



Test Report: LDC-35

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



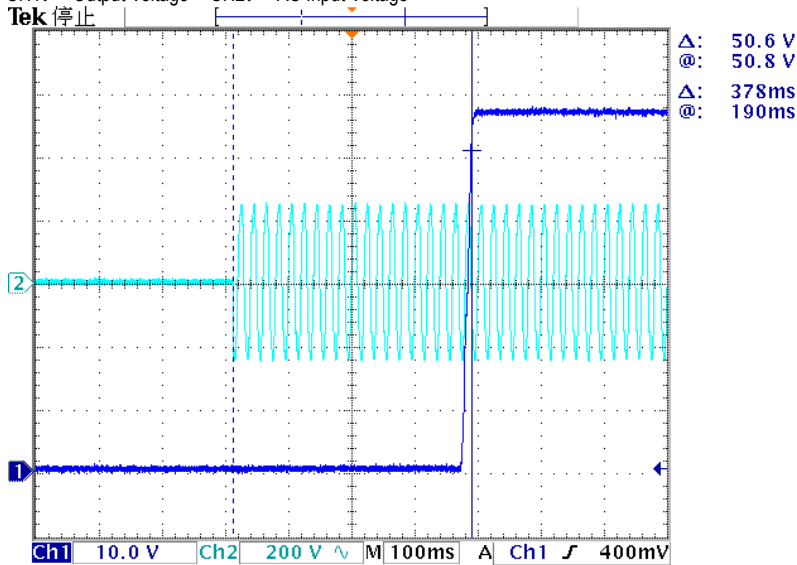
DESIGN VERIFY TEST

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

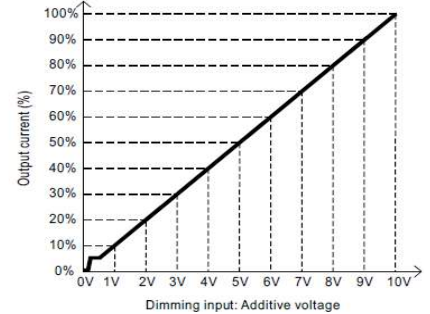
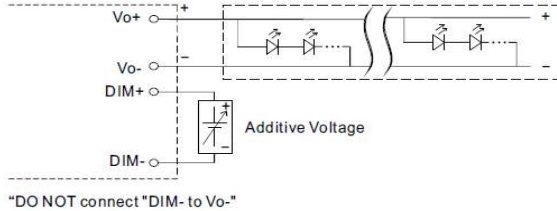


7 DIMMING OPERATION (for B-Type)

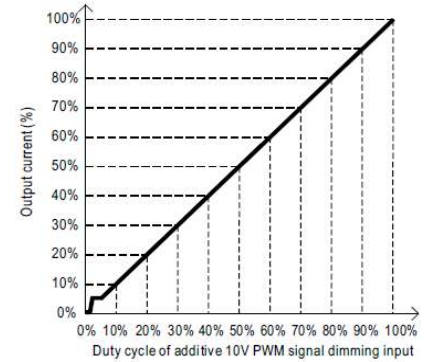
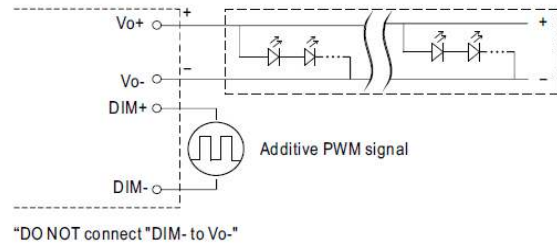
※ 3 in 1 dimming function(for B-Type)

- 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 μ A (typ.)

