



Test Report: GST220A48-R7B

220W AC-DC Single Output Desktop

■ 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

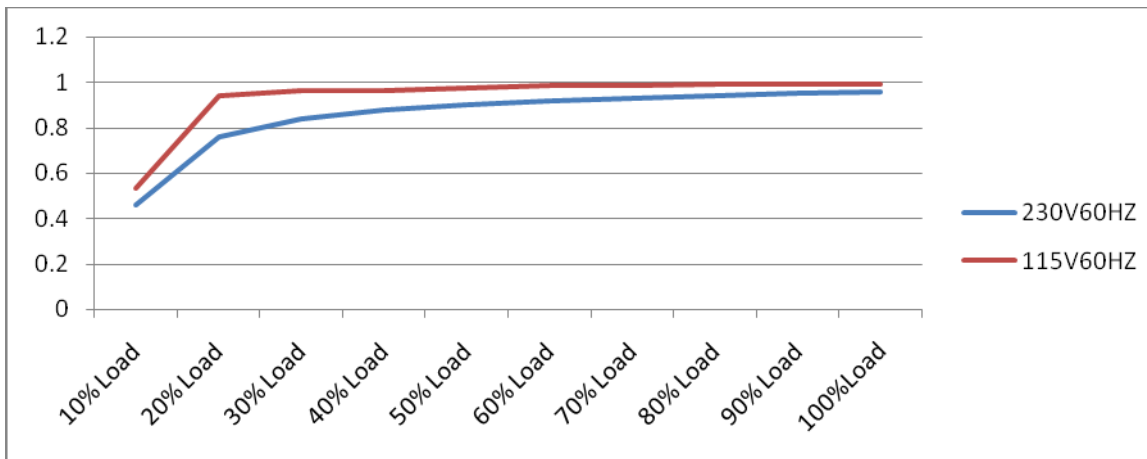
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -2%~ 2%	I/P: 100VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.207%~ 0.145%
2	LINE REGULATION (Max)	V1: -1%~ 1%	I/P: 100VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1: 0%~ 0%
3	LOAD REGULATION(Max)	V1: -2%~ 2%	I/P: 230VAC O/P:FULL -MIN LOAD Ta:25°C	V1: -0.207%~ 0.145%
4	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	< ±5%
5	RIPPLE & NOISE(Max)	V1: 200mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 33.2mVp-p
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>high frequency :</p> <p>Ch1 峰-峰値測定 29.2mV</p> </div> <div style="text-align: center;"> <p>low frequency :</p> <p>Ch1 峰-峰値測定 33.2mV</p> </div> </div>				
6	SET UP TIME(Max)	230VAC/2000ms 115VAC/2000ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 1000ms 115VAC/ 1130ms
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1 : Output Voltage CH2 : AC Input Voltage</p> <p>Δ: 228 V @: 0.00 V Δ: 1.00 s @: -960ms</p> </div> <div style="text-align: center;"> <p>INPUT=115VAC/60HZ @ FULL LOAD</p> <p>CH1 : Output Voltage CH2 : AC Input Voltage</p> <p>Δ: 144 V @: 0.00 V Δ: 1.13 s @: -1.08 s</p> </div> </div>				
7	RISE TIME (Max)	230VAC/50ms 115VAC/50ms	I/P : 230 VAC I/P : 115 VAC	230VAC/ 21.6ms 115VAC/ 21.8ms

		O/P : FULL LOAD Ta : 25°C	
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage	
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/ 22.4ms 115VAC/ 22.8ms	
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage	
9	DYNAMIC LOAD	V1: 1200mVp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C
		311mVp-p 312mVp-p	
FULL /50% LOAD 50%DUTY / 120HZ		FULL /50% LOAD 50%DUTY / 1KHZ	
23 3月 2015 09:36:27		23 3月 2015 09:35:59	

