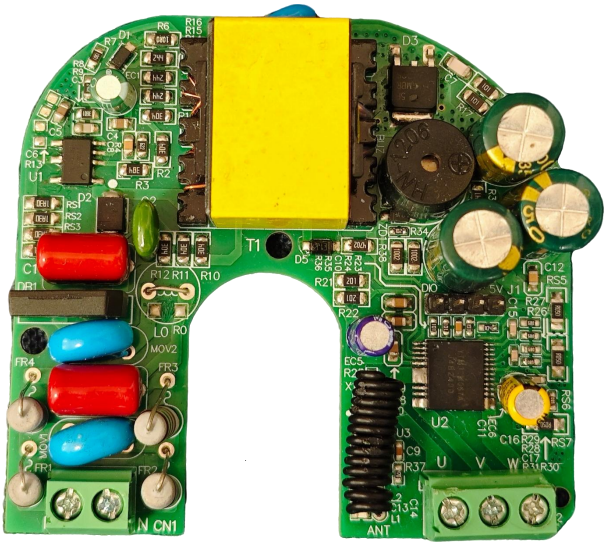

Features

-Built-in MOSFET and drive characteristics

- Integrated gate drive circuit and 3 pairs of P+N MOS, with a continuous over–current capacity of 6A
- Wide input voltage range: 6.5V to 40V
- Maximum Output Frequency 50kHz
- Junction temperature from –40°C to 125°C
- P+N RDSON: typical value is 40.6mΩ at VGS=10V

- PSR isolation HPF system constant voltage current limiting output.

-Adaptive Motor FOC algorithm.

-Support single resistor/triple resistor sampling optional.

-Control mode: torque control, limited power, limited speed, positive and negative electronic brake.

-Complete protection functions: over voltage, under voltage, over current, blocking, phase deficiency, internal power supply monitoring and protection

- AC Line Under Voltage and Over Voltage Protection

- Driver output open circuit, short circuit, a cycle by a cycle to limit the current protection

- PCB integrated molding, high production efficiency, low cost

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Phone/Fax: 86-510-85388846

Contents

1 Specification

1.1 Input Spec

- Input Voltage: 130-280 Vac
- Input Frequency: 47-63 Hz
- Input Power:36W(350 RPM)

