



# Test Report: LDC-35

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35W Constant Power MODE Linear LED Driver

## ■ 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

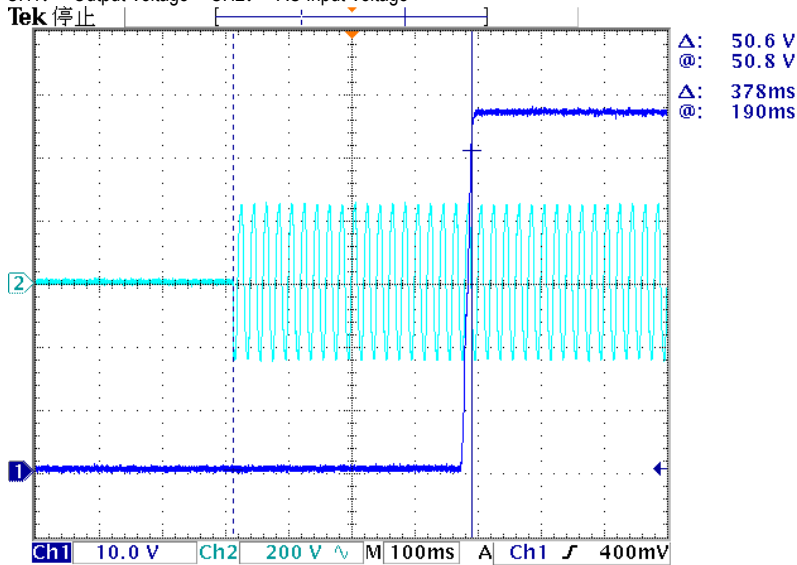
DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CURRENT TOLERANCE	±5%	I/P: 180 VAC / 295 VAC O/P: FULL/ MIN LOAD Ta: 25°C	<±5%
2	CONSTANT CURRENT REGION	27 V~ 56 V	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	22.30 V~ 59.80 V
3	OPEN CIRCUIT VOLTAGE	60 V	I/P: 230 VAC O/P: NO LOAD	59 V
4	LOW FREQUENCY CURRENT RIPPLE	3.0% max. @rated current	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	1.92%
5	CONSTANT POWER	O/P: 35W	I/P: 230 VAC O/P: Vo×Io	TEST: OK
6	SET UP TIME(Max)	500ms/230VAC	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	378ms/230 VAC

INPUT=230VAC/50HZ @ FULL LOAD

CH1: Output Voltage CH2: AC Input Voltage

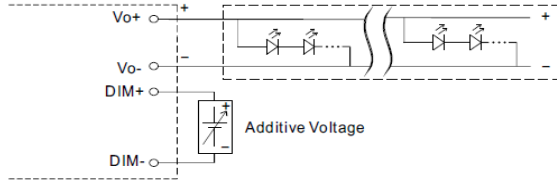


7 DIMMING OPERATION (for B-Type)

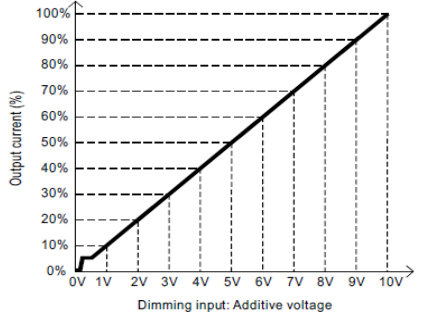
※ 3 in 1 dimming function(for B-Type)

- 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: 100 $\mu$ A (typ.)

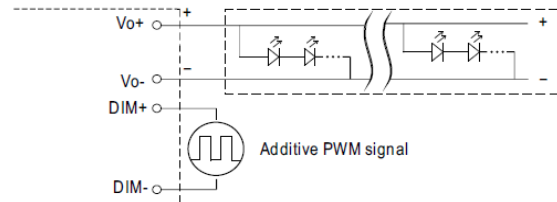
◎ Applying additive 0 ~ 10VDC



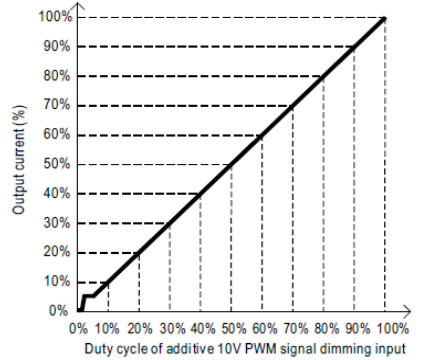
"DO NOT connect "DIM- to Vo-"



