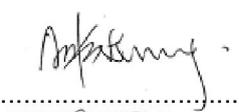
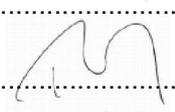


<b>TEST REPORT</b> <b>IEC 60968 and/or EN 60968</b> <b>Self-ballasted lamps for general lighting services</b> <b>Safety requirements</b>	
<b>Report reference No.</b> .....	3015614.51-QUA/LI
Tested by (printed name and signature) .....	Anky Leung 
Approved by (printed name and signature) .....	Roy Yip 
Date of issue .....	2012-10-31
<b>Testing Laboratory Name</b> .....	DEKRA Certification Hong Kong Limited
Address .....	Unit 1-14, 6/F., Fuk Shing Commercial Building, 28 on Lok Mun Street, On Lok Tsuen, Fanling, N.T. Hong Kong
Testing location .....	CBTL <input checked="" type="checkbox"/> CCATL <input type="checkbox"/> SMT <input type="checkbox"/> TMP <input type="checkbox"/>
Address .....	as above
<b>Applicant's Name</b> .....	Matrix Lighting Limited
Address .....	Room 223-231, 2/F., East Wing, Tsim Sha Tsui Centre, 66 Mody Road, Tsim Sha Tsui East, Kowloon, Hong Kong
<b>Test specification</b>	
Standard .....	IEC 60968:88 (1 <sup>st</sup> Edition) + A1:91 + A2:99 and EN 60968:90 + A1:93 + A2:99 + Australia national deviation (AS/NZS 60968: 2001)
Test procedure .....	LVD
Non-standard test method .....	N/A
<b>Test Report Form No.</b>	IECEN60968A
TRF originator .....	SGS Fimko Ltd
Master TRF .....	dated 2002-01
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<b>Test item description</b> .....	LED PL-C Lamp
Trademark .....	VIRIBRIGHT
Manufacturer .....	Matrix Lighting Limited
Factory .....	1) KEYHINGE TOYS VIET NAM JOINT STOCK COMPANY Hoa Khanh Industrial Zone, Da Nang City, Viet Nam. 2) ZhongShan Wei Heng Plastic Industry Co.,Ltd. 172 North Banfu Road, Banfu Town, ZhongShan, Guangdong, China
Model and/or type reference .....	1) PLC-75GEU; 2) PLC-75EEU
Rating(s) (V; Hz).....	220-240 Vac, 50 Hz, 35 mA, 7,5 W 1) G24; 2) E27

**Copy of marking plate**

	Model#:PLC-75GEU 220-240VAC 50Hz 35mA 7.5W Indoor Use Only	<b>7.5W</b> <b>G24</b>	LED PL-C Lamp Matrix Made In China Patents Pending				
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	Model#:PLC-75EEU 220-240VAC 50Hz 35mA 7.5W Indoor Use Only	<b>7.5W</b> <b>E27</b>	LED PL-C Lamp Matrix Made In China Patents Pending				
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**Summary of testing**

Full test according IEC/EN 60968 except cl. 12 with additionally cl. 13, 15,16,17,19 of IEC/EN 62031, IEC/EN 62471 and IEC/EN 60061-1 sheets 7004-78-5 (G24).

The LED PL-C Lamp was tested according EN 62471:2008. The models: PLC-75GEU with 2800 K and 6000 K LED module were selected for the test, which can represent all models. The LED PL-C Lamp have been classified as Exempt Group.

Australia national deviation of AS/NZS 60968: 2001 was applied. See details in page 13.

<b>Test items particulars:</b>		LED PL-C Lamp
Lamp cap .....	:	1) G24; 2) E27
Lamp identification .....	:	-
Commission received from .....	:	-
Date .....	:	2012-10-31
Electrical safety class .....	:	II
IP number .....	:	IP20
.....	:	
<b>Test case verdicts</b>		
Test case does not apply to the test object ..	:	N/A
Test item does meet the requirement .....	:	P(ass)
Test item does not meet the requirement ...	:	F(ail)
<b>Testing</b>		
Date of receipt of test item .....	:	2012-10-15
Date(s) of performance of test .....	:	2012-10-15 to 2012-10-26
<b>General remarks</b>		
<p><b>This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by a NCB in accordance with IEC 60730-2.</b></p> <p>This report shall not be reproduced except in full without the written approval of the testing laboratory. The test results presented in this report relate only to the item(s) tested.</p> <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 comma (point) is used as the decimal separator.</p> <p>Remark: Due to update of model number: PLC-75EEU, the test report: 3013417.50-QUA/LI was being superseded. The models: PLC-75GEU and PLC-75EEU were using similar construction and same type of LED, the difference is at the lamp cap only, additional test of clauses 5 &amp; 8 was applied to the E27 lamp cap.</p>		
<b>General product information:</b>		
<p>Self-ballasted LED lamps with G24 and E27 lamp cap.</p> <p>Each model has three different colour temperatures: 2800K, 4000K and 6000K.</p> <p>All models contained similar construction; the difference between each model is the lamp cap only.</p>		

