



Test Report: PB-230-12

230W Single Battery Charger

■ 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	BOOST CHARGE VOLTAGE	14.4V	I/P : 230 VAC I/P : 115 VAC O/P : 90% LOAD Ta : 25°C	14.2 V/230V 14.2 V/115V	P
21	DC VOLTAGE (Typ.)	13.6V	I/P : 230 VAC I/P : 115 VAC O/P : NO LOAD Ta : 25°C	13.775 V/230V 13.774 V/115V	P
3	OUTPUT CURRENT	16 A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	16.35 A/230V 16.38 A/115V	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C I/P : LOW-LINE-3V= 87 V HIGH-LINE+15%=300 V O/P : FULL/MIN LOAD ON : 30 Sec. OFF : 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	79 V~264V TEST : OK	P
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 90 VAC ~ 264 VAC O/P : FULL-MIN LOAD Ta : 25°C	TEST : OK	P
3	POWER FACTOR	0.95 / 230 VAC(TYP) 0.98 / 115 VAC(TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.979 / 230 VAC PF= 0.997 / 115 VAC	P
4	EFFICIENCY	81.5 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	81.8 %	P
5	INPUT CURRENT	230V/ 1.5 A (TYP) 115V/ 3 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 1.2 A/ 230 VAC I = 2.4 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 50 A (TYP) COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 49.4 A/ 230 VAC	P
7	LEAKAGE CURRENT	< 3.5 mA/ 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-FG : 1 mA N-FG : 0.2 mA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	90 %~ 110 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	102 %/ 230 VAC 102 %/ 115 VAC Constant Current Limiting	P
2	OVER VOLTAGE PROTECTION	CH1 : 16 V- 18 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	18 V/ 230 VAC 17.6 V/ 115 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	Automatically derate charge current until zero	I/P: 230 VAC O/P: FULL LOAD	O.T.P. Active Automatically derate charge current until zero	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Constant Current Limiting	P

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	FAN ON/OFF CONTROL	RTH3 > 50 °C FAN ON < 45 °C FAN OFF	I/P : 230 VAC O/P : FULL LOAD	➤ 52.4 °C FAN ON <46.7 °C FAN OFF	P
2	REMOTE CONTROL	OPEN : POWER ON SHORT : POWER OFF	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	OPEN : POWER ON SHORT : POWER OFF	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 : STP7N95K3 7A/950V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 794 V (2) 792 V (3) 796 V	P
2	Diode Peak Voltage	D101 Rated : FMEN-2308 30A/80V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 49.6 V (2) 51.4 V (3) 49.6 V	P
3	Input Capacitor Voltage	C 5 Rated : 150u/400V 105°C HU5 V peak=450V	I/P : High-Line +3V = 267 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) 388 V (2) 432 V (3) 414 V	P
4	Control IC Voltage Test	U 1 Rated : FAN4800IN 13.26V-20V	I/P : High-Line +3V = 267 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) 13.8 V (2) 14.8 V (3) 14.7 V	P
5	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : IRFB20N50K 20A/500V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 396 V (2) 406 V (3) 398 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 KVAC/min I/P-FG: 1.5 KVAC/min O/P-FG: 0.5 KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 1.8 KVAC/min O/P-FG: 0.6 KVAC/min Ta:25°C	I/P-O/P: 5.03 mA I/P-FG: 3.21 mA O/P-FG: 3.95 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-O/P: 17.7 GΩ I/P-FG: 14.9 GΩ O/P-FG: 24.5 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta:25°C	26 mΩ	P
4	APPROVAL	TUV: Certificate NO : S50180926 UL: File NO :			P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A CLASS D	I/P : 220 /230/240VAC/50HZ O/P : 100/75/50/25% LOAD Ta : 25°C	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : BAT 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: BAT 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: BAT LOAD Ta:25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N :1KV L,N-PE:2KV	I/P: 230 VAC/50HZ O/P: BAT 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.	THERMO TRACER TEST Before potted (ROOM AMBIENT)	MODEL:PB-230-24	TEST CONDITION: 110 VAC FULL LOAD	ROOM AMBIENT = 25 °C	<table border="1"> <thead> <tr> <th></th> <th>Position</th> <th>Temp</th> <th>VERDICT</th> </tr> </thead> <tbody> <tr><td>P1</td><td>L1</td><td>52.2</td><td>PASS</td></tr> <tr><td>P2</td><td>C5</td><td>42.1</td><td>PASS</td></tr> <tr><td>P3</td><td>T1</td><td>49.4</td><td>PASS</td></tr> <tr><td>P4</td><td>L101</td><td>45.7</td><td>PASS</td></tr> <tr><td>P5</td><td>C105</td><td>45.2</td><td>PASS</td></tr> <tr><td>P6</td><td>D112</td><td>38.6</td><td>PASS</td></tr> <tr><td>P7</td><td>D102</td><td>39.3</td><td>PASS</td></tr> <tr><td>P8</td><td>D101</td><td>38.9</td><td>PASS</td></tr> <tr><td>P9</td><td>Q2</td><td>38.3</td><td>PASS</td></tr> <tr><td>P10</td><td>D2</td><td>37.9</td><td>PASS</td></tr> <tr><td>P11</td><td>Q1</td><td>38.6</td><td>PASS</td></tr> <tr><td>P12</td><td>BD1</td><td>37.7</td><td>PASS</td></tr> <tr><td>P13</td><td></td><td></td><td></td></tr> <tr><td>P14</td><td></td><td></td><td></td></tr> <tr><td>P15</td><td></td><td></td><td></td></tr> </tbody> </table>		Position	Temp	VERDICT	P1	L1	52.2	PASS	P2	C5	42.1	PASS	P3	T1	49.4	PASS	P4	L101	45.7	PASS	P5	C105	45.2	PASS	P6	D112	38.6	PASS	P7	D102	39.3	PASS	P8	D101	38.9	PASS	P9	Q2	38.3	PASS	P10	D2	37.9	PASS	P11	Q1	38.6	PASS	P12	BD1	37.7	PASS	P13				P14				P15																																																																					
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3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 40 °C NO DAMAGE	I/P : 272 VAC O/P : BAT+LOAD Ta= 40 °C HUMIDITY= 95 %R.H	TEST : OK	P
4	TEMPERATURE COEFFICIENT	±0.03 %(0-50°C)	I/P : 230 VAC O/P : FULL LOAD	±0.01 %(0-50°C)	P
5	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : CV=13V Ta= -20 °C	TEST : OK	P
6	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
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -25°C ~ +45°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
8	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 : 60min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK	P
9	CAPACITOR LIFE CYCLE	PB-230-12: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= 40 °C LIFE TIME		(1) 754769.6HRS (2) 255948HRS	P
10	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 244.5K HRS			P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2009/11/27	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2009/12/17	PRODUCT SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2010/2/12	PRODUCT SAMPLE W1001D61	PASS	SANFORD SU	VINCENT TSENG

2009/08/04 A50-F023