



Test Report: HVGC-240-1050

240W 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

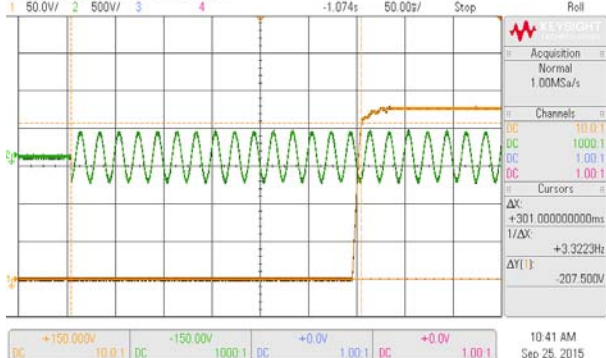
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CURRENT ACCURACY	±5%	I/P: 347VAC I/P: 480VAC O/P: FULL LOAD Ta: 25°C	1.0494A /347VAC@CV MAX-1V 1.052A /347VAC@CV MIN 1.0493A/480VAC@CV MAX-1V 1.0529A/480VAC@CV MIN 0.34%
2	CONSTANT CURRENT REGION	CH1: 114.3 V~ 228.6 V	I/P: 347VAC O/P: FULL LOAD Ta: 25°C	0.46V~228.6 V /347VAC
3	CURRENT ADJ. RANGE	CH1: 525mA~ 1050mA	I/P: 347VAC I/P: 480VAC O/P: CV MIN & CV MAX-1V Ta: 25°C	0.437A~ 1.109A /347VAC@CV MAX-1V 0.441A~ 1.1304A /347VAC@CV MIN 0.437A~ 1.108A/480VAC@CV MAX-1V 0.441A~ 1.1306A/480VAC@CV MIN
4	OPEN CIRCUIT VOLTAGE (max.)	235V	I/P: 347VAC O/P: NO LOAD Ta: 25°C	231.9 V
5	CURRENT RIPPLE	5.0% max. @rated current	I/P: 347VAC O/P: FULL LOAD Ta: 25°C	2.86%
6	OVER/UNDERSHOOT TEST	< ±5%	I/P: 347 VAC O/P: FULL LOAD Ta: 25°C	TEST: <5 %
7	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/ 301 ms 347VAC/ 285 ms 480VAC/ 294 ms

INPUT=230VAC/50HZ @ FULL LOAD

CH1 : Output Voltage CH2 : AC Input Voltage

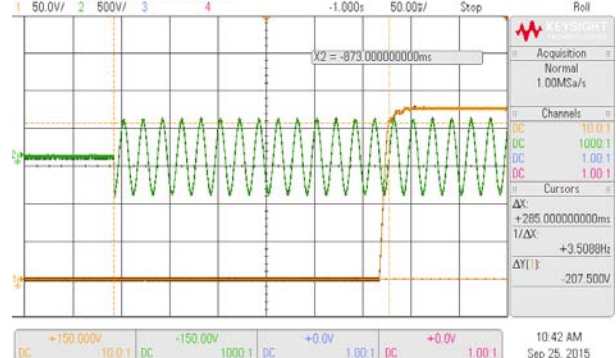
0904X 3014A, M52161480 Fri Sep 25 10:42:12 2015