IEC 60968 and/or EN 60968			
Clause	Requirement – Test	Result - Remark	Verdict

	SAFETY REQUIREMENTS		
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4	MARKING		
4.1	1) Mark of origin	VIRIBRIGHT	P
	2) Rated voltage/voltage range (V)	220-240 Vac	P
	3) Rated wattage (W)	7,5 W	P
	4) Rated frequency (Hz)	50 Hz	P
4.2	1) Lamp current (A)	35 mA	P
	2) Burning position if restricted		N/A
	3) The mechanical stress caused by the weight of the lamp in the luminaire		N/A
	4) Special conditions or restrictions observed for lamp operation; operation in dimming circuits		N/A
	Not suitable for dimming; symbol used		P
4.3	1) Presence and legibility of the marking by visual inspection		P
	2) The durability of the marking is checked by rubbing lightly with water and hexane for 15 s		P
	3) Availability of information by visual inspection		P

5	INTERCHANGEABILITY		
5.1	Interchangeability shall be ensured by the use of caps in accordance with IEC 60061-1		P
5.2	Compliance of the combination of cap and bulb is checked by the use of gauges		P
	B22d or B15d:		N/A
	A max. and A min. gauge 7006-10/11		N/A
	D1 max. gauge 7006-10/11		N/A
	N min. gauge 7006-10/11		N/A
	Diametrical position of the pins:		N/A
	Insertion in lampholder gauge 7006-4A		N/A
	Retention in lampholder gauge 7006-4B		N/A
	E27:		P
	Max. dimension of the screw thread gauge 7006-27B		P

IEC 60968 and/or EN 60968			
Clause	Requirement – Test	Result - Remark	Verdict
	Min. major diameter of the screw thread gauge 7006-28A		P
	Contact making gauge 7006-50		P
	E26:		N/A
	Max. dimensions of the screw thread 7006-27D		N/A
	Max. major diameter of the screw thread 7006-27E		N/A
	E14:		N/A
	Max. dimensions of the screw thread 7006-27F		N/A
	Min. major diameter of the screw thread 7006-28B		N/A
	Contact making 7006-54		N/A
5.3	Mass not exceeding 1 kg		P
	Bending moment not exceeding 2 Nm	< 2 Nm	P

6	PROTECTION AGAINST ELECTRIC SHOCK		
	Lamps shall be so constructed that no internal metal parts or live parts are accessible, when the lamps is installed in a prescribed lampholder. Compliance is checked by means of the standard test finger with force of 10 N		P
	Edison screw caps compliance with gauge IEC 60061-3, sheet 7006-51A for E27 caps		N/A
	and sheet 7006-55 for E14 caps		N/A
	B22 or B15 caps compliances with normal incandescent lamps		N/A
	External metal parts shall be so designed that live parts are not accessible (test of Cl. 7)		P

7	INSULATION RESISTANCE AND ELECTRIC STRENGTH AFTER HUMIDITY TREATMENT		
7.1	After storage 48 h at a 91...95 % relative humidity and at 20...30 °C		P
	Insulation resistance with 500 V d.c., required $\geq 4 \text{ M}\Omega$ .	> 100 M $\Omega$	P
7.2	Immediately after the insulation resistance test, electric strength test for 1 min.		P
	Type HV (220 ... 250 V): 4000 V rms		P
	Type BV (100 ... 120 V): 2xU + 1000 V		N/A
	No flashover or breakdown		P

IEC 60968 and/or EN 60968			
Clause	Requirement – Test	Result - Remark	Verdict

8	MECHANICAL STRENGTH		
	Torsion resistance		P
	The cap is remain firmly attached when subjected to torque levels		P
	- B22d ..... 3 Nm :		N/A
	- B15d ..... 1,15 Nm:		N/A
	- E26 and E27 ..... 3 Nm:		P
	- E14 ..... 1,15 Nm:		N/A
	Torque increased continuously from zero to specified value		P
	Uncemented caps; relative movement between cap and bulb does not exceed 10°		P
	After mechanical strength test sample complies requirements of accessibility		P

9	CAP TEMPERATURE RISE		
	Cap temperature rise $\Delta T_s$ not exceeding the condition specified in IEC 60360:		P
	- B22d ..... 125 K:		N/A
	- B15d ..... 120 K:		N/A
	- E27 ..... 120 K:		N/A
	- E14 ..... 120 K:		N/A
	- E26 ..... under consideration		N/A
	- G24 ..... under consideration	5,9 K	N/A