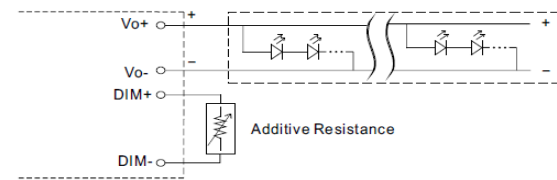
◎ Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):



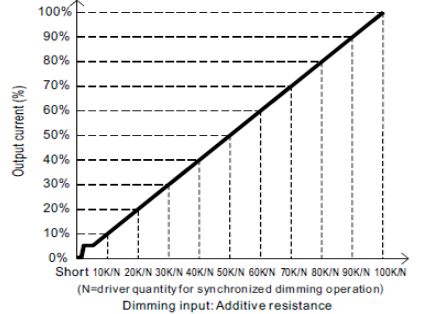
"DO NOT connect "DIM- to Vo-"



◎ Applying additive resistance:



"DO NOT connect "DIM- to Vo-"



- Note : 1. Min. dimming level is about 8% and the output current is not defined when 0% < Iout < 8%.  
 2. The output current could drop down to 0% when dimming input is about 0Vdc or 10V PWM signal with 0% duty cycle.  
 3. To ensure the dimming performance at low dimming level, output current must be over 45mA.

I/P: 230 VAC

O/P: DIMMING TEST

Ta: 25 $^{\circ}$ C

1	DIMMING	Short	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V
	Output Current	0	0.063	0.125	0.188	0.250	0.309	0.372	0.437	0.5	0.56	0.623
%	0%	10.08%	20.00%	30.08%	40.00%	49.44%	59.52%	69.92%	80.00%	89.60%	99.68%	
2	PWM	0V	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
	Output Current	0	0.066	0.127	0.188	0.249	0.310	0.37	0.431	0.493	0.555	0.610
%	0%	10.54%	20.29%	30.03%	39.78%	49.52%	59.11%	68.85%	78.75%	88.66%	97.44%	
3	R	0 $\Omega$	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K
	Output Current	0	0.062	0.126	0.190	0.225	0.319	0.383	0.447	0.511	0.576	0.619
%	0%	9.92%	20.16%	30.40%	36.00%	51.04%	61.28%	71.52%	81.76%	92.16%	99.04%	

TEST RESULT: OK

TEST RESULT: OK

8	<p>PUSH DIMMING OPERATION (primary side ; for DA-Type)</p>	<p>※PUSH dimming(primary side)</p> <table border="1" data-bbox="427 347 1417 470"> <thead> <tr> <th>Action</th> <th>Action duration</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>Short push</td> <td>0.1~1 sec.</td> <td>Turn ON-OFF the driver</td> </tr> <tr> <td>Long push</td> <td>1.5~10 sec.</td> <td>Every Long Push changes the dimming direction, dimming up or down</td> </tr> <tr> <td>Reset</td> <td>&gt;11 sec.</td> <td>Set up the dimming level to 100%</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>The factory default dimming level is at 100%.</li> <li>If the push action lasts less than 0.05 sec., it will not lead to a change for the status of the driver.</li> <li>Up to 10 drivers can perform the PUSH dimming at the same time when utilizing one common push button.</li> <li>The maximum length of the cable from the push button to the last driver is 20 meters.</li> <li>The additive push button can be connected only between the PUSH terminal, as displayed in the diagram, and AC/L (in brown or black); it will lead to short circuit if it is connected to AC/N.</li> </ul> <p>I/P: 230 VAC O/P: PUSH DIMMING TEST Ta: 25°C TEST RESULT:</p>	Action	Action duration	Function	Short push	0.1~1 sec.	Turn ON-OFF the driver	Long push	1.5~10 sec.	Every Long Push changes the dimming direction, dimming up or down	Reset	>11 sec.	Set up the dimming level to 100%
Action	Action duration	Function												
Short push	0.1~1 sec.	Turn ON-OFF the driver												
Long push	1.5~10 sec.	Every Long Push changes the dimming direction, dimming up or down												
Reset	>11 sec.	Set up the dimming level to 100%												
9	<p>DALI DIMMING OPERATION (primary side ; for DA-Type)</p>	<p>※DALI Interface(primary side)</p> <ul style="list-style-type: none"> <li>Apply DALI signal between DA+ and DA-.</li> <li>DALI protocol comprises 16 groups and 64 addresses.</li> <li>First step is fixed at 8% of output.</li> </ul> <p>I/P: 230 VAC O/P: DIMMING TEST Ta: 25°C TEST RESULT: OK</p>												

