高威電業有限公司
Goright Electrical Co., Ltd.

PT4223 solution for 10V/0.3A design

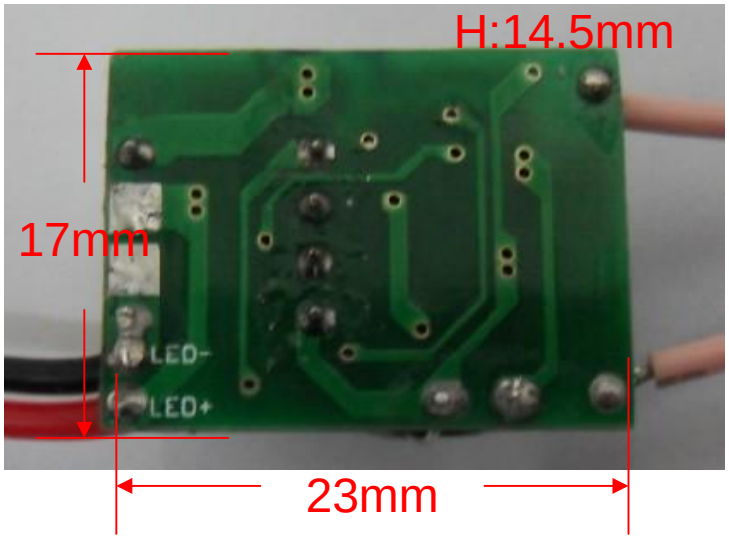
General Design Specification :
1.AC Input Range 90-264Vac
2.DC Output 10V, 300mA
3.Output constant current precision within ±5%
4.High Efficiency and Least Parts Solution

