



# Test Report: GST40A09

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40W AC-DC Reliable Green Industrial Adaptor

## ■ 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(Max)	V1: 120mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 48.0mVp-p	P
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -5%~ 5%	I/P: 100VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.83 %~+0.83%	P
3	LINE REGULATION (Max)	V1: -1%~ 1%	I/P: 100VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1:0%~0%	P
4	LOAD REGULATION(Max)	V1: -5%~ 5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: -0.83 %~+0.83%	P
5	SET UP TIME(Max)	230VAC/1000ms 115VAC/1000ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 392 ms 115VAC/ 566 ms	P
6	RISE TIME (Max)	230VAC/50ms 115VAC/50ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/16.468ms 115VAC/16.295ms	P
7	HOLD UP TIME(Typ)	230VAC/50ms 115VAC/15ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 127.295ms 115VAC/25.198ms	P
8	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	< ±5%	P
9	DYNAMIC LOAD	V1: 1800mVp-p	I/P: 230VAC O/P(1)FULL /Min LOAD 90%DUTY / 1KHZ (2) (1)FULL /Min LOAD 90%DUTY / 3KHZ (3)FULL /Min LOAD 90%DUTY / 5KHZ (4)FULL /Min LOAD 50%DUTY / 120HZ Ta:25°C	(1)578mVp-p (2)448mVp-p (3)448mVp-p (4)604mVp-p	P

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~264VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	63.787V~264V	P
			I/P: (1)LOW-LINE-3V=87 V HIGH-LINE+15%=300 V O/P:FULL/MIN LOAD ON: 30 Sec OFF: 30 Sec 10MIN (2)230Vac ON: 0.5 Sec OFF: 0.5 Sec 20MIN (3)230Vac ON:3Sec OFF:3Sec 12HOURS ( POWER ON/OFF NO DAMAGE )	TEST:OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P:100 VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK	P
4	EFFICIENCY(TYP)	88.5%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	89.83%	P
5	INPUT CURRENT (Typ)	230V/ 0.5 A 115V/ 1 A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I =0.328A/ 230VAC I =0.650A/ 115VAC	P
6	INRUSH CURRENT(Typ)	230V/65A 115V/35A COLD START	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I =56A/ 230VAC I =29.3A/ 115VAC	P
7	LEAKAGE CURRENT	< 0.75 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.397 mA N-FG : 0.397 mA	P
8	NO LOAD CONSUMPTION	< 0.075 W	I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25°C	< 0.0342 W < 0.0342 W	P

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105%~ 150%	I/P: 230VAC I/P: 115VAC O/P: TESTING Ta:25°C	137.52%/ 230VAC 134.15%/115VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH:9.4V~12.2V	I/P: 230VAC I/P: 115VAC O/P: MIN LOAD Ta:25°C	10.8V/ 230VAC 11.1V/115VAC Shut down Re- power ON	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE Hiccup Mode	P

**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	PWM Transistor ( D to S) or (C to E) <b>Peak Voltage</b>	Q1 Rated : 6A/ 800 V	I/P: High-Line +3V =267V AC ON/OFF VDS: O/P: (1) Full Load (2) Output Short Min. Load 90%Duty/5KHz (3) Full Load Continue Ta:25°C	VDS (1) 672V (2) 522V (3) 656V	P
2	Diode <b>Peak Voltage</b>	Q100 Rated : 80A/ 75 V	I/P: High-Line +3V =267 V AC ON/OFF O/P: (1) Full Load (2) Output Short (3) Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (4) 0%→400% Load. Ta:25°C	Q100: (1) 32.6V (2) 23.5V (3) 32.7V (4) 32.8V	P
3	<b>Input Capacitor Voltage</b>	C5 Rated: : 120μ/ 400V 105°C	I/P: High-Line +3V =267 V O/P: (1) Full Load input on/off (2) Min load input on /Off (3) Full Load /Min load Change Ta:25°C	(1) 358V (2) 358V (3) 360V	P
4	<b>Control IC Voltage Test</b>	PWM IC U1 Rated : 30V -0.4V(MIN.)	I/P: High-Line +3V =267 V AC ON/OFF O/P(1) FULL LOAD (2) Output Short (3) O.L.P (4) O.V.P. (5) NO LOAD VR MIN LOW LINE Ta:25°C	(1) 26.3V (2) 26.1V (3) 26.2V (4) 14.9V (5) 24.1V	P



