



LED Driver Design with iW1692

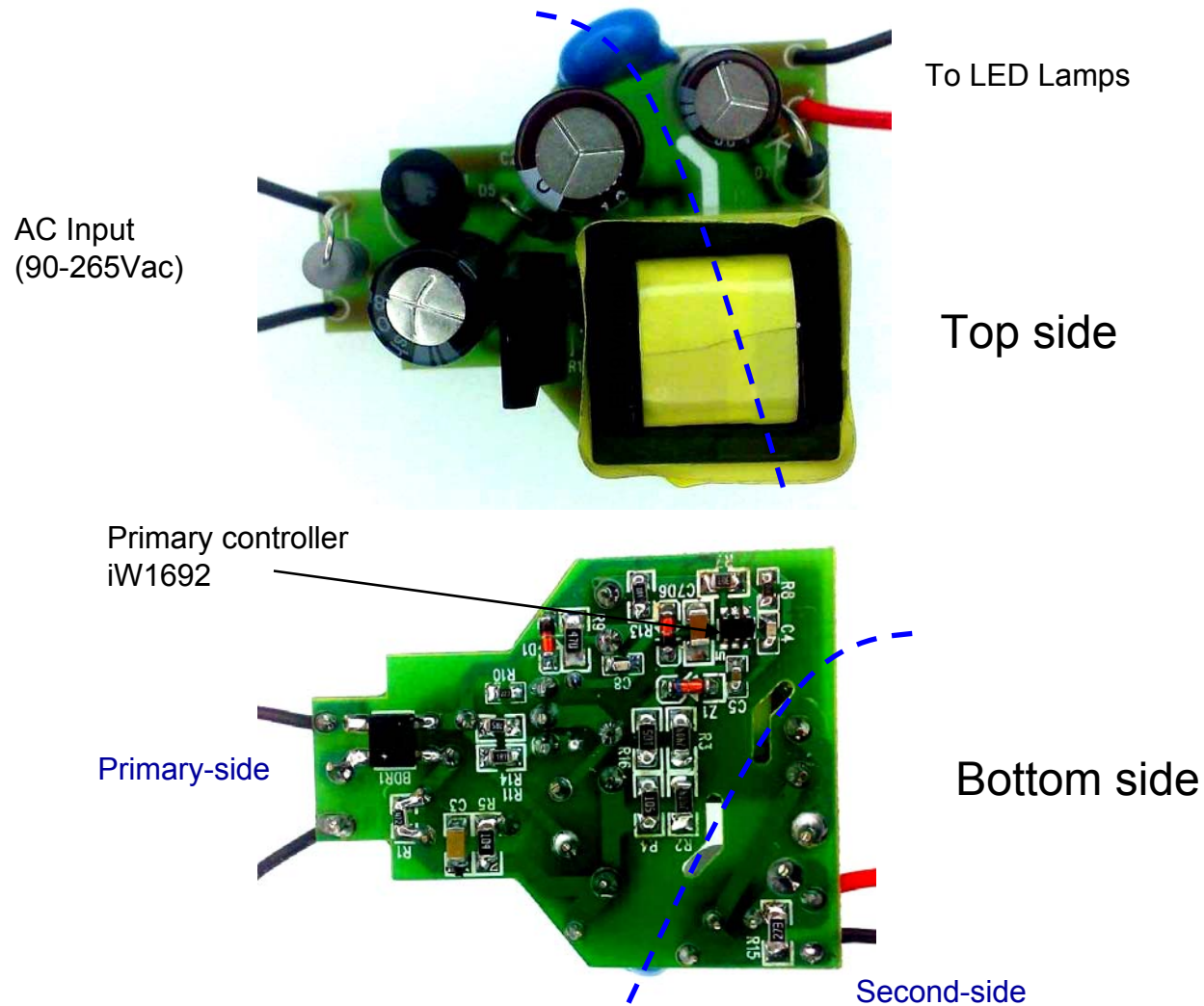
Summary and Features :

1. **8W LED driver, 29V, 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 _{AC}	2 Wire
Frequency		f_{LINE}	47	50/60	63	Hz	
Open-load Input Power (264V _{AC})						W	
Output							
Const Voltage	Output Voltage	V_{OUT_CV}		29		V	Measured at the PCB connector
	Output Current	I_{OUT_CV}		0.35		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}				W	
Over Current Protection		I_{OUT_MAX}			0.4	A	Auto-restart
Efficiency		η	84			%	Measured at end of PCB, (T _A = 25 °C)
Environmental							
Conducted EMI			Meets EN55015B				
Safety							
Operation Temperature		T_{opr}			50	° C	Free convection, sea level

