



Test Report: HLG-320H-C1400

320W 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

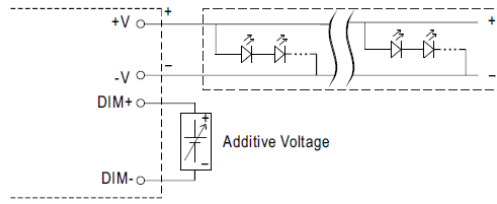
ENVIRONMENT TEST

DESIGN VERIFY TEST

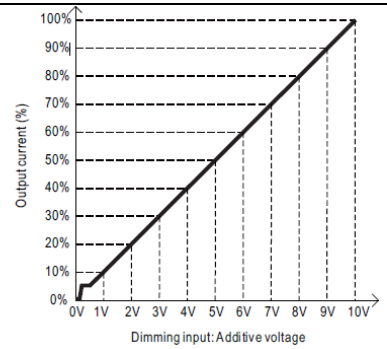
OUTPUT FUNCTION TEST

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	1.3898A /230VAC@CV MAX-1V 1.3892A /230VAC@CV MIN 1.3904A/115VAC@CV MAX-1V 1.3911A/115VAC@CV MIN 0.14%
2	CONSTANT CURRENT REGION	CH1: 114 V~ 229V	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	0.5V~228V /230VAC
3	OPEN CIRCUIT VOLTAGE (max.)	234V	I/P: 230 VAC O/P:NO LOAD Ta:25°C	230V
4	CURRENT ADJ. RANGE	CH1:700mA~ 1400mA	I/P: 230 VAC I/P:115VAC O/P:CV MIN & CV MAX-1V Ta:25°C	0.560A~ 1.629 A /230VAC@CV MAX-1V 0.558A~1.626 A /230VAC@CV MIN 0.561A~1.629A/115VAC@CV MAX-1V 0.558A~1.629A/115VAC@CV MIN
5	CURRENT RIPPLE	5.0% max. @rated current	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	1.14%
6	SET UP TIME (Max)	230VAC/ 500 ms (Max) 115VAC/ 1000ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 238 ms 115 VAC/ 280 ms
		<div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1 : Output Voltage CH2 : AC Input Voltage</p> </div> <div style="width: 45%;"> <p>INPUT=115VAC/60HZ @ FULL LOAD</p> <p>CH1 : Output Voltage CH2 : AC Input Voltage</p> </div> </div>		
7	DIMMING OPERATION (for B-Type)	<p>※3 in 1 dimming function (for B-Type)</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>		

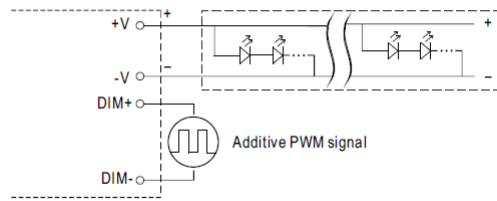
◎ Applying additive 0 ~ 10VDC



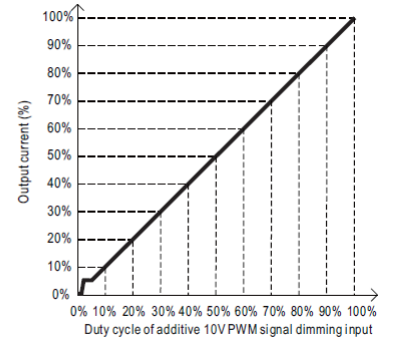
"DO NOT connect "DIM- to -V"



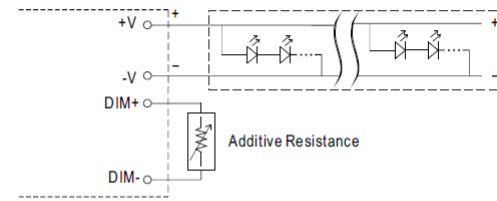
◎ Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):



