

Demo Board Test Report for LD7792SGS

150 W LED Constant Current Power
(100V~50V / 1.45 A)

Tested by	Reviewed by	Approved by
Brad_Hsu	Neo_Cheng	Will_Su

Total Pages	Revision	Date
26	01	2018/08/06

Contents Index

I. DESIGN CHECK LIST.....	3
II. EXECUTIVE SUMMARY	4
1. INPUT VOLTAGE & FREQUENCY	4
2. OUTPUT LOAD	4
III. BASIC CHARACTERISTIC	5
3-1. EFFICIENCY & POWER FACTOR & THDI.....	5
3-2. TOTAL REGULATION OF OUTPUT CURRENT.....	7
3-3. LED CURRENT RIPPLE.....	9
3-4. START UP TIME	11
3-5. OUT OVER VOLATGE PROTECTION	12
3-6 LED SHORT PROTECTION	13
3-7. LED OPEN PROTECTION.....	14
3-8. POWER SAVING AT DIMMING OFF	15
3-9. NEGATIVE 40°C TURN-ON TEST	15
3-10. DIMMING CURVE.....	17
3-11. EMI CONDUCTION TEST.....	18
III. SCHEMATIC.....	21
IV. BOM	22
V. P.F.C. CHOKE & TRANSFORMER SPEC.....	26

I. Design Check List

No. (項目)	Test Item (測試項目)	Spec. (規格)	Page (頁)
I	Design Check List		
II	Executive Summary		
1	Input Voltage & Frequency	100~277V _{AC} /47~63Hz	4
2	Output Load	1.45A _{DC} / 100~50V _{DC}	4
3	Basic characteristic		
3-1	Efficiency & Power Factor & THDi	See content	5
3-2	Total Regulation of Output Current	$\Delta I_{LED} < \pm 5\% \times I_{LED,main}$	7
3-3	LED Current Ripple	$\Delta I_{LED,p-p} < 10\% \times I_{LED,main}$	9
3-4	Start up Time	$T_s = (T_d + T_r) < 0.8 \text{ Sec@ } 90V_{ac}$	11
3-5	Output Over Voltage Protection	When photo coupler is short circuit, No Components Damage.	12
3-6	LED Short Protection	1. $P_{IN,AVG} \leq 1W.$ 2. No Component Damage	13
3-7	LED Open Protection	1. $V_{OUT,OPEN} \leq \text{Voltage rating of } C_{OUT}$ 2. $P_{IN,OPEN} \leq 1\% \times P_{IN,MAX}$	14
3-8	Power Saving when dimming off	$P_{IN,OFF \text{ MODE}} \leq 0.5W$	14
3-9	Turn-On test check after 12Hr at Ta= -40°C	See content	15
3-10	Dimming Performance Test	See content	17
3-11	EMI Conduction Test	Over Limit $\leq -6dB$	18
III.	Schematic	See content	21
IV	BOM	See content	22
V	Magnetic Materials spec.	See content	26

II. Executive Summary

Test Equipment	
Equipment	Equipment Model No.
Electrical Load	Chroma 6312A 、63113A
Digital Power Meter	WT310
AC Power Source	Chroma 61602
Scope	Tektronix DMO3034
Current Probe	Tektronix TCP0030A

Note: All test conditions are based on ambient temperature 25℃ if haven't special highlight

1. Input Voltage & Frequency

The unit shall be capable of operating as a universal AC input power supply accepting AC inputs. The power supply shall operate between the following voltages (from 90 V to 277 V). The supply will be designed to operate for Table 1.

	Minimum	Normal		Maximum
Input Voltage (V_{AC})	90	100/120	220/240	277
Frequency (Hz)	63	60/50	50	47

Table 1

2. Output Load

The line and load regulation for each of the outputs are shown in Table 2.

Parameter	Output Current (A)			Output Voltage (V)	
	Minimum	Typical	Maximum	Minimum	Maximum
90 ~ 277 V_{AC}	1.38	1.45	1.52	50	100

Table 2

3. Basic characteristic

3.1 Efficiency & Power Factor

Symbol	Item	Condition	Rating			Unit
			Min.	Typ.	Max.	
I_{LED}	Output constant current	$V_{IN} = 90V_{AC} \sim 277V_{AC}$ $F_{IN}=47\sim63Hz$ and output load is electrical load	1380	1450	1520	mA
V_{OUT}	Output Voltage		50		100	V
P_{IN}	Rate Power			150		W
η	Efficiency		89	91		%
PF	Power Factor		0.92			-

	Load is LED Lamp η (%)	
LEDs number	17 Series	34 Series
90 V_{AC} / 47Hz	90.089%	89.023%
110 V_{AC} / 60Hz	90.572%	90.205%
132 V_{AC} / 60Hz	90.888%	90.997%
198 V_{AC} / 50Hz	90.038%	91.345%
230 V_{AC} / 50Hz	89.917%	91.592%
277 V_{AC} / 50Hz	89.800%	91.774%

V_{IN} (V_{AC})	F_{IN} (Hz)	I_{IN} (A)	PF	THDi(%)	P_{IN} (W)	I_{LED} (mA)	V_{LED} (V_{DC})	η (%)
90	60	0.9051	0.998	3.811	81.06	1.45459	50.2037	90.089%
100	60	0.8119	0.997	4.051	80.81	1.45461	50.2041	90.369%
110	60	0.7365	0.996	4.305	80.62	1.45441	50.2054	90.572%
120	60	0.6745	0.995	4.575	80.47	1.45467	50.2036	90.754%
132	60	0.6129	0.993	4.888	80.33	1.45432	50.2024	90.888%
198	50	0.4171	0.981	9.677	81.09	1.45441	50.2002	90.038%
220	50	0.3786	0.973	11.275	81.16	1.45487	50.2052	89.998%
230	50	0.3639	0.969	12.003	81.21	1.45452	50.2033	89.917%
240	50	0.3505	0.965	12.831	81.26	1.45435	50.2053	89.855%
264	50	0.3229	0.953	15.334	81.33	1.45491	50.2032	89.808%
277	50	0.31	0.946	16.558	81.31	1.45431	50.2071	89.800%

V_{IN} (V _{AC})	F_{IN} (Hz)	I_{IN} (A)	PF	THDi(%)	P_{IN} (W)	I_{LED} (mA)	V_{LED} (V _{DC})	η (%)
90	60	1.8281	0.9991	3.825	163.34	1.45437	99.9812	89.023%
100	60	1.6332	0.998	4.602	162.15	1.45437	99.9721	89.668%
110	60	1.475	0.998	5.193	161.17	1.45422	99.9735	90.205%
120	60	1.345	0.997	5.475	160.47	1.45422	99.9717	90.597%
132	60	1.218	0.997	5.633	159.77	1.45425	99.9726	90.997%
198	50	0.8113	0.993	5.578	159.16	1.45423	99.9741	91.345%
220	50	0.7286	0.991	5.516	158.83	1.45439	99.9769	91.548%
230	50	0.6973	0.989	5.571	158.77	1.45461	99.9723	91.592%
240	50	0.6688	0.988	5.589	158.67	1.45432	99.9782	91.637%
264	50	0.6099	0.984	6.079	158.49	1.45433	99.9748	91.739%
277	50	0.5823	0.981	6.628	158.38	1.45382	99.9791	91.774%

Note: Efficiency calculation: $P_{IN} = (V_{IN} * I_{IN}) * PF$, $\eta = (V_{LED} * I_{LED}) / (P_{IN}) * 100\%$

Note: Short NTC (TH1) when measuring efficiency.

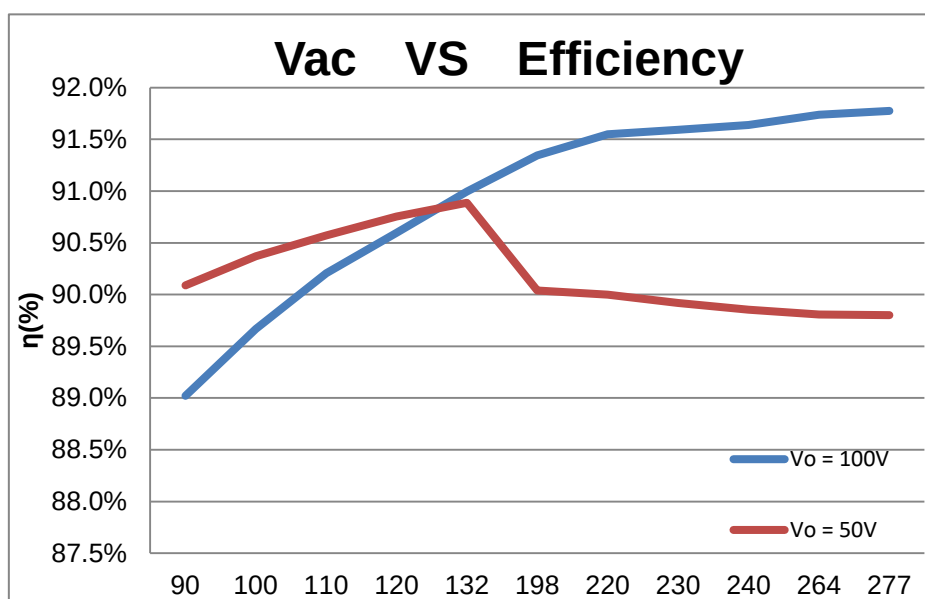


Fig1. Efficiency & V_{AC} Curve

3.2 Total Regulation of Output Current

Symbol	Item	Condition	Rating			Unit
			Min.	Typ.	Max.	
$V_{\text{LOAD-REG}}$	Load Regulation	$V_{\text{O}} = 50\text{V}_{\text{DC}} \sim 100\text{V}_{\text{DC}}$; and output load is electrical load	-1		+1	%
$V_{\text{LINE-REG}}$	Line Regulation	$V_{\text{IN}} = 100\text{V}_{\text{AC}} \sim 277\text{V}_{\text{A}}$; and output load is electrical load	-1		+1	%

