



Test Report: PB-230-24

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	28.8V	I/P : 230 VAC I/P : 115 VAC O/P : 90% LOAD Ta : 25°C	28.76 V /230V 28.77 V /115V	P
21	DC VOLTAGE (Typ.)	27.2V	I/P : 230 VAC I/P : 115 VAC O/P : NO LOAD Ta : 25°C	27.53 V /230V 27.53 V /115V	P
3	OUTPUT CURRENT	8 A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	8.13 A /230V 8.15 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= 0.98 / 230 VAC PF= 0.997 / 115 VAC	P
4	EFFICIENCY	85.5 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	85.72 %	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 = 1.18 A / 230 VAC I = 2.44 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 = 31 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 : 1.1 mA N-FG : 0.45 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	103 %/ 230 VAC 101 %/ 115 VAC Constant Current Limiting	P
2	OVER VOLTAGE PROTECTION	CH1 : 31 V- 35 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	34.1 V/ 230 VAC 34.1 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	➤ 51.2 °C FAN ON < 45.1 °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) 792 V (2) 680 V (3) 744 V	P
2	Diode Peak Voltage	D101 Rated : 20CTQ150 20A/150V	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) 102 V (2) 79.2 V (3) 78.8 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) 381.8 V (2) 382.6 V (3) 382.5 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) 13.738 V (2) 13.107 V (3) 13.109 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) 420 V (2) 410 V (3) 418 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: 5.38 mA I/P-FG: 3.51 mA O/P-FG: 4.23 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: 19.2 GΩ I/P-FG: 17.2 GΩ O/P-FG: 17.2 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>p 1:</td><td>52.2°C</td><td>249x, 110y</td><td></td></tr> <tr><td>p 2:</td><td>42.1°C</td><td>200x, 76y</td><td></td></tr> <tr><td>p 3:</td><td>49.4°C</td><td>128x, 79y</td><td></td></tr> <tr><td>p 4:</td><td>45.7°C</td><td>59x, 94y</td><td></td></tr> <tr><td>p 5:</td><td>45.2°C</td><td>48x, 151y</td><td></td></tr> <tr><td>p 6:</td><td>38.6°C</td><td>21x, 187y</td><td></td></tr> <tr><td>p 7:</td><td>39.3°C</td><td>62x, 188y</td><td></td></tr> <tr><td>p 8:</td><td>38.9°C</td><td>98x, 188y</td><td></td></tr> <tr><td>p 9:</td><td>38.3°C</td><td>157x, 191y</td><td></td></tr> <tr><td>p 10:</td><td>37.9°C</td><td>197x, 189y</td><td></td></tr> <tr><td>p 11:</td><td>38.6°C</td><td>227x, 190y</td><td></td></tr> <tr><td>p 12:</td><td>37.7°C</td><td>279x, 193y</td><td></td></tr> <tr><td>p 13:</td><td></td><td></td><td></td></tr> <tr><td>p 14:</td><td></td><td></td><td></td></tr> <tr><td>p 15:</td><td></td><td></td><td></td></tr> </tbody> </table>		Position	Temp	VERDICT	p 1:	52.2°C	249x, 110y		p 2:	42.1°C	200x, 76y		p 3:	49.4°C	128x, 79y		p 4:	45.7°C	59x, 94y		p 5:	45.2°C	48x, 151y		p 6:	38.6°C	21x, 187y		p 7:	39.3°C	62x, 188y		p 8:	38.9°C	98x, 188y		p 9:	38.3°C	157x, 191y		p 10:	37.9°C	197x, 189y		p 11:	38.6°C	227x, 190y		p 12:	37.7°C	279x, 193y		p 13:				p 14:				p 15:				P																																																																	
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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