



Test Report: HLG-480H-C2800

480W Single Output LED Power Supply

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

DESIGN VERIFY TEST

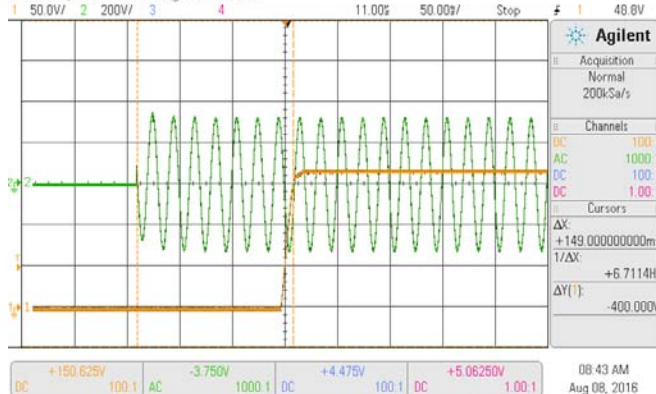
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CURRENT TOLERANCE	±5%	I/P: 230 VAC I/P:115VAC O/P:FULL LOAD Ta:25°C	2.800A /230VAC@CV MAX-1V 2.793A /230VAC@CV MIN 2.801A/115VAC@CV MAX-1V 2.793A/115VAC@CV MIN -0.25%
2	CONSTANT CURRENT REGION	CH1: 85 V~ 171V	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	50V~171V /230VAC
3	OPEN CIRCUIT VOLTAGE (max.)	210V	I/P: 230 VAC O/P:NO LOAD Ta:25°C	173.62V
4	CURRENT ADJ. RANGE	CH1:1400mA~ 2800mA	I/P: 230 VAC I/P:115VAC O/P:CV MIN & CV MAX-1V Ta:25°C	1.224A~3.000 A /230VAC@CV MAX-1V 1.22A~ 2.990A /230VAC@CV MIN 1.224A~3.000A/115VAC@CV MAX-1V 1.22A~2.990A/115VAC@CV MIN
5	CURRENT RIPPLE	5% max. @rated current	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	2.84%
6	SET UP TIME (Max)	230VAC/ 500 ms (Max) 115VAC/ 500ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 149ms 115 VAC/ 174ms

INPUT=230VAC/50HZ @ FULL LOAD

CH1 : Output Voltage CH2 : AC Input Voltage

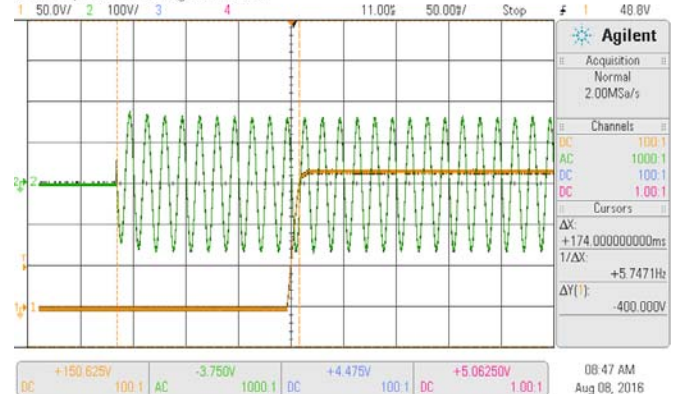
DSO-X 3014A, M154100664, Mon Aug 08 08:44:04 2016



INPUT=115VAC/60HZ @ FULL LOAD

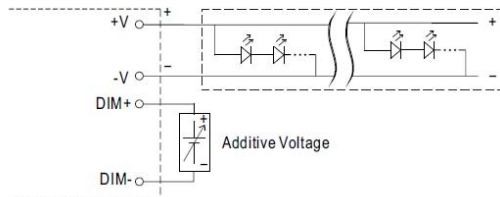
CH1 : Output Voltage CH2 : AC Input Voltage

