

# LED Driver Design with iW1692

## Summary and Features :

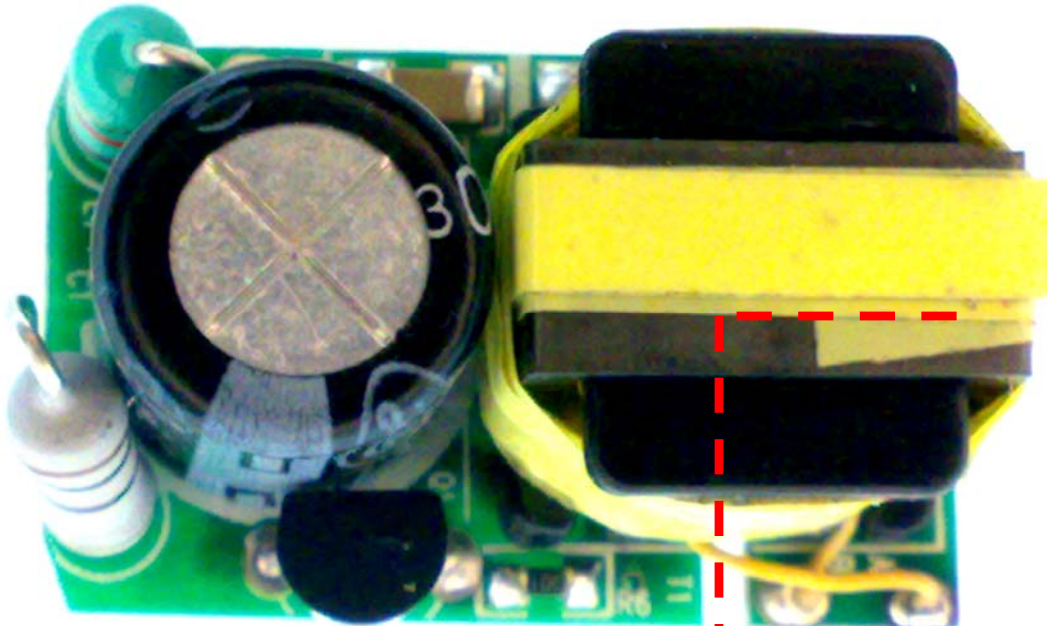
1. LED driver, 5V, CC@0.35A ; Wide AC input range @90Vac- 264Vac
- 2 For Isolated or Non-isolated Applications
3. High Efficiency and Minimum Parts count
4. Meet EMI EN55015B-QP & AV limits
5. Fully protected against AC input UV, OV, O/P Short/Open, meet single point failure test.

# 1. Specification

Description		Symbol	Min	Typ	Max	Units	Comment	
Input								
Voltage		$V_{IN}$	90		264	V <sub>AC</sub>	2 Wire	
Frequency		$f_{LINE}$	47	50/60	63	Hz		
Open-load Input Power (264V <sub>AC</sub> )						W		
Output								
Const Voltage	Output Voltage	$V_{OUT\_CV}$		5		V	Measured at the PCB connector	
	Output Current	$I_{OUT\_CV}$		0.35		A		
Const Current	Output Voltage	$V_{OUT\_CV}$		5		V	Min Vout is depend on Vcc	
	Output Current	$I_{OUT\_CV}$		0.35		A		
Total Output Power								
Continuous Output Power		$P_{OUT}$		1		W		
Over Current Protection		$I_{OUT\_MAX}$			0.4	A	Auto-restart	
Efficiency		$\eta$	65			%	Measured at end of PCB, (T <sub>A</sub> = 25 °C)	
Environmental								
Conducted EMI			Meets EN55015B					
Safety								
Operation Temperature		$T_{opr}$			50	° C	Free convection, sea level	



