

Scope

- The purpose of the document is to specify the functional requirement of a WPC1.2_Qi Wireless Power Supply's Tx Module. (WPC1.2 downward compatible WPC1.1)
- The Wireless Power supply's Tx Module shall meet the ROHS requirement.

Applications

- Smartphone
- Wearable devices
- Home appliances
- Portable consumer products

Product Characteristic

QPT-0004 is a WPC1.2 Qi-compliant multi-function wireless charging platform: Its transmission efficiency is up to 70% ± 5% and can provide up to 1A transmission capacity. It enables powering or charging for any WPC1.2 Qi certified products.

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. The console will process the corresponding power adjustment based on the encoding of the receiving unit. This module has fulfilled the WPC1.2 Qi requirement and is certified by Qi.

Multiple LED indication scheme available for options						
Scheme	LED	Operational States				
		Standby	Power Transfer	Charge Complete	Fault	Dynamic Power Limiting
Generic	D2, Blue	Off	On	On	Off	Off
	D3, Red	Off	Off	Off	On	Blink slow
Generic Opt 1	D2, Blue	Off	Blink slow	On	Off	Off
	D3, Red	Off	Off	Off	On	Blink slow
	D1, Green	While the module is charged, the green led light is on				

Its dedicated power adapter has ultra-wide input voltage design, can work stably under AC100~240V / 50~60Hz and can be used for users from all countries and regions.

Input Characteristics

- Input Voltage & Frequency

Item	Minimum	Normal	Maximum
Input Voltage	4.75VDC	5.0VDC	5.50VDC
Chargng Mode	Qi_5W		
Frequency	112 ~ 205 kHz		
Modulation	AM		

- Input Current
2.0A max. @ 5.0VDC Full load
- Inrush Current (cold)
2.5A max. @ 5.0VDC Full load & Ambient temperature 25°C
- Energy Consumption
At 4.75VDC or 5.0VDC, energy consumption ≤ 0.05A.

Output Characteristics (Rx_Module)

- Static Output Characteristics <Vo & R+N>

Output Power	Rated Load		Peak Load	Output Range	R+N
	Min. Load	Max. Load			
5W	0.10A	1.00A	1.20A	5V ± 5%	≤ 250m 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		
5W	0.10A	1.00A	± 5%	± 5%

Protection Requirement

- Short Circuit Protection

The input power shall decrease when the output is short to GND, the power supply shall not damage, and shall be self-recovery when the fault condition is removed.

- Over Current Protection (OCP)

OCP Point Limited : 120%~130% auto restart

The output shall hiccup when the over current applied to the output, and shall be self-recovery when the fault condition is removed.

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

- Carton 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

- Burn-in
2 hours at 35 °C (± 5 °C) environment, nominal input voltage, nominal load.
- Vibration Test
 - (1) Amplitude: 2 mm
 - (2) Frequency: 12.4 Hz
 - (3) Direction: X, Y
 - (4) Time: 30 minutes/pc

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)

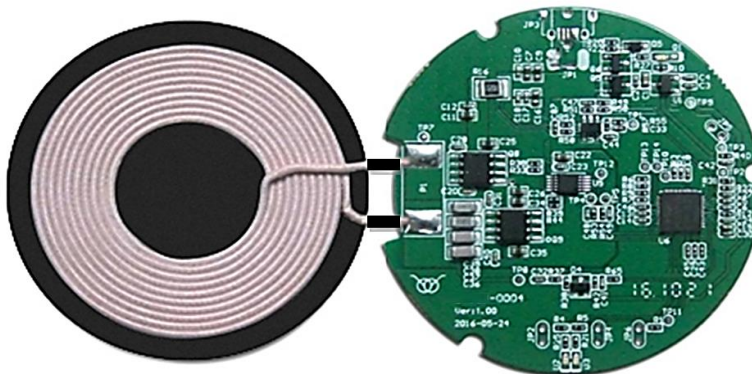
- EMC Standards

EN55032	EN55024
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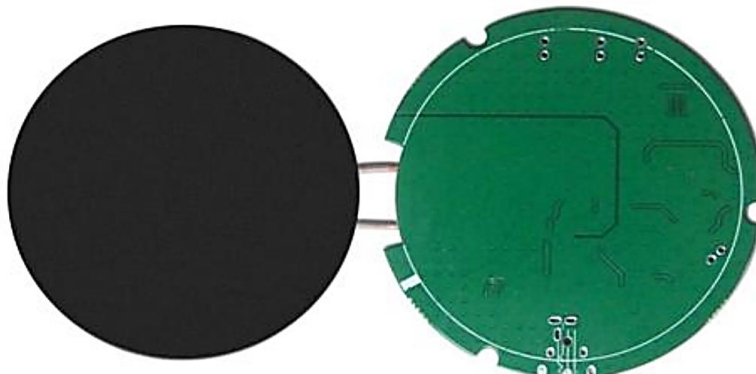
- WPC1.2_Qi Standards