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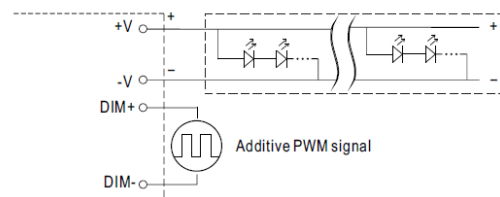
7	DIMMING OPERATION (for B-Type)	<p>※3 in 1 dimming function</p> <p>※Output constant current level can be adjusted by applying one of the three methodologies between DIM+ and DIM-: 0 ~ 10VDC, or 10V PWM signal or resistance.</p> <p>※Direct connecting to LEDs is suggested. It is not suitable to be used with additional drivers.</p> <p>※Dimming source current from power supply: 100μ. A (typ.)</p>		
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◎ Applying additive 0 ~ 10VDC



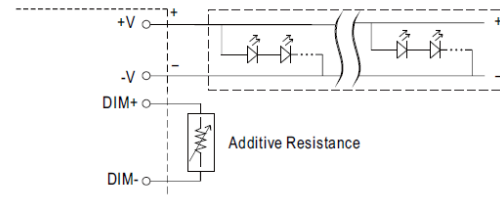
"DO NOT connect "DIM- to -V"

◎ Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):

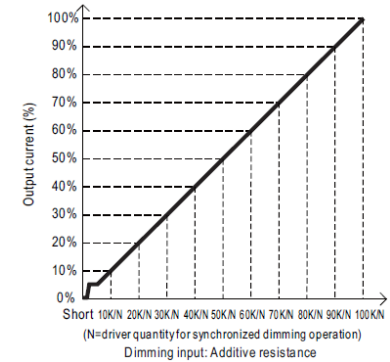
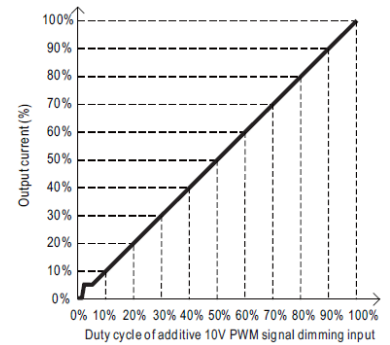
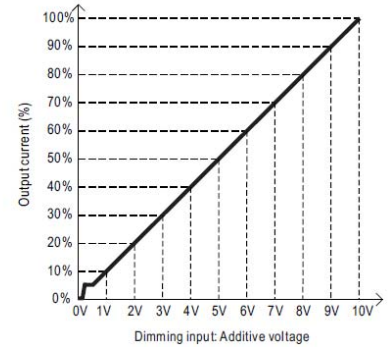


"DO NOT connect "DIM- to -V"

◎ Applying additive resistance:



"DO NOT connect "DIM- to -V"



Note : 1. Min. dimming level is about 6% and the output current is not defined when 0% < I_{out} < 6%.

2. The output current could drop down to 0% when dimming input is about 0kΩ or 0Vdc, or 10V PWM signal with 0% duty cycle.

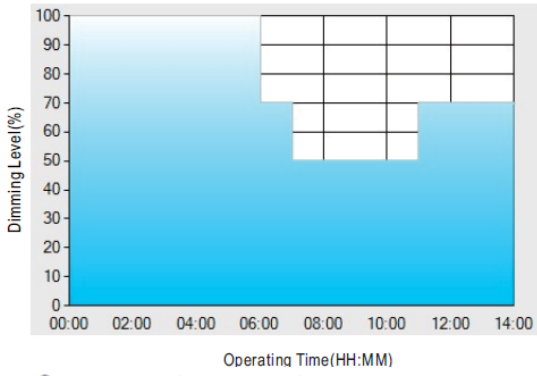
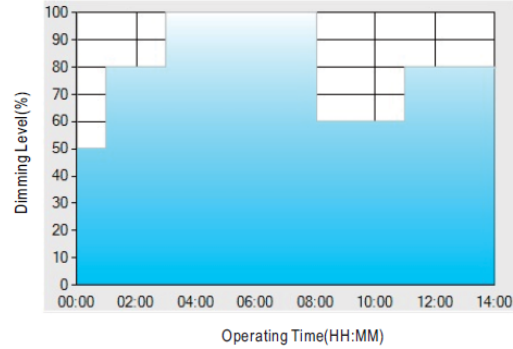
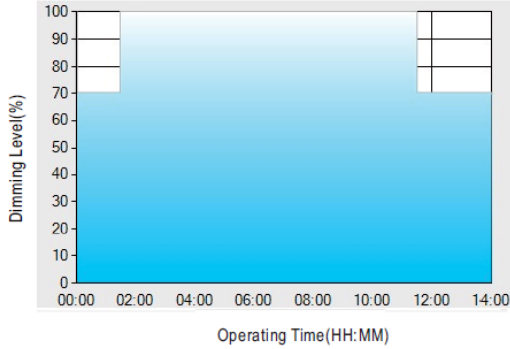
I/P : 230VAC