$V_{\text{IN}} (V_{\text{AC}})$	f (Hz)	$I_{\text{LED}} (\text{mA})$	$V_{\text{LED}} (\text{V})$	Regulation(%)	Judgement
100	60	1.45461	50.2041	0.02	Pass
115	60	1.45467	50.2036		
230	50	1.45452	50.2033		
277	50	1.45431	50.2071		

$V_{\text{IN}} (V_{\text{AC}})$	f (Hz)	$I_{\text{LED}} (\text{mA})$	$V_{\text{LED}} (\text{V})$	Regulation(%)	Judgement
100	60	1.45437	99.9721	0.05	Pass
115	60	1.45422	99.9717		
230	50	1.45461	99.9723		
277	50	1.45382	99.9791		

Line regulation calculation: $(\Delta I_{\text{LED}} / I_{\text{LED}}) * 100\%$

$\Delta I_{\text{LED}} = I_{\text{LED}}(V_{\text{IN}}=100\text{VAC}@60\text{Hz}) - I_{\text{LED}}(V_{\text{IN}}=277\text{VAC}@50\text{Hz})$

$I_{\text{LED}} = I_{\text{LED(AVE)}}$ of the measure value.

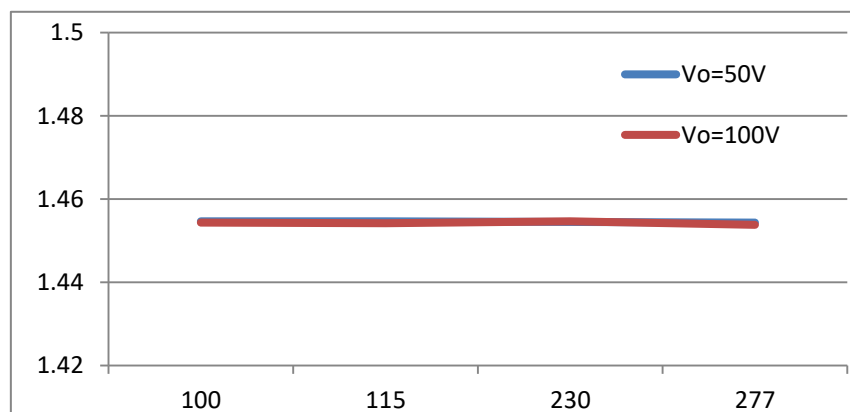


Fig2. Output Current Total Regulation

3.3 LED Current Ripple

Symbol	Item	Condition	Flicker Spec.			Unit
			Min.	Typ.	Max.	
ΔI_{LED}	Current Ripple	$V_{IN}=90V_{AC} \sim 277V_{AC}$ and output load is real LED lamp		10		%

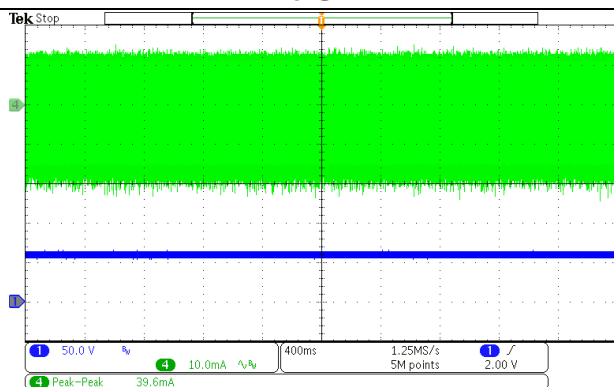
V_{IN} (V_{AC})	F(Hz)	$I_{LED}(A)$	ΔI_{LED} (mA) (Include high freq.)	V_{OUT}	Current Ripple (%)
100	60	1.46271	39.6	57.6371	2.72
120	60	1.46268	38.8	57.5942	2.65
230	50	1.46281	46.4	57.5104	3.17
277	50	1.45411	46.4	57.4818	3.17

Note: Output load is the real LED lamp (2pcs COB).

Waveform

Ch1 : V_{LED} 、 Ch4 : $I_{LED_Ripple\&Noise}$

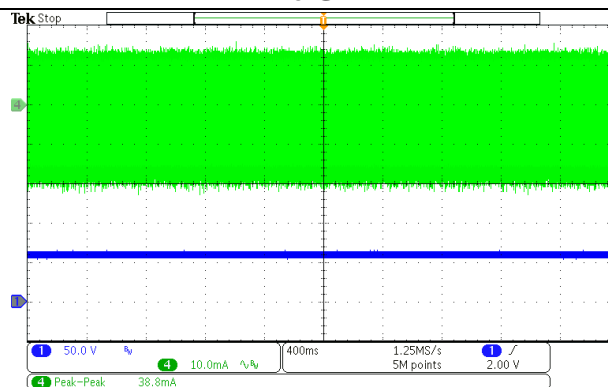
100V_{AC} @ 58V_{LED}



Current Ripple = 39.6mA

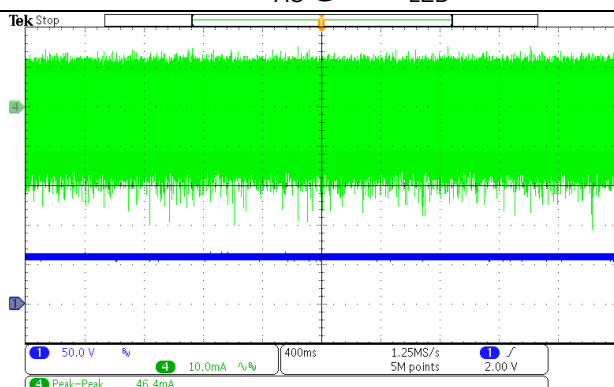
Ch1 : V_{LED} 、 Ch4 : $I_{LED_Ripple\&Noise}$

120V_{AC} @ 58V_{LED}



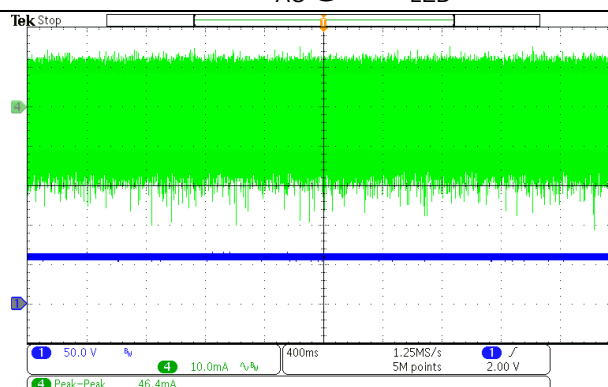
Current Ripple = 38.8mA

230V_{AC} @ 58V_{LED}



Current Ripple = 46.4mA

277V_{AC} @ 58V_{LED}



Current Ripple = 46.4mA

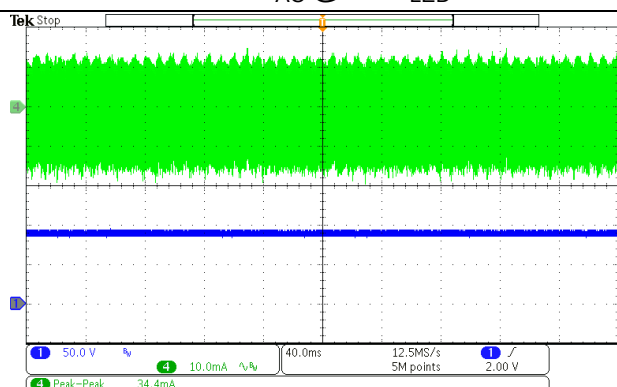
V_{IN} (V _{AC})	F(Hz)	I_{LED} (mA)	ΔI_{LED} (mA) (Include high freq.)	V_{OUT}	Current Ripple (%)
100	60	1.46253	34.4	87.1049	5.955
120	60	1.45431	37.6	86.9472	5.979
230	50	1.46222	34	86.8251	5.938
277	50	1.46404	38.4	86.6691	5.920

Note: Output load is the real LED lamp (3pcs COB) .