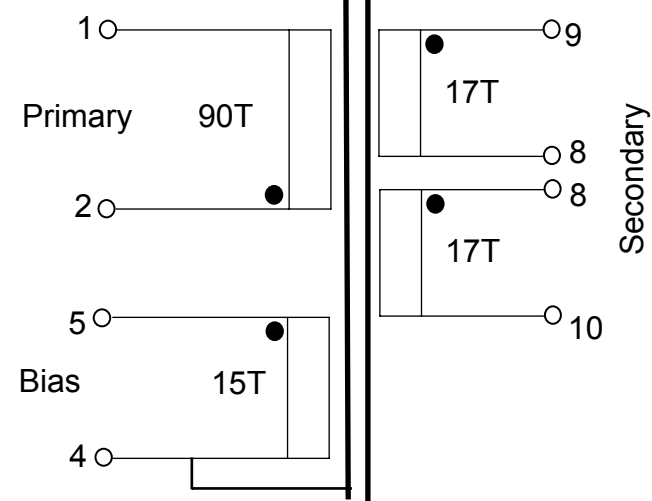
3. Circuit Board Photograph





Transformer Design

SCHMATIC



ELECTRICAL SPECIFICATIONS:

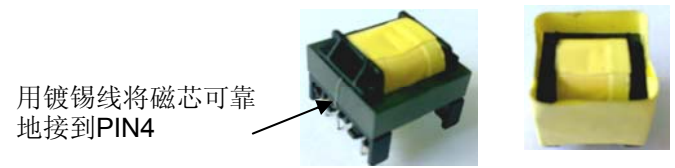
1. Primary Inductance (L_p) = 1.0mH @10KHz
2. Primary Leakage Inductance (L_k) \leq 30uH@10KHz

MATERIALS:

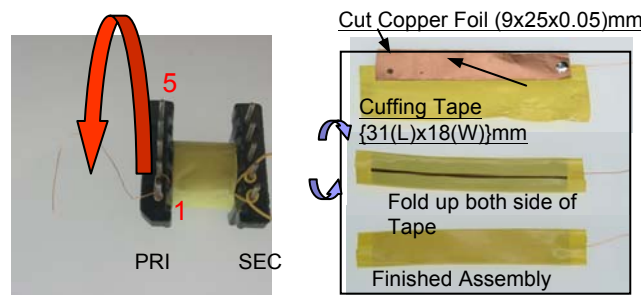
1. Core : EE20 (Ferrite Material TDK PC40 or equivalent)
2. Bobbin : EE20 horizontal
3. Magnet Wires : Type 2-UEW
4. Layer Insulation Tape : 3M1298 or equivalent.

FINISHED :