10	RESISTANCE TO HEAT		
	External parts of insulating material providing protection against electric shock, and parts of insulating material retaining live parts in position, ball pressure test:		P
	Part tested; temperature (°C); diameter of impression ( $\leq 2$ mm) .....	Lamp cover; 125 °C; 1,06 mm	P
	Part tested; temperature (°C); diameter of impression ( $\leq 2$ mm) .....	LED module; 125 °C; 1,21 mm	P
	Part tested; temperature (°C); diameter of impression ( $\leq 2$ mm) .....	PCB; 125 °C; 0,90 mm	P
	Part tested; temperature (°C); diameter of impression ( $\leq 2$ mm) .....	Bobbin; 125 °C; 0,52 mm	P
	Part tested; temperature (°C); diameter of impression ( $\leq 2$ mm) .....	Lamp enclosure; 125 °C; 1,09 mm	P

IEC 60968 and/or EN 60968			
Clause	Requirement – Test	Result - Remark	Verdict
	Part tested; temperature (°C); diameter of impression (≤ 2 mm) .....	Lamp cap; 125 °C; 1,12 mm	P
	Part tested; temperature (°C); diameter of impression (≤ 2 mm) .....	Upper housing; 80 °C; 0,43mm	P

11	RESISTANCE TO FLAME AND IGNITION		
	Parts of insulating material retaining live parts in position and external parts of insulating material providing protection against electric shock, glow-wire test 650 °C		P
	Part tested; temperature (°C) .....	Lamp cover; 650 °C	P
	Part tested; temperature (°C).. .....	LED module; 650 °C	P
	Part tested; temperature (°C) .....	PCB; 650 °C	P
	Part tested; temperature (°C) .....	Bobbin; 650 °C	P
	Part tested; temperature (°C).. .....	LED enclosure; 650 °C	P
	Part tested; temperature (°C) .....	Lamp cap; 650 °C	P
	Part tested; temperature (°C) .....	Upper housing; 650 °C	P
	No visible flame and no sustained glowing		P
	Flames and glowing, extinguish within 30 s .....		N/A
	No ignition of the tissue paper		P

12	FAULT CONDITIONS		
	a) In a switch-start circuit, the starter is short-circuited		N/A
	b) Short-circuit across capacitors		N/A
	c) The lamp does not start, because one of the cathodes is broken		N/A
	d) The lamp does not start, although the cathode circuits are intact (de-activated lamp)		N/A
	e) The lamp operates, but one of the cathodes is de-activated or broken (rectifying effect)		N/A
	f) Opening or bridging other points in the circuit where the diagram indicates that such a fault condition may impair safety		N/A

	COMMON MODIFICATIONS (EN 60968:1990)		
5, 6, 8 and 9	Delete all references to E26 lamp caps		N/A

12	TABLE : tests of fault conditions (Refer to cl.13 of IEC/EN 62031)					
part	$0,9xU_n$	$1,1xU_n$	short-circuited	dis-connected		Hazard

IEC 60968 and/or EN 60968			
Clause	Requirement - Test	Result - Remark	Verdict

ANNEX 1 : Additional requirement of IEC 62031			—
<b>13</b>	<b>FAULT CONDITIONS</b>		
<b>13.1</b>	In compliance with IEC 61347-1 (clause numbers between parentheses refer to IEC 61347-1)		P
	When operated under fault conditions the LED-module:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	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)	N/A
	Distances on printed boards provided with coating according to IEC 60664-3		N/A
- (14.2)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	N/A
- (14.4)	Short-circuit across electrolytic capacitors	(see appended table)	P
- (14.5)	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
	After the tests the insulation resistance with d.c. 500 V (MΩ) are ≥ 1 MΩ .....	> 100 MΩ	P
	Temperature declared thermally protected LED-modules fulfil the requirements in Annex C of IEC 61437-1		N/A
<b>13.2</b>	Module withstands overpower condition >15 min.		N/A
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N/A
	During the tests, tissue paper, spread below module, does not ignite		N/A

IEC 60968 and/or EN 60968			
Clause	Requirement - Test	Result - Remark	Verdict
<b>15</b>	<b>CONSTRUCTION</b>		
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
	<b>ANNEX 1 : Additional requirement of IEC/EN 62031</b>		—