### INPUT FUNCTION TEST

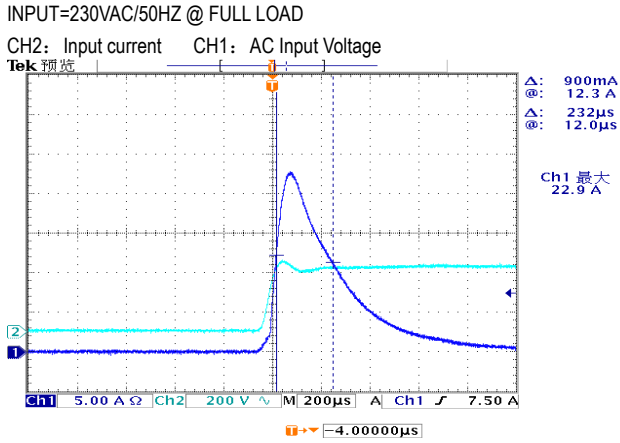
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~295 VAC	I/P: TESTING O/P: FULL LOAD Ta: 25°C	177V~305V
			I/P: (1)LOW-LINE-3V=177 V HIGH-LINE+10V=305 V O/P: FULL/NO LOAD ON: 30 Sec OFF: 30 Sec 10MIN (2)230VAC ON: 0.5 Sec OFF: 0.5 Sec 20MIN ( POWER ON/OFF NO DAMAGE )	TEST: OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 180 VAC ~295 VAC O/P: FULL~NO LOAD Ta: 25°C	TEST: OK
3	AC CURRENT	0.20A/230VAC 0.16A/277VAC	I/P: 230 VAC I/P: 277 VAC O/P: FULL LOAD Ta: 25°C	I = 0.176A/ 230VAC I = 0.149A/ 277VAC
4	LEAKAGE CURRENT	< 0.75mA / 277VAC	I/P: 277 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.384 mA N-FG: 0.384 mA
5	NO LOAD/STANDBY POWER CONSUMPTION	<0.5W	I/P: 230VAC O/P: NO LOAD/STANDBY Ta: 25°C	0.356W



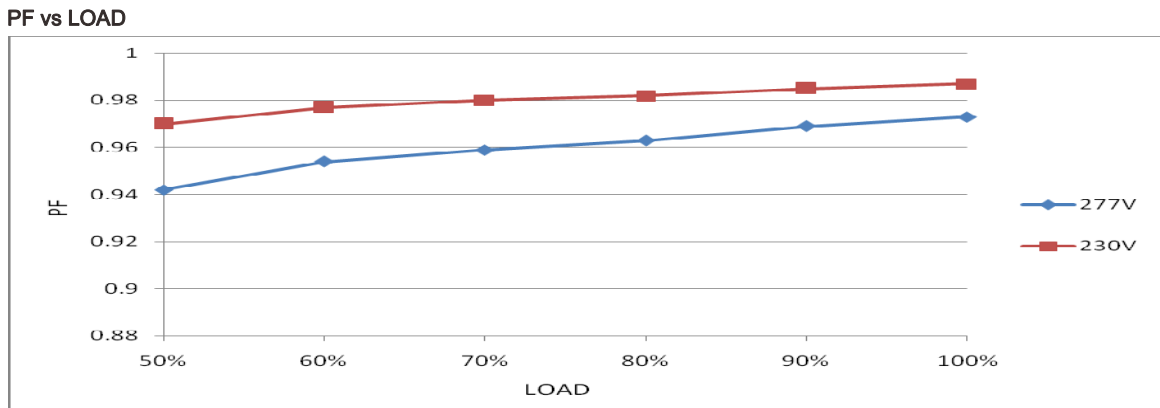
# 35W Constant Power Mode Linear LED Driver