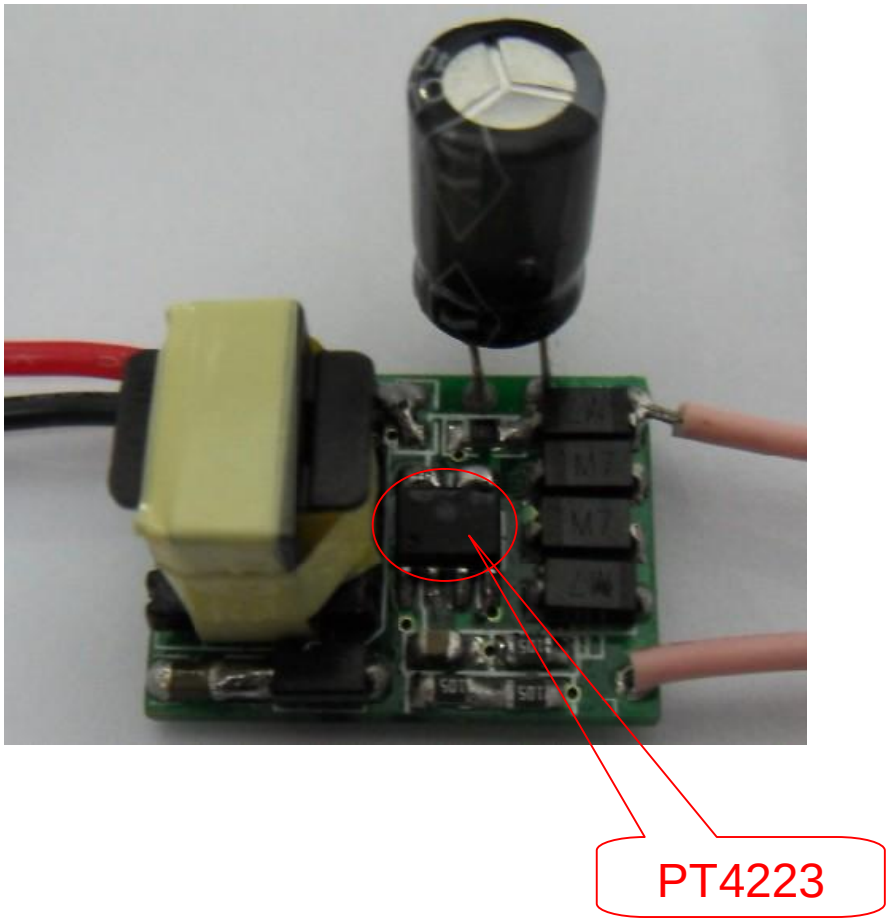
2012-July-3 Prepared By: Peter

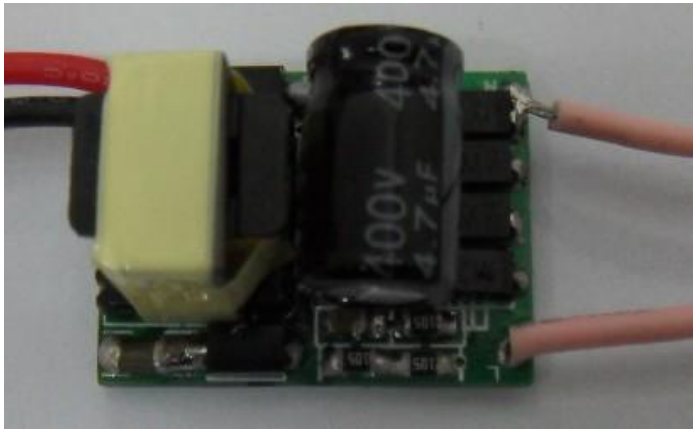
2. Specification

Description		Symbol	Min	Typ	Max	Units	Comment
Input							
Voltage		V_{IN}	90		264	V_{AC}	2 Wire
Frequency		f_{LINE}	47	50/60	63	Hz	
No-load Input Power ($230V_{AC}$)						mW	
Output							
Constant Voltage	Output Voltage	V_{OUT_CV}		10		V	Measured at end of Output DC-Cable (R_{CABLE}=0.54Ω)
	Output Current	I_{OUT_CV}				A	
Constant Current	Output Voltage	V_{OUT_CC}				V	Min V_{OUT} is dependence of V_{CC} supply voltage
	Output Current	I_{OUT_CC}	291	300	309	A	
Output Ripple Voltage		V_{RIPPLE}				mV_{P_P}	Measured at end of Output DC-Cable I_{OUT}=0.7A @T_A = 25 ℃ 20 MHz Bandwidth
Total Output Power							
Continuous Output Power		P_{OUT}		2-3		W	
Over Current Protection		I_{OUT_MAX}		0.3		A	Auto-restart
Active Mode Efficiency (Meet EPA2.0)		*h*		79		%	Measured at end of output DC-Cable, V_{IN} = 115VAC and 230VAC (T_{AMB} = 25 ℃).
Environmental							
Conducted EMI							
Safety							
Ambient Temperature		T_{AMB}		40		° C	Free convection, sea level