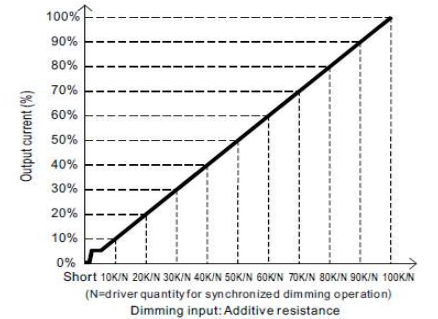
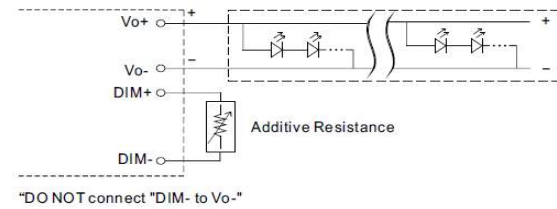
◎ Applying additive 0 ~ 10VDC



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



◎ Applying additive resistance:



- 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 Ω	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="427 349 1417 472"> <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>>11 sec.</td> <td>Set up the dimming level to 100%</td> </tr> </tbody> </table> <ul style="list-style-type: none"> The factory default dimming level is at 100%. If the push action lasts less than 0.05 sec., it will not lead to a change for the status of the driver. Up to 10 drivers can perform the PUSH dimming at the same time when utilizing one common push button. The maximum length of the cable from the push button to the last driver is 20 meters. 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. <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%
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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"> Apply DALI signal between DA+ and DA-. DALI protocol comprises 16 groups and 64 addresses. First step is fixed at 8% of output. <p>I/P: 230 VAC O/P: DIMMING TEST Ta: 25°C TEST RESULT: OK</p>												

INPUT FUNCTION TEST

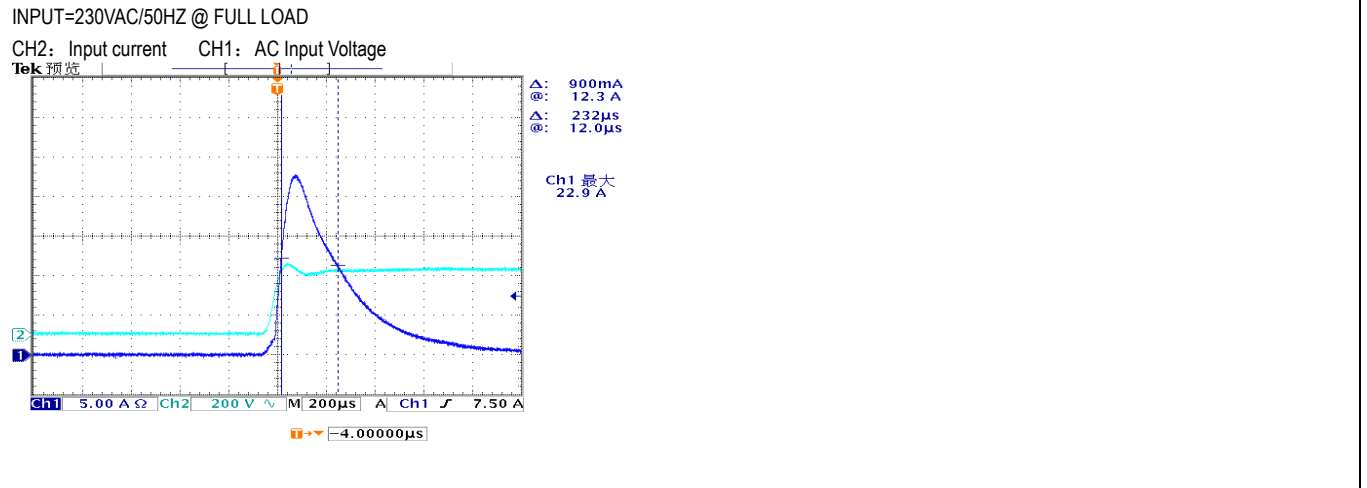
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~295 VAC	I/P: TESTING O/P: FULL LOAD Ta: 25°C	177V~305V
			I/P: (1)LOW-LINE-3V=177 V HIGH-LINE+10V=305 V O/P: FULL/NO LOAD ON: 30 Sec OFF: 30 Sec 10MIN (2)230VAC ON: 0.5 Sec OFF: 0.5 Sec 20MIN (POWER ON/OFF NO DAMAGE)	TEST: 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