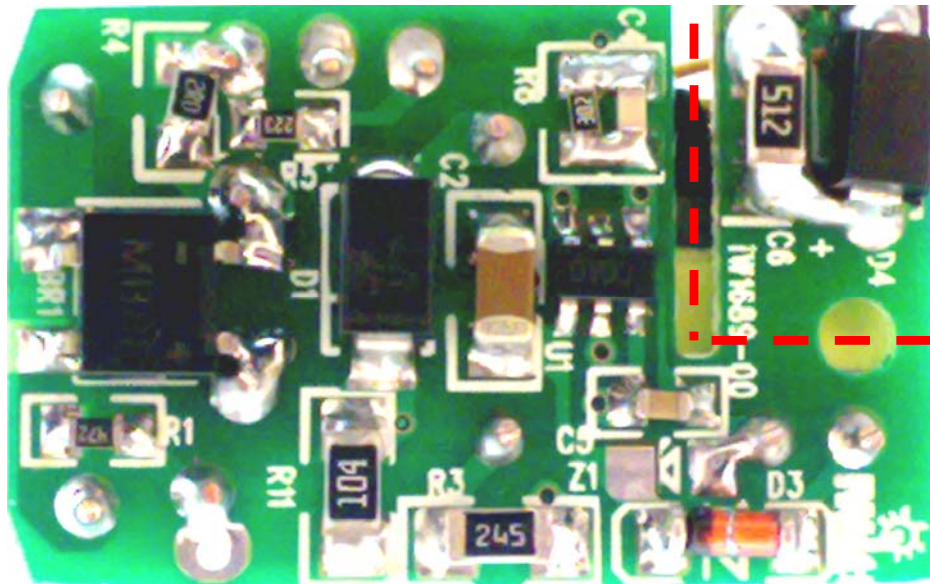
### 3.Circuit Board Photograph



Primary

Secondary

Top side



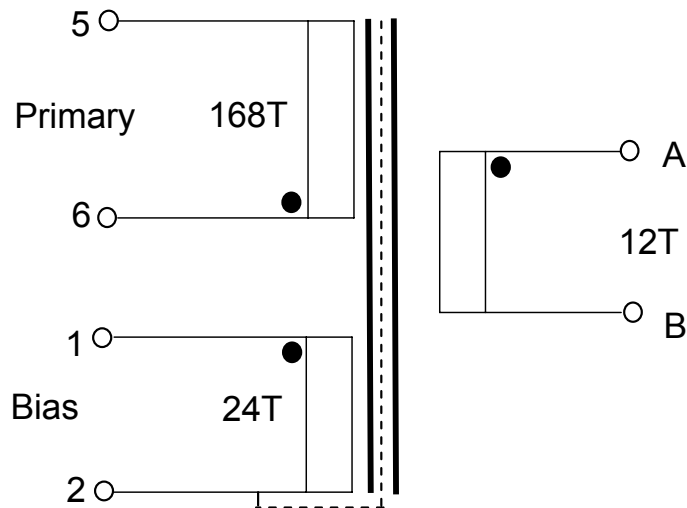
Secondary

Primary

Bottom side

# 4. Transformer Design

## SCHEMATIC



## ELECTRICAL SPECIFICATIONS:

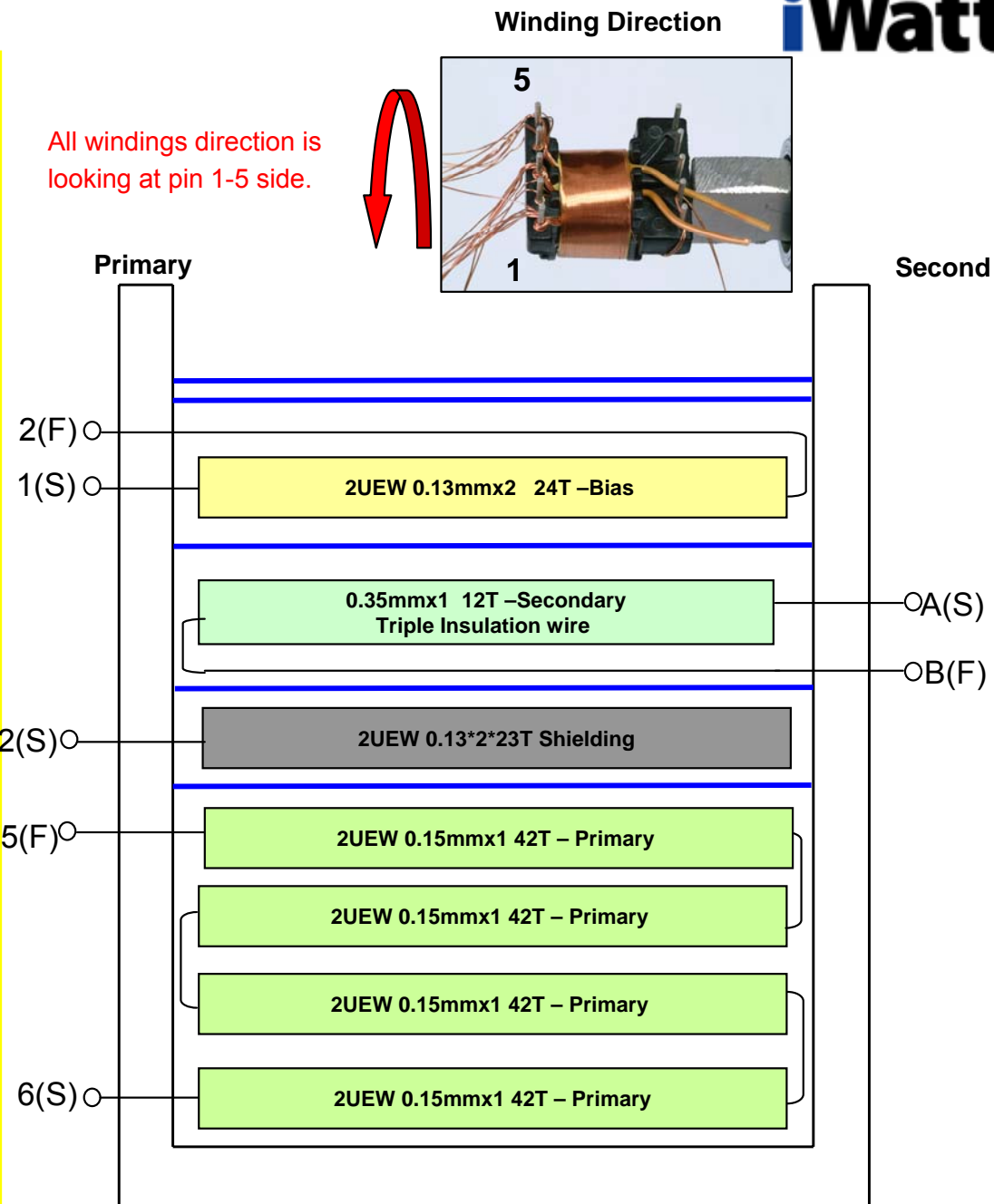
1. Primary Inductance ( $L_p$ ) = 4.3mH @10KHz
2. Primary Leakage Inductance ( $L_k$ )  $\leq$  50uH@10KHz

## MATERIALS:

1. Core : EE13 (Ferrite Material TDK PC40 or equivalent)
2. Bobbin : EE13Vertical
3. Magnet Wires : Type 2-UEW
4. Layer Insulation Tape : 3M1298 or equivalent.