<b>16</b>	<b>CREEPAGE DISTANCES AND CLEARANCES</b>		
	Creepage and distances and clearances in compliance with IEC/EN 60598-1		P
	Class of protection .....	Class II	—
	Working voltage (V) .....	220-240	—
	Voltage form .....	Sinusoidal	—
	PTI .....	< 600	—
	Rated pulse voltage (kV) .....	-	—
	(1) Live parts of different polarity: cr (mm); cl (mm) .....	Cr > 2,5 mm Cl > 1,5 mm	P
	(2) Live parts and accessible parts: cr (mm); cl (mm) .....	Cr > 5 mm; Cl > 3 mm	P
	(3) Parts becoming live: cr (mm); cl (mm) :	Cr > 2,5 mm Cl > 1,5 mm	P
	(4) Outer surface of cable: cr (mm); cl (mm) :		N/A
	(5) Live parts of switches: cr (mm); cl (mm) :		N/A
	(6) Live parts and supporting surface: cr (mm); cl (mm) .....	Cr > 5 mm Cl > 3 mm	P

<b>17 (17)</b>	<b>SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS</b>		
	Screws, current-carrying parts and connections in compliance with IEC/EN 60598-1 (clause numbers between parentheses refer to IEC/EN 60598-1)		P
(4.11)	Electrical connections:		P
(4.11.1)	Contact pressure		P
(4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
	- at least two self-tapping screws		N/A
(4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
(4.11.4)	Material of current-carrying parts		P

IEC 60968 and/or EN 60968			
Clause	Requirement - Test	Result - Remark	Verdict
(4.11.5)	No contact to wood	No wood	N/A
(4.12)	Mechanical connections and glands:		P
(4.12.1)	Mechanical stress		P
	<b>ANNEX 1 : Additional requirement of IEC/EN 62031</b>		—

	Screws not made of soft metal		N/A
	Screws of insulating material		N/A
	Torque test: part; torque (Nm) .....		N/A
	Torque test: part; torque (Nm) .....		N/A
	Torque test: part; torque (Nm) .....		N/A
(4.12.2)	Screw diameter < 3 mm screwed into metal		N/A
(4.12.3)	Void		—
(4.12.4)	Locked connections		N/A
(4.12.5)	Screwed glands: force (N) .....		N/A

<b>19</b>	<b>RESISTANCE TO CORROSION</b>		
	Resistance to corrosion in compliance with IEC/EN 61347-1		N/A
	Rust protection:		N/A
	- test according 4.18.1 of IEC/EN 60598-1		N/A
	- adequate varnish on the outer surface		N/A

<b>14</b>	<b>TABLE: tests of fault conditions</b>		
Part	Simulated fault		Hazard
U3	Short-circuited	Fuse operated	NO
R7	Open-circuited	LED switched off	NO
C6	Short-circuited	Fuse operated	NO
V1	Short-circuited	Fuse operated	NO
C9	Short-circuited	Fuse operated	NO
C5	Short-circuited	Fuse operated	NO

ANNEX 2: Components						
object/part No.	code	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
Varistor	B	Brightking (Shenzhen) Co. Ltd. / Jinbaoge	471KD07	2,5 A; -40 °C to +85 °C	IEC 61051-1; IEC 61051-2	VDE
Fuse	B	Dongguan Hongda	2009	AC 250 V; 1 A	EN 60127-1; EN 60127-3	VDE
PCB	C	-	LI02-0	FR4	IEC / EN 60968	Test with appliance
PCB	C	-	LI02-1	FR4	IEC / EN 60968	Test with appliance
LED	C	Epistar Corporation	ES- AEHRAX12	Max. 2,5 V; 20 mA	IEC / EN 60968	Test with appliance
LED	C	Chi Mei Lighting Technology Corporation	C- C4XXCTXXSX	Max. 3,5 V; 20 mA	IEC / EN 60968	Test with appliance

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 60968 and/or EN 60968			
Clause	Requirement - Test	Result - Remark	Verdict
<b>ZC</b>	<b>ANNEX ZC, NATIONAL DEVIATIONS (AUS)</b>		—
<b>1</b>	<b>GENERAL</b>		—
1.1	SCOPE		—
<b>3</b>	<b>GENERAL REQUIREMENT AND GENERAL TEST REQUIREMENTS</b>		—
<b>4</b>	<b>MARKING</b>		P
<b>5</b>	<b>INTERCHANGEABILITY</b>		P
5.1 and 5.2	For Edison screw lamp holder, is checked by measurement and by inserting the lamp cap into a lamp holder complying with AS 3140		P
	For Bayonet cap lamp holder, is checked by measurement and by inserting the lamp cap into a lamp holder complying with AS 3117		P
<b>6</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK</b>		P
	Edison screw caps compliance with gauge IEC 60061-3, sheet 7006-51A for E27 caps or by measurement		P
	and sheet 7006-55 for E14 caps or by measurement		P
<b>7</b>	<b>INSULATION RESISTANCE AND ELECTRIC STRENGTH AFTER HUMIDITY TREATMENT</b>		P
<b>8</b>	<b>MECHANICAL STRENGTH</b>		P
	Other appropriate holders can be used except in the case of uncemented caps		N/A
<b>9</b>	<b>CAP TEMPERATURE RISE</b>		P
<b>10</b>	<b>RESISTANCE TO HEAT</b>		P
<b>11</b>	<b>RESISTANCE TO FLAME AND IGNITION</b>		P
	Base material of any printed circuit boards together with any coating or encapsulation is subject to the needle-flame test in accordance with AS/NZS 4695.2.2		P
	Not carried out on base material that is made of material classified as FV-0 according to AS/NZS 4695.707		N/A
<b>12</b>	<b>FAULT CONDITIONS</b>		N/A