Waveform

Ch1 : V_{LED} 、 Ch4 : I_{LED_Ripple&Noise}

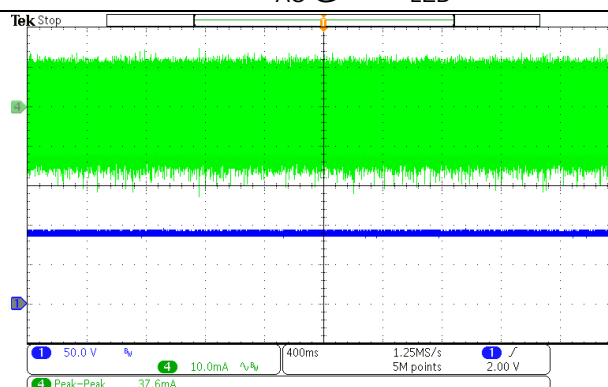
100V_{AC} @ 88V_{LED}



Current Ripple = 34.4mA

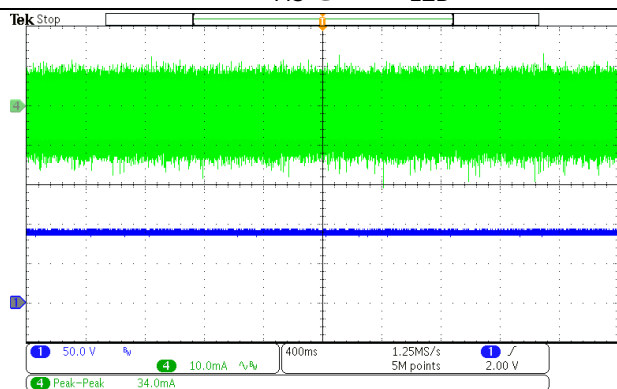
Ch1 : V_{LED} 、 Ch4 : I_{LED_Ripple&Noise}

120V_{AC} @ 88V_{LED}



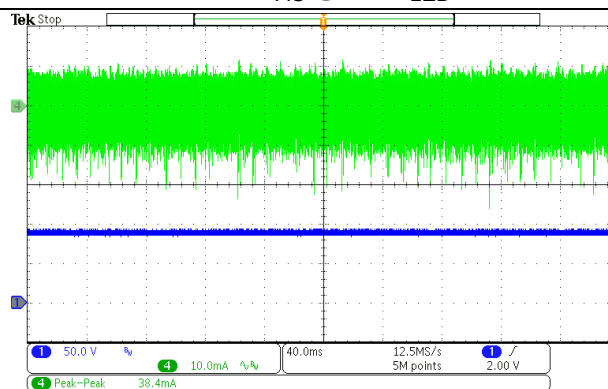
Current Ripple = 37.6mA

230V_{AC} @ 88V_{LED}



Current Ripple = 34mA

277V_{AC} @ 88V_{LED}



Current Ripple = 38.4mA

Note: Add a capacitor (160V/100uF/CY series/Nichicon) at output terminal during output ripple current test .

3.4 Start up Time

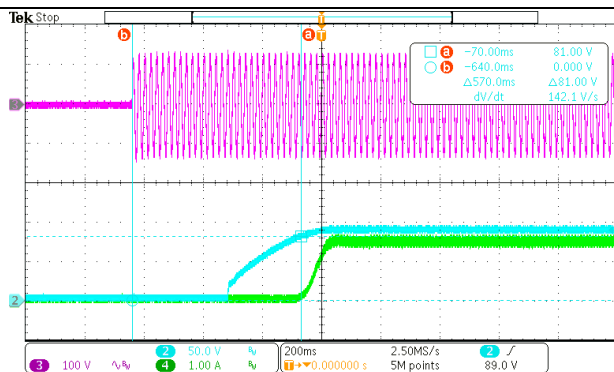
Symbol	Item	Condition	Spec.			Unit
			Min.	Typ.	Max.	
$T_{\text{TURN-ON}}$	Turn-On delay time After $I_{\text{LED}} \geq 90\%$ spec.	$V_{\text{IN,AC}}=90V_{\text{AC}}$ or $277V_{\text{AC}}$; and output load is real LED lamp	-	0.5	0.8	Sec

$V_{\text{IN}} (V_{\text{AC}})$	f (Hz)	$V_{\text{LED}}(V)$ (LED Lamp)	$I_{\text{LED}}(A)$	Output Voltage $\Delta T_{\text{TURN-ON}}$ (Sec)	Output Current $\Delta T_{\text{TURN-ON}}$ (Sec)
90	60	100	1.45	570mS	660mS
277	50	100	1.45	524mS	610mS

Waveform

Ch2 : V_{LED} 、Ch3 : V_{AC} 、Ch4 : I_{LED}

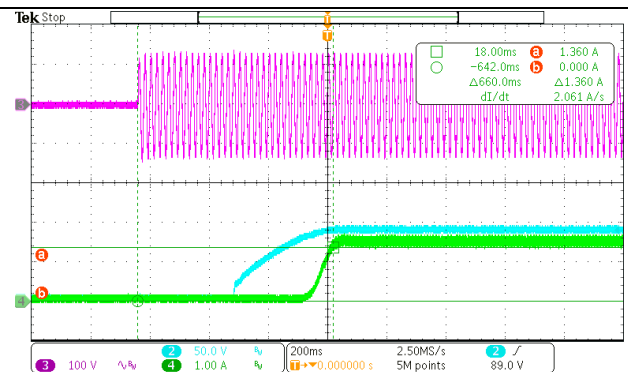
90V_{AC} @ 100V_{LED}



Output Voltage $\Delta T_{\text{TURN-ON}}$ (Sec) = 570mS

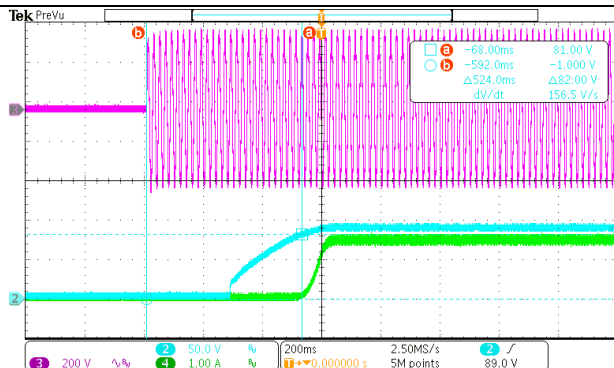
Ch2 : V_{LED} 、Ch3 : V_{AC} 、Ch4 : I_{LED}

90V_{AC} @ 100V_{LED}



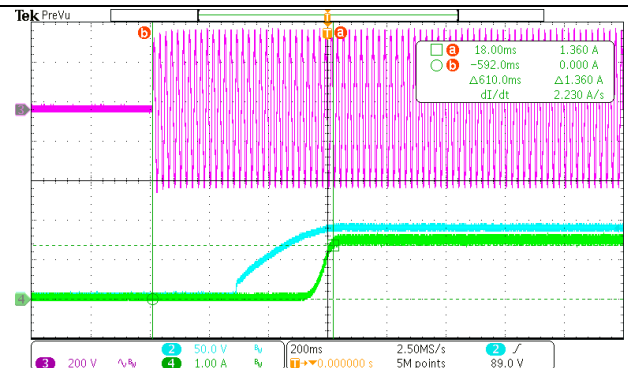
Output Current $\Delta T_{\text{TURN-ON}}$ (Sec) = 660mS

277V_{AC} @ 100V_{LED}



Output Voltage $\Delta T_{\text{TURN-ON}}$ (Sec) = 524mS

277V_{AC} @ 100V_{LED}



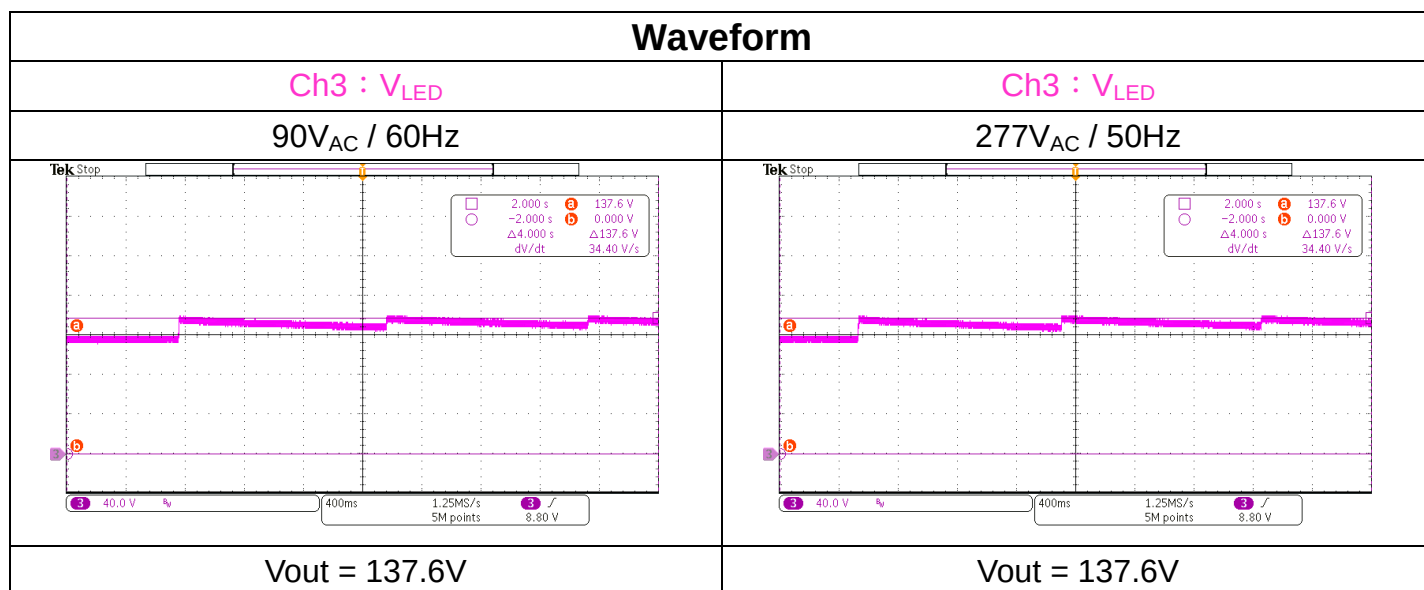
Output Current $\Delta T_{\text{TURN-ON}}$ (Sec) = 610mS

Note: Length of set up time is a measurement at the cold first start at room temp. turning ON/OFF the driver may lead to an increase in the setup time

3.5 Output Over Voltage Protection

Symbol	Item	Condition	Function
LED _{OVP}	Output Over Voltage Protection (Short photocoupler)	$V_{IN} = 90 \sim 277V_{AC}$, LED + & - short	Shutdown until the re-start & Auto-recovery when the fault is removed.

