



Test Report: HVGC-320-1750

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

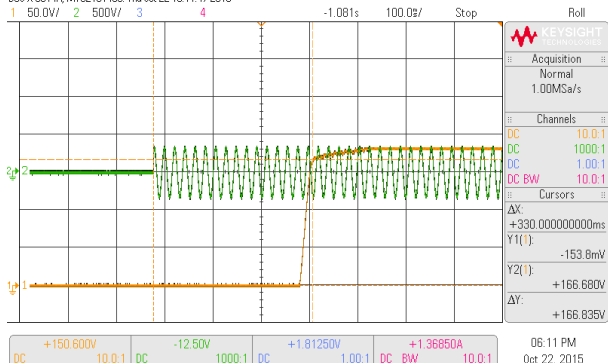
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CURRENT TOLERANCE	±5%	I/P: 347VAC I/P: 480VAC O/P: FULL LOAD Ta: 25°C	1.7547A / 347VAC @ CV MAX-1V 1.7354A / 347VAC @ CV MIN 1.7542A / 480VAC @ CV MAX-1V 1.735A / 480VAC @ CV MIN 0.83%
2	OPEN CIRCUIT VOLTAGE (max)	187V	I/P: 347VAC O/P: NO LOAD Ta: 25°C	184V
3	CONSTANT CURRENT REGION	CH1: 91.4V ~ 182.8 V	I/P: 347VAC O/P: FULL LOAD Ta: 25°C	0.26V ~ 182.8V / 347VAC
4	CURRENT ADJ. RANGE	CH1: 875mA ~ 1750mA	I/P: 347VAC I/P: 480VAC O/P: CV MIN & CV MAX-1V Ta: 25°C	0.6944A ~ 1.841A / 347VAC @ CV MAX-1V 0.688A ~ 1.8294A / 347VAC @ CV MIN 0.6944A ~ 1.841A / 480VAC @ CV MAX-1V 0.6899A ~ 1.831A / 480VAC @ CV MIN
5	CURRENT RIPPLE	5.0% max. @ rated current	I/P: 347VAC O/P: FULL LOAD Ta: 25°C	1.14%
6	SET UP TIME	230VAC / 500 ms (Max) 347VAC / 500 ms (Max) 480VAC / 500 ms (Max)	I/P: 230VAC I/P: 347VAC I/P: 480VAC O/P: FULL LOAD Ta: 25°C	230VAC / 330 ms 347VAC / 296 ms 480VAC / 298 ms

INPUT=230VAC/50HZ @ FULL LOAD

CH1 : Output Voltage CH2 : AC Input Voltage

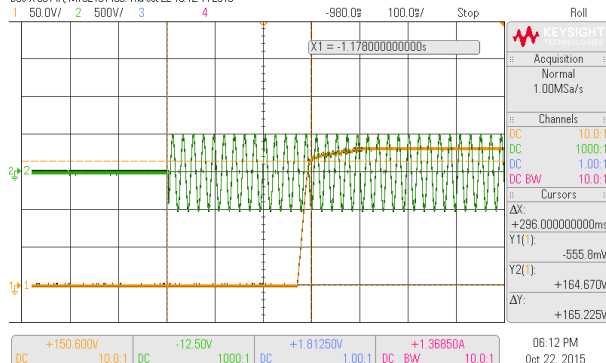
D50-X 3014A, MY52161480, Thu Oct 22 18:11:47 2015



INPUT=347VAC/60HZ @ FULL LOAD

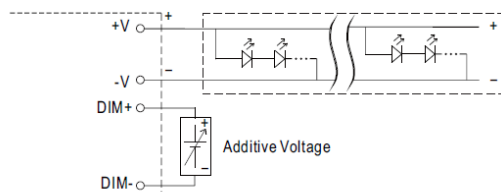
CH1 : Output Voltage CH2 : AC Input Voltage

