

Scope

- The purpose of the document is to specify the functional requirement of a WPC_Qi_V1.2.2 Wireless Power Supply's Tx Module. (Qi_V1.2.2 downward compatible Qi_V1.1.2)
- The Wireless Power supply's Tx Module shall meet the ROHS requirement.

Applications

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

Distributed by:



Product Characteristic

QPT-0005 is a V1.2.2 Qi-compliant multi-function wireless charging module with WPC_Qi A28 three coil scheme, its three transmitter coil can identify the location of the receiver automatically, so the user don't need to align the center, which able to enhance user experience. Its transmission efficiency is reached 75%. The device provides 5W output power with the Qi certified receiver device. It enables powering or charging for any WPC_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 WPC_Qi_V1.2.2 The console will process the corresponding power adjustment based on the encoding of the receiving unit. This module has fulfilled the WPC_Qi-V1.2.2 Qi requirement and is certified by Qi.

Multiple LED indication scheme available for selection						
Scheme	LED	Operational States				
		Standby	Power Transfer	Charge Complete	Fault	Dynamic Power Limiting
Generic	D6, Blue	Off	On	Off	Off	Off
	D5, Red	Off	Off	Off	On	Blink slow
Generic Opt 1	D6, Blue	Off	Blink slow	On	Off	Off
	D5, Red	Off	Off	Off	On	Blink slow
Generic Opt 2	D6, Blue	On	Blink slow	On	Off	Off
	D5, Red	On	Off	Off	On	Blink slow

A28 scheme using a DC5.0V as power supply, the user can find suitable AC-DC power adapter easily. AC-DC power adapter is not a must during sales and production, in order to achieve the purpose of saving and environmental protection.

Input Characteristics

- Input Voltage & Frequency

Item	Minimum	Normal	Maximum
Input Voltage	4.75VDC	5.00VDC	5.50VDC

- Input Current

1.6A Max. @5.00VDC Full load

- Energy Consumption

At 5.00VDC, average standby power consumption ≤ 0.075W.

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	0A	1.0A	1.2A	4.75~5.25V	< 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 10uF electrolysis capacitor.

- Line & Load Regulation

Output Power	Load Condition		Line Regulation Period	Load Regulation
	Min. Load	Max. Load		
5W	0A	1.1A	< 1S	± 5.0%

Protection Requirement

- Over Temperature Protection (OTP)
When the working temperature of the transmitter too high (>65°C), OTP function self-start, stop output the electromagnetic wave and indicates red LED is on continuously. And when the working temperature is returned to normal, the transmitter returns to normal operation.
- Over Current Protection (OCP)
When the receiving end of the output current exceeds 1.2A(rated capacity: DC5.0V/1A), the receiving end sends the wrong data in time to the transmitter, the transmitter stops sending the radio electromagnetic wave, and indicates the red LED is on continuously. It will be working normal after restart the transmitter when the fault receiving condition is removed.
- Charge Completion
When received the “charge completed” data packet from the receiver, the transmitter enters a low power state, and the blue LED is on continuously.

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

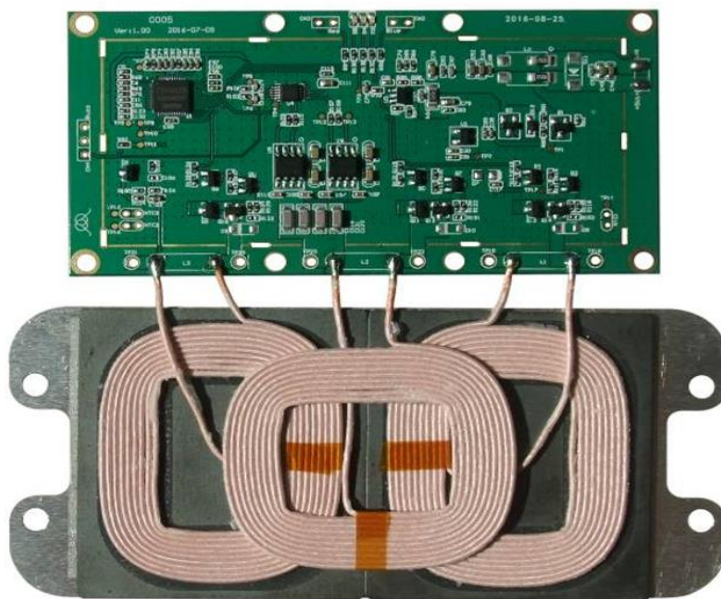
- Burn-in
2hours at 35°C (±5°C), nominal input voltage, nominal load.

Environment Requirement

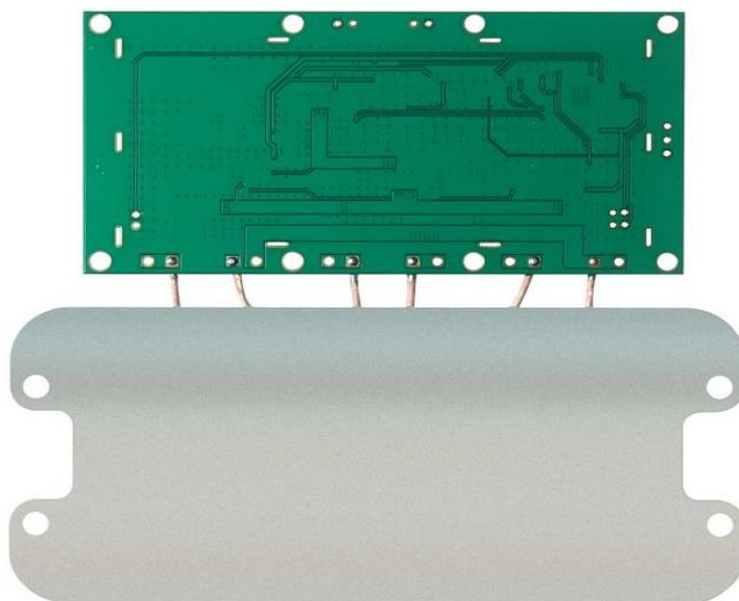
- Operating Temperature and Relative Humidity
0°C to +40°C, 20%RH to 80%RH @sea level shall below or no more than 10000 feet.
- Storage Temperature and Relative Humidity
-20°C to +60°C, 10%RH to 90%RH (non-condensing) @sea level shall below 30000 feet.

Photo of Product

Front Side



Back Side



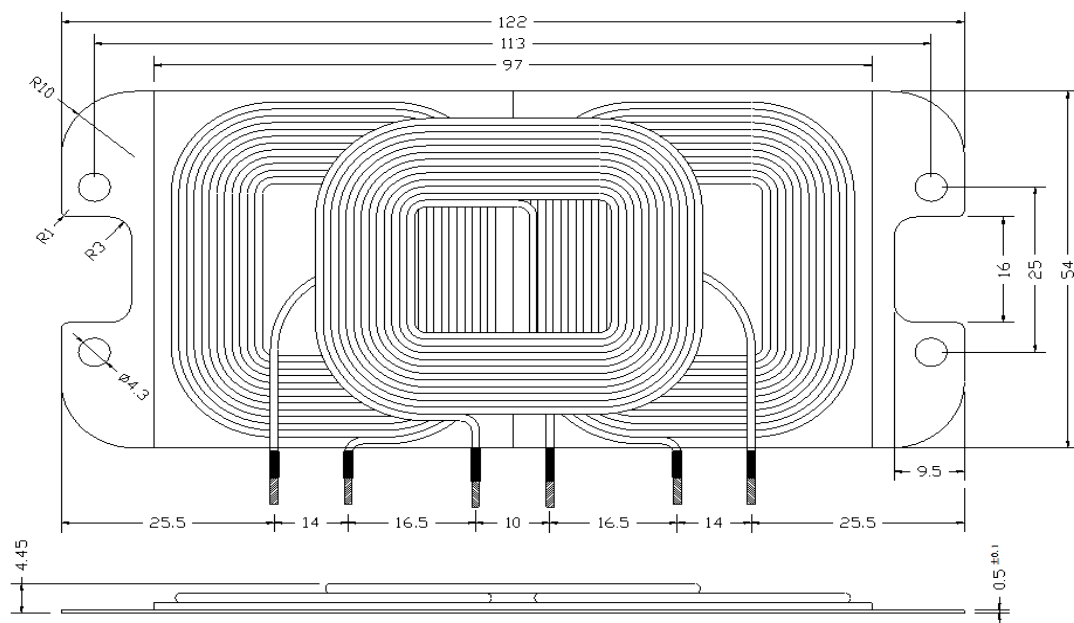
Module

● Product Design Proposal

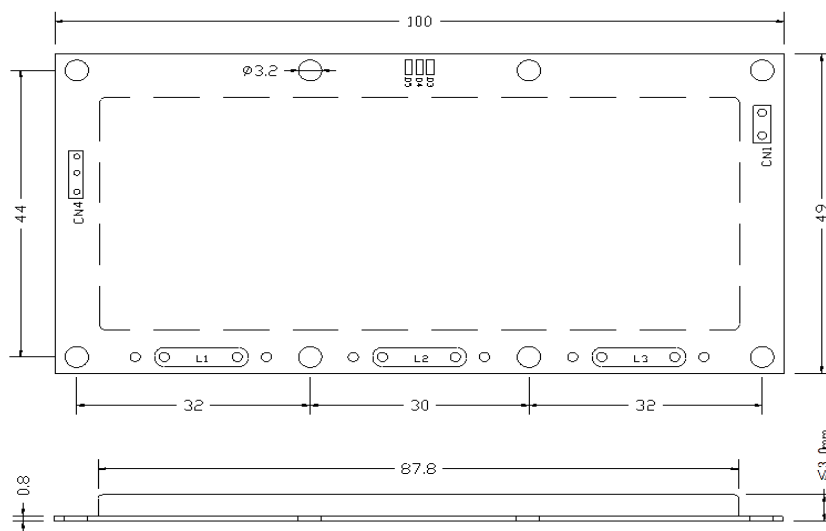
In order to comply with relevant technical standards, there is three principles need to be careful :

- (1) Coil and PCBA can be placed either side by side or overlapping installed in the product; But the distance between Tx Coil with PCBA 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 1.5-2.5mm, 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 3.5~5.0mm.

