

Wireless Power Reference Design

EVB-WP300 Datasheet



Part Number: EVB-WP300TX14 & EVB-WP300RX14

August 11, 2020

FEATURES

Default DC 24V Input Voltage, maximum operating voltage 36V input.

Up to 90% Efficiency at 100W power

Effective Foreign Object Detection

Over Voltage, Under voltage, Over Current, Over temperature protection schemes

APPLICATIONS

Electro-magnetic inductive wireless electric power transmission



FCC Information

ID 2AVS4-FDT-EVB-WP300

<https://fcc.report/FCC-ID/2AVS4-FDT-EVB-WP300>

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a **Class A** digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

Federal Communication Commission (FCC) Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End user must follow the specific operating instructions for satisfying RF exposure compliance.



CE Information

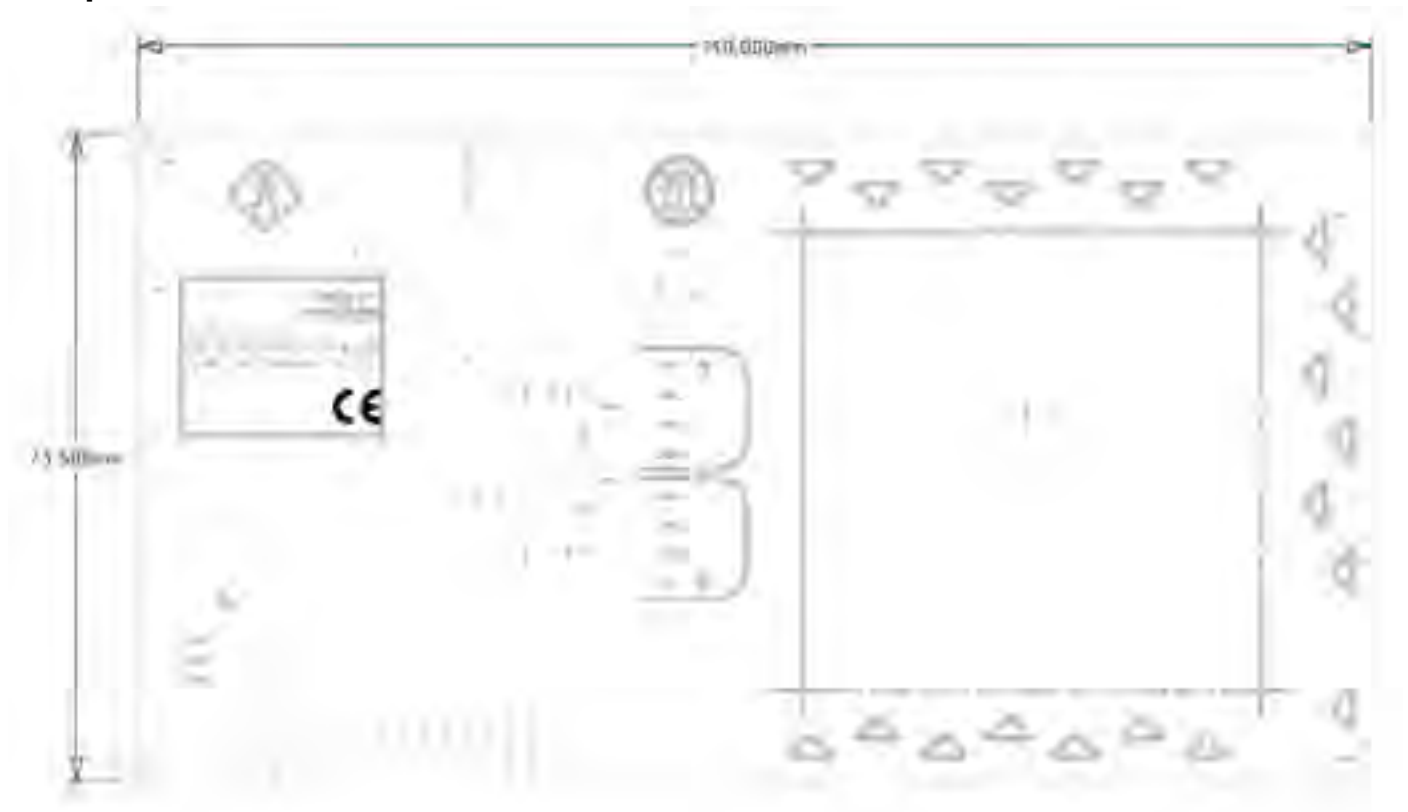
This equipment should be installed and operated with minimum distance 10cm between the radiator & your body.

Compliance with 2014/53/EU Radio Equipment Directive (RED)

In accordance with Article 10.8(a) and 10.8(b) of the RED, the following table provides information on the frequency bands used and the maximum RF transmit power of the product for sale in the EU:

Frequency range (MHz)	Max. Transmit Power (dBuA/m)
0.110 - 0.140	3.55

The position of the CE mark on the transmission circuit board



EU Declaration of Conformity

We

Name of manufacturer: Fu Da Tong Technology Co., Ltd.
Address: 1(F)-5, No.880, Zhongzheng Rd., Zhonghe Dist., New Taipei City, Taiwan, R.O.C.
Telephone number: 886-2-32344442

hereby declare under our sole responsibility that the requirements set out in the Directive 2014/53/EU has been fully fulfilled in our product with indication below:

Product Name: Wireless Power Reference Design
Model Number: EVB-WP300
Serial Number: NA



Object of the declaration

The object of the declaration described above is in conformity with the relevant Union harmonization legislation:

- Radio Equipment Directive (RED) 2014/53/EU
- Restriction of Hazardous Substances Directive (RoHS) 2011/65/EU
- Waste Electrical and Electronic Equipment Directive (WEEE) 2012/19/EU

The following standards and technical specifications have been applied:

- Article 3.2 & 3.3 : EN 303 417 V1.1.1
 Article 3.1(b) : EN 301 489-1 V2.1.0 / EN 301 489-3 V2.1.1 / EN 55032:2015/AC:2016(Class A)
 / EN 55024 : 2010/A1 : 2016 / EN 61000-3-2:2014 / EN 61000-3-3:2013
 Article 3.1(a) : EN 62311: 2008 / EN 60665:2017
 Article 3.1(a) : EN 60950-1: 2006+A11:2009+A1:2010+A12:2011+A2:2013

Notified Body (where applicable): *(fill in the name and number of the notified body if it has been notified under the law)*

Timco Engineering, Inc. 1177

EU-type examination certificate: 200188 With Module B+C

Signed for and on behalf of

Signature

Tsai Ming-Chiu

August 11, 2020, Taiwan

Name, Function Title: Tsai Ming-Chiu, General Manager

E-mail: eva@rfidpower.com.tw

Packaging Information



FDT
RFID POWER
WIRELESS

Fu Da Tong Technology Co., Ltd.

10F-5, No.800, Zhongcheng Rd., Zhonghe Dist., New Taipei City 22000, TAIWAN
Mail: EVO@rfidpower.com.tw <http://www.rfidpower.com.tw>



HANDLE WITH CARE

Exceeding conditions over the maximum capacity may cause damage to the products.

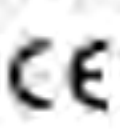


23.7cm x 12.2cm x 4.3cm

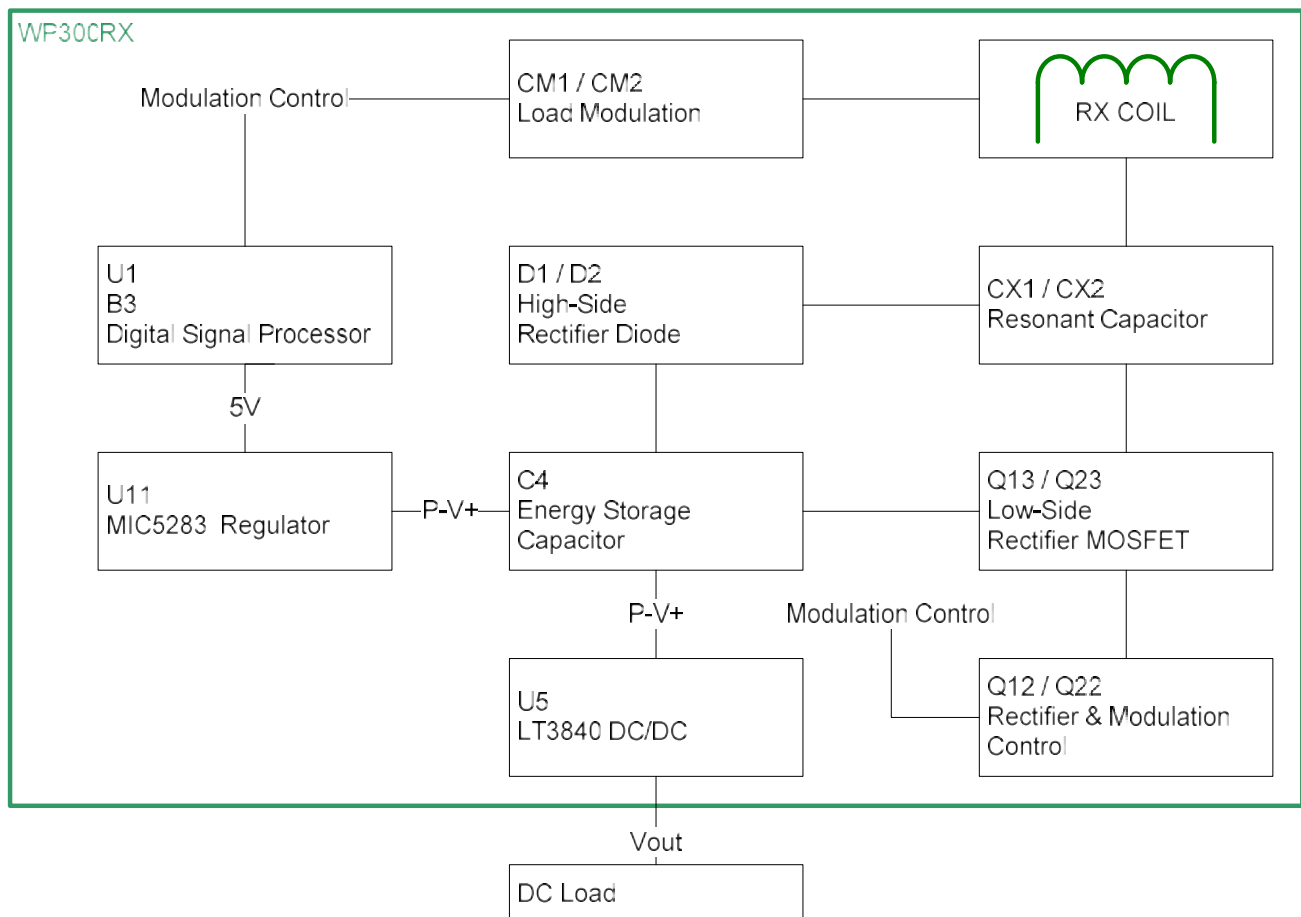
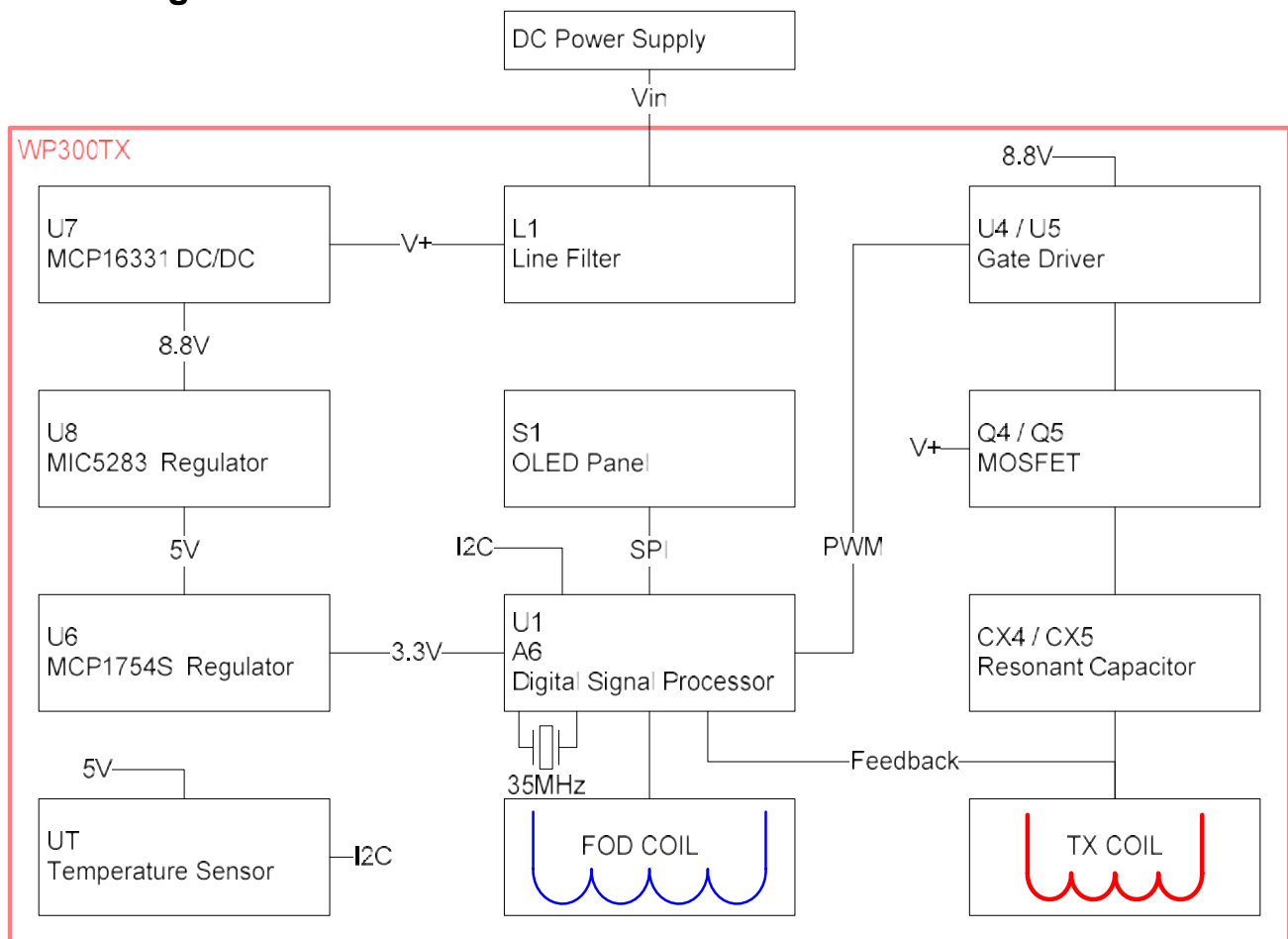
Weight : 0.5kg