# LDC-35 series

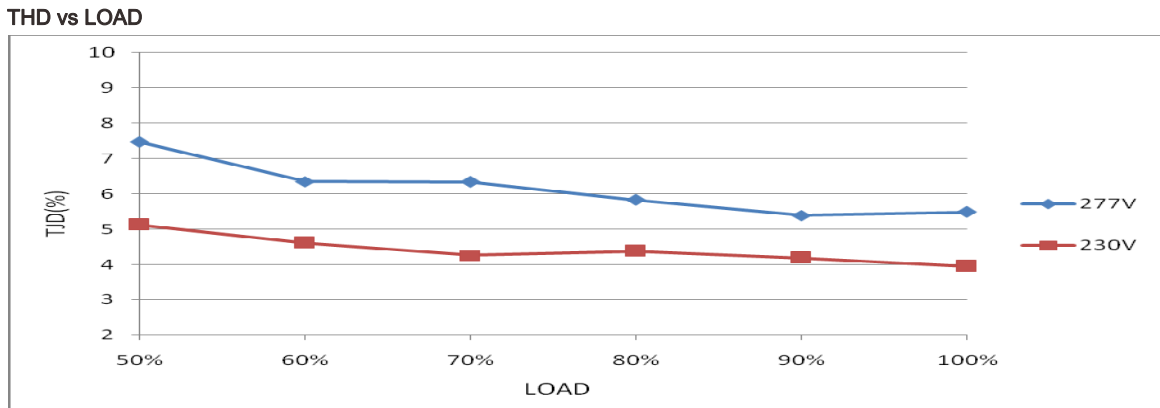
6	<b>INRUSH CURRENT(Typ)</b> 230 V/ 30 A COLD START (twidth=250us measured at 50% Ipeak) COLD START	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I=22.9 A/ 230VAC Twidth = 232us
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7	<b>POWER FACTOR</b> 0.95/ 230VAC@load≥50% 0.92/ 277VAC@load≥75%	I/P: 230 VAC I/P: 277 VAC O/P: 50% /75% LOAD Ta: 25°C	PF=0.970 @50% load /230VAC PF=0.960 @75% load /277VAC
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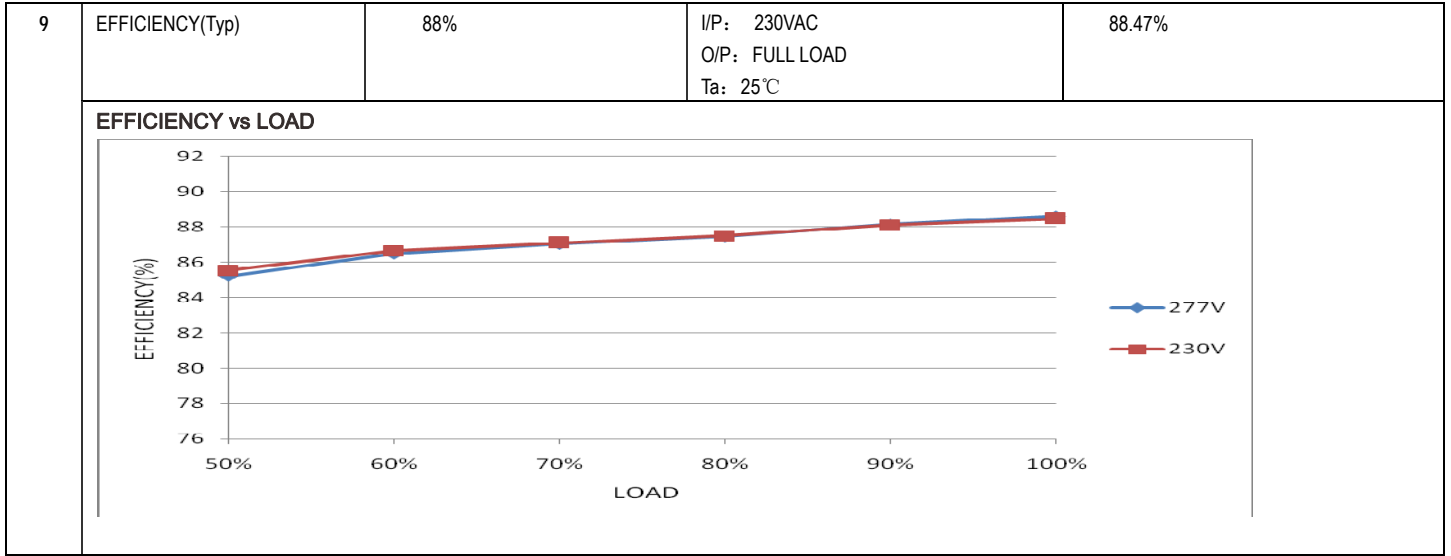
8	<b>TOTAL HARMONIC DISTORTION</b> THD<10% (@load≥50%/230VAC; @load≥75%/277VAC)	I/P: 230 VAC I/P: 277 VAC O/P: 50% /75% LOAD Ta: 25°C	THD=5.12% @50% load /230VAC THD=6.02% @75% load /277VAC
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### 35W Constant Power Mode Linear LED Driver

