Customer Name : (주) 하이디스플레이 Date : 2011. 02. 22.

SPECIFICATION FOR APPROVAL

Part Name : CCFL INVERTER
Customer Part No. :
DS-Plus Part No. : DS-1308WG (Voltage Control Dimming)

Approval Sign

Please Return 1 Copy After Approved

DS -Plus Inc.

PREPARED	APPROVAL

Table of content

1. Revision history

No.	DATE	REVISION	DESCRIPTION

2. Features

- High efficiency
- Drive 4 lamps with one module
- Nominal current 7.5 mArms for each lamp
- 10.8 to 13.2V input voltage operation
- Protection against output open or disconnection as well as lamp failure
  Automatically shut down of high voltage
- Voltage dimming control : No influence to power ripple
- Long lamp life with soft start
- Low sleep current
- Single sided PCB layout
- Low EMI and spurious noise

3. Applications

- 17~24" Desktop LCD monitor
- Industrial LCD Panel

4. Absolute maximum ratings

Input supply voltage (V_{IN})	- 0.3V to 13.2V
Output voltage, no load	Internally limited to zero volt
Output current for each lamp(I_O)	9.0mArms
Output power (per lamp)	7.0W
Sleep & bright adjust signal voltage (V_{SLEEP} , V_{BRT})	- 0.3V to V_{IN}
Ambient operating temperature	0 °C to 50 °C
Storage temperature range	- 30 °C to 80 °C
Operating & storage humidity	10 % to 85 %

5. Recommended operating conditions (R.C.)

Parameter	Symbol	Recommendation			Units
		Min	R.C.	Max	
Input supply voltage	V_{IN}	10.8	12.0	13.2	V
Full bright lamp current	$I_{O(MAX)}$	7.0	7.5	8.0	mArms
Brightness control voltage range	V_{BRT}	0		5.0	V
Lamp on/off control voltage	V_{SLEEP}	3.0	5.0	7.0	V
Lamp operating voltage	V_O		720		Vrms
Operating ambient temperature range	T_A	0		50	°C

6. Electrical characteristics

Parameter	Symbol	Conditions*	Specification*			Unit
			Min	Typ	Max	
Input supply voltage	V_{IN}		10.8	12.0	13.2	V
Input current	I_{IN}	V_{IN}=12V, V_{BRT}=0V	2.0	2.5	3.0	A
Full bright lamp current	$I_{O(MAX)}$	V_{IN}=12V,V_{BRT}=0V	6.5	7.5	8.5	mArms
Minimum lamp current	$I_{O(MIN)}$	V_{IN}=12V,V_{BRT}=5.0V	2.0	3.0	4.0	mArms
Operating frequency	F_O	V_{IN}=12V, V_{BRT}=0V	45	50	55	KHz
Open lamp output voltage	V_O	lamp open	-	-	0	Vrms
Dimming ratio		V_{IN}=12V, V_{BRT}=0 to 5.0V		2 :1		
Sleep current	I_{IN}	V_{IN}=12V, V_{SLEEP}=0V			10	mA
Efficiency		V_{IN}=12V, V_{BRT}=0V	80	88		%

* At the reference 23”LCD-Module(LM230WF1) of LG-Philips LCD

7. Functional pin description

CN1 Connector : 12505WR- 12A00 (YEONHO or Equivalent)

