirement + Test	Result - Remark	Verdict
6.3	Dimensions		
6.3.1	The length of the lamp shall not change significantly within specified ambient temperature range of the lamp.	See appended table 3	
6.3.2	Double-capped LED lamps for use in FL luminaires shall comply with the dimensions and tolerances of the corresponding lamps as defined in IEC 60081 at 25 °C.	See appended table 3	P
6.3.3	Variation of dimension A due self-heating at 25° C.	See appended table 4	
6.3.4	Dimensions of corresponding lamps of IEC 60081. min ambient temp.(e.g. -20 °C)	See appended table 4	
6.3.5	Dimensions of corresponding lamps of IEC 60081. max ambient temp. (e.g. +60 °C)	See appended table 4	
6.3.6	Compliance		
	Dimensions A1, B1 of corresponding lamps of IEC 60081.	See appended table 5	P
6.4	Temperature		
6.4.1	Temperature requirement		
	LED temperature shall not be higher than 75 °C on any location of the lamp.	66°C	P
6.4.2	Power requirement		
	Power consumed of LED lamp shall not higher than replaced FL lamp (described in 60081)		P
6.4.3	Compliance		
	Compliance; ta 25 °C, horizontally, rated supply voltage. Max surface temp. shall not exceed 6.4.1 and 6.4.2.		P
6.5	Safety of the lamp in case a wrong starter-lamp combination is used		
	– FL starter with LED lamp		P
	– LED starter with FL lamp		P
	– Starter compliance for all possible combinations in case of two fluorescent lamps in series.		P
	– For LED replacement which replace shorted starter: combination “replaced starter for LED lamp and FL lamp” test not required.		P
	Rated voltage is taken as maximum voltage range.		P
13.2	Testing under extreme electrical conditions		
	Lamp withstands overpower condition (150 % of the rated power) >15 min.		P
	A lamp fails safe after 15 min overpower condition		P
	Lamp with automatic protective device or power limiter, test performed 15 min. at limit.		N/A

IEC 62776			
Clause	Requirement + Test	Result - Remark	Verdict
13.3	Short-circuit across capacitors		
	Only one component at a time allowed	see appended table 7	
13.4	Fault conditions across electronic components		
	Fault conditions: where diagram indicates fault condition impairs safety, electronic components have been short-circuited or disconnected.	see appended table 7	
	Only one component at the time subjected.		P
13.5	Compliance		
	During the tests 13.2 to 13.5 the lamp shall not:		P
	– catch fire		P
	– does not produce flammable gases or smoke		P
	– live parts not accessible		P
	After the tests the insulation resistance with d.c. 500 V complies with requirements of Cl. 8.3:		P
	To avoid any overheating during fault conditions, the impedance of the lamp shall be checked.	Impedance: > 2000 MΩ	P
	Overload due to rectifications of supply current shall be prevent. The difference of pos. and neg. semi waveform <30% of max. value.		P
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)	see appended table 7	
	Creepage distances on printed boards less than specified in clause 16 in Part 1 provided with coating according to IEC 60664-3		N/A
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	see appended table 7	
13.7	Safety of the lamp with different types of controlgear		
	LED lamp operate safely with any type of controlgear as following		P
	– with magnetic ballast		P
	– with HF ballast (fic. A.5, IEC 60081)		N/A
	LED lamp tested at max. rated voltage with max. rated power.		P
7	PIN-SAFETY DURING INSERTION		P
	G5 and G13 lamps shall not be any electrical continuity between two ends of lamp.	No direct electrical connection	P
	Basic insulation during lamp insertion (IEC 60598-1 clause 8)		P
	Deactivation of the protection against electric shock is not permissible		N/A
	Electric strength test conducted with 1500 V (2 U +		P

IEC 62776			
Clause	Requirement + Test	Result - Remark	Verdict
	1000 V) between both ends of the lamp		
	Insulation resistance measured with about 500 V d.c. the minimum resistance shall be 2 MΩ		P
	Clearance (according to IEC 61347-1) shall be applied based on 250V working voltage		P
	Creepage distances shall not be less than the required minimum clearance.		P
	Touch current shall not exceed 0,7mA peak at a test voltage of 500 V r.m.s. (50 Hz or 60Hz) acc. to Fig. 8		P
8	PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS		P
8.1	General		
	Adequate insulation resistance and electrical strength between live and accessible parts. For caps requirements of IEC 61195 clauses 2.4 and 2.5		P
8.2	Test to establish whether a conductive part may cause an electric shock during operation		
	Lamp construction without any additional luminaire enclosure. Following parts are not accessible when lamp is installed:		
	– internal metal parts		P
	– basic insulated external metal parts, other than caps		N/A
	– live metal parts of the lamp cap		P
	– live metal parts of the lamp itself		N/A
	Tested with a test finger with a force of 10 N		P
	External metal parts other than current-carrying parts of the cap shall not be live.		P
8.3	Insulation resistance		
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ):		
	≥ 4 MΩ for double or reinforced insulation..... :	>2000 MΩ	P
8.4	Electric strength		
	Immediately after clause 8.3 electric strength test for 1 min		
	Basic insulation; pcb-board, SELV-circuits: 500 V		P
	Double or reinforced insulation, 4U + 2000 V	2960V	P
	No flashover or breakdown		P
9	MECHANICAL REQUIREMENTS FOR CAPS		P

