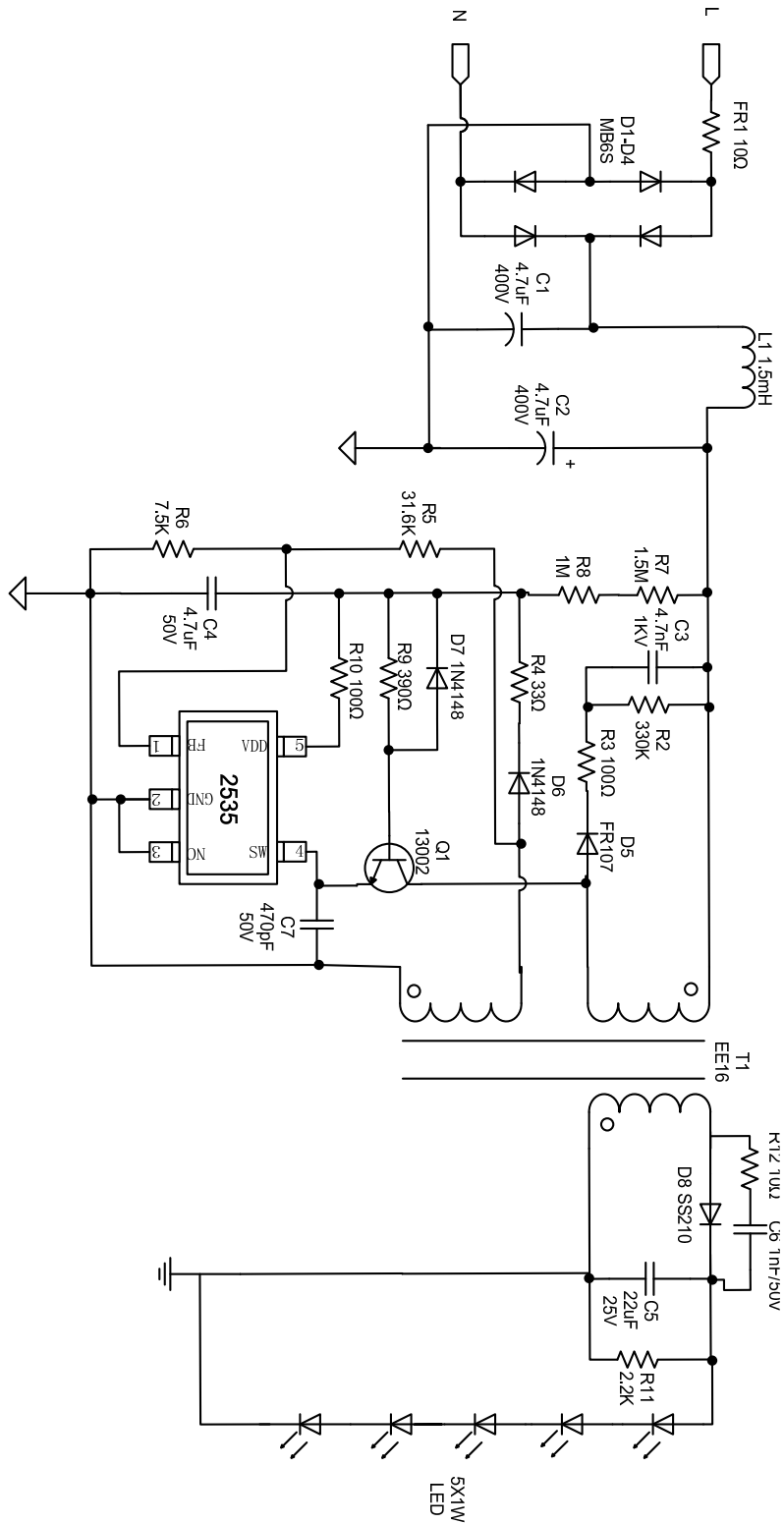


# 基于2535的低成本小体积5X1W LED驱动应用方案

## 1. 电路原理图



## 2. 样机照片

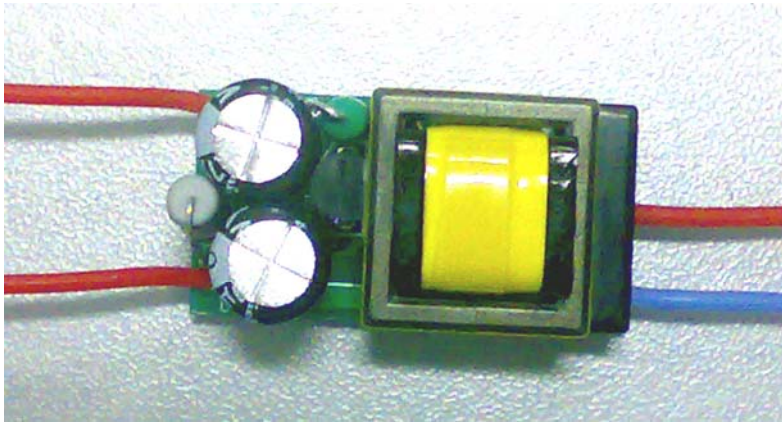


图1, 正面 (32mm x 17mm x 17mm)