Part Number WP3001 & WP3003

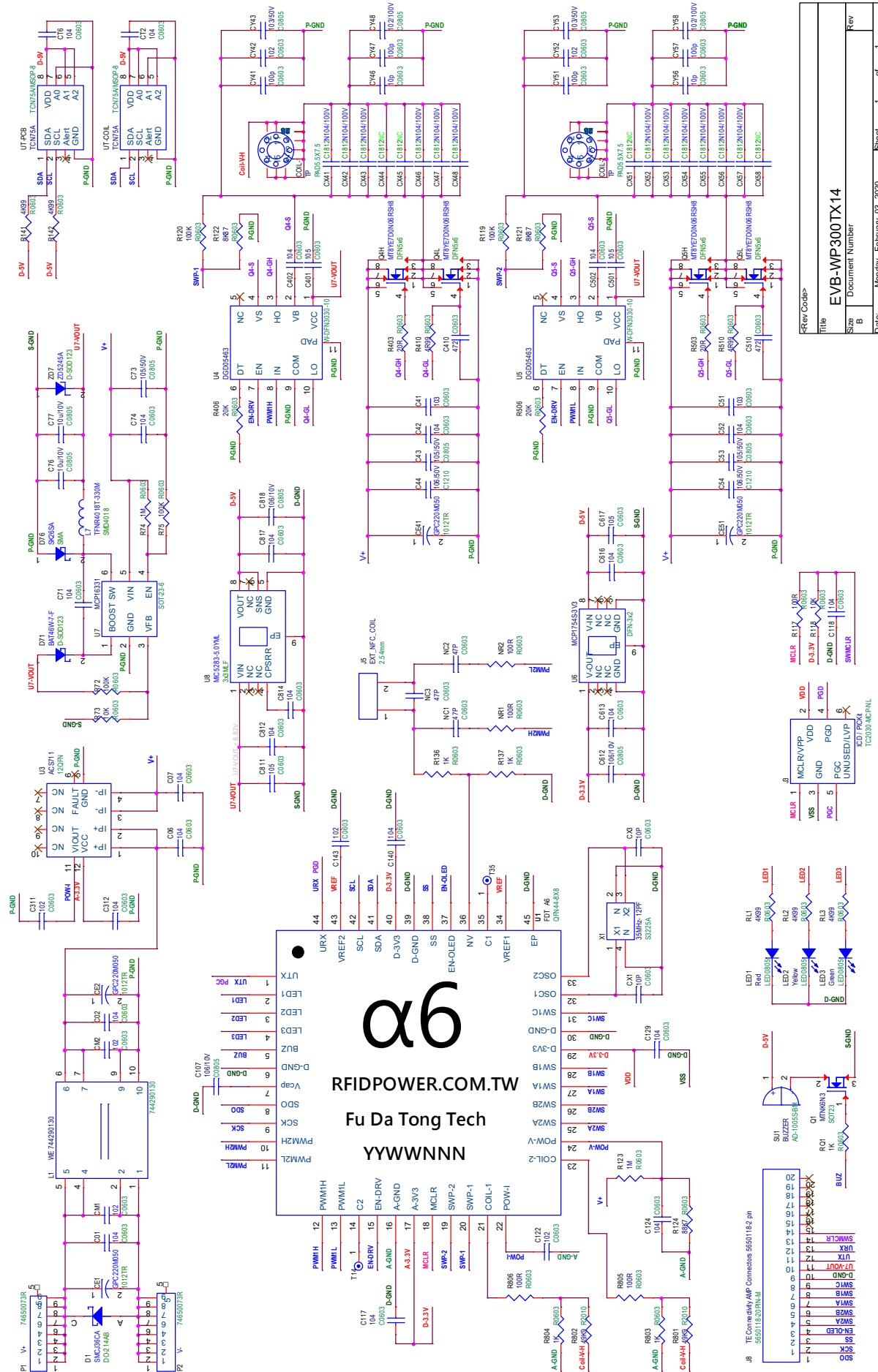
Made in Taiwan

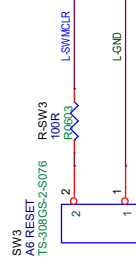
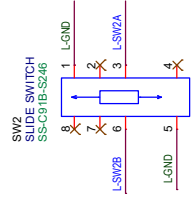
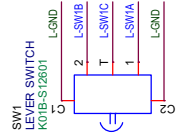
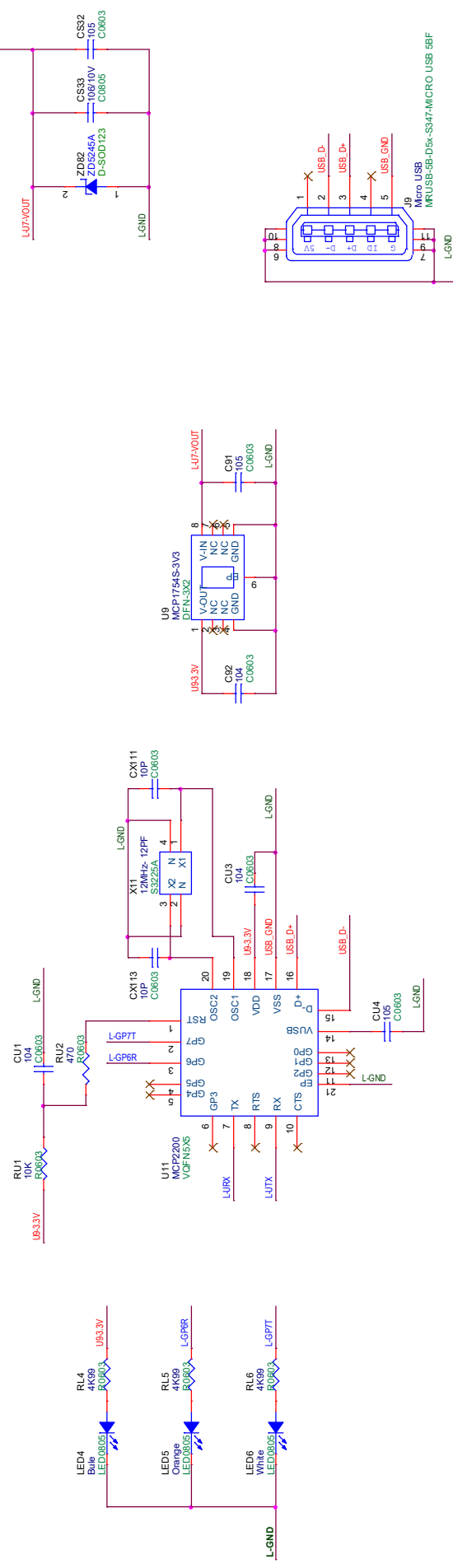
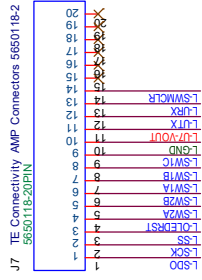


Block diagram

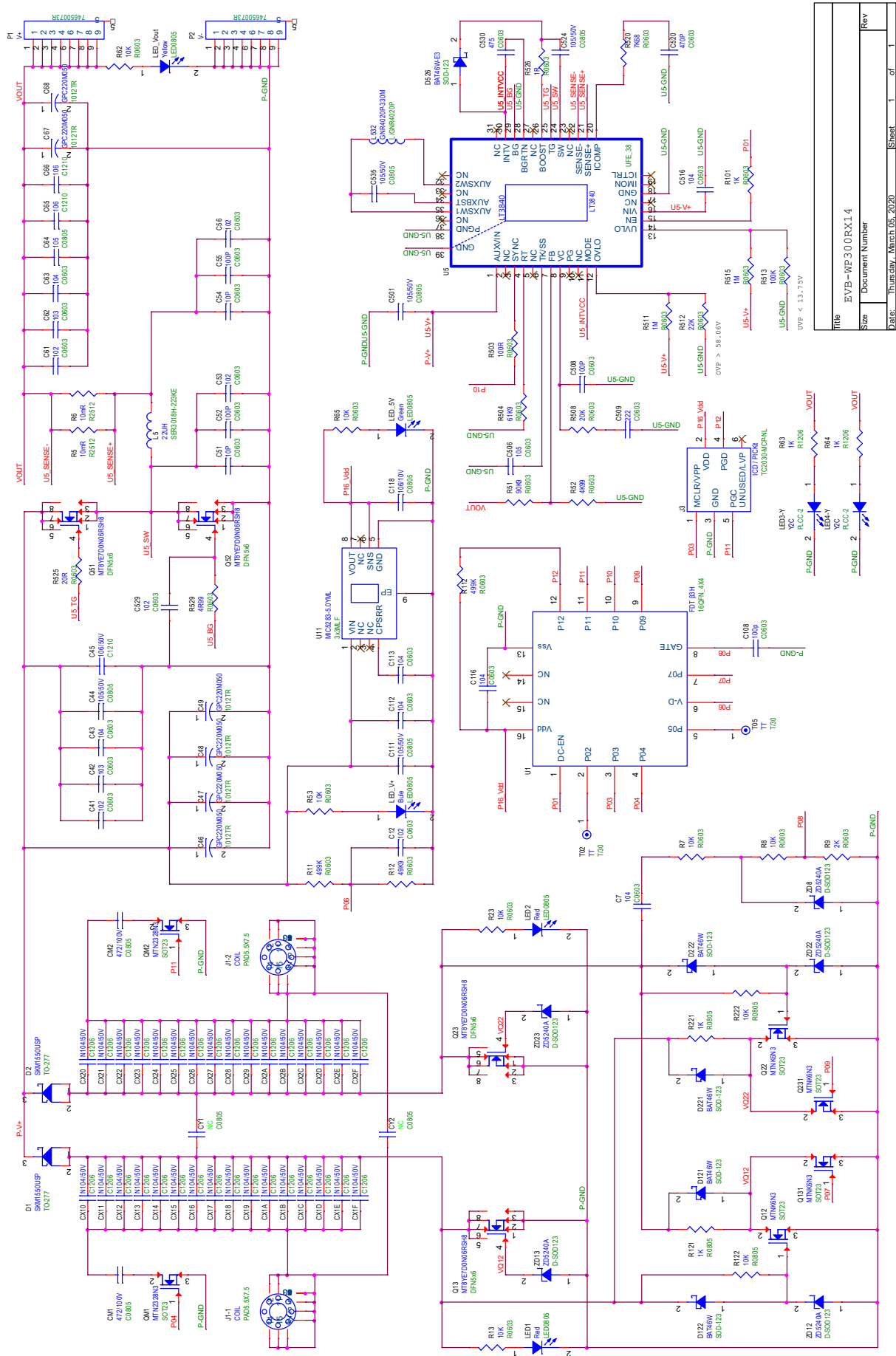


Reference schematic





EVB-WP300TX14-EXPANSION DOCK			
Title			
Size B	Document Number		Rev
Date:	Monday, February 03, 2020	Sheet 1 of 1	



Title EVB-WE300RX14			
Size Document Number			
Date: Thursday, March 05, 2020	Sheet	1	of 1
Rev			

Bill Of Materials “BOM”

