



*Shenzhen Sunlight Electronic CO., LTD*

# 承認書

## SPECIFICATION FOR APPROVAL

DOE VI AC DC Adapter 15V 1A Power Supply Switching 1000mA 15 Volt Adaptor

**CUSTOMER:** \_\_\_\_\_

**DESCRIPTION:** ADAPTER

**SPECS:** 15V1A AC/DC ADAPTER

**MODEL NO.:** GA150010

**DATE:** Feb-22-2015

|                           |              |              |
|---------------------------|--------------|--------------|
| <b>APPROVAL SIGNATURE</b> |              |              |
| <b>DATE:</b>              | <b>DATE:</b> | <b>DATE:</b> |

**PLEASE RETURN TO US ONE COPY OF “SPECIFICATION FOR APPROVAL” WITH YOUR APPROVED SIGNATURE**

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### 2. FEATURE :

- INPUT : UNIVERSAL 100-240 Vac/50-60 Hz INPUT, WITHOUT ANY SLIDE SWITCH
- OUTPUT : +15.0V/0-1.0A
- DIMENSION : 80.0(D)\*50.0(W)\*35.0(T)
- EFFICIENCY : 85% TYPICAL
- SAFETY : UL/CB/GS/SAA/PSE/LVD/CCC
- EMI : FCC CLASS B / EN55022 CLASS B; CONDUCTED & RADIATED MEETED
- HIGH FREQUENCY DESIGN, LESS POWER CONSUMPTION
- OVER VOLTAGE PROTECTION, SHORT CIRCUITED PROTECTION, OVER POWER PROTECTION
- CAN BE USED AT TELCOMMUNICATION, COMPUTER, INDUSTRIAL CONTORLLER & OA SYSTEM

### 3. INPUT :

|                             |  |
|-----------------------------|--|
| 3.1 VOLTAGE                 | UNIVERSAL 100~240Vac,SINGLE PHASE                            |
| 3.2 FREQUENCY               | 50HZ~60HZ  |
| 3.3 CURRENT                 | 0.8A Max   |
| 3.4 INRUSH CURRENT          | 20A Max/110Vac;40A Max/240Vac (COLD STABT AT 25°C FULL LOAD) |
| 3.5 EFFICIENCY              | 85% TYPICAL (AT NOMINAL LINE VOLTAGE FULL LOAD)              |
| 3.6 INPUT POWER DISSIPATION | UNDER 0.1W < ZERO LOAD 115V/60HZ INPUT                       |
|                             | UNDER 0.1W < ZERO LOAD 230V/50HZ INPUT                       |

### 4. OUTPUT :

|               |                |                                  |
|---------------|----------------|----------------------------------|
| 4.1 DC OUTPUT | VOLTAGE        | +15.0V                           |
|               | CURRENT        | 1.0A Max                         |
|               | REGULATION     | 14.40V Min~15.0V Typ.~15.60V Max |
|               | RIPPLE & NOISE | 120mV Max                        |
|               | TOTAL POWER    | 15W Max                          |

NOTE : FOR RIPPLE & NOISE MEASUREMENT, USE A 20MHZ BAND WIDTH FREQUENCY OSCILLOSCOPF, AND ADD A 0.1uF MULTILAYER CAP. AND A LOW ESR ELECTROLYTICCAP. (10uF) AT OUTPUT CONNECTOR TERMINALS. (AT NOMINAL LINE VOLTAGE FULL LOAD)

### 5. PROTECTION :

|                              |  |
|------------------------------|--|
| 5.1 OVER VOLTAGE PROTECTION  | 16.8V MAX. The power supply shall be hiccupped when output voltage reaches to its over voltage protection trigger point. |
| 5.2 SHORT CIRCUIT PROTECTION | The power supply shall be hiccupped when operating any output in a short circuit condition.                              |

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|                             |   |
|-----------------------------|---|
| 5.3 OVER POWER PROTECTION   | The adapter provide protection at 120%~240% of rated output power, the adapter shall be hiccupped but not damage.       |
| 5.4 OVER CURRENT PROTECTION | 2.4A MAX. The power supply shall be hiccupped when output current reaches to its over current protection trigger point. |

NOTE : WHEN PROTECTION CIRCUIT IS WORKING THE POWER SUPPLY WILL HICCUPPED, ONCE THE ABNORMAL CONDITIONS ARE REMOVED. THE POWER SUPPLY WILL RESTART AUTOMATICALLY.

