

### Scope

- Qi 15W multi-power, fast charge wireless charging transmitter module.
- WPC Qi V1.2.4 certified, compatible with all Qi enabled devices.
- RoHS compliant

### Applications

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

### Product Characteristic

QPT-0035 is a WPC1.2.4 Qi Medium Power wireless charging platform: Its transmission efficiency is up to 70% ± 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 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.

LED	Operational States					
	Standby	5W RX	15W RX Samsung Fast Charger	Charge Complete	Fault	Dynamic Power Limiting
LED1, Red	Off	Off	Off	Off	On	Blink slow
LED2, Blue	Off	On	On	On	Off	Off

Remark:  
If with a dual LED indicator, dual LED should use the same negative pole, and limit the current ≤10mA. If the current ≥10mA, please connect LDO to supply power to LED light separately.

### Input Characteristics

- Input Voltage

Item	Minimum	Normal	Maximum
Input Voltage	4.75VDC	12.0VDC	13.0VDC

Charging Mode	Qi 5W	Qi 10W	Qi 15W	Samsung Fast Charger	iPhone Fast Charger
Frequency	110kHz ~ 148kHz				127.7kHz ± 0.4kHz

TX Input Voltage	RX Module				
	Qi 5W	Qi 10W	Qi 15W	Apple 7.5W	Samsung 10W
12.0VDC	V	V	V	V	V
9.0VDC	V	V		V	V
5.0VDC	V				
USB fast charger	V	V	V	V	V
	Remark: To support 15W wireless charging, the minimum output of the USB fast charger must be greater than 20W.				

- Input Current
 

1.80A max. @ 12.0VDC	Full load
1.75A max. @ 9.0VDC	Full load
1.65A max. @ 5.0VDC	Full load
  
- Inrush Current (cold)
 

2.0A max. @ 12.0VDC	Full load & Ambient temperature 25°C
2.0A max. @ 9.0VDC	Full load & Ambient temperature 25°C
2.0A max. @ 5.0VDC	Full load & Ambient temperature 25°C
  
- Energy Consumption
 

At 4.75VDC or 12.5VDC, energy consumption ≤ 0.03A.

### Output Characteristics (Rx\_Module)

- Static Output Characteristics <Vo & R+N>

Output Power	Rated Load		Peak Load	Output Range	R+N
	Min. Load	Max. Load			
15W	0.10A	1.25A	1.50A	12V ± 5%	≤ 300m 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		
15W	0.10A	1.25A	± 5%	± 5%

### Protection Requirement

- Short Circuit Protection
 

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.
- 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.
	15W NTC temperature is 80°C ± 5°C.
External NTC :	5W / 7.5W / 10W NTC temperature is 60°C ± 5°C.
	15W NTC temperature is 80°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) → -20°C (2Hrs) continually work 24hours

- Vibration Test

- |                        |                         |
|------------------------|-------------------------|
| (1) Amplitude: 2 mm    | (3) Direction: X, Y     |
| (2) Frequency: 12.4 Hz | (4) Time: 30 minutes/pc |

- Dropping Test

- Test height: Determined by the weight level
- Drop times: 10 times (one triangle, three edge, six surface)
- 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.

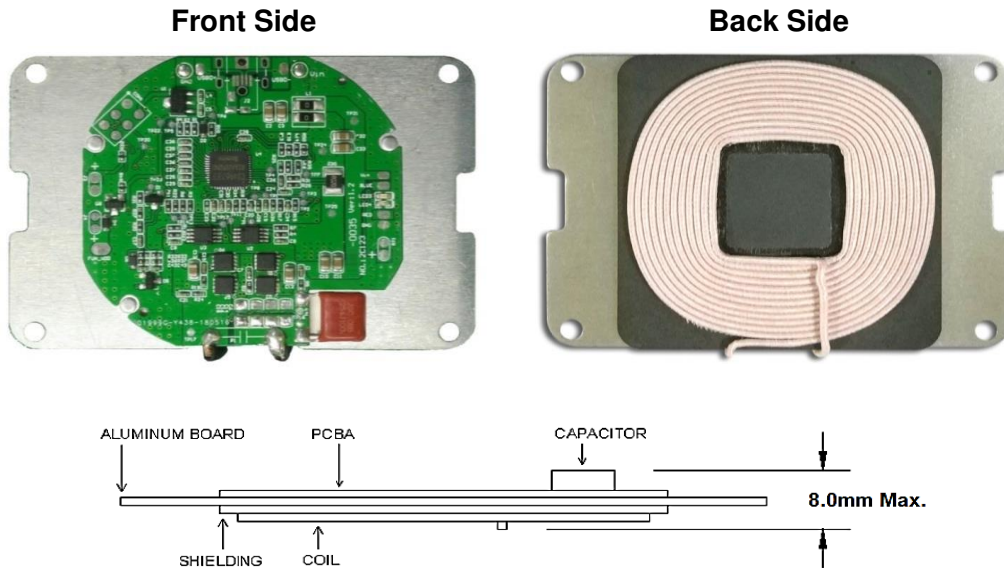
### Execution Standards (Compatible with these specifications)

