QPT-0039A
Wireless Charging Transmitter Module

QST
Fuel The Digital World

Scope

- This product conforms to the TX module function requirements of the WPC1.2.4 Qi protocol and it is also compatible with all versions of WPC1.2.4 or lower.
- The Wireless Power supply's Tx Module should meet the ROHS requirement.

Applications

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

Product Characteristic

QPT-0039A is a WPC1.2.4 Qi fast charge wireless charging platform: Its transmission efficiency is up to 70% ± 5% and can provide up to 10W transmission capacity. It enables powering or charging for any WPC-Qi certified products. With fast charging function for Samsung® and iPhone® 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.

Multiple LED indication scheme available for options						
LED	**Operational States**					
	Power On	**Standby**	**Charger**	**Charge Complete**	**Fault**	**Dynamic Power Limiting**
LED1, Red	0.5S	Off	Off	Off	On	Blink slow
LED2, Blue	0.5S	Off	On	Off	Off	Off
External LED	If with a dual LED indicator, dual LED should using 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	9.0VDC	9.5VDC

TX Input Voltage	RX Module			
	Qi 5W	**Qi 10W**	**Apple 7.5W**	**Samsung 10W**
9.0VDC	V	V	V	V
5.0VDC	V			
USB fast charger	V	V	V	V

- Input Current
  1.75A max. @ 9.0VDC   Full load
  1.65A max. @ 5.0VDC   Full load
- Inrush Current (cold)
  2.00A max. @ 9.0VDC   Full load & Ambient temperature 25°C
  1.85A max. @ 5.0VDC   Full load & Ambient temperature 25°C
- Energy Consumption
  At 4.75VDC or 9.0VDC, energy consumption ≤ 0.625W.

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Output Characteristics (Rx_Module)

● Static Output Characteristics <Vo & R+N>

Output Power	Rated Load		Peak Load	Output Range	R+N
	Min. Load	Max. Load			
10W	0.10A	1.00A	1.10A	9.0V ± 5%	≤ 450m 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		
10W	0.10A	1.00A	± 5%	± 5%

● Charging Mode and Frequency

Charging Mode	Qi 5W	Qi 10W	Samsung Fast Charger	iPhone 7.5W
Frequency	110kHz ~ 205kHz			127.7kHz ± 0.4kHz

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.

Paste NTC and external NTC on the PCBA share one I/O port, they can only choose one from the other.

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

  (2) Frequency: 12.4 Hz

  (3) Direction: X, Y

  (4) Time: 30 minutes/pc

- 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

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
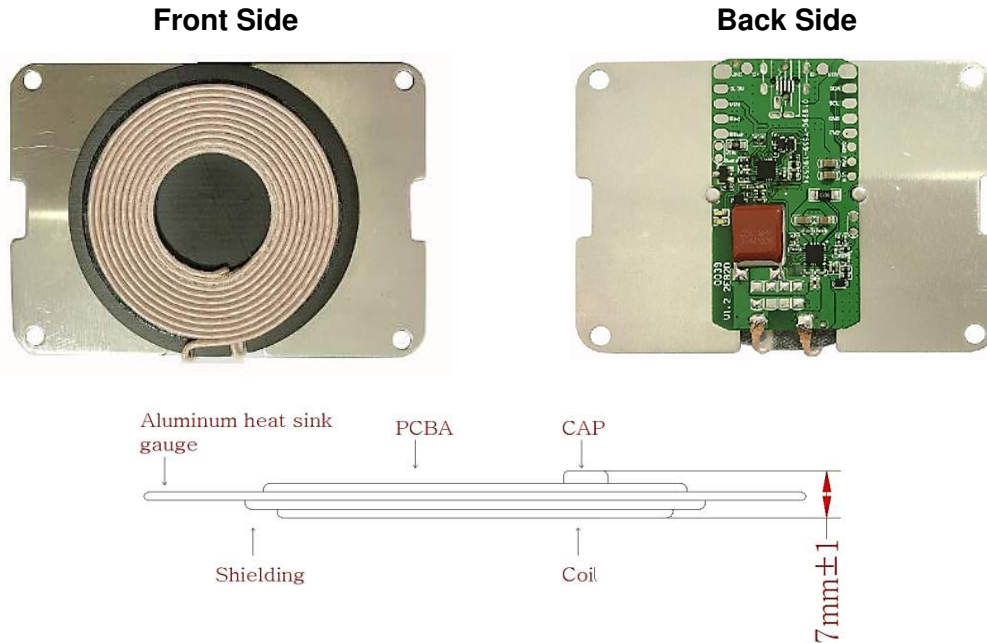 -20°C to +60°C, 10%RH to 90%RH (non-condensing) @ altitude shall be below 30000 feet.