D50-X 3014A, MY52161480, Thu Oct 22 18:12:44 2015

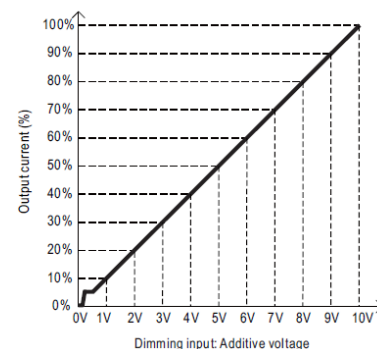


7	DIMMING OPERATION (for B-Type)	※3 in 1 dimming function ※Output constant current level can be adjusted by applying one of the three methodologies between DIM+ and DIM-: 0 ~ 10VDC, or 10V PWM signal or resistance. ※Direct connecting to LEDs is suggested. It is not suitable to be used with additional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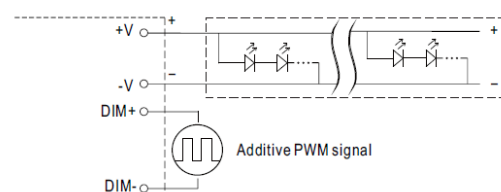
◎ Applying additive 0 ~ 10VDC



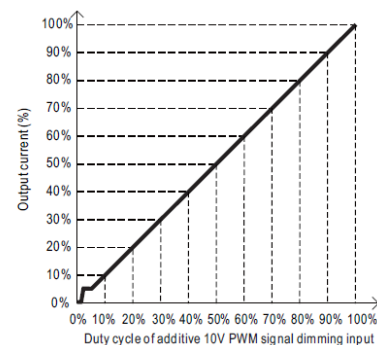
"DO NOT connect "DIM- to -V"



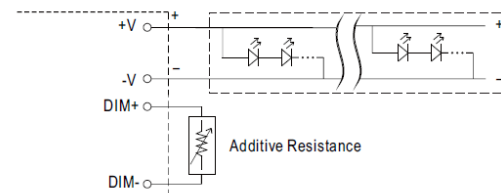
◎ Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):



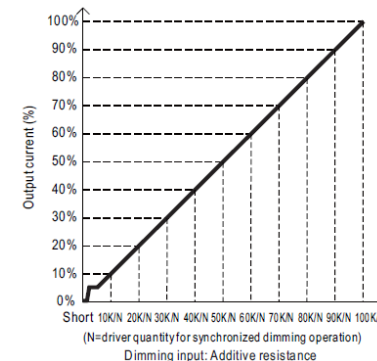
"DO NOT connect "DIM- to -V"



◎ Applying additive resistance:



"DO NOT connect "DIM- to -V"



Note : 1. Min. dimming level is about 5% and the output current is not defined when $0\% < I_{out} < 5\%$.

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 : 347VAC

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	0.170A	0.345A	0.519A	0.695A	0.870A	1.035A	1.206A	1.373A	1.544A	1.695A	1.814A
%	0.00%	9.71%	19.71%	29.66%	39.71%	49.71%	59.14%	68.91%	78.46%	88.23%	96.86%	103.66%
V	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
O/P CURRENT	0.00000A	0.179A	0.368A	0.543A	0.727A	0.908A	1.064A	1.249A	1.417A	1.600A	1.750A	1.814A
%	0.00%	10.23%	21.03%	31.03%	41.54%	51.89%	60.80%	71.37%	80.97%	91.43%	100.00%	103.66%
PWM (100HZ)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
O/P CURRENT	0.00000A	0.185A	0.363A	0.544A	0.728A	0.908A	1.082A	1.259A	1.436A	1.610A	1.771A	1.814A
%	0.00%	10.57%	20.74%	31.09%	41.60%	51.89%	61.83%	71.94%	82.06%	92.00%	101.20%	103.66%

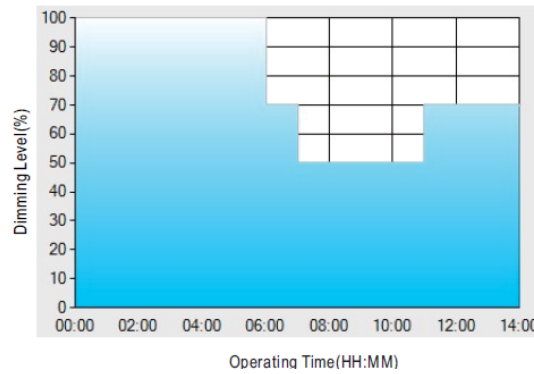
TEST RESULT : OK

8 DIMMING OPERATION (for Dxx-Type by User definition)

※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.

