

# LED Driver Design with iW3620

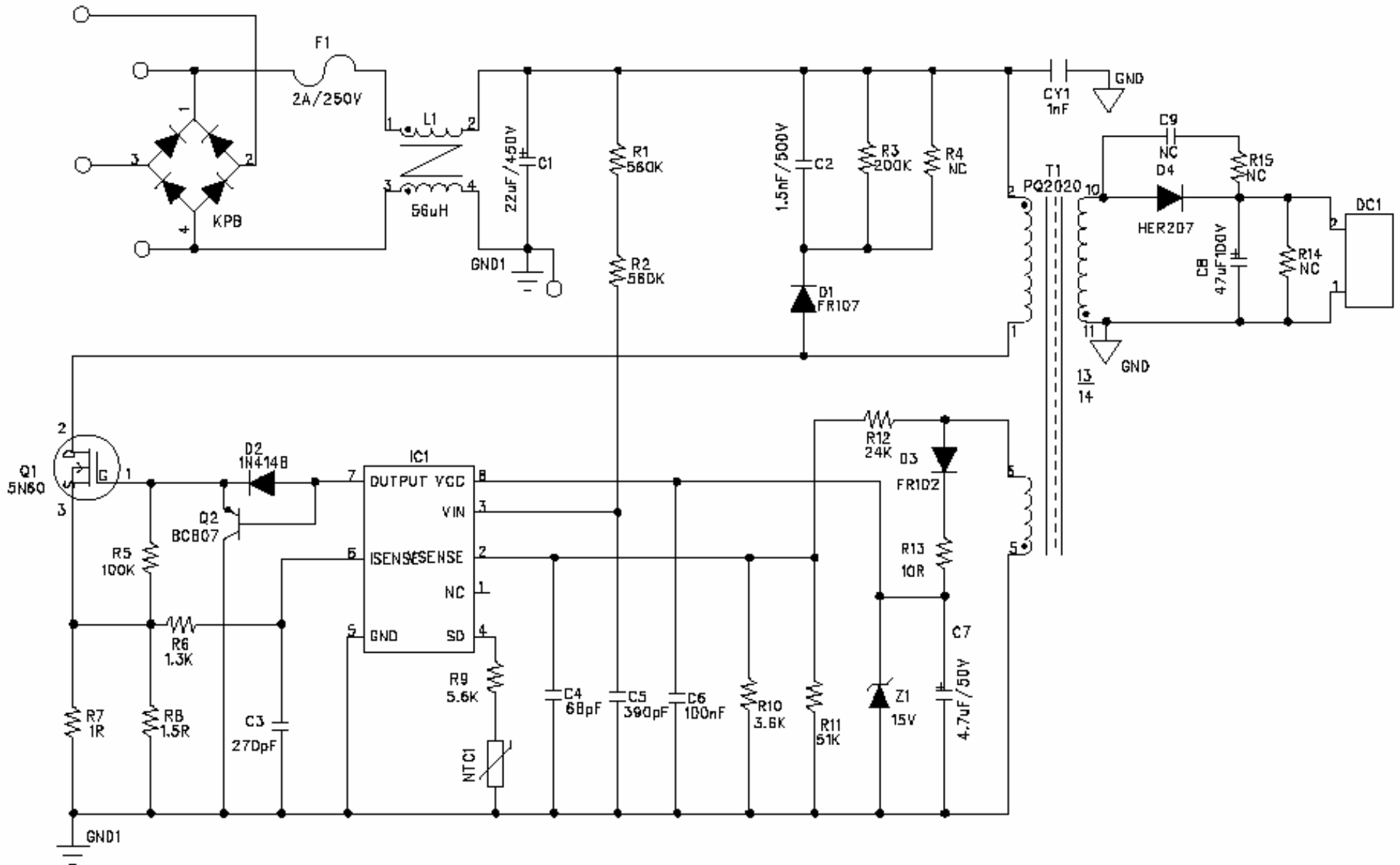
## Summary and Features :