Waveform



Note: Output Capacitor voltage rating is 160V

3.6 LED Short Protection

Symbol	Item	Condition	Function
LED _{SCP}	LED short protection	$V_{IN} = 90V_{AC}$ and $277V_{AC}$ LED + & - short	Shutdown until the re-start & Auto-recovery when the fault is removed.

3.6.1 Short output terminal before turn on.

V_{IN} (V_{AC})	f (Hz)	Normal		LED short 10 minutes and remove fault	
		P_{IN} (W)	I_{LED} (mA)	$P_{IN, SHORT}$ (W)	I_{LED} (mA)
90	60	100	1.45431	0.0827	0
277	50	100	1.45431	0.259	0

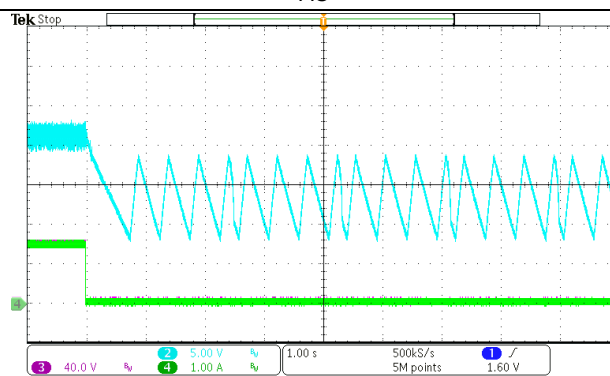
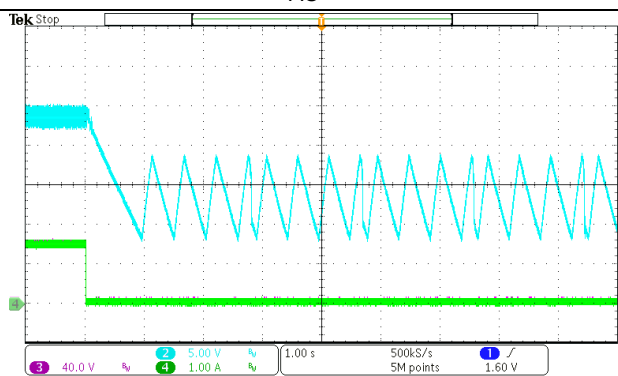
Waveform

Ch2 : FB_V_{CC} 、 Ch3 : V_{LED} 、 Ch4 : I_{LED}

Ch2 : FB_V_{CC} 、 Ch3 : V_{LED} 、 Ch4 : I_{LED}

90V_{AC} / 60Hz

277V_{AC} / 50Hz



3.6.1 Short output terminal after turn on.

V_{IN} (V_{AC})	f (Hz)	Normal		LED short 10 minutes and remove the fault	
		P_{IN} (W)	I_{LED} (mA)	$P_{IN, SHORT}$ (W)	I_{LED} (mA)
90	60	100	1.45386	0.0846	0
277	50	100	1.45377	0.259	0

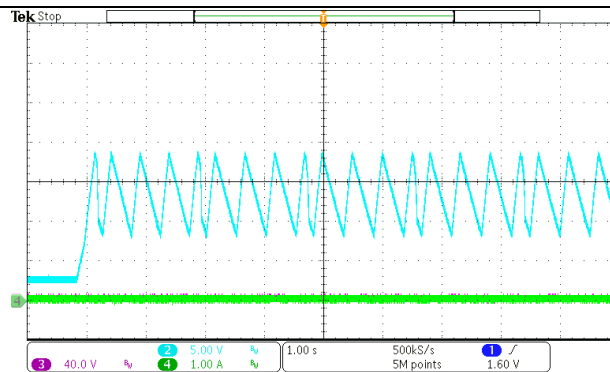
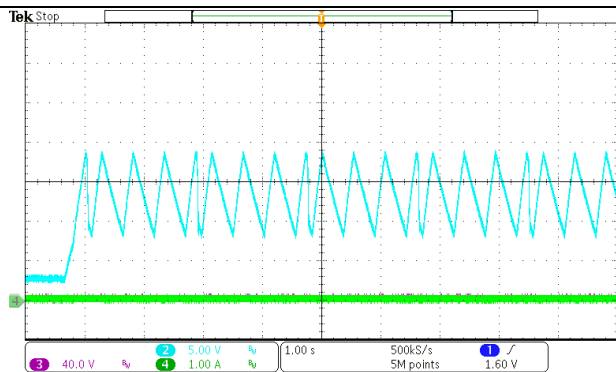
Waveform

Ch2 : FB_V_{CC} 、 Ch3 : V_{LED} 、 Ch4 : I_{LED}

Ch2 : FB_V_{CC} 、 Ch3 : V_{LED} 、 Ch4 : I_{LED}

90V_{AC} / 60Hz

277V_{AC} / 50Hz



3.7 LED Open Protection

Symbol	Item	Condition	Function
LED _{Open}	LED open protection	V _{IN} = 90 ~ 277V _{AC} , LED + & - open	Shutdown until the re-start & Auto-recovery when the fault is removed.

V _{IN} (V _{AC})	f (Hz)	Normal		LED open 10 minutes and remove the fault	
		P _{IN} (W)	I _{LED} (mA)	P _{IN, OPEN} (W)	V _{OUT} (V)
90	60	116	0	1.297	116
277	50	116	0	1.072	116

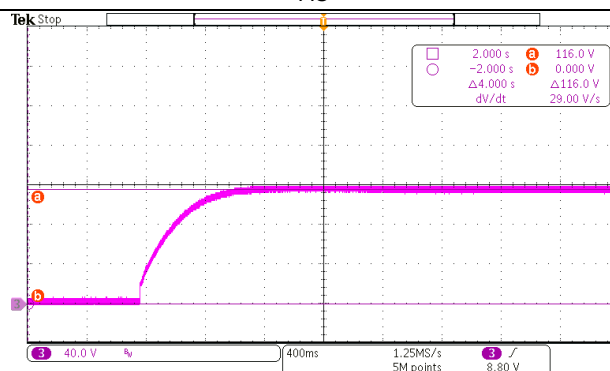
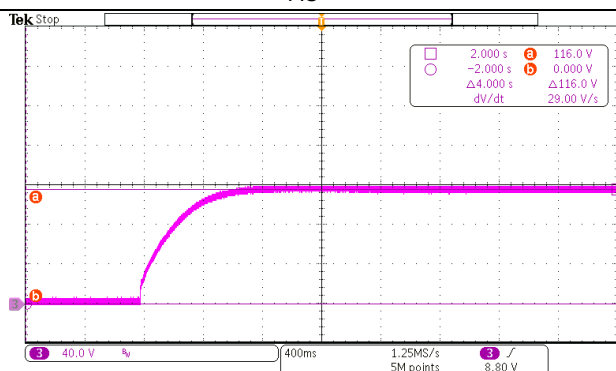
Waveform

