Test Report: PCD-16-350A

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	V1：4.6 Vp-p (Max)	I/P： 115VAC O/P：FULL LOAD Ta：25℃	V1： 1.35 Vp-p (Max)	P
2	SET UP TIME	115VAC： 2000 ms (Max)	I/P： 115 VAC O/P：FULL LOAD Ta：25℃	115VAC/ 820 ms	P
3	OPERATING VOLTAGE RANGE	24V~48V	I/P： 115VAC O/P：CV MODE Ta：25℃	O/P= 24V : 0.373 A O/P= 47V : 0.371 A	P
4	OVER/UNDERSHOOT TEST	< 63V	I/P： 115 VAC O/P：FULL LOAD Ta：25℃	TEST： < 63 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℃ 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)	72V~135V TEST： OK	p
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P：90 VAC ~ 135 VAC O/P：FULL~MIN LOAD Ta：25℃	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℃	PF= 0.98 / 115 VAC PF= 0.995 / 90 VAC	p
4	EFFICIENCY	82 % (TYP)	I/P： 115 VAC O/P：FULL LOAD Ta：25℃	85.66 %	P
5	INPUT CURRENT	115V/ 0.4 A (TYP)	I/P： 115 VAC O/P：FULL LOAD Ta：25℃	I = 0.19 A/ 115 VAC	P
6	INRUSH CURRENT	115V/ 40 A (TYP) COLD START	I/P： 115 VAC O/P：FULL LOAD Ta：25℃	I = 7 A/ 115 VAC	P
7	LEAKAGE CURRENT	< 0.5 mA / 120 VAC	I/P： 120 VAC O/P：Min LOAD Ta：25℃	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℃	106 %/ 115 VAC 106 %/ 90 VAC Constant Current Limiting recovers automatically after fault condition is removed.	P
2	OVER TEMPERATURE PROTECTION	SPEC： RTH1： 95 ± 10℃ O.T.P. Detect on heatsink of power transistor	I/P： 115 VAC O/P：FULL LOAD	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℃	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)Fulll load continue Ta：25℃	(1) 344 V (2) 244 V (3) 338 V	P
2	Diode Peak Voltage	D100 Rated： NSF03A20 3A/200V	I/P：High-Line +3V = 138 V O/P： (1)Full Load Turn on (2)Output Short (3)Fulll load continue Ta：25℃	(1) 146 V (2) 87 V (3) 145 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)Fulll load continue Ta：25℃	(1) 342 V (2) 220 V (3) 340 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℃	(1) 13.918 V (2) 12.466 V (3) 13.599 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℃	I/P-O/P： 1.23 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P：500VDC>100MΩ	I/P-O/P： 500 VDC Ta：25℃/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℃	PASS	P
2	CONDUCTION	EN55015 CLASS B	I/P： 115 VAC (60HZ) O/P：FULL/50% LOAD Ta：25℃	PASS Test by certified Lab	P
3	RADIATION	EN55015 CLASS B	I/P： 115 VAC (60HZ) O/P：FULL LOAD Ta：25℃	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℃	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℃	CRITERIA A	P
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N ：1KV	I/P： 115 VAC/60HZ O/P：FULL LOAD Ta：25℃	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