1. LED driver, 88V, 350mA ; Wide AC input range: 90Vac-264Vac
2. For Isolated Applications
3. High Efficiency, High Power Factor and Least Parts Solution
4. Meet EMI Requirement (EN55015BQP&AV scan)
5. Fully Protection Against AC input UV/OV,O/P Short &Open, Component single fault

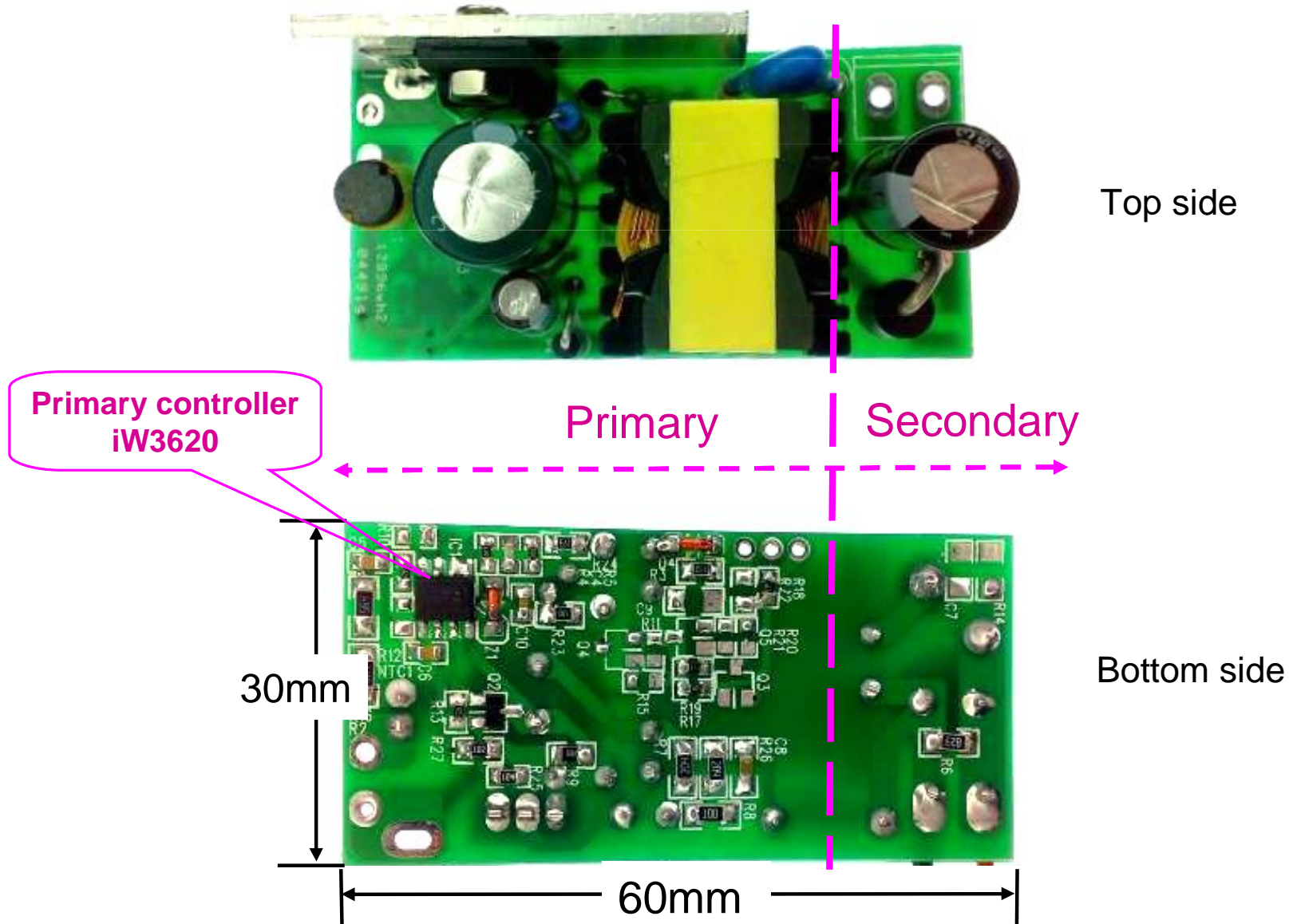
# 1. Specification

Description		Symbol	Min	Typ	Max	Units	Comment
Input							
Voltage		$V_{IN}$	250		400	V <sub>dc</sub>	2 Wire
Frequency		$f_{LINE}$	47	50	63	Hz	
Open-load Input Power (264V <sub>AC</sub> )						W	
Output							
Const Voltage	Output Voltage	$V_{OUT\_CV}$		88		V	Measured at the PCB connector
	Output Current	$I_{OUT\_CV}$				A	
Const Current	Output Voltage	$V_{OUT\_CV}$				V	Min Vout is depend on Vcc
	Output Current	$I_{OUT\_CV}$		0.35		A	
Total Output Power							
Continuous Output Power		$P_{OUT}$		30		W	
Over Current Protection		$I_{OUT\_MAX}$				A	Auto-restart
Efficiency		$h$	90			%	Measured at end of PCB
Power Fact		$PF$					Harmonic meet IEC61000-3-2
Turn on Delay Time						Sec	
Conducted EMI			Meets EN55015B				
Hi-pot test				3		KV	
Operation temperature		$T_{opr}$		40		° C	Free convection, sea level