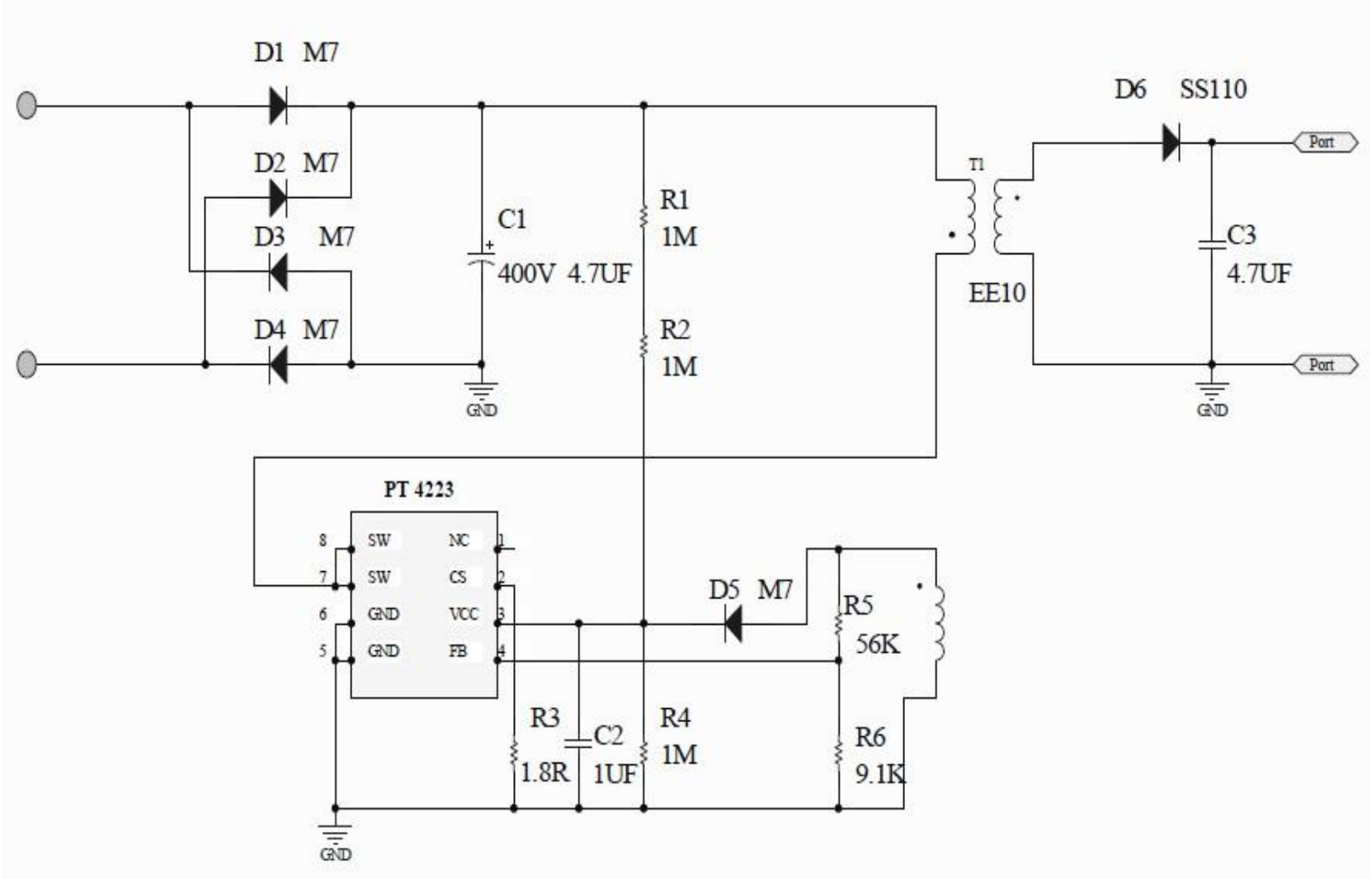
3.Circuit Board Photograph





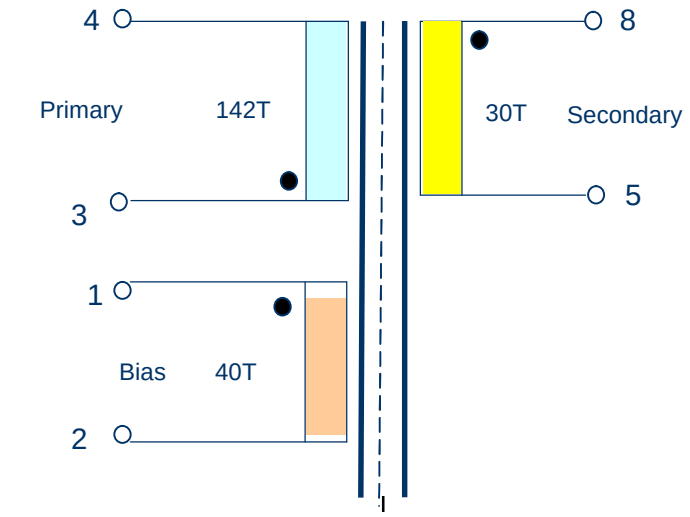


4 Schematic



5. Transformer Drawing

SCHEMATIC



ELECTRICAL SPECIFICATIONS:

1. Primary Inductance (Lp) = **1.8mH ±7%** @10KHz
2. Primary Leakage Inductance 100uH
3. Electrical Strength = 3KV, 50/60Hz,1Min

MATERIALS:

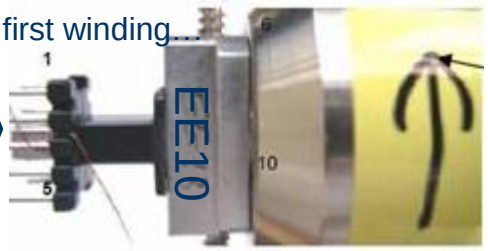
1. Core : EE10(Ferrite Material TDK PC40 or equivalent)
2. Bobbin : EE10 Vertical.
3. Magnet Wires (Pri) : Type 2-UEW

FINISHED :

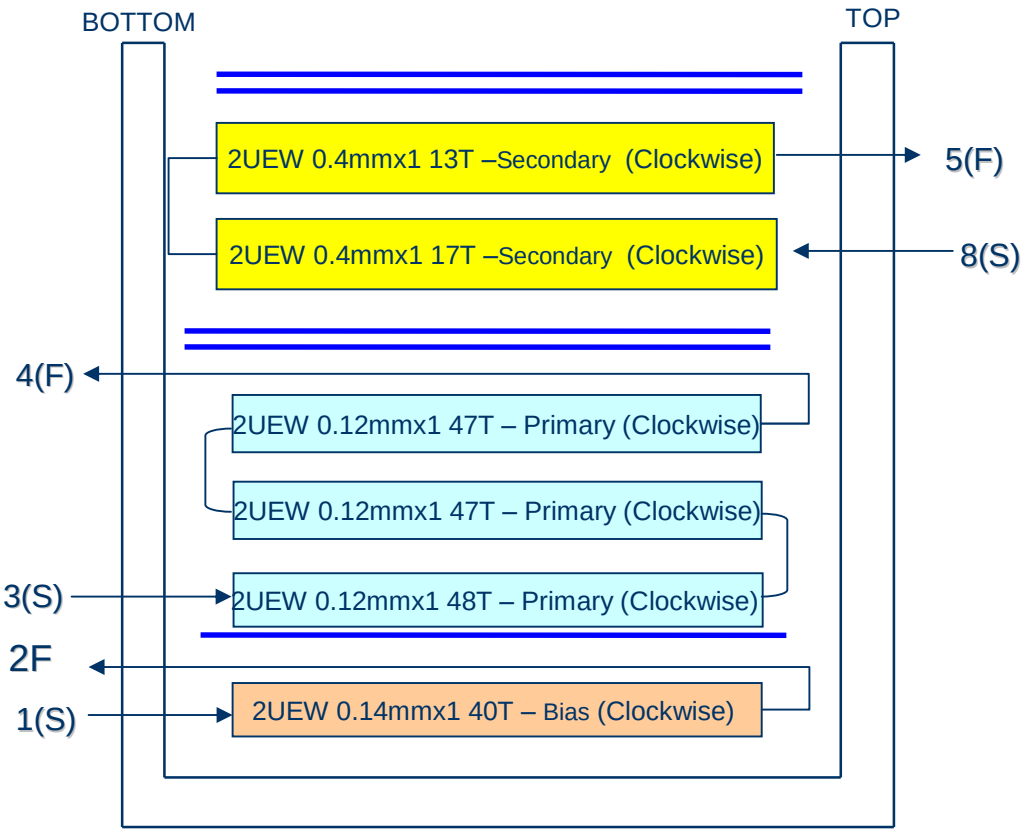
1. Varnish the complete assembly

Instruction for start of first winding...

Winding Start pin-1 & End pin-2 in "Clockwise" direction – looking from Bottom side of the Bobbin.