INPUT=347VAC/60HZ @ FULL LOAD

CH1 : Output Voltage CH2 : AC Input Voltage

0904X 3014A, M52161480 Fri Sep 25 10:42:54 2015



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	142V~528V

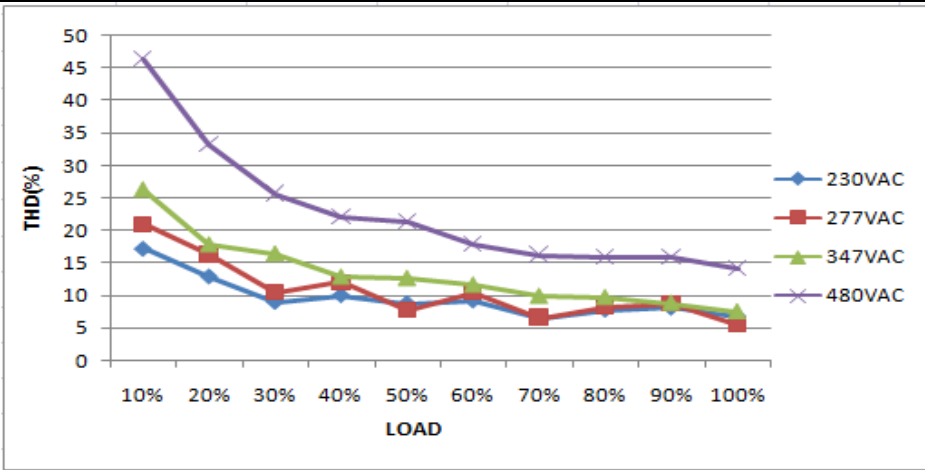


240W Single Output LED Power Supply **HVGC-240** series

			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/ 0.76 A 480VAC/ 0.56 A	I/P: 347VAC/480VAC O/P:FULL LOAD Ta:25°C	I= 0.759A/ 347VAC I= 0.551A/ 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= 0.989/347V/100%LOAD PF= 0.979/480V/100%LOAD PF= 0.994/277V/100%LOAD PF= 0.997/230V/100%LOAD																																																							
<table border="1"> <caption>Power Factor vs Load Data</caption> <thead> <tr> <th>LOAD (%)</th> <th>230VAC</th> <th>277VAC</th> <th>347VAC</th> <th>480VAC</th> </tr> </thead> <tbody> <tr><td>10%</td><td>0.90</td><td>0.85</td><td>0.70</td><td>0.55</td></tr> <tr><td>20%</td><td>0.95</td><td>0.92</td><td>0.85</td><td>0.70</td></tr> <tr><td>30%</td><td>0.97</td><td>0.95</td><td>0.92</td><td>0.80</td></tr> <tr><td>40%</td><td>0.98</td><td>0.96</td><td>0.94</td><td>0.88</td></tr> <tr><td>50%</td><td>0.98</td><td>0.97</td><td>0.95</td><td>0.90</td></tr> <tr><td>60%</td><td>0.98</td><td>0.97</td><td>0.96</td><td>0.92</td></tr> <tr><td>70%</td><td>0.98</td><td>0.97</td><td>0.96</td><td>0.93</td></tr> <tr><td>80%</td><td>0.98</td><td>0.97</td><td>0.96</td><td>0.94</td></tr> <tr><td>90%</td><td>0.98</td><td>0.97</td><td>0.96</td><td>0.95</td></tr> <tr><td>100%</td><td>0.98</td><td>0.97</td><td>0.96</td><td>0.95</td></tr> </tbody> </table>					LOAD (%)	230VAC	277VAC	347VAC	480VAC	10%	0.90	0.85	0.70	0.55	20%	0.95	0.92	0.85	0.70	30%	0.97	0.95	0.92	0.80	40%	0.98	0.96	0.94	0.88	50%	0.98	0.97	0.95	0.90	60%	0.98	0.97	0.96	0.92	70%	0.98	0.97	0.96	0.93	80%	0.98	0.97	0.96	0.94	90%	0.98	0.97	0.96	0.95	100%	0.98	0.97	0.96	0.95
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5	EFFICIENCY (TYP)	93%	I/P: 347VAC O/P:FULL LOAD Ta:25°C	93.62%																																																							
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6	INRUSH CURRENT (TYP)	480VV/ 50 A COLD START (twidth= 532us measured at 50% Ipeak) COLD START	I/P: 347VAC 480VAC O/P:FULL LOAD Ta:25°C	I=40.9A/ 480VAC T50= 520 uS																																																							

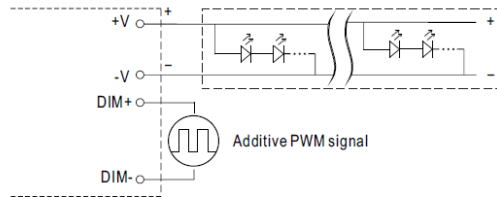


7	TOTAL HARMONIC DISTORTION	Total harmonic distortion will be lower than 20% when output loading is 50% or higher at 230V/277V/347V/480V	I/P : 230V/277V/347V	THD : 8.69%/230V 50%
			O/P : 100% LOAD	THD : 5.92%/230V 100%
			50% LOAD	THD : 8.77%/277V 50%
			I/P : 480V	THD : 7.77%/277V 100%
			O/P : 60% LOAD	THD : 10.38%/347V 50%
			Ta : 25°C	THD : 7.03%/347V 100%
				THD : 14.36%/480V 60%
				THD : 9.09%/480V 100%