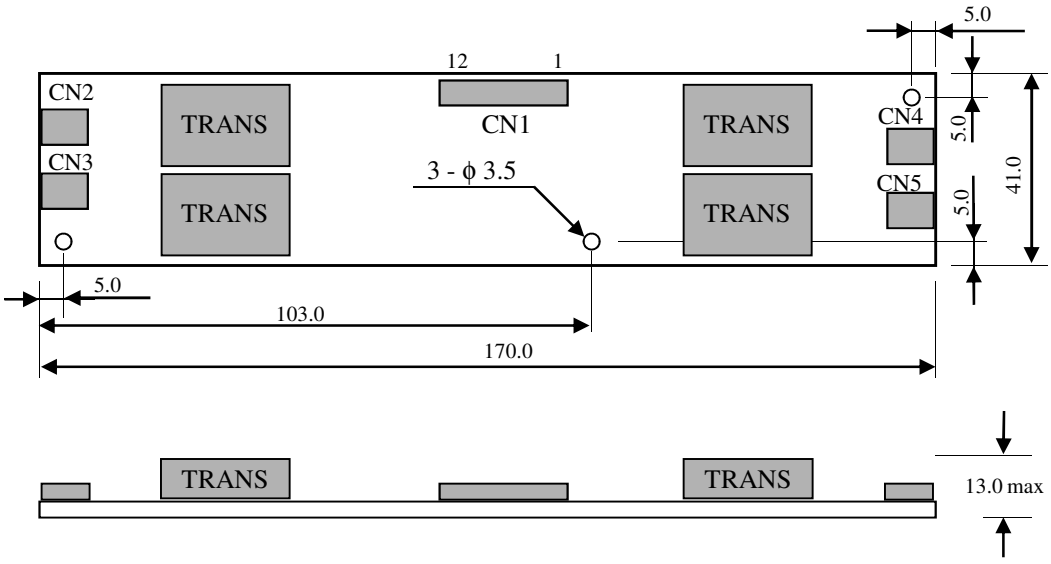
CN1- 1,2,3	V_{IN} (DC input ; 12.0V)
CN1- 4,5,7,8,10,12	G_{ND} (Power supply return)
CN1- 9	V_{SLEEP} (Lamp On/Off control ; Off at Low , On at High)