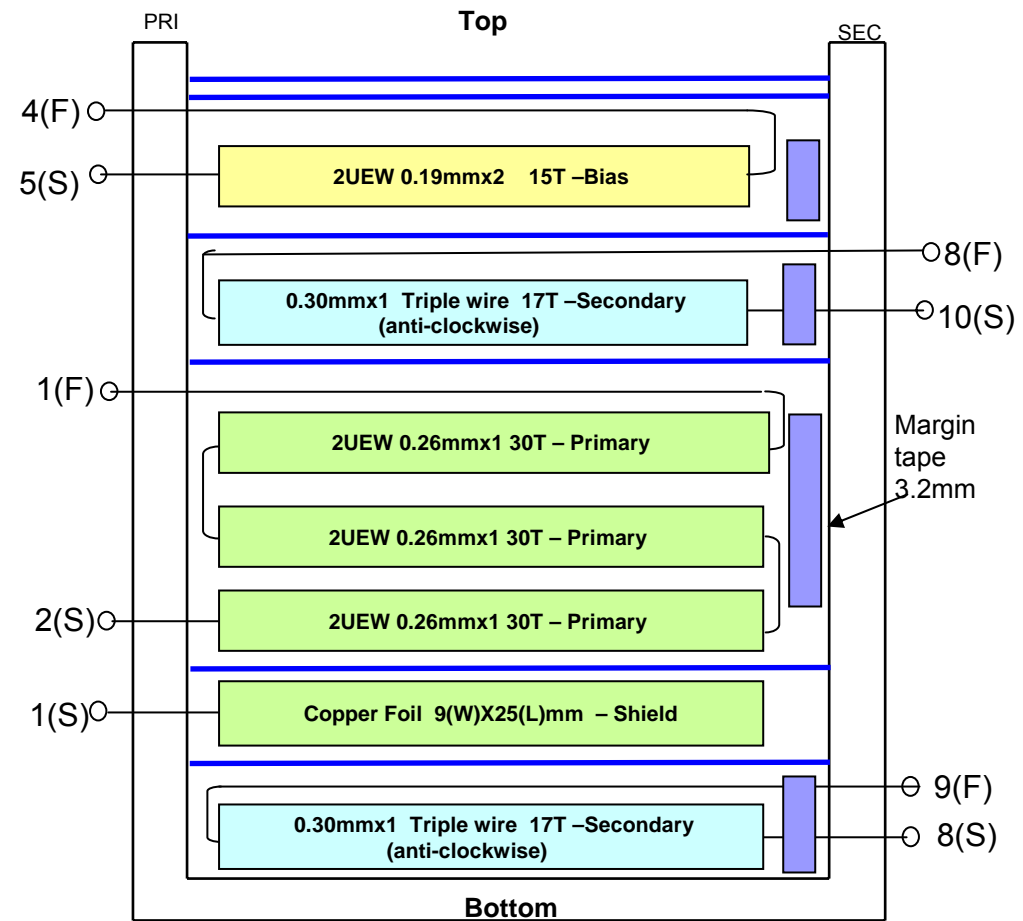
1. Cut remained of Pin3-7 after wires termination
2. Core is connected to pin4 (primary ground)