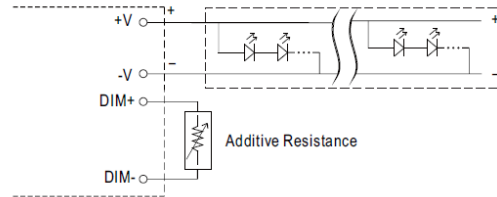
8	DIMMING OPERATION (for B-Type)	<p>※3 in 1 dimming function</p> <p>※Output constant current level can be adjusted by applying one of the three methodologies between DIM+ and DIM-: 0 ~ 10VDC, or 10V PWM signal or resistance.</p> <p>※Direct connecting to LEDs is suggested. It is not suitable to be used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

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

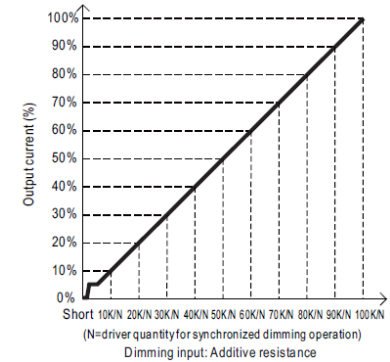
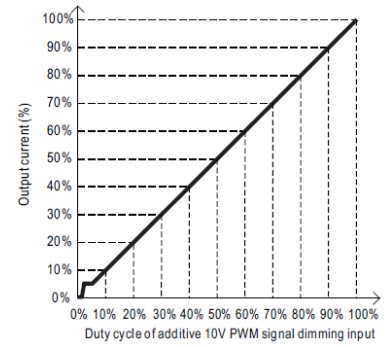


"DO NOT connect "DIM- to -V"

© 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	0.00050A	0.111A	0.212A	0.314A	0.415A	0.516A	0.616A	0.719A	0.818A	0.921A	1.016A	1.084A
%	0.05%	10.54%	20.23%	29.88%	39.52%	49.14%	58.67%	68.48%	77.90%	87.67%	96.76%	103.24%
V	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
O/P CURRENT	0.00050A	0.123A	0.238A	0.329A	0.427A	0.541A	0.635A	0.744A	0.856A	0.962A	1.051A	1.084A
%	0.05%	11.69%	22.67%	31.33%	40.67%	51.52%	60.48%	70.86%	81.52%	91.66%	100.05%	103.24%
PWM (100HZ)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
O/P CURRENT	0.00016A	0.118A	0.222A	0.328A	0.432A	0.538A	0.641A	0.747A	0.852A	0.958A	1.063A	1.084A
%	0.02%	11.25%	21.14%	31.24%	41.14%	51.24%	61.07%	71.14%	81.13%	91.21%	101.24%	103.24%

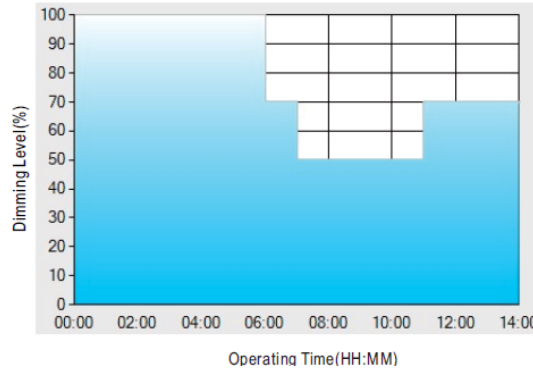
TEST RESULT : OK

9 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.

