



Test Report: HVGC-240-1750

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

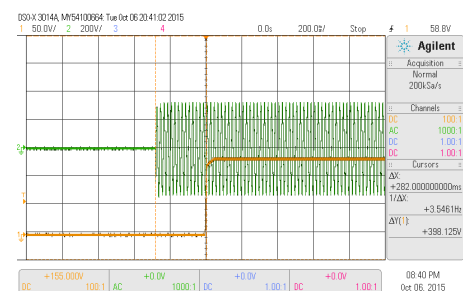
DESIGN VERIFY TEST

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	1.788A /347VAC@CV MAX-1V 1.784A /347VAC@CV MIN 1.7878A/480VAC@CV MAX-1V 1.7843A/480VAC@CV MIN 2.16%
2	CONSTANT CURRENT REGION	CH1: 68.5V~ 137.1V	I/P: 347VAC O/P: FULL LOAD Ta: 25°C	68.5V~136.1 V /347VAC
3	CURRENT ADJ. RANGE	CH1: 875mA~ 1750mA	I/P: 347VAC I/P: 480VAC O/P: CV MIN & CV MAX-1V Ta: 25°C	0.7819A~1.8637A /347VAC@CV MAX-1V 0.7875A~1.8887A /347VAC@CV MIN 0.7818A~1.8669A/480VAC@CV MAX-1V 0.7873A~ 1.8882A/480VAC@CV MIN
4	OPEN CIRCUIT VOLTAGE (max.)	141V	I/P: 347VAC O/P: NO LOAD Ta: 25°C	138.4 V
5	CURRENT RIPPLE	5.0% max. @rated current	I/P: 347VAC O/P: FULL LOAD Ta: 25°C	3.14%
6	OVER/UNDERSHOOT TEST	< ±5%	I/P: 347 VAC O/P: FULL LOAD Ta: 25°C	TEST: 0.656 %
7	SET UP TIME	230VAC/ 500 ms (Max) 347VAC/ 400 ms (Max) 480VAC/ 400 ms (Max)	I/P: 230VAC I/P: 347VAC I/P: 480VAC O/P: FULL LOAD Ta: 25°C	230VAC/ 282 ms 347VAC/ 266 ms 480VAC/ 262 ms

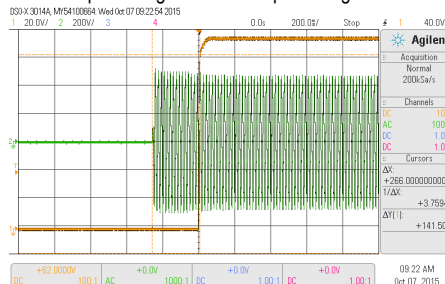
INPUT=230VAC/50HZ @ FULL LOAD

CH1 : Output Voltage CH2 : AC Input Voltage



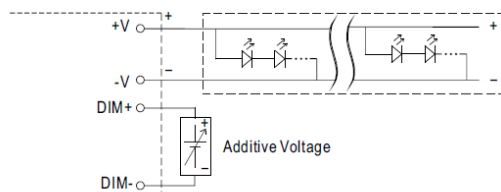
INPUT=347VAC/60HZ @ FULL LOAD

CH1 : Output Voltage CH2 : AC Input Voltage

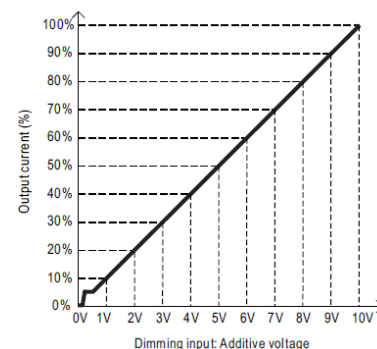


8	DIMMING OPERATION (for B-Type)	<p>※3 in 1 dimming function</p> <p>※Output constant current level can be adjusted by applying one of the three methodologies between DIM+ and DIM-: 0 ~ 10VDC, or 10V PWM signal or resistance.</p> <p>※Direct connecting to LEDs is suggested. It is not suitable to be used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