Clockwise looking at pin 1-5 side



Small solder joint with fine wire

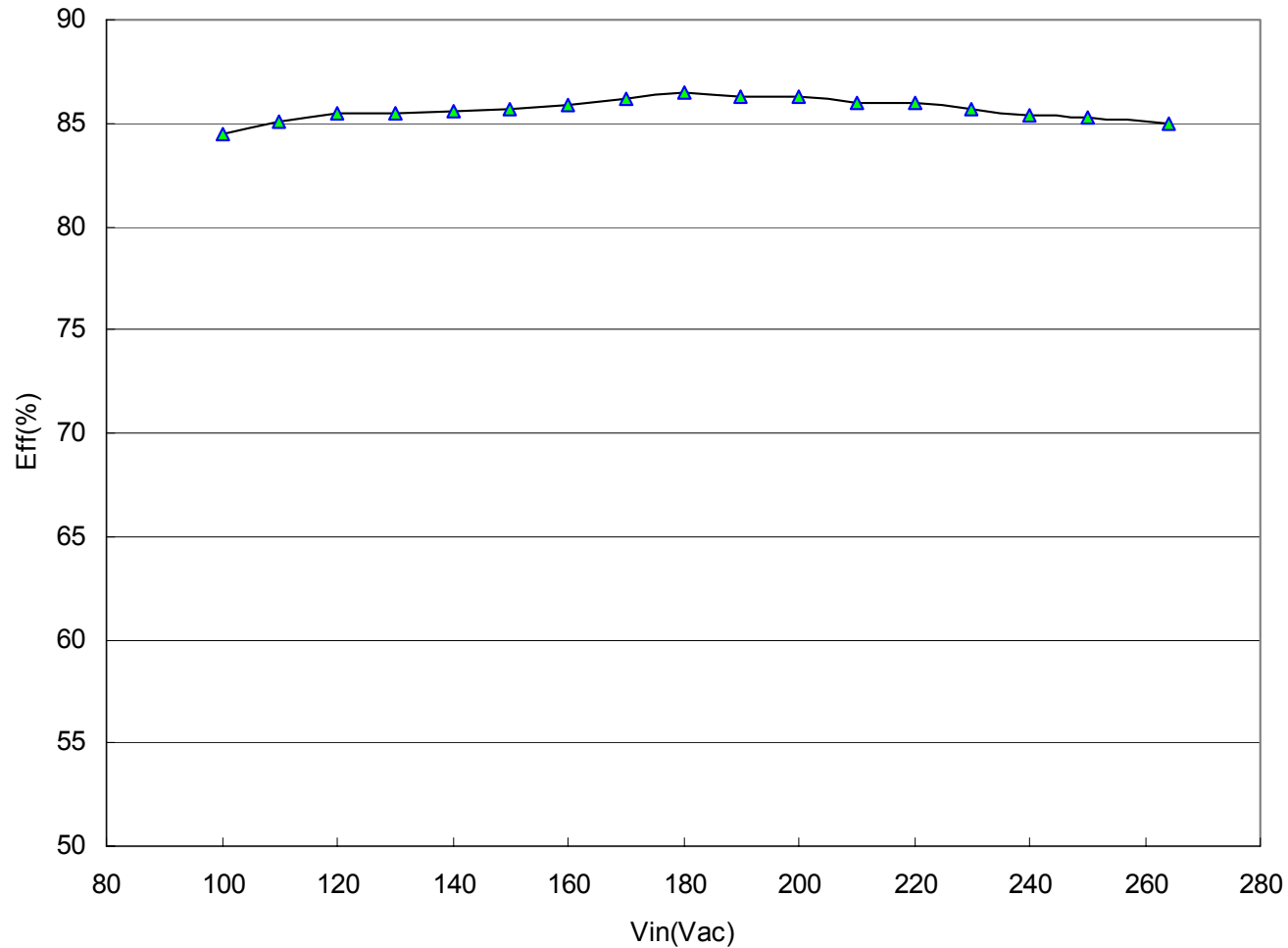


5. Bill of Material

Item	Qty.	Ref.	Description	Cost (US Cent) / unit	Sub-Total (Cent)
1	1	U1	iW1692, Off-line digital PWM Controller, SOT-6		
2	1	C1	6.8uF, 400V, E-CAP, 105°C		
3	1	C2	10uF, 400V, E-CAP, 105°C		
4	1	C3	2.2nF, 1KV, Ceramic Capacitor, SMD-1206		
5	1	C4	68pF, 50V, NPO, SMD-0603		
6	1	C5	470pF, 50V, NPO, SMD-0805		
7	1	C6	0.1uF, 50V, NPO, SMD-0603		
8	1	C7	4.7uF, 50V, E-CAP, Low ESR		
9	1	C8	150pF, 50V, SMD-0805		
10	1	C10	100uF, 35V, Low ESR E-CAP,		
11	1	R1	4.7kΩ ±5 %, SMD-0805		
12	2	R2,R3	2.4MΩ, ±1 %, SMD-1206		
13	2	R4,R16	1MΩ, ±5 %, SMD-1206		
14	1	R5	100kΩ, ±5 %, SMD-1206		
16	1	R7	30kΩ, ±5 %, SMD-0805		
17	1	R8	3.9kΩ, ±5 %, SMD-0603		
18	1	R9	47Ω ±5 %, SMD-0805		
19	1	R10	22kΩ, ±5 %, SMD-0805		
20	1	R11	1.1Ω ±1 %, SMD-0805		
21	1	R12	1.5kΩ ±5 %, 1/8W		
22	1	R13	10Ω ±5 %, SMD-0805		
23	1	R14	7.5Ω ±5 %, SMD-0805		
24	1	R15	27k ±5 %, SMD-0805		
27	2	D1,D6	1N4148 0.1A/100V, LL-34		
26	1	D5	FR107, Rectifier Diode, DO-41		
25	1	D7	HER204, Rectifier Diode,		
28	1	BR1	Rectifier Bridge MB8S		
29	1	FR1	10R 1W Fusible resistor		
30	1	L1	600uH, Filter Inductor, 6x8mm		
31	1	Q1	4N60, TO-220		
32	1	Z1	15V, 0.5W		
33	1	CY1	470pF, Y1		
34	1	T1	EE20 Transformer		
			Total BOM (Based on 100K/M volume)		