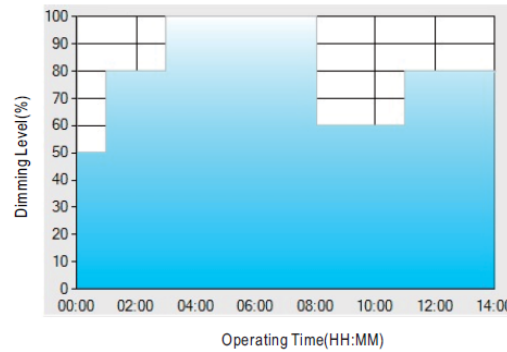
Ex: ☉ D01-Type: the profile recommended for residential lighting



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%

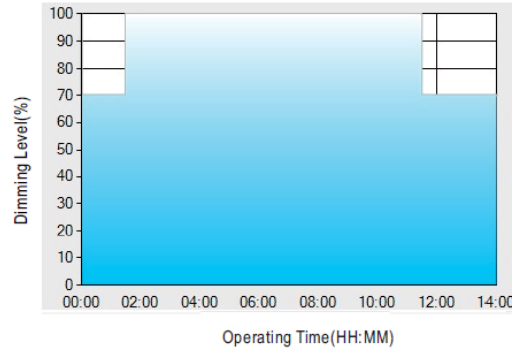
Ex: ☉ D02-Type: the profile recommended for street lighting



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

ROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
2	OVER VOLTAGE PROTECTION	V1: 240 V~ 263 V	I/P: 528VAC I/P: 347VAC I/P: 180VAC O/P: MIN LOAD Ta:25°C	249.33V/ 528VAC 249.71V/ 347VAC 247.97V/ 180VAC PROTECTION TYPE : Shut down o/p voltage with re-power on to recovery

3	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
4	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 Ta:25°C	VDS: (1)771V/7.53A (2)779V/ 4.62A (3)763V/1.56A
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 Ta:25°C	VDS: (1)851V/3.59A (2)827V/3.67A (3)851V/3.51A
3	Diode Peak Voltage	D103 Rated 20A/600V D104 Rated 4A/600V	I/P:High-Line +3V =531 V D101 : AC ON/OFF O/P: (1)Full Load (2)Output Short (3) Full Load continue D104 : AC ON/OFF O/P: (1)Full Load (2)Output Short (3) Full Load continue Ta:25°C	D103 VDS: (1)239V (2)249V (3)239V VDS: (1)239V (2)241V (3)239V
4	Input Capacitor Voltage	C6 Rated: 82u/450V 105°C	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)411V (2)415V (3)403V (4)387V
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. (5)NO LOAD VR MIN.LOW LINE Ta:25°C	(1) 14.34V (2) 14.02V (3) 14.02V (4) 13.93V (5) 14.26V

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: 0.23mA I/P-FG: 0.29 mA O/P-FG: 0.18mA 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: 23.4GΩ I/P-FG: 5.84G Ω O/P-FG: 21.4G Ω NO DAMAGE
3	GROUNDING CONTINUITY	IEC60950-1 FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	21mΩ
4	LEAKAGE CURRENT	IEC60950-1 < 0.75mA / 480VAC	I/P: 480 VAC O/P:Min LOAD Ta:25°C	L-FG: 0.17 mA N-FG: 0.17mA L,N -V(+): 0.18 mA L,N-V(-): 0.19 mA