■ RELIABILITY TEST

ENVIRONMENT TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th><th>VERDICT</th></tr>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td colspan="3">MODEL：PCD-16-1400A
1. ROOM AMBIENT BURN-IN：1 HRS
I/P： 115VAC O/P： FULL LOAD Ta=28.8 ℃ ℃
2. HIGH AMBIENT BURN-IN： 4 HRS
I/P： 115VAC O/P： FULL LOAD Ta=50.7 ℃ ℃
<table>
<tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT Ta=28.8 ℃</th><th>HIGH AMBIENT Ta= 50.7 ℃</th></tr>
<tr><td>6</td><td>LF1</td><td>LF804</td><td>50.2℃</td><td>68.9℃</td></tr>
<tr><td>7</td><td>L1</td><td>TF2171</td><td>59.2℃</td><td>76.8℃</td></tr>
<tr><td>8</td><td>BD1</td><td>2A/800V GLASS KBP208G</td><td>57.6℃</td><td>75.7℃</td></tr>
<tr><td>9</td><td>C9</td><td>104/250V 10% P=7.5 MEC</td><td>56.5℃</td><td>74.8℃</td></tr>
<tr><td>10</td><td>R1</td><td>2W 330Ω 5% MINI</td><td>55.0℃</td><td>73.4℃</td></tr>
<tr><td>11</td><td>R5</td><td>2W 820Ω 5% MINI</td><td>61.0℃</td><td>79.5℃</td></tr>
<tr><td>12</td><td>C1</td><td>473/275VAC 20% P=10 R.46</td><td>55.7℃</td><td>73.5℃</td></tr>
<tr><td>13</td><td>D30</td><td>1A/1KV 1N4007GP</td><td>55.5℃</td><td>74.9℃</td></tr>
<tr><td>14</td><td>C48</td><td>22u/50V UL10Kh 5*11 YXM</td><td>56.8℃</td><td>74.5℃</td></tr>
<tr><td>15</td><td>TSW1</td><td>220KΩ 3Φ
TTC3A224F4371EY 1%</td><td>54.2℃</td><td>72.9℃</td></tr>
<tr><td>16</td><td>T1</td><td>TF2145</td><td>66.2℃</td><td>83.4℃</td></tr>
<tr><td>17</td><td>U1</td><td>NCP1608B</td><td>57.5℃</td><td>75.0℃</td></tr>
<tr><td>18</td><td>Q1</td><td>STD10NM60N 8A/650V DPAK</td><td>63.6℃</td><td>81.2℃</td></tr>
<tr><td>19</td><td>C7</td><td>334/250V 10% P=7.5 MEX</td><td>58.2℃</td><td>76.2℃</td></tr>
<tr><td>20</td><td>D100</td><td>B5100C 5A/100V SMC</td><td>73.1℃</td><td>90.1℃</td></tr>
<tr><td>21</td><td>C105</td><td>2200u/16V UL10Kh 12.5*20 ZLH</td><td>58.5℃</td><td>75.6℃</td></tr>
<tr><td>22</td><td>C54</td><td>47u/25V UL10Kh 5*11 YXM</td><td>56.3℃</td><td>74.0℃</td></tr>
<tr><td>23</td><td>LF100</td><td>TR574-R2</td><td>53.6℃</td><td>70.9℃</td></tr>
</table></td><td>P</td></tr>
<tr><td>2</td><td>LOW TEMPERATURE
TURN ON TEST</td><td>TURN ON AFTER 2 HOUR</td><td>I/P： 115VAC/100VAC
O/P： 100 % LOAD
Ta= -30 ℃</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>3</td><td>HIGH HUMIDITY
HIGH TEMPERATURE
HIGH VOLTAGE
TURN ON TEST</td><td>AFTER 12 HOURS
IN CHAMBER ON
CONTROL 50 ℃
NO DAMAGE</td><td>I/P： 135 VAC
O/P：FULL LOAD
Ta= 50 ℃
HUMIDITY= 95 %R.H</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>4</td><td>TEMPERATURE
COEFFICIENT</td><td>± 0.03 %(0~50℃)</td><td>I/P： 115 VAC
O/P：FULL LOAD</td><td>± 0.005 %(0~50℃)</td><td>P</td></tr>
<tr><td>5</td><td>STORAGE TEMPERATURE TEST</td><td colspan="2">1. Thermal shock Temperature： -45℃~ +90℃
2. Temperature change rate ：25℃ / MIN
3. Dwell time low and high temperature ： 30 MIN/EACH
4. Total test cycle：5 CYCLE
5. Input/Output condition： STATIC</td><td>OK</td><td>P</td></tr>
<tr><td>6</td><td>THERMAL SHOCK TEST</td><td colspan="2">1. Thermal shock Temperature： -30℃~ +50℃
2. Temperature change rate ：25℃ / 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</td><td>OK</td><td>P</td></tr>
</table>

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