## 6. SAFETY AND EMI REQUIREMENT :

### 6.1 SAFETY REQUIREMENT

a. SAFETY : UL/CB/GS/SAA/PSE/LVD/CCC

b. DIELECTRIC STRENGTH :5mA Max. CUT OFF CURREN

|                             |                      |
|-----------------------------|----------------------|
| (1):PRIMARY TO SECONDARY    | 3000Vac FOR 1 MINUTE |
| (2):PRIMARY TO FRAME GROUND | 3000Vac FOR 1 MINUTE |

c. INSULAION RESISTANCE :

|                             |                          |
|-----------------------------|--------------------------|
| (1):PRIMARY TO SECONDARY    | 50 M OHMS min FOR 500Vdc |
| (2):PRIMARY TO FRAME GROUND | 50 M OHMS min FOR 500Vdc |

d. LEAKAGE CURRENT :

|                     |           |
|---------------------|-----------|
| (1) : 100VAC / 60HZ | < 0.25 mA |
| (2) : 240VAC / 50HZ | < 0.25 mA |

### 6.2 EMI/EMS REQUIREMENT

a. EMI : FCC CLASS B / EN55022 CLASS B; CONDUCTED & RADIATED MEETED

b. Electron Static Discharge(ESD) :

| Applicable Standard | CONDITION   | SPECIFICATION                       |
|---------------------|---|-------------------------------------|
| IEC/EN 61000-4-2    | Contact discharge performance is 4KV;<br>Air discharge performance is 8KV | Normal operation shall be continued |

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c. Lightning Surge :

| Applicable Standard | CONDITION  | SPECIFICATION                       |
|---------------------|--|-------------------------------------|
| IEC/EN 61000-4-5    | +/- 1KV (Line to Line)<br>+/- 2KV (Line to Ground) | Normal operation shall be continued |

d. Electric Fast Transients :

| Applicable Standard | CONDITION                    | SPECIFICATION                       |
|---------------------|------------------------------|-------------------------------------|
| IEC/EN 61000-4-4    | +/-1KV for Power Supply Line | Normal operation shall be continued |

## 7. OPERATION & ENVIRONMENT PERFORMANCE:

### 7.1 TEMPERATURE RANGE

|           |               |
|-----------|---------------|
| OPERATING | -10°C ~ +40°C |
| STORAGE   | -40°C ~+70°C  |

### 7.2 HUMIDITY RANGE (NON CONDENSING)

|           |              |
|-----------|--------------|
| OPERATING | 10% ~ 90% RH |
| STORAGE   | 5% ~ 95% RH  |

7.3 Product operating/storage test requirement :

| TEST ITEM                              | CONDITION            | SPECIFICATION   |
|--|----------------------|---|
| <b>High Temperature Storage TEST</b>   | 70 degree C for 72H  | There is no malfunction and deformation to be found after TEST. |
| <b>High Temperature Operation TEST</b> | 40 degree C for 16H  | There is no malfunction and deformation to be found after TEST. |
| <b>Low Temperature Storage TEST</b>    | -20 degree C for 72H | There is no malfunction and deformation to be found after TEST. |
| <b>Low Temperature Operation TEST</b>  | 0 degree C for 16H   | There is no malfunction and deformation to be found after TEST. |

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|                                    |   |   |
|------------------------------------|---|---|
| <b>Termal Shock Operation TEST</b> | Apply 2 cycle from 0 degree C to +40 degree C as 24 Hours as 1 cycle  | There is no malfunction and deformation to be found after TEST. |
| <b>Termal Shock Storage TEST</b>   | Apply 2 cycle from -20 degree C to +70 degree C as 2 Hours as 1 cycle | There is no malfunction and deformation to be found after TEST. |

7.4 COOLING : SHOULD OPERATE WITHOUT FAN

7.5 M.T.B.F. : 30000 HOURS Min ; 25°C SEE CONDITION

### 8. MECHANICAL REQUIREMENT :

8.1 DIMENSION : 80.0(D)\*50.0(W)\*35.0(T)

8.2 DROP TEST : From a height of 100cm onto concrete or similar material.  
No impairment of normal function, breaking away of any parts or change

8.3 VIBRATION TEST : Non-operating but with packing. Shock acceleration 50 G, sin, 100Ms.  
Directions of force : X , Y , Z . One time at 6 directions. There is no malfunction and deformation to be found after TEST.

