



# Test Report: ADD-155C

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155W Single Output With Battery Charger ( UPS Function )

## ■ DESIGN VERIFY TEST

Output Function Test  
Input Function Test  
Protection Function Test  
Control 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 : 240 mVp-p (Max) V2 : 100 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 78 mVp-p (Max) V2 : 86 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 48 V ~ 58 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	44.53 V ~ 59.88 V / 230 VAC 44.55 V ~ 59.88 V / 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : -1 %~ +1 % (Max) V2 : -5 %~ +5 % (Max)	I/P : 100VAC / 264 VAC O/P : FULL / MIN LOAD Ta : 25°C	V1 : -0.035 %~ 0.024 % V2 : -0.619 % 0.998 %	P
4	LINE REGULATION	V1 : -1 %~ +1 % (Max) V2 : -0.5 %~ +0.5 % (Max)	I/P : 88VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0 %~ 0 % V2 : 0 % 0 %	P
5	LOAD REGULATION	V1 : -1 %~ +1 % (Max) V2 : -2 %~ +2 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : -0.022 %~ 0.022 % V2 : -0.619 % 0.739 %	P
6	CROSS REGULATION	V1 : -1 %~ +1 % (Max) V2 : -2 %~ +2 % (Max)	I/P : 230 VAC O/P : Testing O/P 60%LOAD Other O/P 40%LOAD Change Ta : 25°C	V1 : 0 %~ 0 % V2 : 0 % 0.12 %	P
7	SET UP TIME	230VAC : 1000 ms (Max) 115VAC : 2000 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC / 466.487 ms 115VAC / 1405.959 ms	P
8	RISE TIME	230VAC : 90 ms (Max) 115VAC : 90 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC / 13.625 ms 115VAC / 14.051 ms	P
9	HOLD UP TIME	230VAC : 24 ms (TYP) 115VAC : 20 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC / 34.554 ms 115VAC / 34.909 ms	P
10	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : <5 %	P
11	DYNAMIC LOAD	V1 : 5400 mVp-p V2 : 1000 mVp-p	I/P : 230 VAC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 90%DUTY/ 3KHZ (3).O/P : FULL /Min LOAD 90%DUTY/ 5KHZ (4).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) V1: 316 / V2: 305 mVp-p (2) V1: 220 / V2: 346 mVp-p (3) V1: 196 / V2: 345 mVp-p (4) V1: 396 / V2: 295 mVp-p	P

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	88VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	50.793 V~264V	P
			I/P : LOW-LINE-3V= 85 V HIGH-LINE+15%=300 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 : 100VAC ~ 264 VAC O/P : FULL~MIN LOAD Ta : 25°C	TEST : OK	P
3	POWER FACTOR	0.92 / 230 VAC(TYP) 0.92 / 115 VAC(TYP)	I/P : 230 VAC	PF= 0.968 / 230 VAC	P
			I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.983 / 115 VAC	
4	EFFICIENCY	81 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	85.1 %	P
5	INPUT CURRENT	230V/ 1.5 A (TYP) 115V/ 2.5 A (TYP)	I/P : 230 VAC	I = 0.789 A/ 230 VAC	P
			I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 1.588 A/ 115 VAC	
6	INRUSH CURRENT	230V/ 40 A (TYP) 115V/ 20 A (TYP) COLD START	I/P : 230 VAC	I = 38.132 A/ 230 VAC	P
			I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 18.335 A/ 115 VAC	
7	LEAKAGE CURRENT	< 1 mA / 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.43 mA N-FG : 0.43 mA	P

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 %~ 135 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	127.1 %/ 230 VAC 127.1 %/ 115 VAC ■ Constant Current Limiting	P
2	OVER VOLTAGE PROTECTION	CH1 : 62.1V~72.9V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	67.74 V/ 230 VAC 67.65 V/ 115 VAC ■ Shut down Re- power ON	P
3	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**

1	BATTERY LOW	Battery low voltage: 39V ±2	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	Battery low : 39.6 V	P
2	REST FUNCTION	Battery voltage:48V	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	OK	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 : 900V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue (4) Dynamic Load 90%Duty/1KHz Ta : 25°C	(1) 796 V (2) 558 V (3) 685 V (4) 696 V	P
2	Diode Peak Voltage	D40 Rated : 400 V 10 A	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) 250 V (2) 245 V (3) 246 V	P
3	Clamp Diode Peak Voltage	D1 Rated : 1000 V 1 A	I/P : High-Line +3V = 267 V O/P : (1) Dynamic Load 90%Duty/1KHz (2)Full load continue Ta : 25°C	(1) 745 V (2) 816 V	P
4	Input Capacitor Voltage	C5 Rated : 150 u / 400V/85°C SURGE Voltage:450V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on /Off	(1) 389 V (2) 426 V	P

			(2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(3) 404 V	
5	Control IC Voltage Test	U1 Rated : 30 V	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) 17.4 V (2) 18.2 V (3) 17.9 V	P
6	Power Transistor ( D to S) or (C to E) Peak Voltage	Q1 Rated : 600 V 12 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue (4)NO Load Turn on Ta : 25°C	(1) 412/2.16 V/A (2) 398/1.16 V/A (3) 408/2.36 V/A (4) 428/2.67 V/A	P

