

Scope

- The purpose of the document is to specify the functional requirement of a WPC1.2.3_Qi Medium Power Tx Module. (WPC1.2.3 is compatible with WPC1.1).
- The Wireless Power supply's Tx Module should meet the ROHS requirement.

Applications

- Smartphone, Mobile phone
- Wearable devices
- Home appliances
- Portable consumer products

Product Characteristic

QPT-0014 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.

Multiple LED indication scheme available for options						
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	Breathing lamp	On	Off	Off

Standard no LED light, LED1 & LED2 for customer to choose, or design customer LED color.

Input Characteristics

- Input Voltage & Frequency

Item	Minimum	Normal	Maximum
Input Voltage	8.0VDC	12.0VDC	13.0VDC

TX Input Voltage	RX Module		
	Low Power	Fast Charging	Medium Power
12.0VDC	V	V	V
9.0VDC	V	V	
5.0VDC	V		

- Input Current
1.6A Max. @12.0VDC Full load
- Inrush Current (cold)
2.0A Max. @12.0VDC Full load & ambient temperature @25°C
- Energy Consumption
At 11.5VDC 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.

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	+45°C (2Hrs) → -20°C (2Hrs) → +45°C (2Hrs) → -20°C (2Hrs) continually work 24hours

- Burn-in

Burn-in for 2hours at 35°C (±5°C), nominal input voltage, nominal load.

- Vibration Test

(1) Amplitude: 2 mm

(3) Direction: X, Y

(2) Frequency: 12.4 Hz

(4) Time: 30 minutes/pc

- Dropping Test

(1) Test height : Determined by weight

(2) Drop times: 10 times (one triangle, 3 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 should be below 10000 feet.
- Storage Temperature and Relative Humidity
-20°C to +60°C, 10%RH to 90%RH (non-condensing) @altitude should be below 30000 feet.

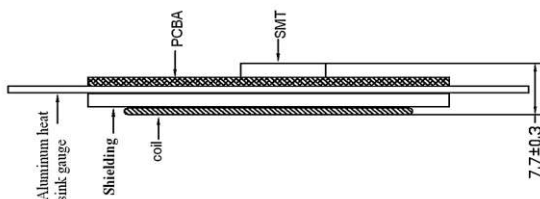
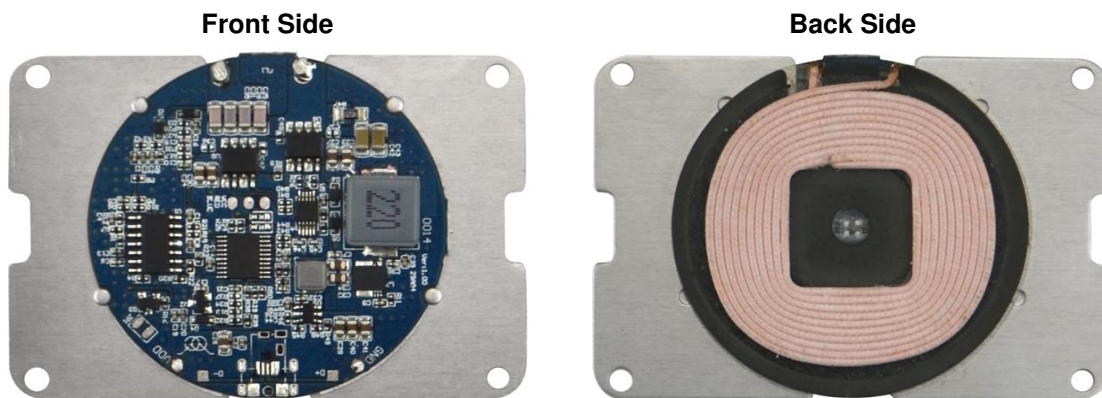
Execution Standards (Compatible with these specifications)

- EMC Standards

EN55022	EN55024
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- WPC1.2.3_Qi Standards

Photo of Product



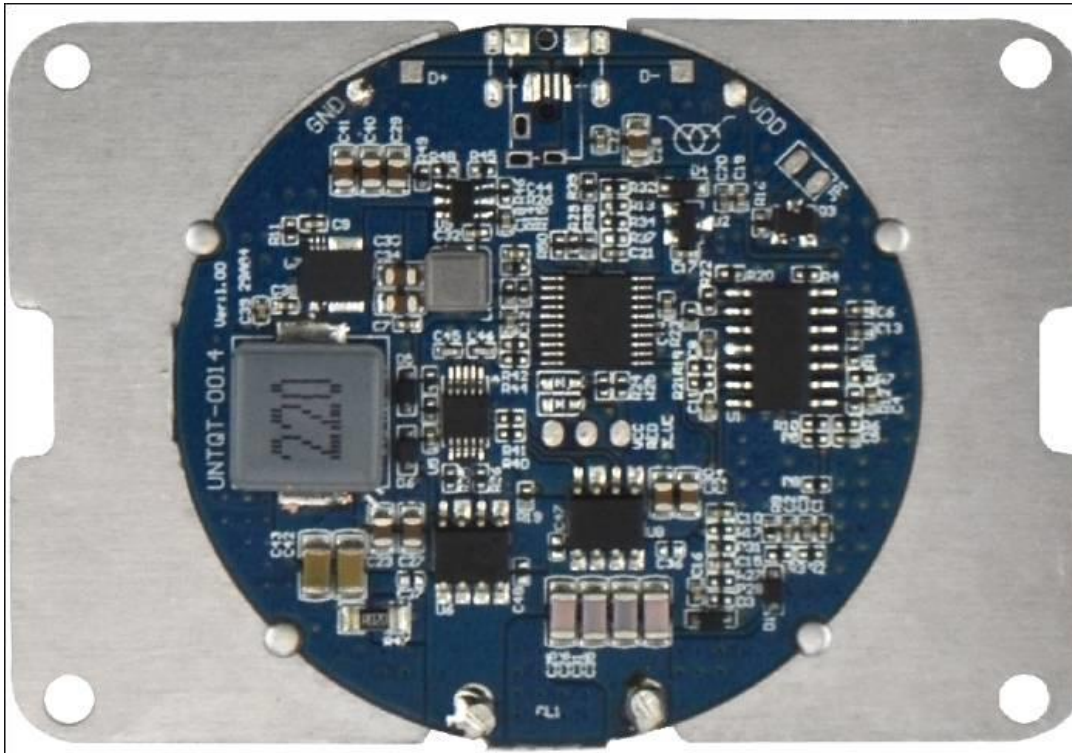
Module

- 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. 4.5mm.
- (2) 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.
- (3) The surface distance between Tx Coil and Rx Coil is 3.0~4.5mm.
- (4) Added cooling device to 22uH inductor to do heat treatment (similar to the computer CPU cooling method).
- (5) In order to pass the EMI, it is recommended to connect the PCBA with the DC 12V power.

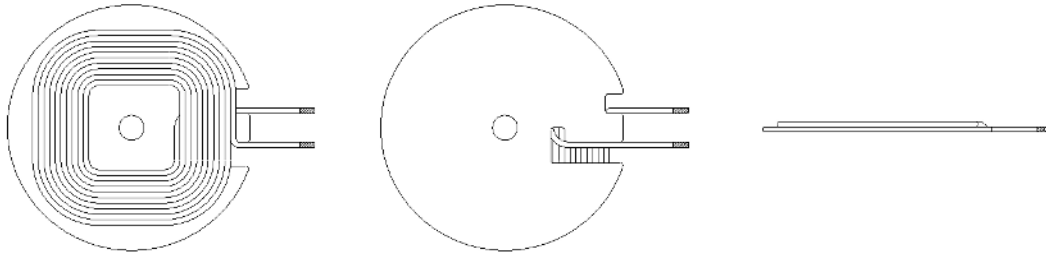
- PCBA Port Functional Illustration



PCBA : $\Phi 50(\pm 0.3) * 4.7(\pm 0.2)$ mm

Port	JP1-1	JP1-2	VCC	RED	BLUE
Function	BUZZ+	BUZZ-	LED VDD	Red LED-	Blue LED-
Port	GND	D+/D-	VDD	CL1-1	CL1-2
Function	QC3.0/12V GND	QC3.0 D+/D-	QC3.0/12V VDD	Tx Coil	

- Tx Coil Spec

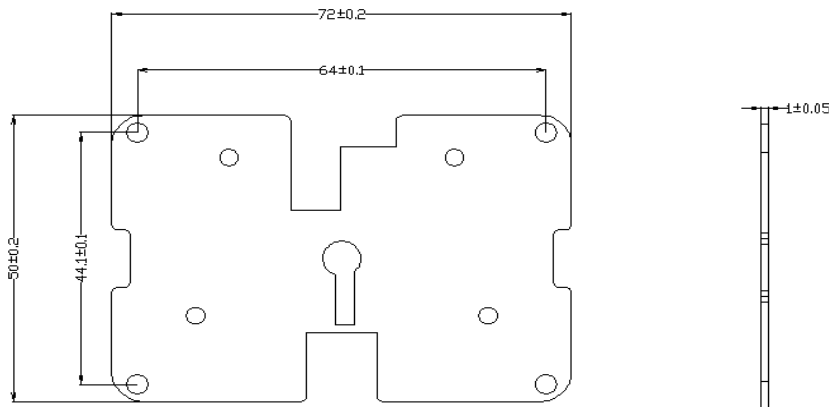


Coil + Shielding : $\Phi 50 * 2.25$ mm (Max.)

Electrical specification @25°C

Parameters	Unit	Limit
Inductance, LS @100kHz, 1.0V, 0.08mm*100 ~10Turns	uH	$6.30 \pm 10\%$
Q	---	$40 \pm 10\%$
DCR	m Ω	$30 \pm 10\%$

- Aluminum Heat Sink Gauge Spec



(Unit: mm)

Others

- Weight : 25 ± 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)