8.4 APPEARANCE : There shall not be any remarkable defects such as clack, distortion, uneven color, dirty nameplate and its peeling

8.5 Tensile Strength of the Cord : A static load of 100N is applied to the cord for 1 minute  
The cord should not be deteriorated

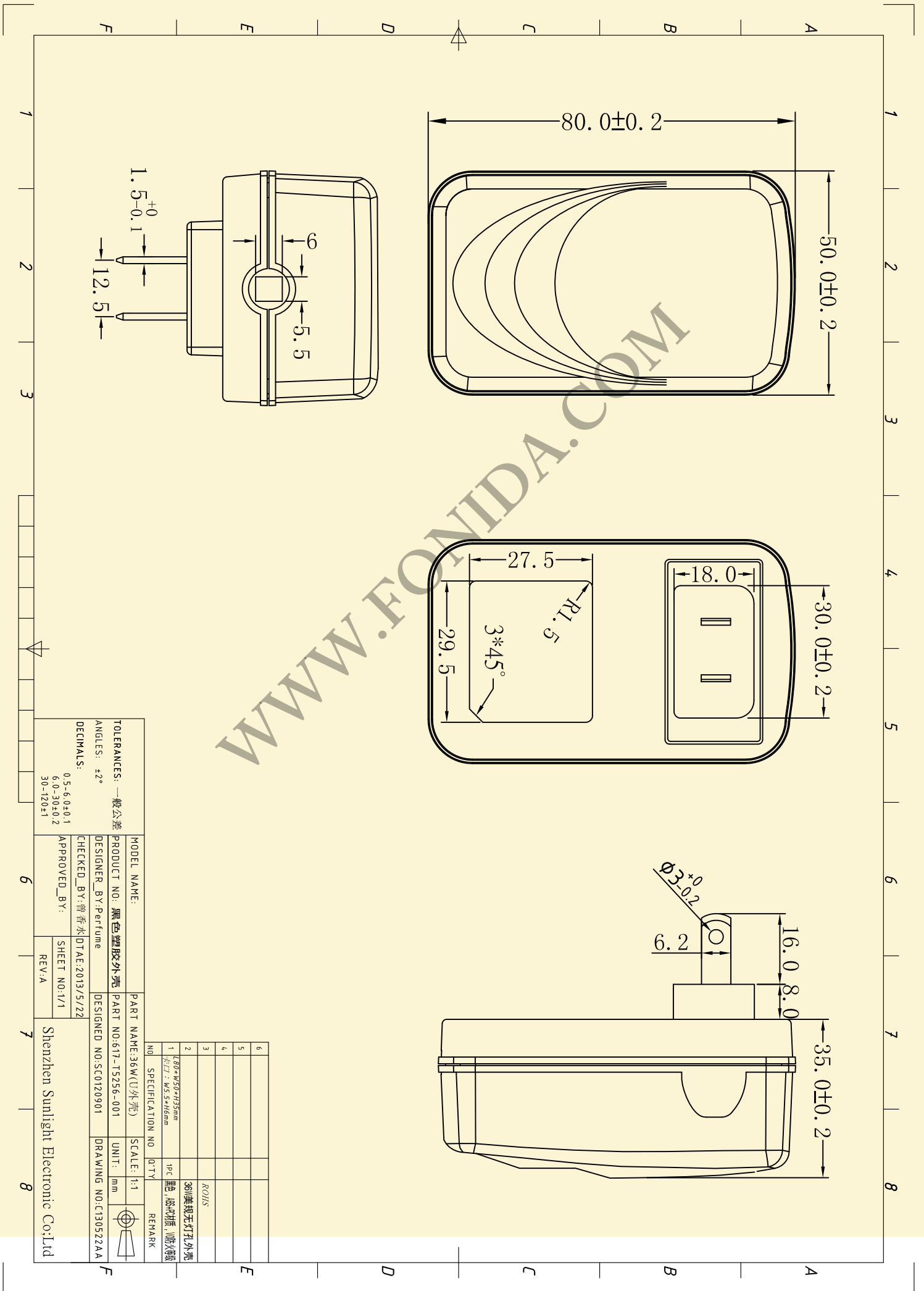
8.6 Cord Bending TEST : Hang the specified weight and swing it to one direction and return to the original position, then swing to the opposite direction and return to the original position .The strain relief shall be subjected to the specified cycles and speed. Weight 200 (g), Angle  $\pm 60$  degree, 800 times, Cycles in every minute 30, Distance 300mm.