## 2. Schematic (simple)



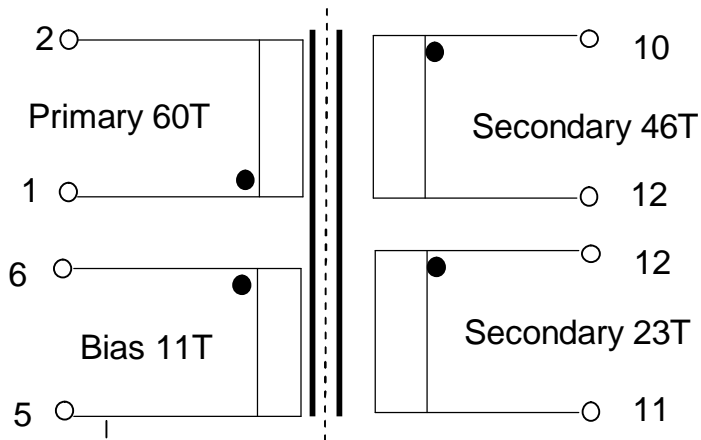
### 3.Circuit Board Photograph





# 4. Transformer Design

## SCHEMATIC



### ELECTRICAL SPECIFICATIONS:

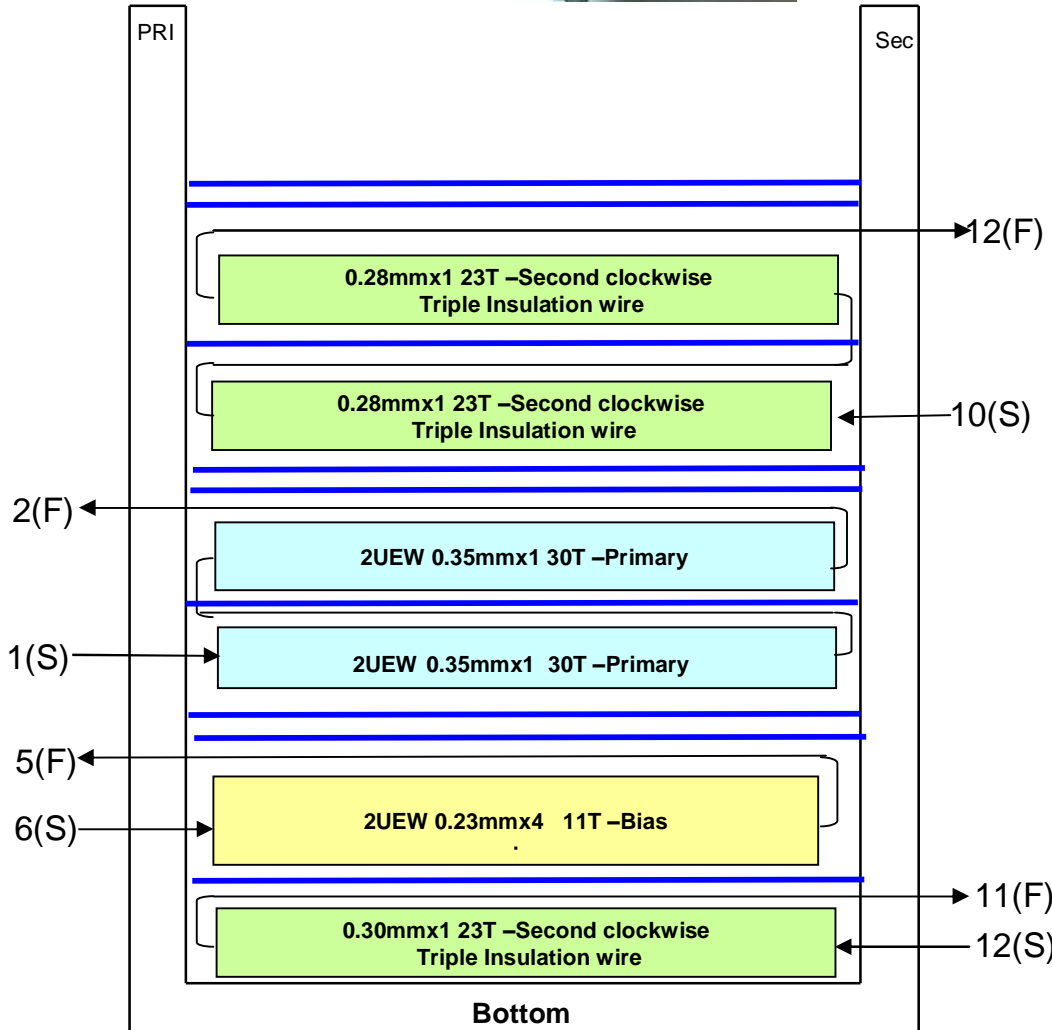
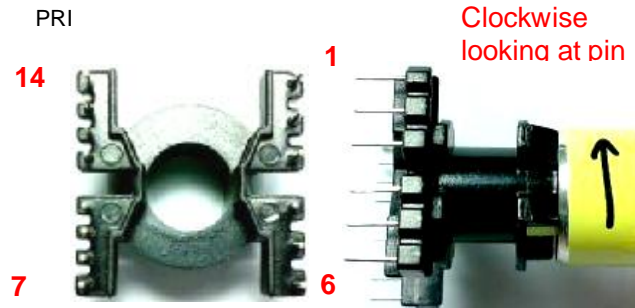
1. Primary Inductance ( $L_p$ ) = 490uH @ 10KHz
2. Primary Leakage Inductance ( $L_k$ ) ≤ 40uH @ 10KHz

### MATERIALS:

1. Core : PQ2020(Ferrite Material TDK PC40 or equivalent)
2. Bobbin : PQ2020
3. Magnet Wires : Type 2-UEW
4. Layer Insulation Tape :3M1298 or equivalent.

### FINISHED :

1. Cut remained of Pin3,4, 7,8,9,13,14after wires termination
2. Varnish the complete assembly
3. Core is connected to primary pin5