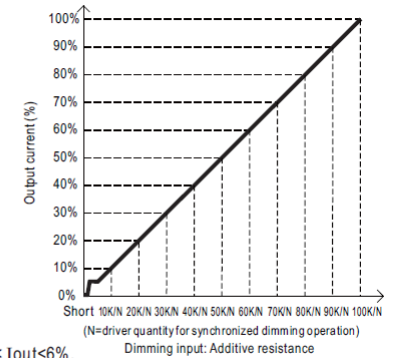
"DO NOT connect "DIM- to -V"



◎ 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 $0k\Omega$ or 0Vdc, or 10V PWM signal with 0% duty cycle.

I/P : 230VAC
 O/P : DIMMING TEST
 TA : 25°C

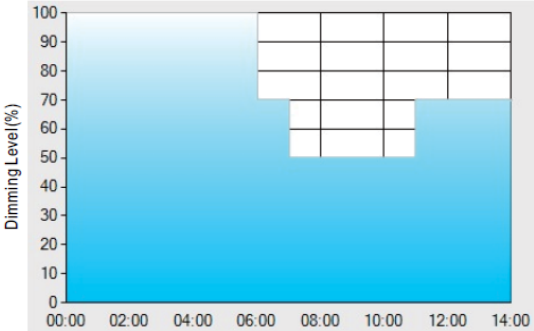
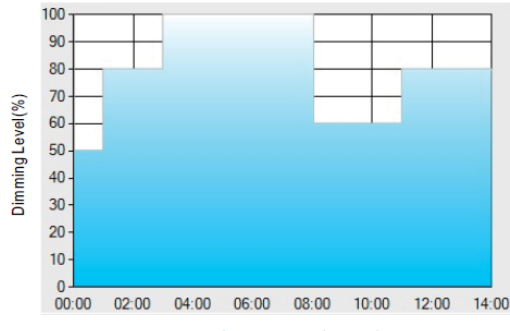
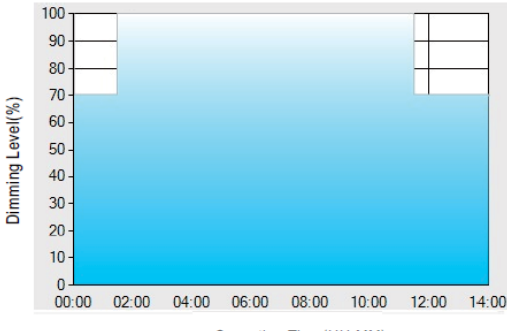
R	SHORT	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN
O/P CURRENT	0.00000A	0.125A	0.265A	0.412A	0.554A	0.700A	0.836A	0.980A	1.120A	1.260A	1.380A	1.400A
%	0.00%	8.93%	18.93%	29.43%	39.57%	50.00%	59.71%	70.00%	80.00%	90.00%	98.57%	100.00%
V	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
O/P CURRENT	0.00000A	0.152A	0.286A	0.434A	0.562A	0.714A	0.856A	0.980A	1.120A	1.250A	1.380A	1.400A
%	0.00%	10.86%	20.43%	31.00%	40.14%	51.00%	61.14%	70.00%	80.00%	89.29%	98.57%	100.00%
PWM (100HZ)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
O/P CURRENT	0.00000A	0.149A	0.293A	0.448A	0.592A	0.728A	0.864A	0.996A	1.130A	1.250A	1.370A	1.400A
%	0.00%	10.64%	20.93%	32.00%	42.29%	52.00%	61.71%	71.14%	80.71%	89.29%	97.86%	100.00%