### 9. PRODUCT GUARANTEE : AFTER SHIPMENT 12 MONTHS.

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### 10. PRODUCT OUTLINE DRAWING:





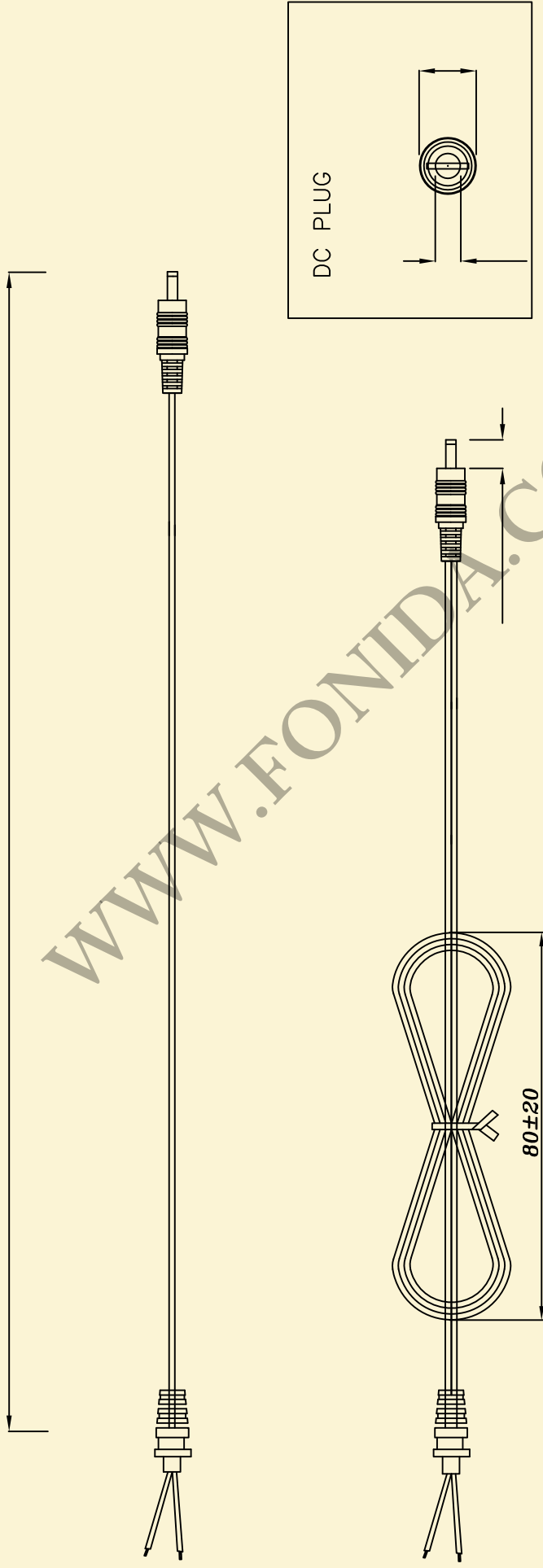
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### 11. DC OUTPUT CORD DRAWING:

RoHS - COMPONENT

| LTR | REV. | DESCRIPTION           | UNIT |
|-----|------|-----------------------|------|
|     |      | 2468 VW-1 24AWG BLACK | mm   |