**■ AFETY & 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 : 2.31 mA I/P-FG : 2.29 mA O/P-FG : 4.91 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 /70%RH	I/P-O/P : 9999 MΩ I/P-FG : 9999 MΩ O/P-FG : 9999 MΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	5 mΩ	P

**E.M.C TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 ■CLASS B	I/P : 230 VAC/50HZ O/P : FULL 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 : 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 A	P

6	SURGE	IEC61000-4-5 ■LIGHT INDUSTRY L-N : 1KV L,N-PE : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

**ENVIRONMENT TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																																				
1	TEMPERATURE RISE TEST	MODEL : ADD-155A 1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta= 16.1°C 2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta= 49.2°C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 16.1 °C</th> <th>HIGH AMBIENT Ta= 49.2°C</th> </tr> </thead> <tr><td>1</td><td><b>U1</b></td><td>61.7°C</td><td>91.9°C</td></tr> <tr><td>2</td><td><b>U100</b></td><td>56.7°C</td><td>86.9°C</td></tr> <tr><td>3</td><td><b>LF1</b></td><td>37.9°C</td><td>70.2°C</td></tr> <tr><td>4</td><td><b>BD1</b></td><td>62.7°C</td><td>94.2°C</td></tr> <tr><td>5</td><td><b>L1</b></td><td>73.6°C</td><td>106.8°C</td></tr> <tr><td>6</td><td><b>D2</b></td><td>63.7°C</td><td>95.1°C</td></tr> <tr><td>7</td><td><b>D3</b></td><td>57.3°C</td><td>88.2°C</td></tr> <tr><td>8</td><td><b>C5</b></td><td>49.2°C</td><td>81.4°C</td></tr> <tr><td>9</td><td><b>Q1</b></td><td>45.0°C</td><td>76.1°C</td></tr> <tr><td>10</td><td><b>Q2</b></td><td>52.1°C</td><td>82.8°C</td></tr> <tr><td>11</td><td><b>T1coil</b></td><td>72.6°C</td><td>103.6°C</td></tr> <tr><td>12</td><td><b>U200</b></td><td>72.2°C</td><td>102.7°C</td></tr> <tr><td>13</td><td><b>D40</b></td><td>78.7°C</td><td>108.6°C</td></tr> <tr><td>14</td><td><b>L100</b></td><td>70.2°C</td><td>102.5°C</td></tr> <tr><td>15</td><td><b>Q300</b></td><td>49.5°C</td><td>80.0°C</td></tr> <tr><td>16</td><td><b>D201</b></td><td>54.6°C</td><td>85.4°C</td></tr> <tr><td>17</td><td><b>L201</b></td><td>53.1°C</td><td>85.8°C</td></tr> <tr><td>18</td><td><b>C201</b></td><td>35.0°C</td><td>67.1°C</td></tr> <tr><td>19</td><td><b>C102</b></td><td>58.9°C</td><td>91.5°C</td></tr> <tr><td>20</td><td><b>J106</b></td><td>53.8°C</td><td>87.1°C</td></tr> </table>	NO	Position	ROOM AMBIENT Ta= 16.1 °C	HIGH AMBIENT Ta= 49.2°C	1	<b>U1</b>	61.7°C	91.9°C	2	<b>U100</b>	56.7°C	86.9°C	3	<b>LF1</b>	37.9°C	70.2°C	4	<b>BD1</b>	62.7°C	94.2°C	5	<b>L1</b>	73.6°C	106.8°C	6	<b>D2</b>	63.7°C	95.1°C	7	<b>D3</b>	57.3°C	88.2°C	8	<b>C5</b>	49.2°C	81.4°C	9	<b>Q1</b>	45.0°C	76.1°C	10	<b>Q2</b>	52.1°C	82.8°C	11	<b>T1coil</b>	72.6°C	103.6°C	12	<b>U200</b>	72.2°C	102.7°C	13	<b>D40</b>	78.7°C	108.6°C	14	<b>L100</b>	70.2°C	102.5°C	15	<b>Q300</b>	49.5°C	80.0°C	16	<b>D201</b>	54.6°C	85.4°C	17	<b>L201</b>	53.1°C	85.8°C	18	<b>C201</b>	35.0°C	67.1°C	19	<b>C102</b>	58.9°C	91.5°C	20	<b>J106</b>	53.8°C	87.1°C		P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230 VAC O/P : 120% LOAD Ta : 25°C	TEST : OK	P																																																																																				
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -10°C	TEST : OK	P																																																																																				
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL50°C NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta=50°C HUMIDITY= 95%R.H	TEST : OK	P																																																																																				
5	TEMPERATURE COEFFICIENT	±0.03%/°C (0~50°C)	I/P : 230 VAC O/P : FULL LOAD	±0.01%/°C (0~50°C)	P																																																																																				



155W Single Output With Battery Charger ( UPS Function )

**ADD-155 series**

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 : -10°C ~ +60°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 : 12min/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	SUPPOSE C102 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 (4) I/P : 230VAC O/P : 50% LOAD Ta=50°C LIFE TIME	(1) 122310HRS (2) 22364HRS (3) 40924HRS (4) 67372HRS	P
10	MTBF	MIL-HDBK-217F NOTICE S2 PARTS COUNT TOTAL FAILURE RATE : 202.3K HRS		P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 50,000 hours @ TA 50°C		P

2007/3/20 A50-S014

SAMPLE	TEST RESULT	TESTER	APPROVAL
PRODUCT SAMPLE	PASS	SHENYM	WANGDZ