O/P : DIMMING TEST

TA : 25°C

R	SHORT	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN
O/P CURRENT	0A	0.269A	0.563A	0.855A	1.159A	1.430A	1.700A	1.990A	2.280A	2.570A	2.800A	2.800A
%	0%	9.61%	20.11%	30.54%	41.39%	51.07%	60.71%	71.07%	81.43%	91.79%	100.00%	100.00%
V	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
O/P CURRENT	0A	0.265A	0.575A	0.850A	1.141A	1.440A	1.690A	1.980A	2.300A	2.572A	2.800A	2.800A
%	0%	9.46%	20.54%	30.36%	40.75%	51.43%	60.36%	70.71%	82.14%	91.86%	100.00%	100.00%
PWM (100HZ)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
O/P CURRENT	0A	0.212A	0.516A	0.821A	1.096A	1.390A	1.680A	1.970A	2.270A	2.540A	2.800A	2.800A
%	0%	7.57%	18.43%	29.32%	39.14%	49.64%	60.00%	70.36%	81.07%	90.71%	100.00%	100.00%

TEST RESULT : OK

<p>8</p>	<p>DIMMING OPERATION (for Dxx-Type by User definition)</p> <p>※Smart timer dimming function (for Dxx-Type by User definition) MEAN WELL Smart timer dimming primarily provides the adaptive proportion dimming profile for the output constant current level to perform up to 14 consecutive hours. 3 dimming profiles hereunder are defined accounting for the most frequently seen applications. If other options may be needed, please contact MEAN WELL for details. Ex: ☉ D01-Type: the profile recommended for residential lighting</p>  <p>Set up for D01-Type in Smart timer dimming software program:</p> <table border="1" data-bbox="1050 593 1484 721"> <thead> <tr> <th></th> <th>T1</th> <th>T2</th> <th>T3</th> <th>T4</th> </tr> </thead> <tbody> <tr> <td>TIME**</td> <td>06:00</td> <td>07:00</td> <td>11:00</td> <td>--</td> </tr> <tr> <td>LEVEL**</td> <td>100%</td> <td>70%</td> <td>50%</td> <td>70%</td> </tr> </tbody> </table> <p>Ex: ☉ D02-Type: the profile recommended for street lighting</p>  <p>Set up for D02-Type in Smart timer dimming software program:</p> <table border="1" data-bbox="997 990 1497 1117"> <thead> <tr> <th></th> <th>T1</th> <th>T2</th> <th>T3</th> <th>T4</th> <th>T5</th> </tr> </thead> <tbody> <tr> <td>TIME**</td> <td>01:00</td> <td>03:00</td> <td>8:00</td> <td>11:00</td> <td>--</td> </tr> <tr> <td>LEVEL**</td> <td>50%</td> <td>80%</td> <td>100%</td> <td>60%</td> <td>80%</td> </tr> </tbody> </table> <p>Ex: ☉ D03-Type: the profile recommended for tunnel lighting</p>  <p>Set up for D03-Type in Smart timer dimming software program:</p> <table border="1" data-bbox="1066 1384 1417 1518"> <thead> <tr> <th></th> <th>T1</th> <th>T2</th> <th>T3</th> </tr> </thead> <tbody> <tr> <td>TIME**</td> <td>01:30</td> <td>11:00</td> <td>---</td> </tr> <tr> <td>LEVEL**</td> <td>70%</td> <td>100%</td> <td>70%</td> </tr> </tbody> </table> <p>I/P : 230VAC O/P : DIMMING TEST TA : 25°C TEST RESULT : OK</p>		T1	T2	T3	T4	TIME**	06:00	07:00	11:00	--	LEVEL**	100%	70%	50%	70%		T1	T2	T3	T4	T5	TIME**	01:00	03:00	8:00	11:00	--	LEVEL**	50%	80%	100%	60%	80%		T1	T2	T3	TIME**	01:30	11:00	---	LEVEL**	70%	100%	70%
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LEVEL**	70%	100%	70%																																											