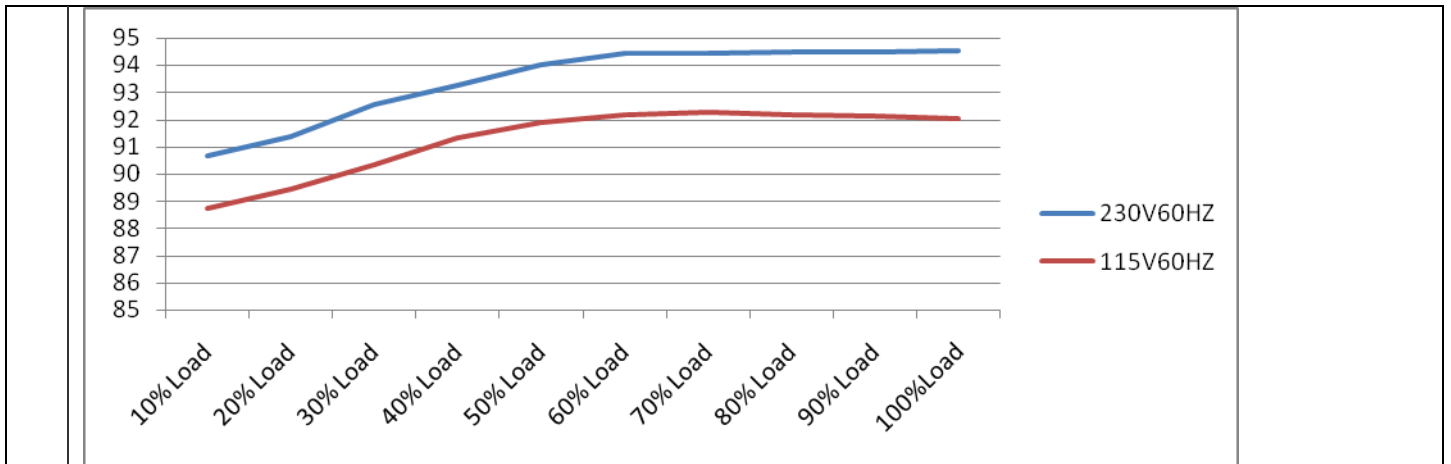
INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	95VAC~264VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	69V~264V
			I/P: LOW-LINE-3V=82 V HIGH-LINE+15%=300 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (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
3	INPUT CURRENT (Typ.)	230V/ 2A 115V/ 4A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I =1.074A/ 230VAC I =2.089A/ 115VAC
4	LEAKAGE CURRENT	<0.75 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.363 mA N-FG : 0.363 mA
5	NO LOAD CONSUMPTION	< 0.15W	I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25°C	< 0.1038 W < 0.1149 W
6	POWER FACTOR (Typ.)	0.91/ 230VAC 0.98/115VAC	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF=0.943/230VAC PF=0.993/115VAC

