



Test Report: PCD-16-1400A

16W Single Output AC Dimmable 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	VERDICT
1	RIPPLE & NOISE	V1 : 2 Vp-p (Max)	I/P : 115VAC O/P : FULL LOAD Ta : 25°C	V1 : 772 mVp-p (Max)	P
2	SET UP TIME	115VAC : 2000 ms (Max)	I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	115VAC/ 817 ms	P
3	OPERATING VOLTAGE RANGE	8V~12V	I/P : 115VAC O/P : CV MODE Ta : 25°C	O/P= 8V : 1.938 A O/P= 11V : 1.938 A	P
4	OVER/UNDERSHOOT TEST	< 16V	I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	TEST : < 16 V	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~135 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	79 V~135V	P
			I/P : LOW-LINE-3V= 87 V HIGH-LINE+15%=155.25 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	TEST : OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 90 VAC ~ 135 VAC O/P : FULL~MIN LOAD Ta : 25°C	TEST : OK	P
3	POWER FACTOR	0.9 / 115 VAC(TYP) 0.9 / 90 VAC(TYP)	I/P : 115 VAC (FULL LOAD) I/P : 90 VAC (FULL LOAD) O/P : FULL LOAD Ta : 25°C	PF= 0.979 / 115 VAC PF= 0.993 / 90 VAC	P
4	EFFICIENCY	80 % (TYP)	I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	82.40 %	P
5	INPUT CURRENT	115V/ 0.4 A (TYP)	I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I= 0.17 A/ 115 VAC	P
6	INRUSH CURRENT	115V/ 40 A (TYP) COLD START	I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I= 7 A/ 115 VAC	P
7	LEAKAGE CURRENT	< 0.5 mA / 120 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-CASE : 0.01 mA N-CASE : 0.01 mA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	95 % ~ 110 %	I/P : 115 VAC I/P : 90 VAC O/P : TESTING Ta : 25°C	99.8 %/ 115 VAC 99.8 %/ 90 VAC Constant Current Limiting recovers automatically after fault condition is removed.	P
2	OVER TEMPERATURE PROTECTION	SPEC : RTH1 : $95 \pm 10^{\circ}\text{C}$ O.T.P. Detect on heatsink of power transistor	I/P : 115 VAC O/P : FULL LOAD TSW1,10KΩ OTP	O.T.P. Active Shut down o/p voltage , Re-power ON to recover	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 135 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE	P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q 1 Rated : STD10NM60N 8A/650V	I/P : High-Line +3V = 138 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 374 V (2) 242 V (3) 370 V	P
2	Diode Peak Voltage	D100 Rated : B5100C 5A/100V	I/P : High-Line +3V = 138 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 34.8 V (2) 24.6 V (3) 34.4 V	P
3	Clamp Diode Peak Voltage	D 6 Rated : 1A/1KV 1N4007GP	I/P : High-Line +3V = 138 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 364 V (2) 274 V (3) 362 V	P
4	Control IC Voltage Test	U 1 Rated : PWM NCP1608B 10.2V~20V	I/P : High-Line +3V = 138 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 13.732 V (2) 12.304 V (3) 12.244 V	P

■ SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P : 3.75 KVAC/min	I/P-O/P : 4 KVAC/min Ta : 25°C	I/P-O/P : 1.236 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ	I/P-O/P : 500 VDC Ta : 25°C /70%RH	I/P-O/P : 30 GΩ NO DAMAGE	P
3	APPROVAL	TUV : Certificate NO : UL : File NO :			N/A

