

### Scope

- This product conforms to the Tx module function requirements of the WPC1.2.4 Qi protocol and it is also compatible with all versions of WPC1.2.4 or lower.
- The Wireless Power supply's Tx Module should meet the ROHS requirement.

### Applications

- Wireless charging pad
- Power bank
- Home appliances, Furniture
- Computer peripheral devices
- Car holder, GPS navigation

### Product Characteristic

QPT-0023 is a WPC1.2.4 Qi Medium Power (10W) wireless charging platform: Its transmission efficiency is up to 70%  $\pm$  5% 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® and iPhone® 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 WPC1.2.4. The console will process the corresponding power adjustment based on the encoding of the receiving unit. This module has fulfilled the WPC1.2.4 Qi requirement and is certified by Qi.

| Multiple LED indication scheme available for options |                    |         |         |                 |       |                        |
|------------------------------------------------------|--------------------|---------|---------|-----------------|-------|------------------------|
| LED                                                  | Operational States |         |         |                 |       |                        |
|                                                      | Power On           | Standby | Charger | Charge Complete | Fault | Dynamic Power Limiting |
| LED1, Red                                            | 0.5 S              | Off     | Off     | Off             | On    | Blink slow             |
| LED2, Blue                                           | 0.5 S              | Off     | On      | Off             | Off   | Off                    |

### Input Characteristics

- Input Voltage

| Item          | Minimum | Normal | Maximum |
|---------------|---------|--------|---------|
| Input Voltage | 4.75VDC | 9.0VDC | 9.25VDC |

| TX Input Voltage | RX Module |        |            |             |
|------------------|-----------|--------|------------|-------------|
|                  | Qi 5W     | Qi 10W | Apple 7.5W | Samsung 10W |
| 9.0VDC           | V         | V      | V          | V           |
| 5.0VDC           | V         |        |            |             |
| USB: QC2.0/QC3.0 | V         | V      | V          | V           |

- Input Current
 

|                     |           |
|---------------------|-----------|
| 1.75A max. @ 9.0VDC | Full load |
| 1.65A max. @ 5.0VDC | Full load |
- Inrush Current (cold)
 

|                     |                                      |
|---------------------|--------------------------------------|
| 2.00A max. @ 9.0VDC | Full load & Ambient temperature 25°C |
| 1.85A max. @ 5.0VDC | Full load & Ambient temperature 25°C |
- Energy Consumption
 

At 8.75VDC or 9.25VDC, energy consumption  $\leq$  0.625W.

### Output Characteristics (Rx\_Module)

- Static Output Characteristics <Vo & R+N>

| Output Power | Rated Load |           | Peak Load | Output Range | R+N         |
|--------------|------------|-----------|-----------|--------------|-------------|
|              | Min. Load  | Max. Load |           |              |             |
| 10W          | 0.10A      | 1.00A     | 1.20A     | 9V ± 5%      | ≤ 600m Vp-p |

#### 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.

- Line & Load Regulation

| Output Power | Load Condition |           | Line Regulation | Load Regulation |
|--------------|----------------|-----------|-----------------|-----------------|
|              | Min. Load      | Max. Load |                 |                 |
| 10W          | 0.10A          | 1.00A     | ± 5%            | ± 5%            |

- Charging Mode and Frequency

| Charging Mode | Qi 5W           | Qi 10W | Samsung Fast Charger | iPhone 7.5W       |
|---------------|-----------------|--------|----------------------|-------------------|
| Frequency     | 110kHz ~ 148kHz |        |                      | 127.7kHz ± 0.4kHz |

### Protection Requirement

- Short Circuit Protection

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

- Over Current Protection (OCP)

OCP Point Limited : 120%~130% auto restart

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

- FOD Function

Pre-FOD function: During Tx standby state, put metal foreign body(diameter ≥ Φ20mm) in the center of Tx Coil, Tx will warn when it recognizes metal foreign body and red lights flashes.

Post FOD function: During Tx is in normal working state, insert metal foreign body into the middle of Tx Coil & Rx Coil. Tx will warn when it recognizes metal foreign body, and the red light flashes & stops output.

- NTC Function

PCBA with NTC : 5W / 7.5W / 10W NTC temperature is 60°C ± 5°C.

External NTC : 5W / 7.5W / 10W NTC temperature is 60°C ± 5°C.