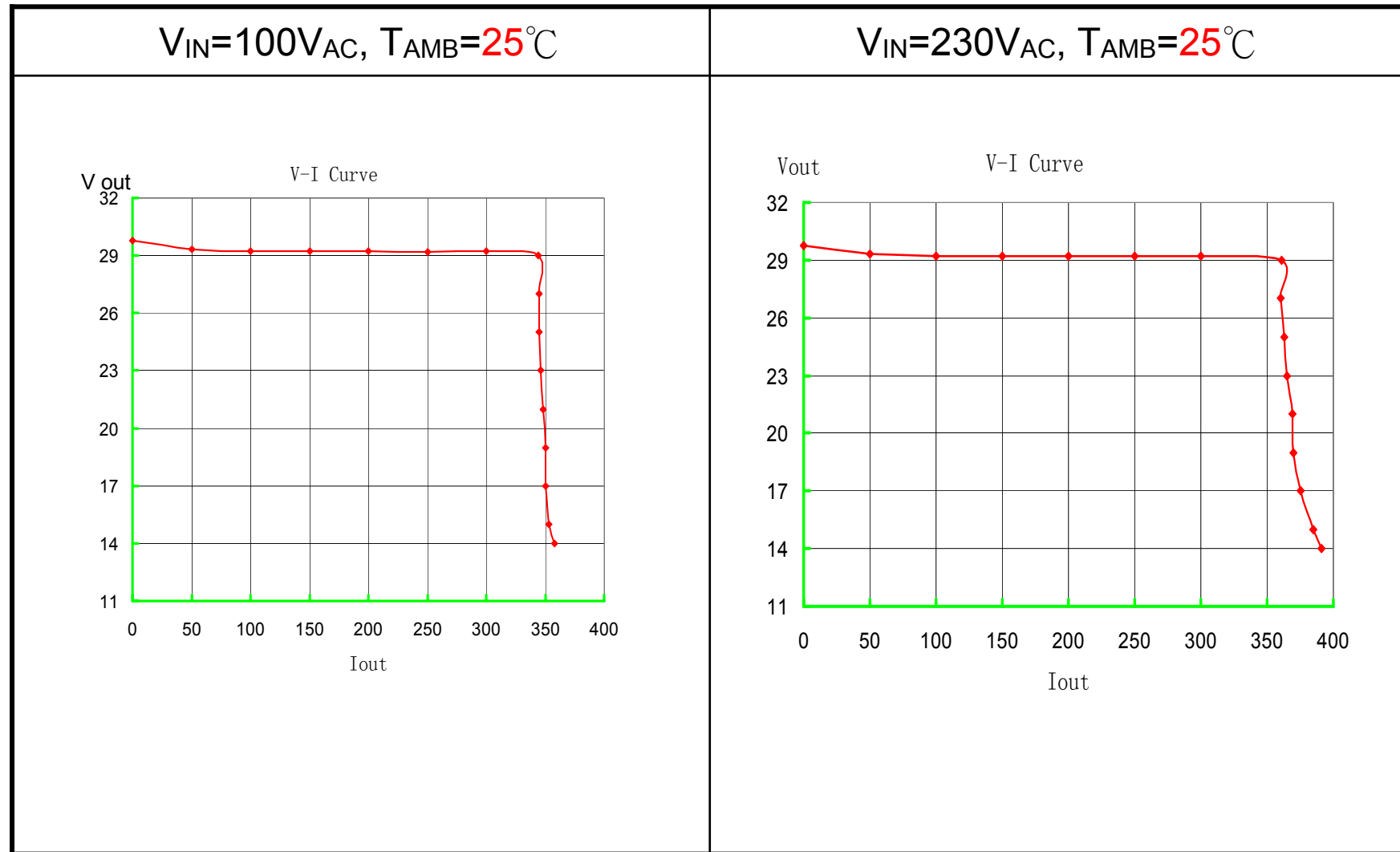
7. Efficiency Measurement



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

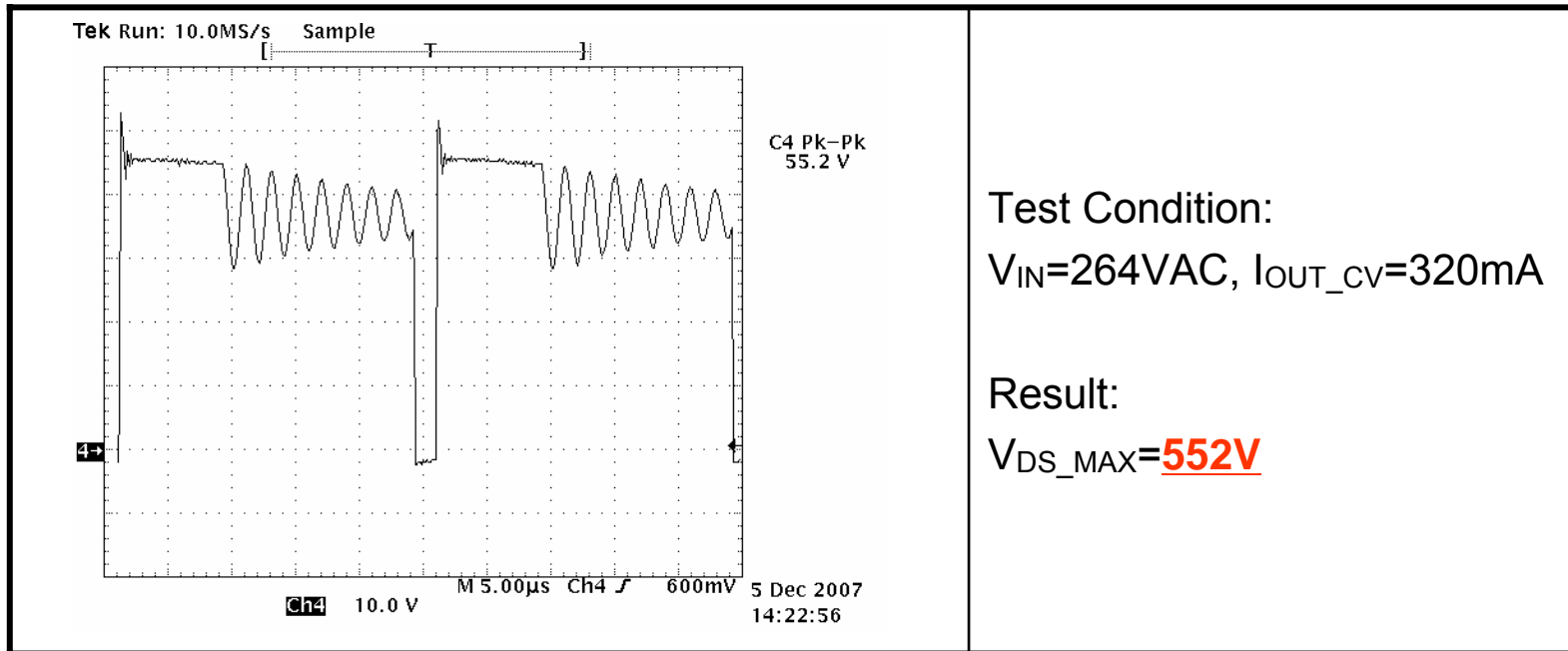
7. Output VI Characteristics

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