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS C	I/P:115V/100V/120VAC/60HZ LOAD:LED/ELECTRONIC LOAD O/P:40V/58VLOAD Ta:25°C	PASS	P
2	CONDUCTION	EN55015 CLASS B	I/P : 115 VAC (60HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55015 CLASS B	I/P : 115 VAC (60HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR : 8KV / Contact : 4KV	I/P : 115 VAC/60HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT : 1KV	I/P : 115 VAC/60HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N : 1KV	I/P : 115 VAC/60HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																																															
1	TEMPERATURE RISE TEST	MODEL : PCD-16-1400A 1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 115VAC O/P : FULL LOAD Ta=28.8 °C °C 2. HIGH AMBIENT BURN-IN : 4 HRS I/P : 115VAC O/P : FULL LOAD Ta=50.7 °C °C <table><tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT Ta=28.8 °C</th><th>HIGH AMBIENT Ta= 50.7 °C</th></tr><tr><td>6</td><td>LF1</td><td>LF804</td><td>50.2°C</td><td>68.9°C</td></tr><tr><td>7</td><td>L1</td><td>TF2171</td><td>59.2°C</td><td>76.8°C</td></tr><tr><td>8</td><td>BD1</td><td>2A/800V GLASS KBP208G</td><td>57.6°C</td><td>75.7°C</td></tr><tr><td>9</td><td>C9</td><td>104/250V 10% P=7.5 MEC</td><td>56.5°C</td><td>74.8°C</td></tr><tr><td>10</td><td>R1</td><td>2W 330Ω 5% MINI</td><td>55.0°C</td><td>73.4°C</td></tr><tr><td>11</td><td>R5</td><td>2W 820Ω 5% MINI</td><td>61.0°C</td><td>79.5°C</td></tr><tr><td>12</td><td>C1</td><td>473/275VAC 20% P=10 R.46</td><td>55.7°C</td><td>73.5°C</td></tr><tr><td>13</td><td>D30</td><td>1A/1KV 1N4007GP</td><td>55.5°C</td><td>74.9°C</td></tr><tr><td>14</td><td>C48</td><td>22u/50V UL10Kh 5*11 YXM</td><td>56.8°C</td><td>74.5°C</td></tr><tr><td>15</td><td>TSW1</td><td>220KΩ 3Φ TTC3A224F4371EY 1%</td><td>54.2°C</td><td>72.9°C</td></tr><tr><td>16</td><td>T1</td><td>TF2145</td><td>66.2°C</td><td>83.4°C</td></tr><tr><td>17</td><td>U1</td><td>NCP1608B</td><td>57.5°C</td><td>75.0°C</td></tr><tr><td>18</td><td>Q1</td><td>STD10NM60N 8A/650V DPAK</td><td>63.6°C</td><td>81.2°C</td></tr><tr><td>19</td><td>C7</td><td>334/250V 10% P=7.5 MEX</td><td>58.2°C</td><td>76.2°C</td></tr><tr><td>20</td><td>D100</td><td>B5100C 5A/100V SMC</td><td>73.1°C</td><td>90.1°C</td></tr><tr><td>21</td><td>C105</td><td>2200u/16V UL10Kh 12.5*20 ZLH</td><td>58.5°C</td><td>75.6°C</td></tr><tr><td>22</td><td>C54</td><td>47u/25V UL10Kh 5*11 YXM</td><td>56.3°C</td><td>74.0°C</td></tr><tr><td>23</td><td>LF100</td><td>TR574-R2</td><td>53.6°C</td><td>70.9°C</td></tr></table>			NO	Position	P/N	ROOM AMBIENT Ta=28.8 °C	HIGH AMBIENT Ta= 50.7 °C	6	LF1	LF804	50.2°C	68.9°C	7	L1	TF2171	59.2°C	76.8°C	8	BD1	2A/800V GLASS KBP208G	57.6°C	75.7°C	9	C9	104/250V 10% P=7.5 MEC	56.5°C	74.8°C	10	R1	2W 330Ω 5% MINI	55.0°C	73.4°C	11	R5	2W 820Ω 5% MINI	61.0°C	79.5°C	12	C1	473/275VAC 20% P=10 R.46	55.7°C	73.5°C	13	D30	1A/1KV 1N4007GP	55.5°C	74.9°C	14	C48	22u/50V UL10Kh 5*11 YXM	56.8°C	74.5°C	15	TSW1	220KΩ 3Φ TTC3A224F4371EY 1%	54.2°C	72.9°C	16	T1	TF2145	66.2°C	83.4°C	17	U1	NCP1608B	57.5°C	75.0°C	18	Q1	STD10NM60N 8A/650V DPAK	63.6°C	81.2°C	19	C7	334/250V 10% P=7.5 MEX	58.2°C	76.2°C	20	D100	B5100C 5A/100V SMC	73.1°C	90.1°C	21	C105	2200u/16V UL10Kh 12.5*20 ZLH	58.5°C	75.6°C	22	C54	47u/25V UL10Kh 5*11 YXM	56.3°C	74.0°C	23	LF100	TR574-R2	53.6°C	70.9°C	P
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 115VAC/100VAC O/P : 100 % LOAD Ta= -30 °C	TEST : OK	P																																																																																															
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL °C NO DAMAGE	I/P : 135 VAC O/P : FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST : OK	P																																																																																															
4	TEMPERATURE COEFFICIENT	± % (0~50°C)	I/P : 115 VAC O/P : FULL LOAD	± 0.05 % (0~50°C)	P																																																																																															
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		OK	P																																																																																															
6	THERMAL SHOCK TEST	1. Thermal shock Temperature : -30°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 : 115VAC/Full Load AC ON/OFF TEST turn on 58sec ; turn off 2sec		OK	P																																																																																															

7	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 2G (5) Test Time : 72min in each axis (X.Y.Z) (6) Ta : 25℃	TEST : OK	P
8	CAPACITOR LIFE CYCLE	PCD-16-1400A: SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P : 115VAC O/P : FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P : 115VAC O/P : FULL LOAD Ta= 50 ℃ LIFE TIME	(1) 398901 HRS (2) 98413 HRS	P
9	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 906.5 HRS		P
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 30,000 hours @ Tcase 75℃; 50,000 hours @ Tcase 65℃		P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2010/10/6	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2010/11/10	PRODUCT SAMPLE	PASS	SANFORD SU	VINCENT TSENG

2009/08/04 A50-F023