### Reliability Requirements

- Reliability Test

| Test items                         | Test conditions                                                                       |
|------------------------------------|---------------------------------------------------------------------------------------|
| Storage at high temperature test   | +60°C, 16hours                                                                        |
| Storage at low temperature test    | -20°C, 16hours                                                                        |
| Operating at high temperature test | +40°C, 8hours                                                                         |
| Operating at low temperature test  | -20°C, 8hours                                                                         |
| High / Low temperature cycle test  | +40°C (2Hrs) → -20°C (2Hrs) → +40°C (2Hrs)<br>→ -20°C (2Hrs) continually work 24hours |

- Vibration Test
  - (1) Amplitude: 2 mm
  - (2) Frequency: 12.4 Hz
  - (3) Direction: X, Y
  - (4) Time: 30 minutes/pc
- Dropping Test
  - (1) Test height: Determined by the weight level
  - (2) Drop times: 10 times (one corner, three edge, six surface)
  - (3) Drop platform: 1~2cm thickness solid wood

| Equal to or greater than |    | But Less than |    | Free Fall |     |
|--------------------------|----|---------------|----|-----------|-----|
| lb                       | Kg | lb            | Kg | In        | mm  |
| 0                        | 0  | 21            | 10 | 30        | 760 |
| 21                       | 10 | 41            | 19 | 24        | 610 |
| 41                       | 19 | 61            | 28 | 18        | 460 |
| 61                       | 28 | 100           | 45 | 12        | 310 |
| 100                      | 45 | 150           | 68 | 8         | 200 |

### Environment Requirement

- Operating Temperature and Relative Humidity  
0°C to +40°C, 20%RH to 80%RH @ altitude shall be below 10000 feet.
- Storage Temperature and Relative Humidity  
-20°C to +60°C, 10%RH to 90%RH (non-condensing) @ altitude shall be below 30000 feet.

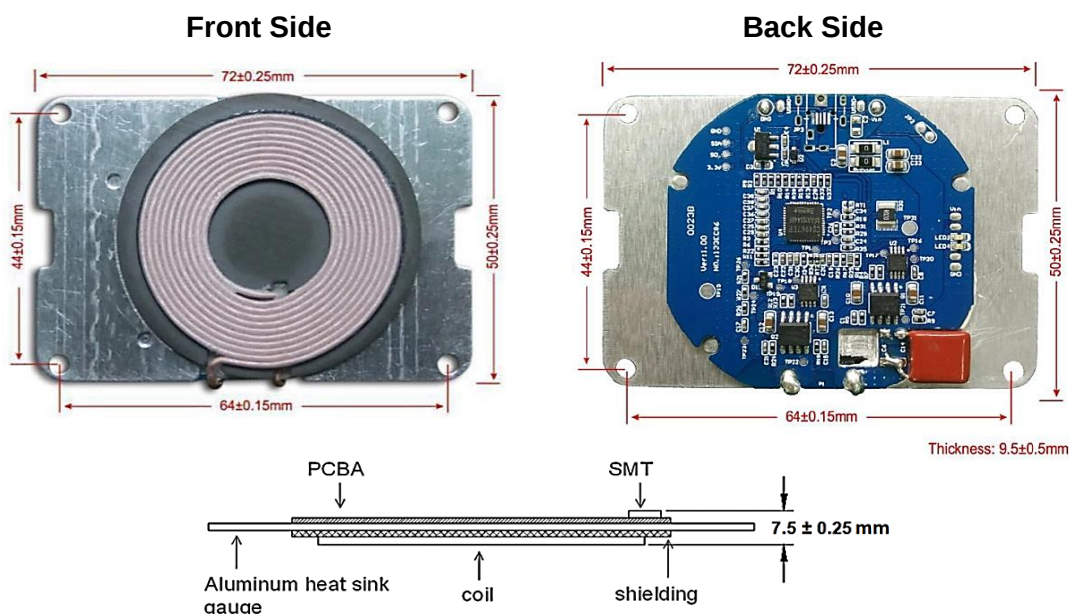
### Execution Standards (Compatible with these specifications)

