



# Test Report: GST36B09-P1J

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36W AC-DC High Reliability 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: 90 mVp-p	I/P : 230VAC O/P:FULL LOAD Ta:25°C	V1: 22.8mVp-p	P
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1: 5%~ 5%	I/P: 100VAC ~264VAC O/P:FULL~MIN. LOAD Ta:25°C	V1: -1.2%~ 0%	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: -0.66%~0.66%	P
5	SET UP TIME(Max)	230VAC/1000 ms 115VAC/1500 ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/584 ms 115VAC/712ms	P
6	RISE TIME (Max)	230VAC/30ms 115VAC/30 ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 8.2ms 115VAC/8.2ms	P
7	HOLD UP TIME(Typ)	230VAC/50 ms 115VAC/13 ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 82.4ms 115VAC/17.6ms	P
8	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	< ±5%	P
9	DYNAMIC LOAD	V1: 1800 mVp-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	308mVp-p 294mVp-p 302mVp-p 626mVp-p	P

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	100VAC~264VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	65V~264V	P
			I/P: (1)LOW-LINE-3V=97 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
3	EFFICIENCY(TYP)	86%	I/P:230 VAC I/P:115 VAC O/P:FULL LOAD Ta:25°C	86.81%	P
4	INPUT CURRENT (Typ)	230V/ 0.45 A 115V/ 0.8 A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I =.027A/ 230VAC I =0.44A/ 115VAC	P
5	INRUSH CURRENT(Typ)	230V/70A 115V/35A COLD START	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I =57.1A/230VAC I =28.6A/115VAC T50=240 us/230V	P
6	LEAKAGE CURRENT	< 0.25 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.001 mA N-FG : 0.001 mA	P
7	NO LOAD CONSUMPTION	< 0.075 W	I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25°C	<0.0262 W < 0.0353W	P

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	110 %~150%	I/P: 230VAC I/P: 115VAC O/P: TESTING Ta:25°C	124.11%/ 230VAC 137.29%/115VAC Hiccup mode, recovers automatically after fault condition is removed	P
2	OVER VOLTAGE PROTECTION	110 ~ 140% rated output voltage Clamp by zener diode	I/P: 230VAC I/P: 115VAC O/P: MIN LOAD Ta:25°C	122.2%/ 230VAC 122.2%/115VAC Clamp by zener diode	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, recovers automatically after fault condition is removed	P

**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	PWM Transistor ( D to S) or (C to E) Peak Voltage	Q 1 Rated :6A/600V	I/P:High-Line +3V =267V AC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3) Full Load Continue Ta:25°C	(1) 534V (2) 566V (3) 528V	P
2	Diode Peak Voltage	D100 Rated : 30A/100V	I/P:High-Line +3V =267 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz Ta:25°C	D100 : (1) 77.2V (2) 78.8V (3) 77.2V (4) 78.0V	P
3	Input Capacitor Voltage	C5 Rated: 56u/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) 376V (2) 370V (3) 370V	P
4	Control IC Voltage Test	PWM IC U1 Rated : 27V 10V(MIN.)	I/P:High-Line +3V =267 V AC ON/OFF O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)NO LOAD VR MIN LOW LINE Ta:25°C	(1) 17.3V (2) 17.3V (3) 17.3V (4) 17.2V	P

5	Clamp Diode Peak Voltage	D1 Rated: : 2A/800V	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) 446 V (2) 450 V	P
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**SAFETY TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P: 4.242 KVDC/min	I/P-O/P: 4.666 KDC/min Ta:25°C	I/P-O/P:0.001mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ	I/P-O/P: 500 VDC Ta:25°C	I/P-O/P: 9999MΩ	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%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 : GST36B05-P1J 1. ROOM AMBIENT BURN-IN : 1HRS I/P : 230VAC O/P : FULL LOAD Ta=30.6°C 2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta=47.0°C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=30.6°C</th> <th>HIGH AMBIENT Ta=47.0°C</th> </tr> </thead> <tbody> <tr><td>1</td><td><b>C5</b></td><td>61.6°C</td><td>76.0°C</td></tr> <tr><td>2</td><td><b>BD1</b></td><td>61.1°C</td><td>75.5°C</td></tr> <tr><td>3</td><td><b>T1</b></td><td>75.3°C</td><td>89.7°C</td></tr> <tr><td>4</td><td><b>Q1</b></td><td>70.9°C</td><td>85.8°C</td></tr> <tr><td>5</td><td><b>C40</b></td><td>67.9°C</td><td>82.1°C</td></tr> <tr><td>6</td><td><b>D1</b></td><td>70.7°C</td><td>85.3°C</td></tr> <tr><td>7</td><td><b>C105</b></td><td>71.3°C</td><td>85.3°C</td></tr> <tr><td>8</td><td><b>D100</b></td><td>78.5°C</td><td>93.0°C</td></tr> <tr><td>9</td><td><b>LF1</b></td><td>57.0°C</td><td>71.1°C</td></tr> <tr><td>10</td><td><b>TC</b></td><td>61.0°C</td><td>76.5°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta=30.6°C	HIGH AMBIENT Ta=47.0°C	1	<b>C5</b>	61.6°C	76.0°C	2	<b>BD1</b>	61.1°C	75.5°C	3	<b>T1</b>	75.3°C	89.7°C	4	<b>Q1</b>	70.9°C	85.8°C	5	<b>C40</b>	67.9°C	82.1°C	6	<b>D1</b>	70.7°C	85.3°C	7	<b>C105</b>	71.3°C	85.3°C	8	<b>D100</b>	78.5°C	93.0°C	9	<b>LF1</b>	57.0°C	71.1°C	10	<b>TC</b>	61.0°C	76.5°C		P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230 VAC O/P : 134% 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=-30°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 : 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 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=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) 82448HRS (2) 17203HRS (3) 30187HRS (4) 47716HRS	P
10	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE : 692.3KHRS		P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 50,000 hours @ TA 50°C		P

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

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