**技术要求:**

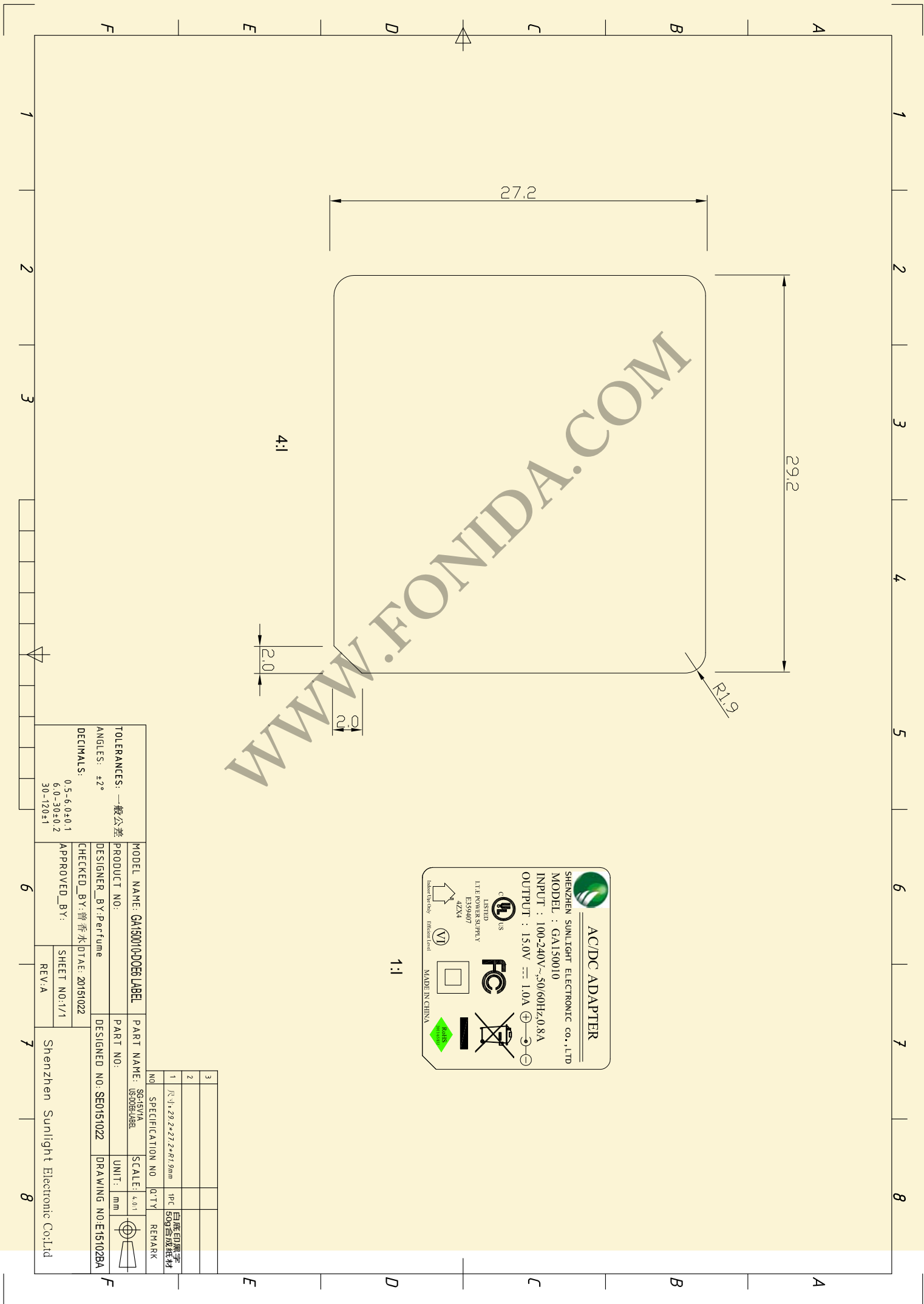
- 拉力测试要求:
  1. SR/DC PLUG/CORE 与线身拉力  $> / = 50N$  (1min), 位移  $< 2mm$ ;
  2. 线身耐拉力  $> / = 100N$  (要求 1min 内无断芯, 延伸长度小于总长 10%)
- 摇摆测试要求:
  1. SR, 负重 200g, 左右各 60 degree, 30 cycles/min, 最少 800 次。
  2. DC PLUG, 负重 200g, 左右各 60 degree, 30 cycles/min, 最少 800 次。
- 耐温测试要求: 在 85 摄氏度环境下静置 6 小时, 线身/SR/DC PLUG/CORE 无开裂或变形。
- 外观要求:
  1. 线材外被直径小于 0.5mm 的凸凹颗粒每米少于 3 个;
  2. 线材外被不可有破损/压伤/脏污等外观不良现象;
  3. SR/DC PLUG/CORE 表面不可有变形/缩水/披锋/气纹/缺胶等不良现象;
  4. DC PLUG 外露金属部分不能有氧化/刮伤/生锈等不良现象。
  5. SR/CORE 两侧, DC PLUG 尾部不能有压线现象, 尾端上锡良好。