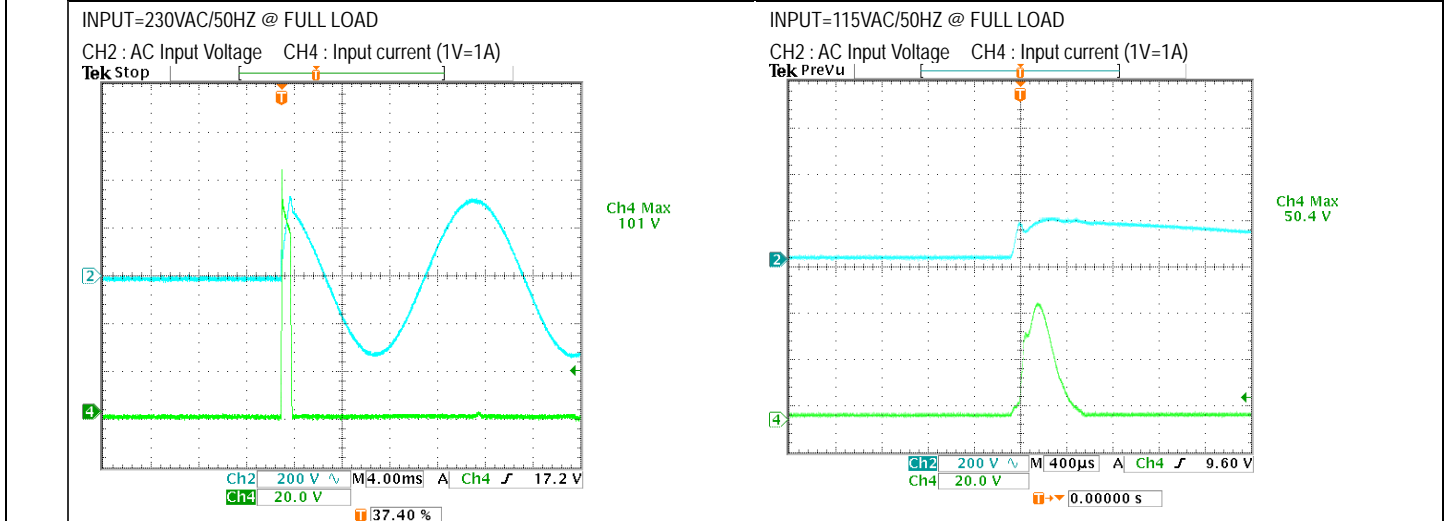
P.F vs LOAD



7	EFFICIENCY(Typ.)	94.5%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	94.54%
EFFICIENCY vs LOAD				



8	INRUSH CURRENT(Typ.)	230V/120A	I/P : 230 VAC	I =104A/ 230VAC
		115V/95A	I/P : 115 VAC	I =50.4A/ 115VAC
		COLD START	O/P : FULL LOAD	
			Ta : 25°C	



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 135%	I/P: 264VAC I/P: 230VAC I/P: 100VAC O/P: TESTING Ta:25°C	106.8%/ 264VAC 106.1%/ 230VAC 106.2%/100VAC PROTECTION TYPE : Hiccup mode,recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	50.4V~64.8V	I/P: 264VAC I/P: 230VAC I/P: 90VAC O/P:MIN LOAD Ta:25°C	58.2V/ 264VAC 58.2V/ 230VAC 58.4V/ 90VAC PROTECTION TYPE : Shot down o/p voltage,re-power on to recover
3	OVER TEMPERATURE PROTECTION	Protection type :	I/P: 264VAC I/P: 90VAC O/P:FULL LOAD	O.T.P: Active Protection type :Shut down o/p voltage,recovers automatically after temperature goes down
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264VAC I/P: 90VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE PROTECTION TYPE : Hiccup mode,recovers automatically after fault condition is removed

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q5 Rated : 18A/ 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	VDS: (1)484V (2) 486V (3) 440V
2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : 15.8A/ 600 V	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	VDS: (1) 542V (2) 514V (3) 476V
3	P.F.C DIODE	D2 Rated : 15 A/ 600 V	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	(1) 442V (2) 442V (3) 440V (4) 440V
4	Diode Peak Voltage	Q101 Rated : 30 A/ 150V	I/P:High-Line +3V =267 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3) Full Load Continue Ta:25°C	Q101: VDS: (1) 106V (2) 11.4V (3) 106V
5	Input Capacitor Voltage	C5 Rated: : 220 μ /450 V 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) 436V (2)434V (3)426V
6	Control IC Voltage Test	PWM IC U1 Rated : 32V -0.4 V(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. Ta:25°C	(1) 25.4V (2) 20.1V (3) 20.1V (4) 28.4V

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC/min I/P-FG:2KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG:2.4KVAC/min Ta:25°C	I/P-O/P:6.53mA I/P-FG:3.64mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100M Ω	I/P-O/P: 500 VDC Ta:25°C	I/P-O/P: 9999M Ω NO DAMAGE