1.2 Output Spec

- Output Voltage: 24V
- Output Current: 1.5A

2 Assessment Result

2.1 Behavior of Electricity @ 230Vac input and full load output

-Constant pressure accuracy: ±4%

- Efficiency: ≥0.86%
- Power Factor: >0.95

-THD <10%@full load

-No load power: ≦ 500mW@ 230V

2.2 Defensive Function

-Over power Protection:OK

-Open Circuit Protection:OK

-Short Circuit Protection:OK

-Power overrun protection:OK

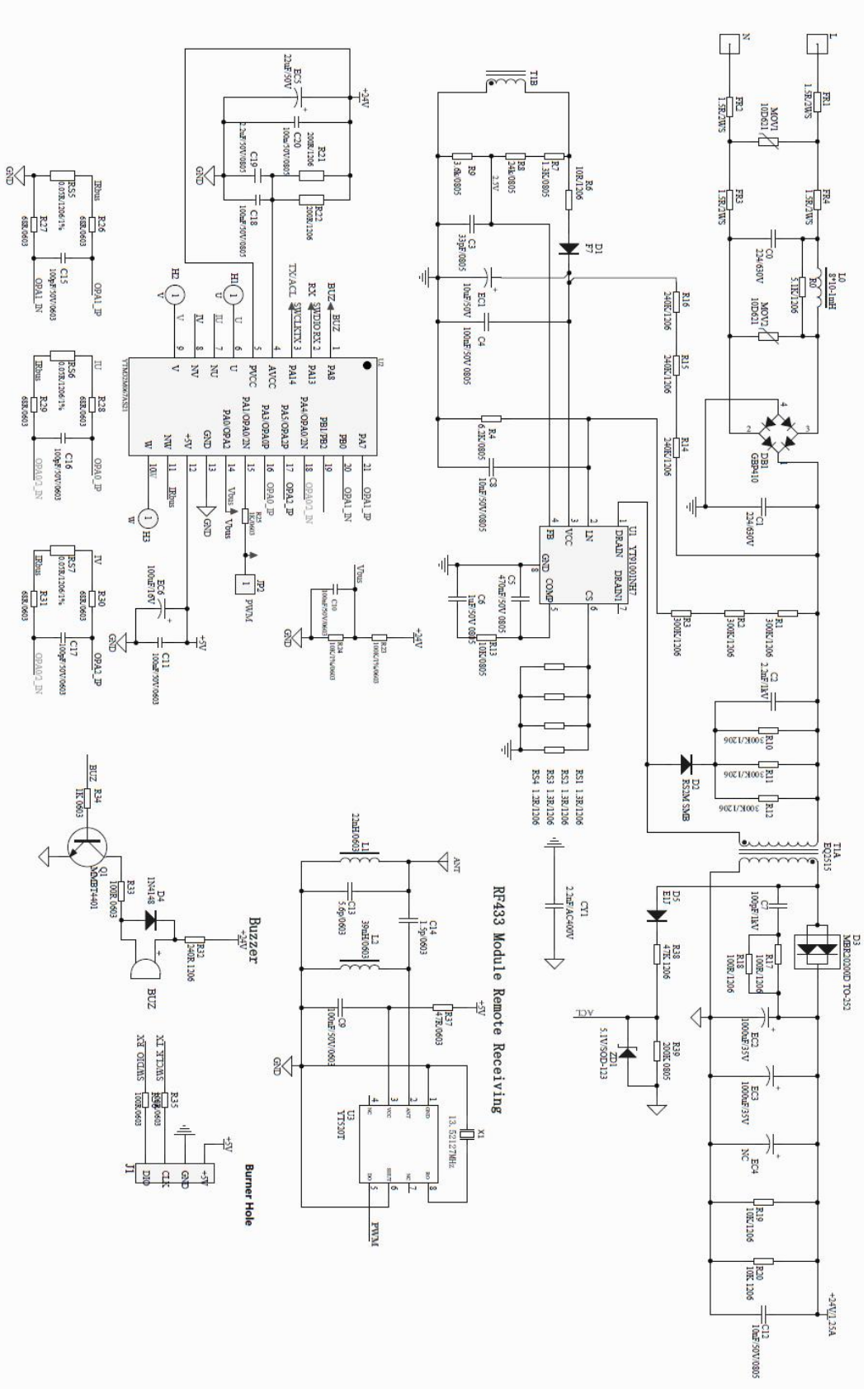
-Speed limit protection:OK

-Motor lock protection:OK

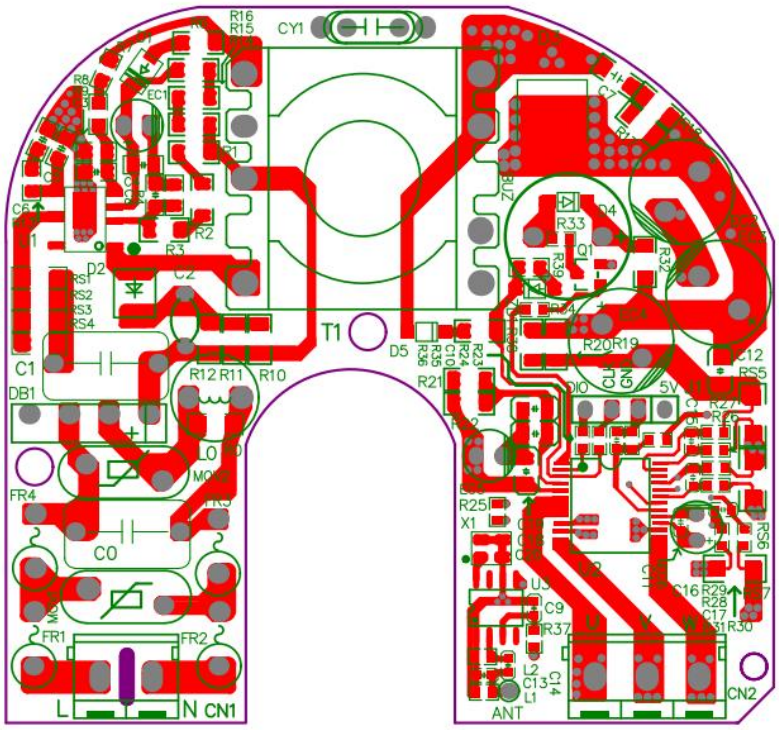
-Surge Level: 4kV

3 LED Driver Data

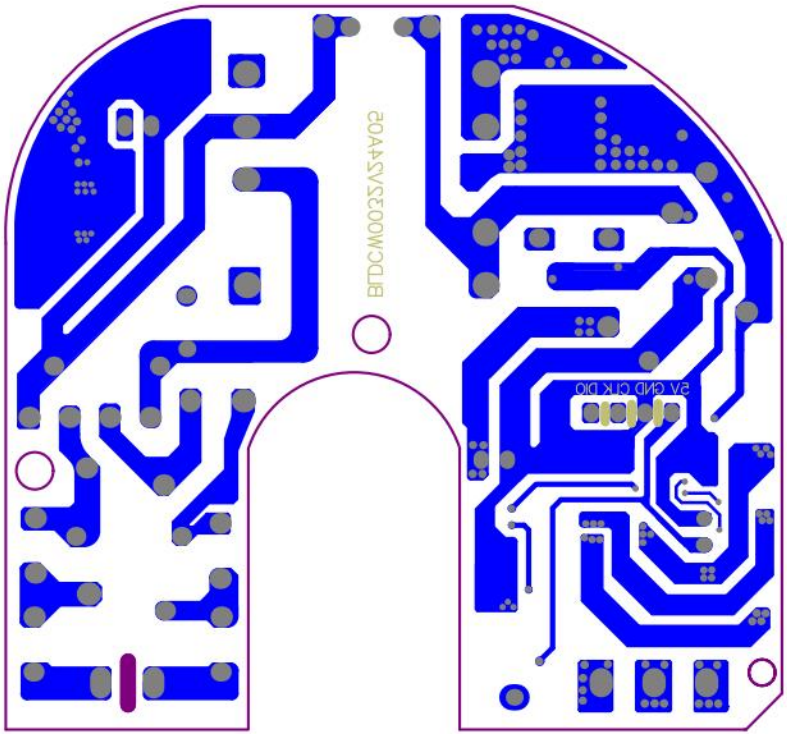
3.1 Schematic



3.2 PCB Layout



PCB Top Layer



PCB Bottom Laye

3.3 BOM-List

Type	NO.	Name	Specification Description	Designator	Qty.	Unit
SMD Components(solder paste process)	1	Driver PCB	BLDCW0032V24A05 Driver PCB_FR-4 Dual panel_3 Pcs_panel size:230.2*78.4_Board Size:68.4*73.4_T=1.6mm_OSP silk-screen_Green oil and white characters_CU=25um_Through hole cover oil_94-V0_RoHS		1/3	pcs
	2	SMD Diode	SMD FRD_F7_SOD-123FL_1000V_1A_46mil_T/R_RoHS	D1	1	pcs
	3	SMD Diode	SMD Diode_RS2M_SMB_1000V_2A_60mil_T/R_RoHS	D2	1	pcs
	4	SMD Schottky Diodes	SMD Schottky Diodes_MBR20200CS_TO-252_200V_20A_102Mil_T/R_RoHS	D3	1	pcs
	5	SMD Diode	SMD Diode_1N4148_SOD-123_100V_150mA_26mil_T/R_RoHS	D4	1	pcs
	6	SMD Diode	SMD fast recovery diode_E1J_SOD-123FL_600V_1A_46mil_T/R_RoHS	D5	1	pcs
	7	SMD Voltage-regulator	SMD Voltage-regulator_BZT52C5V1_5.1V_SOD-123_500mW_±5%_33mil_T/R_RoHS/MM1Z5V1	ZD1	1	pcs
	8	SMD Capacitor	SMD Capacitor_C0G_0805_50V_33pF±10%_RoHS	C3	1	pcs
	9	SMD Capacitor	SMD Capacitor_X7R_0805_50V_100nF±10%_RoHS	C4,C18,C20	3	pcs
	10	SMD Capacitor	SMD Capacitor_X7R_0805_50V_220nF±10%_RoHS	C5	1	pcs
	11	SMD Capacitor	SMD Capacitor_X7R_0805_25V_2.2uF±10%_RoHS	C6	1	pcs
	12	SMD Capacitor	SMD Capacitor_X7R_1206_1kV_100pF±10%_RoHS	C7	1	pcs
	13	SMD Capacitor	SMD Capacitor_X7R_0805_50V_10nF±10%_RoHS	C8,C12	2	pcs
	14	SMD Capacitor	SMD Capacitor_X7R_0603_50V_100nF±10%_RoHS	C9,C10,C11	3	pcs
	15	SMD Capacitor	SMD Capacitor_COG_0603_50V_5.6pF±5%_RoHS	C13	1	pcs
	16	SMD Capacitor	SMD Capacitor_COG_0603_50V_1.5pF±5%_RoHS	C14	1	pcs
	17	SMD Capacitor	SMD Capacitor_X7R_0603_50V_100pF±10%_RoHS	C15,C16,C17	3	pcs
	18	SMD Capacitor	SMD Capacitor_X7R_0805_50V_2.2uF±10%_RoHS	C19	1	pcs
	19	SMD Resistor	SMD Resistor_TF_1206_1/4W_200V_4.7k±5%_RoHS	R0	1	pcs
