



Test Report: GST90A12-P1M

90W 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)	V1:120mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 95mVp-p (Max)	P
3	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -5%~ 5%	I/P: 100VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.88% -0.88 %	P
4	LINE REGULATION (Max)	V1: -1%~ 1%	I/P: 100VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1: -0.05%~0 %	P
5	LOAD REGULATION(Max)	V1: -5%~ 5%	I/P: 230VAC O/P:FULL -MIN LOAD Ta:25°C	V1: -0.88%~0.88%	P
6	SET UP TIME(Max)	230VAC/1000ms 115VAC/1000ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 321.103 ms 115VAC/ 461.841 ms	P
7	RISE TIME (Max)	230VAC/50ms 115VAC/50ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/16.563 ms 115VAC/17.119 ms	P
8	HOLD UP TIME(Typ)	230VAC/20ms 115VAC/20ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 34.745 ms 115VAC/ 23.343 ms	P
9	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	< ±5%	P
10	DYNAMIC LOAD	V1: 1200mVp-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	844mVp-p 836mVp-p 912mVp-p 888mVp-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	55.212V~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
3	POWER FACTOR(TYP)	0.91/ 230VAC 0.95/115VAC	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF=0.959/230VAC PF=0.990/115VAC	P
4	EFFICIENCY(TYP)	89%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	89.09%	P
5	INPUT CURRENT (Typ)	230V/ 0.6A 115V/ 1.3A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I =0.402A/ 230VAC I =0.781A/ 115VAC	P
6	INRUSH CURRENT(Typ)	230VAC/70A 115VAC/35A COLD START	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I =50.23A/ 230VAC I =25.64A/ 115VAC	P
7	LEAKAGE CURRENT	< 1 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.53 mA N-FG : 0.53 mA	P
8	NO LOAD CONSUMPTION	< 0.15 W	I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25°C	< 0.0397W < 0.0492W	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	130.58%/ 230VAC 125.18%/115VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH:12.6V~16.2V	I/P: 230VAC I/P: 115VAC O/P: MIN LOAD Ta:25°C	14.2V/ 230VAC 14.2V/ 115VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 230 VAC O/P: FULL LOAD	O.T.P. Active Shunt down Re-power ON	P
4	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) Peak Voltage	Q32 Rated 11A/700V	I/P: High-Line +3V =267V AC ON/OFF O/P: (1) Full Load (2) Output Short (3) Full Load Continue Ta:25°C	(1) 582V (2) 494V (3) 568V	P
2	Diode Peak Voltage	Q101 Rated 80A/75V	I/P: High-Line +3V =267 V AC ON/OFF O/P: (1) Full Load (2) Output Short (3) 0%→400% Load. (4) NO LOAD Ta:25°C	Q101: (1) 70.8V (2) 56.4V (3) 71.6V (6) 69.2V	P
3	Input Capacitor Voltage	C5 Rated: :100u/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) 396V (2) 394V (3) 398V	P
4	Control IC Voltage Test	PWM IC U1 Rated 28 V(MAX.)	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) 18.5V (2) 15.1V (3) 15.0V (4) 20.7V (5) 17.6V	P
5	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q31 Rated 15.8A/600V	I/P: High-Line +3V =267 V AC ON/OFF O/P: (1) Full Load (2) Output Short (3) Full Load Continue	(1) 446V (2) 412V (3) 420V	P

			Ta:25°C				
6	P.F.C DIODE	D1 Rated 4A/600V	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 Ta:25°C	(1) 434V (2) 430V (3) 434V			P
7	Clamp Diode Peak Voltage	D30 Rated : 800V/ 2A	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) 536 V (2) 524 V			P

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: 2.422 mA I/P-FG: 2.684 mA O/P-FG: 1.466 m A 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: 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	40A / 2min Ta:25°C	15 mΩ BY PCB	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 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				

■ **RELIABILITY TEST**

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT		
1	TEMPERATURE RISE TEST	MODEL : GST90A15-P1M			P		
		1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta=22.5°C					
		2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta=44.9°C					
			NO	Position		ROOM AMBIENT Ta=22.5°C	HIGH AMBIENT Ta=44.9°C
			1	LF1		59.7°C	78.2°C
			2	LF2		57.5°C	77.2°C
			3	BD1		60.7°C	80.1°C
			4	LF3		63.6°C	83.0°C
			5	L2		65.3°C	84.3°C
			6	C5		65.9°C	85.2°C
			7	D1		69.5°C	85.7°C
			8	Q31		65.4°C	84.9°C
			9	Q32		67.3°C	87.0°C
			10	D30		77.8°C	97.8°C
			11	C52		66.8°C	86.2°C
			12	T1		75.2°C	94.7°C
			13	RTH30		65.3°C	84.7°C
			14	Q101		64.6°C	83.9°C
			15	CASE		50.8°C	71.0°C
			16	Q102		61.5°C	81.4°C
			17	C109		64.5°C	84.3°C
			18	U2		63.8°C	83.0°C
			19	R56		67.2°C	84.5°C
	20	R64	67.2°C	86.7°C			
	21	R58	70.4°C	90.2°C			
	22	LF101	58.7°C	79.3°C			
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 126% 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 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 (0-40°C)	I/P : 230 VAC O/P : FULL LOAD	±0.012%/°C (0-40°C)	P		



6	STORAGE TEMPERATURE TEST	<ol style="list-style-type: none"> 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 	TEST : OK	P
7	THERMAL SHOCK TEST	<ol style="list-style-type: none"> 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 	TEST : OK	P
8	VIBRATION TEST	<p>1 Carton & 1 Set</p> <ol style="list-style-type: none"> (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	<p>SUPPOSE C109 IS THE MOST CRITICAL COMPONENT</p> <ol style="list-style-type: none"> (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 	<ol style="list-style-type: none"> (1) 171060 HRS (2) 72452 HRS (3) 127834 HRS (4) 240196 HRS 	P
10	MTBF	<p>MIL-HDBK-217F TOTAL FAILURE RATE : 348.7KHRS</p>		P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 40°C		P

TEST RESULT	TESTER	APPROVAL
PASS	FRANK	WANGDZ

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