## FINISHED :

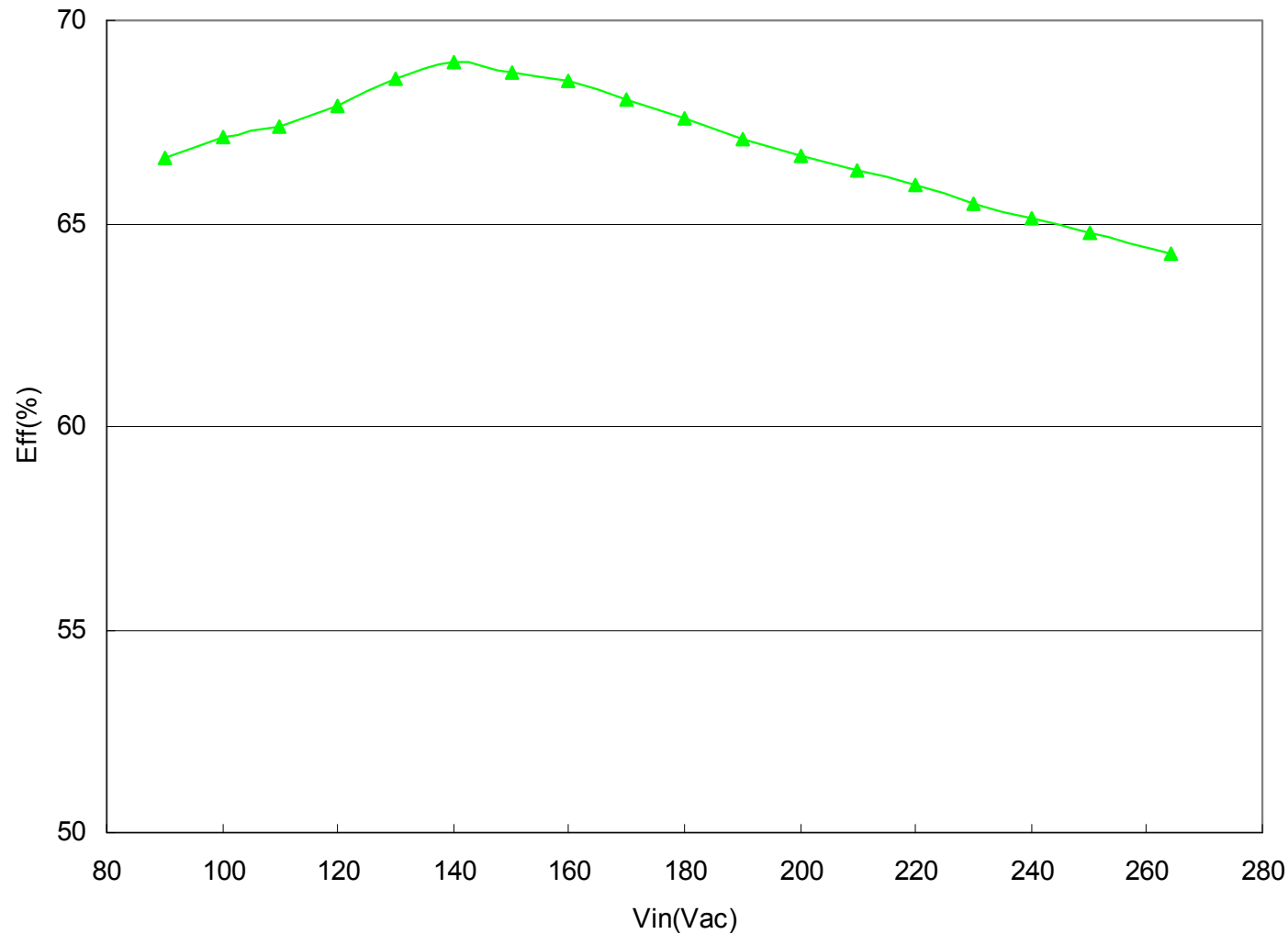
1. Cut remained of Pin3,4,7,8,9,10 after wires termination
2. Varnish the complete assembly
3. Core is connected to Pin 2( Primary Ground)



# 5. Bill of Material

Item	Qty.	Ref.	Description	Cost (US Cent) / unit	Sub-Total (Cent)
1	1	U1	iW1692, Off-line digital PWM Controller, SOT-6		
2	1	C5	470pF, 50V, NPO, SMD-0603		
3	1	C4	68pF, 50V, NPO, SMD-0603		
4	1	R1	4.7K $\Omega$ $\pm$ 5%, SMD-0603		
5	2	R2,R3	2.4M $\Omega$ , $\pm$ 5%, SMD-1206		
6	1	R4	4.3 $\Omega$ $\pm$ 5%, SMD-0805		
7	1	R7	22K $\Omega$ $\pm$ 5%, SMD-0805		
8	1	R6	300 $\Omega$ $\pm$ 5%, SMD-0805		
9	1	R9	3K $\Omega$ $\pm$ 5%, SMD-1206		
10	1	R8	3.6K $\Omega$ , $\pm$ 5%,SMD-0603		
11	1	R11	100K $\Omega$ $\pm$ 5%, SMD-1206		
12	1	R5	22K $\Omega$ $\pm$ 5%, SMD-0603		
13	1	C8	1nF, 1KV, Ceramic Capacitor,SMD-1206		
14	1	C2	4.7uF/25V, SMD-1206		
15	1	C1	3.3uF, 400V, E-CAP, 105'C		
16	1	C6	10uF, 16V,SMD-1206		
17	1	BR1	MB8S		
18	1	D3	1N4148 0.1A/100V, LL-34		
19	1	F1	10R,1W, FUSE Resistor		
20	1	L1	4.7mH, 0410		
21	1	Q1	01N60, TO-92		
22	1	D4	SS16,SMD		
23	1	D1	1N4007, SMD		
24	1	T1	EE13, Transformer		