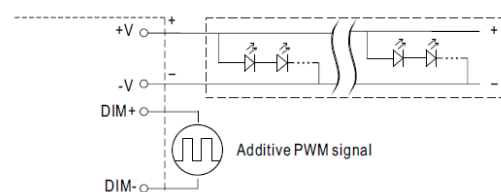
◎ Applying additive 0 ~ 10VDC



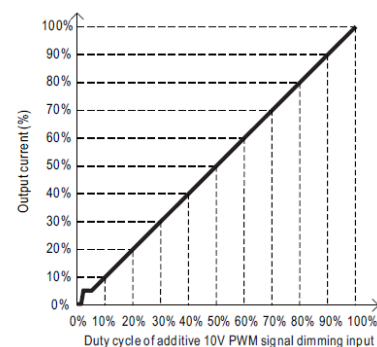
"DO NOT connect "DIM- to -V"



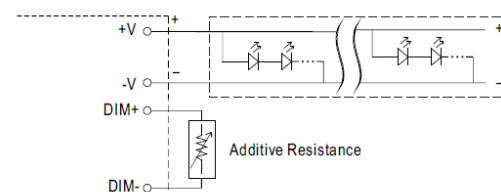
◎ Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):



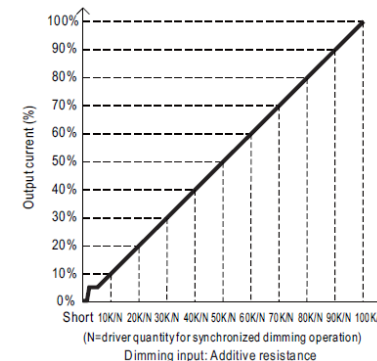
"DO NOT connect "DIM- to -V"



◎ 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	0.00030A	0.205A	0.367A	0.528A	0.691A	0.852A	1.014A	1.179A	1.339A	1.503A	1.658A	1.753A
%	0.02%	11.69%	20.96%	30.17%	39.49%	48.69%	57.94%	67.37%	76.51%	85.89%	94.74%	100.17%
V	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
O/P CURRENT	0.00032A	0.221A	0.374A	0.539A	0.719A	0.882A	1.039A	1.210A	1.372A	1.529A	1.713A	1.753A
%	0.02%	12.63%	21.39%	30.82%	41.09%	50.41%	59.37%	69.14%	78.41%	87.37%	97.89%	100.17%
PWM (100HZ)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
O/P CURRENT	0.00060A	0.219A	0.385A	0.553A	0.718A	0.886A	1.051A	1.218A	1.384A	1.552A	1.717A	1.754A
%	0.03%	12.49%	21.98%	31.57%	41.04%	50.61%	60.06%	69.58%	79.10%	88.66%	98.13%	100.21%

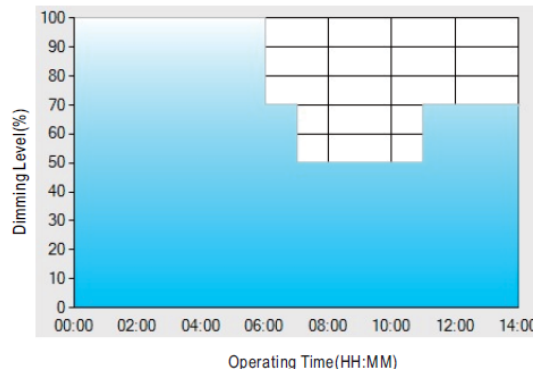
TEST RESULT : OK

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.