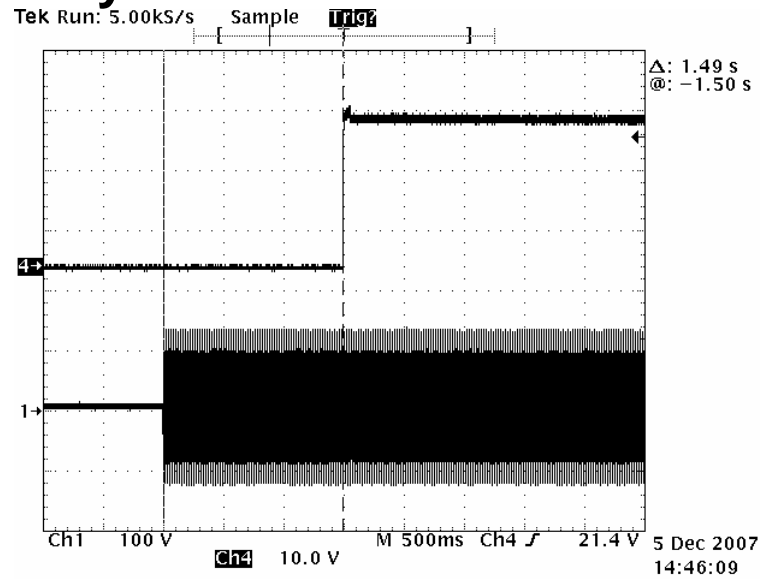




9. V_{DS} waveform

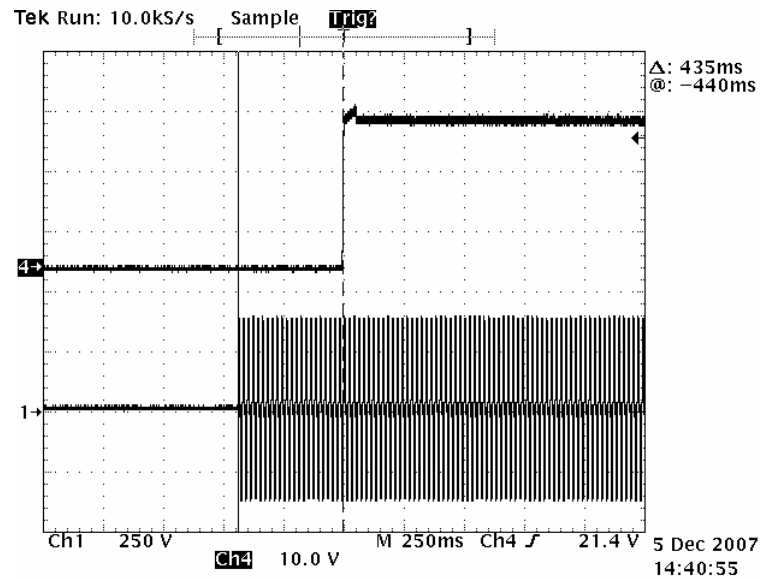


10. Turn On Delay Time



90V_{AC}, Full Load

$T_{ST_DELAY} = 1.49\text{S}$



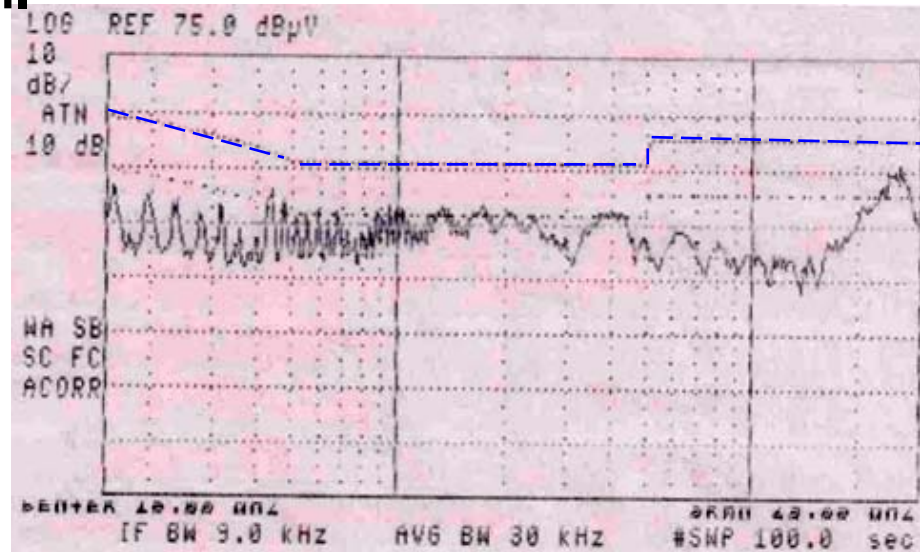