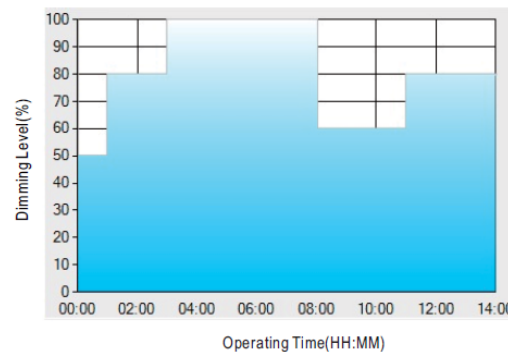
Ex : Ⓒ D01-Type: the profile recommended for residential lighting



Set up for D01-Type in Smart timer dimming software program:

	T1	T2	T3	T4
TIME**	06:00	07:00	11:00	---
LEVEL**	100%	70%	50%	70%

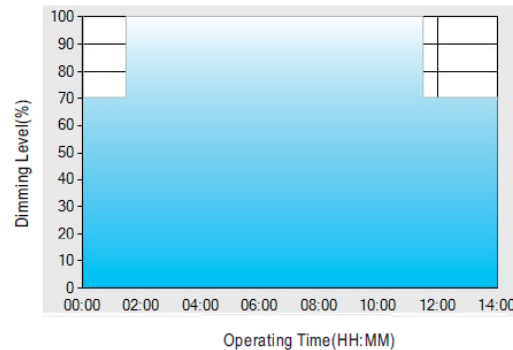
Ex : Ⓒ D02-Type: the profile recommended for street lighting



Set up for D02-Type in Smart timer dimming software program:

	T1	T2	T3	T4	T5
TIME**	01:00	03:00	8:00	11:00	---
LEVEL**	50%	80%	100%	60%	80%

Ex : Ⓒ D03-Type: the profile recommended for tunnel lighting



Set up for D03-Type in Smart timer dimming software program:

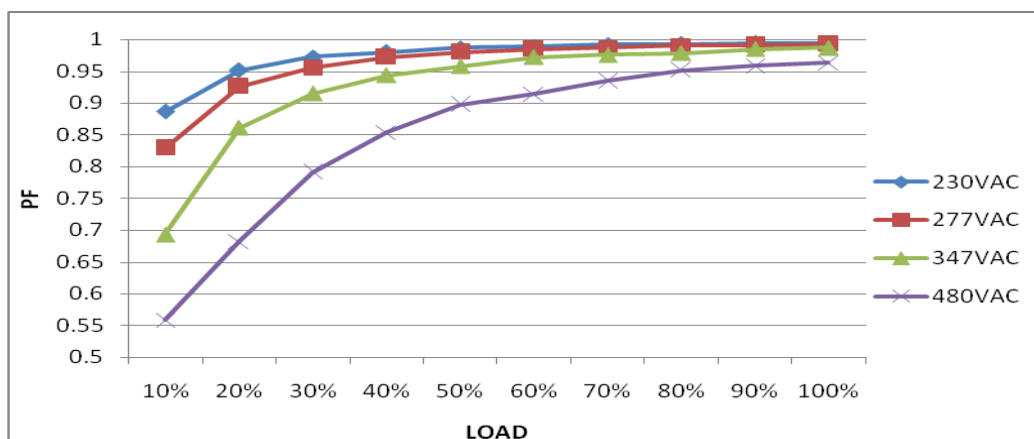
	T1	T2	T3
TIME**	01:30	11:00	---
LEVEL**	70%	100%	70%