	20	SMD Resistor	SMD Resistor_TF_1206_1/4W_200V_510k±1%_RoHS	R1,R2,R3	3	pcs
	21	SMD Resistor	SMD Resistor_TF_0805_1/8W_150V_10k±1%_RoHS	R4	1	pcs
	22	SMD Resistor	SMD Resistor_TF_1206_1/4W_200V_10Ω±5%_RoHS	R6	1	pcs
	23	SMD Resistor	SMD Resistor_TF_0805_1/8W_150V_1.47k±1%_RoHS	R7	1	pcs
	24	SMD Resistor	SMD Resistor_TF_0805_1/8W_150V_24k±1%_RoHS	R8	1	pcs

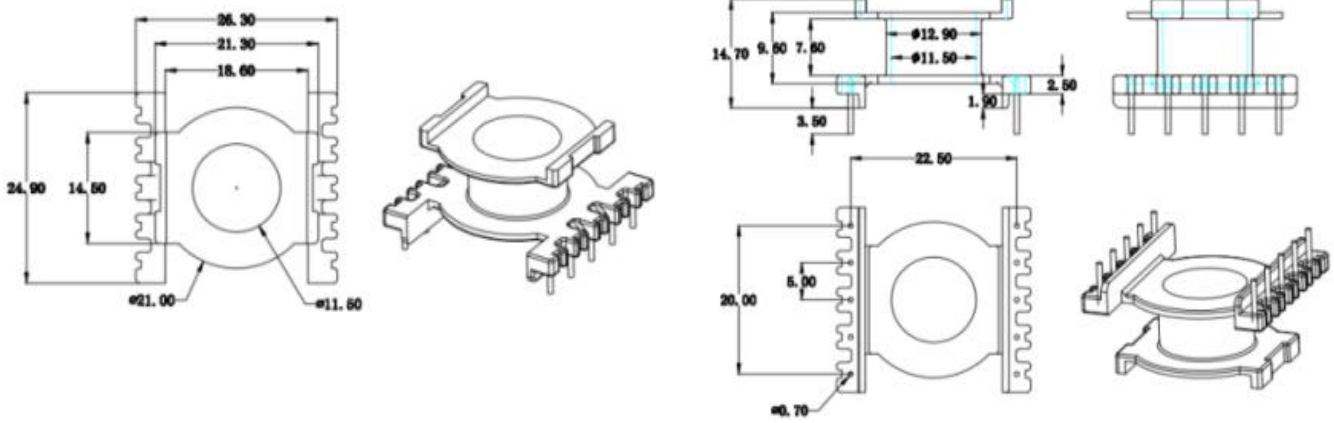
	25	SMD Resistor	SMD Resistor_TF_0805_1/8W_150V_3.6k±1%_RoHS	R9	1	pcs
	26	SMD Resistor	SMD Resistor_TF_1206_1/4W_200V_300k±5%_RoHS	R10,R11,R12	3	pcs
	27	SMD Resistor	SMD Resistor_TF_0805_1/8W_150V_30k±5%_RoHS	R13	1	pcs
	28	SMD Resistor	SMD Resistor_TF_1206_1/4W_200V_240k±5%_RoHS	R14,R15,R16	3	pcs
	29	SMD Resistor	SMD Resistor_TF_1206_1/4W_200V_100Ω±5%_RoHS	R17,R18	2	pcs
	30	SMD Resistor	SMD Resistor_TF_1206_1/4W_200V_10k±5%_RoHS	R19,R20	2	pcs
	31	SMD Resistor	SMD Resistor_TF_1206_1/4W_200V_200Ω±5%_RoHS	R21,R22	2	pcs
	32	SMD Resistor	SMD Resistor_TF_0603_1/8W_150V_100k±1%_RoHS	R23	1	pcs
	33	SMD Resistor	SMD Resistor_TF_0603_1/8W_150V_10k±1%_RoHS	R24	1	pcs
	34	SMD Resistor	SMD Resistor_TF_0603_1/8W_150V_1k±5%_RoHS	R25,R34	2	pcs
	35	SMD Resistor	SMD Resistor_TF_0603_1/8W_150V_68Ω±5%_RoHS	R26,R27,R28, R29,R30,R31	6	pcs
	36	SMD Resistor	SMD Resistor_TF_1206_1/4W_200V_240Ω±5%_RoHS	R32	1	pcs
	37	SMD Resistor	SMD Resistor_TF_0603_1/8W_150V_100Ω±5%_RoHS	R33,R35,R36	3	pcs
	38	SMD Resistor	SMD Resistor_TF_0603_1/8W_150V_47Ω±5%_RoHS	R37	1	pcs
	39	SMD Resistor	SMD Resistor_TF_1206_1/4W_200V_47k±5%_RoHS	R38	1	pcs
	40	SMD Resistor	SMD Resistor_TF_0805_1/8W_150V_200k±5%_RoHS	R39	1	pcs
	41	SMD Resistor	SMD Resistor_TF_1206_1/4W_200V_1.3Ω±1%_RoHS	RS1,RS2,RS3	3	pcs
	42	SMD Resistor	SMD Resistor_TF_1206_1/4W_200V_1.2Ω±1%_RoHS	RS4	1	pcs
	43	SMD Resistor	SMD Resistor_TF_1210_1/2W_200V_0.05Ω±1%_RoHS	RS5,RS6,RS7	3	pcs
	44	SMD Inductor	SMD Inductor_0603_22nH±0.3nH_RoHS	L1	1	pcs
	45	SMD Inductor	SMD Inductor_0603_39nH±0.3nH_RoHS	L2	1	pcs
	46	SMD Crystal XTAL	SMD passive crystal oscillator_FXTAL433.92_13.52127MHz_SMD3225-4P_RoHS	X1	1	pcs
	47	SMD BJT	SMD BJT_MMBT4401_NPN_Vceo:40V_600mA_SOT-23_T/R_RoHS	Q1	1	pcs
	48	SMD IC	SMD IC_YT91003NH7_HSOP-7_T/R_RoHS	U1	1	pcs
	49	SMD Microcontroller	SMD Microcontroller_YTM32M067AS21_SSOP21_T/R_RoHS	U2	1	pcs
	50	SMD IC	SMD IC_RF433 Wireless Receiver IC_YT520T_SOP8_T/R_RoHS	U3	1	pcs