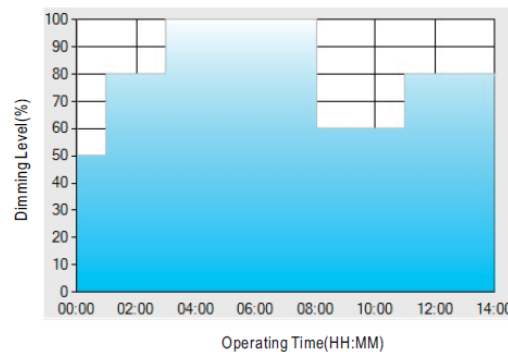
Ex : Ⓒ D01-Type: the profile recommended for residential lighting



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%

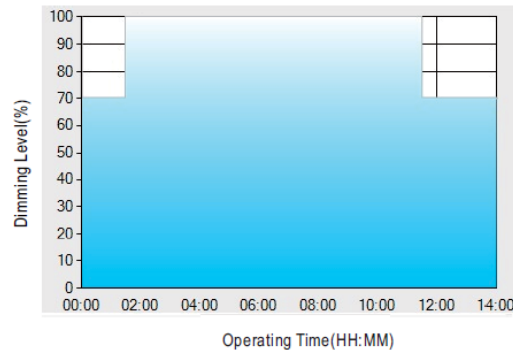
Ex : Ⓒ D02-Type: the profile recommended for street lighting



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



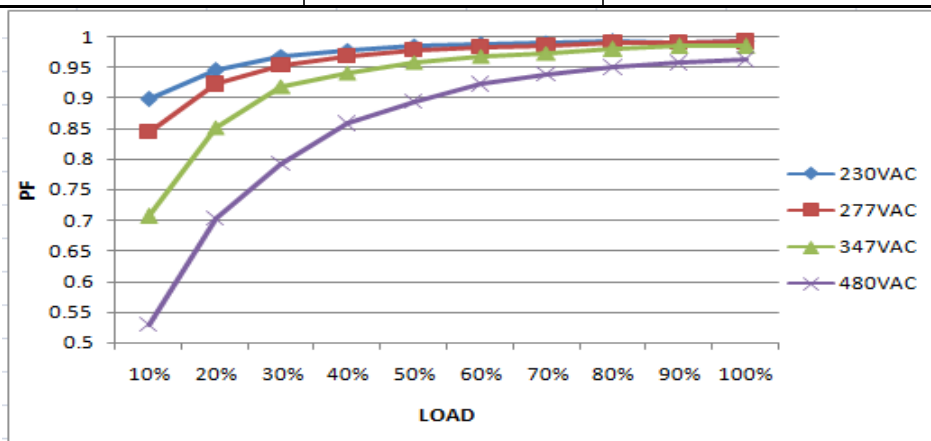
Set up for D03-Type in Smart timer dimming software program:

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

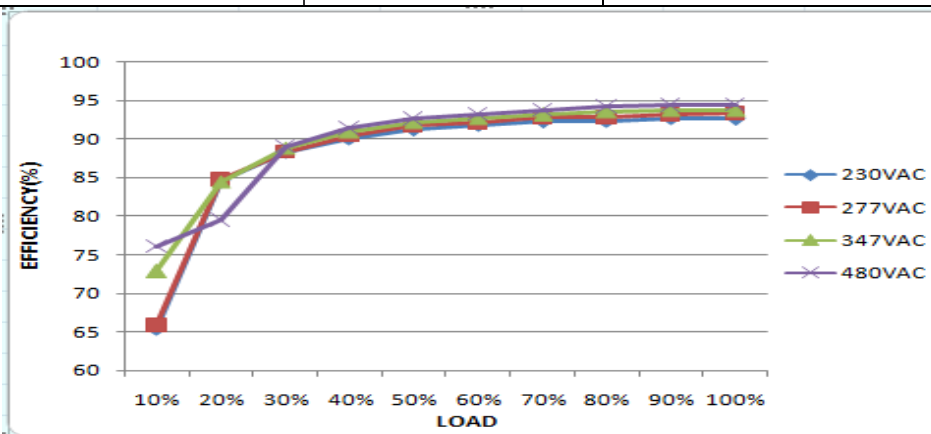
I/P : 347VAC
O/P : DIMMING TEST
TA : 25°C
TEST RESULT : OK