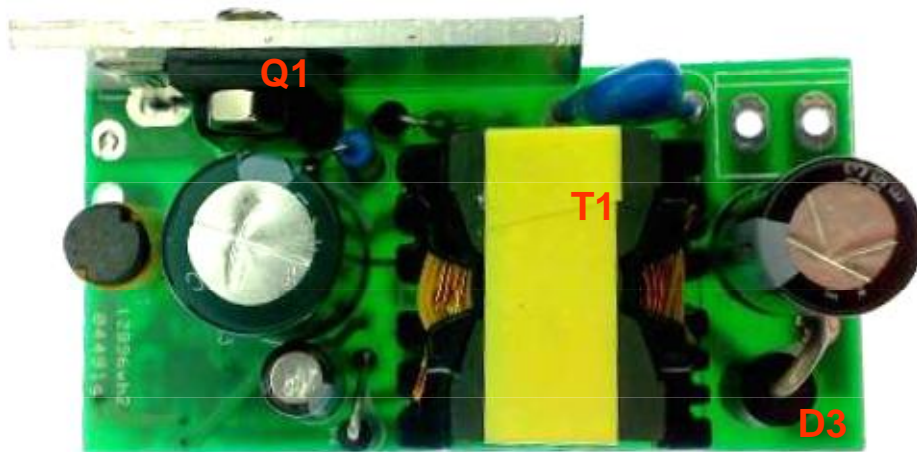
## 5. Bill of Material

Item	Qty.	Ref.	Description	U/P	U/P
1	1	C1	22uF,450V,E-CAP,105°C		
2	1	C2	1.5nF,250V,SMD-1206		
3	1	C3	270pF,50V,NPO,SMD-0603		
4	1	C4	68pF,50V,SMD-0603		
5	1	C5	390pF,50V,NPO,SMD-0603		
6	1	C6	100nF,50V,SMD-1206		
7	1	C7	4.7uF,50V,E-CAP,105°C		
8	1	C8	47uF,100V,E-CAP,105°C		
9	1	D1	FR107,DO-41		
10	1	D2	1N4148		
11	1	D3	FR102,DO-41		
12	1	D4	HER207		
13	1	Z1	Zener diode 15V		
14	1	L1	Common chock 0.3*2*12T 56uH		
15	1	Q1	5N60,TO-220		
16	1	Q2	BC807 SMD		
17	1	R7	FR 1 $\Omega$ ,1%,1/2W,		
18	2	R1,R2	560K $\Omega$ +/-5%,SMD-1206		
19	1	R3	200K $\Omega$ +/-5%,SMD-1206		
20	1	R5	100K $\Omega$ +/-1%,SMD-0603		
21	1	R6	1.3K $\Omega$ +/-5%,SMD-0805		
22	1	R8	1.5 $\Omega$ +/-5%,SMD-1206		
23	1	R9	5.6K $\Omega$ +/-1%,SMD-1206		
24	1	R10	3.6K $\Omega$ +/-1%,SMD-0603		
25	1	R11	51K $\Omega$ +/-1%,SMD-0603		
26	1	R12	24K $\Omega$ +/-1%,SMD-0805		
27	1	R13	10 $\Omega$ +/-1%,SMD-1206		
28	1	T1	PQ2020 Transformer		
29	1	CY1	1nF 250V Y-cap		
30	1	U1	Iw3620,Off-line digital PWM controller,SOT-8		
31	1	KPB			

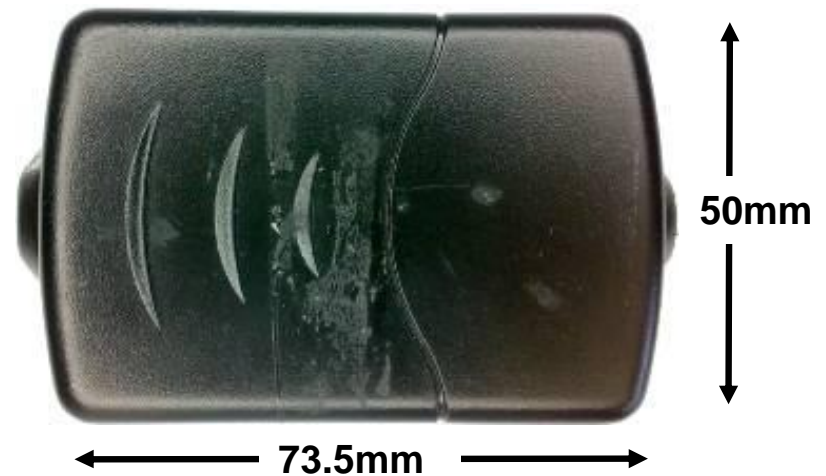
# 6. Temperature Rise Test

Circuit code	Vin 180Vac		Vin 280Vac	
	Temperature	Temperature rise	Temperature	Temperature rise
Coil of Transformer(T1 PQ2020)	72.4	44.5	81.8	53.9
Core of Transformer(T1 PQ2020)	71.7	43.8	81.1	53.2
Power controller IC iW3620 (IC1)	63.8	35.9	70.8	42.9
Secondary diode (D3 HER307)	72.8	44.9	80.6	52.7
Mosfet(Q1 8N60C)	67	39.7	78.9	51
Ambient temperature	27.9 ° C		27.9 ° C	