DIP Components	1	FUSE Resistor	Wire-wound fuse resistance_KNP_1.5Ω_±5%_2WS_Pin CP wire diameter 0.55mm_Alloyed wire_B52_Passement_Surge3.5kV_RoHS	FR1,FR2,FR3, FR4	4	pcs
	2	Varistor	Varistor_10D621KJ_570-650V_ High Joule _125°_P=7.5mm_Pin length: 3.5mm_RoHS(silver electrode)	MOV1,MOV2	2	pcs
	3	Film Capacitor	Film Capacitor_CBB22_630V_220nF_S3.5_P10_RoHS	C0,C1	2	pcs
	4	Poly.CAP	Poly.CAP_1000V_2.2nF±10%_P5_S3.5_RoHS	C2	1	pcs
	5	Y1-Safety Cap	Y1-Safety Cap_400V_2.2nF±20%_P10_S3.5_RoHS	CY1	1	pcs
	6	E-Cap	ELEC-CAP_Φ5*11_50V_10μF_105℃_8000h_S3.5_RoHS	EC1	1	pcs
	7	E-Cap	ELEC-CAP_Φ10*20_35V_1000μF_105℃_6000h_S3.5_high frequency low resistance_RoHS	EC2,EC3,EC4	3	pcs
	8	E-Cap	ELEC-CAP_Φ5*9_50V_22μF_105℃_6000h_S4.0_RoHS	CE5	1	pcs
	9	E-Cap	E-Cap_Φ5*11_16V_100μF±20%_105℃_8000h_S4.0_RoHS	CE6	1	pcs
	10	Bridge Rectifiers	Bridge Rectifiers_GBP410_GBP_1kV_4A_84mil_RoHS	BD1	1	pcs
	11	I-shaped inductor	I-shaped inductor_Φ8*10_560uH±10%_0.25 Bare Copper Wire_RoHS	L0	1	pcs
	12	Transformer	Transformer_EQ2515_L_D5+5_F0.4mH_28T(233)D54_11T(255)D10976_9T(125)D12_18T(233)D43_S3.5_PC40_Isolation	T1	1	pcs
	13	Buzzer	Passive electromagnetic buzzer_HN-1212-140R_2KHZ_Voltage:24-30V(30VMax)_Internal resistance 140±2Ω_Size:9*11.8_P6.5mm_(string of 240 Ohm resistance)_Foot length:3.5mm	BUZ	1	pcs
	14	RF Antenna	RF Antenna_Spring wire_Black rubber spiral_14 turns_Copper_RoHS	ANT	1	pcs
	15	Input terminal	Connector terminal_GH0126-212-2P_300V_10A_Pin Distance 5 mm_Pin 3.7mm_Green with card slot_UL94 V-0_RoHS	CN1	1	pcs
	16	Output terminal	Connector terminal_GH0126-312-3P_300V_10A_Pin Distance 5 mm_Pin 3.7mm_Green with card slot_UL94 V-0_RoHS	CN2	1	pcs
	17	Pin Herder	Pin Herder_XHD2.54_1X4P Straight cutting_P2.54mm_Length11.5_S3.4_RoHS	J1	1	pcs