Ch3 : V_{LED}

Ch3 : V_{LED}

90V_{AC} / 60Hz

277V_{AC} / 50Hz



3.8 Power Saving at Dimming off

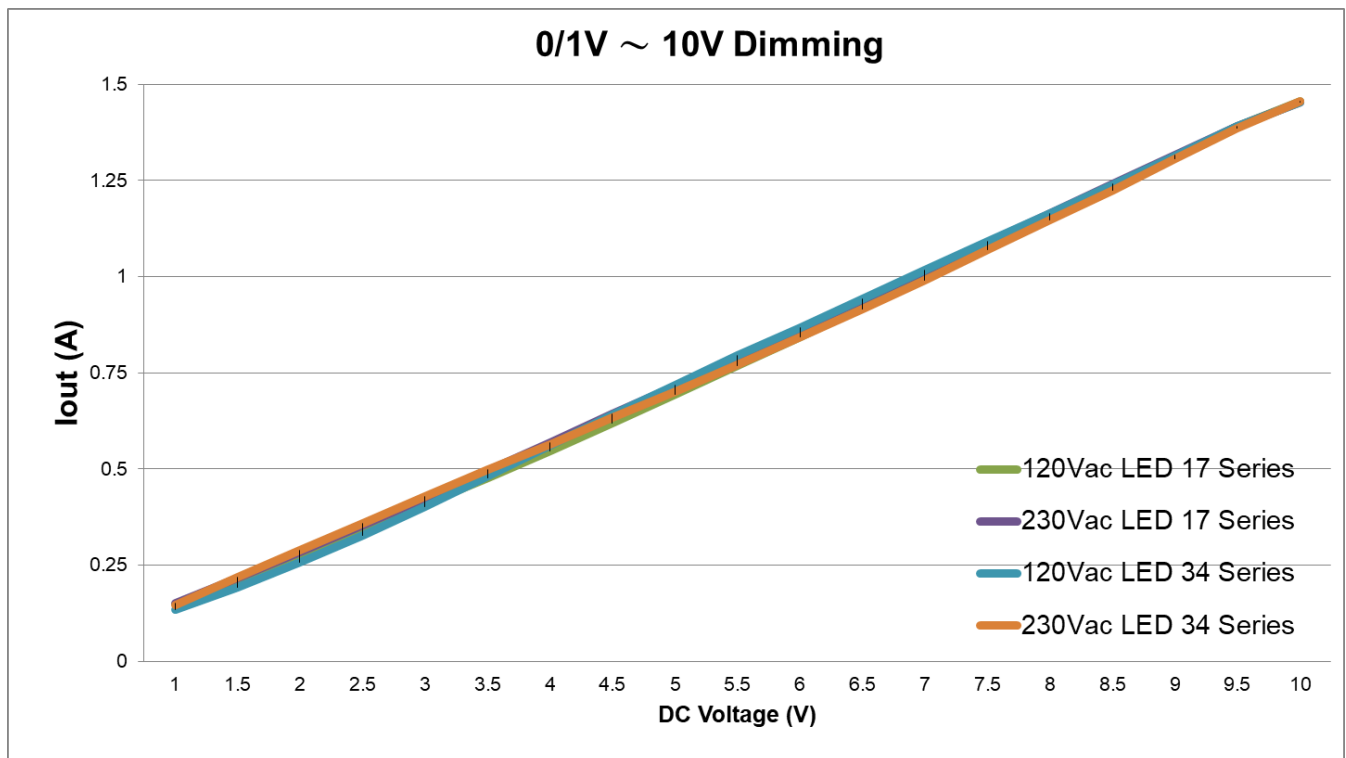
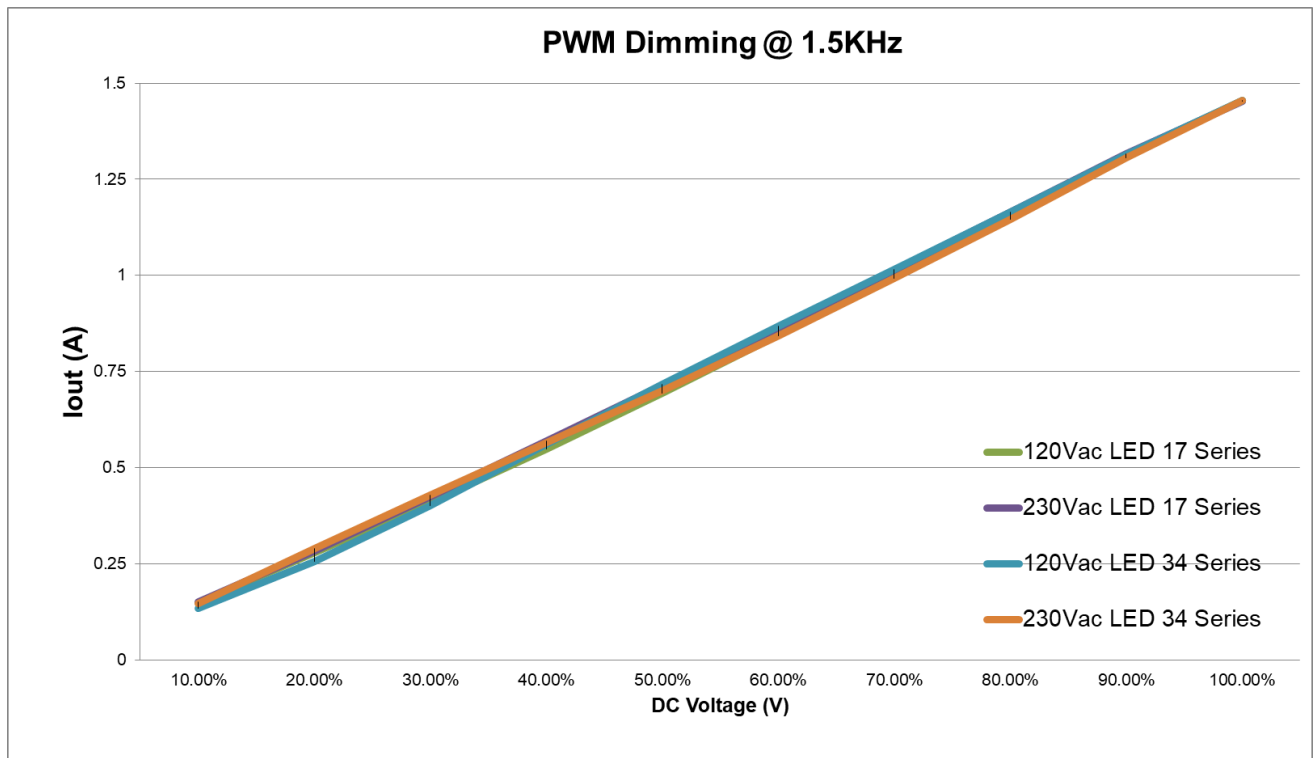
Symbol	Item	Condition	Function
P_{DIM_OFF}	DIM pin is GND	$V_{IN}=135V_{AC} \sim 277V_{AC}$	LED lamp is no light (off) But output voltage is being ; $V_{OUT} \leq V_{LED}$, typ.

$V_{IN} (V_{AC})$	f (Hz)	Dimming Off 10 minutes	
		$P_{IN,OFF\ MODE} (mW)$	$V_{OUT} (V)$
135Vac	60Hz	52.7	33.5942
230Vac	50Hz	147.9	33.8789
277Vac	50Hz	218.6	34.6281

3.9 Turn-On test check after 12 Hr. at Ta= -40°C

$V_{IN} (V_{AC})$	f (Hz)	Dimming Voltage		Judgement
		1V	10.5V	
100	60	V	V	Pass
115	60	V	V	
230	50	V	V	
277	50	V	V	

3.10 Dimming Performance Test



3.11 EMI Conduction Test

Specification : EN55015

Load condition: 100V/1.45A (LED's Lamp COB)

230V _{AC} / 50Hz , With Earth GND , L		230V _{AC} / 50Hz , With Earth GND , N																					
DEKRA File# : 通嘉 - Page: 311 <table><tr><td>Engineer : Rich</td><td></td></tr><tr><td>Site : SR2-H</td><td>Time : 2018/08/02 - 11:03</td></tr><tr><td>Limit : CNS14115_00M_QP</td><td>Margin : 10</td></tr><tr><td>Probe : SR2-B127_LISN(16A)-8 - L</td><td>Power : AC 230V/50Hz</td></tr><tr><td>EUT : LD7792S demo board</td><td>Note :</td></tr></table>		Engineer : Rich		Site : SR2-H	Time : 2018/08/02 - 11:03	Limit : CNS14115_00M_QP	Margin : 10	Probe : SR2-B127_LISN(16A)-8 - L	Power : AC 230V/50Hz	EUT : LD7792S demo board	Note :	DEKRA File# : 通嘉 - Page: 312 <table><tr><td>Engineer : Rich</td><td></td></tr><tr><td>Site : SR2-H</td><td>Time : 2018/08/02 - 11:05</td></tr><tr><td>Limit : CNS14115_00M_QP</td><td>Margin : 10</td></tr><tr><td>Probe : SR2-B127_LISN(16A)-8 - N</td><td>Power : AC 230V/50Hz</td></tr><tr><td>EUT : LD7792S demo board</td><td>Note :</td></tr></table>		Engineer : Rich		Site : SR2-H	Time : 2018/08/02 - 11:05	Limit : CNS14115_00M_QP	Margin : 10	Probe : SR2-B127_LISN(16A)-8 - N	Power : AC 230V/50Hz	EUT : LD7792S demo board	Note :
Engineer : Rich																							
Site : SR2-H	Time : 2018/08/02 - 11:03																						
Limit : CNS14115_00M_QP	Margin : 10																						
Probe : SR2-B127_LISN(16A)-8 - L	Power : AC 230V/50Hz																						
EUT : LD7792S demo board	Note :																						
Engineer : Rich																							
Site : SR2-H	Time : 2018/08/02 - 11:05																						
Limit : CNS14115_00M_QP	Margin : 10																						
Probe : SR2-B127_LISN(16A)-8 - N	Power : AC 230V/50Hz																						
EUT : LD7792S demo board	Note :																						
Test result		PASS (under -6dB)																					
110V _{AC} / 60Hz , With Earth GND , L		110V _{AC} / 60Hz , With Earth GND , N																					
DEKRA File# : 通嘉 - Page: 313 <table><tr><td>Engineer : Rich</td><td></td></tr><tr><td>Site : SR2-H</td><td>Time : 2018/08/02 - 11:09</td></tr><tr><td>Limit : CNS14115_00M_QP</td><td>Margin : 10</td></tr><tr><td>Probe : SR2-B127_LISN(16A)-8 - L</td><td>Power : AC 110V/60Hz</td></tr><tr><td>EUT : LD7792S demo board</td><td>Note :</td></tr></table>		Engineer : Rich		Site : SR2-H	Time : 2018/08/02 - 11:09	Limit : CNS14115_00M_QP	Margin : 10	Probe : SR2-B127_LISN(16A)-8 - L	Power : AC 110V/60Hz	EUT : LD7792S demo board	Note :	DEKRA File# : 通嘉 - Page: 315 <table><tr><td>Engineer : Rich</td><td></td></tr><tr><td>Site : SR2-H</td><td>Time : 2018/08/02 - 11:12</td></tr><tr><td>Limit : CNS14115_00M_QP</td><td>Margin : 10</td></tr><tr><td>Probe : SR2-B127_LISN(16A)-8 - N</td><td>Power : AC 110V/60Hz</td></tr><tr><td>EUT : LD7792S demo board</td><td>Note :</td></tr></table>		Engineer : Rich		Site : SR2-H	Time : 2018/08/02 - 11:12	Limit : CNS14115_00M_QP	Margin : 10	Probe : SR2-B127_LISN(16A)-8 - N	Power : AC 110V/60Hz	EUT : LD7792S demo board	Note :
Engineer : Rich																							
Site : SR2-H	Time : 2018/08/02 - 11:09																						
Limit : CNS14115_00M_QP	Margin : 10																						
Probe : SR2-B127_LISN(16A)-8 - L	Power : AC 110V/60Hz																						
EUT : LD7792S demo board	Note :																						
Engineer : Rich																							
Site : SR2-H	Time : 2018/08/02 - 11:12																						
Limit : CNS14115_00M_QP	Margin : 10																						
Probe : SR2-B127_LISN(16A)-8 - N	Power : AC 110V/60Hz																						
EUT : LD7792S demo board	Note :																						
Test result		PASS (under -6dB)																					