264V_{AC}, Full Load

$T_{ST_DELAY} = 435\text{mS}$

9. Conducted EMI

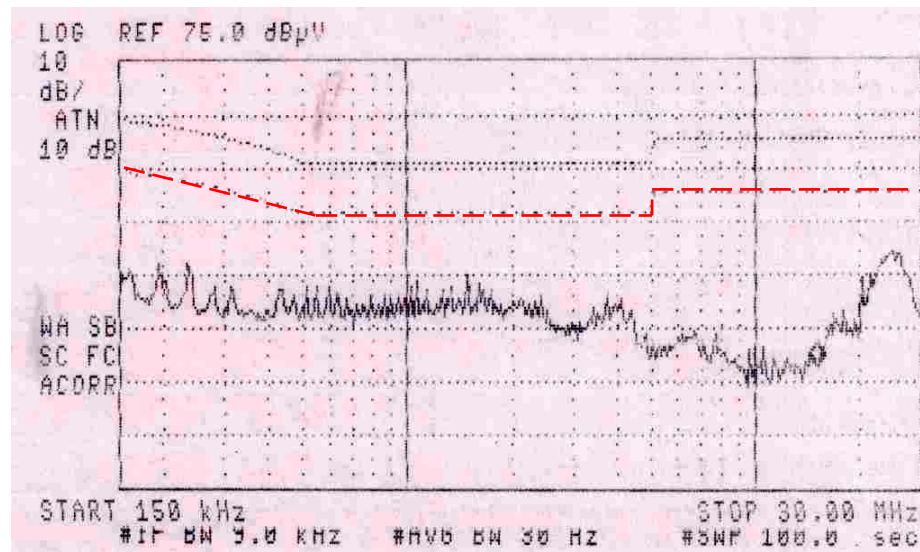
230V_{AC}/50Hz
Live

PKScan



Peak Scan
QP Limit line

AVScan



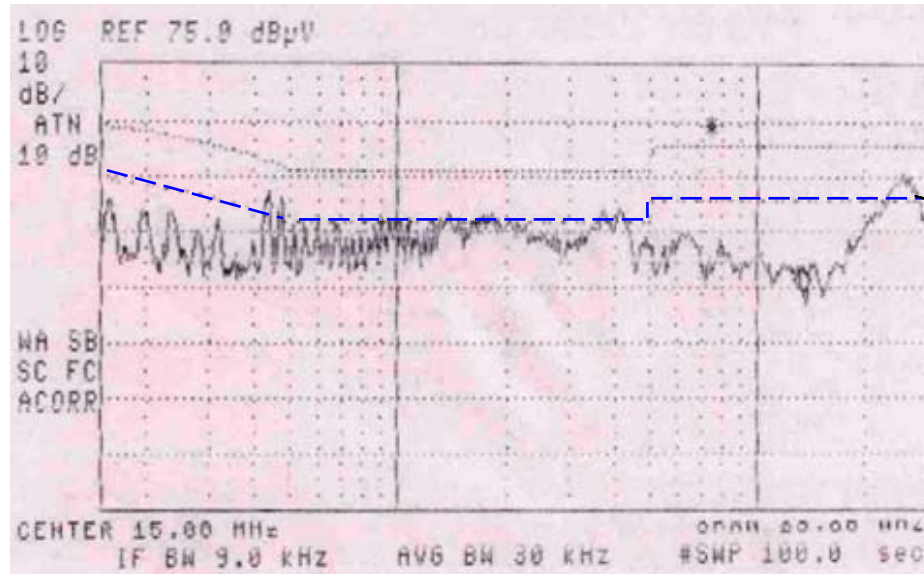
AVScan
Limit line

