15W Wireless Charger Transmitter

*Pulse Part Number SWA1400*

**Features**

- SWA1400 is a WPC1.2.3 Qi Medium Power (15W) wireless charging platform: Its transmission efficiency is up to 76% and can provide up to 15W transmission capacity. It enables powering or charging for any WPC-Qi certified products. With fast charging function for Samsung mobile phone.

- It adopts intelligent identification system while its transmitter and receiver unit adopts UART (Universal asynchronous receiver/transmitter) encrypted transmission control signal which is stipulated by WPC1.2.3 The console will process the corresponding power adjustment based on the encoding of the receiving unit. This module has fulfilled the WPC1.2.3 Qi requirement and is certified by Qi.

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1. Input Characteristics / 输入特性

1.1. Input Voltage & Frequency / 输入电压&频率

<table>
<thead>
<tr>
<th>Item/项目</th>
<th>Minimum/最小</th>
<th>Normal/标准</th>
<th>Maximum/最大</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage/输入电压</td>
<td>8Vdc</td>
<td>12.0Vdc</td>
<td>13.0Vdc</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TX Input Voltage/TX 输入电压</th>
<th>Rx_Module 类别/RX 模组类别</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low Power</td>
</tr>
<tr>
<td>12.0Vdc</td>
<td>✓</td>
</tr>
<tr>
<td>9.0Vdc</td>
<td>✓</td>
</tr>
<tr>
<td>5.0Vdc</td>
<td>✓</td>
</tr>
</tbody>
</table>

1.2. Input Current / 输入电流

1.6A max. @ 12.0Vdc Full load

1.3. Inrush Current (cold) / 浪涌电流（冷电流）

2.0 A max. @ 12.0Vdc Full load & Ambient temperature 25 °C

1.4. Energy Consumption / 损耗

At 11.5VDC or 12.5VDC, Energy Consumption ≤ 0.03A

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2. Output Characteristics (Rx Module)/输出特性

2.1. Static Output Characteristics (<Vo & R+N>/ 静态输出特性（输出&纹波+噪音）

<table>
<thead>
<tr>
<th>Output</th>
<th>Rated Load</th>
<th>Max. Load</th>
<th>Peak Load</th>
<th>Output Range</th>
<th>R+N/纹波+噪音</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>15W</td>
<td>0.10A</td>
<td>1.25A</td>
<td>1.50A</td>
<td>12V±5%</td>
<td>≤300mVp-p</td>
<td></td>
</tr>
</tbody>
</table>

Note: Ripple & Noise: Measurement is done by 20MHz bandwidth oscilloscope and the output end paralleled a 0.1uF ceramic capacitor and a 47uF electrolysis capacitor.

3. Protection Requirement/保护要求

3.1. Short Circuit Protection/短路保护

When the output is short circuit to ground, the input power should decrease, the power supply remains undamaged and automatically recover when fault condition is removed.

3.2. Over Current Protection/过流保护

OCP Point Limited: 120%-130% auto restart
OCP 限制：120% - 130%自动重启

The output will be blocked when output is over-current, and should automatically recover when fault condition is removed.

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### 4. Reliability Requirements/可靠性要求

#### 4.1. Reliability Test/可靠性测试

<table>
<thead>
<tr>
<th>Test Items/测试项目</th>
<th>Test conditions/测试条件</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage at high temperature test/高温存储</td>
<td>+60℃ 16Hrs</td>
</tr>
<tr>
<td>Storage at low temperature test/低温存储</td>
<td>-20℃ 16Hrs</td>
</tr>
<tr>
<td>Operating at high temperature test/高温操作</td>
<td>+40℃ 8Hrs</td>
</tr>
<tr>
<td>Operating at low temperature test/低温操作</td>
<td>-20℃ 8Hrs</td>
</tr>
<tr>
<td>High/low Temperature cycle test/高低温循环测试</td>
<td>45℃(2Hrs)→-20℃(2Hrs)→45℃(2Hrs)→-20℃(2Hrs) Continually work 24 Hours</td>
</tr>
</tbody>
</table>

#### 4.2. Burn-in/老化

Burn-in for 2 hours under 35℃(±5℃) environment, Nominal input voltage, Nominal load. 在35℃(±5℃)的环境下，额定输入电压，额定负载，老化2小时

#### 4.3. Vibration Test/震动测试

Vibration Condition: vibration amplitude 2mm; Vibration frequency: 12.4Hz; Vibration direction X, Y; Vibration time 30 minutes / pc 振动条件：振动幅度2mm；振动频率12.4Hz；振动方向：X，Y；振动时间：30分钟/个

#### 4.4. Dropping Test/跌落测试

Test height: Determined by the weight: levelDrop times: drop 10 times (one triangle, 3 edge, six surface); Drop platform: 1~2cm thickness solid wood 测试高度：由重量决定高度；跌落次数：跌落次数10次（1个角，3个边，6个面），跌落环境：1~2cm 厚的实木板