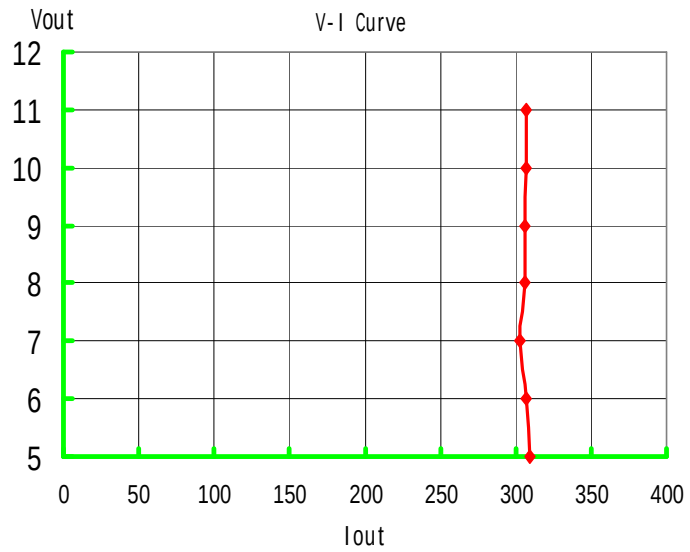
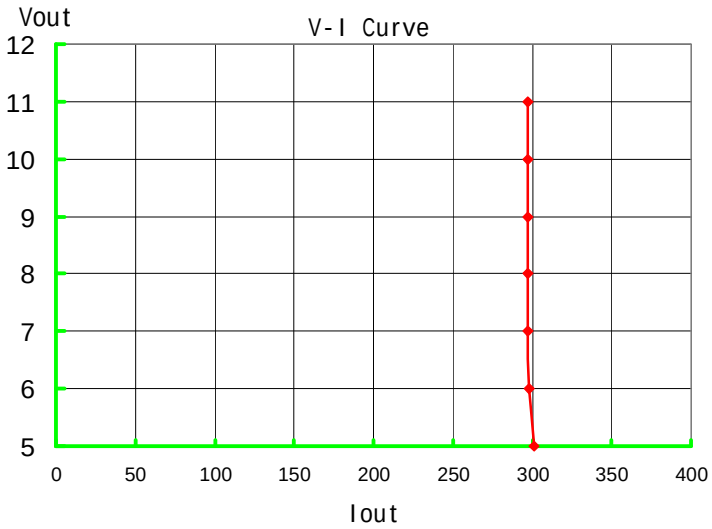
Rotating direction of winding machine