Test Conditions : LED Full load. Output Ungrounded.



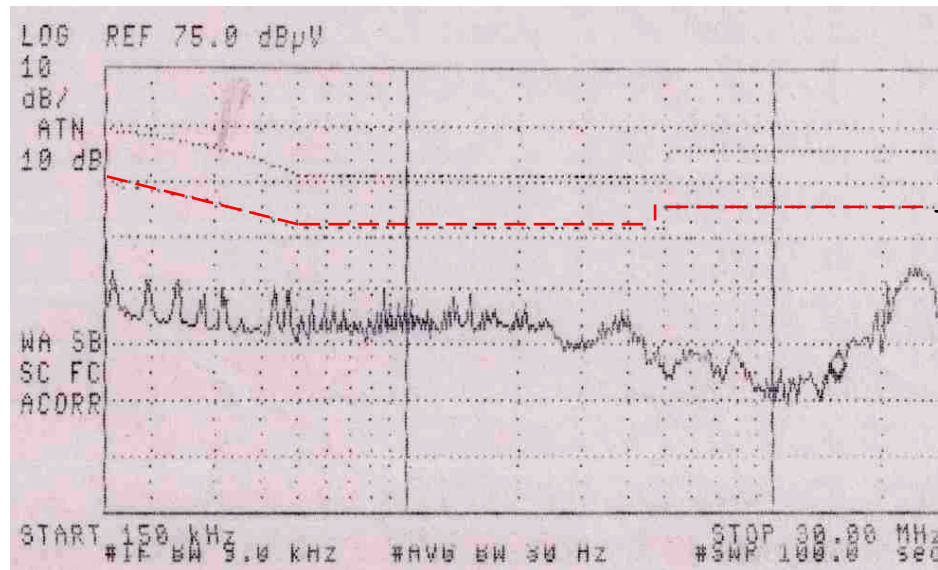
230V_{AC}/50Hz
Neutral

PKScan



Peak Scan
QP Limit line

AVScan



AVScan
Limit line

Test Conditions : LED Full load. Output Ungrounded.