EVB-WP300TX14 Electronic component

NO.	Position	Parts	Description	Value	Package	Q'ty	Manufacturer
1	CX1,CX3,CY46,CY56	Capacitance	MLCC_NP0(C0G)	10pF(100)/100V	0603	4	Synton
2	NC1,NC2,NC3	Capacitance	MLCC_NP0(C0G)	47pF(470)/100V	0603	3	Synton
3	CY41,CY47,CY51,CY57	Capacitance	MLCC_NP0(C0G)	100pF(101)/100V	0603	4	Synton
4	CM1,CM2,CY42,CY52,C122, C143,C311	Capacitance	MLCC_NP0(C0G)	1nF(102)/50V	0603	7	Synton
5	C410,C510	Capacitance	MLCC_NP0(C0G)	2.7nF(272)/50V	0603	2	Synton
6	C41,C51	Capacitance	MLCC_X7R	10nF(103)/50V	0603	2	Synton
7	CT2,CT6,C01,C02,C06,C07,C42, C52,C71,C74,C117,C118,C124, C129,C140,C312,C402,C502, C613,C616,C812,C814,C817	Capacitance	MLCC_X7R	0.1uF(104)/50V	0603	23	Synton
8	C401,C501,C617,C811	Capacitance	MLCC_X7R	1uF(105)/25V	0603	4	Synton
9	CY48,CY58	Capacitance	MLCC_NP0(C0G)	1nF(102)/ 100V	0805	2	Synton
10	CY43,CY53	Capacitance	MLCC_NP0(C0G)	10nF(103)/50V	0805	2	Synton
11	C43,C53,C73	Capacitance	MLCC_X7R	1uF(104)/50V	0805	3	Synton
12	C76,C77,C107,C612,C818	Capacitance	MLCC_X7R	10uF(106)/10V	0805	5	Synton
13	C44,C54	Capacitance	MLCC_X7R	10uF(106)/50V	1210	2	Synton
14	CX41,CX42,CX43,CX46,CX47, CX48,CX52,CX53,CX54,CX55, CX56,CX57	Capacitance	MLCC_NP0(C0G)	0.1uF(104)/100V	1812	12	Holystone
15	CE1,CE2,CE41,CE51	Capacitance	Aluminum Solid	220uF(227)/50V	10*12.5	4	Gemmy
16	R410,R510	Resistance	Chip_1%_1/10W	4R99	0603	2	Synton
17	R403,R503	Resistance	Chip_1%_1/10W	20R	0603	2	Synton
18	NR1,NR2,R117,R805,R806	Resistance	Chip_1%_1/10W	100R	0603	5	Synton
19	RQ1,R136,R137,R803,R804	Resistance	Chip_1%_1/10W	1K	0603	5	Synton
20	RL1,RL2,RL3,R141,R142	Resistance	Chip_1%_1/10W	4K99	0603	5	Synton
21	R121,R122	Resistance	Chip_1%_1/10W	8K87	0603	2	Synton
22	R73,R118	Resistance	Chip_1%_1/10W	10K	0603	2	Synton
23	R406,R506	Resistance	Chip_1%_1/10W	20K	0603	2	Synton
24	R801,R802	Resistance	Chip_1%_1/10W	49K9	0603	2	Synton
25	R124	Resistance	Chip_1%_1/10W	88K7	0603	1	Synton
26	R72,R75,R119,R120	Resistance	Chip_1%_1/10W	100K	0603	4	Synton
27	R74,R123	Resistance	Chip_1%_1/10W	1M	0603	2	Synton
28	R801,R802	Resistance	Chip_1%_3/4W	49K9	2010	2	Synton
29	L1	Line Filter	Common Mode 10A Max	744290130	SMT	1	Würth Elektronik
30	L7	Inductance	Wire Wound 33uH , 0.6A	TFNR4018T-330M	4X4	1	Tech Mount
31	ZD7	Zener	16V , 500mW	ZD5246ASH	SOD-123	1	CYStech

32	D1	TVS	Bidirectional , 36V	SMCJ36CA	SMC	1	CYStech
33	D71	Schottky	Small Signal , 100V	BAT46W-E3	SOD-123	1	Vishay
34	D76	Schottky	60V , 2A , Vf=0.75V	SK26SA	SMA	1	CYStech
35	LED1	LED	Red	17-21SURC/S530-A2/TR8	0805	1	Everlight
36	LED2	LED	Yellow	17-215/Y2C-FN2P2B/3T	0805	1	Everlight
37	LED3	LED	Green	17-21SYGC/S530-E2/TR8	0805	1	Everlight
38	Q1	MOSFET	N-ch , 60V , 0.35A	MTNK6N3	SOT-23	1	CYStech
39	Q4L,Q4H,Q5L,Q5H	MOSFET	N-ch , 60V , 10.6A	MT8YE7D0N06RSH8	DFN5×6	4	CYStech
40	UT-PCB,UT-COIL	IC	Temperature Sensor	TCN75AVUA713	MSOP8	2	Microchip
41	U1	IC	FDT-A6TX	A6 #20200304	QFN-44	1	FuDaTong
42	U3	IC	Current Sensor , 15.5A	ACS711	QFN3x3	1	Allegro
43	U4,U5	IC	GATE DRIVER	DGD05463FN-7	DFN3x3	2	DIODES
44	U6	IC	LDO , 16Vmax , 3.3V	MCP1754S-3302E/MC	DFN2x3	2	Microchip
45	U7	IC	Step-Down Regulator	MCP16331T-E/CH	SOT-23-6	1	Microchip
46	U8	IC	LDO , 120Vmax , 5V	MIC5283-5.0YML	MLF3x3	1	Microchip
47	X1	Quartz	35MHz	035000-F12-YYD-YFA	S3225A	1	Yoketan
48	SU1	BUZZER	AD-1005S-BM	5V_10*10	SMT	1	Aatc
49	P1,P2	Terminals	M3 Screw , 50A	74650073R	SMT	2	Würth Elektronik
50	CX44,CX45,CX51,CX58		No Connection	-	-	4	-

EVB-WP300TX14-EX Electronic component

NO.	Position	Parts	Description	Value	Package	Q'ty	Manufacturer
1	CX111,CX113	Capacitance	MLCC_NP0(C0G)	10pF(100)/100V	0603	2	Synton
2	CU1,CU3,C92	Capacitance	MLCC_X7R	0.1uF(104)/50V	0603	3	Synton
3	CU4,CS31,CS32,C91	Capacitance	MLCC_X7R	1uF(105)/25V	0603	4	Synton
4	CS07	Capacitance	MLCC_X5R	4.7Uf(475)/16V	0603	1	Synton
5	CS33	Capacitance	MLCC_X7R	10uF(106)/10V	0805	1	Synton
6	R-SW3	Resistance	Chip_1%_1/10W	100R	0603	1	Synton
7	RU2	Resistance	Chip_1%_1/10W	470R	0603	1	Synton
8	RL4,RL5,RL6	Resistance	Chip_1%_1/10W	4K99	0603	3	Synton
9	RU1	Resistance	Chip_1%_1/10W	10K	0603	1	Synton
10	RS26	Resistance	Chip_1%_1/10W	499K	0603	1	Synton
11	LED4	LED	Blue	17-21/BHC-AP1Q2/3T	0805	1	Everlight
12	LED5	LED	Orange	17-21UYOC/S530-A2/TR8	0805	1	Everlight
13	LED6	LED	White	17-21/T1D-KQ1R2B5Y/3T	0805	1	Everlight
14	ZD82	Zener	16V , 500mW	ZD5246ASH	SOD-123	1	CYStech
15	X11	Quartz	12MHz	012000-T23-YYD-YFA	S3225A	1	Yoketan
16	U11	IC	USB - RS232	MCP2200	VQFN5X5	1	Microchip
17	U9	IC	LDO , 16Vmax , 3.3V	MCP1754S-3302E/MC	DFN2x3	1	Microchip

18	SW1	Button	PUSH & LEVER SW	K01B-S126	SMT	1	Contactswitch
19	SW2	Button	SLIDE SW	SS-C91B-S246	SMT	1	Contactswitch
20	SW3	Button	Side direction SW	TS-308GS-2-S076	SMT	1	Contactswitch
21	J9	Connector	MRUSB-5B-D5TN-S347	MRUSB-5B-D5TN-S347	SMT	1	Contactswitch
22	S1	OLED Panel	20 characters x 4 Lines	REX002004CYPP5N	FPCB	1	Raystar

EVB-WP300TX14 Assembly parts

NO.	Position	Parts	Description	Value	Package	Q'ty	Manufacturer
1	J8	Connector	20PIN , 2.54mm	TE-5650118-2	DIP	1	TE Connectivity
2	PCB	PCB	4 layer , 1.6mm , 2oz	EVB-WP300TX14		1	Newheart Tech
3	J5	PCB	2 layer , 1.6mm , 1oz	FOD COIL		1	Newheart Tech
4		PCB	2 layer , 0.2mm ,1oz	FOD COIL LINK		1	Newheart Tech
5	COIL-1,COIL-2	COIL	14Turns , 12uH , 22mR	TMW157-T	DIP	1	Tech Mount
6		Cooling	Thermal adhesive	L70*W50*T3	L37-3S	1	T-global corp
7		Cooling	Thermal adhesive	L50*W20*T3	TG-A6200	1	T-global corp
8		Cooling	Thermal adhesive	L53*W53*T2.5	L37-3S	1	T-global corp
9		Cooling	Heat sink	50-17-89-4M3	Black	1	T-global corp
10		Structure	Acrylic	L80*W73.5*T2		1	FuDaTong
11	H1,H2,H3,H4	Structure	Screws	M3 , Metal	8mm	4	FuDaTong
12	H16,H17,H18,H19	Structure	Screws	M3 , Metal	10mm	4	FuDaTong
13	H1,H4	Structure	Plastic column	HTS-306	6mm	2	KSS
14	H2,H3	Structure	Plastic column	HTS-308	8mm	2	KSS
15	H5,H6,H7,H8,H20,H21	Structure	Plastic screw	PF-306	6mm	6	KSS
16	H1,H2,H3,H4,H5,H6	Structure	Plastic column	HTP-325	25mm	6	KSS
17	H7,H8,H20,H21	Structure	Plastic column	HTP-320	20mm	4	KSS

EVB-WP300RX14 Electronic component

NO.	Position	Parts	Description	Value	Package	Q'ty	Manufacturer
1	C51,C54	Capacitance	MLCC_NP0(C0G)	10pF(100)/100V	0603	2	Synton
2	C52,C55,C108,C508	Capacitance	MLCC_NP0(C0G)	100Pf(101)/100V	0603	4	Synton
3	C520	Capacitance	MLCC_NP0(C0G)	470P(471)/50V	0603	1	Synton
4	C12,C41,C53,C56,C61,C529	Capacitance	MLCC_NP0(C0G)	1nF(102)/50V	0603	6	Synton
5	C509	Capacitance	MLCC_X7R	2.2nF(222)/50V	0603	1	Synton
6	C42,C62	Capacitance	MLCC_X7R	10nF(103)/50V	0603	2	Synton
7	C7,C43,C63,C112,C113, C116,C516	Capacitance	MLCC_X7R	0.1uF(104)/50V	0603	7	Synton
8	C506	Capacitance	MLCC_X7R	1uF(105)/25V	0603	1	Synton
9	C530	Capacitance	MLCC_X5R	4.7uF(475)/16V	0603	1	Synton

10	CM1,CM2	Capacitance	MLCC_X7R	4.7nF(472)/200V	0805	2	Synton
11	C44,C64,C111,C501,C524,C535	Capacitance	MLCC_X7R	1uF(105)/50V	0805	6	Synton
12	C118	Capacitance	MLCC_X7R	10uF(106)/10V	0805	1	Synton
13	CX10,CX11,CX12,CX13,CX14, CX15,CX16,CX17,CX18,CX19, CX1A,CX1B,CX1C,CX1E,CX1D, CX1F,CX20,CX21,CX22,CX23, CX24,CX25,CX26,CX27,CX28, CX29,CX2A,CX2B,CX2C,CX2D, CX2E,CX2F	Capacitance	MLCC_NP0(C0G)	0.1nF(104)/50V	1206	32	Holystone
14	C45,C65,C66	Capacitance	MLCC_X7R	10uF(106)/50V	1210	3	Synton
15	C46,C47,C48,C49,C67,C68	Capacitance	Aluminum Solid	220uF(227)/50V	10*12.5	6	Synton
16	R526	Resistance	Chip_1%_1/10W	1R	0603	1	Synton
17	R529	Resistance	Chip_1%_1/10W	4R99	0603	1	Synton
18	R525	Resistance	Chip_1%_1/10W	20R	0603	1	Synton
19	R503	Resistance	Chip_1%_1/10W	100R	0603	1	Synton
20	R101	Resistance	Chip_1%_1/10W	1K	0603	1	Synton
21	R9	Resistance	Chip_1%_1/10W	2K	0603	1	Synton
22	R52	Resistance	Chip_1%_1/10W	4K99	0603	1	Synton
23	R520	Resistance	Chip_1%_1/10W	7K68	0603	1	Synton
24	R7,R8,R13,R23,R53,R62,R65	Resistance	Chip_1%_1/10W	10K	0603	7	Synton
25	R508	Resistance	Chip_1%_1/10W	20K	0603	1	Synton
26	R512	Resistance	Chip_1%_1/10W	22K	0603	1	Synton
27	R12	Resistance	Chip_1%_1/10W	49K9	0603	1	Synton
28	R504	Resistance	Chip_1%_1/10W	61K9	0603	1	Synton
29	R51	Resistance	Chip_1%_1/10W	90K9	0603	1	Synton
30	R513	Resistance	Chip_1%_1/10W	100K	0603	1	Synton
31	R11,R112	Resistance	Chip_1%_1/10W	499K	0603	2	Synton
32	R511,R515	Resistance	Chip_1%_1/10W	1M	0603	2	Synton
33	R121,R221	Resistance	Chip_1%_1/8W	1K	0805	2	Synton
34	R122,R222	Resistance	Chip_1%_1/8W	10K	0805	2	Synton
35	R63,R64	Resistance	Chip_1%_1/4W	1K	1206	2	Synton
36	R5,R6	Resistance	Chip_1%_2W	10mR	2512	2	Synton
37	L5	Inductance	22uH , 12A	TFSEW2818-220KL	28x28	1	Tech Mount
38	L532	Inductance	Wire Wound 33uH , 0.6A	TFNR4018T-330M	4x4	1	Tech Mount
39	LED_V+	LED	Blue	17-21/BHC-AP1Q2/3T	0805	1	Everlight
40	LED_Vout	LED	Yellow	17-215/Y2C-FN2P2B/3T	0805	1	Everlight
41	LED_5V	LED	Green	17-21SYGC/S530-E2/TR8	0805	1	Everlight
42	LED1,LED2	LED	Red	17-21SURC/S530-A2/TR8	0805	2	Everlight
43	LED3-Y,LED4-Y	LED	Yellow	67-21S/Y2C	PLCC-2	2	Everlight
44	D1,D2	Schottky	50V , 15A , Vf=0.43V	SKM1550USP	TO-277	2	CYStech