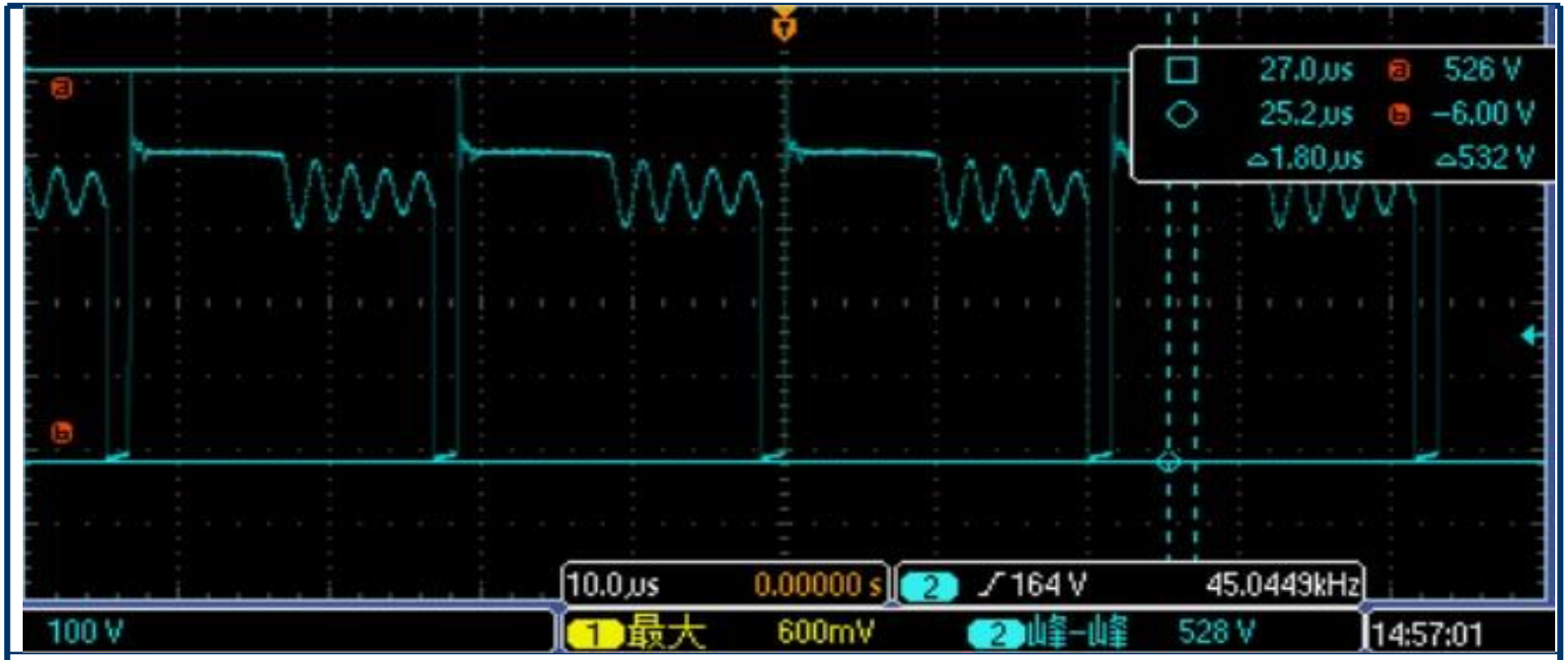
6.Constant Current and Efficiency

#of LEDs	Vin (V)	Pin (W)	Vout (V)	Iout (A)	efficiency
3X1W LEDs	90	3.960	10.08	0.309	78.65%
	100	3.920	10.06	0.308	79.04%
	110	3.880	10.06	0.307	79.60%
	120	3.840	10.05	0.306	80.09%
	130	3.810	10.04	0.304	80.11%
	140	3.790	10.04	0.303	80.27%
	150	3.770	10.03	0.301	80.08%
	160	3.760	10.02	0.300	79.95%
	170	3.750	10.02	0.299	79.89%
	180	3.760	10.01	0.299	79.60%
	190	3.760	10	0.298	79.26%
	200	3.760	10	0.297	78.99%
	210	3.770	9.99	0.297	78.70%
	220	3.780	9.99	0.297	78.49%
	230	3.800	9.99	0.296	77.82%
	240	3.810	9.99	0.296	77.61%
	250	3.830	9.98	0.296	77.13%
	264	3.860	9.98	0.295	76.27%

7. Output VI Characteristics

V_{IN}=115V_{AC}, T_{AMB}=25℃	V_{IN}=230V_{AC}, T_{AMB}=25℃
	

8. V_{DS} Waveform



Test Condition:

V_{IN}=264Vac, I_{OUT}=0.3A

Result:

V_{DS_MAX}=**532V**

9. Bill of Material

Item	Qty.	Ref.	Description
1	2	R1,R2	1M+/-5%,SMD-0805
2	1	R3	1.8R+/-5%,SMD-0805
3	1	R4	1M+/-5%,SMD-0805
4	1	R5	56K+/-5%,SMD-0805
5	1	R6	9.1K+/-5%,SMD-0805
6	1	C1	4.7uF,400V,E-CAP,105℃
7	1	C2	1uF,25V,SMD-0805
8	1	C3	4.7uF,25V,SMD-1206
9	5	D1,D2,D3,D4,D5	M7, SMD 1A/1000V
10	1	D6	SS110, SMD 1A/100V
11	1	IC	PT4223
12	1	T1	EE10 formulation

10.温度测试

Vin (V)	时间	Pin (W)	变压线包（℃)	IC (℃)	环境 (℃)
90	10:00	3.45	96.1	92.5	44.2
90	10：30	3.45	95.5	92.4	46.4
90	11:00	3.45	96.3	92.8	45.2
230	11:30	3.32	89.4	85	41.3
230	12:00	3.32	89.3	86.5	39.1
230	12:30	3.31	89.9	86.8	38.2
230	13:00	3.31	89.4	86.6	39.4
230	13:30	3.31	89.5	87	40
264	14:00	3.33	97.1	95.2	45
264	14：30	3.33	96.9	94.8	44.5
264	15:00	3.33	96.8	95.1	45.7