\* Put the driver in plastic housing and measure the temperature

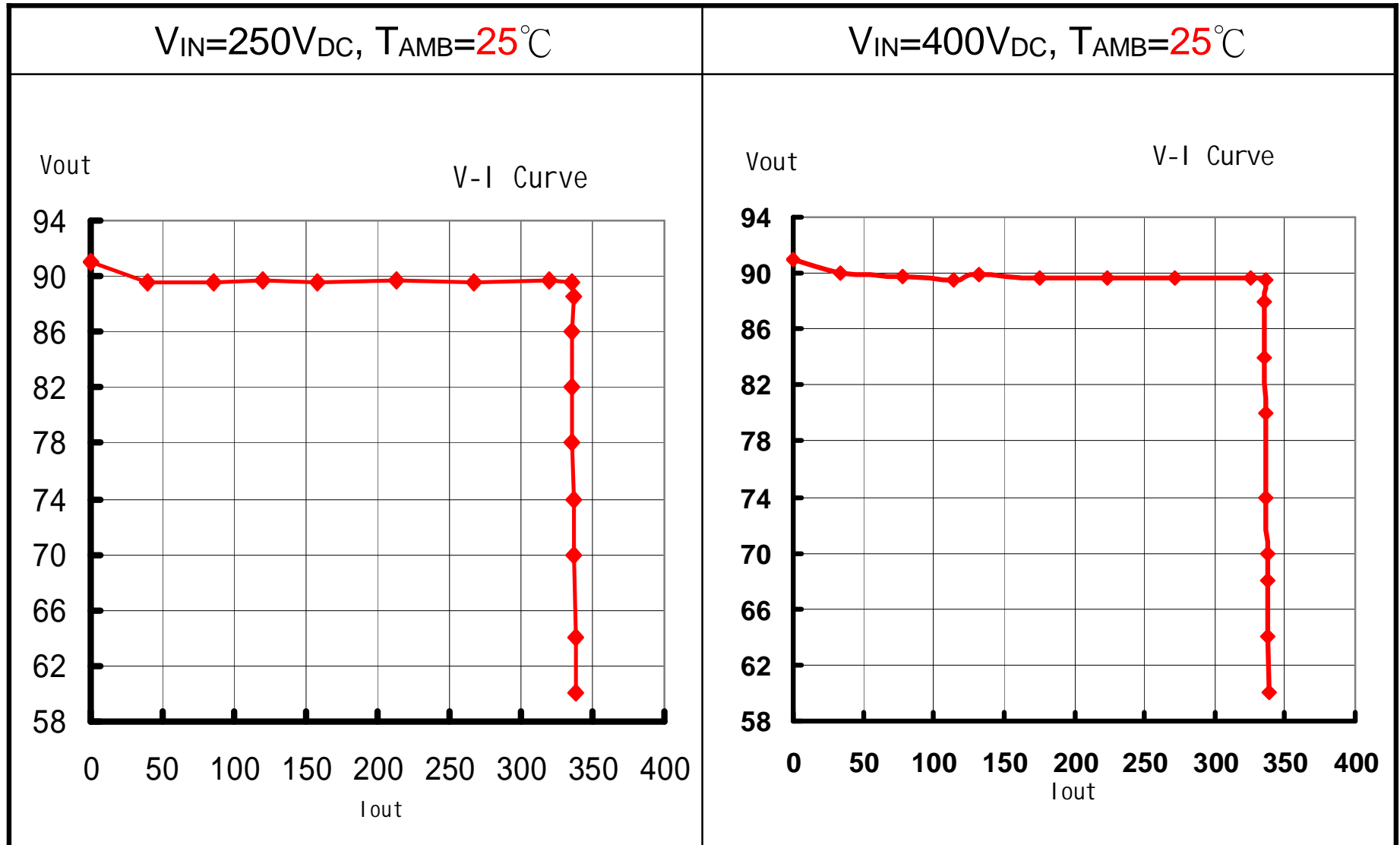


The Closed Case for the test (73.5mm\*50mm\*27mm)