I/P : 347VAC
O/P : DIMMING TEST
TA : 25°C
TEST RESULT : OK

INPUT FUNCTION TEST

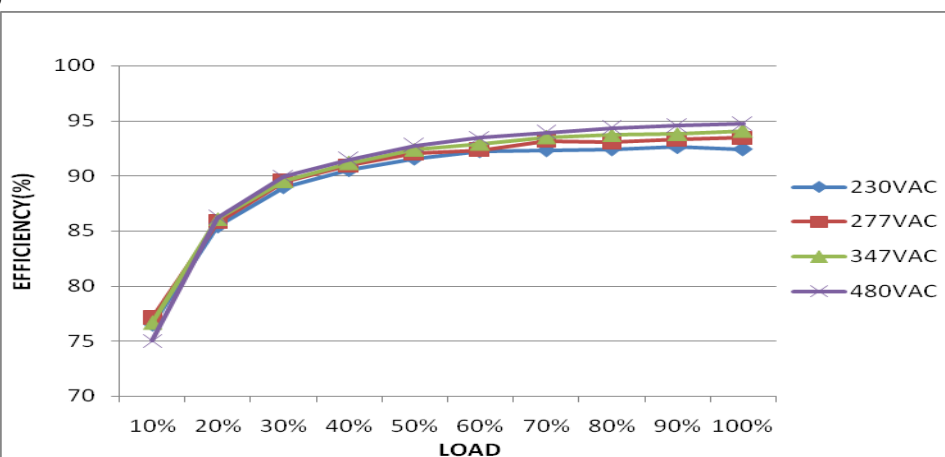
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~528 VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	113V~528 V
			I/P: LOW-LINE-3V=177 V HIGH-LINE+10V=538 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	(1).TEST:OK (2).TEST :OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 180 VAC ~528VAC O/P:FULL~MIN LOAD Ta:25°C	OK
3	INPUT CURRENT (TYP)	347VAC/ 1.1 A 480VAC/ 0.8 A	I/P: 347VAC/480VAC O/P:FULL LOAD Ta:25°C	I = 0.984A/ 347VAC I = 0.712A/ 480VAC
4	POWER FACTOR(TYP)	0.95/347VAC FULL LOAD 0.93/480VAC FULL LOAD 0.97/277 VAC FULL LOAD 0.98/230 VAC FULL LOAD	I/P: 347VAC/480VAC/277VAC/230VAC O/P:FULL LOAD Ta:25°C	PF= 0.991 /347V/100%LOAD PF= 0.982/480V/100%LOAD PF= 0.993/277V/100%LOAD PF= 0.997/230V/100%LOAD

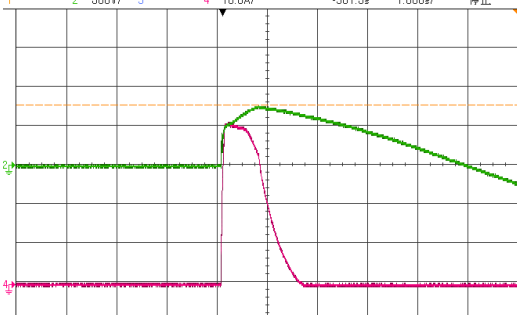
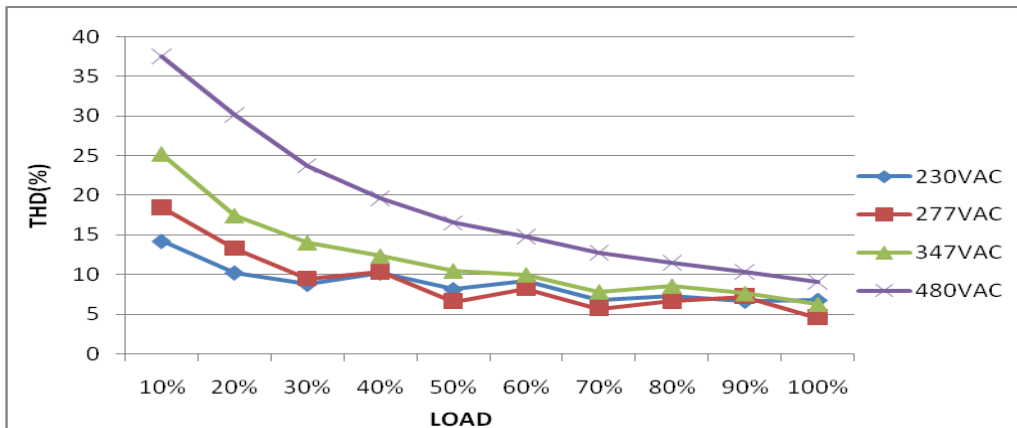
P.F vs LOAD