TEST RESULT : OK

8 DIMMING OPERATION (primary side; for DA-Type)

※ DALI Interface

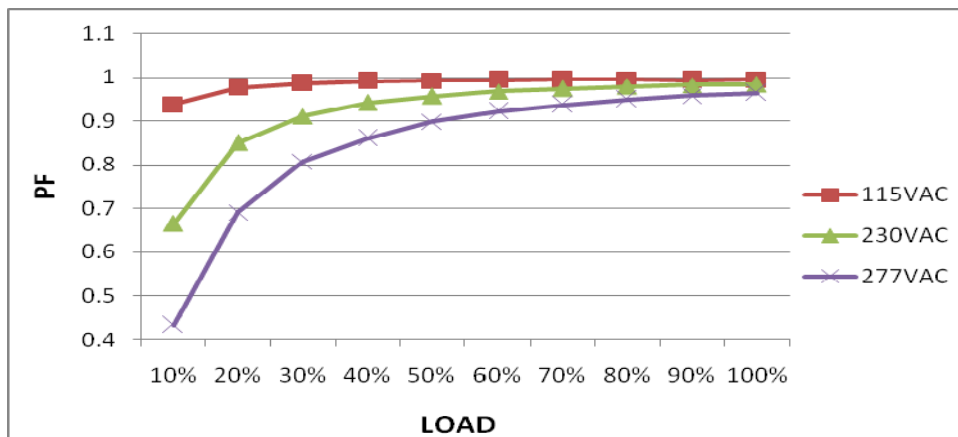
- * Apply DALI signal between DA+ and DA-.
- * DALI protocol comprises 16 groups and 64 addresses.
- * First step is fixed at 8% of output. Please contact MEAN WELL for other setup.

		I/P : 230VAC O/P : DIMMING TEST TA : 25°C TEST RESULT : OK																																													
9	DIMMING OPERATION (for Dxx-Type by User definition)	<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> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  <p style="text-align: center;">Operating Time(HH:MM)</p> </div> <div style="width: 45%;"> <p>Set up for D01-Type in Smart timer dimming software program:</p> <table border="1" data-bbox="1050 611 1484 741"> <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> </div> </div> <p> Ex : Ⓒ D02-Type: the profile recommended for street lighting </p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  <p style="text-align: center;">Operating Time(HH:MM)</p> </div> <div style="width: 45%;"> <p>Set up for D02-Type in Smart timer dimming software program:</p> <table border="1" data-bbox="997 1010 1497 1135"> <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> </div> </div> <p> Ex : Ⓒ D03-Type: the profile recommended for tunnel lighting </p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  <p style="text-align: center;">Operating Time(HH:MM)</p> </div> <div style="width: 45%;"> <p>Set up for D03-Type in Smart timer dimming software program:</p> <table border="1" data-bbox="1066 1406 1417 1541"> <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> </div> </div> <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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TIME**	01:30	11:00	---																																												
LEVEL**	70%	100%	70%																																												

INPUT FUNCTION TEST

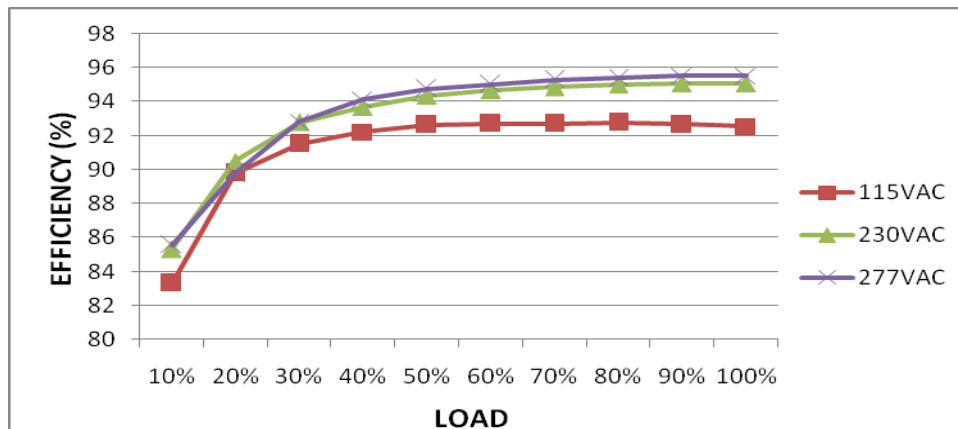
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~305 VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	66V~305 V
			I/P: LOW-LINE-3V=87 V HIGH-LINE+10V=315 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	(1).TEST:OK (2).TEST :OK
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/ 1.45 A 230 VAC/ 1.65 A 115 VAC/ 3.5 A	I/P: 277VAC/230 VAC/115 VAC O/P:FULL LOAD Ta:25°C	I=1.248 A/277VAC I=1.478 A/ 230VAC I=3.024A/ 115VAC
4	POWER FACTOR(TYP)	0.95/230 VAC FULL LOAD 0.98/115 VAC FULL LOAD 0.92/277 VAC FULL LOAD	I/P: 230 VAC/115VAC/277VAC O/P:FULL LOAD Ta:25°C	PF=0.9851 /230V/100%LOAD PF=0.9973/115V/100%LOAD PF=0.964/277V/100%LOAD