- 线材规格: 2468, 24AWG, 80 摄氏度, 300V, VW-1, 线身有印字。
- 线身印字: 2468, 24AWG, 80 摄氏度, 300V, VW-1, UL 认证号码, 线材制造商名称
- DC PLUG 描述:  $\phi 3.5 * \phi 1.35 * 10.0mm$  音叉直头无磁环
- 颜色要求: 黑色
- 环保要求: 过 ROHS 认证
- 盐雾实验: 在 35 摄氏度  $+ / - 2$  度密闭空间, 湿度 = 86%, PH 值 = 6.5 - 7.2, 用 5%  $+ / - 0.1\%$  的 NaCl 溶液连续 36 小时喷雾后, 检查产品表面无锈蚀, 镀层无剥落, 功能测试正常。

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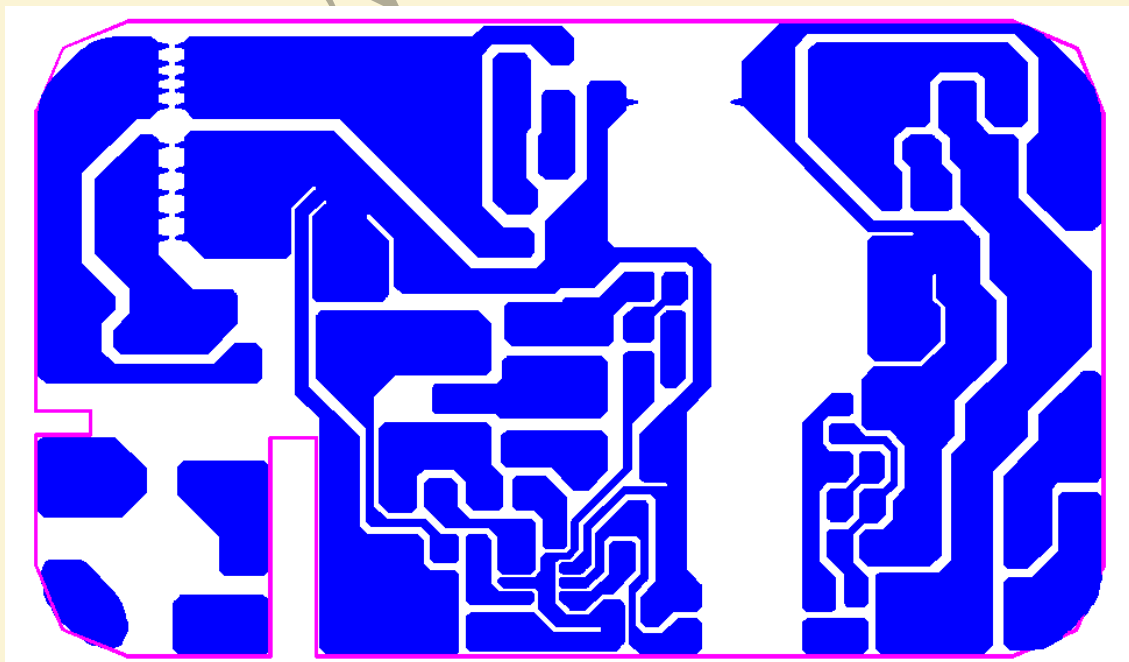
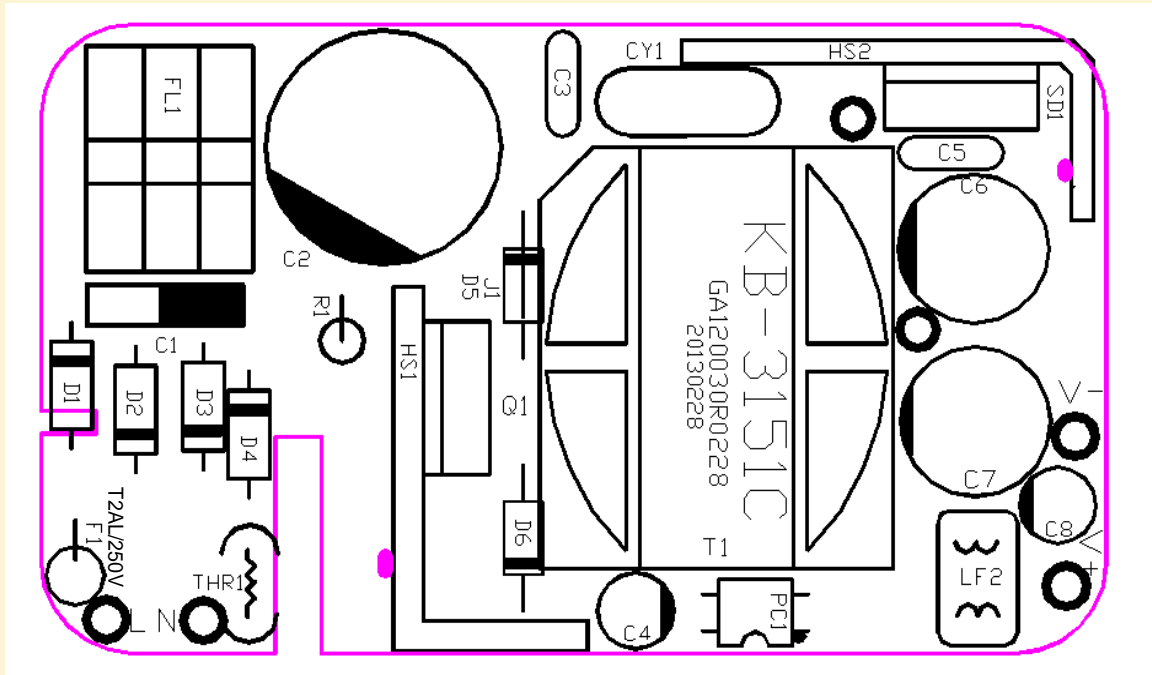
### 12. RATING LABEL DRAWING :



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### 13. PCB LAYOUT :



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### 14.TEST REPORT:

| 电源适配器样品测试报告        |                               |   |   |         |              |          |         |                     |            |         |      |
|--------------------|-------------------------------|---|---|---------|--------------|----------|---------|---------------------|------------|---------|------|
| 客 户                |                               | 客户编号  |   | 室 温     | 25℃          |          |         |                     |            |         |      |
| 产品型号               | GA150010                      | 产品编号  | SAD1510-20  | 日 期     | 2015. 01. 12 |          |         |                     |            |         |      |
| 输入电压/频率            | 100Vac-240Vac                 | 50/60Hz   | 输出电压/电流   |         |              | 15V 1.0A |         |                     |            |         |      |
| 测试内容               |                               | 1#样机  |   |         |              | 2#样机     |         |                     |            | 判定      |      |
| 测试项目               | 测试标准                          | 90V   | 100V  | 240V    | 264V         | 90V      | 100V    | 240V                | 264V       | PASS/NG |      |
| 空载电压               | 14. 40V-15. 60V               | 15. 18  | 15. 18  | 15. 19  | 15. 19       | /        | /       | /                   | /          | PASS    |      |
| 空载纹波与噪声            | ≤120mV                        | 26  | 20  | 27      | 23           | /        | /       | /                   | /          | PASS    |      |
| 满载电压               | 14. 40V-15. 60V               | 14. 98  | 14. 97  | 14. 98  | 14. 98       | /        | /       | /                   | /          | PASS    |      |
| 满载纹波与噪声            | <120mV                        | 98  | 98  | 89      | 96           | /        | /       | /                   | /          | PASS    |      |
| 最大输入电流             | <1000mA                       | 339   | 303   | 129     | 119          | /        | /       | /                   | /          | PASS    |      |
| 短路保护               | 无损坏, 可恢复<br>OK/NG             | OK  | OK  | OK      | OK           | /        | /       | /                   | /          | PASS    |      |
| 过流保护               | >1. 2A<br><2. 4A              | 1. 55   | 1. 56   | 2. 12   | 2. 13        | /        | /       | /                   | /          | PASS    |      |
| 过压保护<br>(光耦开环)     | <1V/满载                        | OK  | OK  | OK      | OK           | /        | /       | /                   | /          | PASS    |      |
| 启动延迟时间             | < 4 s                         | 3   | 2. 8  | 2       | 2            | /        | /       | /                   | /          | PASS    |      |
| 输出保持时间             | > 10 ms                       | √   | √   | √       | √            | /        | /       | /                   | /          | PASS    |      |
| 上升时间               | < 20 ms                       | 16. 5   | 15. 9   | 15. 3   | 15. 1        | /        | /       | /                   | /          | PASS    |      |
| 下降时间               | < 30 ms                       | 26. 3   | 27. 7   | 25. 9   | 26. 9        | /        | /       | /                   | /          | PASS    |      |
| 开机过冲               | < 5 %                         | 0   | 0   | 0       | 0            | /        | /       | /                   | /          | PASS    |      |
| 雷击电压               | 共模: (L/N-GND)                 | ± 2KV   |   |         | 差模: (L-N)    |          | ± 1KV   |                     |            | PASS    |      |
| 绝缘强度测试             | AC3. 0KV 60S                  | < 5mA   | 泄漏电流 0. 6mA: 绝缘击穿: <input type="checkbox"/> 有 <input checked="" type="checkbox"/> 无 |         |              |          |         |                     |            |         | PASS |
| 绝缘阻抗测试             | DC500V 60S                    | >100MΩ  | 绝缘阻抗 100MΩ: 绝缘击穿: <input type="checkbox"/> 有 <input checked="" type="checkbox"/> 无  |         |              |          |         |                     |            |         | PASS |
| 泄漏电流测试             | 264V                          | <0. 25mA  | 泄漏电流 0. 06mA  |         |              |          |         |                     |            |         | PASS |
| 能效测试               | 平均效率 > 84. 13%空<br>载功耗<0. 10W | 输入电压  | 100%  | 75%     | 50%          | 25%      | 平均效率    | 10%负载效<br>率>74. 13% | 空载输<br>入功耗 | PASS    |      |
|                    |                               | 115Vac  | 85. 08%   | 85. 22% | 85. 23%      | 84. 06%  | 84. 89% | 78. 56%             | 0. 05W     | PASS    |      |
|                    |                               | 230Vac  | 85. 41%   | 85. 21% | 84. 53%      | 81. 91%  | 84. 26% | 74. 81%             | 0. 08W     | PASS    |      |
| DC输出短路30分钟         | 264V输入                        | 短路30分不损坏: <input checked="" type="checkbox"/> OK <input type="checkbox"/> NG: 可恢复工作: <input checked="" type="checkbox"/> OK <input type="checkbox"/> NG |   |         |              |          |         |                     |            |         | PASS |
| 90V/264V输入时满载开关机测试 | 各10次                          | 正常开机: <input checked="" type="checkbox"/> OK <input type="checkbox"/> NG  |   |         |              |          |         |                     |            |         | PASS |
| PASS               |                               |   |   |         |              |          |         |                     |            |         |      |
| 测 试                |                               |   |   | 核 准     |              |          | KIKIN   |                     |            |         |      |

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