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### PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	61V-80V	I/P: 295 VAC I/P: 180 VAC O/P: NO LOAD	70.9V / 295VAC 71.7V /180VAC Shut down o/p voltage with auto-recovery or re-power on to recovery
2	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 295 VAC I/P: 180 VAC O/P: FULL LOAD	O.T.P. Active Shut down o/p voltage, with auto-recover
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 295 VAC I/P: 180 VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE Hiccup mode or 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	Q2 Rated 6.8 A/ 600V	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 488V (2) 488V (3) 460V
2	Diode Peak Voltage	D100 Rated 10A/200V	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 120V (2) 11.6V (3) 124V



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3	Input Capacitor Voltage	C5 Rated: 22 $\mu$ / 450 V	I/P: High-Line +3V =308 V O/P: (1) FULL LOAD input on/off (2) NO LOAD input on /Off (3) FULL LOAD /NO LOAD Change Ta: 25°C	(1) 446V (2) 446V (3) 438V
4	Control IC Voltage Test	U2 Rated 9 V~18.5 V	I/P: High-Line +3V =298V O/P: (1) Full Load input on/off (2) NO load input on /Off (3) Full Load /NO load Change Ta: 25°C	(1) 16.2V (2) 16.3V (3) 16.3V
5	P.F.C Transistor ( D to S) or (C to E) Peak Voltage	Q1 Rated 6.8A/600V	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 486V (2) 482V (3) 458V

### SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	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: 1.797 mA I/P-FG: 1.625mA O/P-FG: 1.665mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P: 500VDC>100M $\Omega$ I/P-FG: 500VDC>100M $\Omega$ O/P-FG: 500VDC>100M $\Omega$	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta: 25°C	I/P-O/P: >9999G $\Omega$ I/P-FG: >9999 G $\Omega$ O/P-FG: >9999 G $\Omega$ NO DAMAGE

### E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS C	I/P: 230VAC/50HZ O/P: FULL/50% LOAD Ta: 25°C	PASS
2	CONDUCTION	EN55015	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS
3	RADIATION	EN55015	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY Air: 8KV Contact: 4KV	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS



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6	SURGE	EN61000-4-5 LIGHT INDUSTRY L-N : 1KV L-PE: 2KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A
7	Test by certified Lab & Test Report Prepare			