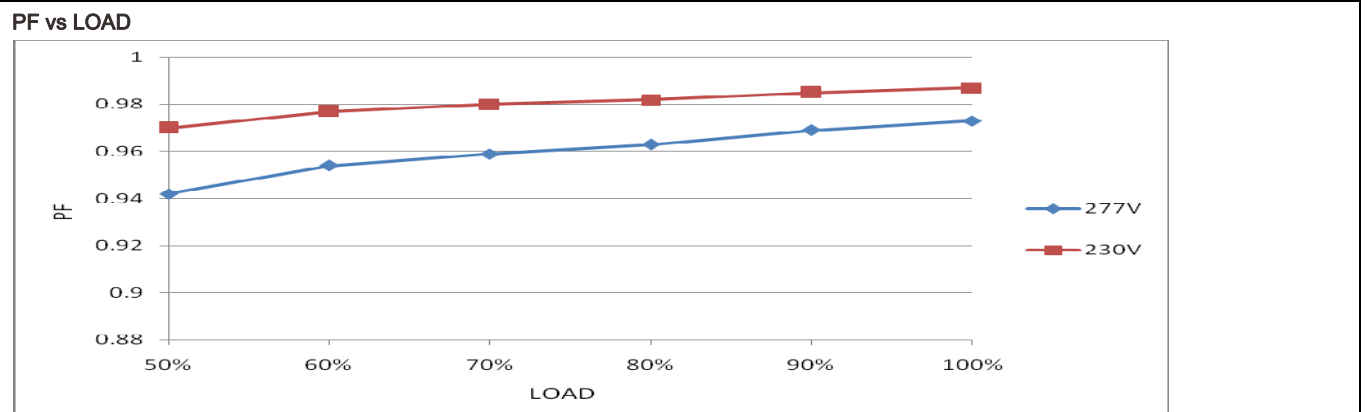
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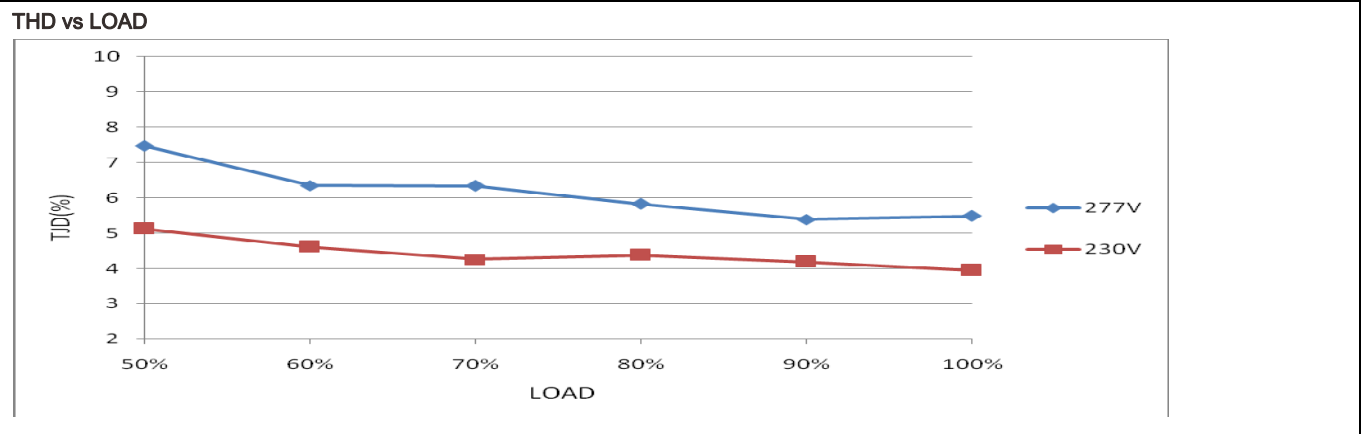
6	INRUSH CURRENT(Typ)	230 V/ 30 A COLD START (twidth=250us measured at 50% Ipeak) COLD START	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I=22.9 A/ 230VAC Twidth = 232us
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7	POWER FACTOR	0.95/ 230VAC@load≥50% 0.92/ 277VAC@load≥75%	I/P: 230 VAC I/P: 277 VAC O/P: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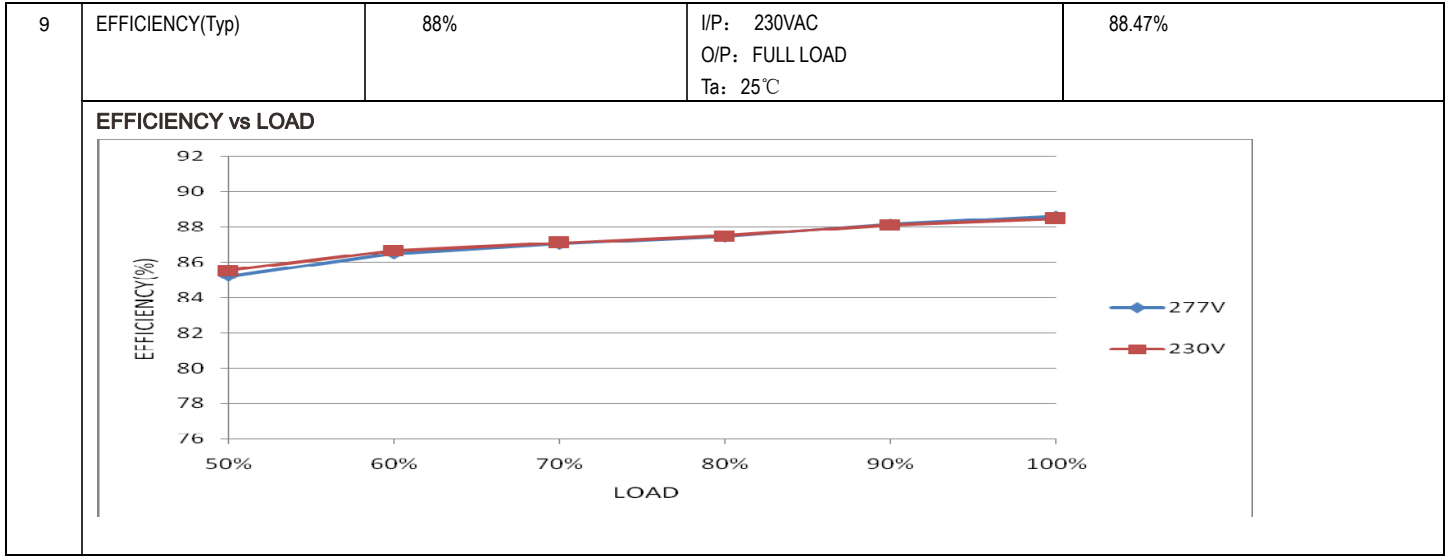
8	TOTAL HARMONIC DISTORTION	THD<10% (@load≥50%/230VAC; @load≥75%/277VAC)	I/P: 230 VAC I/P: 277 VAC O/P: 50% /75% LOAD Ta: 25°C	THD=5.12% @50% load /230VAC THD=6.02% @75% load /277VAC
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PROTECTION FUNCTION TEST

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 μ / 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 Ω I/P-FG: 500VDC>100M Ω O/P-FG: 500VDC>100M Ω	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta: 25°C	I/P-O/P: >9999G Ω I/P-FG: >9999 G Ω O/P-FG: >9999 G Ω 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°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°C LIFE TIME (2) I/P: 230VAC O/P: FULL LOAD Ta= 50°C LIFE TIME (3) I/P: 230VAC O/P: 75% LOAD Ta= 50°C LIFE TIME (4) I/P: 230VAC O/P: 50% LOAD Ta= 50°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°C)	
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 50,000 hours @ Tcase 75°C 	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIANGQW/ZHUOKB	SKY	LIUWY