



Test Report: IDPV-25-24

25W PWM Output 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	PWM FREQUENCY	1KHz (±20%)	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	1108Hz
2	VOLTAGE TOLERANCE	± 10%	I/P: 90 VAC / 295 VAC O/P: 70%/FULL/ NO LOAD Ta: 25°C	1.5%~2.35%
3	OVER/UNDERSHOOT TEST	<±10%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	<±10%
4	SET UP TIME(Max)	500ms/230VAC 1200ms/115VAC	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	364ms/230VAC 432ms/115VAC
<div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1: Output Voltage CH2: AC Input Voltage</p> <p>Ch1 Max 25.9 V Ch1 RMS 18.5 V</p> <p>16 Dec 2016 17:27:48</p> </div> <div style="width: 45%;"> <p>INPUT=115VAC/60HZ @ FULL LOAD</p> <p>CH1: Output Voltage CH2: AC Input Voltage</p> <p>Ch1 Max 25.9 V Ch1 RMS 16.8 V</p> <p>16 Dec 2016 17:42:37</p> </div> </div>				
5	AUXILIARY DC OUTPUT (For A-Type only)	Nominal 12V (deviation 11.4~12.6) @50mA	I/P: 230 VAC O/P: FULL LOAD	11.94V

6	DIMMING TEST	<p>※ Dimming principle for PWM style output Dimming is achieved by varying the duty cycle of the output current.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Output DC current</p> </div> <div style="text-align: center;"> $\text{Duty cycle}(\%) = \frac{T_{ON}}{T} \times 100\%$ <p>Output PWM frequency : 1KHz(±20%)</p> </div> </div> <p>※ 2 in 1 dimming function</p> <ul style="list-style-type: none"> ● Applying additive 0 ~ 10VDC <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>"DO NOT connect "DIM- to Vo-"</p> </div> <div style="text-align: center;"> </div> </div> <ul style="list-style-type: none"> ● Applying additive 10V PWM signal (frequency range 300~3000Hz): <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>"DO NOT connect "DIM- to Vo-"</p> </div> <div style="text-align: center;"> </div> </div> <p>Note : 1. Min. duty cycle of output current is about 8% and the output current is not defined when 0% < Iout < 8%. 2. The duty cycle of output current could drop down to 0% when dimming input is about 0Vdc or 10V PWM signal with 0% duty cycle.</p> <p>I/P: 230 VAC O/P: DIMMING TEST Ta: 25°C</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">1</th> <th>Dimming voltage</th> <th>0V</th><th>1V</th><th>2V</th><th>3V</th><th>4V</th><th>5V</th><th>6V</th><th>7V</th><th>8V</th><th>9V</th><th>10V</th><th>OPEN</th> </tr> </thead> <tbody> <tr> <td>Output Current</td> <td>0</td><td>0.09A</td><td>0.20A</td><td>0.30A</td><td>0.41A</td><td>0.51A</td><td>0.62A</td><td>0.73A</td><td>0.83A</td><td>0.94A</td><td>1.04A</td><td>1.06A</td> </tr> <tr> <td>Duty cycle of output current</td> <td>0%</td><td>8.6%</td><td>19.0%</td><td>28.6%</td><td>39.0%</td><td>48.6%</td><td>59.0%</td><td>69.5%</td><td>79.0%</td><td>89.5%</td><td>99.0%</td><td>100.1%</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">2</th> <th>Dimming Duty cycle</th> <th>0%</th><th>10%</th><th>20%</th><th>30%</th><th>40%</th><th>50%</th><th>60%</th><th>70%</th><th>80%</th><th>90%</th><th>100%</th><th>OPEN</th> </tr> </thead> <tbody> <tr> <td>Output Current</td> <td>0</td><td>0.09A</td><td>0.20A</td><td>0.30A</td><td>0.41A</td><td>0.51A</td><td>0.62A</td><td>0.72A</td><td>0.83A</td><td>0.94A</td><td>1.04A</td><td>1.05A</td> </tr> <tr> <td>Duty cycle of output current</td> <td>0%</td><td>8.6%</td><td>19.0%</td><td>28.6%</td><td>39.0%</td><td>48.6%</td><td>59.0%</td><td>68.6%</td><td>79.0%</td><td>89.5%</td><td>99.0%</td><td>100%</td> </tr> </tbody> </table>	1	Dimming voltage	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN	Output Current	0	0.09A	0.20A	0.30A	0.41A	0.51A	0.62A	0.73A	0.83A	0.94A	1.04A	1.06A	Duty cycle of output current	0%	8.6%	19.0%	28.6%	39.0%	48.6%	59.0%	69.5%	79.0%	89.5%	99.0%	100.1%	2	Dimming Duty cycle	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN	Output Current	0	0.09A	0.20A	0.30A	0.41A	0.51A	0.62A	0.72A	0.83A	0.94A	1.04A	1.05A	Duty cycle of output current	0%	8.6%	19.0%	28.6%	39.0%	48.6%	59.0%	68.6%	79.0%	89.5%	99.0%	100%
	1	Dimming voltage		0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN																																																																			
		Output Current	0	0.09A	0.20A	0.30A	0.41A	0.51A	0.62A	0.73A	0.83A	0.94A	1.04A	1.06A																																																																				
	Duty cycle of output current	0%	8.6%	19.0%	28.6%	39.0%	48.6%	59.0%	69.5%	79.0%	89.5%	99.0%	100.1%																																																																					
	2	Dimming Duty cycle	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN																																																																				
		Output Current	0	0.09A	0.20A	0.30A	0.41A	0.51A	0.62A	0.72A	0.83A	0.94A	1.04A	1.05A																																																																				
	Duty cycle of output current	0%	8.6%	19.0%	28.6%	39.0%	48.6%	59.0%	68.6%	79.0%	89.5%	99.0%	100%																																																																					
	TEST RESULT: OK																																																																																	