## RELIABILITY TEST

### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																																
1	TEMPERATURE RISE TEST	MODEL: LDC-35 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 23.7°C 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=54.4°C																																																																																																		
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 23.7 °C</th> <th>HIGH AMBIENT Ta=54.4 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>RTH1</td><td>50.8°C</td><td>75.2°C</td></tr> <tr><td>2</td><td>LF2</td><td>51.2°C</td><td>78.3°C</td></tr> <tr><td>3</td><td>L1</td><td>67.5°C</td><td>92.1°C</td></tr> <tr><td>4</td><td>RTH2</td><td>61.8°C</td><td>86.5°C</td></tr> <tr><td>5</td><td>C5</td><td>59.2°C</td><td>83.8°C</td></tr> <tr><td>6</td><td>L2</td><td>81.0°C</td><td>98.8°C</td></tr> <tr><td>7</td><td>T1</td><td>65.3°C</td><td>86.2°C</td></tr> <tr><td>8</td><td>C42</td><td>61.9°C</td><td>82.3°C</td></tr> <tr><td>9</td><td>C110</td><td>63.8°C</td><td>83.8°C</td></tr> <tr><td>10</td><td>C111</td><td>55.9°C</td><td>82.0°C</td></tr> <tr><td>11</td><td>C101</td><td>58.3°C</td><td>85.5°C</td></tr> <tr><td>12</td><td>C102</td><td>54.9°C</td><td>82.7°C</td></tr> <tr><td>13</td><td>Q100</td><td>48.2°C</td><td>77.4°C</td></tr> <tr><td>14</td><td>BD1</td><td>59.2°C</td><td>85.1°C</td></tr> <tr><td>15</td><td>Q1</td><td>67.0°C</td><td>91.6°C</td></tr> <tr><td>16</td><td>U2</td><td>67.7°C</td><td>91.2°C</td></tr> <tr><td>17</td><td>Q2</td><td>70.0°C</td><td>94.3°C</td></tr> <tr><td>18</td><td>Q3</td><td>71.5°C</td><td>95.1°C</td></tr> <tr><td>19</td><td>U6</td><td>56.9°C</td><td>79.3°C</td></tr> <tr><td>20</td><td>D100</td><td>65.5°C</td><td>94.3°C</td></tr> <tr><td>21</td><td>U102</td><td>51.8°C</td><td>78.2°C</td></tr> <tr><td>22</td><td>SCR1</td><td>64.0°C</td><td>84.8°C</td></tr> <tr><td>23</td><td>Tc</td><td>46.2°C</td><td>71.7°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 23.7 °C	HIGH AMBIENT Ta=54.4 °C	1	RTH1	50.8°C	75.2°C	2	LF2	51.2°C	78.3°C	3	L1	67.5°C	92.1°C	4	RTH2	61.8°C	86.5°C	5	C5	59.2°C	83.8°C	6	L2	81.0°C	98.8°C	7	T1	65.3°C	86.2°C	8	C42	61.9°C	82.3°C	9	C110	63.8°C	83.8°C	10	C111	55.9°C	82.0°C	11	C101	58.3°C	85.5°C	12	C102	54.9°C	82.7°C	13	Q100	48.2°C	77.4°C	14	BD1	59.2°C	85.1°C	15	Q1	67.0°C	91.6°C	16	U2	67.7°C	91.2°C	17	Q2	70.0°C	94.3°C	18	Q3	71.5°C	95.1°C	19	U6	56.9°C	79.3°C	20	D100	65.5°C	94.3°C	21	U102	51.8°C	78.2°C	22	SCR1	64.0°C	84.8°C	23	Tc	46.2°C	71.7°C
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 295VAC/180VAC O/P: FULL LOAD Ta= -30°C	TEST: OK																																																																																																
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P: 305VAC O/P: FULL LOAD Ta=50 °C HUMIDITY= 95% R.H	TEST: OK																																																																																																
4	TEMPERATURE COEFFICIENT	±0.03%/°C (0~60°C)	I/P: 230 VAC O/P: FULL LOAD	±0.015%/°C (0~60°C)																																																																																																





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5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature: $-45^{\circ}\text{C} \sim +85^{\circ}\text{C}$ 2. Temperature change rate : $25^{\circ}\text{C} / \text{MIN}$ 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle: 5 CYCLE 5. Input/Output condition: STATIC	TEST: OK
6	THERMAL SHOCK TEST	1. Thermal shock Temperature: $-30^{\circ}\text{C} \sim +85^{\circ}\text{C}$ 2. Temperature change rate : $25^{\circ}\text{C} / \text{MIN}$ 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle: 10 CYCLE 5. Input/Output condition: 230VAC/Full Load AC ON/OFF TEST AC on 3 sec/AC off 1 sec TEST	TEST: OK
7	VIBRATION TEST	1 Carton & 1 Set (1) Waveform: Sine Wave (2) Frequency: 10~500Hz (3) Sweep Time: 10min/sweep cycle (4) Acceleration: 2G (5) Test Time: 180min in each axis (X.Y.Z) (6) Ta: $25^{\circ}\text{C}$	TEST: OK
8	CAPACITOR LIFE CYCLE	LDC-35: SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P: 230VAC O/P: FULL LOAD Ta= $25^{\circ}\text{C}$ LIFE TIME (2) I/P: 230VAC O/P: FULL LOAD Ta= $50^{\circ}\text{C}$ LIFE TIME (3) I/P: 230VAC O/P: 75% LOAD Ta= $50^{\circ}\text{C}$ LIFE TIME (4) I/P: 230VAC O/P: 50% LOAD Ta= $50^{\circ}\text{C}$ LIFE TIME	(1) 213131 HRS (2) 48014 HRS (3) 78198 HRS (4) 120640 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 1097K hrs min. Telcordia SR-332 (Bellcore) 286K hrs min. MIL-HDBK-217F ( $25^{\circ}\text{C}$ )	
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 50,000 hours @ Tcase $75^{\circ}\text{C}$ 	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIANGQW/ZHUOKB	SKY	LIUWY