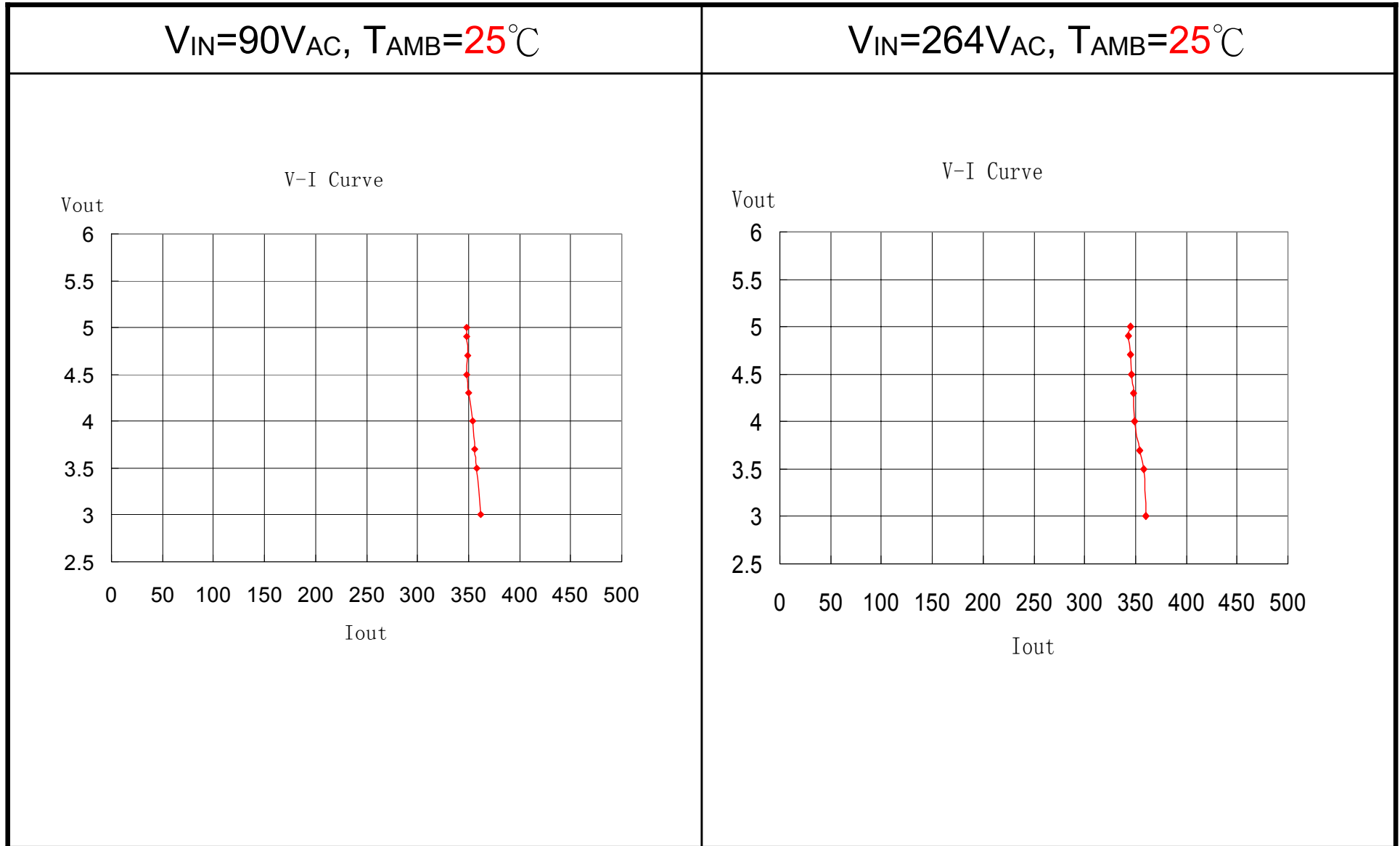
## 6. Efficiency Measurement



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

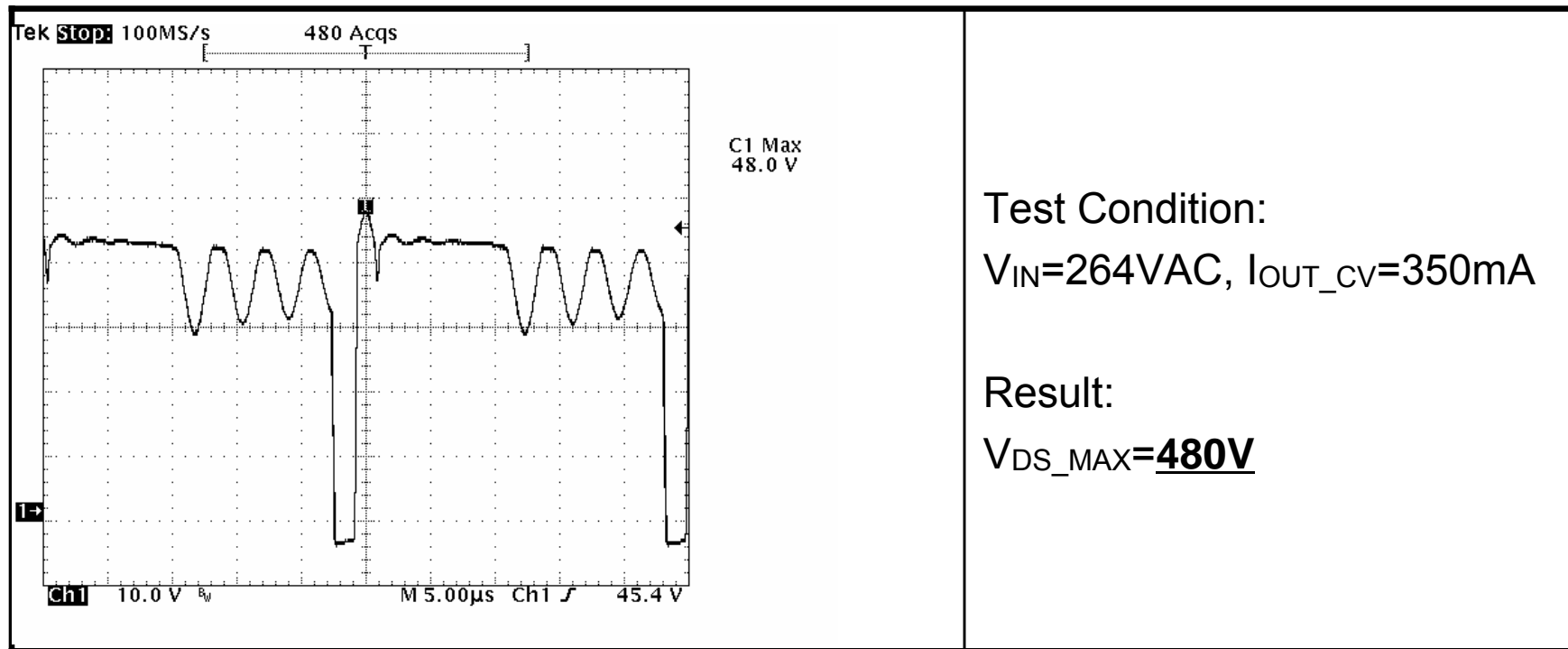