Sample Photo



Outlook – PLC-75GEU



Outlook – PLC-75EEU

Sample Photo



Remote Phosphor – 6000 K

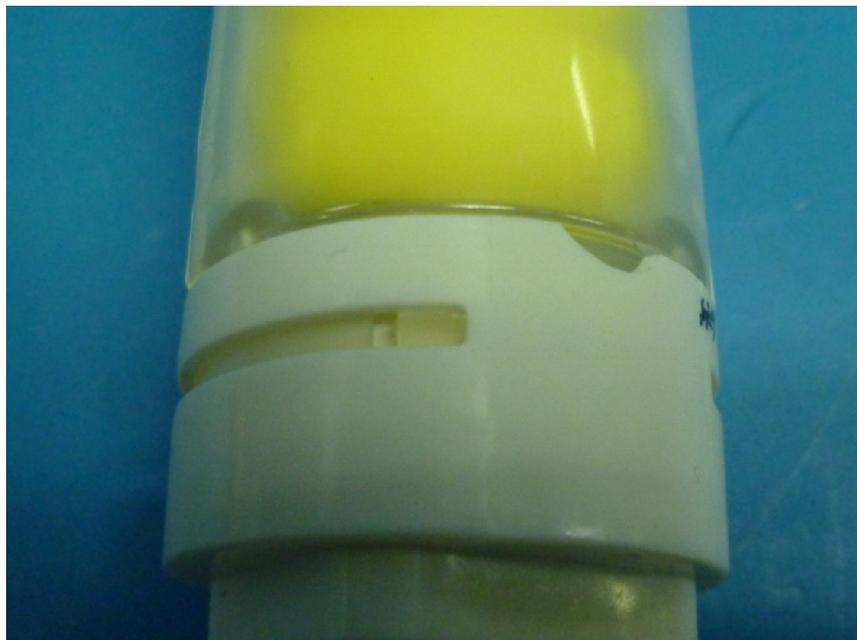


Remote Phosphor – 4000 K

Sample photo



Remote Phosphor – 2800 K