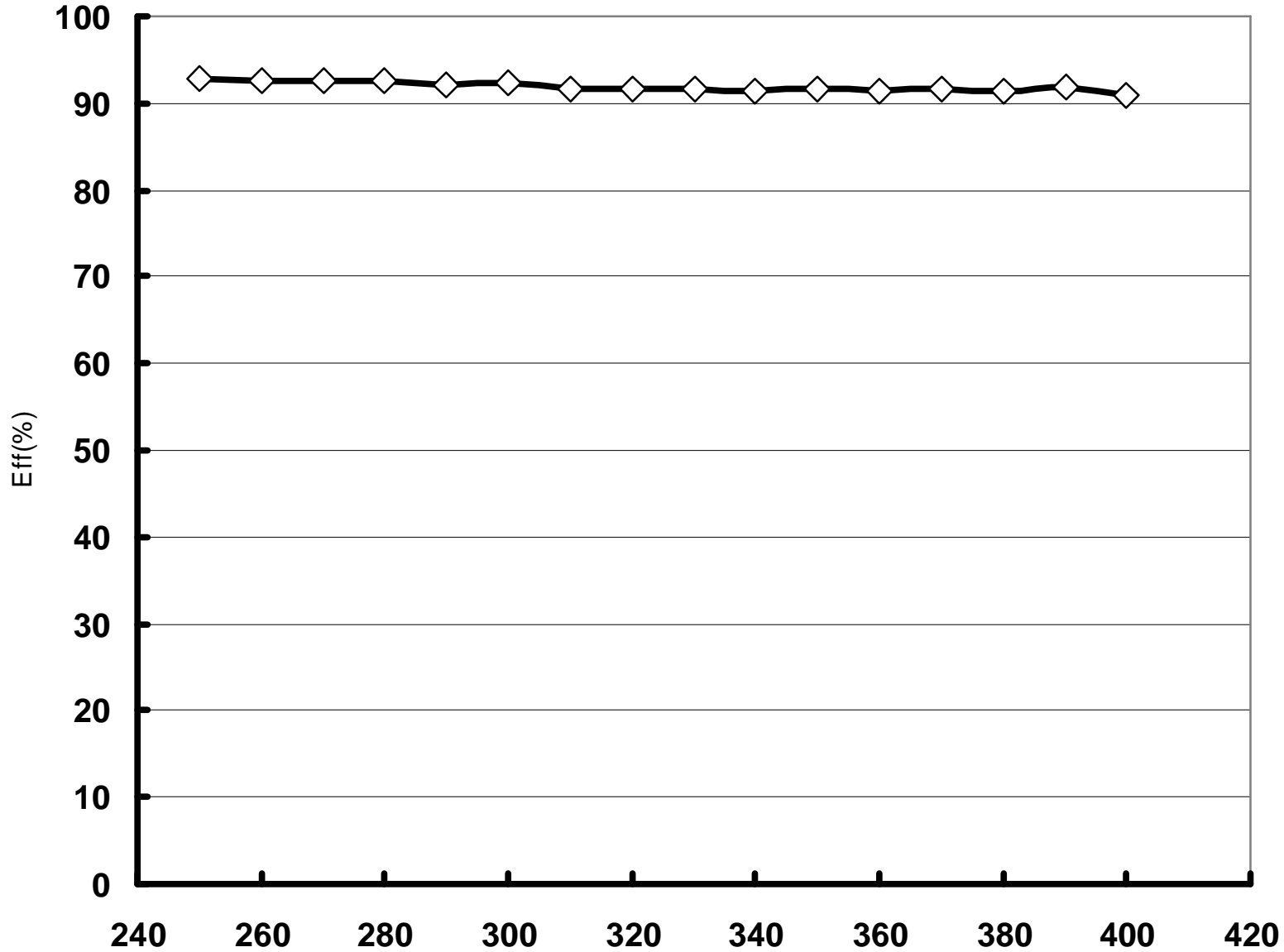
# 7. V-I Curve

\* Note: Output voltage measured at PCB end,  $T_{AMB}=25\text{ }^{\circ}\text{C}$