5	Clamp Diode Peak Voltage	D1 Rated : 1000V A	I/P : High-Line +3V = 267 V AC ON/OFF O/P : (1) Dynamic Load 90%Duty/1KHz (2) Full load continue Ta : 25°C	(1) 620 V (2) 584 V	P
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**SAFETY TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC/min I/P-FG :2KVAC/min O/P-FG:0.5KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG:0.6 KVAC/min Ta:25°C	I/P-O/P:0.474mA I/P-FG:3.392mA O/P-FG:1.323mA 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: 9999MΩ I/P-FG: 9999MΩ O/P-FG: 9999MΩ NO DAMAGE	P

**E.M.C TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	I/P:230VAC/50HZ O/P:100%,75%,50%OAD 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  AIR : 15KV / Contact : 8KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4  INPUT : 1KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	EN61000-4-5 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				

■ RELIABILITY TEST

ENVIRONMENT TEST

■ ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																								
1	TEMPERATURE RISE TEST	MODEL : GST40A07-P1J 1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta= 17.0 °C 2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta=48.5°C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 17.0 °C</th> <th>HIGH AMBIENT Ta= 48.5 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF1</td><td>40.1°C</td><td>70.0°C</td></tr> <tr><td>2</td><td>BD1</td><td>47.9°C</td><td>77.1°C</td></tr> <tr><td>3</td><td>C5</td><td>43.2°C</td><td>73.6°C</td></tr> <tr><td>4</td><td>C15</td><td>48.4°C</td><td>78.9°C</td></tr> <tr><td>5</td><td>R22</td><td>44.1°C</td><td>74.8°C</td></tr> <tr><td>6</td><td>T1</td><td>53.0°C</td><td>83.0°C</td></tr> <tr><td>7</td><td>Q1</td><td>45.1°C</td><td>77.1°C</td></tr> <tr><td>8</td><td>Q100</td><td>45.9°C</td><td>77.1°C</td></tr> <tr><td>9</td><td>C104</td><td>43.6°C</td><td>74.2°C</td></tr> <tr><td>10</td><td>U1</td><td>44.9°C</td><td>76.3°C</td></tr> <tr><td>11</td><td>C106</td><td>49.5°C</td><td>80.1°C</td></tr> <tr><td>12</td><td>D1</td><td>58.5°C</td><td>90.6°C</td></tr> <tr><td>13</td><td>R6</td><td>65.6°C</td><td>95.1°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 17.0 °C	HIGH AMBIENT Ta= 48.5 °C	1	LF1	40.1°C	70.0°C	2	BD1	47.9°C	77.1°C	3	C5	43.2°C	73.6°C	4	C15	48.4°C	78.9°C	5	R22	44.1°C	74.8°C	6	T1	53.0°C	83.0°C	7	Q1	45.1°C	77.1°C	8	Q100	45.9°C	77.1°C	9	C104	43.6°C	74.2°C	10	U1	44.9°C	76.3°C	11	C106	49.5°C	80.1°C	12	D1	58.5°C	90.6°C	13	R6	65.6°C	95.1°C		P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230 VAC O/P : 107 % 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 50 °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 %/°C (0~50°C)	P																																																								
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40°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																																																								
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -30°C~ +70°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	SUPPOSE C104 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) 497745HRS (2) 96353HRS (3) 168864HRS (4) 184718HRS	P
10	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE : 736.4 KHRS		P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 50°C		P

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

2007/3/20 A50-S014