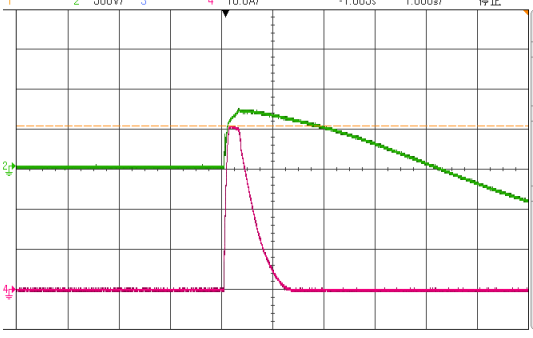
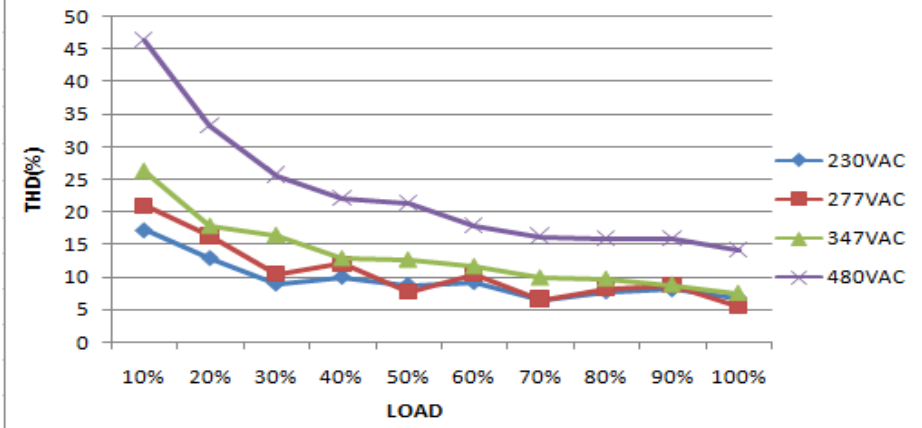
INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~528 VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	143V~305 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/ 0.76 A 480VAC/ 0.56 A	I/P: 347VAC/480VAC O/P:FULL LOAD Ta:25°C	I =0.7464A/ 347VAC I =0.559 A/ 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=0.982 /347V/100%LOAD PF=0.9622 /480V/100%LOAD PF=0.9912 /277V/100%LOAD PF=0.9945 /230V/100%LOAD



5	EFFICIENCY (TYP)	93%	I/P: 347VAC O/P:FULL LOAD Ta:25°C	93.78%
---	------------------	-----	---	--------



6	INRUSH CURRENT (TYP)	480VV/ 50 A COLD START (twidth= 532 us measured at 50% Ipeak) COLD START	I/P: 347VAC 480VAC O/P:FULL LOAD Ta:25°C	I =40.9 A/ 480VAC T50= 520 us
	INPUT=480VAC/ 60HZ @ FULL LOAD CH2 : AC Input Voltage CH4 : Input current (1V=1A) DSO-X 3014A, Mf52161480 Wed Sep 09 11:38:24 2015 			
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 O/P : 100% LOAD 50% LOAD I/P : 480V O/P : 60% LOAD Ta : 25°C	THD : 7.341 %/230V 50% THD : 5.6687%/230V 100% THD : 7.3217 %/277V 50% THD : 6.5981 %/277V 100% THD : 14.089 %/347V 50% THD : 8.3443 %/347V 100% THD : 18.66 %/480V 60% THD : 11.916 %/480V 100%
				

ROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	V1: 144 V~ 158 V	I/P: 528VAC I/P: 347VAC I/P: 180VAC O/P:MIN LOAD Ta:25°C	151.39V/ 528VAC 151.58V/ 347VAC 151.17V/ 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 Ta:25°C	VDS: (1) 833V/5.52A (2) 785V/8.17A (3) 769V1.82A
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) 873V/3.10A (2) 841V/3.34A (3) 809V/2.94A
3	Diode Peak Voltage	D100 Rated 10A/400 V	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	(1) 303V (2) 301V (3) 303V
4	Input Capacitor Voltage	C6 Rated: 82 μ / 450 V	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) 426V (2) 426V (3) 418V (4) 354V
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) 13.9V (3) 15.1V (4) 13.81V

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:1.634 mA I/P-FG:1.082 mA O/P-FG:0.688 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: 30GΩ I/P-FG: 12.8G 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	23 mΩ
4	LEAKAGE CURRENT	IEC60950-1 < 0.75mA /480VAC	I/P: 480VAC O/P:Min LOAD Ta:25°C	L-FG:0.18 mA N-FG:0.18mA L,N -V(+):0.18 mA L,N-V(-):0.18 mA

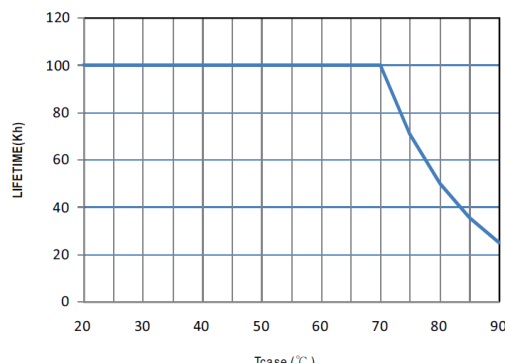
E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONDUCTION	FCC PART 15	I/P: 347VAC (50HZ) O/P:FULL/50% LOAD Ta:25°C	PASSL 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: 230V/347VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
4	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230V/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: 230V/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	<div>MODEL : HVGC-240-700</div> <div>1. ROOM AMBIENT BURN-IN : 15 HRS</div> <div>I/P : 347VAC O/P : FULL LOAD Ta= 25.5 °C</div> <div>2. HIGH AMBIENT BURN-IN : 3.5 HRS</div> <div>I/P : 347VAC O/P : FULL LOAD Ta= 56.3 °C</div> <table><tr><th>CH.</th><th>Position</th><th>ROOM AMBIENT Ta= 25.5 °C</th><th>HIGH AMBIENT Ta= 56.3 °C</th></tr><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></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
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																																																																																																					
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℃ ~ +65℃ 2. Temperature change rate : 25℃ / 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℃	TEST : OK																		
8	CAPACITOR LIFE CYCLE	SUPPOSE C106 IS THE MOST CRITICAL COMPONENT (1) I/P : 347VAC O/P : FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P : 347VAC O/P : FULL LOAD Ta= 60 ℃ LIFE TIME (3) I/P : 347VAC O/P : 75% LOAD Ta= 60 ℃ LIFE TIME (4) I/P : 347VAC O/P : 50% LOAD Ta= 60 ℃ 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℃)																			
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 50,000 hours @ Tcase 80℃ <div><table><caption>Approximate data points from the Lifetime vs Tcase graph</caption><thead><tr><th>Tcase (°C)</th><th>Lifetime (kh)</th></tr></thead><tbody><tr><td>20</td><td>100</td></tr><tr><td>30</td><td>100</td></tr><tr><td>40</td><td>100</td></tr><tr><td>50</td><td>100</td></tr><tr><td>60</td><td>100</td></tr><tr><td>70</td><td>100</td></tr><tr><td>80</td><td>50</td></tr><tr><td>90</td><td>25</td></tr></tbody></table></div>		Tcase (°C)	Lifetime (kh)	20	100	30	100	40	100	50	100	60	100	70	100	80	50	90	25
Tcase (°C)	Lifetime (kh)																				
20	100																				
30	100																				
40	100																				
50	100																				
60	100																				
70	100																				
80	50																				
90	25																				

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

12.10.30 A50-F031