CN1- 11	V_{BRT} (Bright adjust ; 0 to 5.0V)
CN1- 6	NC

CN2,3,4,5 Connector : 35001WR- 02A00 (YEONHO or Equivalent)

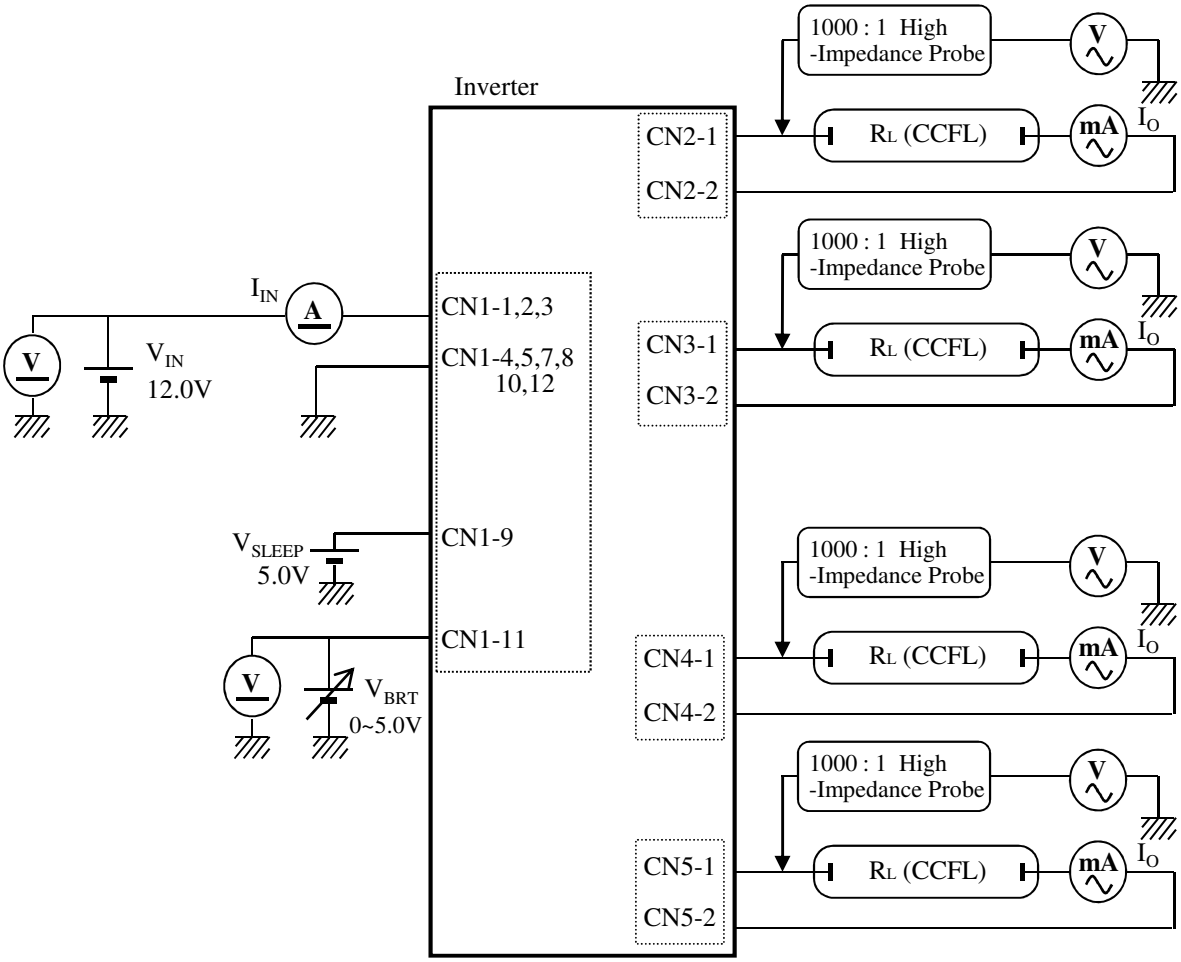
CN2,3,4,5- 1	High voltage
CN2,3,4,5- 2	Lamp current return