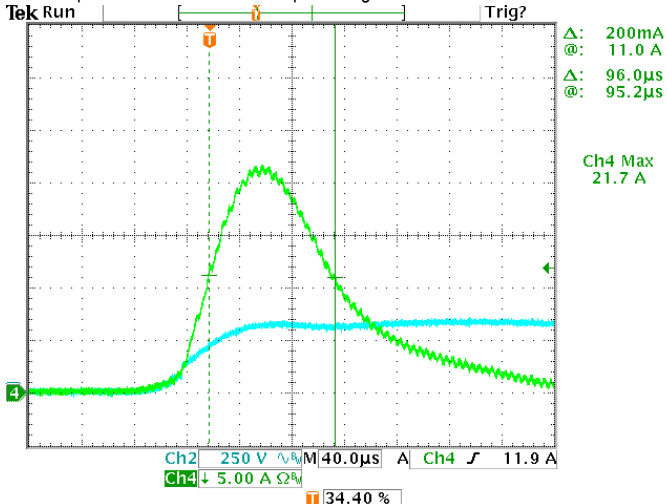


INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~295VAC	I/P: TESTING O/P: FULL LOAD Ta: 25°C	90V~295V
			I/P: (1)LOW-LINE-3V=87 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: 90 VAC ~295 VAC O/P: FULL~NO LOAD Ta: 25°C	TEST: OK
3	AC CURRENT	0.4A/115VAC 0.16A/230VAC 0.13A/277VAC	I/P: 115 VAC I/P: 230 VAC I/P: 277 VAC O/P: FULL LOAD Ta: 25°C	I = 0.2688A/ 115VAC I = 0.1364A/ 230VAC I = 0.1181A/ 277VAC
4	LEAKAGE CURRENT	< 0.75mA / 277VAC	I/P: 277 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.0027 mA N-FG: 0.0029 mA
5	NO LOAD POWER CONSUMPTION	< 0.5W for Blank-Type < 1.2W for A-Type	I/P: 230VAC O/P: NO LOAD Ta: 25°C	0.4231W for Blank-Type 0.4932W for A-Type
6	INRUSH CURRENT(Typ)	COLD START 30A/230VAC Twidth =150 us measured at 50% Ipeak	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I=21.7 A/ 230VAC Twidth = 96us