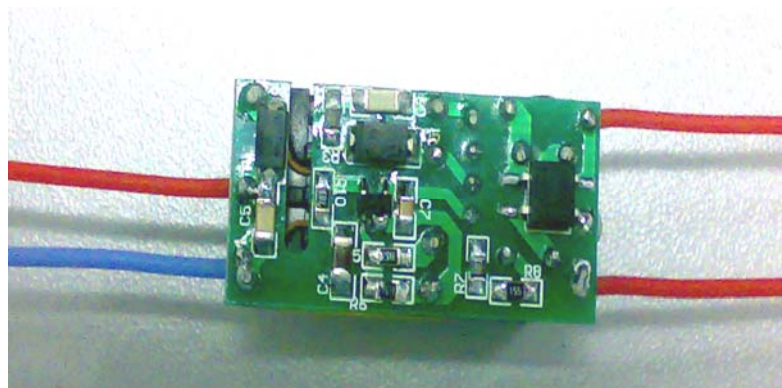


图2, 背面(32mm x 17mm x 17mm)

## 3. PCB绘制图

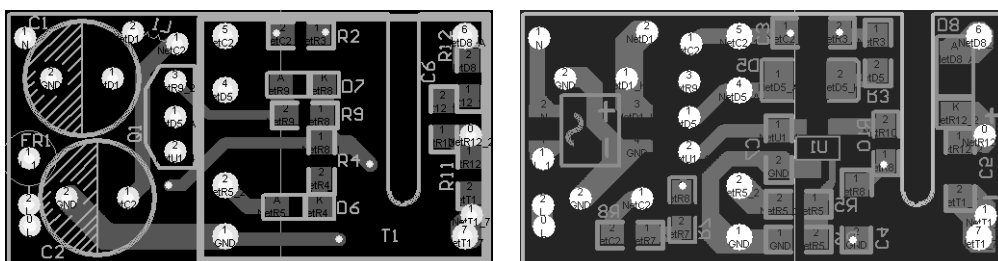


图3, PCB板设计

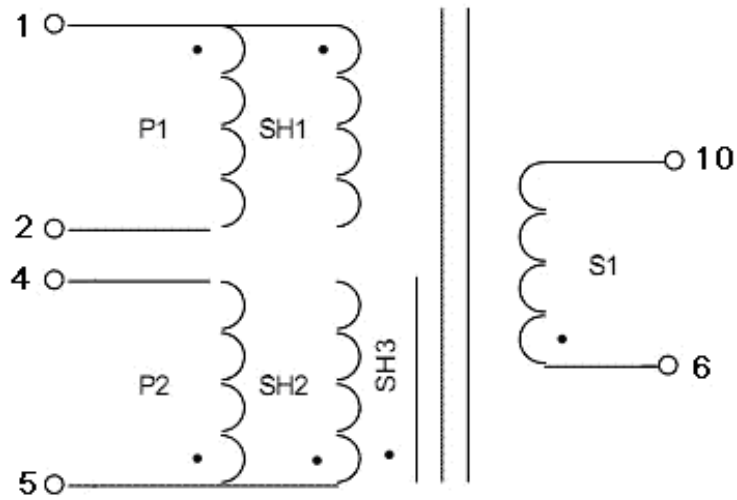
#### 4. 材料清单

序号	元件符号	描述	数量
1	FR1	Resistor,10ohm,1W	1
2	R2	Resistor,330Kohm,5%,SMT,0805	1
3	R3	Resistor,100ohm,5%,SMT,0805	1
4	R4	Resistor,33ohm,5%,SMT,0805	1
5	R5	Resistor, 31.6Kohm,1%,SMT,0805	1
6	R6	Resistor,7.5Kohm,1%,SMT,0805	1
7	R7	Resistor,1Mohm,5%,SMT,0805	1
8	R8	Resistor,1.5Mohm,5%,SMT,0805	1
9	R9	Resistor,390ohm,5%,SMT,0805	1
10	R10	Resistor,100ohm,5%,SMT,0805	1
11	R11	Resistor,2.2Kohm,5%,SMT,0805	1
12	R12	Resistor,10ohm,5%,SMT,0805	1
13	C1-C2	Capacitor,Electrolytic,4.7uF/400V,8x12	2
14	C3	Capacitor,Ceramic,4.7nF/1KV	1
15	C4	Capacitor, Ceramic,4.7uF/50V	1
16	C5	Capacitor, Ceramic,22uF/25V	1
17	C6	Capacitor,Ceramic,1nF/50V	1
18	C7	Capacitor,Ceramic,470pF/50V	1
19	L1	Inductor,1.5mH,0410	1
20	T1	Transformer,Lp=1.7mH,EE16	1
21	D1-D4	Bridge,Rectifier,600V,0.5A,MB6S	1
22	D5	Diode,UltraFast,FR107	1
23	D6	Diode,Switching, 1N4148,1206	1
24	D7	Diode,Switching,1N4148,1206	1
25	D8	Diode,Schottky, SS210	1