8. *Mechanical dimensions*

Tolerance : ± 0.5
Unit : mm

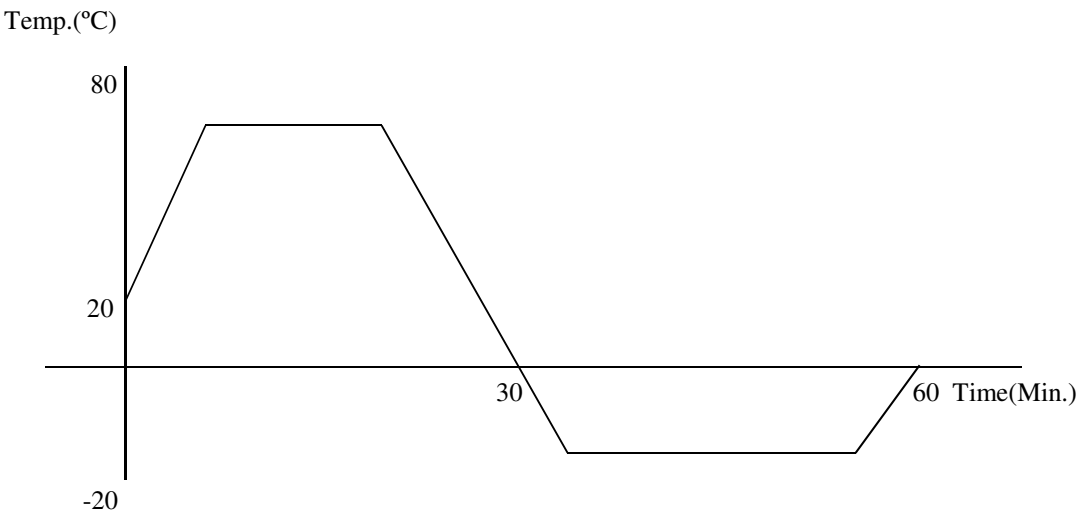


9. Test circuit



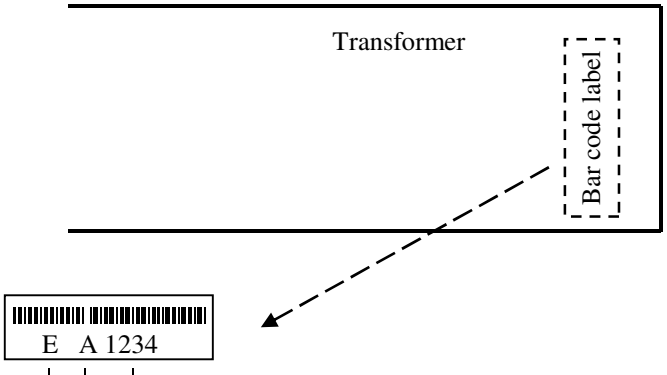
10. Heat shock test

20 cycles of test



11. Notation of lot number

Marking position : Bottom of PWB



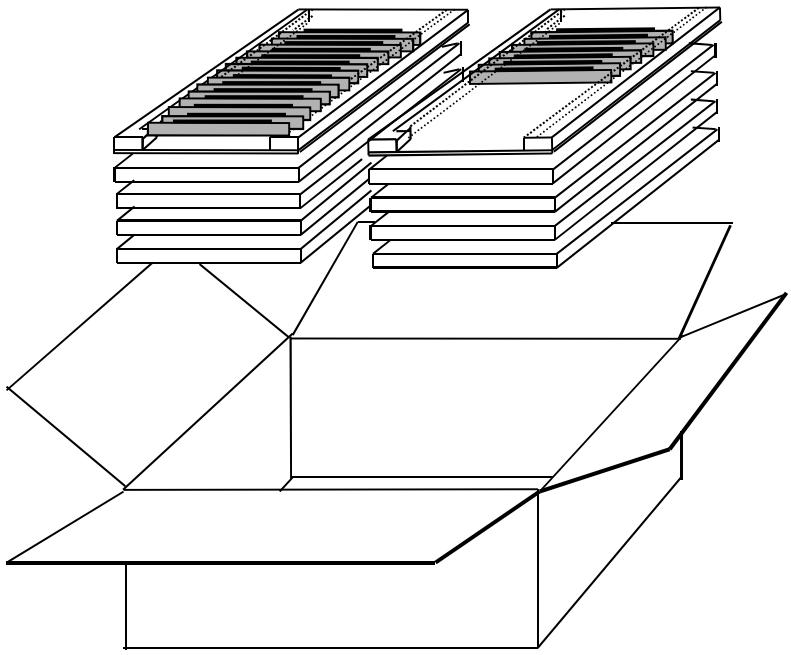
Serial number

Month of product : A, B, C, D, E, F, G, H, I, J, K, L
(01,02,03,04,05,06,07,08,09,10,11,12)

Year of product : A, B, C, - - - -
(01, 02, 03, - - - -)