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC-305 VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	74V-305 V



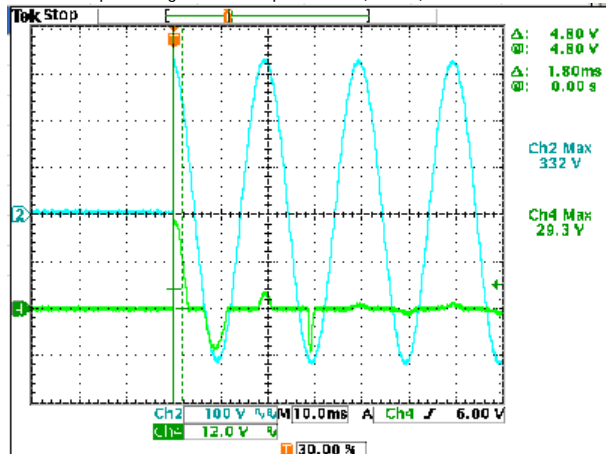
480W Single Output LED Power Supply

HLG-480H-C series

			I/P: LOW-LINE-3V=87 V HIGH-LINE+10V=315 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST:OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 100 VAC ~305VAC O/P:FULL ~MIN LOAD Ta:25°C	OK
3	INPUT CURRENT (TYP)	277VAC/ 2A 230 VAC/ 2.45 A 115 VAC/ 5 A	I/P: 277VAC/230 VAC/115 VAC O/P:FULL LOAD Ta:25°C	I=1.86A/277VAC I =2.206 A/ 230VAC I =4.433A/ 115VAC
4	LEAKAGE CURRENT	< 0.75 mA/ 277 VAC	I/P : 277 VAC O/P : Min LOAD Ta : 25°C	L-FG: 0.26mA N-FG: 0.26mA
5	INRUSH CURRENT (TYP)	230 V/ 35A COLD START (twidth=1800us measured at 50% Ipeak) COLD START	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	I = 29.3 A/ 230VAC T50=1320 μS

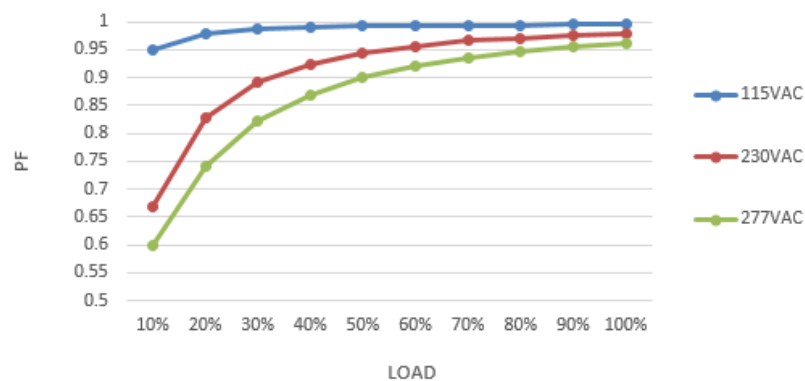
INPUT=230VAC/50HZ @ FULL LOAD

CH2 : AC Input Voltage CH4 : Input current (1V=1A)



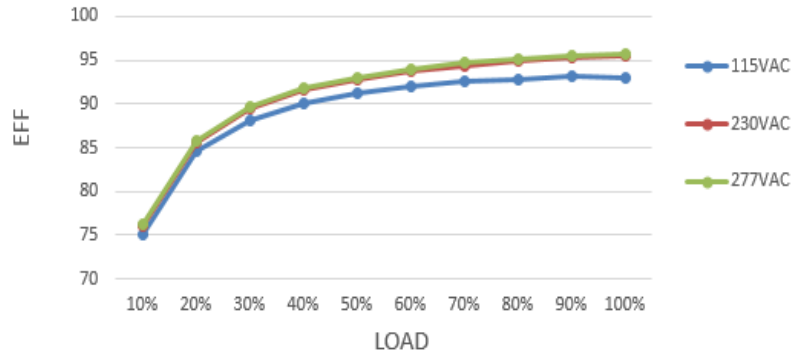
6	POWER FACTOR(TYP)	0.95/230 VAC FULL LOAD 0.98/115 VAC FULL LOAD 0.94/277 VAC FULL LOAD	I/P: 230 VAC/115VAC/277VAC O/P:FULL LOAD Ta:25°C	PF= 0.9815/230V/100%LOAD PF=0.9977/115V/100%LOAD PF=0.962 /277V/100%LOAD
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P.F vs LOAD