3.4 Transformer

- Iron Core：EQ2515 PC40 AE=95mm²

- Bobbin: Vertical EQ2515 skeleton(5+5P)bakelite



-Windings：

Windings requirements:							
NO.	**Winding**	**Start(PIN)**	**End(PIN)**	**Turns(Ts)**	**Wire Diameter(mm)**	**Winding method**	**Remark**
1)	Np1	5	4	28ts	Φ0.33mm*2P	Flat and tight，Two-layer winding	2EUW copper wire
2)	Myra tape	/	/	2ts	According to bobbin	/	/
3)	NS	10/9	7/6	11ts	Φ0.55mm *2P	Flat and tight，Two-layer winding	TEX-E
4)	Myra tape	/	/	2ts	According to bobbin	/	/
5)	Nvcc	1	2	9ts	Φ0.25mm*2P	Flat and tight，One layer winding	2EUW copper wire
5)	Myra tape	/	/	2ts	According to bobbin	/	/
7)	Np2	4	3	18ts	Φ0.33mm*2P	Flat and tight，Two-layer winding	2EUW copper wire
8)	Myra tape			2ts	According to bobbin	/	/
9)	Blank below						

- Key Point:

1. Inductance value-Lp=0.40mH±5% for P3-P1. (Test conditions: 1V,10kHz).
2. Leakage inductance of P3-P1<20uH. (Test conditions: 1V,10kHz).
3. Other Requirements：

1). Reserved Pins of Bobbin: Remove Pin8， cut off 2/3 of pin4 after wrapping，Keep other pins;

2). Removed Pins of Bobbin：NA

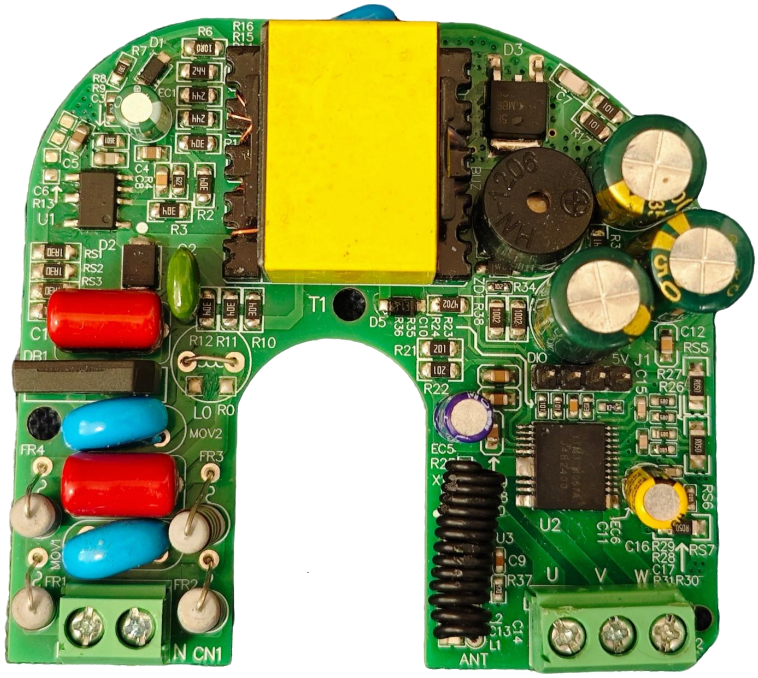
3). The transformer shall be immersed for 2H and baked for 2H to ensure that no magnetic core loosens and falls off.

4). Keep the tin surface on the PIN pin to a minimum.