45	D121,D122,D221,D222,D526	Schottky	Small Signal , 100V	BAT46W-E3	SOD-123	5	Vishay
46	QM1,QM2	MOSFET	N-ch , 100V , 1.9A	MTN2328N3	SOT-23	2	CYStech
47	Q12,Q22,Q131,Q231	MOSFET	N-ch , 60V , 0.35A	MTNK6N3	SOT-23	4	CYStech
48	Q13,Q23,Q51,Q52	MOSFET	N-ch , 60V , 10.6A	MT8YE7D0N06RSH8	DFN5×6	4	CYStech
49	U1	FDT_IC	FDT-B3HRX	β3	QFN4x4	1	FuDaTong
50	U5	DC/DC	Step-Down Regulator	LT3840EUF	QFN4x6	1	Linear tech
51	U11	IC	LDO , 120Vmax , 5V	MIC5283-5.0YML	MLF3x3	1	Microchip
52	ZD8,ZD12,ZD13,ZD22,ZD23	Zener	10V , 500mW	ZD5240ASH	SOD-123	5	CYStech
53	P1,P2	Terminals	M3 Screw , 50A	74650073R	SMT	2	Würth Elektronik
54	CY1,CY2		No Connection	-	-	2	

EVB-WP300RX14 Assembly parts

NO.	Position	Parts	Description	Value	Package	Q'ty	Manufacturer
1	PCB	PCB	4 layer , 1.6mm , 2oz	WP300RX14		1	Newheart Tech
2	J1-1,J1-2	COIL	16Turns , 15uH , 30mR	TMW158-R	DIP	1	Tech Mount
3		Cooling	Thermal adhesive	L78*W25*T3	TG-A6200	1	T-global corp
4		Cooling	Thermal adhesive	L53*W53*T2.5	L37-3S	1	T-global corp
5		Cooling	Heat sink	25-8.5-80-4M3	Black		T-global corp
6		Structure	Acrylic	L80*W70*T2		1	FuDaTong
7	H1,H2,H3,H4	Structure	Screws	M3 , Metal	8mm	4	FuDaTong
8	H18,H19,H20,H21	Structure	Screws	M3 , Metal	10mm	4	FuDaTong
9	H1,H2,H3,H4	Structure	Plastic column	HTS-308	8mm	4	KSS
10	H1,H2,H3,H4	Plastic nut	Plastic nut PN-3	PN-3		4	KSS

Transmission IC Specification

Marking Details



- : Pin 1 indicator
- α6 : A6 TX, Product Name
- RFIDPOWER.COM.TW
- FuDaTong Tech : Company Name
- YYWWNNN : Date code Year / Week / Batch number

MSL Results To J-STD-020C Profile Pass MSL1/260C

ORDERING INFORMATION

Part Number	Package	Top Marking	Free Air Temperature (TA)
FDT-A6TX-QFN44	QFN44 (8*8mm)	α6	- 40℃ TO + 125 ℃

PIN FUNCTIONS

Pin #	Name	Sort	Description
1	UTX	Digital output	For update of firmware by connection between UART and computer.
2	LED1	Digital output	The luminescent display status that outputs voltage to drive LED
3	LED2	Digital output	The luminescent display status that outputs voltage to drive LED
4	LED3	Digital output	The luminescent display status that outputs voltage to drive LED
5	BUZ	Digital output	Output voltage to drive Buzzers' switch
6	D-GND	POWER	Digital Ground
7	Vcap	POWER	Internal electric source constant voltage capacitance
8	SOD	Digital output	External display module for communication data SPI Protocol
9	SCK	Digital output	External display module for communication clock SPI

			Protocol
10	PWM2H	Digital output	FOD H side of detective application driving signal
11	PWM2L	Digital output	FOD L side of detective application driving signal
12	PWM1H	Digital output	H side of electric power transmission coil driving signal
13	PWM1L	Digital output	L side of electric power transmission coil driving signal
14	C2	Digital output	Internal comparator output 2
15	EN-DRV	Digital output	Enable Gate Drive
16	A-GND	POWER	Analog power ground
17	A-3.3V	POWER	Analog power
18	MCLR	Digital input	Master Clear Pin External Reset
19	SWP-2	Analog input	Output voltage measurement 2 for drive elements
20	SWP-1	Analog input	Output voltage measurement 1 for drive elements
21	COIL-1	Analog input	Measurement input for coil signal 1
22	POW-I	Analog input	Measurement input for DC supply current
23	COIL-2	Analog input	Measurement input for coil signal 2
24	POW-V	Analog input	Measurement input for supply voltage
25	SW2A	Digital input	Key detection input 2A
26	SW2B	Digital input	Key detection input 2B
27	SW1A	Digital input	Key detection input 1A
28	SW1B	Digital input	Key detection input 1B
29	D-3.3V	POWER	Digital power input
30	D-GND	POWER	Digital power ground
31	SW1C	Digital input	Key detection input 1C
32	OSC1	Oscillator	Oscillator pin 1
33	OSC2	Oscillator	Oscillator pin 2
34	VREF1	Analog output	Signal processing reference voltage output
35	C1	Digital output	Internal comparator output 1
36	NV	Analog output	FOD coil signal detection input
37	EN-OLED	Digital output	Enable OLED display panel
38	SS	Digital output	External display module for communication enable Slave selected
39	D-GND	POWER	Digital Ground
40	D-3.3V	POWER	Digital power input
41	SDA	Digital output	Data of I2C communication protocol
42	SCL	Digital output	Clock of I2C communication protocol
43	VREF2	Analog input	Signal processing reference voltage input
44	URX	Digital input	For update of firmware by connection between UART and computer.

ABSOLUTE MAXIMUM RATINGS

Parameter	Value		Units
	Min	Max	
Working environment temperature	-40	+125	°C
Storage temperature	-65	+150	°C
Relative voltage of Vdd pin to Vss pin	-0.3	+3.5	V
Relative voltage of other pins to Vss pin	-0.3	Vdd+0.3	V
Largest input current of Vdd		300	mA
Largest output current of Vss		300	mA
Largest output current of other pins		200	mA

ELECTRICAL CHARACTERISTICS

Parameters	Symbol	Condition	Min	Typ	Max	Units
Operating Voltage	Vdd	Standard ⁽¹⁾	3.0	3.3	3.5	V
Supply Current (Standby)	I	Standard ⁽¹⁾		10	20	mA
Supply Current (In operation)	I	Standard ⁽¹⁾		50	100	mA

⁽¹⁾ Design for typical use of circuit

OPERATION

D-3.3V & A-3.3V & D-GND & A-GND

A6 uses 3.3V DC power supply, consuming the current of 60mA under normal operation. The main consumption of power is D 3.3V. A-3.3V is for the IC internal analog signal processing. This voltage is also used as analog reference voltage, which must be precisely maintained at 3.3V. If it deviates, it will cause the relevant measurement values to be inconsistent with the actual measurement. Regarding the implementation of circuit, PCB layout for digital and analog power supply should be separated to prevent the high-frequency noise from entering the analog power supply in digital signals.

Vcap

A6 core is that a high-speed DSP processor adopts 1.8V operating voltage. The circuit needs to stabilize the capacitor, connecting through the Vcap. The capacitor of the recommended value is 10uF, using X7R materials with the operating voltage of 1.8V. Therefore, it uses more than 6.3V permissible voltage. The endpoint's voltage measures 1.8V in the operation. If it deviates too much, it means failure.

OSC1 & OSC2

To maintain the high-performance operation, the IC needs a precise operating frequency. Therefore, 35 MHz crystal oscillator is used. OSC1 is the input of the operating frequency, and OSC2 is the reverse drive. If the external oscillator source is used, input the operating frequency into OSC1, and OSC2 can be empty.

MCLR

Hardware resets the pin. After power-on, the pin needs to be inputted D-3.3V high potential and starts to operate. To confirm the circuit is completed to power on and then starts to operate, so delay to start the RC circuit is configured. In the process of the operation, this endpoint is pulled down to GND before resetting.

POW-V

In this system, DC power supply voltage is inputted to the measure endpoint. The measurement of the endpoint is the important value for the operation of the system. The endpoint needs to be divided working with the upper divider resistance of (R123) 1MΩ and the lower which of (R124) 88.7KΩ. The endpoint voltage measurement, working with bypass capacitor of (C124) 0.1uF, of full value is of 3.3V. The upper limit of measurement of the upper divider resistance is 40V, the internal 12Bit ADC. The conversion of effective resolution is 10mV.

PWM1H & PWM1L

It drives signal output. The system is drive switch elements launch the coil and capacitors to generate resonance to send wireless power, using full-bridge drive architecture. Integrated DrMOS

is recommended to use in design. The port output is 3.3V logic voltage, so be sure to note that the received signal is the product with 3.3V logic voltage when selecting switching elements.

POW-I

The current measurement of this system is operated with Allegro MicroSystems - ACS711. After the endpoint and connecting to power, the voltage is $V_{cc} / 2$ when the current is zero. In the design of the system, V_{cc} is 3.3V. After powering on each time, the driving elements will carry out the protection control zero current level retrieve before operating. Subsequently, perform the current detection, and then convert the current values according to the added values of the current level that turn on the machine then. The current values are used for the protection and the monitoring of the OCP OPP in the system. The signal in the endpoint is very sensitive. The layout of the circuit needs to pay attention to the interference in the path between ACS711 and A6. A 0.1uF bypass capacitor is connected in parallel next to the A6 port to filter noise. In addition, another model ACS725 can be matched, which can provide the relatively precise current detection, the current reading value conversion parameter of the used model is different and need to choose a correct using model in the set mode menu.

EN-DRV

This port is output to a high potential by software startup after startup and is used to enable the Gate driver.

EN-OLED

After booting up, the software will start this port to output a high potential to enable the OLED display panel.

SWP-1 & SWP-2

SWP-1 and SWP-2 are used to measure the output voltage of driving elements. SWP-1 and SWP-2 are the output voltages of U4 and U5 of the drive elements in the example circuit, whose voltage is the switching signal. Ideally, the high potential of its switching signal should be equal to the input power supply. Actually, because of load effect, the voltage will be slightly lower than the input supply voltage, which is used to monitor the drive performance of the switching elements. If the switching elements fail, determination can be performed from this endpoint.

VREF1 & VREF2

The internal reference voltage outputs from VREF1 and then inputs from VREF2. After the reference voltage output of coil signal is processed, the voltage is regulated by voltage regulator capacitor 1Nf (102). The maximum voltage at the endpoint is 3V. It is recommended to use X7R or NP0 material capacitors. Note capacitance value is the specified 102, using too large capacitance will make the signal operation unstable.

COIL-1 & COIL-2

Coil signal measurement is the most important value in the operation of the system. If the coil signal measurement is incorrect, it will lead to damage to the circuit. Therefore, the system uses dual-loop detection. The signal ratio of the two endpoints needs to be consistent, they will operate normally. The voltage connection between endpoint and coil is divided through the upper (R801 & R802) 49.9K Ω and the lower resistance (R803 & R804) 1K Ω . Because the endpoint of the coil is the high voltage signal, R801 R802 will withstand greater power. The system is designed to recommend R801 R802 have 1W of power carrying capacity with the maximum value of 200V pp of the coil voltage. In addition, this endpoint is the measurement for the AC signal without needing bypass capacitors. R805 and R806 are used to protect the port current limit. Recommended value is 100 Ω . The interior of the port is the complex analog electronics with the collaboration of ADC comparator and OPA at the same time.

PWM2H & PWM2L

The FOD detective application driving signal, which is used to drive the FOD detective application auxiliary coil, it monitors whether there is FOD device on the major electricity transmission coil under the standby mode, if there is, the FOD device will not launch power transmission.