12. Packing

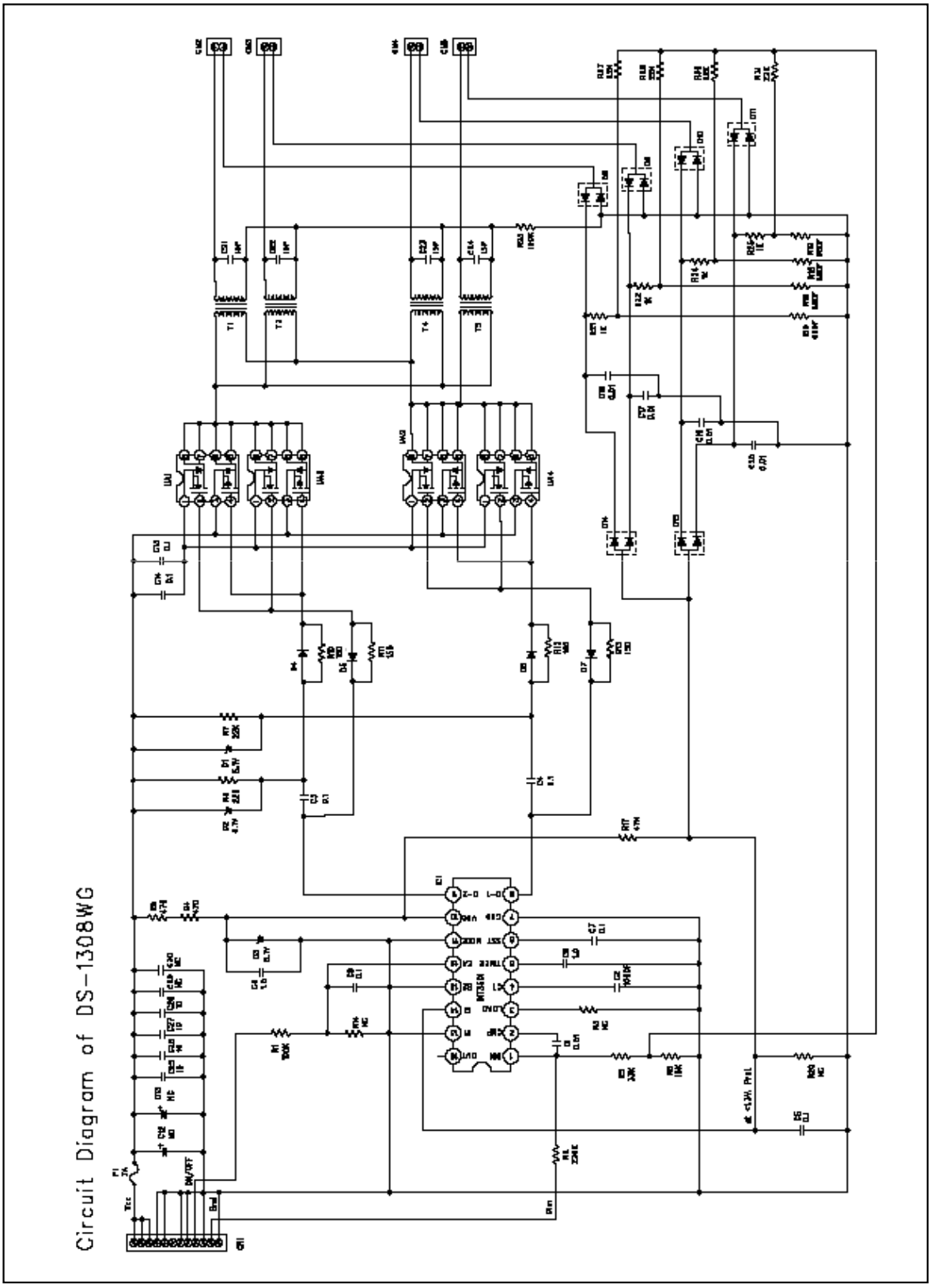
1 Box = 280 Pieces (20 Ea × 7 layer × 2 Row)



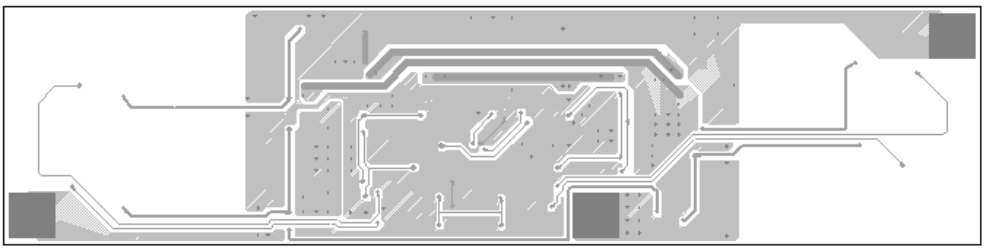
13. Parts List (Voltage- Dimming)