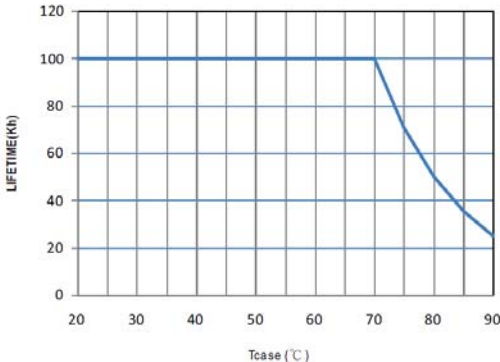
E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONDUCTION	FCC Part 15 Subpart B	I/P: 440VAC (60HZ) O/P:FULL/30% LOAD Ta:25°C	PASS Test by certified Lab
2	RADIATION	FCC Part 15 Subpart B	I/P: 480VAC (60HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab
3	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR:8KV / Contact:4KV	I/P: 230VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
4	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230VAC/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: 230VAC/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-240-700 1. ROOM AMBIENT BURN-IN : 15 HRS I/P : 347VAC O/P : FULL LOAD Ta= 25.5 °C 2. HIGH AMBIENT BURN-IN : 3.5 HRS I/P : 347VAC O/P : FULL LOAD Ta= 56.3 °C																																																																																																						
				<table border="1"> <thead> <tr> <th>CH.</th> <th>Position</th> <th>ROOM AMBIENT Ta= 25.5 °C</th> <th>HIGH AMBIENT Ta= 56.3 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>C1</td><td>62.2°C</td><td>92.2°C</td></tr> <tr><td>2</td><td>BD1</td><td>65.4°C</td><td>95.7°C</td></tr> <tr><td>3</td><td>L2</td><td>65.1°C</td><td>95.4°C</td></tr> <tr><td>4</td><td>C10</td><td>65.1°C</td><td>95.4°C</td></tr> <tr><td>5</td><td>C11</td><td>69.8°C</td><td>97.0°C</td></tr> <tr><td>6</td><td>Q2</td><td>67.3°C</td><td>97.9°C</td></tr> <tr><td>7</td><td>RTH2</td><td>76.4°C</td><td>103.5°C</td></tr> <tr><td>8</td><td>Q901</td><td>69.0°C</td><td>100.1°C</td></tr> <tr><td>9</td><td>T2</td><td>62.3°C</td><td>94.1°C</td></tr> <tr><td>10</td><td>L1</td><td>67.3°C</td><td>98.4°C</td></tr> <tr><td>11</td><td>C5</td><td>66.0°C</td><td>96.9°C</td></tr> <tr><td>12</td><td>ZNR1</td><td>60.1°C</td><td>89.7°C</td></tr> <tr><td>13</td><td>Q35</td><td>65.7°C</td><td>97.6°C</td></tr> <tr><td>14</td><td>C46</td><td>64.7°C</td><td>96.8°C</td></tr> <tr><td>15</td><td>C54</td><td>67.0°C</td><td>98.5°C</td></tr> <tr><td>16</td><td>RTH3</td><td>63.0°C</td><td>94.7°C</td></tr> <tr><td>17</td><td>U1</td><td>63.2°C</td><td>94.2°C</td></tr> <tr><td>18</td><td>U901</td><td>63.6°C</td><td>95.3°C</td></tr> <tr><td>19</td><td>T1</td><td>66.3°C</td><td>98.5°C</td></tr> <tr><td>20</td><td>D103</td><td>62.6°C</td><td>93.0°C</td></tr> <tr><td>21</td><td>D104</td><td>63.7°C</td><td>94.2°C</td></tr> <tr><td>22</td><td>C106</td><td>61.1°C</td><td>91.6°C</td></tr> <tr><td>23</td><td>C201</td><td>61.2°C</td><td>91.9°C</td></tr> <tr><td>24</td><td>LF100</td><td>61.2°C</td><td>91.8°C</td></tr> </tbody> </table>	CH.	Position	ROOM AMBIENT Ta= 25.5 °C	HIGH AMBIENT Ta= 56.3 °C	1	C1	62.2°C	92.2°C	2	BD1	65.4°C	95.7°C	3	L2	65.1°C	95.4°C	4	C10	65.1°C	95.4°C	5	C11	69.8°C	97.0°C	6	Q2	67.3°C	97.9°C	7	RTH2	76.4°C	103.5°C	8	Q901	69.0°C	100.1°C	9	T2	62.3°C	94.1°C	10	L1	67.3°C	98.4°C	11	C5	66.0°C	96.9°C	12	ZNR1	60.1°C	89.7°C	13	Q35	65.7°C	97.6°C	14	C46	64.7°C	96.8°C	15	C54	67.0°C	98.5°C	16	RTH3	63.0°C	94.7°C	17	U1	63.2°C	94.2°C	18	U901	63.6°C	95.3°C	19	T1	66.3°C	98.5°C	20	D103	62.6°C	93.0°C	21	D104	63.7°C	94.2°C	22	C106	61.1°C	91.6°C	23	C201	61.2°C	91.9°C	24	LF100	61.2°C	91.8°C
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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	± 0.009 %/°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°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 : 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) 221268 HRS (2) 19976 HRS (3) 37783HRS (4) 43303HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 143.6K 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