# 7. Output VI Characteristics

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



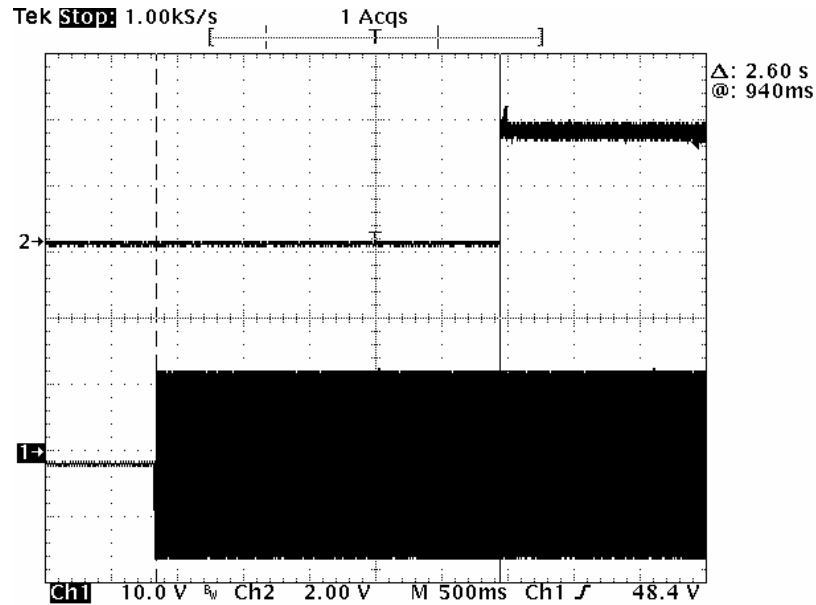


## 8. $V_{DS}$ waveform



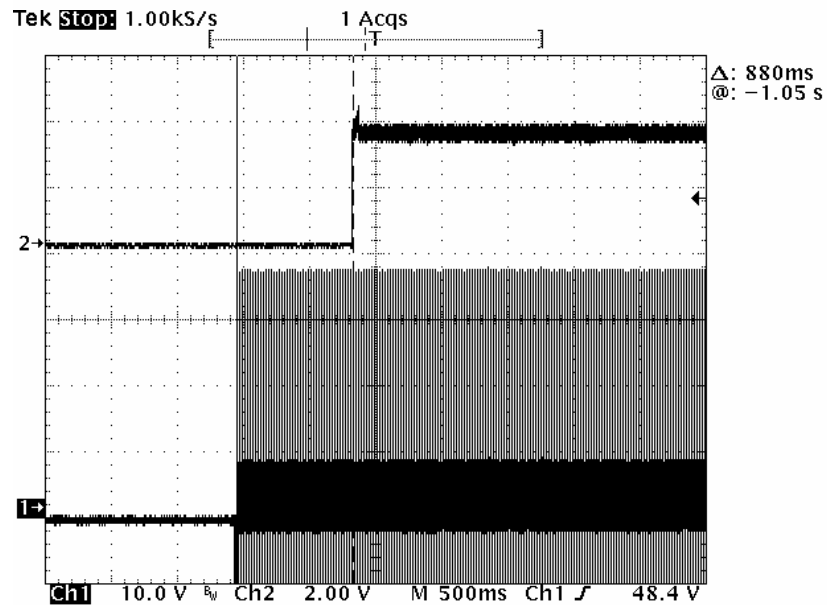