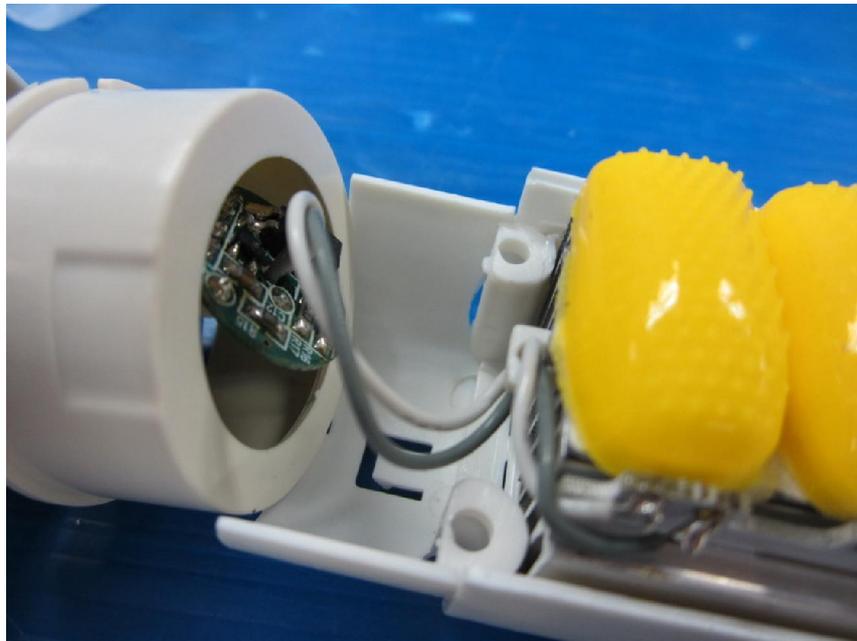


Construction

Sample Photo

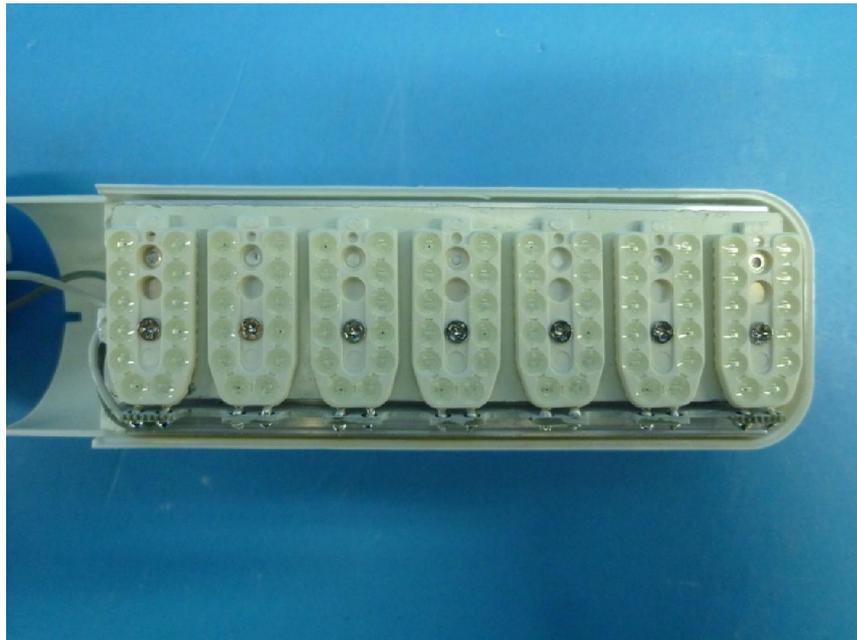


Construction

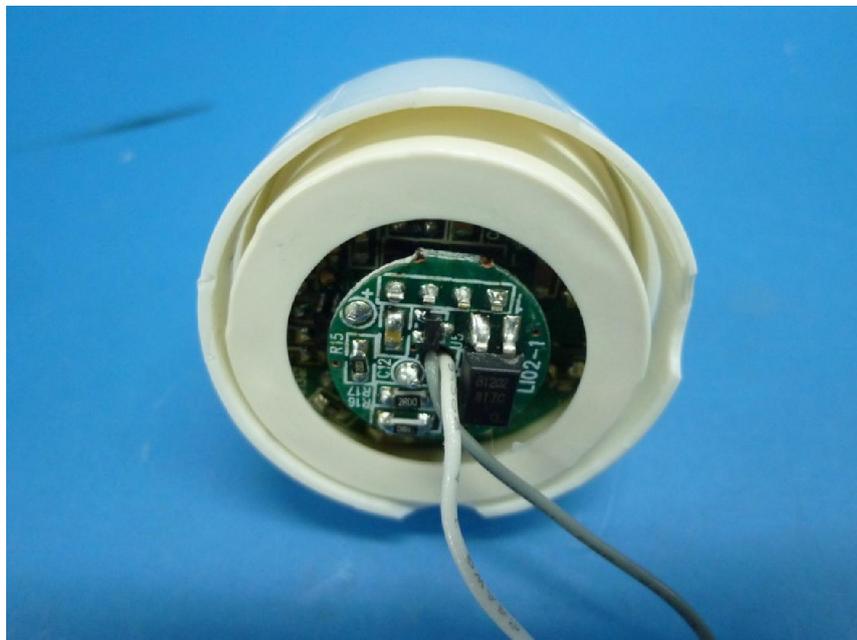


Construction

Sample Photo



LED module