- EMC Standards

EN55032	EN55024
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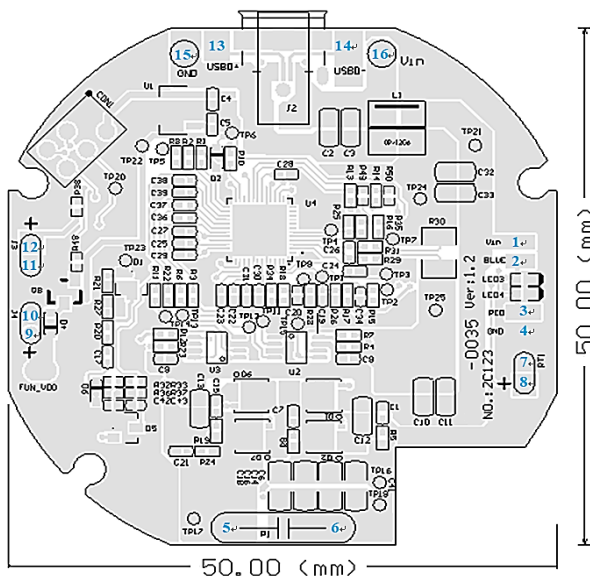
- WPC1.2.4\_Qi Standards

### Photo of Product



### Module

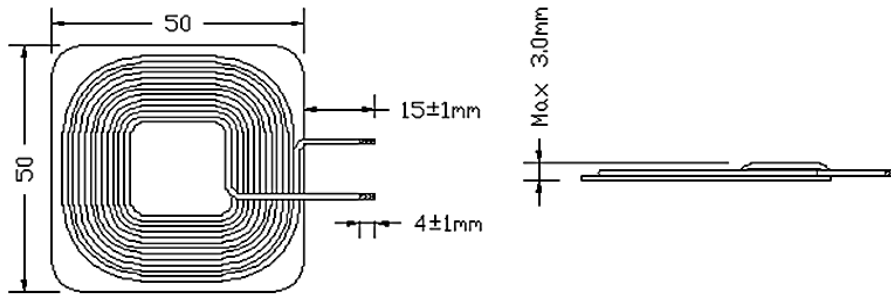
- Product design proposal
  - According to the standardization of Qi, please note below 3 points :
    - The distance between Tx Coil with PCB and other metal components is Min. 4.5mm.
    - The distance between the surface of Tx coil and the surface of product (Working Face) is  $2.0_{-0.5}^{+0.25}$  mm, which means the thickness of the working face plastic is not more than 2.25mm.
    - The surface distance between Tx Coil and Rx Coil is 3.0~4.5mm.
    - Added cooling device to MOSFET inductor to do heat treatment. (similar to the computer CPU cooling method)
- PCBA Port Functional Illustration



50 \* 50 \* 4.0 mm (Max.)

Port	Pin 1	Pin 2
Function	LED+	Blue LED
Port	Pin 3	Pin 4
Function	Red LED	LED GND
Port	Pin 5 / 6	Pin 7 / 8
Function	Tx Coil	NTC
Port	Pin 9 / 10	Pin 11 / 12
Function	FUN+/-	BUZ-/+
Port	Pin 13	Pin 14
Function	USB D-	USB D+
Port	Pin 15	Pin 16
Function	VIN-	VIN+

- Tx\_Coil Spec

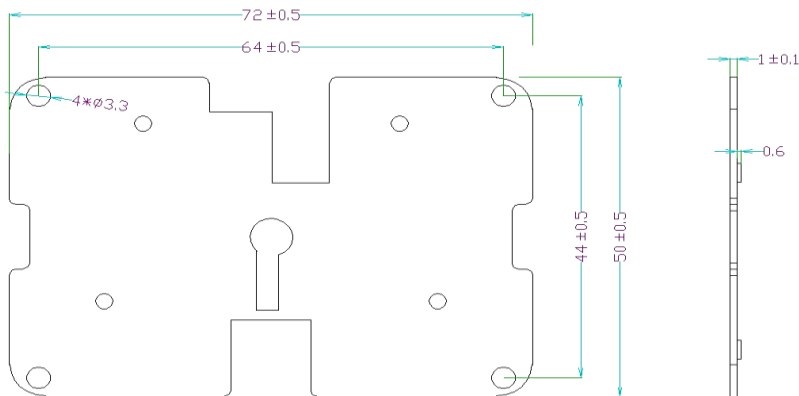


Coil + Shielding : 50 \* 50 \* 3.0 mm (Max.)

### Electrical specification @25°C

Parameters	Unit	Limit
Inductance, LS @100kHz, 1.0V, 0.08mm*105 ~12Turns	uH	10 ± 10%
Q	---	40 ± 10%
DCR	mΩ	50 ± 10%

- Aluminum Heat Sink Guage Spec



(Unit: mm)

### Others

- Weight : 32 ± 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)