Specification : EN55015

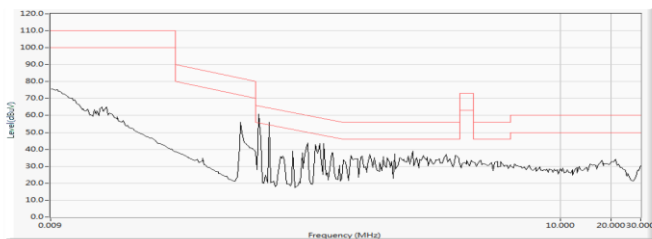
Load condition: 100V/1.45A (LED's Lamp COB)

230V_{AC} / 50Hz , None Earth GND , L



File# : 通嘉 - Page: 317

Engineer : Rich	
Site : SR2-H	Time : 2018/08/02 - 11:17
Limit : CNS14115_00M_QP	Margin : 10
Probe : SR2-B127_LISN(16A)-8 - L	Power : AC 230V/50Hz
EUT : LD7792S demo board	Note : none Erath GND

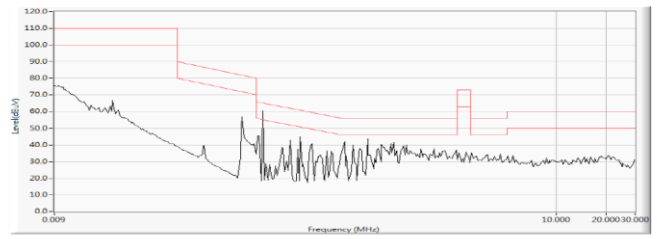


230V_{AC} / 50Hz , None Earth GND , N



File# : 通嘉 - Page: 319

Engineer : Rich	
Site : SR2-H	Time : 2018/08/02 - 11:20
Limit : CNS14115_00M_QP	Margin : 10
Probe : SR2-B127_LISN(16A)-8 - N	Power : AC 230V/50Hz
EUT : LD7792S demo board	Note : none Erath GND



Test result

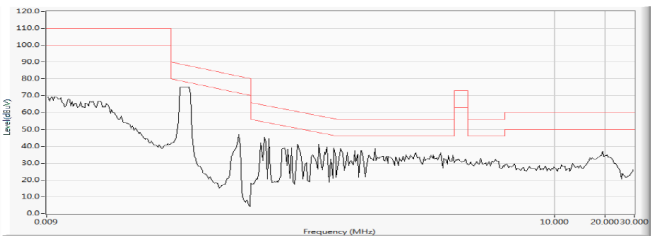
PASS (under -6dB)

110V_{AC} / 60Hz , None Earth GND , L



File# : 通嘉 - Page: 321

Engineer : Rich	
Site : SR2-H	Time : 2018/08/02 - 11:25
Limit : CNS14115_00M_QP	Margin : 10
Probe : SR2-B127_LISN(16A)-8 - L	Power : AC 110V/60Hz
EUT : LD7792S demo board	Note : none Erath GND

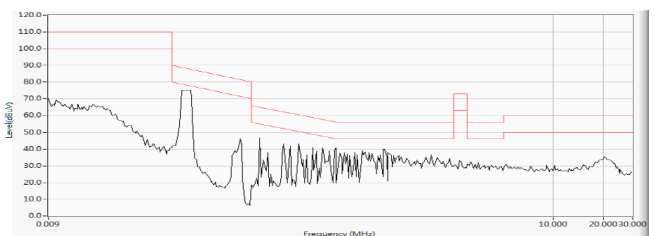


110V_{AC} / 60Hz , None Earth GND , N



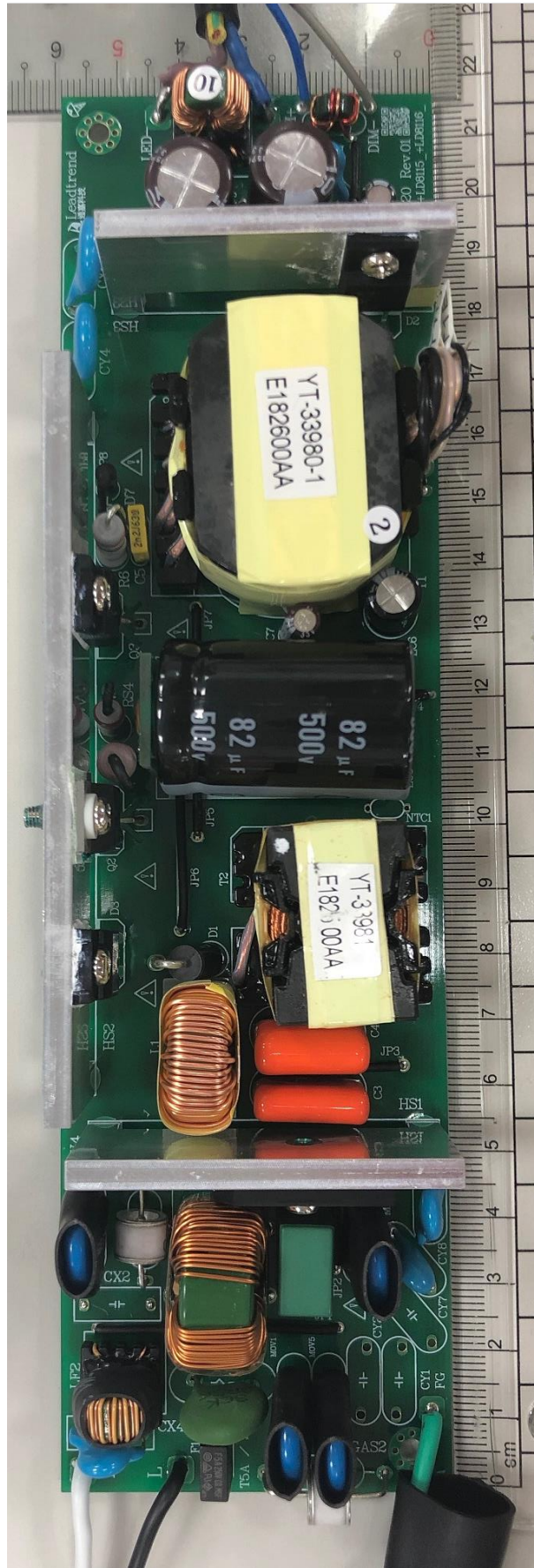
File# : 通嘉 - Page: 323

Engineer : Rich	
Site : SR2-H	Time : 2018/08/02 - 11:27
Limit : CNS14115_00M_QP	Margin : 10
Probe : SR2-B127_LISN(16A)-8 - N	Power : AC 110V/60Hz
EUT : LD7792S demo board	Note : none Erath GND

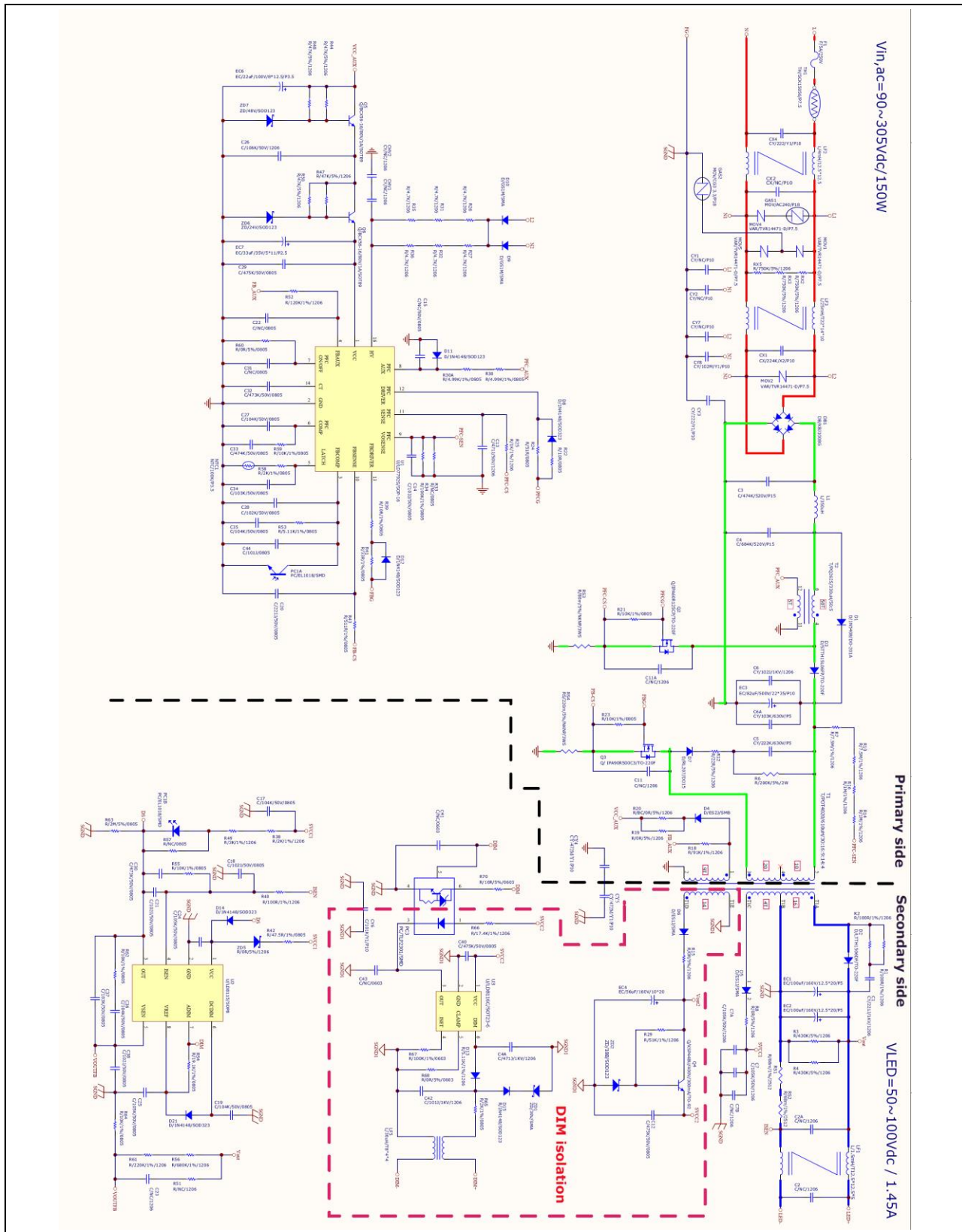


Test result

PASS (under -6dB)