- EMC Standards

|         |         |
|---------|---------|
| EN55032 | EN55024 |
|---------|---------|

- WPC1.2.4\_Qi Standards

### Photo of Product



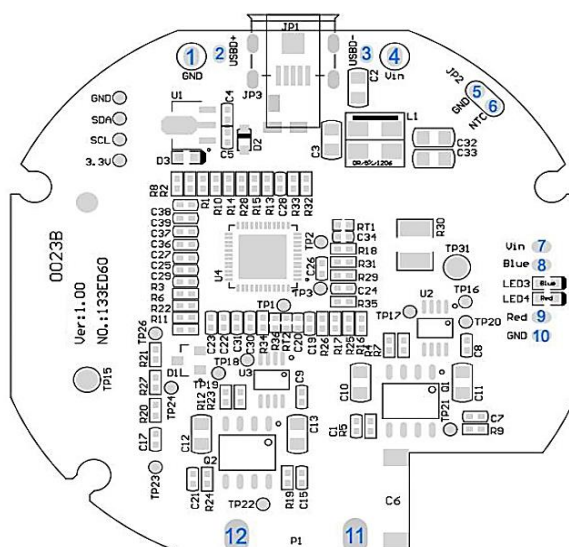
# Module

- Product design proposal

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. 4.50mm.
- (2) The distance between the surface of Tx coil and the surface of product (Working Face) is  $3.0_{-0.25}^{+0.5}$  mm, which means the thickness of the working face plastic is not more than 2.00mm.
- (3) The surface distance between Tx Coil and Rx Coil is 4.0~6.0mm.

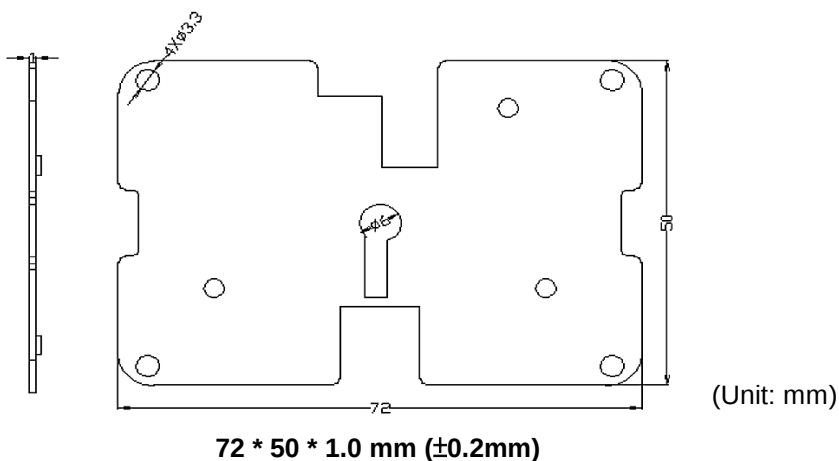
- PCBA Port Functional Illustration



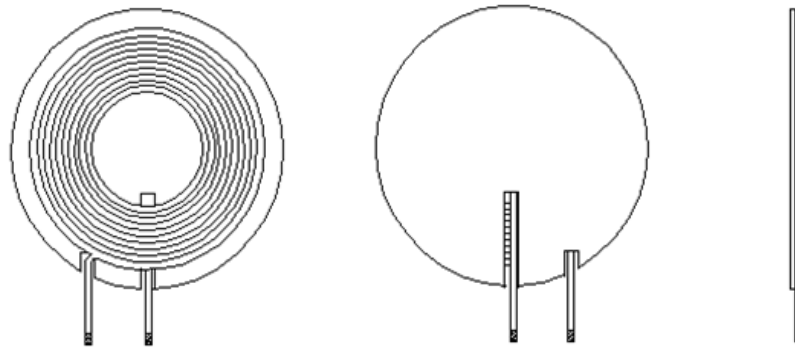
**PCBA Size : 51 \* 50 \* 4.0 mm ( $\pm 0.2$ mm)**

| Port     | Pin 1             | Pin 2                   | Pin 3                  | Pin 4             | Pin 5   | Pin 6   |
|----------|-------------------|-------------------------|------------------------|-------------------|---------|---------|
| Function | GND               | USB D+                  | USB D-                 | VIN               | GND     | NTC     |
| Port     | Pin 7             | Pin 8                   | Pin 9                  | Pin 10            | Pin 11  | Pin 12  |
| Function | Vin<br>(external) | Blue LED-<br>(external) | Red LED-<br>(external) | GND<br>(external) | Tx Coil | Tx Coil |

- Aluminum Heat Sink Gauge Spec



- Tx\_Coil Spec



Coil + Shielding :  $\Phi 50 * 2.5$  mm (Max.)

### Electrical specification @25°C

| Parameters                                           | Unit             | Limit          |
|------------------------------------------------------|------------------|----------------|
| Inductance, LS<br>@100kHz, 1.0V, 0.08mm*105 ~12Turns | $\mu\text{H}$    | $3.8 \pm 10\%$ |
| Q                                                    | ---              | ---            |
| DCR                                                  | $\text{m}\Omega$ |                |

### Others

- Weight :  $25 \pm 2$  g
- Major Test Equipment
  - (1) DC Supply
  - (2) Rx Module
  - (3) Electronic Load
  - (4) DPO3014 Digital Phosphor Oscilloscope
  - (5) Logical Analyzer
  - (6) Q110 Qi BST (Base Station Tester)