NV

The FOD coil signal detective input is used for measure the resonance signal on the auxiliary coil of the FOD detective application, and analyzes if there is FOD device existed.

C1 & C2

Output detection pin for internal comparator status is used for deep analysis of signal problems. In the circuit Implementation, it is empty. The detection point is optional.

SOD & SCK & SS

This system is used for showing operation content working with REX002004CYPP5N00000 (Raystar Optronics, Inc.). Its communication contents are compatible with the IC SSD1311 (Solomon Systech Limited) inside the panel, using the SPI interface operated by 1MHz to display the content transmission. The port in this area is used for engineering development or inspection with the display panel. When it is not in use, it can be empty.

SDA & SCL

The temperature management of the system is connected to the temperature sensing IC TCN75A (MICROCHIP) through the I2C interface. If the temperature sensing is not used, the port can be empty.

UTX & URX

Working with the update program of PC rolled out by the company, updating through RS-232 (UART). Note that the potential of UART interface is 3.3V. If other UART voltage is used,

converting it through voltage converter is needed.

EP

Please connect the pad at the bottom to the digital ground to maintain optimum operational performance.

LED1 & LED2 & LED3

Used for output and display of system conditions. Current-limiting resistor is needed when connecting to LED to display. The maximum current limit is 10mA.

BUZ

This port is the buzzer switch signal. When starting, it outputs logic signal with a high potential 3.3V, instead of directly supplying the power to the buzzer. The buzzer needs to be switched by using start circuit.

SW1A & SW1B & SW1C

It is used for going with the knob on the display panel. 1A 1B are selection values by the left and right rotation. 1C is the button to confirm to press. The port is the internal pull-up, operating with ground and contact.

SW2A & SW2B

It is the operating mode selector switch. The port is operating mode selection for IC, which pulls up the potential internally. The port is empty in the general operating mode.

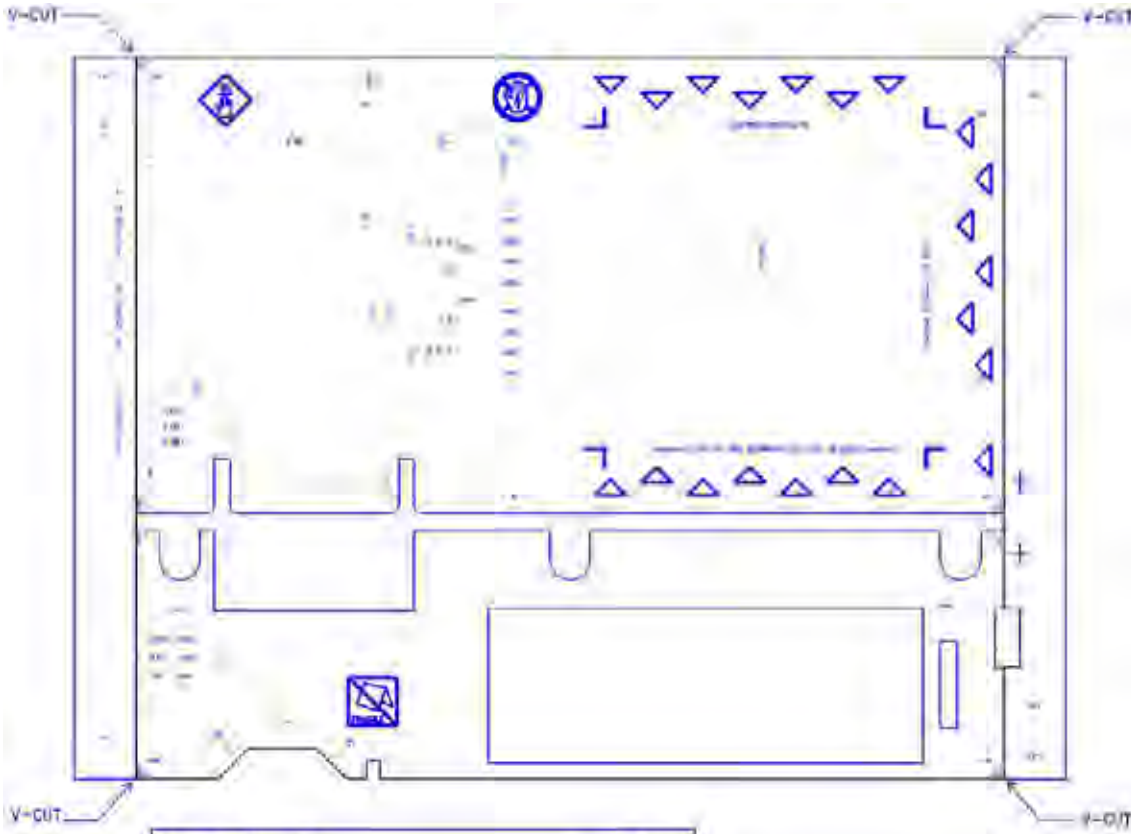
SW2A	SW2B	Function
H	H	RUN , operational mode
L	H	USB MODE , Reserved for connection with PC
H	L	SET , set mode

H: High potentials (empty) L:Ground

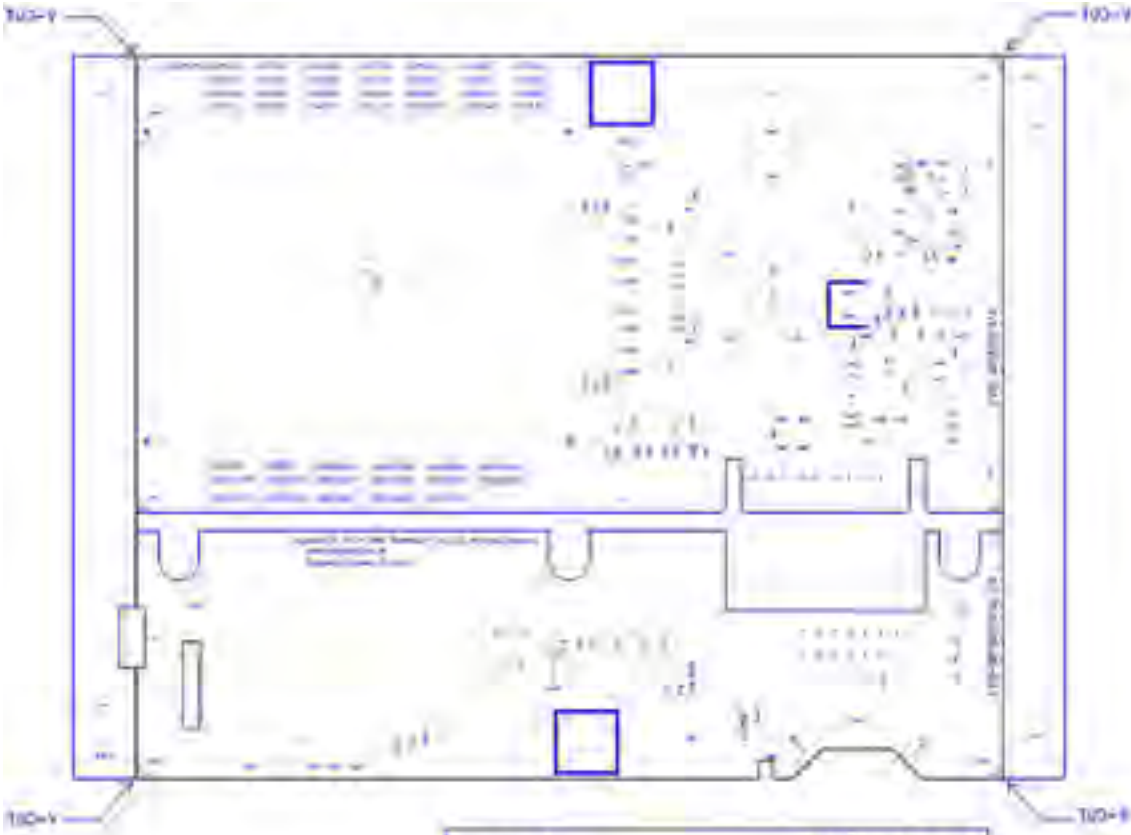
*Currently the operational mode 1 and 2 is the same high power electric power transmission mode