III. Schematic



IV. BOM

Designator & Footprint	Number	Location
Resistor, 0 ohm, 5%, 0603	1	R68
Resistor, 10 ohm, 5%, 0603	1	R70
Resistor, 100K ohm, 1%, 0603	1	R67
Resistor, 0 ohm, 5%, 0805	6	JPP2, JPP3, JPP4, JPP5, JPP6, R60
Resistor, 10 ohm, 1%, 0805	2	R22, R39
Resistor, 33 ohm, 1%, 0805	1	R41
Resistor, 47.5 ohm, 1%, 0805	1	R42
Resistor, 51 ohm, 1%, 0805	1	R24
Resistor, 511 ohm, 1%, 0805	1	R43
Resistor, 2K ohm, 1%, 0805	2	R58, R65
Resistor, 4.99K ohm, 1%, 0805	2	R30, R30A
Resistor, 5.11K ohm, 1%, 0805	1	R53
Resistor, 10K ohm, 1%, 0805	6	R21, R23, R55, R59, R62, R64
Resistor, 19.1K ohm, 1%, 0805	1	R54
Resistor, 100K ohm, 1%, 0805	1	R34
Resistor, 2M ohm, 1%, 0805	1	R63
Resistor, 0 ohm, 5%, 1206	10	R8, R15, R19, R20, JPP7, JPS1, JPS2, JPS3, JPS4, ZD5
Resistor, 22 ohm, 5%, 1206	1	R12
Resistor, 100 ohm, 1%, 1206	3	R1, R2, R40
Resistor, 1K ohm, 1%, 1206	1	R25
Resistor, 2K ohm, 1%, 1206	1	R38
Resistor, 3K ohm, 1%, 1206	1	R49
Resistor, 4.7K ohm, 1%, 1206	6	R26, R27, R31, R32, R35, R36
Resistor, 5.11K ohm, 1%, 1206	1	D13
Resistor, 10K ohm, 1%, 1206	1	R29
Resistor, 17.4K ohm, 1%, 1206	1	R66
Resistor, 47K ohm, 5%, 1206	4	R44, R47, R48, R50
Resistor, 91K ohm, 1%, 1206	1	R18
Resistor, 120K ohm, 1%, 1206	1	R52
Resistor, 430K ohm, 5%, 1206	2	R3, R4

Designator & Footprint	Number	Location
Resistor, 220K ohm, 1%, 1206	1	R61
Resistor, 680K ohm, 1%, 1206	1	R56
Resistor, 750K ohm, 5%, 1206	3	RX2, RX3, RX5
Resistor, 1M ohm, 1%, 1206	2	R14, R16
Resistor, 7.5M ohm, 1%, 1206	2	R7, R10
Resistor, 68m ohm, 1%, 3W, 2512	2	RS1, RS2
Capacitor, 100pF, 50V, NPO, 0805	1	C44
Capacitor, 220pF, 50V, NPO, 0805	1	C20
Capacitor, 1000pF, 50V, NPO, 0805	4	C18, C21, C28, C38
Capacitor, 10nF, 50V, X7R, 0805	3	C14, C34, C37
Capacitor, 47nF, 50V, X7R, 0805	2	C30, C32
Capacitor, 0.1uF, 50V, X7R, 0805	5	C17, C19, C27, C35, C36
Capacitor, 0.47uF, 50V, X7R, 0805	1	C33
Capacitor, 1uF, 50V, X7R, 0805	2	C24, C40
Capacitor, 4.7uF, 25V, X7R, 0805	2	C12, C40
Capacitor, 4.7uF, 50V, X5R, 0805	1	C29
Capacitor, 470pF, 50V, NPO, 1206	1	C13
Capacitor, 100pF, 1KV, NPO, 1206	1	C42
Capacitor, 220pF, 1KV, NPO, 1206	1	C1
Capacitor, 470pF, 1KV, NPO, 1206	1	C4A
Capacitor, 1000pF, 1KV, NPO, 1206	1	C6
Capacitor, 1uF, 50V, X7R, 1206	2	C7, C7A
Capacitor, 10uF, 50V, X5R, 1206	1	C26
Diode, 1N4148, 75V, 0.15A, SOD-323	3	D8, D14, D21
Diode, 1N4148, 75V, 0.15A, SOD-123	3	D11, D12, D15
Diode, Super, ES1J, 600V, 1A, SMA	2	D5, D6
Diode, Super, ES2J, 600V, 1A, SMB	1	D4
Diode, General, GS1M, 1000V, 1A, SMA	2	D9, D10
Zener diode, 24V, 2%, SOD-123	1	ZD6
Zener diode, 18V, 2%, SOD-123	1	ZD2
Zener diode, 39V, 5%, SMA	1	ZD1

Designator & Footprint	Number	Location
Zener diode, 48V, 2%, SOD-123	1	ZD7
Optocoupler, EL1018, SMD, Everlight	1	PC1
Optocoupler, TLP2301, SMD, Toshiba	1	PC3
BJT, NPN, BCX56-16, hfe=100~250, 1A, 100V, SOT-89, SECOS	2	Q5, Q6
LD7792S, SO-16	1	U1
LD8115, SO-8	1	U2
LD8116C, SOT23-6	1	U3
NTC, SCK15056, 5 ohm, 6A, D=16mm, T=6mm, P=10mm, THINKING	1	TH1
Fuse, 250V, 5A, 8.5*4*8mm, P=5mm, time lag, 369 serise, littlefuse	1	F1
Varistor, TVR14471-D, D=16.5mm, T=6mm, P=10mm, THINKING	4	MOV1, MOV2, MOV4, MOV5
DIODE, Ultrafast, STTH15L06FP, 600V, 15A, TO-220FPAC, ST	2	D3
DIODE, Ultrafast, LTTH15L06DF, 600V, 15A, TO-220FPAC, LITEON	1	D2
DIODE, General, 1N5408, 1000V, 3A, DO-201	1	D1
DIODE, General, RL207, 1000V, 2A, DO-15	1	D7
MOSFET, cool, IPA60R125CP, 650V, 16A, PG-TO220, INFINEON	1	Q2
MOSFET, cool, IPA90R500C3, 900V, 6.8A, PG-TO220, INFINEON	1	Q3
BJT, NPN, KSP44BU, hfe=50~200, 0.3A, 400V, TO-92, ON semi	1	Q4
Resistor, 200K ohm, 5%, MOF, 3WS	1	R6
Resistor, 0.08 ohm, 5%, NKNP, 3WS	1	RS3
Resistor, 0.22 ohm, 5%, NKNP, 3WS	1	RS4
Capacitor, MLCC, 10nF, 630V, P5, C322C103KBR5TA, KEMET	1	C6A
Capacitor, MLCC, 2.2nF, 630V, P5, Chiefcon	1	C5
Capacitor, film, MPNVI34704JJA, 0.47uF, 520V, P15, DURA	1	C3
Capacitor, film, MPNVI36804JJA, 0.68uF, 520V, P15, DURA	1	C4
Safety, Y1, 101K, CD70-B2GA101KY, 400VAC, P10, TDK	1	CY6
Safety, Y1, 102M, CD70ZU2GA102MY, 400VAC, P10, TDK	1	CY8
Safety, Y1, 222M, CD90ZU2GA222MY, 400VAC, P10, TDK	2	CY3, CX4
Safety, Y1, 472M, CD12ZU2GA472MY, 400VAC, P10, TDK	2	CY4, CY5
Safety, X2, 0.22uF, 305VAC, 13*14*8, P10, MKP-X2, HJC	1	CX1
Capacitor, AL, 33uF, 35V, 5*11, P2.5, 4000hours, -40~105°C	1	EC7