26	Q1	Transistor,NPN, 13002,TO-92	1
27	IC1	IC,PWM, 2535CH,SOT-23-5	1

表1: 材料清单表

## 5. 变压器规格

### 5.1. 示意图



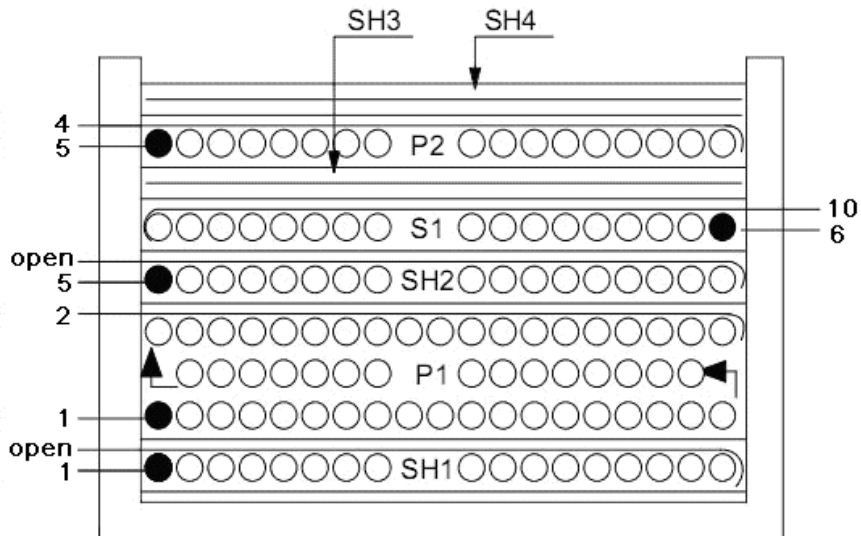
变压器示意图

### 5.2. 材料清单

绕组	脚位		匝数	绝缘导线/铜箔		
	开始	结束		类型	线径/数量	层数
SH1	1	Open	11	2UEW	0.15Φ/4	1
P1	1	2	130	2UEW	0.15Φ/1	3
SH2	5	Open	11	2UEW	0.15Φ/4	1
S1	6	10	29	TEX-E	0.3Φ/1	1
SH3	5	Open	0.9	铜箔胶带	0.025*7mm	1
P2	5	4	26	2UEW	0.15Φ/1	1

注：SH1、SH2为屏蔽层，SH3为铜箔屏蔽层，P1、P2为初级，S1为次级。

### 5.3 装配图



装配图

#### 5.4. 电气规格

序号	描述	条件	限值
1	电气绝缘强度	60Hz, 1 分钟, pins 1-4 到 pins 7-8	3000 Vac
2	初级P1电感	Pin1 到Pin2 电感量, 在1Vac & 1kHz	1.7mH $\pm$ 0.14mH

## 6. 性能测试数据

### 6.1. 短路功耗

输入电压	85 VAC	115 VAC	230 VAC	264 VAC	平均功耗
功耗 (mW)	8	32	140	182	90.5

### 6.2. 效率

条件\Vac	85 VAC	115 VAC	230 VAC	264 VAC	平均效率
3X1WLED	73.92%	75.74%	75.12%	73.69%	74.62%
4X1WLED	74.91%	77.55%	77.22%	76.15%	76.46%
5X1WLED	73.93%	77.25%	77.78%	77.11%	76.52%

### 6.3. 输入电压和负载调整率

条件\Vac	85 VAC	115 VAC	230 VAC	264 VAC	平均电流
3X1WLED	302.2mA	297.9mA	298.7mA	301.5mA	300.1mA
4X1WLED	307.3mA	304.1mA	309.2mA	308.2mA	307.2mA
5X1WLED	300.6mA	303.5mA	310.4mA	313.2mA	306.9mA