IEC 62776			
Clause	Requirement + Test	Result - Remark	Verdict
9.1	Construction and assembly		
	Caps shall be constructed and assembled to the bulb that they remain attached during and after operation as following		P
9.2	Torque test on unused lamps		
	Compliance is checked by applying a torque test to the pins. The lamp cap shall remain firmly attached to the bulb. Angular displacement < 6°.		P
	Lamps with adjustable caps. Rotated to both extreme positions		N/A
9.3	Torque test after heat treatment		
	Fixing the cap by crimp, screw or similar connection, lamps are exempt from this clause		N/A
	Heat treatment for 2000h at 80°C		P
	Heat treatment for 100h at 80°C for other kind of fixing		N/A
	Lamps with adjustable caps. Rotated to its extreme positions (both)		N/A
9.4	Repetition of Clause 8.2		
	Clause 8.2 shall comply after the mechanical strength test.		P
10	CAP TEMPERATURE RISE		P
	Lamp cap temperature shall not exceed 120 °C.	G13: Max $\Delta t = 39,7K < 95 K$	P
11	RESISTANCE TO HEAT		P
	Parts of insulating material retaining live parts in position and other parts, enclosure of starter, ball-pressure test:		
	– part; test temperature (°C)	See appended table 6	P
12	RESISTANCE TO FLAME AND IGNITION		P
	External parts of insulating material preventing electric shock, enclosure of starter, glow-wire test 650 °C		
	– flame extinguished within 30 s		P
	– no flaming drops igniting tissue paper		P
13	FAULT CONDITIONS		P
13.1	General		
	Lamps shall not impair safety		P
13.2	Testing under extreme electrical conditions		
	Lamp withstands overpower condition (150 % of the rated power) >15 min.		P
	A lamp fails safe after 15 min overpower condition		P

IEC 62776			
Clause	Requirement + Test	Result - Remark	Verdict
	Lamp with automatic protective device or power limiter, test performed 15 min. at limit.		N/A
13.3	Short-circuit across capacitors		P
	Only one component at a time allowed	see appended table 7	
13.4	Fault conditions across electronic components		
	Fault conditions: where diagram indicates fault condition impairs safety, electronic components have been short-circuited or disconnected.	see appended table 7	P
	Only one component at the time subjected.		P
13.5	Compliance		
	During the tests 13.2 to 13.5 the lamp shall not:		P
	– catch fire		P
	– does not produce flammable gases or smoke		P
	– live parts not accessible		P
	After the tests the insulation resistance with d.c. 500 V complies with requirements of Cl. 8.3:		P
	To avoid any overheating during fault conditions, the impedance of the lamp shall be checked.	Impedance: $2000 \Omega > 50 \Omega$	P
	Overload due to rectifications of supply current shall be prevent. The difference of pos. and neg. semi waveform <30% of max. value.		P
13.6	Further requirements		
	In add. to fault conditions 13.2to 13.5, fault conditions Cl.14.1 of IEC 61347-1 and 14.3 and the additional tests in 13.7 are carried out.		P
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)	see appended table 7	
	Creepage distances on printed boards less than specified in clause 16 in Part 1 provided with coating according to IEC 60664-3		N/A
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	see appended table 7	
13.7	Safety of the lamp with different types of controlgear		
	LED lamp operate safely with any type of controlgear as following		P
	– with magnetic ballast		P
	– with HF ballast (fic. A.5, IEC 60081)		N/A
	LED lamp tested at max. rated voltage with max. rated power.		P
13.8	Compliance for test with different type of controlgears		
	During tests of 13.7 shall not catch fire, produce		P

IEC 62776			
Clause	Requirement + Test	Result - Remark	Verdict
	flammable gases or smoke, live parts shall not become accessible.		
	Low impedance: max. 0,51 A when 3,6 V applied to the pins of a cap.	<0,40 A	P
13.9	Safety of the lamp in case the luminaire controlgear short circuits		
	Ballast and starter are short-circuited in the luminaire.		P
14	CREEPAGE DISTANCES AND CLEARANCES		P
	Creepage distances and clearances according to IEC 61347-1 with add. requirements.	see appended table 8	
	Creepage distance between contact pins or metal shell of the cap according to IEC 60061-4		P
	For other parts creepage distances and clearances IEC 61347-1; accessible conductive parts IEC 60598-1, double or reinforced insulation.		P
15	LAMP WITH PROTECTION AGAINST DUST AND MOISTURE		N/A
15.1	Aim of the test		
	Where the lamp is not marked acc. to Fig.5 tests 15.2 and 15.3 have to be conducted.		N/A
15.2	Thermal endurance		
	- mounting-position:		
	- test temperature (°C):		
	- total duration (h):		
	- supply voltage:		
	Lamp shall not have become unsafe		N/A
	Marking legible		N/A
15.3	IP testing		
- (9.2)	Tests for ingress of dust, solid objects and moisture:		
	- classification according to IP:	IP	
	- mounting position during test:		
	- fixing screws tightened; torque (Nm):		
	- tests according to clauses:		
	- electric strength test afterwards		N/A
	a) no deposit in dust-proof lamp		N/A
	b) no talcum in dust-tight lamp		N/A
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard		N/A
	d) i) For lamps without drain holes – no water entry		N/A
	d) ii) For lamps with drain holes – no hazardous		N/A