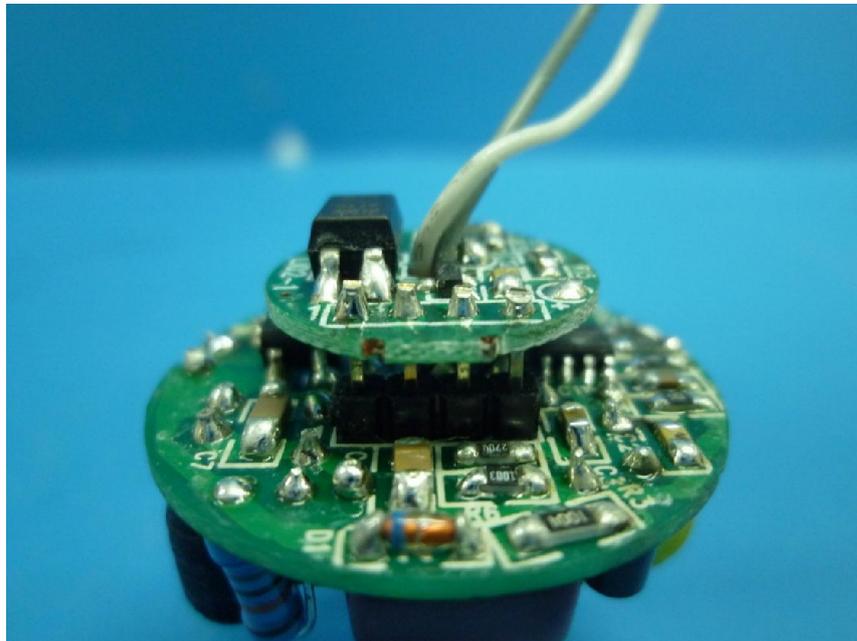


Construction

Sample Photo

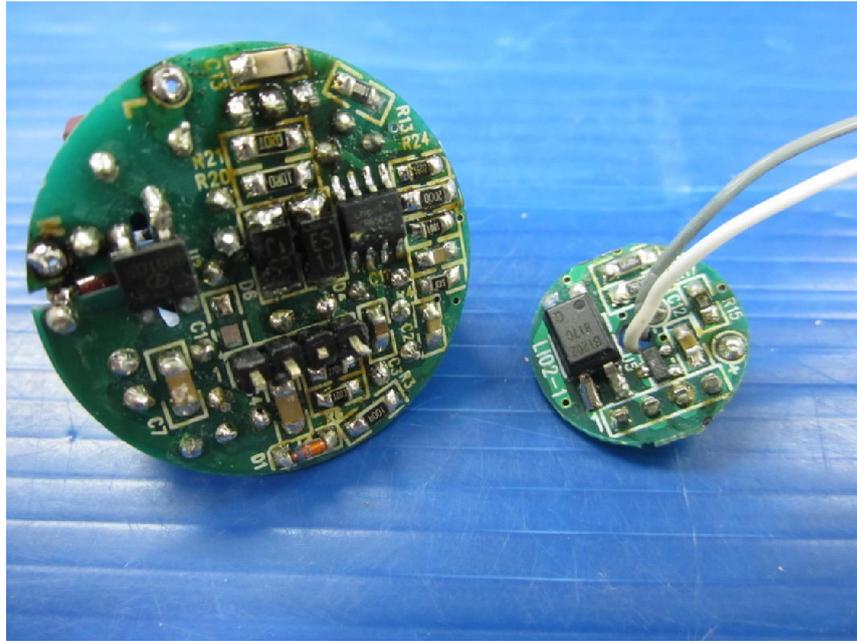


Construction

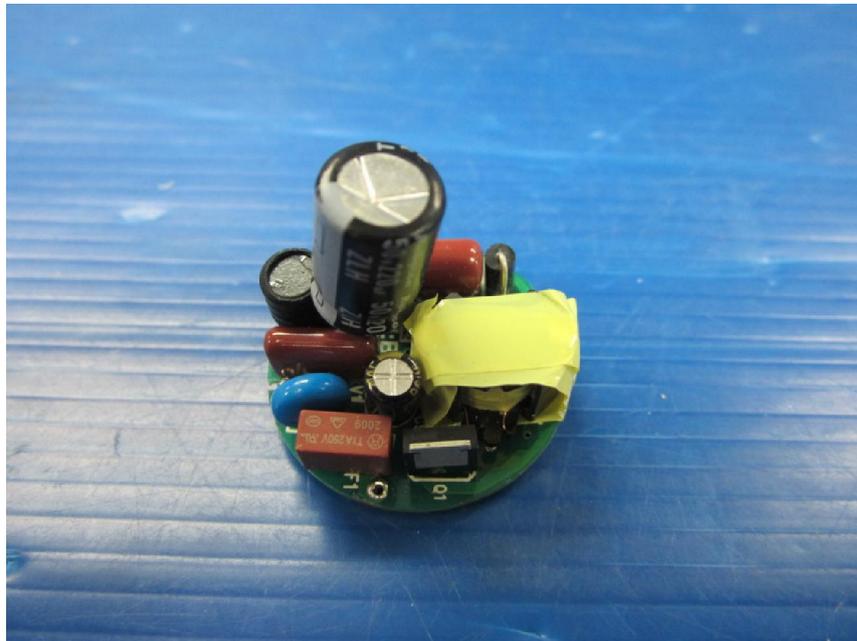


PCB

Sample Photo