P.F vs LOAD



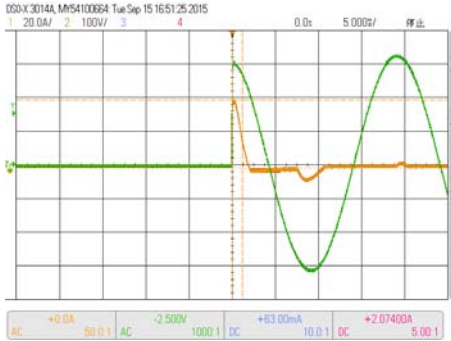
5	EFFICIENCY (TYP)	94 %	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	94.59 %
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EFFICIENCY vs LOAD



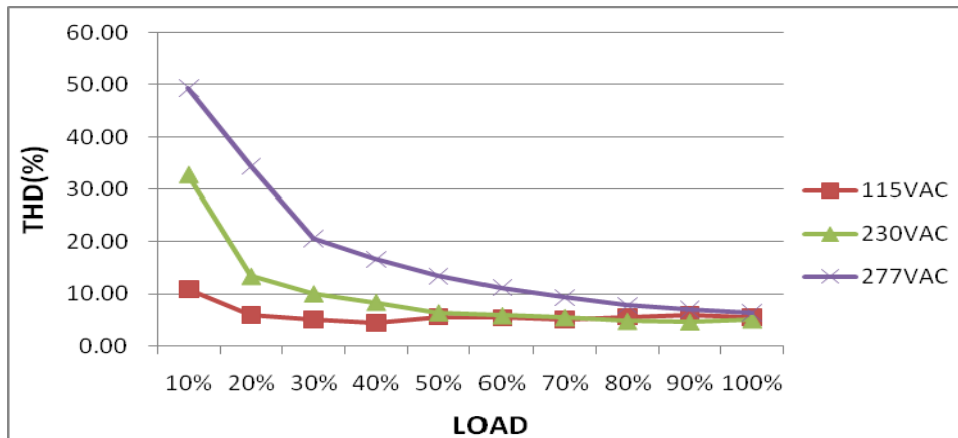
6	INRUSH CURRENT (TYP)	230 V/ 70 A COLD START (twidth=1200us measured at 50% Ipeak) COLD START	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I = 40.25 A/ 230VAC NOTE8 T50= 1200 us
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INPUT=230VAC/50HZ @ FULL LOAD
CH2 : AC Input Voltage CH4 : Input current (1V=1A)



7	TOTAL HARMONIC DISTORTION	THD < 20% @ $\geq 50\%$ load/115VAC/230VAC,	I/P : 230VAC O/P : 100% LOAD 50% LOAD Ta : 25°C	THD : 4.3 % THD : 7.1 %
		THD < 20% @ $\geq 70\%$ load/277VAC	I/P : 277VAC O/P : 100% LOAD 70% LOAD Ta : 25°C	THD : 7.12 % THD : 10.94 %