Designator & Footprint	Number	Location
Capacitor, AL, 22uF, 100V, 8*12.5, P2.5, 4000hours, -40~105℃	1	EC6
Capacitor, AL, UCY series, 100uF, 160V, 12.5*20, P5, NICHICON, 10000hours, -40~105℃	2	EC1, EC2
Capacitor, AL, 56uF, 160V, 10*20, P5, 4000hours, -40~105℃	1	EC4
Capacitor, AL, LGX series, 82uF, 500V, 22*35, P10, NICHICON, 5000hours, -20~105℃	1	EC3
Common choke, 1.5mH(min), YT-33979-1	1	LF1
Common choke, 4mH(min), YT-31867	1	LF2
Common choke, 25mH(min), YT-34207	1	LF3
Common choke, 30uH(min), YT-34208	1	LF5
Inductor, 330uH, T17*9*7, YT-33982-1	1	L1
Transformer, PQ2620, 330uH, 50:5, YT-33981	1	T2
Transformer, POT4020, 560uH, 30:16:9:14:4, YT-33980-2	1	T1
Bridge diode, KBJ1008G, 10A, 800V, LITEON	1	DB1
Gas Discharge Tubes, AC240, Littelfuse	1	GAS1
Gas Discharge Tubes, CG3 3.3, Littelfuse	1	GAS2
Jump wire, cooper, 1mm, L=44mm, KINK 3&41mm, 90 deg	2	JP1, JP6
Jump wire, cooper, 1mm, L=20mm, KINK 3&17mm, 90 deg	1	JP2
Jump wire, cooper, 1mm, L=23mm, KINK 3&20mm, 90 deg	2	JP3, JP5
Jump wire, cooper, 1mm, L=21mm, KINK 3&18mm, 90 deg	1	JP7
Jump wire, cooper, 1mm, L=30mm, KINK 3&27mm, 90 deg	1	JP4
Jump wire, cooper, 1mm, L=49mm, KINK 3&46mm, 90 deg	1	JP8
Jump wire, cooper, 1mm, L=18mm, KINK 3&15mm, 90 deg	2	JP9, JP10
Heat tube, 1.5mm , L=41mm, 125℃	1	For JP8
Heat tube, 1.5mm , L=36mm, 125℃	2	For JP1, For JP6
Heat tube, 1.5mm , L=12mm, 125℃	1	For JP2
Heat tube, 1.5mm , L=15mm, 125℃	3	For JP3, For JP5, For D7
Heat tube, 1.5mm , L=13mm, 125℃	1	For JP7
Heat tube, 1.5mm , L=22mm, 125℃	3	For JP4, For RS3, For RS4
Heat tube, 1.5mm , L=10mm, 125℃	2	For JP9, For JP10
Heat tube, 18mm , L=18mm, 125℃	4	For MOV1, For MOV2, For MOV4, For MOV5
Heat tube, 25mm , L=25mm, 125℃	1	For FG Ring Core

Designator & Footprint	Number	Location
HEATSINK, AL, T=3mm, L=53mm	1	HS1
HEATSINK, AL, T=3mm, L=105mm	1	HS2
HEATSINK, AL, T=3mm, L=50mm	1	HS2
M3 螺絲, 圓頭, 8mm	4	For D2, For D3, For Q2, For Q3,
M3 螺絲, 圓頭, 10mm	1	For DB1
M3 螺絲, 圓頭, 6mm	5	For HS1*2, For HS2*2, For HS3*1
RI 14*8*10, A8, EROCORE	1	For FG wire* 6T
RH 3.5x4x1 ,KING CORE	2	For Q2 Gate Pin , For Q3 Drain Pin
AWM1452, 18AWG, 90℃, 1000V, E77981, solid, BLACK, L=350mm	1	L wire
AWM1452, 18AWG, 90℃, 1000V, E77981, solid, WHITE, L=350mm	1	N wire
AWM1452, 18AWG, 90℃, 1000V, E77981, solid, GREEN, L=450mm	1	FG wire
AWM1452, 18AWG, 90℃, 1000V, E77981, solid, PURPLE, L=350mm	1	DIM+ wire
AWM1452, 18AWG, 90℃, 1000V, E77981, solid, GRAY, L=350mm	1	DIM- wire
AWM1452, 18AWG, 90℃, 1000V, E77981, solid, BLUE, L=350mm	1	LED-
AWM1452, 18AWG, 90℃, 1000V, E77981, solid, RED, L=350mm	1	LED+
PCB, 58.5*215mm, CEM-1, T=1.6mm, 2OZ	1	Main PCB
PCB, 16*23mm, FR4, T=1.0mm, 2OZ	1	For EC3

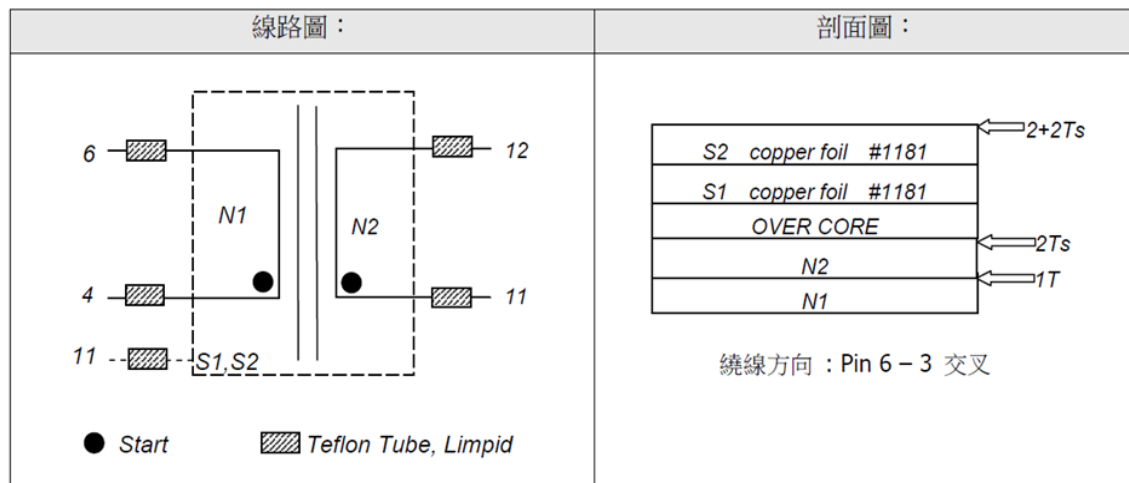
V. P.F.C. Choke & Transformer Spec. (Vender : 音律)

T2 (P.F.C. Choke) :

Bobbin / Core = PQ-2625 / PC-44A

Inductance = 350 μ H $\pm$ 5% @ 10 kHz / 1 V

Ae = 124.3 mm²



WINDING TABLE : (繞線結構)

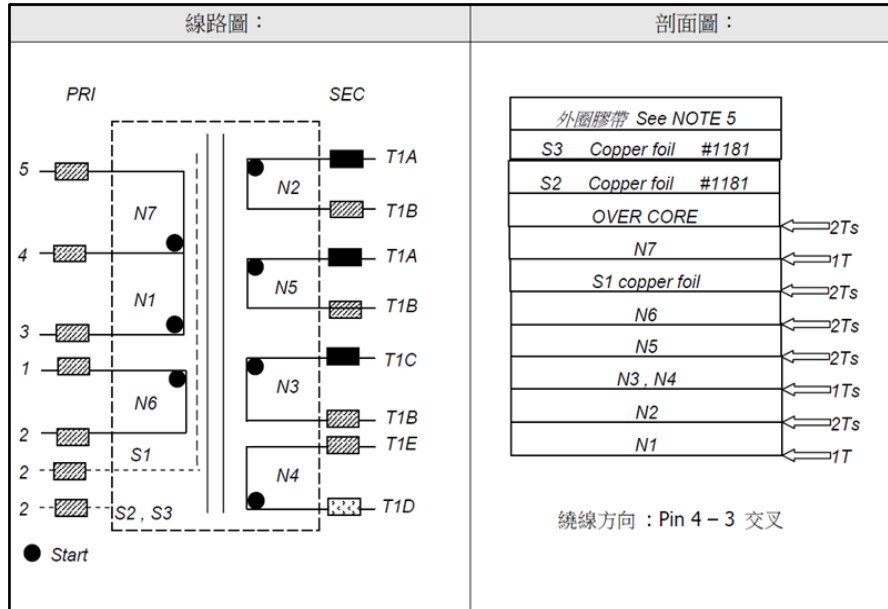
WINDING (繞組)	DIAMETER AND TYPE (線徑及線種)	TURN (圈數)	ML TAPE (絕緣膠帶)	WINDING METHOD (繞線方式)
N1(4 --- 6)	2UEW 0.1mm * 40(litz) * 1P	50TS	1Ts	密繞一層
N2(11 --- 12)	2UEW 0.25mm*1P	2TS	2Ts	置中密繞
	OVER Core			
S1	Copper Foil W=7mm #1181	1TS		垂直
S2(11 --- X)	Copper Foil W=7mm #1181	1TS		水平
			外圈膠帶 Tape 2+2Ts	

T1 (Transformer) :

Bobbin / Core = POT-4022 / PC-44A

Inductance = 560uH±5% @ 10 kHz / 1 V

Ae = 211 mm²



WINDING TABLE:(繞線結構)

WINDING (繞組)	DIAMETER AND TYPE (線徑及線種)	TURN (圈數)	MLTAPE (絕緣膠帶)	WINDING METHOD (繞線方式)
N1(3 --- 4)	2UEW 0.1mm * 40(litz) * 1P	20Ts	2Ts	第一層密繞 第二層疏繞
N2(T1A --- T1B)	TIW 0.4mm*2P	16Ts	1Ts	密繞
N3(1 --- 2)	2UEW 0.35mm*1P	9Ts	2Ts	疏繞
N4(T1C - T1B)	TIW 0.4mm*1P	4Ts	2Ts	雙線並繞
N5(T1D - T1E)	TIW 0.4mm*1P	14Ts		
N6(T1A --- T1B)	TIW 0.4mm*2P	16Ts	2Ts	密繞
S1(2 --- X)	Copper Foil W=8mm #1181	1Ts	1Ts	
N7(4 --- 5)	2UEW 0.1mm * 40(litz) * 1P	10Ts	2Ts	密繞
	OVER Core			
S2	Copper Foil W=10mm #1181	1TS		垂直
S3(2 --- X)	Copper Foil W=8mm #1181	1TS		水平
				外圈膠帶 2Ts