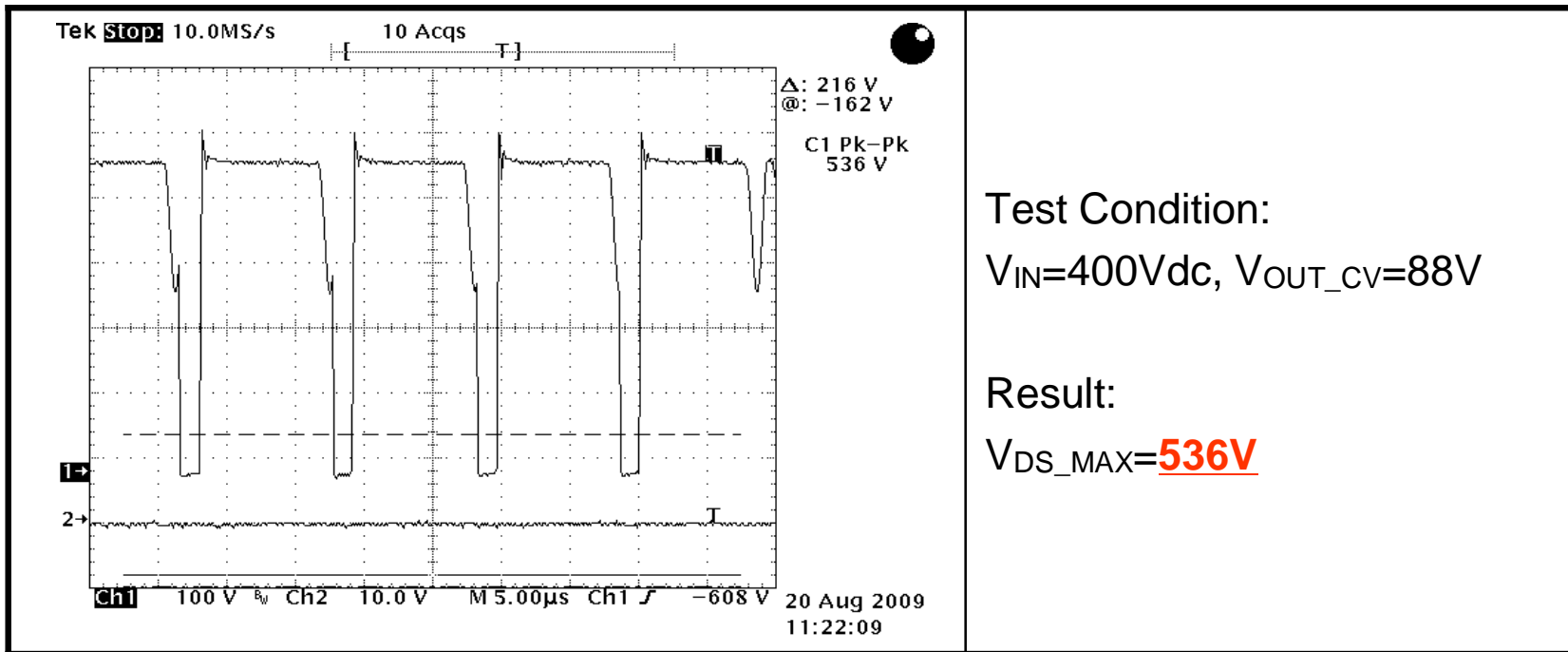


## 8. Efficiency Measurement



\* Note: Output voltage measured at end of PCB.

## 9. $V_{DS}$ waveform



Remark: Mosfet Spec\_\_5A 600V