5	EFFICIENCY (TYP)	93.5 %	I/P: 347VAC O/P:FULL LOAD Ta:25°C	94.07 %
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EFFICIENCY vs LOAD



6	INRUSH CURRENT (TYP)	480VV/ 50 A COLD START (twidth= 920 us measured at 50% Ipeak) COLD START	I/P: 480VAC O/P:FULL LOAD Ta:25°C	I = 41.6 A/ 480VAC T50= 920 us
	INPUT=480VAC/ 60HZ @ FULL LOAD CH2 : AC Input Voltage CH4 : Input current (1V=1A) DSO-X 3014A, MY52161480, Mon Sep 14 13:48:39 2015  +780.000mV 1.00:1 DC +6.25V 1000:1 DC +247.500V 100:1 DC +30.7500A 10.0:1			
7	TOTAL HARMONIC DISTORTION	THD< 20%@ ≥ 50% load/230VAC, or 277VAC, or 347VAC, or @ ≥ 60% load/480VAC	I/P : 230V/277V/347V O/P : 100% LOAD 50% LOAD I/P : 480VAC O/P : 60% LOAD Ta : 25°C	THD : 6.76%/230V 50% THD : 4.06%/230V 100% THD : 6.75%/277V 50% THD : 6.68%/277V 100% THD : 8.06%/347V 50% THD : 5.81%/347V 100% THD : 16.95%/480V 60% THD : 9.4%/480V 100%
	THD vs LOAD 			

ROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	V1: 192 V~210 V	I/P: 528VAC I/P: 347VAC I/P: 180VAC O/P:MIN LOAD Ta:25°C	199.8V/ 528VAC 199.8V/ 347VAC 199.8V/ 180VAC PROTECTION TYPE : Shut down o/p voltage with re-power on to recovery

2	OVER TEMPERATURE PROTECTION	PROTECTION TYPE : Shut down and latch off o/p voltage, re-power on to recover	I/P: 528 VAC I/P: 180 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: 528VAC I/P: 180 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	Q901 Rated 9A/ 950V	I/P: High-Line +3V = 531V AC ON/OFF VDS: O/P: (1) Full Load (2) Output Short (3) Full Load continue I/P: Low-Line -3V = 177V O/P: (1) Full Load (2) Output Short (3) Full Load continue Ta: 25°C	VDS: (1) 791V/2.77A (2) 791V/2.59A (3) 785V/2.26A VDS: (1) 785V/2.77A (2) 774V/2.54A (3) 779V/2.21A
2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q 1 Rated 6A/1050V	I/P: High-Line +3V = 531V AC ON/OFF VDS: O/P: (1) Full Load (2) Output Short (3) Full Load continue I/P: Low-Line -3V = 177V O/P: (1) Full Load (2) Output Short (3) Full Load continue Ta: 25°C	VDS: (1) 808V/4.42A (2) 797V/3.08A (3) 802V/3.81A VDS: (1) 866V/4.25A (2) 837V/2.46A (3) 849V/3.23A
3	Diode Peak Voltage	D101 Rated 10A/400V	I/P: High-Line +3V = 531 V D101 : AC ON/OFF O/P: (1) Full Load (2) Output Short (3) Full Load continue Ta: 25°C	VDS: (1) 386V (2) 20V (3) 386V
4	Input Capacitor Voltage	C6 Rated: 82u/450V	I/P: High-Line +3V = 531V O/P: (1) Full Load input on/off (2) Min load input on /Off (3) Full Load /Min load Change (4) Full load continue Ta: 25°C	(1) 388V (2) 412V (3) 412V (4) 432V