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS
2	CONDUCTION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
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
5	E.F.T	EN61000-4-4 INPUT : 1KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
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
7	Test by certified Lab & Test Report Prepare			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																
1	TEMPERATURE RISE TEST	MODEL : GST220A20-R7B 1. ROOM AMBIENT BURN-IN : 1HRS I/P : 230VAC O/P : FULL LOAD Ta=27 °C 2. HIGH AMBIENT BURN-IN : 1HRS I/P : 230VAC O/P : FULL LOAD Ta= 53.8 °C																																																																																		
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 27 °C</th> <th>HIGH AMBIENT Ta= 53.8 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF2</td><td>61.0°C</td><td>89.0°C</td></tr> <tr><td>2</td><td>L2</td><td>63.0°C</td><td>91.4°C</td></tr> <tr><td>3</td><td>C2</td><td>59.4°C</td><td>85.9°C</td></tr> <tr><td>4</td><td>C11</td><td>62.6°C</td><td>91.4°C</td></tr> <tr><td>5</td><td>C1</td><td>60.5°C</td><td>89.2°C</td></tr> <tr><td>6</td><td>BD1</td><td>63.0°C</td><td>90.5°C</td></tr> <tr><td>7</td><td>D2</td><td>64.7°C</td><td>92.7°C</td></tr> <tr><td>8</td><td>Q2</td><td>63.6°C</td><td>91.9°C</td></tr> <tr><td>9</td><td>L1</td><td>65.9°C</td><td>95.0°C</td></tr> <tr><td>10</td><td>C5</td><td>66.7°C</td><td>95.5°C</td></tr> <tr><td>11</td><td>C81</td><td>65.5°C</td><td>94.1°C</td></tr> <tr><td>12</td><td>C13</td><td>69.1°C</td><td>98.2°C</td></tr> <tr><td>13</td><td>T1</td><td>74.5°C</td><td>105.0°C</td></tr> <tr><td>14</td><td>U4</td><td>66.7°C</td><td>94.7°C</td></tr> <tr><td>15</td><td>TSW1</td><td>59.5°C</td><td>88.7°C</td></tr> <tr><td>16</td><td>RTH2</td><td>63.1°C</td><td>90.6°C</td></tr> <tr><td>17</td><td>Q102</td><td>70.5°C</td><td>100.9°C</td></tr> <tr><td>18</td><td>C109</td><td>68.6°C</td><td>98.3°C</td></tr> <tr><td>19</td><td>U1</td><td>71.4°C</td><td>99.6°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 27 °C	HIGH AMBIENT Ta= 53.8 °C	1	LF2	61.0°C	89.0°C	2	L2	63.0°C	91.4°C	3	C2	59.4°C	85.9°C	4	C11	62.6°C	91.4°C	5	C1	60.5°C	89.2°C	6	BD1	63.0°C	90.5°C	7	D2	64.7°C	92.7°C	8	Q2	63.6°C	91.9°C	9	L1	65.9°C	95.0°C	10	C5	66.7°C	95.5°C	11	C81	65.5°C	94.1°C	12	C13	69.1°C	98.2°C	13	T1	74.5°C	105.0°C	14	U4	66.7°C	94.7°C	15	TSW1	59.5°C	88.7°C	16	RTH2	63.1°C	90.6°C	17	Q102	70.5°C	100.9°C	18	C109	68.6°C	98.3°C	19	U1	71.4°C	99.6°C
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 130 % LOAD Ta : 25°C	TEST : OK																																																																																
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -35 °C	TEST : OK																																																																																
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= 50.1 °C HUMIDITY= 95 %R.H	TEST : OK																																																																																
5	TEMPERATURE COEFFICIENT	± 0.03 %/°C(0-50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.003 %/°C(0-50°C)																																																																																
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																																																																																



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 	OK
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
9	CAPACITOR LIFE CYCLE	<p>SUPPOSE C 109 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= 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 	<ol style="list-style-type: none"> (1) 162961HRS (2) 23556HRS (3) 52689HRS (4) 86715HRS
10	MTBF	<p>MIL-HDBK-217F</p> <p>TOTAL FAILURE RATE : 209.4 KHRS</p>	
11	DMTBF/Accelerated Life Test	<p>Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 50°C</p>	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

12.10.30 A50-F031