### 6.4 雷击

测试条件	测试方法	测试限制	通过/不通过
220Vac 5*1W	火线——零线 5次/45度相位 1次间隔60秒	0.5KV	通过

6.5 EMI测试

6.5.1 传导

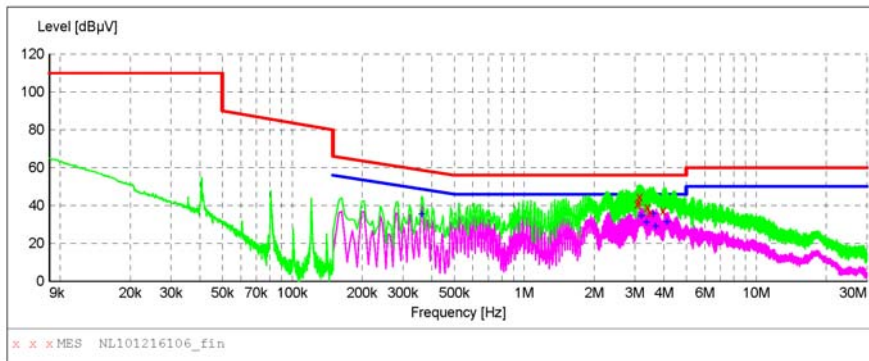
Anbotech Compliance Laboratory Limited

Voltage Mains EN 55015

EUT: LED LIGHT M/N:2535 5\*1W  
 Manufacturer: AI WEI  
 Operating Condition: ON  
 Test Site: 1# Shielding Room  
 Operator: WELL WANG  
 Test Specification: AC 230V 50Hz  
 Comment: L  
 Temp.=22.2 Hum.=60%

SCAN TABLE: "Voltage (9K~30M) FIN"

Short Description: 9K-30M Disturbance Voltages



MEASUREMENT RESULT: "NL101216106\_fin"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
3.079500	40.80	9.8	56	15.2	QP	L1	GND
3.120000	42.00	9.8	56	14.0	QP	L1	GND
3.156000	44.70	9.8	56	11.3	QP	L1	GND
3.399000	39.10	9.8	56	16.9	QP	L1	GND
3.498000	36.50	9.8	56	19.5	QP	L1	GND
3.979500	37.30	9.8	56	18.7	QP	L1	GND

MEASUREMENT RESULT: "NL101216106\_fin2"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.361500	35.50	10.1	49	13.2	AV	L1	GND
3.201000	34.70	9.8	46	11.3	AV	L1	GND
3.363000	31.20	9.8	46	14.8	AV	L1	GND
3.610500	35.70	9.8	46	10.3	AV	L1	GND
3.696000	29.10	9.8	46	16.9	AV	L1	GND
4.132500	31.30	9.8	46	14.7	AV	L1	GND

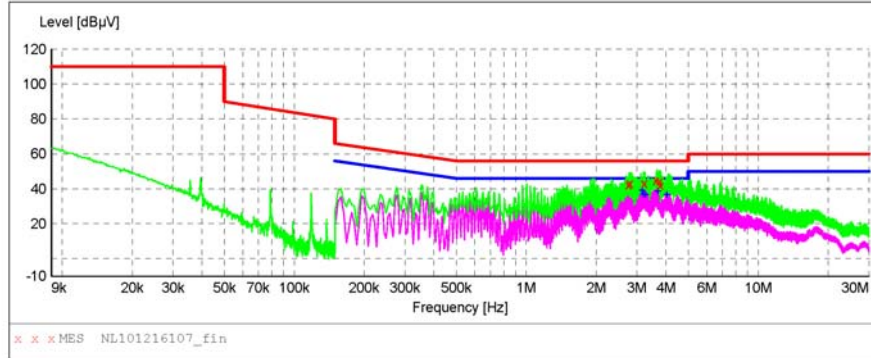
Anbotek Compliance Laboratory Limited

Voltage Mains EN 55015

EUT: LED LIGHT M/N:2535 5\*1W  
 Manufacturer: AI WEI  
 Operating Condition: ON  
 Test Site: 1# Shielding Room  
 Operator: WELL WANG  
 Test Specification: AC 230V 50Hz  
 Comment: N  
 Temp.=22.2 Hum.=60%

SCAN TABLE: "Voltage (9K~30M) FIN"

Short Description: 9K-30M Disturbance Voltages



MEASUREMENT RESULT: "NL101216107\_fin"