Remark: Mosfet Spec\_\_1A 600V

# 9. Start Up & Turn On Delay Time



100V<sub>AC</sub>, Full Load

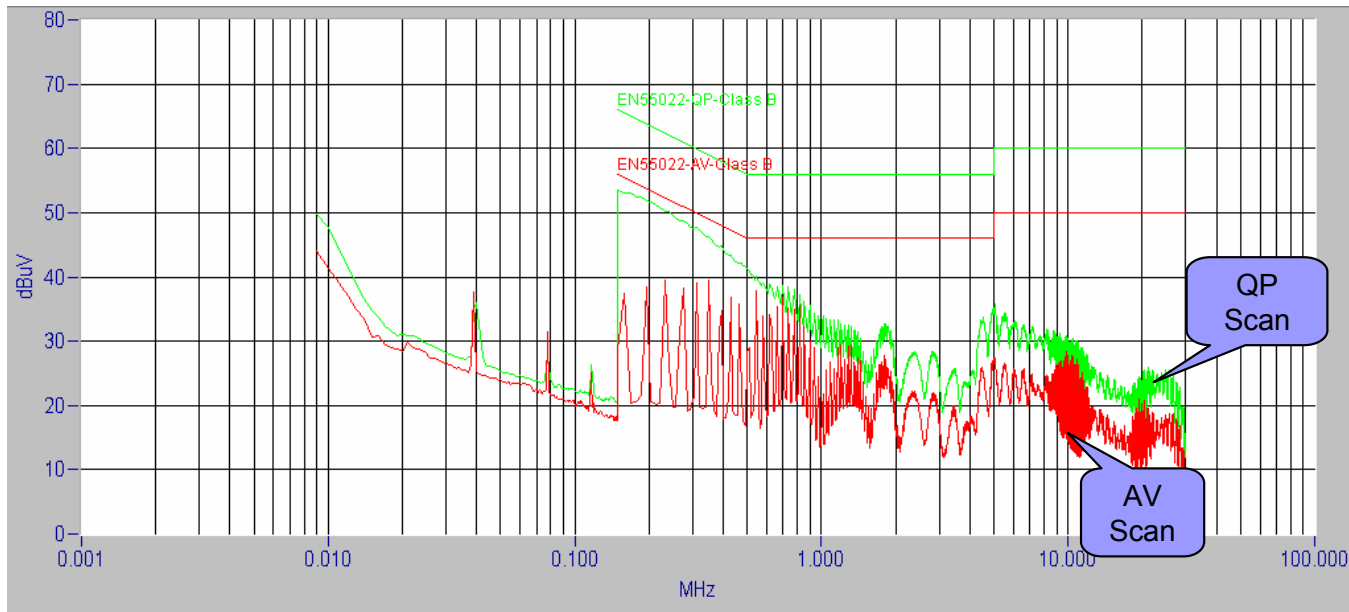
$T_{ST\_DELAY} = 2.6S$