5).The densely wound wire in the middle of the Nvcc windin

4 LED Driver Picture and Size

- L*W: 68.4×73.4mm



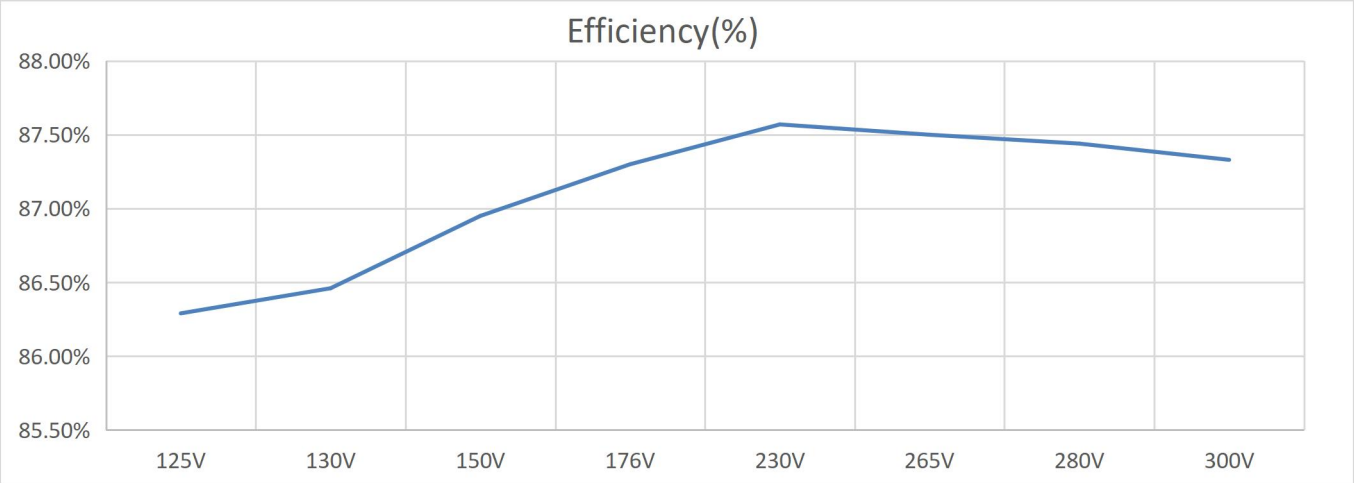
Top view

Bottom view

5 Detail Test Data

5.1 Test conditions: CV Mode

Vin（AC）	Hz	Iin（A）	Pin(W)	PF	Vout(V)	Iout(A)	Pout(W)	Efficiency(%)	THD
125V	60	0.333	41.43	0.990	23.93	1.5	35.75	86.29%	0.99%
130V	60	0.320	41.36	0.990	23.93	1.5	35.76	86.46%	0.98%
150V	50	0.275	41.09	0.990	23.92	1.5	35.73	86.95%	0.81%
176V	50	0.234	40.96	0.989	23.94	1.5	35.76	87.30%	1.00%
230V	50	0.181	40.88	0.978	23.99	1.5	35.80	87.57%	1.67%
265V	50	0.159	40.91	0.964	23.96	1.5	35.80	87.50%	2.61%
280V	50	0.152	40.93	0.957	23.94	1.5	35.79	87.44%	3.21%
300V	50	0.143	40.97	0.945	23.98	1.5	35.78	87.33%	4.56%
Note1.:The output voltage test is the driving board terminal voltage									



5.2 Output Voltage at no load

Vin(ac)	125V	130V	150V	176V	230V	265V	280V	300V
Output Voltage	24.54	24.53	24.55	24.57	24.58	24.58	24.57	24.56

Note1.:The output voltage test is the driving board terminal voltage

5.3 OCP Current Test

Vin(ac)	125V	130V	150V	176V	230V	265V	280V	300V
OCP(A)	2.12	2.15	2.20	2.16	2.10	2.06	2.07	2.09

Note1.:OCP passing point:1.59-1.64 time

5.4 Standby power at no load

Vin(ac)	125V	130V	150V	176V	230V	265V	280V	300V
Pin(W)	0.90	0.91	0.92	0.96	1.03	1.09	1.12	1.17

6 Temperature test @ Vout=24V 1.5A （Unit：℃）

Vin (ac)	Rectifier Bridge (DB1)	Drum Inductor (L0)	CBB Capacitor (C1)	Transformer Wire (T1)	MBR20200CT (D3)	Output Capacitor（EC2)	IC (U1)
110V	94.8	86.6	83.1	97.5	96.6	64.9	96.4
130V	86.5	79.4	77.4	94.7	96.1	64.4	88.9
150V	80.9	74.3	73.8	95.3	96.0	64.2	84.7
176V	76.3	71.5	71.5	95.7	96.3	63.7	81.9
230V	71.9	67.7	69.7	98.4	97.7	65.1	81.3
265V	70.4	67.1	69.2	100.5	98.0	65.6	82.3
280V	72.0	68.9	71.3	103.4	100.5	67.8	84.9
300V	69.9	67.2	69.8	102.9	99.3	66.4	84.3

Note1.The above data are measured when the bare drive is placed at the ambient temperature of 27℃.