12/16/2010 10:31AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
2.764500	42.40	9.8	56	13.6	QP	N	GND
2.800500	43.10	9.8	56	12.9	QP	N	GND
3.232500	43.20	9.8	56	12.8	QP	N	GND
3.642000	44.90	9.8	56	11.1	QP	N	GND
3.754500	44.30	9.8	56	11.7	QP	N	GND
3.795000	42.10	9.8	56	13.9	QP	N	GND

MEASUREMENT RESULT: "NL101216107\_fin2"

12/16/2010 10:31AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
3.156000	39.20	9.8	46	6.8	AV	N	GND
3.196500	37.00	9.8	46	9.0	AV	N	GND
3.273000	36.70	9.8	46	9.3	AV	N	GND
3.682500	38.70	9.8	46	7.3	AV	N	GND
4.038000	36.80	9.8	46	9.2	AV	N	GND

6.5.2 辐射



**Anbotek Compliance Laboratory Limited**  
2/F, Langfeng Building, Kefa Road North, Hi-tech Industrial  
Park, Nanshan District, Shenzhen 518057, China

Site: 966 Chamber  
Tel: (86)755-26014771  
Fax: (86)755-26014772

Job No.: File :艾微	Polarization: Horizontal
Standard: (RE)EN55015	Power Source: AC 230V/50Hz
Test item: Radiation Test	Date: 10/12/16/
Temp.( C)/Hum.(%) 24.3 / 55 %	Time: 11/28/59
EUT: 2535 5x1W	Engineer Signature: JUICE XU
Mode: ON	Distance: 3m
Model: 5x1W	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Remark
1	52.4954	46.50	-25.02	21.48	40.00	-18.52	peak	
2	199.5819	56.45	-29.39	27.06	40.00	-12.94	peak	





**Anbotek Compliance Laboratory Limited**

2/F, Langfeng Building, Kefa Road North, Hi-tech Industrial Park, Nanshan District, Shenzhen 518057, China

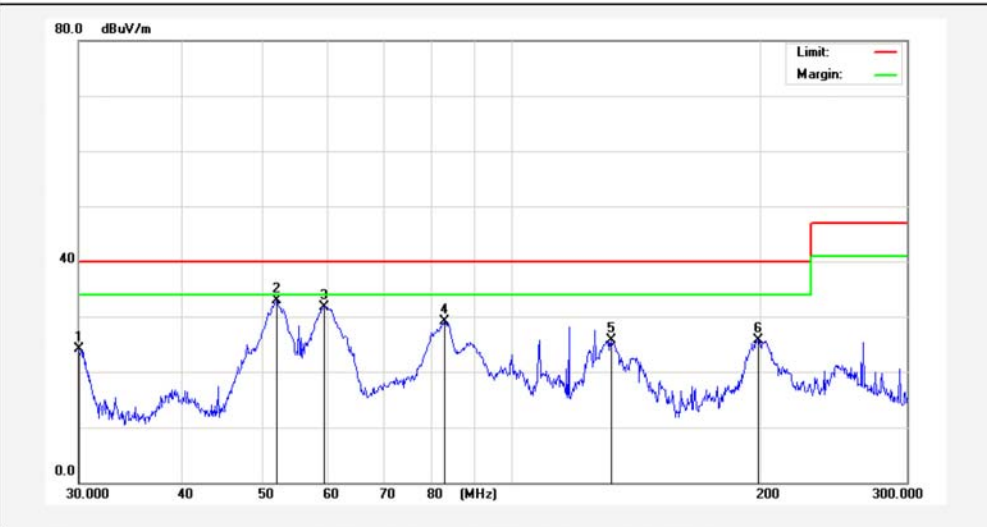
Site: 966 Chamber

Tel: (86)755-26014771

Fax: (86)755-26014772

Job No.: File :艾微	Polarization: Vertical
Standard: (RE)EN55015	Power Source: AC 230V/50Hz
Test item: Radiation Test	Date: 10/12/16/
Temp.( C)/Hum.(%) 24.3 / 55 %	Time: 11/27/49
EUT: 2535 5x1W	Engineer Signature: JUICE XU
Mode: ON	Distance: 3m
Model: 5x1W	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Remark
1	30.0000	50.50	-26.32	24.18	40.00	-15.82	peak	
2	52.0141	57.89	-25.00	32.89	40.00	-7.11	peak	
3	59.4458	57.13	-25.39	31.74	40.00	-8.26	peak	
4	83.0082	57.37	-28.29	29.08	40.00	-10.92	peak	
5	131.8625	52.26	-26.62	25.64	40.00	-14.36	peak	
6	198.6649	50.13	-24.40	25.73	40.00	-14.27	peak	