Photo of Product

Front Side



Back Side



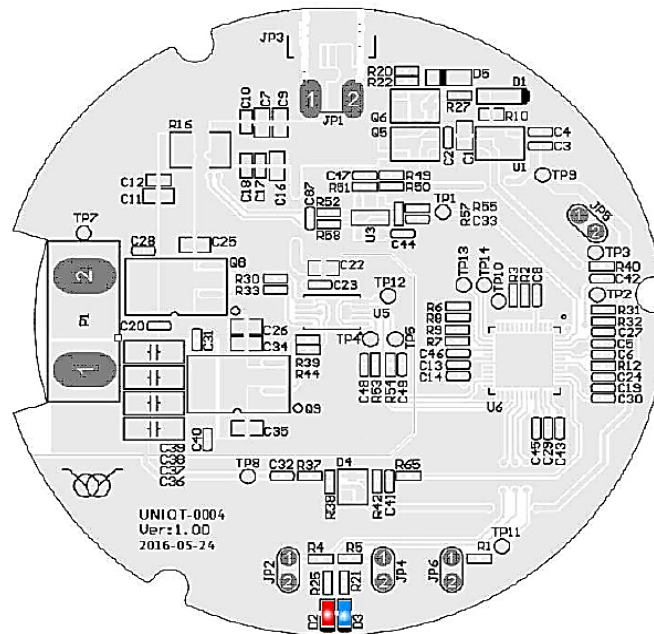
Module

- 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. 5.0mm.
- (2) The distance between the surface of Tx coil and the surface of product (Working Face) is $2.0_{-0.25}^{+0.5}$ mm, which means the thickness of the working face plastic is not more than 2.5mm.
- (3) The surface distance between Tx Coil and Rx Coil is 3.0~4.5mm.

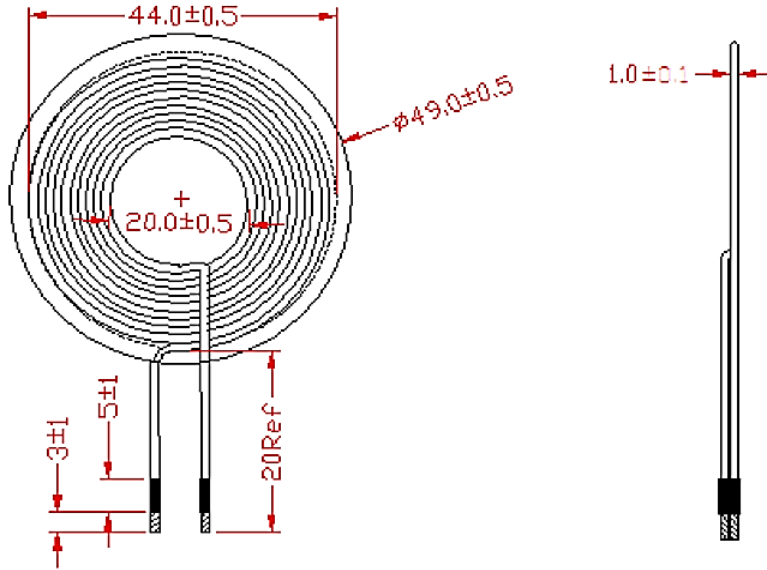
- PCBA Port Functional Illustration



PCBA Size : $\Phi 56 * 2.5$ mm

Port	JP1-L	JP1-R	JP2
Function	5V IN	GND	Red LED
Port	JP4	JP5	JP6
Function	Blue LED	10K NTC	BUZZ
Port	P1		
Function	Tx Coil		

- Tx_Coil Spec



Coil + Shielding : $\Phi 49 (\pm 0.5) * 2.5 (\pm 0.1) \text{ mm}$

Electrical specification @25°C

Parameters	Unit	Limit
Inductance, LS @100kHz, 1.0V, 0.08mm*105 ~10Turns	uH	6.5 ± 10%
Q	---	90 ± 10%
DCR	mΩ	35 ± 10%

Others

- Weight : 22 ± 5 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)