INPUT=230VAC/50HZ @ FULL LOAD

CH2: Input current CH1: AC Input Voltage



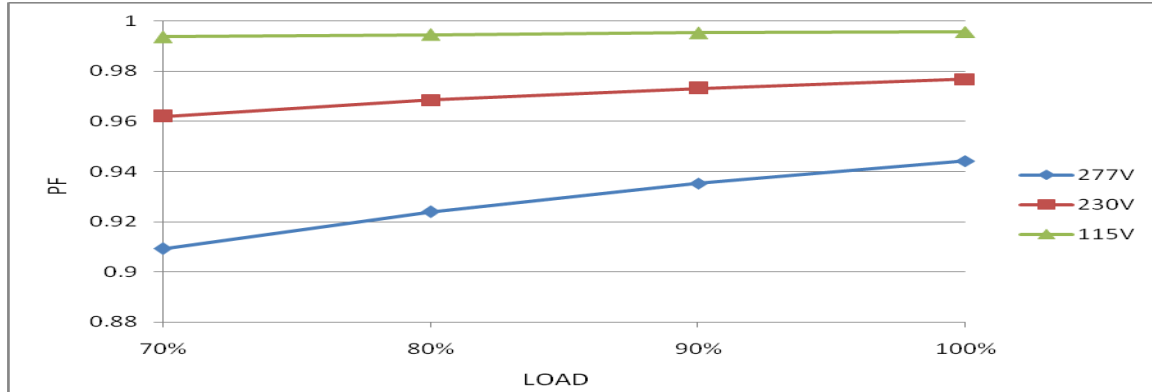


25W PWM Output LED Driver

IDPV-25 series

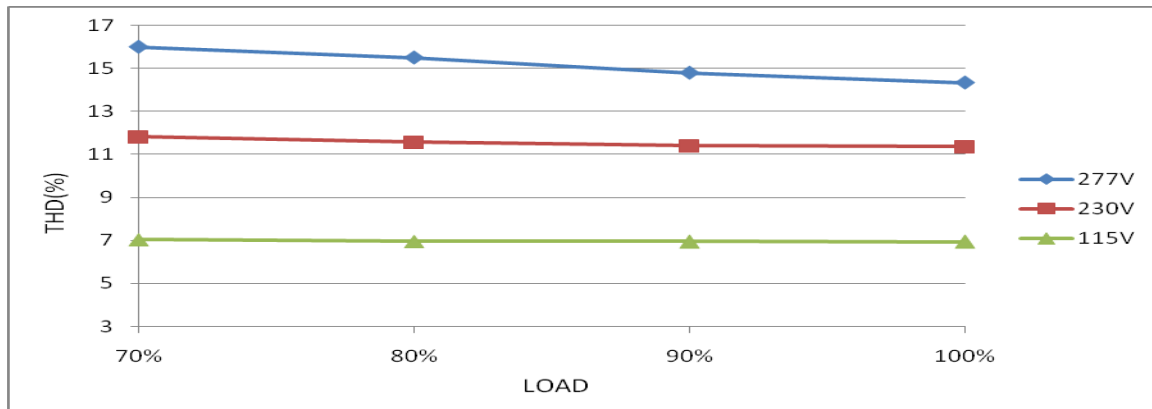
7	POWER FACTOR	0.95/ 115VAC 0.92/ 230VAC 0.9/ 277VAC	I/P: 115 VAC I/P: 230 VAC I/P: 277 VAC O/P: FULL LOAD Ta: 25°C	PF=0.995 /115VAC PF=0.976 /230VAC PF=0.944 /277VAC
---	--------------	---------------------------------------------	----------------------------------------------------------------------------	----------------------------------------------------------

