



Test Report: PCD-60-2400B

60W 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 : 2400 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 2000 mVp-p (Max)	P
2	OPERATING VOLTAGE RANGE	V1= 15V~25V	I/P : 230VAC O/P : CV MODE Ta : 25°C	O/P= 15V : 2.407 A O/P= 24V : 2.408 A	P
3	SET UP TIME	230VAC : 500 ms (Max)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 469 ms	P
4	OVER/UNDERSHOOT TEST	< 35V	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : < 35 V	P
5	CURRENT ACCURACY	±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : ±0.07% %	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	180VAC~295 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	175 V~295V	P
			I/P : LOW-LINE-3V=177 V HIGH-LINE=295 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 : 180 VAC ~ 295 VAC O/P : FULL~MIN LOAD Ta : 25°C	TEST : OK	P
3	POWER FACTOR	0.9 / 230 VAC(TYP)	I/P : 230 VAC	PF= 0.973 / 100%	P
		0.9 / 277 VAC(TYP)	I/P : 277 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.954 / 100%	
4	EFFICIENCY	84 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	86.88 %	P
5	INPUT CURRENT	230V/ 0.6 A (TYP)	I/P : 230 VAC	I = 0.303 A/ 230 VAC	P
		277V/ 0.5 A (TYP)	I/P : 277 VAC O/P : FULL LOAD Ta : 25°C	I = 0.257 A/ 277 VAC	
6	INRUSH CURRENT	230V/ 13 A (TYP) (twidth=50us measured at 50% Ipeak) COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 8.968 A/ 230 VAC T= 34.4 us	P
7	LEAKAGE CURRENT	< 0.5 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-CASE : 0.003 mA N-CASE : 0.003 mA	P
8	TOTAL HARMONIC DISTORTION	Total harmonic distortion will be lower than 20% when output loading is 60% or higher at 230VAC	I/P : 230VAC O/P : 60% LOAD Ta : 25°C	THD : 18.18 %	P
		Total harmonic distortion will be lower than 20% when output loading is 75% or higher at 277VAC	I/P : 277VAC O/P : 75% LOAD Ta : 25°C	THD : 18.76 %	