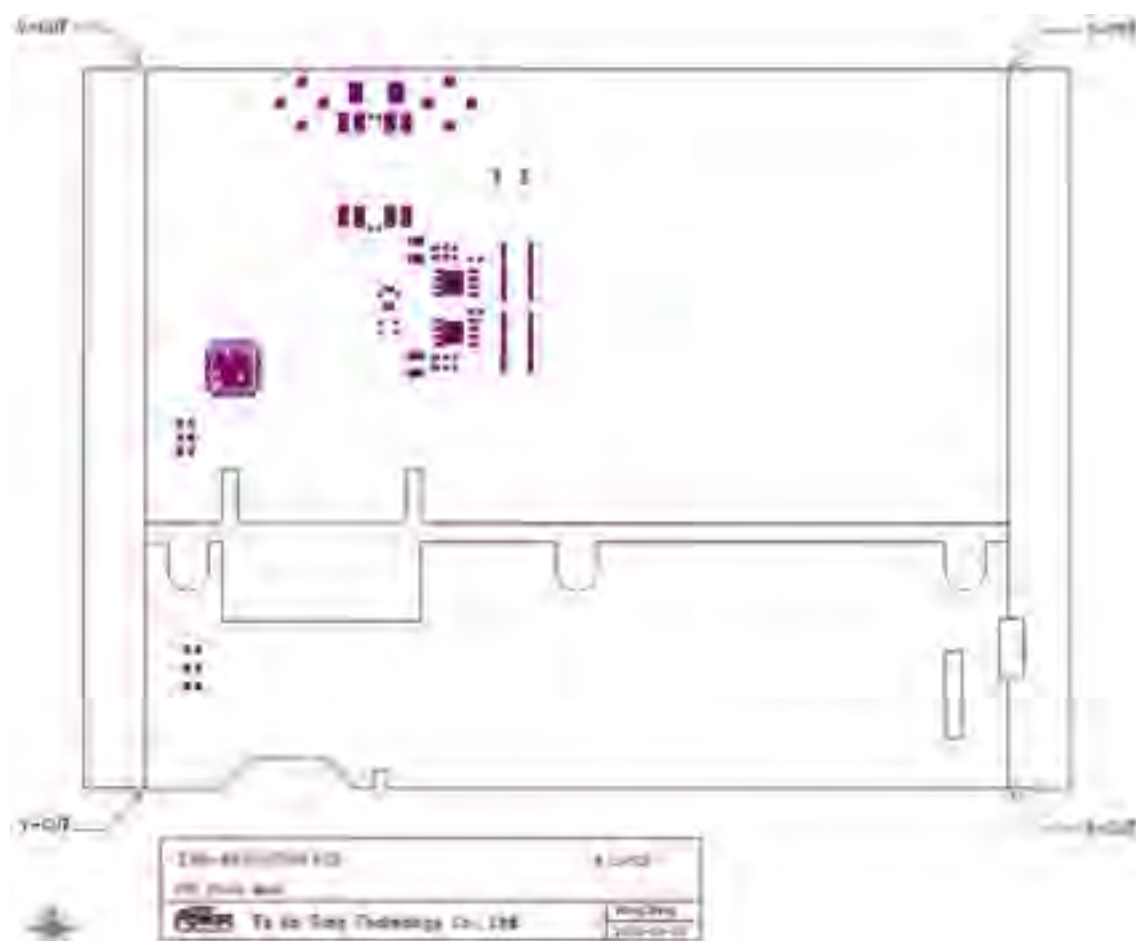
Board Layout

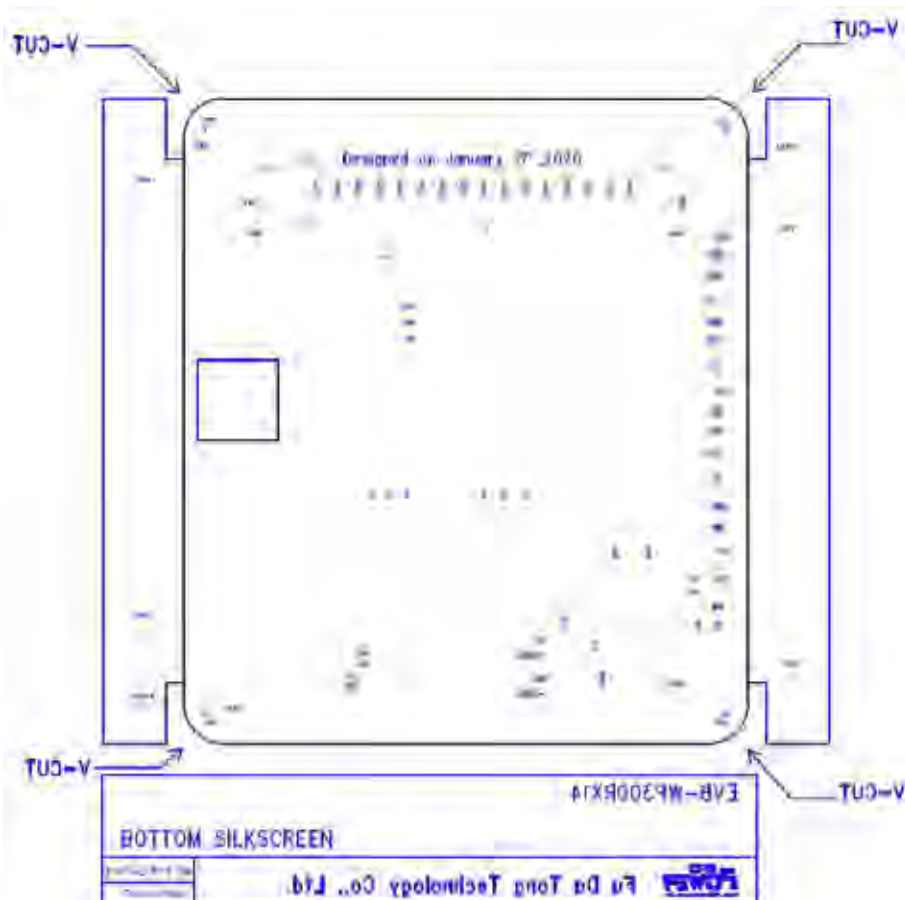
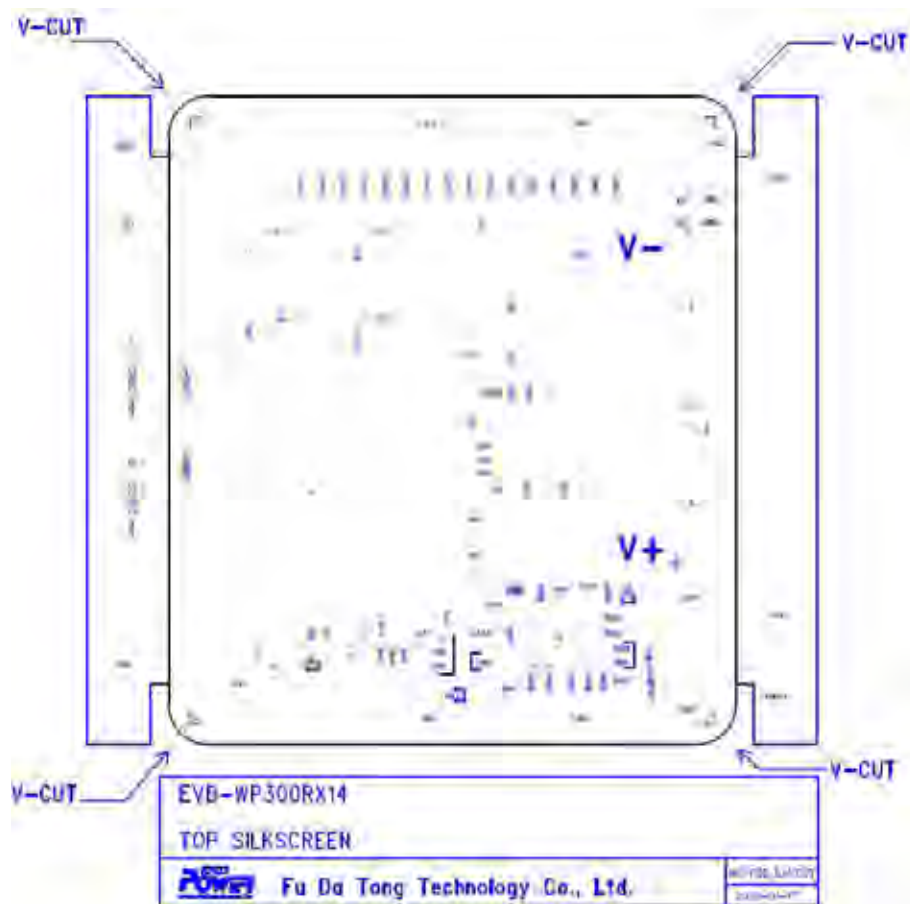


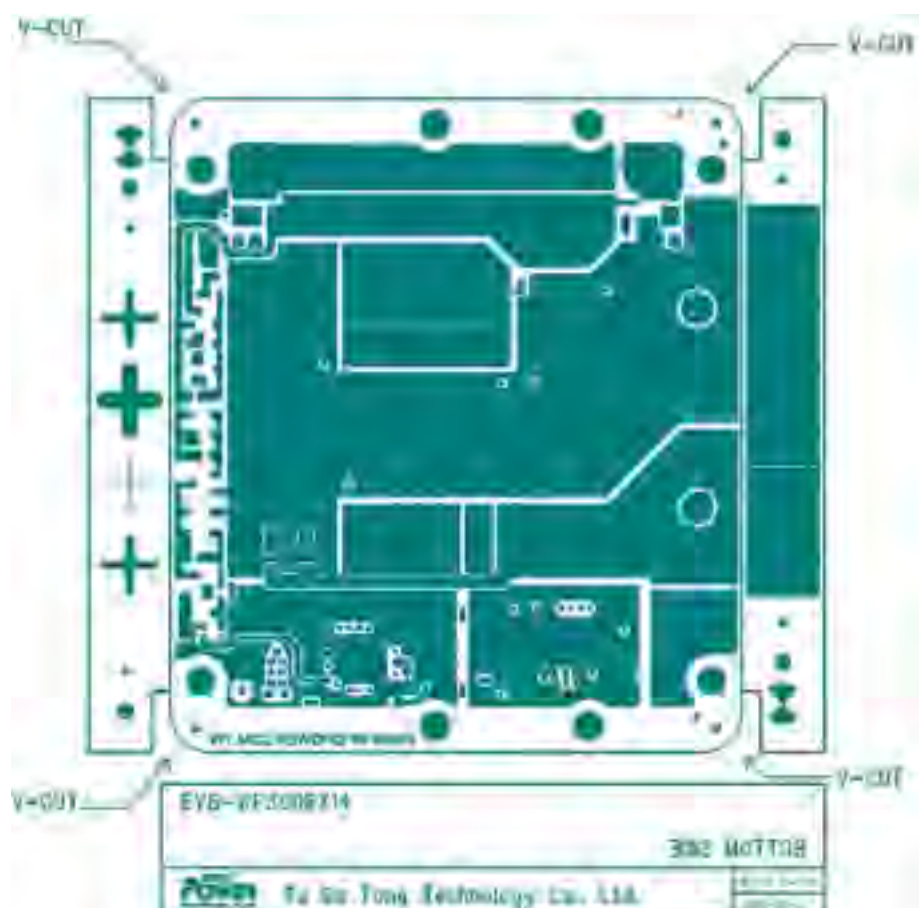
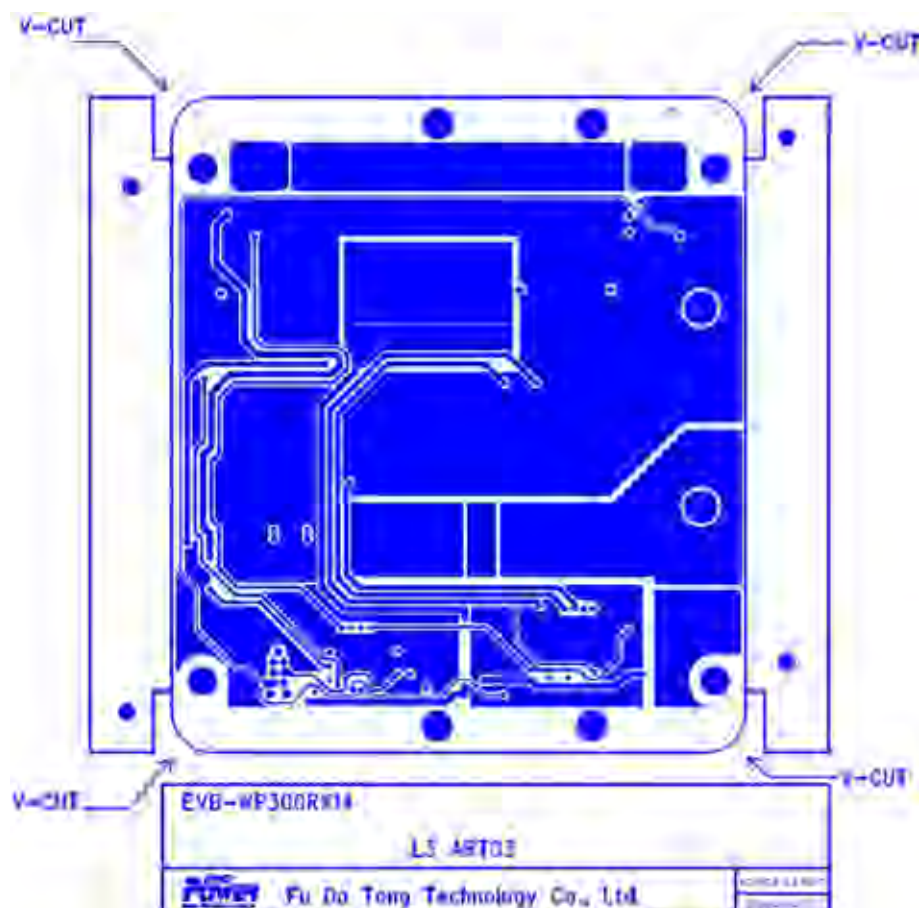
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TOP SCREEN		
 Futong Technology Co., Ltd.		Version: 1.0
		Rev: 01-20

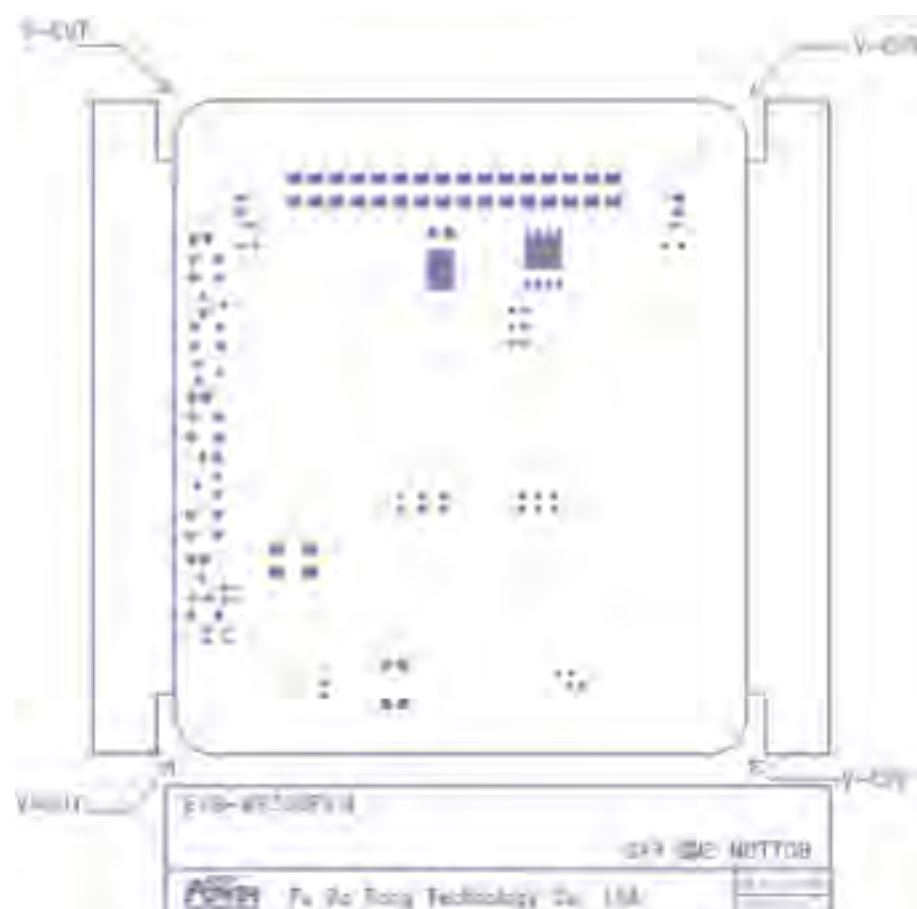
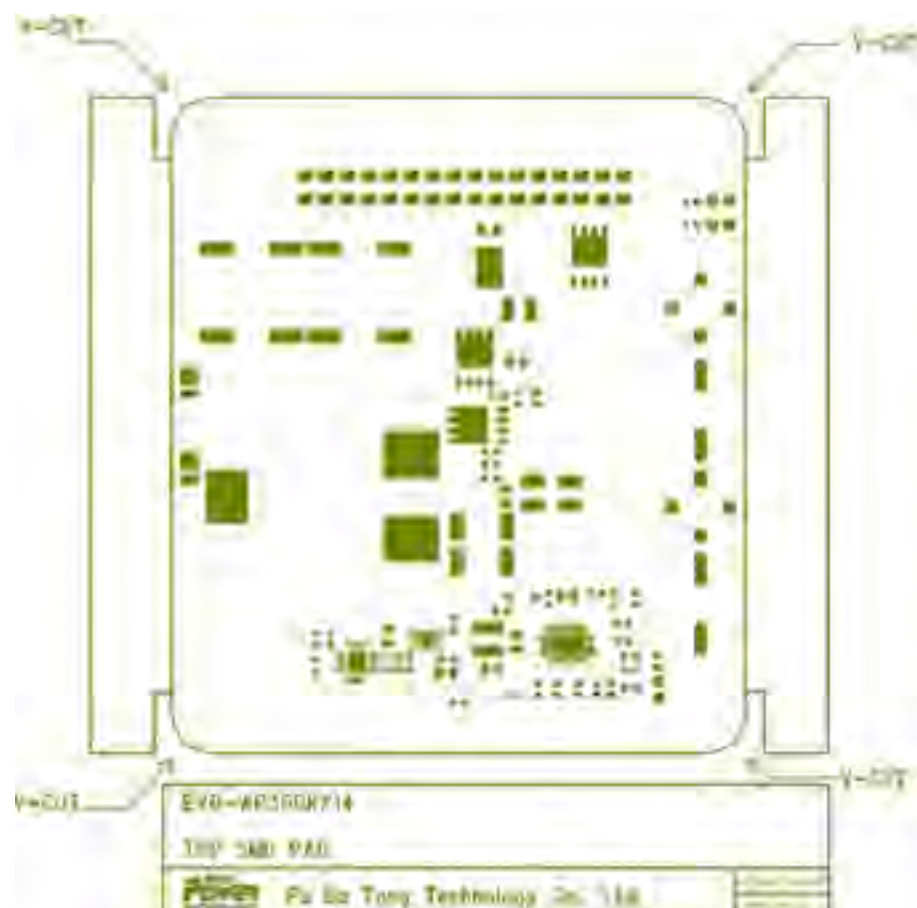