PF vs LOAD



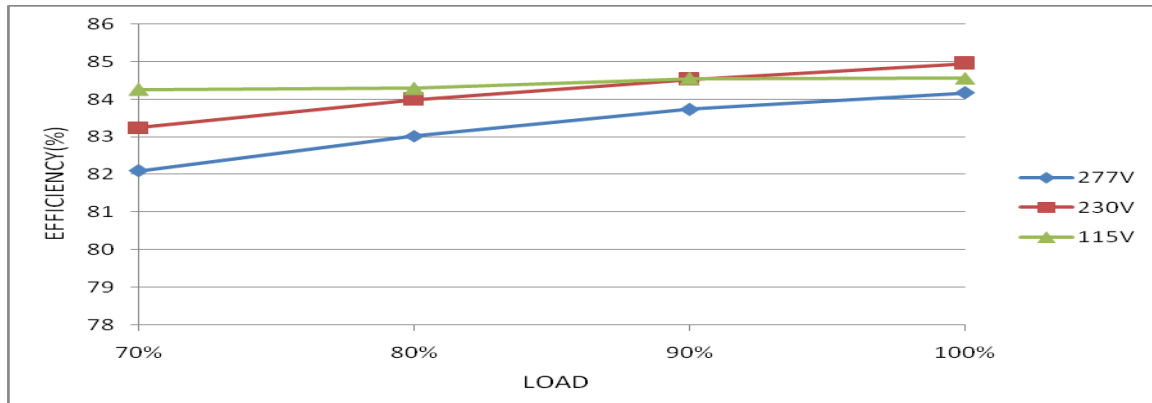
8	TOTAL HARMONIC DISTORTION	THD < 20% (@load ≥ 70%/115VAC, 230VAC; @load ≥ 75%/277VAC)	I/P: 115 VAC I/P: 230 VAC I/P: 277 VAC O/P: 70% /75% LOAD Ta: 25°C	THD=5.03% @70% load /115VAC THD=8.39% @70% load /230VAC THD=12.03% @75% load /277VAC
---	---------------------------	------------------------------------------------------------------	--------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------

THD vs LOAD



9	EFFICIENCY(Typ)	81%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	84.95%
---	-----------------	-----	-------------------------------------------	--------

EFFICIENCY vs LOAD





PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER CURRENT PROTECTION	105 %~ 120 %	I/P: 100VAC I/P: 230VAC I/P: 295VAC O/P: TESTING Ta: 25°C	112%/ 100VAC 112%/ 230VAC 112%/ 295VAC Hiccup mode, recovers automatically after fault condition is removed
2	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 90VAC I/P: 295VAC O/P: 70%/FULL LOAD Ta: 25°C	NO DAMAGE Shut down O/P voltage, re-power on to recovery

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 7A/800V	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 648V (2) 608V (3) 602V
2	Diode Peak Voltage	D100 Rated 16A/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) 128V (2) 131V (3) 127V
3	Control IC Voltage Test	U1 Rated 35V	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) 13.7V (2) 13.6V (3) 13.7V



SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3.75KVAC/min	I/P-O/P: 4.2KVAC/min Ta: 25°C	I/P-O/P: 1.724mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P: 500VDC>100MΩ	I/P-O/P: 500VDC Ta: 25°C	I/P-O/P: >9999MΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2	I/P: 230VAC/50HZ O/P: FULL /60% 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: 10KV Contact: 5KV	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
6	SURGE	EN61000-4-5 LIGHT INDUSTRY L-N: 1KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS
7	Test by certified Lab & Test Report Prepare			