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER TEMPERATURE PROTECTION	SPEC : TSW1 : 105± 5 °C O.T.P. NO DAMAGE	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active Shut down o/p voltage, re-power on to recover	P
2	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 295 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Hiccup mode, recovers automatically after fault condition is removed.	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 2 Rated : STP10NK80ZFP: 800V/9A	I/P : High-Line +3V = 298 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 716 V (2) 592 V (3) 696 V	P
2	Diode Peak Voltage	D100 Rated : STTH3002CT: 200V/30A	I/P : High-Line +3V = 298 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 135 V (2) 130 V (3) 132 V	P
3	Clamp Diode Peak Voltage	D 10 Rated : HER308: 1000V/3A	I/P : High-Line +3V = 298 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 678 V (2) 558 V (3) 646 V	P
4	Control IC Voltage Test	U 1 Rated : NCP1608B: 10.2V~20V	I/P : High-Line +3V = 298 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) 14.6 V (2) 12.2 V (3) 14.5 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 : 1.024 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 : >9999 MΩ NO DAMAGE	P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS C	I/P: 230/240/277VAC /50HZ/60HZ O/P:100% LOAD Ta:25°C	PASS	P
2	CONDUCTION	EN55015	I/P:230 VAC (50HZ) O/P:FULL LOAD Ta:25°C	PASS Test by certified Lab	P
3	RADIATION	EN55015	I/P: 230 VAC (50HZ) 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: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA B	P
6	SURGE	EN61000-4-5 LIGHT INDUSTRY L-N :1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA B	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-60-2400B 1. ROOM AMBIENT BURN-IN : 2.5 HRS I/P : 230VAC O/P : 95% LOAD Ta=32.1 °C 2. HIGH AMBIENT BURN-IN : 3.5 HRS I/P : 230VAC O/P : 95% LOAD Ta=48.3 °C			P																																																																																																														
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>P/N</th> <th>ROOM AMBIENT Ta= 32.1 °C</th> <th>HIGH AMBIENT Ta= 48.3 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF2</td><td>LF6013</td><td>66.4°C</td><td>80.7°C</td></tr> <tr><td>2</td><td>R5</td><td>R/MO 2W 2.2KΩ</td><td>63.3°C</td><td>77.2°C</td></tr> <tr><td>3</td><td>R15</td><td>R/MO 2W 120Ω</td><td>69.0°C</td><td>83.7°C</td></tr> <tr><td>4</td><td>R16</td><td>R/C 1W 75KΩ</td><td>74.0°C</td><td>88.4°C</td></tr> <tr><td>5</td><td>R17</td><td>R/MO 2W 4.3KΩ</td><td>73.8°C</td><td>88.5°C</td></tr> <tr><td>6</td><td>R26</td><td>R/NW 2W 0.15Ω</td><td>76.8°C</td><td>92.3°C</td></tr> <tr><td>7</td><td>C8</td><td>C/MPE 104/630V</td><td>74.0°C</td><td>89.1°C</td></tr> <tr><td>8</td><td>C10</td><td>C/MPE 154/630V</td><td>73.7°C</td><td>88.8°C</td></tr> <tr><td>9</td><td>BD1</td><td>UR4KB80</td><td>73.8°C</td><td>88.4°C</td></tr> <tr><td>10</td><td>Q6</td><td>FMV08N50E</td><td>73.3°C</td><td>88.4°C</td></tr> <tr><td>11</td><td>C11</td><td>C/MPE 224/630V</td><td>78.4°C</td><td>93.1°C</td></tr> <tr><td>12</td><td>L1</td><td>TR6108</td><td>73.0°C</td><td>87.3°C</td></tr> <tr><td>13</td><td>U1</td><td>NCP1608B</td><td>71.5°C</td><td>85.7°C</td></tr> <tr><td>14</td><td>C40</td><td>C/E 47uF/63V</td><td>72.9°C</td><td>88.0°C</td></tr> <tr><td>15</td><td>Q2</td><td>STP10NK80ZFP</td><td>80.3°C</td><td>95.6°C</td></tr> <tr><td>16</td><td>D10</td><td>HER308</td><td>67.0°C</td><td>95.4°C</td></tr> <tr><td>17</td><td>D30</td><td>HER204</td><td>76.3°C</td><td>90.9°C</td></tr> <tr><td>18</td><td>T1</td><td>TF6492</td><td>84.5°C</td><td>98.8°C</td></tr> <tr><td>19</td><td>D100</td><td>STTH3002CT</td><td>88.1°C</td><td>103.2°C</td></tr> <tr><td>20</td><td>LF100</td><td>TR574</td><td>64.3°C</td><td>79.0°C</td></tr> <tr><td>21</td><td>C105</td><td>C/E 1000uF/35V</td><td>68.8°C</td><td>87.2°C</td></tr> </tbody> </table>	NO	Position		P/N	ROOM AMBIENT Ta= 32.1 °C	HIGH AMBIENT Ta= 48.3 °C	1	LF2	LF6013	66.4°C	80.7°C	2	R5	R/MO 2W 2.2KΩ	63.3°C	77.2°C	3	R15	R/MO 2W 120Ω	69.0°C	83.7°C	4	R16	R/C 1W 75KΩ	74.0°C	88.4°C	5	R17	R/MO 2W 4.3KΩ	73.8°C	88.5°C	6	R26	R/NW 2W 0.15Ω	76.8°C	92.3°C	7	C8	C/MPE 104/630V	74.0°C	89.1°C	8	C10	C/MPE 154/630V	73.7°C	88.8°C	9	BD1	UR4KB80	73.8°C	88.4°C	10	Q6	FMV08N50E	73.3°C	88.4°C	11	C11	C/MPE 224/630V	78.4°C	93.1°C	12	L1	TR6108	73.0°C	87.3°C	13	U1	NCP1608B	71.5°C	85.7°C	14	C40	C/E 47uF/63V	72.9°C	88.0°C	15	Q2	STP10NK80ZFP	80.3°C	95.6°C	16	D10	HER308	67.0°C	95.4°C	17	D30	HER204	76.3°C	90.9°C	18	T1	TF6492	84.5°C	98.8°C	19	D100	STTH3002CT	88.1°C	103.2°C	20	LF100	TR574	64.3°C	79.0°C	21	C105	C/E 1000uF/35V	68.8°C	87.2°C		
NO	Position	P/N	ROOM AMBIENT Ta= 32.1 °C	HIGH AMBIENT Ta= 48.3 °C																																																																																																															
1	LF2	LF6013	66.4°C	80.7°C																																																																																																															
2	R5	R/MO 2W 2.2KΩ	63.3°C	77.2°C																																																																																																															
3	R15	R/MO 2W 120Ω	69.0°C	83.7°C																																																																																																															
4	R16	R/C 1W 75KΩ	74.0°C	88.4°C																																																																																																															
5	R17	R/MO 2W 4.3KΩ	73.8°C	88.5°C																																																																																																															
6	R26	R/NW 2W 0.15Ω	76.8°C	92.3°C																																																																																																															
7	C8	C/MPE 104/630V	74.0°C	89.1°C																																																																																																															
8	C10	C/MPE 154/630V	73.7°C	88.8°C																																																																																																															
9	BD1	UR4KB80	73.8°C	88.4°C																																																																																																															
10	Q6	FMV08N50E	73.3°C	88.4°C																																																																																																															
11	C11	C/MPE 224/630V	78.4°C	93.1°C																																																																																																															
12	L1	TR6108	73.0°C	87.3°C																																																																																																															
13	U1	NCP1608B	71.5°C	85.7°C																																																																																																															
14	C40	C/E 47uF/63V	72.9°C	88.0°C																																																																																																															
15	Q2	STP10NK80ZFP	80.3°C	95.6°C																																																																																																															
16	D10	HER308	67.0°C	95.4°C																																																																																																															
17	D30	HER204	76.3°C	90.9°C																																																																																																															
18	T1	TF6492	84.5°C	98.8°C																																																																																																															
19	D100	STTH3002CT	88.1°C	103.2°C																																																																																																															
20	LF100	TR574	64.3°C	79.0°C																																																																																																															
21	C105	C/E 1000uF/35V	68.8°C	87.2°C																																																																																																															
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 180VAC/295VAC O/P : 95 % LOAD Ta= -30 °C	TEST : OK	P																																																																																																														
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P : 295 VAC O/P : 95% LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST : OK	P																																																																																																														
4	TEMPERATURE COEFFICIENT	± 0.03 %(0~50°C)	I/P : 230 VAC O/P : 95% LOAD	± 0.0225 %(0~50°C)	P																																																																																																														
5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C~ +85°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 : -35°C~ +55°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 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°C	TEST : OK	P
8	CAPACITOR LIFE CYCLE	PCD-60-2400B: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	(1) 241722.2 HRS (2) 36661.0HRS (3) 65629.2HRS	P
9	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 358.030KHRS		P
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 30,000 hours @ Tcase 70°C ; 50,000 hours @ Tcase 60°C		P

TEST RESULT	TESTER	APPROVAL
PASS	ZOULF	HOWAY

2009/08/04 A50-G058