EVB-WP300TX14.PCB		4 LAYER
BOTTOM SCREEN		
 Futong Technology Co., Ltd.		Version: 1.0
		Rev: 01-20



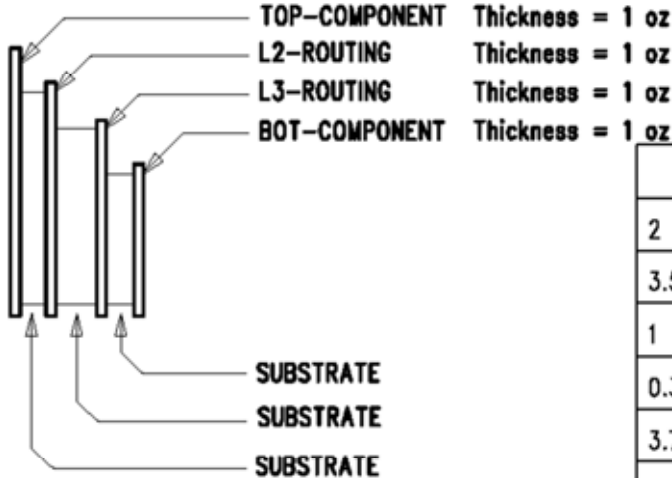




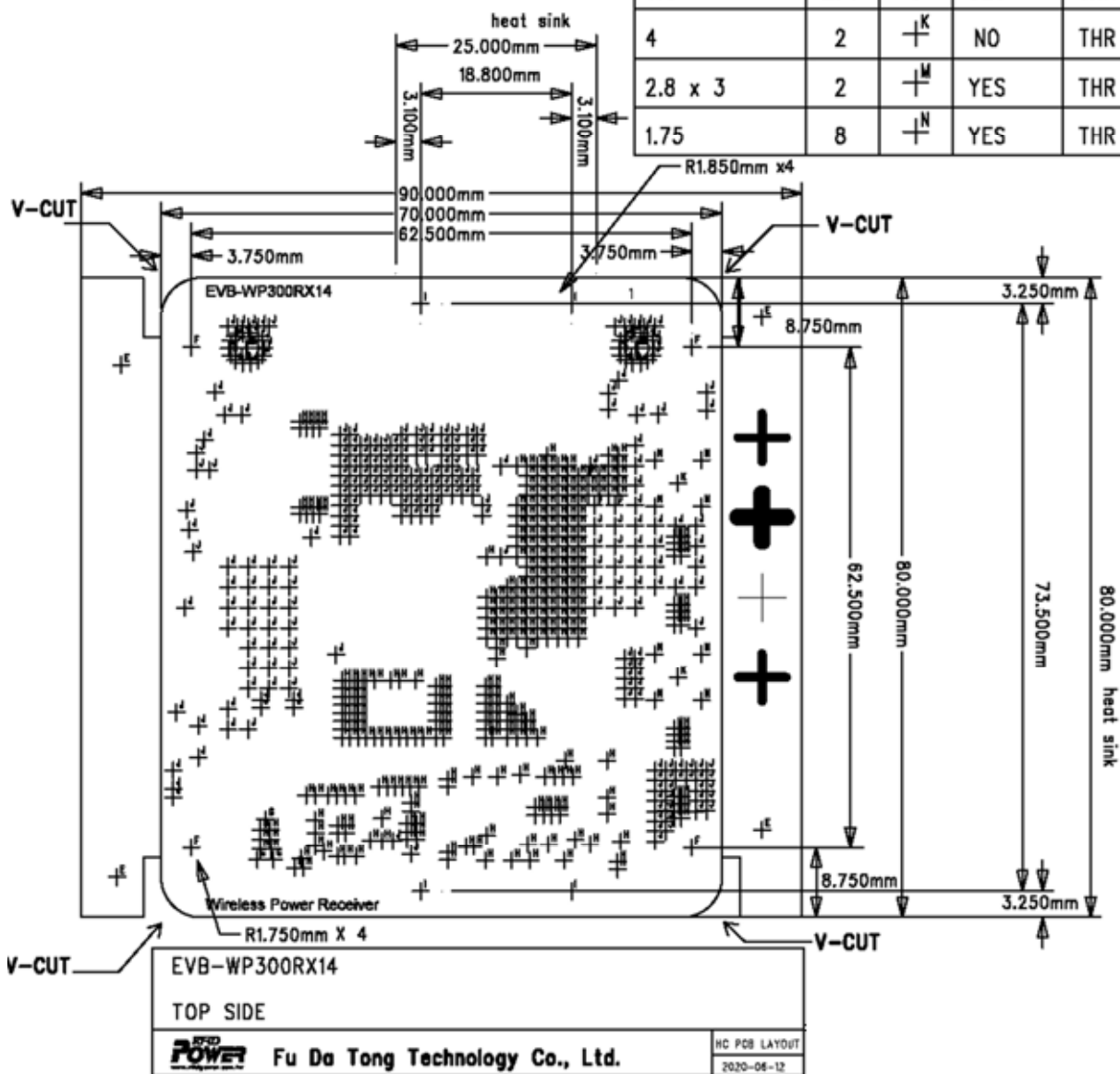


LAYER STRUCTURE

Board Thickness = 2.0 mm

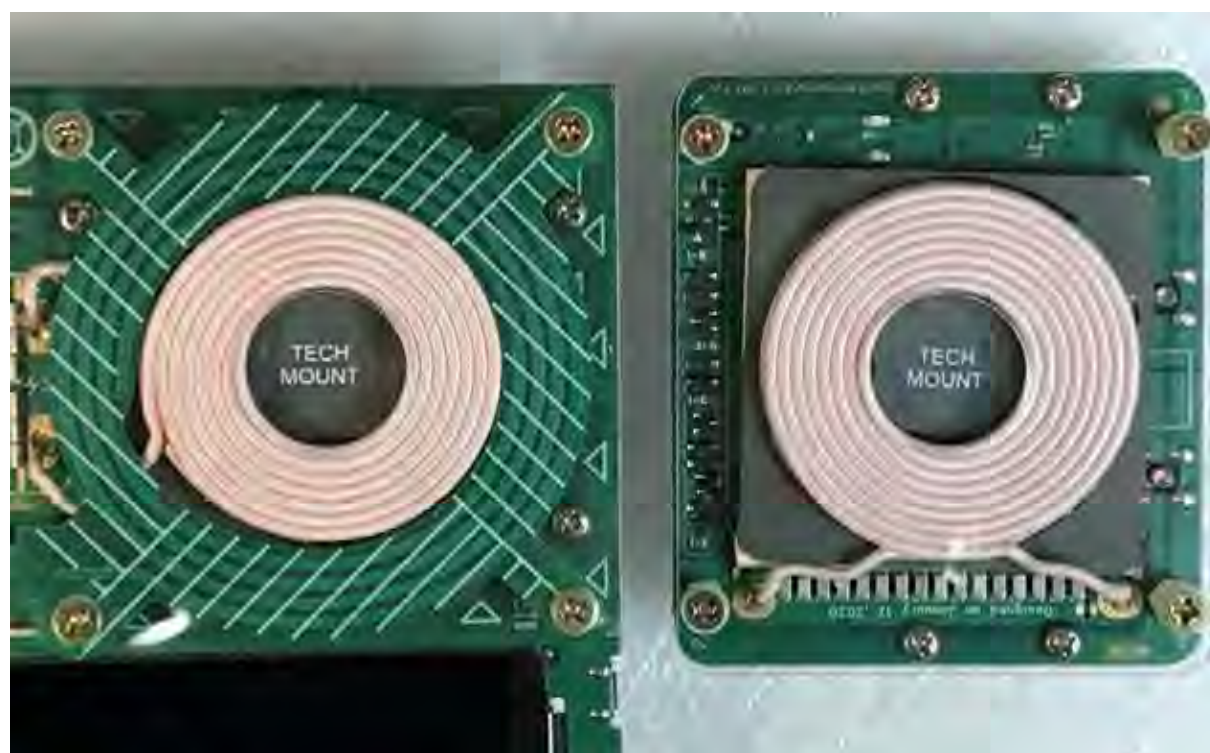
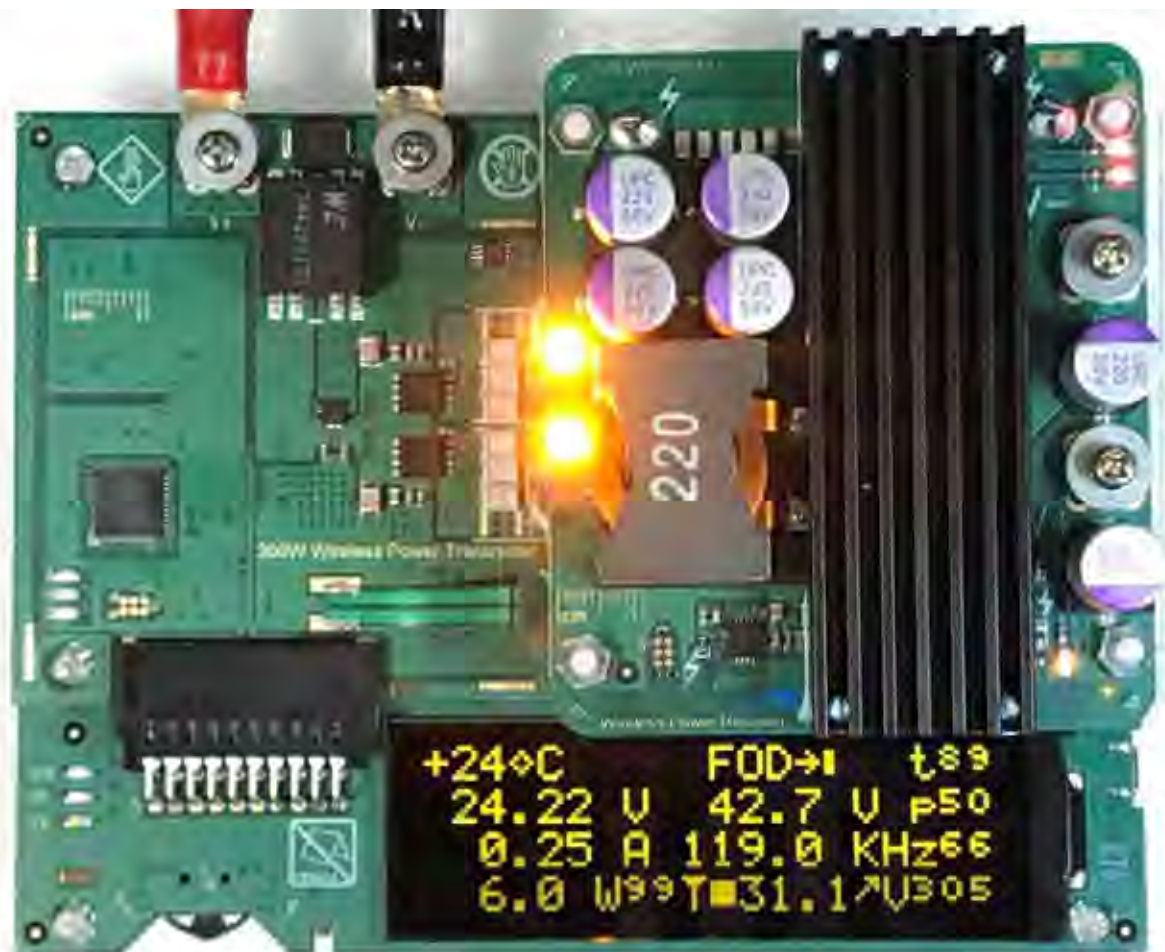