5	Control IC Voltage Test	PWM IC U901 Rated 8.85V~16V	I/P:High-Line +3V =531 V AC ON/OFF O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. Ta:25°C	(1) 14.5V (2) 14.09V (3) 14.9V (4) 14.33V
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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: 1.32 mA I/P-FG: 3.28 mA O/P-FG: 0.57 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: 11GΩ I/P-FG: 6.38 G Ω O/P-FG: 17.2 G Ω NO DAMAGE
3	GROUNDING CONTINUITY	IEC60950-1 FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	24 mΩ
4	LEAKAGE CURRENT	IEC60950-1 < 0.75mA / 480VAC	I/P: 480 VAC O/P:Min LOAD Ta:25°C	L-FG: 0.42 mA N-FG: 0.4 mA L,N -V(+): 0.05 mA L,N-V(-): 0.05 mA

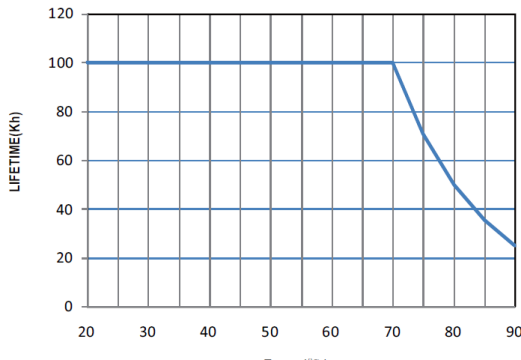
E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONDUCTION	FCC PART 15	I/P: 347VAC (50HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab
2	RADIATION	FCC PART 15	I/P: 347VAC (50HZ) O/P:FULL LOAD Ta:25°C	PASS Test by certified Lab
3	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR:8KV / Contact:4KV	I/P: 347VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
4	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 347VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
5	SURGE	IEC61000-4-5 INDUSTRY L-N :2KV L,N-PE:4KV	I/P: 347VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
6	Test by certified Lab & Test Report Prepare			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																																								
1	TEMPERATURE RISE TEST	MODEL : HVGC-320-700 1. ROOM AMBIENT BURN-IN : 18 HRS I/P : 347VAC O/P : FULL LOAD Ta= 29 °C 2. HIGH AMBIENT BURN-IN : 6 HRS I/P : 347VAC O/P : FULL LOAD Ta= 59.3 °C <table><thead><tr><th>CH.</th><th>Position</th><th>ROOM AMBIENT Ta= 29 °C</th><th>HIGH AMBIENT Ta= 59.3 °C</th></tr></thead><tbody><tr><td>1</td><td>BD1</td><td>60.7°C</td><td>97.1°C</td></tr><tr><td>2</td><td>L2</td><td>57.5°C</td><td>93.8°C</td></tr><tr><td>3</td><td>ZNR2</td><td>56.4°C</td><td>92.1°C</td></tr><tr><td>4</td><td>C10</td><td>58.8°C</td><td>95.1°C</td></tr><tr><td>5</td><td>C2</td><td>56.1°C</td><td>91.6°C</td></tr><tr><td>6</td><td>Q1</td><td>61.3°C</td><td>97.9°C</td></tr><tr><td>7</td><td>C5</td><td>60.3°C</td><td>96.9°C</td></tr><tr><td>8</td><td>RTH2</td><td>77.8°C</td><td>108.3°C</td></tr><tr><td>9</td><td>Q902</td><td>61.7°C</td><td>104.1°C</td></tr><tr><td>10</td><td>T2</td><td>61.1°C</td><td>99.3°C</td></tr><tr><td>11</td><td>C902</td><td>62.1°C</td><td>99.6°C</td></tr><tr><td>12</td><td>L1</td><td>59.9°C</td><td>98.3°C</td></tr><tr><td>13</td><td>C54</td><td>58.1°C</td><td>97.8°C</td></tr><tr><td>14</td><td>C46</td><td>58.7°C</td><td>99.7°C</td></tr><tr><td>15</td><td>RTH3</td><td>56.1°C</td><td>94.5°C</td></tr><tr><td>16</td><td>T1</td><td>62.8°C</td><td>98.9°C</td></tr><tr><td>17</td><td>C200</td><td>57.9°C</td><td>93.5°C</td></tr><tr><td>18</td><td>C201</td><td>58.3°C</td><td>94.7°C</td></tr><tr><td>19</td><td>D100</td><td>57.9°C</td><td>92.7°C</td></tr><tr><td>20</td><td>D103</td><td>59.0°C</td><td>94.1°C</td></tr><tr><td>21</td><td>C105</td><td>56.1°C</td><td>91.4°C</td></tr><tr><td>22</td><td>LF100</td><td>56.4°C</td><td>91.6°C</td></tr><tr><td>23</td><td>U1</td><td>56.2°C</td><td>91.9°C</td></tr><tr><td>24</td><td>U901</td><td>56.1°C</td><td>94.5°C</td></tr><tr><td>25</td><td>C6</td><td>59.7°C</td><td>99.8°C</td></tr></tbody></table>			CH.	