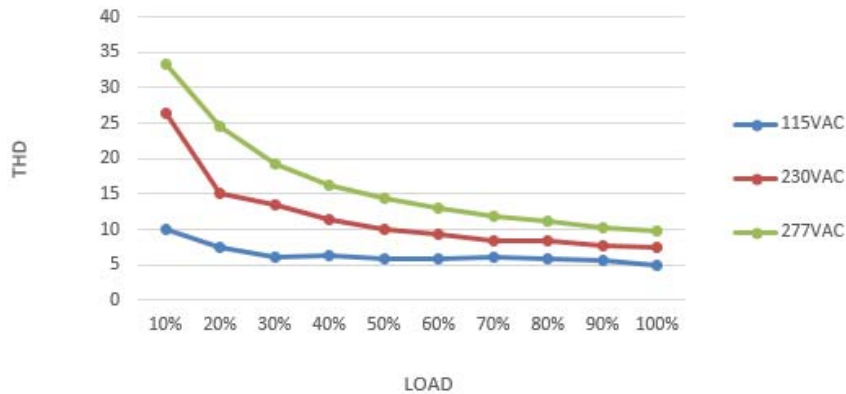
7	EFFICIENCY (TYP)	95 %	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	95.3 %
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EFFICIENCY vs LOAD



8	TOTAL HARMONIC DISTORTION	THD < 20% @ output load ≥ 40% at 115VAC/230VAC/277VAC input	I/P : 115VAC O/P : 100% LOAD 40% LOAD Ta : 25°C	THD : 7.1 % THD : 7.2 %
			I/P : 230VAC O/P : 100% LOAD 40% LOAD Ta : 25°C	THD : 8.12 % THD : 12.9 %
			I/P : 277VAC O/P : 100% LOAD 40% LOAD Ta : 25°C	THD : 10.47 % THD : 16.23 %

THD&LOAD



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	V1: 215 V~ 246 V PROTECTION TYPE : Shut down output voltage, re-power on to recovery	I/P: 305VAC I/P: 230VAC I/P: 90VAC O/P: MIN LOAD Ta: 25°C	224V/ 305VAC 224V/ 230VAC 224V/ 90VAC PROTECTION TYPE : Shut down-Repower ON

2	OVER TEMPERATURE PROTECTION	PROTECTION TYPE : Shut down output voltage, re-power on to recovery	I/P: 305 VAC I/P: 90 VAC O/P: FULL LOAD	O.T.P Active PROTECTION TYPE : Shut down-Repower ON
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE PROTECTION TYPE : Constant current, recovers automatically after fault condition is removed	I/P: 305VAC I/P: 90 VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE PROTECTION TYPE : Current Limiting

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q 10 Rated 13 A/ 650 V Q 13 Rated 13 A/ 650 V	I/P: High-Line +3V = 308V AC ON/OFF VDS: O/P: (1) Full Load (2) Output Short (3) Full Load continue (4) NO LOAD I/P: Low-Line -3V = 97V VDS: O/P: (1) Full Load (2) Output Short (3) Full Load continue (4) NO LOAD Ta: 25°C	Q10 Q13 VDS: VDS: (1) 500V (1) 494V (2) 486V (2) 478V (3) 470V (3) 482V (4) 470V (4) 482V VDS: VDS: (1) 522V (1) 494V (2) 486V (2) 478V (3) 478V (3) 474V (4) 458V (4) 486V
2	P.F.C Transistor ((D to S) or (C to E) Peak Voltage	Q1 Rated 13 A/ 650 V	I/P: High-Line +3V = 308V AC ON/OFF VDS: O/P: (1) Full Load (2) Output Short (3) Full Load continue (4) NO LOAD I/P: Low-Line -3V = 97V VDS: O/P: (1) Full Load (2) Output Short (3) Full Load continue (4) NO LOAD Ta: 25°C	Q1 VDS: (1) 532V (2) 456V (3) 508V (4) 460V VDS: (1) 605V (2) 476V (3) 605V (4) 460V
3	P.F.C DIODE	D8 Rated 12A/ 600V	I/P: High-Line +3V = 308 V AC ON/OFF O/P: (1) Full Load (2) Output Short (3) Full Load continue (4) NO LOAD I/P: Low-Line -3V = 97V AC ON/OFF O/P: (1) Full Load (2) Output Short (3) Full Load continue (4) NO LOAD	308V (1) 469V (2) 437V (3) 437V (4) 441V 97V (1) 521V (2) 429V (3) 517V (4) 429V