IEC 62776			
Clause	Requirement + Test	Result - Remark	Verdict
	water entry		
	e) no water in watertight lamps		N/A
	h) no damage of protective shield or glass envelope		N/A
16	PHOTOBIOLOGICAL HAZARD		P
16.1	UV radiation		
	UV radiation of LED lamp shall not exceed 2 mW/klm		P
16.2	Blue light hazard		
	Blue light hazard acc. IEC/TR 62778. LED lamps shall be classified as RG0 or RG1 unlimited.	Unlimited RG0	P
16.3	Infrared radiation		
	LED lamps do not require measurement		N/A

IEC 62776						
Clause	Requirement + Test			Result - Remark		Verdict
ANNEX 1	TABLE: Critical components information					P
Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
Lamp cap	C	NANTONG ZHONGLAN ENGINEERING PLASTICS CO LTD	403M-G(xx)	PBT; V-0; 130°C	EN 62776	UL(E255317) + tested with appliance
LED PCB	C	HUBEI ZHONGPEI ELECTRONICS TECHNOLOGY CO LTD	ZP-1; ZP-2	V-0; Min. thk: 1,2mm; 130°C	EN 62776	UL(E481795) + tested with appliance
PCB	C	KINGBOARD LAMINATES HOLDINGS LTD	KB-6163F	V-0; Min. thk: 1,0mm; 130°C	EN 62776	UL(E123995) + tested with appliance
Internal wire	C	DONGGUAN HUAJUNDA CO LTD	3239	24AWG; 150°C	EN 62776	UL(E363052) + tested with appliance
Fuse resistor	C	SHENZHEN GREAT ELECTRONICS CO LTD	RF10-1W Series	10Ω; 1W	EN 62776	UL(E301541) + tested with appliance
LED	C	MLS Co., LTD	2835	3V; 60mA; 3000K-6500K	EN 62776	Test with appliance
Heat Shrinkable tube	C	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD	RSFR-H	600V; 125°C; VW-1	EN 62776	UL(E203950) + tested with appliance
Fuse	B	Xuyi Sanwei Electric Co. Ltd.	3,6*10	250V~; 1A	EN 60127-3 EN 60127-1	VDE (40034490)
Base of LED starter	C	LEUCHTEK ELECTRONICS (ZHEJIANG) CO LTD	PCEM-3	V-0	EN 62776	UL (E199273) + tested with appliance
Enclosure of LED starter	C	LOTTE CHEMICAL CORPORATION	PC-1100(+)	PC	EN 62776	Tested with appliance
Supplementary information:						
1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.						
The codes above have the following meaning:						
A - The component is replaceable with another one, also certified, with equivalent characteristics						
B - The component is replaceable if authorised by the test house						
C - Integrated component tested together with the appliance						
D - Alternative component						

IEC 62776							
Clause	Requirement + Test			Result - Remark			Verdict
TABLE 2: Dimensions according to Cap sheet in IEC 60061-1; 7004-51 (G13)							P
Object / part No.	A	D	E	F	G	H	N
T8-L15-25A2	25,46	12,70	2,45	7,15	--	--	8,82
Limit T8 lamp:	max. 25,78	12,70	2,29-2,67	6,6-7,62	--	--	min. 8,71

TABLE 3 Dimensions of the corresponding lamps of IEC 60081 25 °C						P
Object / part No.		A	B		C	D
		max	min	max	max	max
T8-L06-10A2	Requirement	589,8	594,5	596,9	604,0	28,0
	Measured	588,34	594,53		601,72	27,39
T8-L12-18A2	Requirement	1199,4	1204,1	1206,5	1213,6	28,0
	Measured	1198,04	1204,23		1211,42	27,31
T8-L15-25A2	Requirement	1500,0	1504,7	1507,1	1514,2	28,0
	Measured	1499,05	1505,61		1511,2	27,41

TABLE 4 Variation of dimension A and B			
Object / part No.	A (in operation)	A: 45 °C	B: -20 °C
	max		min
T8-L06-10A2	588,50	588,95	594,65
T8-L12-18A2	1198,36	1198,75	1205,32
T8-L15-25A2	1499,15	1499,78	1505,75