<table>
<thead>
<tr>
<th>Equal to or greater than</th>
<th>But Less than</th>
<th>Free Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>1b Kg</td>
<td>1b Kg</td>
<td>In mm</td>
</tr>
<tr>
<td>0 0</td>
<td>21 10</td>
<td>30 760</td>
</tr>
<tr>
<td>21 10</td>
<td>41 19</td>
<td>24 610</td>
</tr>
<tr>
<td>41 19</td>
<td>61 28</td>
<td>18 460</td>
</tr>
<tr>
<td>61 28</td>
<td>100 45</td>
<td>12 310</td>
</tr>
<tr>
<td>100 45</td>
<td>150 68</td>
<td>8 200</td>
</tr>
</tbody>
</table>

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5. Environment Requirement/环境要求

5.1. Operating Temperature and Relative Humidity/操作温度和相对湿度
0°C - 40°C 20%RH to 80%RH @ altitude should be below 10000 feet.

5.2. Storage Temperature and Relative Humidity/储存温度和相对湿度
-20°C to +60°C 10%RH to 90%RH(non-condensing) @ altitude should be below 30000 feet.

6. Execution Standards/执行标准(Compatible with these specifications)/

6.1. EMC Standards/EMC/电磁兼容标准

| EN55022 | EN55024 |

6.2. WPC1.2.3_Qi Standards/ WPC1.2.3_Qi 标准

7. Module/模块

7.1. Product design proposal/产品设计要求

According to the standardization of Qi. Please note below 3 points.

1. The distance between Tx Coil with PCB and other metal components is Min: 4.5mm/
   输出线圈，PCB 和其他金属部件之间的最小距离：4.50mm
2. The distance between the surface of Tx coil and the surface of product (Working Face) is 2.0±0.25mm,
   which means the thickness of the working face plastic is not more than 2.25mm;
   Tx 线圈表面和产品表面之间的距离（正面）为 2.0±0.25mm，即正面塑料的厚度不超过 2.25mm
3. The surface distance between Tx Coil and Rx Coil is 3.0 ~ 4.5mm
   输出线圈和接收线圈之间的表面距离为 3.0~4.5mm
4. Added cooling device to 22uH inductor to do heat treatment (similar to the computer CPU cooling method)
   22uH 的电感要做散热处理（类似电脑 CPU 的方式用来散热）
5. In order to pass the EMI, it is recommended to connect the PCB with the DC 12V power
   为了好通过 EMI，建议用 DC 12V 的电源外加共模电感连接 PCB 的电源。

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7.2 PCBA Port Functional Illustration/PCBA 功能说明

PCB 图

PCBA: Φ 50(±0.3) * 4.7(±0.2) mm

<table>
<thead>
<tr>
<th>Port</th>
<th>JP1-1</th>
<th>JP1-2</th>
<th>VCC</th>
<th>RED</th>
<th>BLUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>BUZZ+</td>
<td>BUZZ-</td>
<td>LED VDD</td>
<td>Red LED-</td>
<td>Blue LED-</td>
</tr>
<tr>
<td>Port</td>
<td>GND</td>
<td>D+/D-</td>
<td>VDD</td>
<td>CL1-1</td>
<td>CL1-2</td>
</tr>
<tr>
<td>Function</td>
<td>QC3.0/12V</td>
<td>QC3.0</td>
<td>QC3.0/12V</td>
<td>TX Coil</td>
<td></td>
</tr>
</tbody>
</table>

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**7.3. Tx_Coil Spec:**

- **Coil + Shielding:** 50 * 50 * 2.25mm (Max)

**Electrical Specification @ 25 °C**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Unit</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inductance LS@100KHz</td>
<td>uH</td>
<td>5.3 ± 10%</td>
</tr>
<tr>
<td>Q</td>
<td></td>
<td>40 ± 10%</td>
</tr>
<tr>
<td>DCR</td>
<td>mΩ</td>
<td>30 ± 13%</td>
</tr>
</tbody>
</table>

**ERP PART**
- **MP-A2**

**Description**
- **UNIQT-0014**

**Dimensions**
- mm

**Modified by**
- David

**Modified Date**
- 2017-04-10

**7.4. Aluminum heat sink gauge Spec**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>72±0.2</td>
<td>mm</td>
</tr>
<tr>
<td>64±0.2</td>
<td>mm</td>
</tr>
<tr>
<td>30±0.2</td>
<td>mm</td>
</tr>
<tr>
<td>14±0.2</td>
<td>mm</td>
</tr>
</tbody>
</table>

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**Packing**

- Put 1pc product in the poly bag, then add the info label.
- Align the finished goods into the tray.
- Cardboard sheet under and on the top of the tray stack in the tray stack. Every second tray must be rotated 180 degrees, binding of the stack-1 strap lengthwise and 2 strap crosswise.
- Add foam paper between two trays.
- First put down 1pc sheet board in box, then put binding tray in box, empty 1 pc on the top of the box.
- Binding of the carton: scaled with tape, 1 strap length wise and 2 strap crosswise.

**Label content:**

- P/N, e.g. SWM1400
- Project Name, e.g. A6 Wireless Charge Coil
- Inductance, e.g. 12.5uH

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