			Ta:25°C	
4	Diode Peak Voltage	D100 Rated 10A/ 400 V D101 Rated 20A/600 V	I/P:High-Line +3V =308 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3) Full Load continue (4)NO LOAD (5) burst mode Ta:25°C	D100: 308V VDS: (1)369V (2)35V (3)361V (4)365V (5)361V D101: VDS: (1)373V (2)39V (3)365V (4)361V (5)365V
5	Input Capacitor Voltage	C5 Rated: 150μ/ 450V	I/P:High-Line +3V =308V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full load continue Ta:25°C	(1)448V (2)447V (3) 435V
6	Control IC Voltage Test	PWM IC U2 Rated 16V~ 8.85V(MIN.) PFC IC U1 Rated 20V~10.5V(MIN.)	I/P:High-Line +3V =308 V AC ON/OFF O/P:(1)FULL LOAD (2) Output Short (3)O.V.P. Ta:25°C	U2 (1)13.5V (2)13.3V (3)13.37V U1 (1)14.125V (2)14.125V (3)13.9V

SAFETY & EMC TEST REPORT

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	IEC60950-1 I/P-O/P: 3.75KVAC/min I/P-FG:2 KVAC/min<4.5mA O/P-FG:1.5KVAC/min	I/P-O/P: 4.125 KVAC/min I/P-FG: 2.4KVAC/min O/P-FG: 1.8 KVAC/min Ta:25°C	I/P-O/P:4.48mA I/P-FG:3.98mA O/P-FG: 5.49 mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-O/P:23.3GΩ I/P-FG:11.1GΩ O/P-FG:30GΩ NO DAMAGE
3	GROUNDING CONTINUITY	IEC60950-1 FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	25mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS C	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS
2	CONDUCTION	EN55015 CLASS B	I/P: 230 VAC /50HZ O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab
3	RADIATION	EN55015 CLASS B	I/P: 230 VAC /50HZ O/P:FULL LOAD Ta:25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY	I/P: 230 VAC/50HZ O/P:FULL LOAD	CRITERIA A



480W Single Output LED Power Supply

HLG-480H-C series

2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 305VAC/100VAC O/P : 100 % LOAD Ta= -45°C	TEST : OK
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60 °C NO DAMAGE	I/P : 315 VAC O/P : FULL LOAD Ta= 60 °C HUMIDITY= 95 %R.H	TEST : OK
4	TEMPERATURE COEFFICIENT	± 0.03%/°C (0-60°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.007 %/°C (0-60°C)
5	STORAGE TEMPERATURE TEST	<ol style="list-style-type: none"> 1. Thermal shock Temperature : -45°C ~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 5 CYCLE 5. Input/Output condition : STATIC 		OK
6	THERMAL SHOCK TEST	<ol style="list-style-type: none"> 1. Thermal shock Temperature : -45°C ~ +65°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:230V/ FULL LOAD Burn In Test 		OK
7	VIBRATION TEST	<ol style="list-style-type: none"> 1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10-500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 5G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C 		TEST : OK
8	CAPACITOR LIFE CYCLE	SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Tc= 75 °C LIFE TIME (2) I/P : 230VAC O/P : 75% LOAD Tc= 75 °C LIFE TIME (3) I/P : 230VAC O/P : 50% LOAD Tc= 75 °C LIFE TIME		(1) 74988 HRS (2) 81335 HRS (3) 83566 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 421.1K hrs min. Telcordia SR-332 (Bellcore) ; 110.5K hrs min. MIL-HDBK-217F (25°C)		
10	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 62,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	DANIEL GAO	SANFORD SU	VINCENT TSENG

12.10.30 A50-F031