■ **RELIABILITY TEST**

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																
1	TEMPERATURE RISE TEST	MODEL: IDPV-25-24 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 25.9°C 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 46.1°C																																																																																		
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 25.9 °C</th> <th>HIGH AMBIENT Ta=46.1 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>56.6°C</td><td>73.9°C</td></tr> <tr><td>2</td><td>L1</td><td>41.0°C</td><td>60.0°C</td></tr> <tr><td>3</td><td>RTH1</td><td>44.0°C</td><td>62.8°C</td></tr> <tr><td>4</td><td>C8</td><td>64.8°C</td><td>82.4°C</td></tr> <tr><td>5</td><td>C?</td><td>61.8°C</td><td>79.3°C</td></tr> <tr><td>6</td><td>Q1</td><td>64.0°C</td><td>83.0°C</td></tr> <tr><td>7</td><td>D1</td><td>70.7°C</td><td>89.5°C</td></tr> <tr><td>8</td><td>U1</td><td>61.6°C</td><td>80.1°C</td></tr> <tr><td>9</td><td>C16</td><td>62.0°C</td><td>79.9°C</td></tr> <tr><td>10</td><td>T1</td><td>67.7°C</td><td>84.5°C</td></tr> <tr><td>11</td><td>D100</td><td>72.2°C</td><td>88.6°C</td></tr> <tr><td>12</td><td>Q100</td><td>55.9°C</td><td>73.7°C</td></tr> <tr><td>13</td><td>U100</td><td>64.1°C</td><td>81.0°C</td></tr> <tr><td>14</td><td>RG1</td><td>71.5°C</td><td>89.1°C</td></tr> <tr><td>15</td><td>C206</td><td>58.6°C</td><td>76.4°C</td></tr> <tr><td>16</td><td>C105</td><td>49.1°C</td><td>67.4°C</td></tr> <tr><td>17</td><td>C106</td><td>48.9°C</td><td>66.8°C</td></tr> <tr><td>18</td><td>LF100</td><td>45.3°C</td><td>63.4°C</td></tr> <tr><td>19</td><td>THS2</td><td>57.7°C</td><td>74.3°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 25.9 °C	HIGH AMBIENT Ta=46.1 °C	1	BD1	56.6°C	73.9°C	2	L1	41.0°C	60.0°C	3	RTH1	44.0°C	62.8°C	4	C8	64.8°C	82.4°C	5	C?	61.8°C	79.3°C	6	Q1	64.0°C	83.0°C	7	D1	70.7°C	89.5°C	8	U1	61.6°C	80.1°C	9	C16	62.0°C	79.9°C	10	T1	67.7°C	84.5°C	11	D100	72.2°C	88.6°C	12	Q100	55.9°C	73.7°C	13	U100	64.1°C	81.0°C	14	RG1	71.5°C	89.1°C	15	C206	58.6°C	76.4°C	16	C105	49.1°C	67.4°C	17	C106	48.9°C	66.8°C	18	LF100	45.3°C	63.4°C	19	THS2	57.7°C	74.3°C		
NO	Position	ROOM AMBIENT Ta= 25.9 °C	HIGH AMBIENT Ta=46.1 °C																																																																																	
1	BD1	56.6°C	73.9°C																																																																																	
2	L1	41.0°C	60.0°C																																																																																	
3	RTH1	44.0°C	62.8°C																																																																																	
4	C8	64.8°C	82.4°C																																																																																	
5	C?	61.8°C	79.3°C																																																																																	
6	Q1	64.0°C	83.0°C																																																																																	
7	D1	70.7°C	89.5°C																																																																																	
8	U1	61.6°C	80.1°C																																																																																	
9	C16	62.0°C	79.9°C																																																																																	
10	T1	67.7°C	84.5°C																																																																																	
11	D100	72.2°C	88.6°C																																																																																	
12	Q100	55.9°C	73.7°C																																																																																	
13	U100	64.1°C	81.0°C																																																																																	
14	RG1	71.5°C	89.1°C																																																																																	
15	C206	58.6°C	76.4°C																																																																																	
16	C105	49.1°C	67.4°C																																																																																	
17	C106	48.9°C	66.8°C																																																																																	
18	LF100	45.3°C	63.4°C																																																																																	
19	THS2	57.7°C	74.3°C																																																																																	
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 295VAC/100VAC O/P: FULL LOAD Ta= -25°C	TEST: OK																																																																																
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 45 °C NO DAMAGE	I/P: 305VAC O/P: FULL LOAD Ta=45 °C HUMIDITY= 95% R.H	TEST: OK																																																																																
4	TEMPERATURE COEFFICIENT	±0.03%/°C (0~45°C)	I/P: 230 VAC O/P: FULL LOAD	±0.012%/°C (0~45°C)																																																																																
5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature: -45°C ~ +90°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		TEST: OK																																																																																



25W PWM Output LED Driver

IDPV-25 series

6	THERMAL SHOCK TEST	1. Thermal shock Temperature: -25°C~+50°C 2. Temperature change rate : 25°C / 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	IDPV-25-24: 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= 45 °C LIFE TIME (3) I/P: 230VAC O/P: 75% LOAD Ta= 45 °C LIFE TIME (4) I/P: 230VAC O/P: 50% LOAD Ta= 45 °C LIFE TIME	(1) 584255 HRS (2) 171297 HRS (3) 234896 HRS (4) 312782 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 3507.1K hrs min. Telcordia SR-332 (Bellcore) ; 382.7K hrs min. MIL-HDBK-217F (25°C)	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	CHENZH/ZHUOKB	SKY	LIUWY