Position	ROOM AMBIENT Ta= 29 °C	HIGH AMBIENT Ta= 59.3 °C	1	BD1	60.7°C	97.1°C	2	L2	57.5°C	93.8°C	3	ZNR2	56.4°C	92.1°C	4	C10	58.8°C	95.1°C	5	C2	56.1°C	91.6°C	6	Q1	61.3°C	97.9°C	7	C5	60.3°C	96.9°C	8	RTH2	77.8°C	108.3°C	9	Q902	61.7°C	104.1°C	10	T2	61.1°C	99.3°C	11	C902	62.1°C	99.6°C	12	L1	59.9°C	98.3°C	13	C54	58.1°C	97.8°C	14	C46	58.7°C	99.7°C	15	RTH3	56.1°C	94.5°C	16	T1	62.8°C	98.9°C	17	C200	57.9°C	93.5°C	18	C201	58.3°C	94.7°C	19	D100	57.9°C	92.7°C	20	D103	59.0°C	94.1°C	21	C105	56.1°C	91.4°C	22	LF100	56.4°C	91.6°C	23	U1	56.2°C	91.9°C	24	U901	56.1°C	94.5°C	25	C6	59.7°C	99.8°C
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19	D100	57.9°C	92.7°C																																																																																																									
20	D103	59.0°C	94.1°C																																																																																																									
21	C105	56.1°C	91.4°C																																																																																																									
22	LF100	56.4°C	91.6°C																																																																																																									
23	U1	56.2°C	91.9°C																																																																																																									
24	U901	56.1°C	94.5°C																																																																																																									
25	C6	59.7°C	99.8°C																																																																																																									
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 528VAC/180VAC 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 : 538VAC O/P : FULL LOAD Ta= 60 °C HUMIDITY= 95 %R.H	TEST : OK																																																																																																								
4	TEMPERATURE COEFFICIENT	± 0.03%/°C (0~60°C)	I/P : 347 VAC O/P : FULL LOAD	± 0.011 %/°C (0~60°C)																																																																																																								
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 : $-45^{\circ}\text{C} \sim +65^{\circ}\text{C}$ 2. Temperature change rate : $25^{\circ}\text{C} / \text{MIN}$ 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 : 70min in each axis (X.Y.Z) (6) Ta : 25°C	TEST : OK
8	CAPACITOR LIFE CYCLE	SUPPOSE C106 IS THE MOST CRITICAL COMPONENT (1) I/P : 347VAC O/P : FULL LOAD Ta= 25°C LIFE TIME (2) I/P : 347VAC O/P : FULL LOAD Ta= 60°C LIFE TIME (3) I/P : 347VAC O/P : 75% LOAD Ta= 60°C LIFE TIME (4) I/P : 347VAC O/P : 50% LOAD Ta= 60°C LIFE TIME	(1) 530076 HRS (2) 33197 HRS (3) 57609HRS (4) 65385HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 141.2K hrs min. MIL-HDBK-217F (25°C)	
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 50,000 hours @ Tcase 80°C 	

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

12.10.30 A50-F031