THD vs LOAD



ROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	V1: 235 V~ 252 V	I/P: 305VAC I/P: 230VAC I/P: 90VAC O/P: MIN LOAD Ta: 25°C	241.58V/ 305VAC 241.55V/ 230VAC 241.39V/ 90VAC PROTECTION TYPE : Shut down and latch off o/p voltage, re-power on to recover

2	OVER TEMPERATURE PROTECTION	PROTECTION TYPE : Shut down and latch off o/p voltage, re-power on to recover	I/P: 305 VAC I/P: 90 VAC O/P: FULL LOAD	O.T.P.Active PROTECTION TYPE : Shut down and latch off o/p voltage, re-power on to recover
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 305VAC I/P: 90 VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE PROTECTION TYPE : Constant current limiting, recovers automatically after fault condition is removed

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q5 Rated 20 A/ 600 V	I/P:High-Line +3V =308v AC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3) Full Load continue I/P:Low-Line -3V = 107V O/P: (1)Full Load (2)Output Short (3) Full Load continue Ta:25°C	VDS: (1)521V/5.37A (2)546V/2.93/A (3)468V/2.56A VDS: (1)465V/7.65A (2)503V/2.93/A (3)450V/2.37A
2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 20A/ 600V	I/P:High-Line +3V =308v AC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3) Full Load continue I/P:Low-Line -3V = 107V O/P: (1)Full Load (2)Output Short (3) Full Load continue Ta:25°C	VDS: (1)562V/17.1A (2)546V/10.35 A (3)537V/14.8A
3	P.F.C DIODE	D2 Rated 15A/600V	I/P:High-Line +3V =308 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3) Full Load continue Ta:25°C	(1)481 (2)450V (3)446V
4	Diode Peak Voltage	D102 Rated 10 A/600 V	I/P:High-Line +3V =308 V D102 : AC ON/OFF O/P: (1)Full Load (2)Output Short (3) Full Load continue VTa:25°C	VDS: (1)496V (2)29.3V (3)500V
5	Input Capacitor Voltage	C5 Rated: 220 μ/ 450 V 105°C Surge Voltage 495V	I/P:High-Line +3V =308V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue	(1)475V (2)443V (3)446V (4) 440V

			Ta:25°C	
6	Control IC Voltage Test	PWM IC U900 Rated 16V/8.85V(MIN.) PFC IC U1 Rated 20 V/ 8.6 V(MIN.)	I/P:High-Line +3V =308 V AC ON/OFF O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. Ta:25°C	(1) 12.1V (2) 12.8V (3) 12.8V (4) 12.0V (1)14.5V (2)15.3V (3)15.3V (4)13.2V

SAFETY & EMC TEST

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:4.33mA I/P-FG: 4.28 mA O/P-FG: 3.92 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:23.8 GΩ I/P-FG:21.5 G Ω O/P-FG:30 G Ω NO DAMAGE
3	GROUNDING CONTINUITY	IEC60950-1 FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	26mΩ
4	LEAKAGE CURRENT	IEC60950-1 < 0.75mA / 277VAC	I/P: 277 VAC O/P:Min LOAD Ta:25°C	L-FG:0.3 mA N-FG:0.3 mA L,N -V(+):0.24 mA L,N-V(-):0.24 mA

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A CLASS C	I/P: 230VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS
2	CONDUCTION	EN55015 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL/50% LOADOP 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 INDUSTRY AIR:8KV / Contact:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT: 2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A

6	SURGE	IEC61000-4-5 INDUSTRY L-N :2KV L,N-PE:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
7	Test by certified Lab & Test Report Prepare. Any contradictions of the test results, please refer to the latest EMC test report.			

RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																												
1	TEMPERATURE RISE TEST	MODEL : HLG-320H-C1050 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta=29.4°C 2. HIGH AMBIENT BURN-IN : 14 HRS I/P : 230VAC O/P : FULL LOAD Ta=50.3 °C																																																																																														
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 29.4 °C</th> <th>HIGH AMBIENT Ta=50.3°C</th> </tr> </thead> <tbody> <tr><td>1</td><td>L2</td><td>57.9°C</td><td>78.8°C</td></tr> <tr><td>2</td><td>C11</td><td>58.1°C</td><td>79.0°C</td></tr> <tr><td>3</td><td>L1</td><td>56.6°C</td><td>77.5°C</td></tr> <tr><td>4</td><td>BD1</td><td>60.5°C</td><td>81.4°C</td></tr> <tr><td>5</td><td>Q1</td><td>60.5°C</td><td>81.4°C</td></tr> <tr><td>6</td><td>RY1</td><td>58.8°C</td><td>79.7°C</td></tr> <tr><td>7</td><td>C5</td><td>56.9°C</td><td>77.8°C</td></tr> <tr><td>8</td><td>C81</td><td>58.5°C</td><td>79.4°C</td></tr> <tr><td>9</td><td>U1</td><td>56.5°C</td><td>77.4°C</td></tr> <tr><td>10</td><td>U900</td><td>56.6°C</td><td>77.5°C</td></tr> <tr><td>11</td><td>C902</td><td>59.2°C</td><td>80.1°C</td></tr> <tr><td>12</td><td>RTH2</td><td>56.9°C</td><td>77.8°C</td></tr> <tr><td>13</td><td>C906</td><td>55.8°C</td><td>76.7°C</td></tr> <tr><td>14</td><td>T1</td><td>70.8°C</td><td>91.7°C</td></tr> <tr><td>15</td><td>C202</td><td>56.1°C</td><td>77.0°C</td></tr> <tr><td>16</td><td>C201</td><td>54.7°C</td><td>75.6°C</td></tr> <tr><td>17</td><td>D102</td><td>61.3°C</td><td>82.2°C</td></tr> <tr><td>18</td><td>D103</td><td>59.2°C</td><td>80.1°C</td></tr> <tr><td>19</td><td>C103</td><td>55.4°C</td><td>76.3°C</td></tr> <tr><td>20</td><td>C108</td><td>53.2°C</td><td>74.1°C</td></tr> <tr><td>21</td><td>C110</td><td>51.8°C</td><td>72.7°C</td></tr> <tr><td>22</td><td>Q5</td><td>59.8°C</td><td>80.7°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 29.4 °C	HIGH AMBIENT Ta=50.3°C	1	L2	57.9°C	78.8°C	2	C11	58.1°C	79.0°C	3	L1	56.6°C	77.5°C	4	BD1	60.5°C	81.4°C	5	Q1	60.5°C	81.4°C	6	RY1	58.8°C	79.7°C	7	C5	56.9°C	77.8°C	8	C81	58.5°C	79.4°C	9	U1	56.5°C	77.4°C	10	U900	56.6°C	77.5°C	11	C902	59.2°C	80.1°C	12	RTH2	56.9°C	77.8°C	13	C906	55.8°C	76.7°C	14	T1	70.8°C	91.7°C	15	C202	56.1°C	77.0°C	16	C201	54.7°C	75.6°C	17	D102	61.3°C	82.2°C	18	D103	59.2°C	80.1°C	19	C103	55.4°C	76.3°C	20	C108	53.2°C	74.1°C	21	C110	51.8°C	72.7°C	22	Q5	59.8°C	80.7°C
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 305VAC/110VAC 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 (0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.001%/°C (0~50°C)																																																																																												



320W Single Output LED Power Supply

HLG-320H-C series

5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -50°C~ +125°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	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 : 16 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	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 5G (5) Test Time : 72min in each axis (X.Y.Z) (6) Ta : 25°C	TEST : OK
8	CAPACITOR LIFE CYCLE	SUPPOSE C103 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) 79984 HRS (2) 99469 HRS (3) 101072 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 168.2K 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 ZENG

12.10.30 A50-F031