TABLE 5 Compliance acc. to clause 6.3.6				P
A1 = Atmax + ΔA – A25°C (tmax – 25 °C) 11,7*10-6				
B1 = Btmin – A25°C (tmin – 25 °C) 11,7*10-6				
Object / part No.		A1	B1	
T8-L06-10A2	Requirement	Max. 589,8	Min. 594,5 Max. 596,9	
	Measured	588,97	594,96	
T8-L12-18A2	Requirement	Max. 1199,4	Min. 1204,1 Max. 1206,5	
	Measured	1198,79	1205,95	
T8-L15-25A2	Requirement	Max. 1500,0	Min. 1504,7 Max. 1507,1	
	Measured	1499,53	1506,54	

IEC 62776			
Clause	Requirement + Test	Result - Remark	Verdict
TABLE 6	Ball Pressure Test of Thermoplastics		P
Allowed impression diameter (mm): 2mm			—
Part	Test temperature (°C)	Impression diameter (mm)	
PCB	125	1,0	
LED PCB	125	0,9	
Lamp cap	125	1,2	
Enclosure of LED starter	125	1,1	
Base of LED starter	125	1,1	
Supplementary information:			

TABLE 7 Tests of fault conditions (for PCB1)			P
Part	Simulated fault	Result	Hazard
BD1	1,1Un, Short-circuited	Fuse resistor opened immediately	YES /NO
C1	1,1Un, Short-circuited	Unit shut down immediately	YES /NO
C2	1,1Un, Short-circuited	Unit shut down immediately	YES /NO
C3	1,1Un, Short-circuited	Unit shut down immediately	YES /NO
U1	1,1Un, Short-circuited	Unit shut down immediately	YES /NO
D1	1,1Un, Short-circuited	Unit shut down immediately	YES /NO
Output(+,-)	1,1Un, Short-circuited	Unit shut down immediately	YES /NO

TABLE 7 Tests of fault conditions (for PCB2)			P
Part	Simulated fault	Result	Hazard
DB1	1,1Un, Short-circuited	Fuse resistor opened immediately	YES /NO
C1	1,1Un, Short-circuited	Fuse resistor opened immediately	YES /NO
C2	1,1Un, Short-circuited	Unit shut down immediately	YES /NO
C3	1,1Un, Short-circuited	Unit shut down immediately	YES /NO
C5	1,1Un, Short-circuited	Unit shut down immediately	YES /NO
C6	1,1Un, Short-circuited	Unit shut down immediately	YES /NO
C7	1,1Un, Short-circuited	Unit shut down immediately	YES /NO
U1	1,1Un, Short-circuited	Unit shut down immediately	YES /NO
D1	1,1Un, Short-circuited	Unit shut down immediately	YES /NO
D2	1,1Un, Short-circuited	Unit shut down immediately	YES /NO
Q1	1,1Un, Short-circuited	Unit shut down immediately	YES /NO
Output(+,-)	1,1Un, Short-circuited	Unit shut down immediately	YES /NO

IEC 62776						
Clause	Requirement + Test	Result - Remark				Verdict
TABLE 8	Clearance And Creep age Distance Measurements (for PCB1)					P
clearance cl and creepage distance decry at/of:	Up (V)	U rams. (V)	required cr (mm)	Measured cr (mm)	required cl (mm)	measured cl (mm)
Between L&N of PCB	--	240	2,5	3,5	1,5	3,5
Between different polarity of lamp cap	--	240	2,5	4,0	1,5	4,0
Between different polarity of fuse in cap	--	240	2,5	8,0	1,5	8,0
Between different polarity of fuse resistor in PCB	--	240	2,5	3,0	1,5	3,0
Between live parts and accessible parts	--	240	5,0	6,0	3,0	6,0
Supplementary information:						

TABLE 8	Clearance And Creep age Distance Measurements (for PCB2)					P
clearance cl and creepage distance decry at/of:	Up (V)	U rams. (V)	required cr (mm)	Measured cr (mm)	required cl (mm)	measured cl (mm)
Between L&N of PCB	--	240	2,5	4,0	1,5	4,0
Between different polarity of lamp cap	--	240	2,5	4,0	1,5	4,0
Between different polarity of fuse in cap	--	240	2,5	8,0	1,5	8,0
Between different polarity of fuse resistor in PCB	--	240	2,5	3,0	1,5	3,0
Between live parts and accessible parts	--	240	5,0	6,0	3,0	6,0
Supplementary information:						

IEC 62776			
Clause	Requirement + Test	Result - Remark	Verdict
	EMF		P
	EMF; The tested product complies to the requirements of EN 62493		P
L	ANNEX L: PARTICULAR ADDITIONAL REQUIREMENTS FOR integrated HF-TRANSFORMERS PROVIDING SELV (IEC 61347-1)		N/A
L.3	Classification		N/A
	non-inherently short circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	inherently short circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	fail safe controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	non-short-circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
L.6	Heating		N/A
	No excessive temperatures in normal use		N/A
	Value if capacitor tc marked :		—
	Winding insulation classified as Class :		—
	Comply with tests of clause 14 of IEC 61558-1 with adjustments		N/A
L.9	Construction		
L.9.1	Transformer comply with 19.12 of IEC 61558-1 and 19 of IEC 61558-2-6		N/A
	HF transformer comply with 19 of IEC 61558-2-16		N/A
L.10	Components		
	Protective devices comply with 20.6 – 20.11 of IEC 61558-1		N/A
L.11	Creepage distances and clearances		
	1. Insulation between input and output circuits, basic insulation:		N/A
	a) measured values > specified values (mm) :		N/A
	b) measured values > specified values (mm) :		N/A
	c) measured values > specified values (mm) :		N/A
	2. Insulation between input and output circuits, double or reinforced insulation:		N/A
	a) measured values > specified values (mm) :		N/A
	b) measured values > specified values (mm) :		N/A
	c) measured values > specified values (mm) :		N/A
	3. Insulation between adjacent input circuits		N/A
	- measured values > specified values (mm) :		N/A
	3. Insulation between adjacent output circuits		N/A
	- measured values > specified values (mm) :		N/A