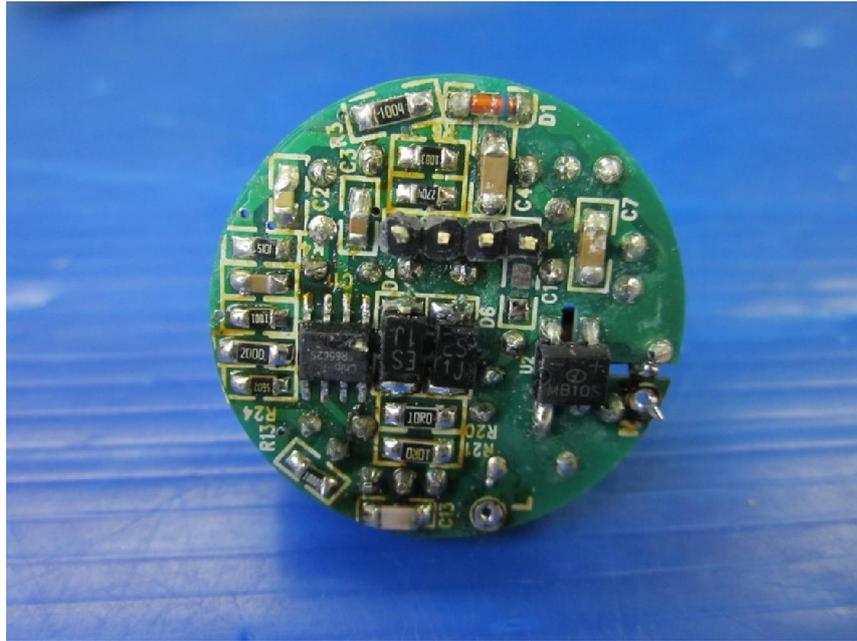


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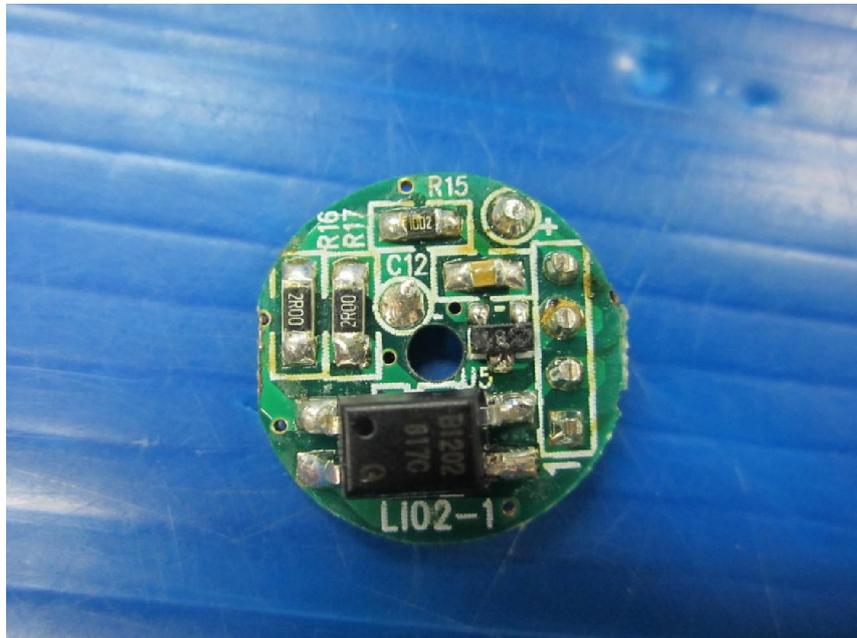


PCB

Sample Photo

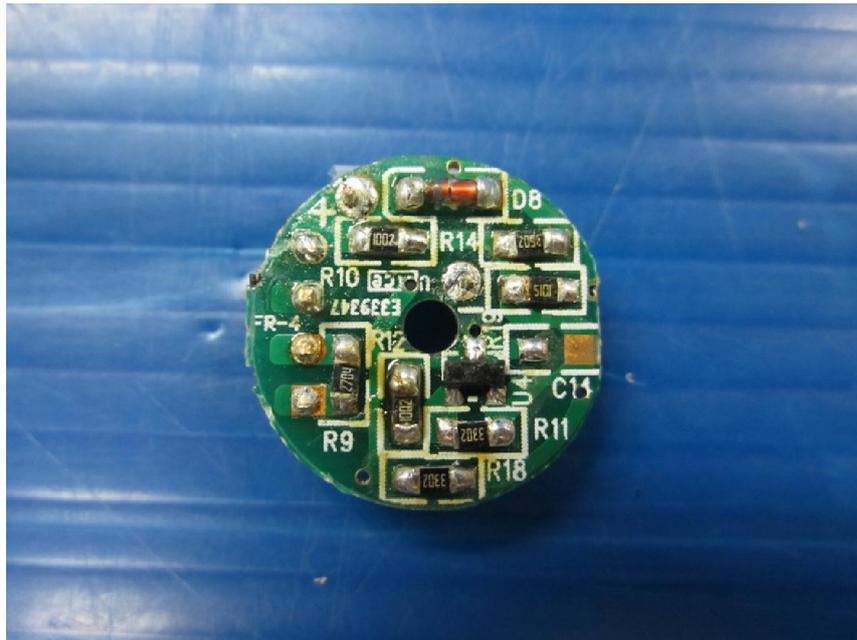


PCB



PCB

Sample Photo



PCB