



Test Report: GC330A36

330W Single Output 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	DC VOLTAGE (Typ.)	40.8V	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	40.832 V /230V 40.831 V /115V	P
2	CHARGING CURRENT RANGE (Typ.)	6.4A-8A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	7.85 A/230V 7.84 A /115V	P
3	LED INDICATOR	Charging(CC) : RED Floating charging(CV) : GREEN	I/P : 230 VAC O/P : setting Ta : 25°C	> 0.34 A/LED :RED < 0.31 A/LED :GREEN	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)	64 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= 0.967 / 230 VAC PF= 0.997 / 115 VAC	P
4	EFFICIENCY	93.5% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	94.45 %	P
5	INPUT CURRENT	230V/ 2 A (TYP) 115V/ 4 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 1.28 A/ 230 VAC I = 2.58 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 120 A (TYP) COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 111 A/ 230 VAC	P
7	LEAKAGE CURRENT	< 1.5 mA / 240 VAC	I/P : 240VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.52 mA N-FG : 0.52 mA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	290W- 360W%	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	324 W/ 230 VAC 320 W/ 115 VAC Constant Current Limiting	P
2	OVER VOLTAGE PROTECTION	CH1 : 105%-135% rated output voltage	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	110.09 % 230 VAC 109.8 %/ 115 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC : RTH2 : 100 ± 10°C O.T.P. NO DAMAGE	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active Shut down o/p voltage + recovers automatically after temperature goes down	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Hiccup mode	P
5	NO LOAD POWER CONSUMPTION	< 1W	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	0.77 W/ 230 VAC 0.87 W/ 115 VAC	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 6 Rated : STF22NM60N 16A/600V	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) 438 V (2) 438 V (3) 420 V	P
2	Diode Peak Voltage	Q101 Rated : AP75T12GP-HF 66A/120V	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) 100 V (2) 19.5 V (3) 98 V	P
3	Input Capacitor Voltage	C 5 Rated : 220u/450V 105°C 30*30 HU	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) 426 V (2) 430 V (3) 432 V	P
4	Control IC Voltage Test	U 900 Rated : PWM L6599AD 8.85V~16V	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) 15.2 V (2) 13.9 V (3) 14.4 V	P
5	Power Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : STF22NM60N 16A/600V	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) 480 V (2) 480 V (3) 468 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-O/P : 3.6 KVAC/min Ta : 25°C	I/P-O/P : 6.85 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 : 22 GΩ NO DAMAGE	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 : 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	I/P : 230 VAC/50HZ O/P : FULL 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	TEMPERATURE RISE TEST	MODEL : GC330A48 1. ROOM AMBIENT BURN-IN : 2.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 29.4 °C 2. HIGH AMBIENT BURN-IN : 26 HRS I/P : 230VAC O/P : FULL LOAD Ta= 40.6 °C				P	
		NO	Position	PART NUMBER	ROOM AMBIENT Ta= 29.4 °C		HIGH AMBIENT Ta= 40.6 °C
		1	LF2	TR890	68.1°C		76.1°C
		2	BD1	10A/800V SILICON US10KB80R	70.4°C		78.6°C
		3	L2	TR892	70.6°C		78.3°C
		4	C11	105/450V 10% P=10 B32611	70.4°C		78.2°C
		5	L1	TF2382	73.1°C		80.7°C
		6	Q2	STF22NM60N 16A/600V	71.9°C		79.7°C
		7	D2	BYT79X-600 15A/600V	73.4°C		81.2°C
		8	C5	220u/450V 105°C 30*30 HU	72.0°C		79.4°C
		9	U1	NCP1605DR2G SOIC-16	69.3°C		77.4°C
		10	TSW1	ST-22W-R4 95°C 60mm PH	63.4°C		71.2°C
		11	C902	220u/25V UL7Kh 8*11.5 KY	71.2°C		78.6°C
		12	C906	330u/25V UL7Kh 10*12.5 KY	70.3°C		77.8°C
		13	U900	L6599AD SO-16N	71.4°C		78.9°C
		14	Q5	STF22NM60N 16A/600V	72.2°C		79.7°C
		15	Q101	YA868C15RSC 30A/150V	78.6°C		85.8°C
		16	C101	470u/63V UL10Kh 12.5*25 YXF	71.5°C		78.8°C
		17	LF101	TR891-R4	52.0°C		61.9°C
		18	C113	470u/63V UL10Kh 12.5*25 YXF	65.2°C		72.9°C
		19	RTH2	330KΩ 3Φ TTC3A334F4573EY 1%	69.4°C		76.9°C
		20	C202	100u/35V L5Kh 6.3*11 KZH	71.8°C		79.1°C
21	T1	TF1978-R2	73.9°C	80.8°C			
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= -35 °C	TEST : OK	P		
4	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 : FULL LOAD Ta= 40 °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 %/°C (0-50°C)	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 : -35°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 : 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	GC330A36:SUPPOSE C101 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 (3) I/P : 230VAC O/P : 75% LOAD Ta= 40 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 40 °C LIFE TIME	(1) 167758HRS (2) 77753HRS (3) 99709HRS (4) 205118HRS	P
10	MTBF	MIL-HDBK-217F NOTICE S2 PARTS COUNT TOTAL FAILURE RATE : 209.4 KHRS		P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 20,000 hours @ TA 50°C		P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2012/11/16	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2013/1/31	PRODUCT SAMPLE W1212D40	PASS	SANFORD SU	VINCENT TSENG

2009/08/04 A50-F023