IEC 62776			
Clause	Requirement + Test	Result - Remark	Verdict
	4. Insulation between terminals for external connection:		N/A
	- measured values > specified values (mm) :		N/A
	5. Basic or supplementary insulation:		N/A
	a) measured values > specified values (mm) :		N/A
	b) measured values > specified values (mm) :		N/A
	c) measured values > specified values (mm) :		N/A
	d) measured values > specified values (mm) :		N/A
	e) measured values > specified values (mm) :		N/A
	6. Reinforced insulation or insulation:		N/A
	Between body and output circuit: measured values > specified values (mm) :		N/A
	Between body and output circuit if provision against transient voltages: measured values > specified values (mm) :		N/A
	7. Distance through insulation:		N/A
	a) measured values > specified values (mm) :		N/A
	b) measured values > specified values (mm) :		N/A
	c) measured values > specified values (mm) :		N/A

Attachment A

Photo documentation

Type of equipment, model: LED Tube; See main report

Details of: Overview: T8-L06-10A2, T8-L12-16A2, T8-L15-25A2

T8-L06-10A2, T8-L12-16A2 and T8-L15-25A2 from top to down

View:

general

front

rear

right

left

top

bottom



Details of: Lamp cap: T8-L15-25A2

View:

general

front

rear

right

left

top

bottom



Attachment A

Details of: Internal view: T8-L15-25A2

View:

general

front

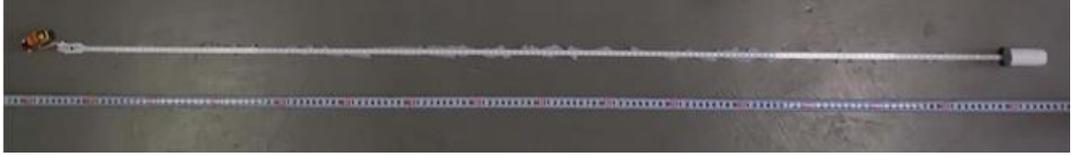
rear

right

left

top

bottom



Details of: Internal view: T8-L15-25A2

View:

general

front

rear

right

left

top

bottom

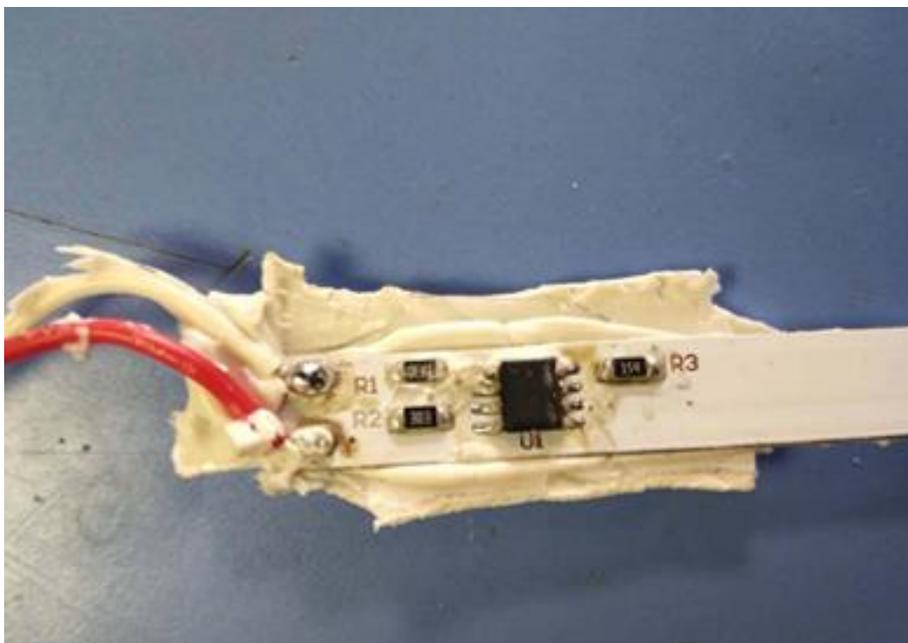


Attachment A

Details of: Internal view for T8-L15-25A2

View:

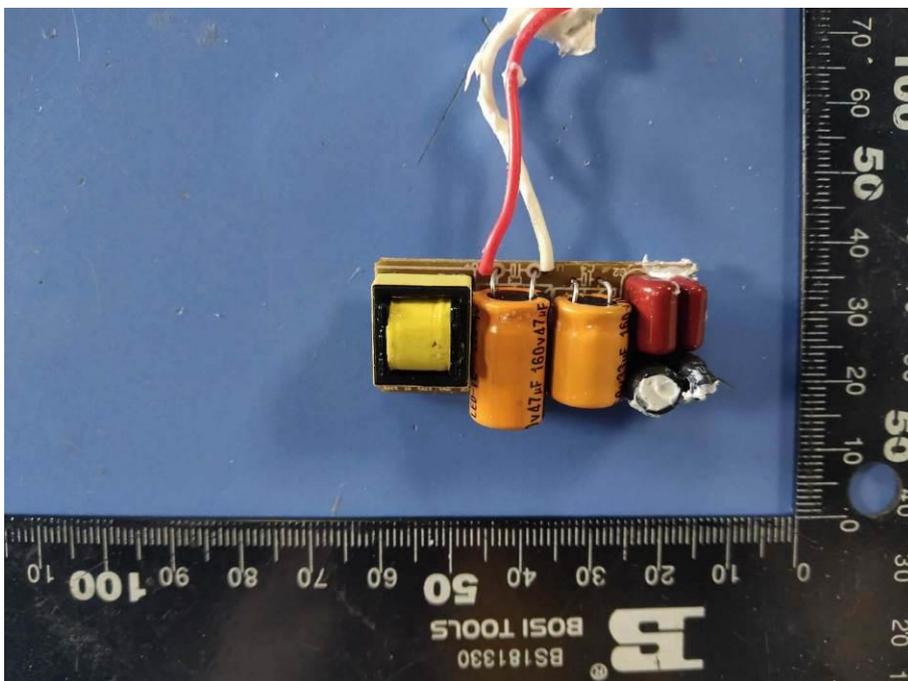
- general
- front
- rear
- right
- left
- top
- bottom



Details of: PCB2: T8-L15-25A2

View:

- general
- front
- rear
- right
- left
- top
- bottom
- left
- top
- bottom

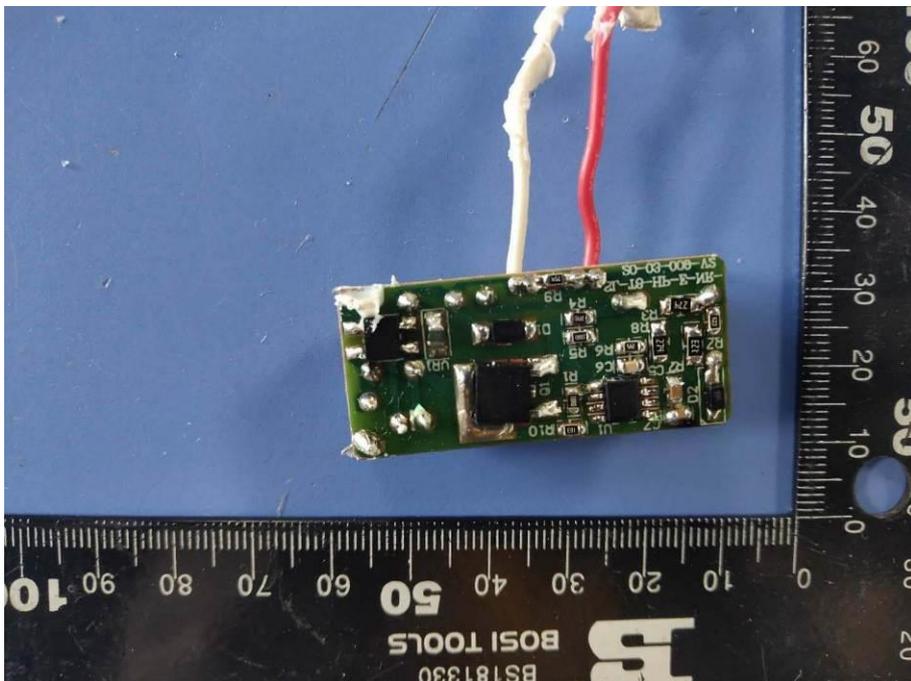


Attachment A

Details of: PCB2: T8-L15-25A2

View:

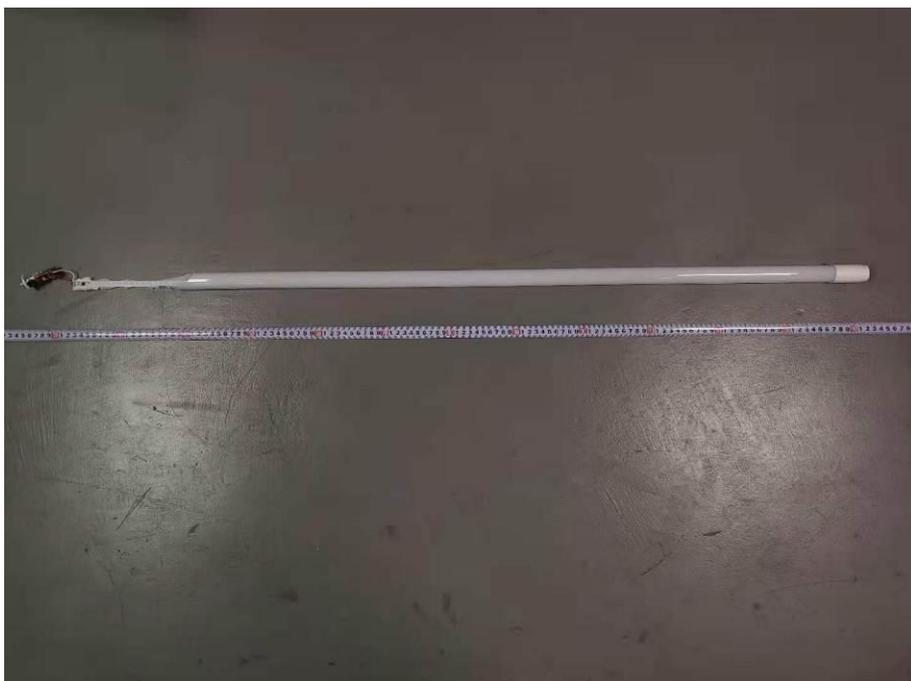
- [x] general
- [] front
- [] rear
- [] right
- [] left
- [] top
- [] bottom



Details of: Internal view: T8-L15-18A2

View:

- [x] general
- [] front
- [] rear
- [] right
- [] left
- [] top
- [] bottom

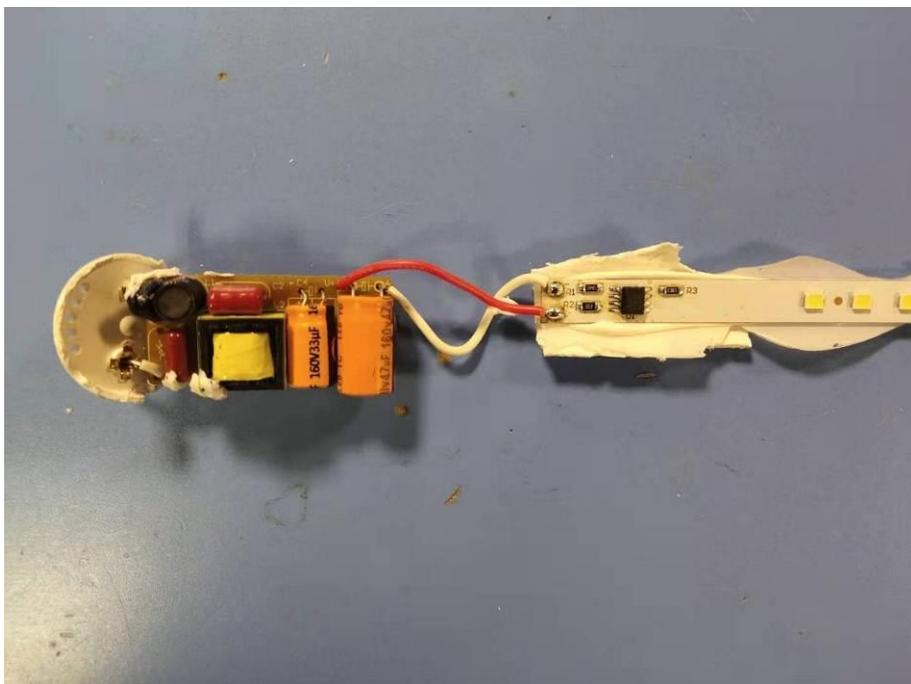


Attachment A

Details of: Internal view: T8-L15-18A2

View:

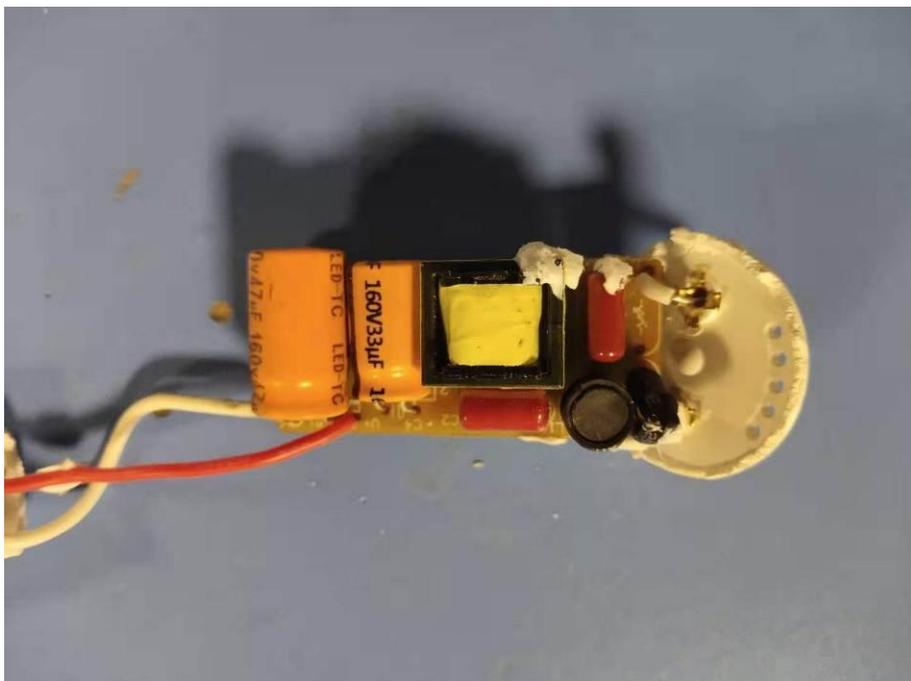
- general
- front
- rear
- right
- left
- top
- bottom