Execution Standards (Compatible with these specifications)

- EMC Standards

EN55032	EN55024

- WPC1.2.4_Qi Standards

Photo of Product

Front Side

Back Side

Aluminum heat sink gauge   PCBA   CAP
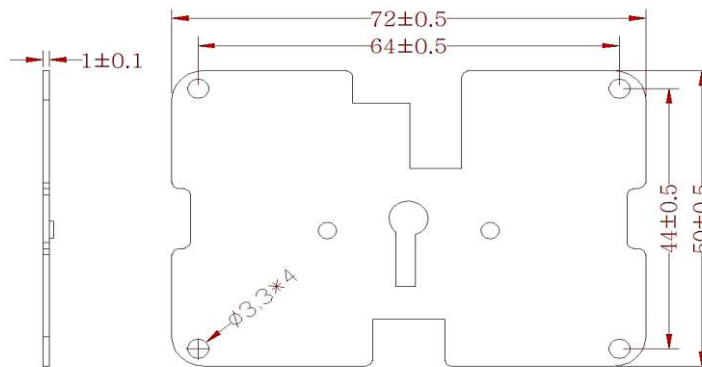
Shielding   Coil

7mm±1

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. 4.50mm.
  (2) The distance between the surface of Tx coil and the surface of product (Working Face) is
     $3.0_{-0.25}^{+0.5}$ mm, which means the thickness of the working face plastic is not more than 2.00mm.
  (3) The surface distance between Tx Coil and Rx Coil is 3.0~4.5mm.

- PCBA Port Functional Illustration
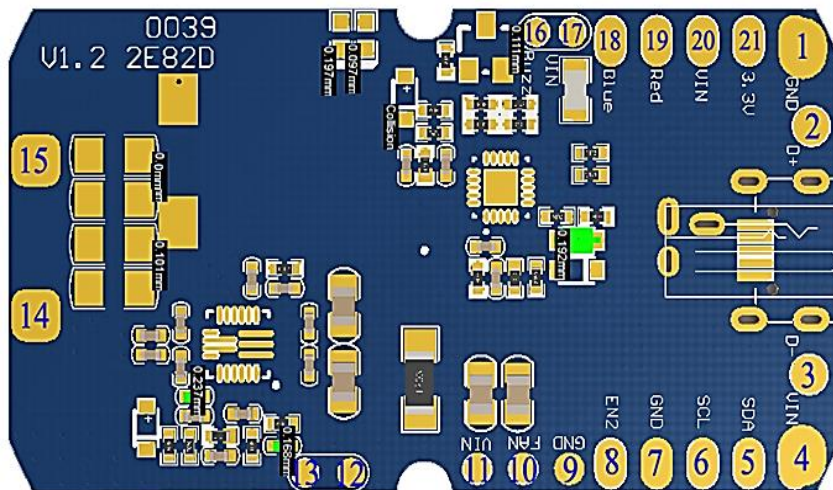
**PCBA Size : 25 * 46 * 3.5 mm (±0.5 mm)**

Port	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6
Function	GND	USB/D+	USB/D-	VIN	NC	NC

Port	Pin 7	Pin 8	Pin 9	Pin 10	Pin 11	Pin 12
Function	NC	NC	FAN_GND	FAN	FAN_VIN	NTC-

Port	Pin 13	Pin 14	Pin 15	Pin 16	Pin 17	Pin 18
Function	NTC+	Coil-1	Coil-2	Buzz-	Buzz+	LED_Blue

Port	Pin 19	Pin 20	Pin 21
Function	LED_Red	LDO_VIN	LED_3.3V

● Aluminum Heat Sink Guage Spec

● Tx_Coil Spec

Coil + Shielding : Φ50 * 2.3 (±0.1) mm
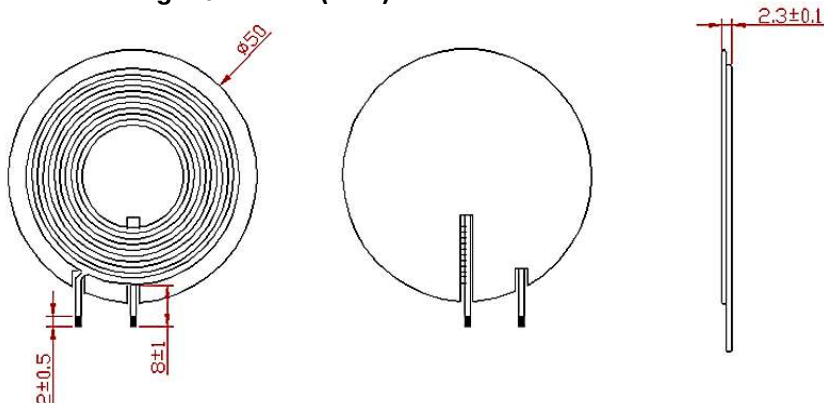
Electrical specification @25°C

Parameters	Unit	Limit
Inductance, LS @100kHz, 1.0V, 0.08mm*105 ~10Turns	uH	6.5 ± 10%
Q	---	65 ± 10%
DCR	mΩ	35 ± 10%

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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)