SIZE	QTY	SYM	PLATED	THR/PRTL	TOL
2	4	⊥ ^E	NO	THR	+/-0.0
3.5	4	⊥ ^F	NO	THR	+/-0.0
1	3	⊥ ^G	YES	THR	+/-0.0
0.3	363	⊥ ^H	YES	THR	+/-0.0
3.7	4	⊥ ^I	NO	THR	+/-0.0
0.4	276	⊥ ^J	YES	THR	+/-0.0
4	2	⊥ ^K	NO	THR	+/-0.0
2.8 x 3	2	⊥ ^M	YES	THR	+/-0.0
1.75	8	⊥ ^N	YES	THR	+/-0.0

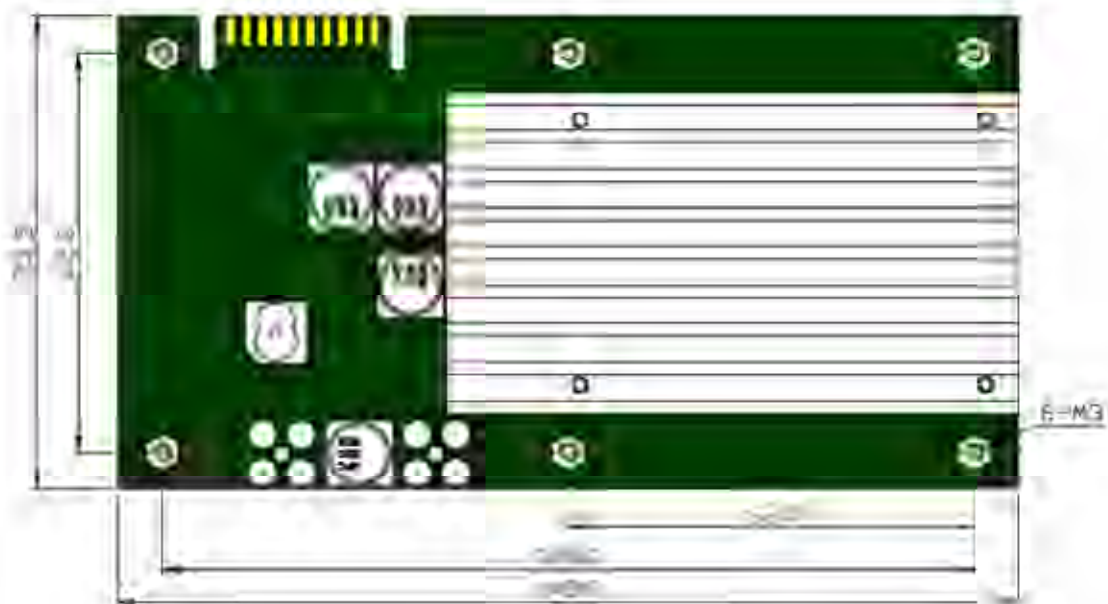
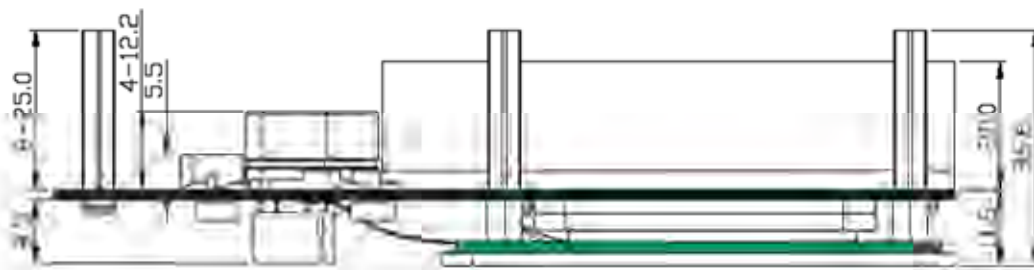
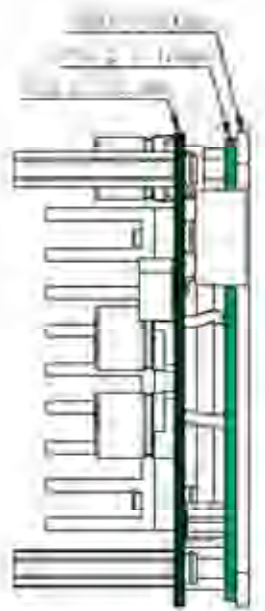
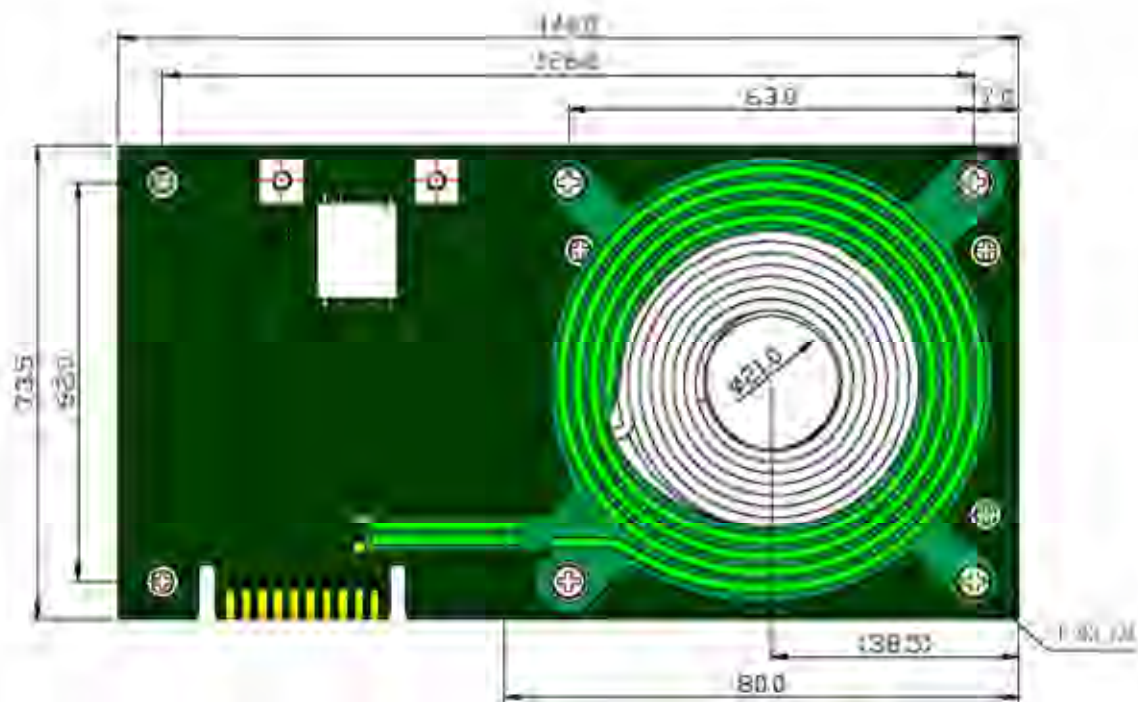


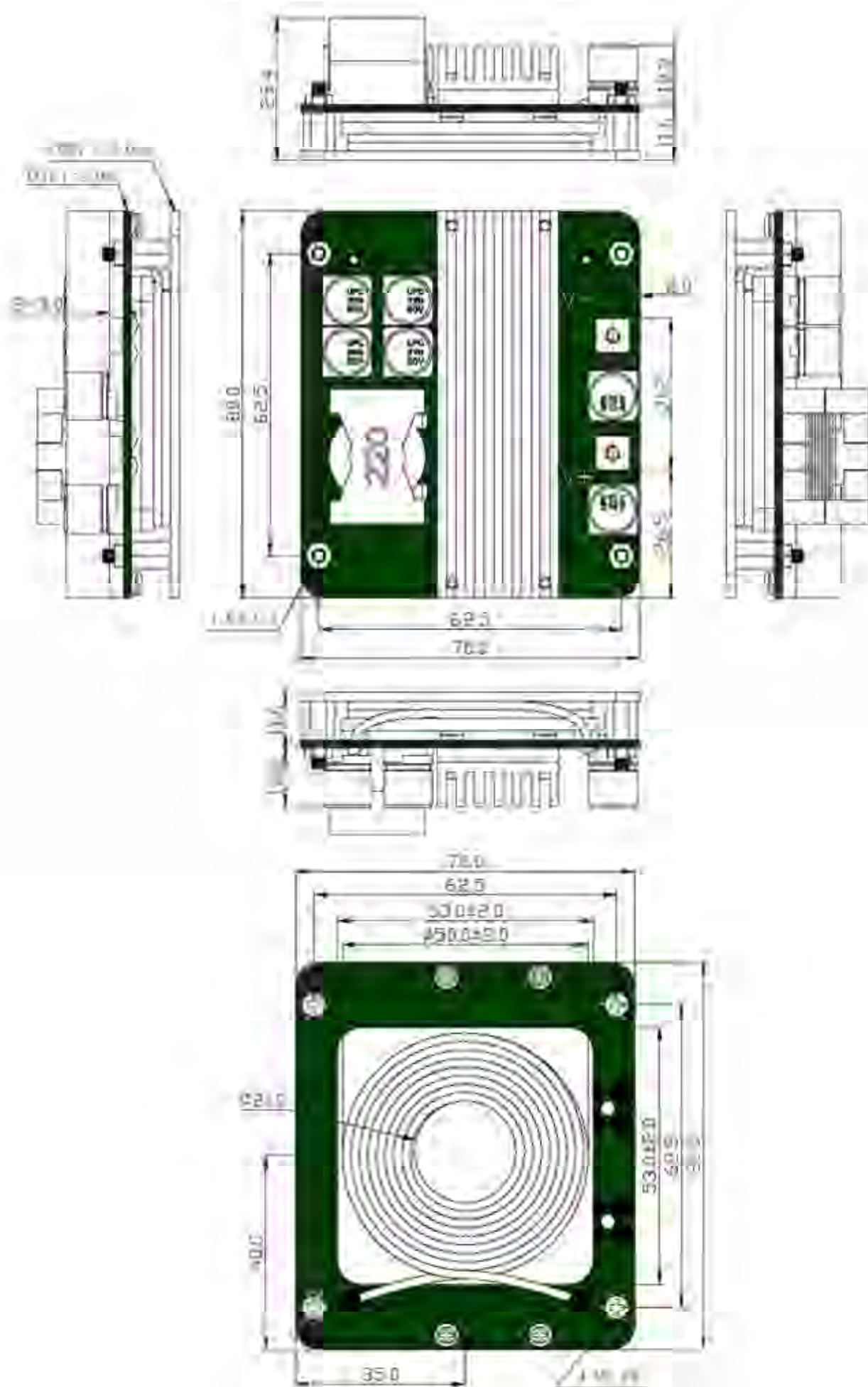
Board Picture





Dimension





United States Patent

8,098,043	Induction type power supply device
8,217,621	Frequency modulation type wireless power supply and charger system
8,412,963	Power supplying and data transmitting method for induction type power supply system
8,417,359	Power transmission method of high-power wireless induction power supply system
8,461,802	Wireless driver system
8,519,667	Mobile wireless charger system
8,729,852	Method for identification of a light inductive charger
8,729,854	Slot-type induction charger
8,754,609	Wireless charging coil structure in electronic devices
8,772,979	Method for power self-regulation in a high-power induction type power source
8,810,072	High-power induction-type power supply system and its data transmission method
8,860,365	Inductive charging method for vehicles
8,941,267	High-power induction-type power supply system and its bi-phase decoding method
8,981,600	Low-loss data transmission method for high-power induction-type power supply system
9,045,050	Inductive charging method for vehicles
9,048,881	Method of time-synchronized data transmission in induction type power supply system
9,075,587	Induction type power supply system with synchronous rectification control for data transmission
9,413,197	Inductive power supply system and intruding metal detection method thereof
9,600,021	Operating clock synchronization adjusting method for induction type power supply system
9,600,022	Operating clock synchronization adjusting method for induction type power supply system
9,628,147	Method of automatically adjusting determination voltage and voltage adjusting device thereof
9,671,444	Current signal sensing method for supplying-end module of induction type power supply system
9,831,687	Supplying-end module for induction-type power supply system and signal analysis circuit therein
9,960,639	Supplying-end module of induction type power supply system and voltage measurement method thereof
10,002,707	Induction coil structure for wireless charging device
10,038,338	Signal modulation method and signal rectification and modulation device
10,056,944	Data determination method for supplying-end module of induction type power supply system and related supplying-end module
10,114,396	Induction type power supply system and intruding metal detection method thereof
10,153,665	Method for adjusting output power for induction type power supply system and related supplying-end module
10,289,142	Induction type power supply system and intruding metal detection method thereof
10,312,748	Signal analysis method and circuit
10,574,095	Decoding method for signal processing circuit and signal processing circuit using the same
10,587,153	Intruding metal detection method for induction type power supply system and related supplying-end module
10,594,168	Intruding metal detection method for induction type power supply system and related supplying-end module
10,600,547	Induction type power supply system and coil module thereof
10,615,645	Power supply device of induction type power supply system and NFC device identification method of the same
10,630,113	Power supply device of induction type power supply system and RF magnetic card identification method of the same
10,630,116	Intruding metal detection method for induction type power supply system and related supplying-end module
10,643,787	Induction type power supply system and coil module thereof
10,673,287	Method and supplying-end module for detecting receiving-end module
10,686,331	Signal modulation method and signal rectification and modulation device

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