Details of: PCB1: T8-L15-18A2

View:

- general
- front
- rear
- right
- left
- top
- bottom
- left
- top
- bottom



Attachment A

Details of: LED starter: T8-L15-18A2

View:

general

front

rear

right

left

top

bottom

left

top

bottom

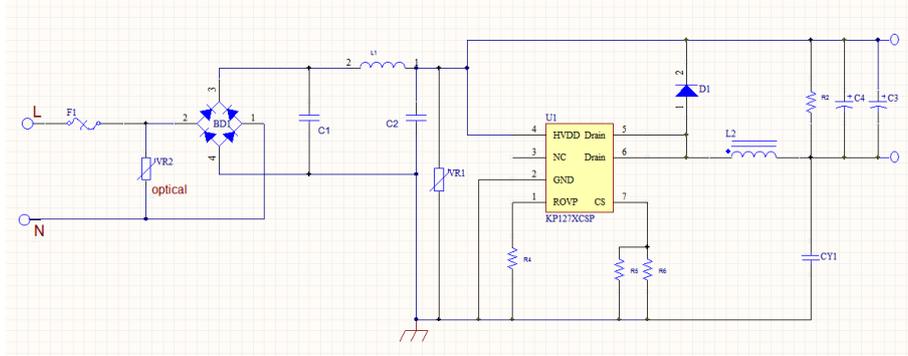


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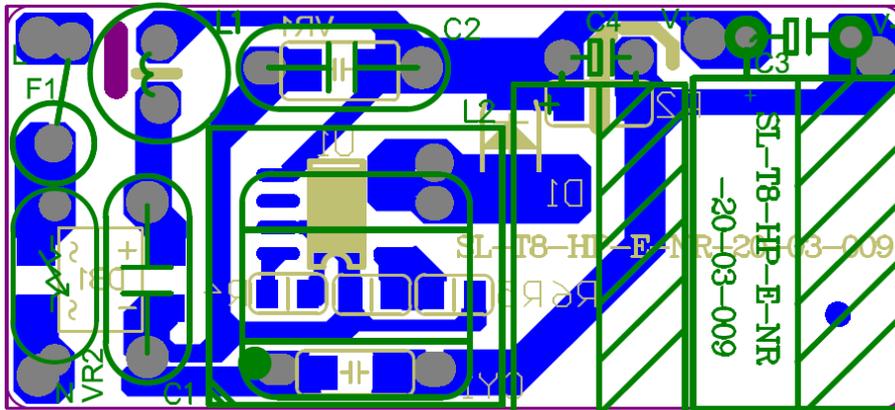
Attachment B

Circuit diagram and PCB layout

Electric circuit for PCB1:



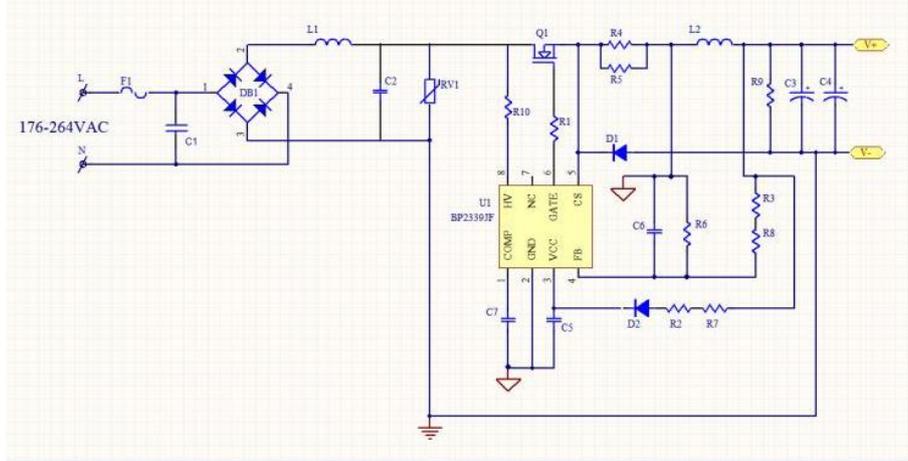
PCB layout for PCB1:



Attachment B

Circuit diagram and PCB layout

Electric circuit for PCB2:



PCB layout for PCB2:

