

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
- Wearable devices
- Home appliances
- Portable consumer products

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%. With the Qi certified receiver device the device provides 5W output power. 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 options Operational States								
Scheme	LED	Standby	Power Transfer	Charge Complete	Fault	Dynamic Power Limiting		
Generic	D6, Blue	Off	On	Off	Off	Off		
Generic	D5, Red	Off	Off	Off	On	Blink slow		
Conoria Opt 1	D6, Blue	Off	Blink slow	On	Off	Off		
Generic Opt 1	D5, Red	Off	Off	Off	On	Blink slow		
Conoria Opt 2	D6, Blue	On	Blink slow	On	Off	Off		
Generic Opt 2	D5, Red	On	Off	Off	On	Blink slow		
A28 scheme usin	g a DC5.0 V	as power sup	ply, the user	can find suital	ole AC-DC pc	ower 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
Chargng Mode			
Frequency		110 ~ 205 kHz	

Input Current
 1.6A max. @ 5.0VDC

Full load

Inrush Current (cold)
 2.0A max. @ 5.0VDC

Full load & Ambient temperature 25°C

Energy Consumption
 At 5.0VDC, average standby power consumption ≤ 0.15W.



Output Characteristics (Rx_Module)

• Static Output Characteristics <Vo & R+N>

Output	Rated Load		Poak Load	Output Range	R+N	
Power	Min. Load	Max. Load	Feak LUau	Output hange	n+N	
5W	0A	1.0A	1.2A	4.75V ~ 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 Characteristics

Output	utput Load Condition		Line Regulation	Load	
Power	Min. Load	Max. Load	Period	Regulation	
5W	0A	1.1A	< 1S	± 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 $\geq \Phi 20$ mm) 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 $60^{\circ}C \pm 5^{\circ}C$.
External NTC :	5W / 7.5W / 10W NTC temperature is $60^{\circ}C \pm 5^{\circ}C$.

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				

Carton Vibration Test

- (1) Amplitude: 2 mm
- (2) Frequency: 12.4 Hz

- (3) Direction: X, Y
- (4) Time: 30 minutes/pc



- Carton Dropping Test
 - (1) Test height: Determined by weight
 - (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 Le	ss 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

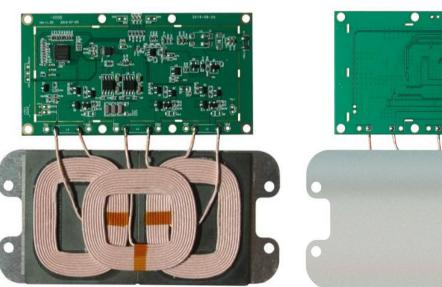
- Operating Temperature and Relative Humidity
 0°C to +40°C, 20%RH to 80%RH @ altitude shall be below 10000 feet.
- Storage Temperature and Relative Humidity -20°C to +60°C, 10%RH to 90%RH (non-condensing) @ altitude shall be below 30000 feet.

Execution Standards (Compatible with these specifications)

- EMC Standards
 EN55032 EN55024
- WPC1.2.2_Qi Standards

Photo of Product

Front Side

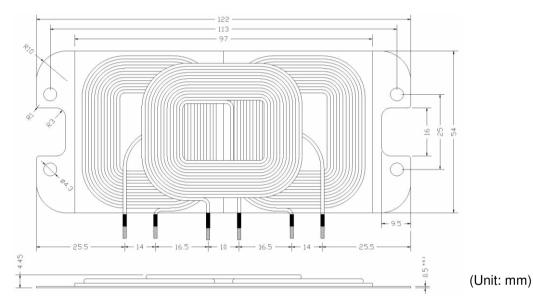


Back Side

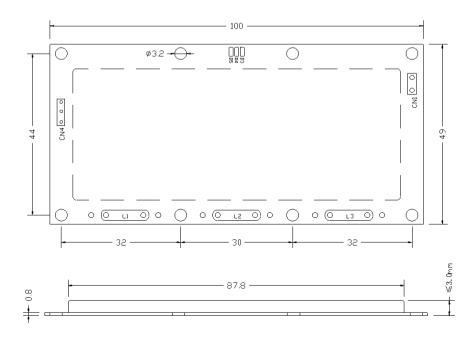


Module

- Product design proposal
 - In order to comply with relevant technical standards, there are 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
 - 1.75~2.5mm, which means the thickness of the working face plastic is not more than 2.5mm.
 (2) The surface distance between Tx Coil and Px Coil ideal value is 2.0x4 5mm.
 - (3) The surface distance between Tx Coil and Rx Coil ideal value is 3.0~4.5mm.
- PCBA Port Functional Illustration

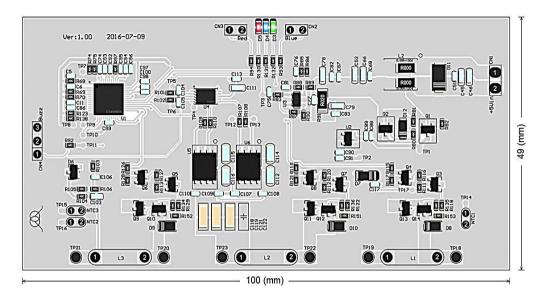


PCBA Size : 100 * 49 * 3.0 mm (Max.)



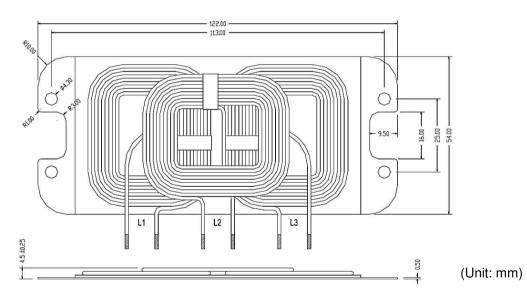


QPT-0005 Wireless Charging Transmitter Module



Port	CN1			CN2			CN3	
FOIL	Pin1	Pin2	2	Pin1		Pin2	Pin1	Pin2
Function	GND	DC5V	in Blue LE		ie LED-	Blue LED+	Red LED+	Red LED-
Port	CN4	L1	L2		L3	NTC1	NTC2	NTC3
Function	BUZZ	3 Coils		NTC	NTC	NTC		

• Tx_Coil Spec :



Electrical specification @25°C

Parameters	Unit	Limit			
Falanieleis	onit	L1	L2	L3	
Inductance, LS @100kHz, 1.0V, AWG20(AWG40*105) ~9Turns	uH	6.8 ± 10%	6.5 ± 10%	6.8 ± 10%	
Q		50 ± 10%	45 ± 10%	50 ± 10%	
DCR	mΩ	55 ± 10%	55 ± 10%	55 ± 10%	



Others

- Weight : 60 ± 2 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