7 Reliability Test

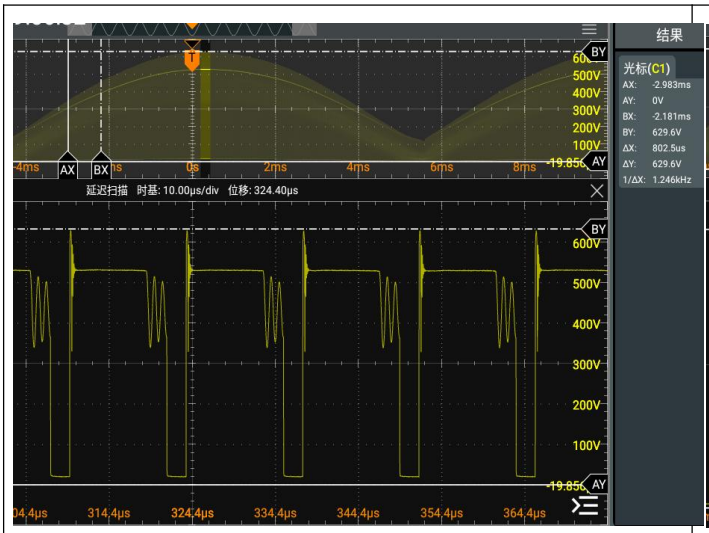
7.1 Open Circuit Protection: OK

7.2 Short Circuit Protection: OK

7.3 Surge Capability: 5 counts of **4 kV** for each ± polarity and 0, 90, 180 and 270 phase

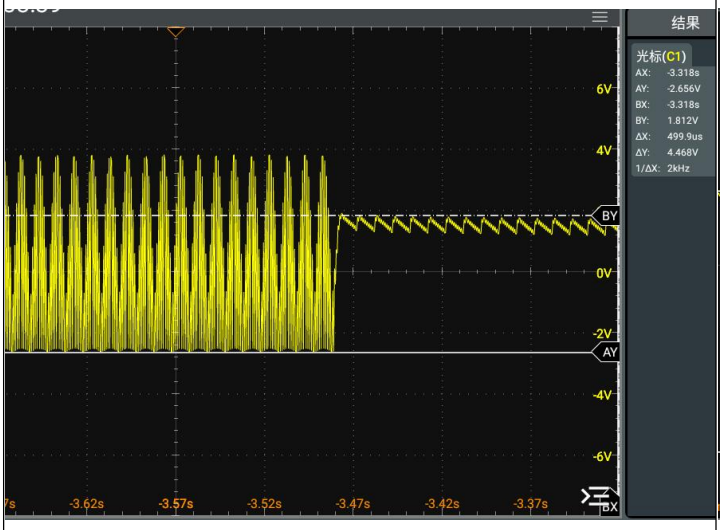
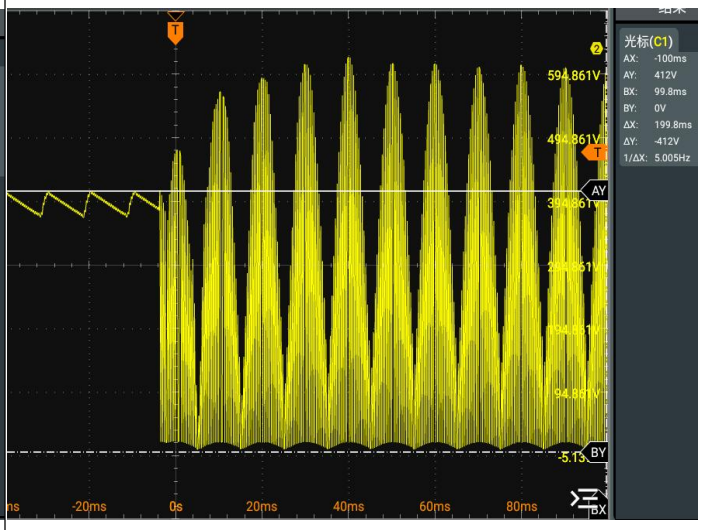
7.4 Component stress Test

CH1:V_{DS} (YT91003RH7), CH3: V_D（MBR20200D）

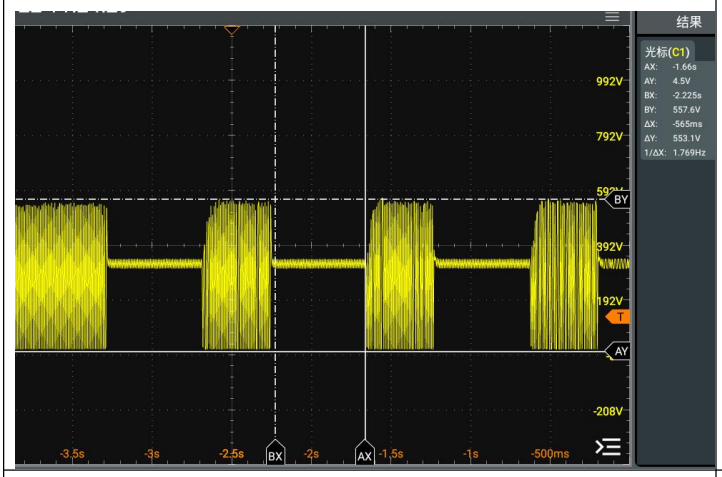
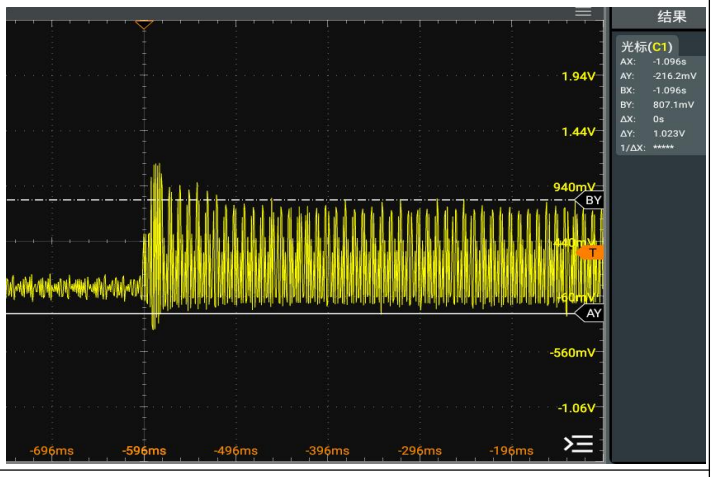
	
1#：Vin=300Vac,DC=24V 1.5A,V_{DS}≈628V	2#：Vin=300Vac,DC=24V 1.5,V_D≈135.2V

7.5 Overvoltage protection and overload protection waveforms

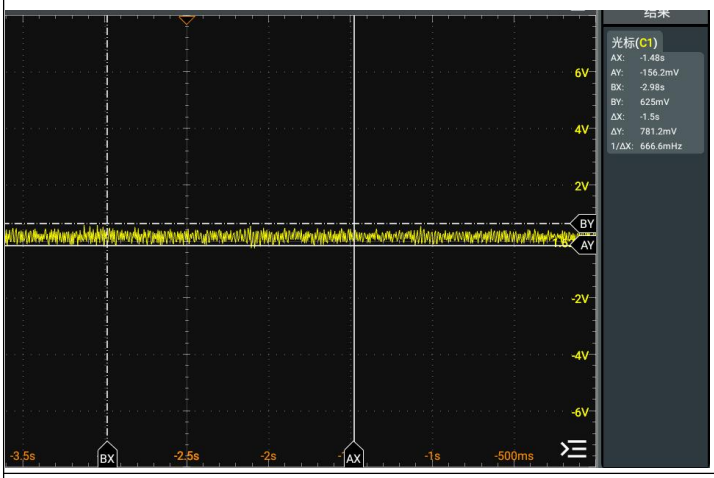
OVP TEST(YT91003RH7)

	
Trigger the OVP ： Vin=304Vac,DC=24V 1.5A	OVP over-voltage recovery operating voltage： Vin=284Vac,DC=24V 1.5A