● PCBA Port Functional Illustration



0005 Coil



0005 PCBA

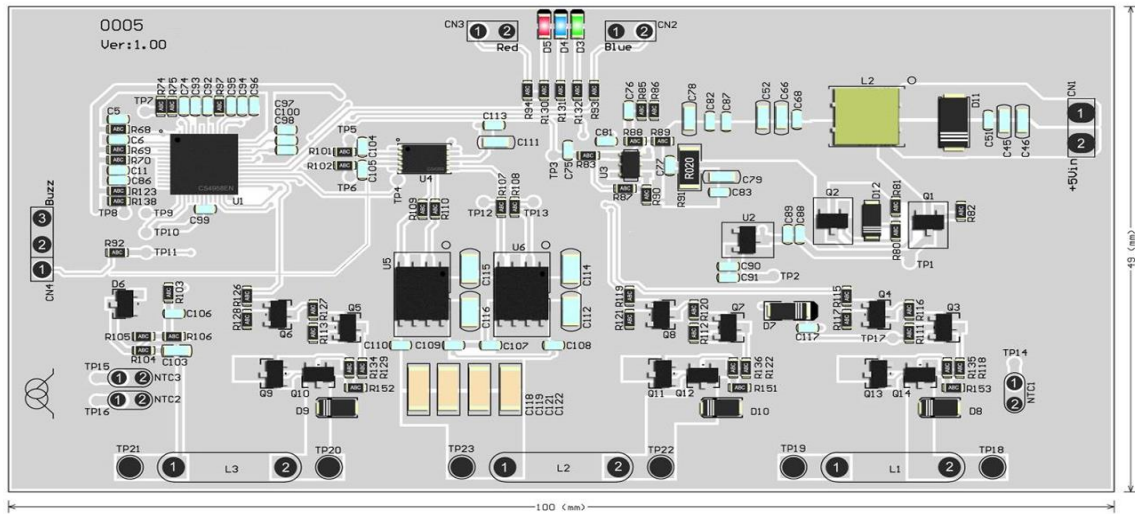
(Unit: mm)

PCBA : 100 * 49 * 3.0 mm (Max.)

Coil + Shielding : 122 * 54 * 4.5 mm (Max.)

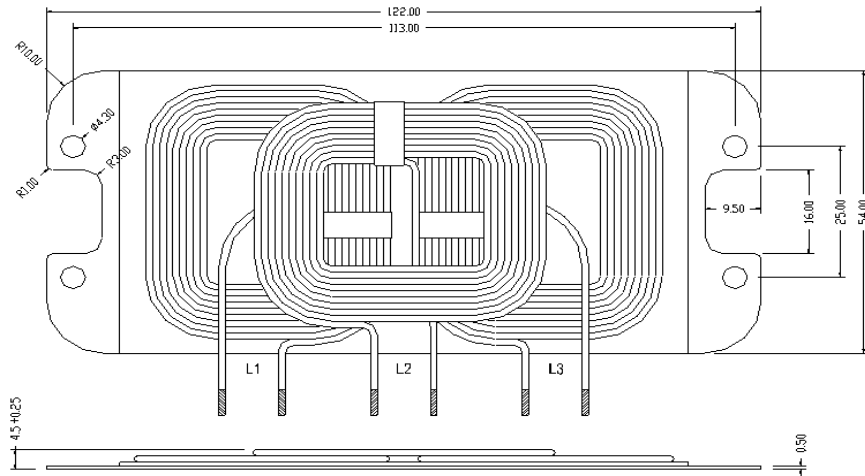
QPT-0005

Wireless Charging Transmitter Module



Port	CN1		CN2		CN3		CN4	L1	L2	L3	NTC 1	NTC 2	NTC 3
	Pin1	Pin2	Pin1	Pin2	Pin1	Pin2							
Function	DC 5V in	GND	Blue LED-	Blue LED+	Red LED+	Red LED-	BUZZ	3 Coils			NTC	NTC	NTC

Tx Coil Spec



(Unit: mm)

Electrical specification @25°C	Unit	Limit		
		L1	L2	L3
Inductance, LS @100kHz, 1.0V, AGW20 (AWG40*105) ~9Turns	uH	6.80±10%	6.50±10%	6.80±10%
Q	---	50±10%	45±10%	50±10%
DCR	mΩ	55±10%	55±10%	55±10%

Others

- Weight : 25 ± 5 g
- Major Test Equipment
 - (1) DC Supply: GPD-3303S
 - (2) Rx_Module: UNIFR-0501
 - (3) Electronic Load: ARRAY3710A
 - (4) Oscilloscope: DPO-3014
 - (5) Logical Analyzer: AMDP-5826
 - (6) AVID FOD Receiver V1.2.2
 - (7) AVID Qi Sniffer v1.2

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