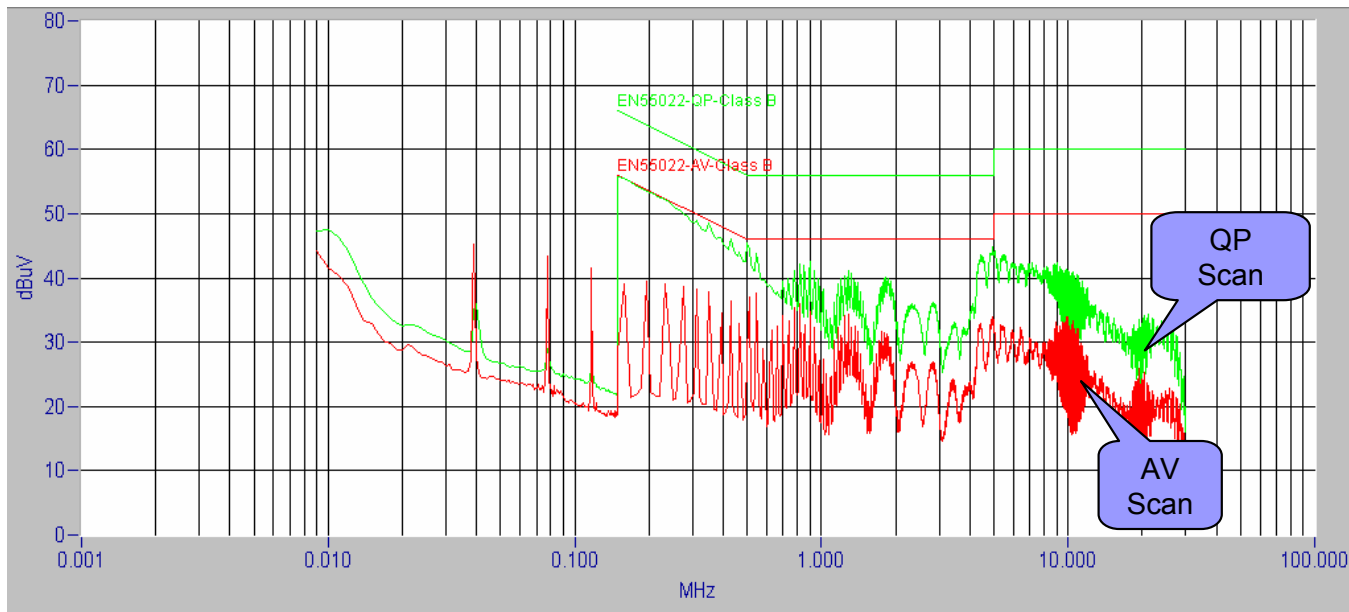
264V<sub>AC</sub>, Full Load

$T_{ST\_DELAY} = 880mS$

# 10. Conducted EMI ( Input 230Vac Full Load )



Live Scan



Neutral Scan