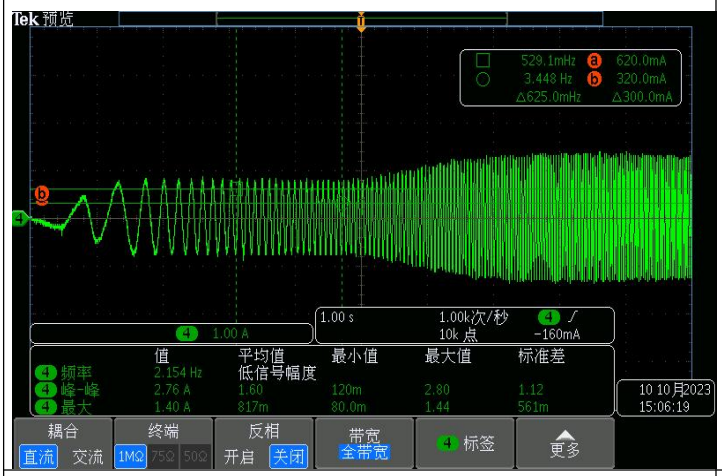
OLP TEST(YTD91003RH7)

	
overload protection ： Vin=230Vac,DC=24V 2.1A	Loaded Sense Resistor Voltage ： Vin=230Vac,DC=24V 1.5A

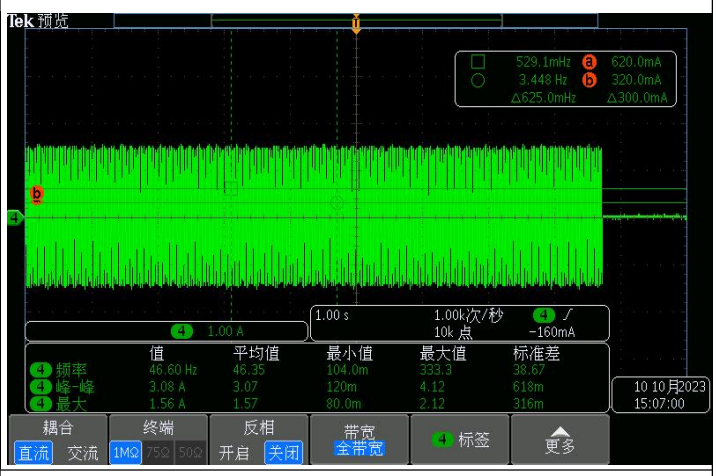
7.6 Output Ripple voltage

	
Typical Ripple Voltage of V_{OUT}=24V, I_{OUT}=0A@230V_{ac} NO load (Power frequency rippie)	Typical Ripple Voltage of V_{OUT}=24V, I_{OUT}=1.5A@230V_{ac} FULL load (Power frequency rippie)

7.7 Starting and braking waveforms

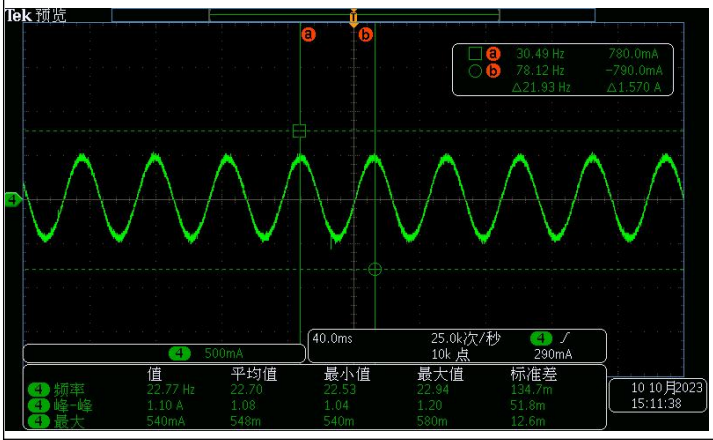


Motor starting waveform

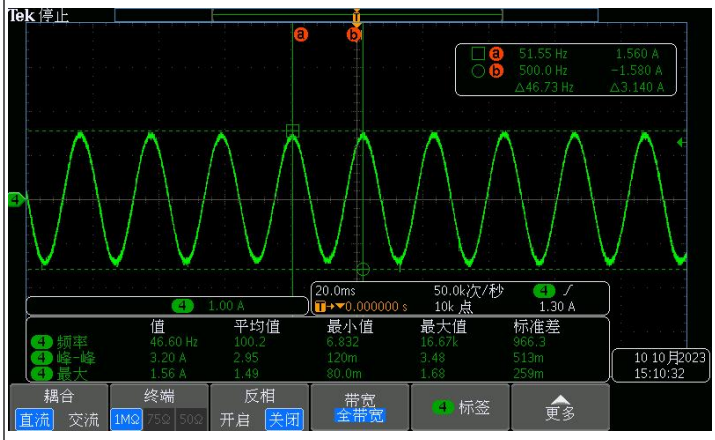


Motor brake waveform

7.8 Fan file number waveform



First- gear 170RPM current waveform



Five-speed 350RPM current waveform

8 433MHZ remote control function description

Key	Functional Description
ON	Power On
OFF	Power Off
1	First gear wind speed (Minimum speed)
5	Five gear wind speed (Maximum speed)
1H	The fan stops turning after one hour
2H	The fan stops turning after two hour
3H	The fan stops turning after three hour
4H	The fan stops turning after four hour

9 Remote control alignmen

Code method: Turn ON the power switch, Within 10 seconds, the host beeps, press the "on", "OFF", "1" key, hear the honey "beep" twice, that is the code is successful.

Note: Each host (straight blade fan) can only remember two address codes,Can recognize two remote controls at the same time,If a third address code pair appears, the address code of the first one is automatically excluded. After the two remote controls are successfully matched, if the third remote control is matched, the code value of the first remote control will be automatically excluded, and so on .

10 Affix

10.1 Affix1 Schematics

10.2 Affix2 BOM

10.3 Affix3 PCB

10.4 Affix4 Transformer specification

10.5 Affix5 IC Data shee

Version History

Version	Date	Description
A0	Jun. 2025	Draft
A1	Jan.2026	Release