NO	SYMBOL	TYPE	MAIN		ALTERNATIVE	
			TYPE	MAKER	TYPE	MAKER
1	IC1	IC	BIT3501	Bitek		
2	UA1,2,3,4	Dual-channel FET	TM8958	Tech-mos	Equivalent	
3	D8,9,10,11	Diode(series connection)	EDS7000	S&E	〃	
4	D14,15	Diode(Annode common)	EDS2836	S&E	〃	
5	D4,5,6,7	Diode	1SS355	Rohm	〃	
6	D1,2,3	Zener	MM3Z5V1T1	Onsemi	〃	
7	C21,22,23,24	CC 15pF/3kV-J	4520	Maruwa	〃	
8	C29,30	MLCC, 1.0uF/16V-Z	3216	Walsin	〃	
9	C2	MLCC, 820pF/50V-J	1608	Walsin	〃	
10	C1,16,17,19,20	MLCC, 0.01㎌/50V-K	1608	Walsin	〃	
11	C3,4,5,7,9,14,15	MLCC, 0.1㎌/50V-Z	1608	Walsin	〃	
12	C6	MLCC, 1.0㎌/16V-Z	1608	Walsin	〃	
13	C8	MLCC, 2.2㎌/10V-Z	1608	Walsin	〃	
14	C12,13	CE, 220uF/35V,105℃	220uF/35V	Samwha	〃	
15	R4,9	Resistor 470Ω J	3216	Walsin	〃	
16	R23	Resistor 100KΩ J	3216	Walsin	〃	
17	R10,11,12,13	Resistor 100Ω J	1608	Walsin	〃	
18	R15,16,18,19	Resistor 680Ω F	1608	Walsin	〃	
19	R21,22,24,25	Resistor 1KΩ J	1608	Walsin	〃	
20	R6	Resistor 9.1KΩ J	1608	Walsin	〃	
21	R7,8,17,27,28,30,31	Resistor 22KΩ J	1608	Walsin	〃	
22	R5	Resistor 33KΩ J	1608	Walsin	〃	
23	R1	Resistor 100KΩ J	1608	Walsin	〃	
24	R2	Resistor 220KΩ J	1608	Walsin	〃	
25	T1,2,3,4	Transformer	DS-2823	Dongheung	〃	
26	F1	Fuse, 7A	3216TD	COOPER BUSSMANN	〃	
27	CN1	Connector,12P	12505WR-12A00	YEONHO	〃	
28	CN2,3,4,5	Connector	35001WR-02A00	YEONHO	〃	
29	PWB	PWB, 1.2t	DS-1308WG	E-RE Electronics	〃	

14. Circuit Diagram



15. PCB Lay- Out



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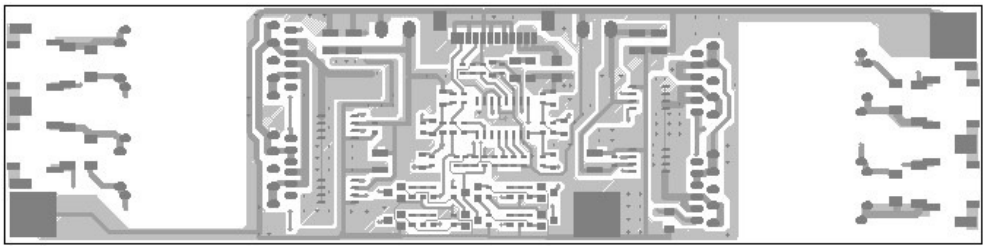

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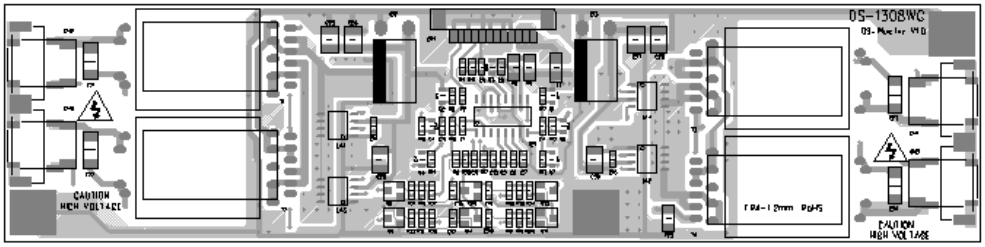

< Components Lay-Out >

16. Material List

Symbol	Component	Type No.	Manufacture	Description
F1	FUSE	3216TD(7A)	COOPER Bussmann or Equivalent	UL File No.-E19180
	PCB		E-RE Electronics or Equivalent	UL File No.-E213562
CN1	Connector	12505WR-12A00	YEONHO or Equivalent	UL File No.-E108706
CN2,3,4,5	Connector	35001WR-02A00	YEONHO or Equivalent	UL File No.-E108706
⚠ T1,2,3,4	Transformer	DS-2823	Dongheung or Equivalent	See Specification