



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

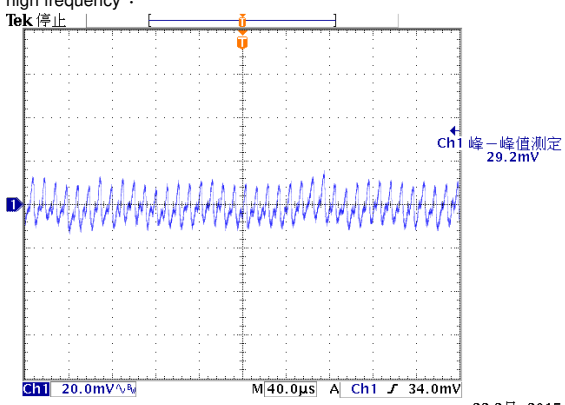
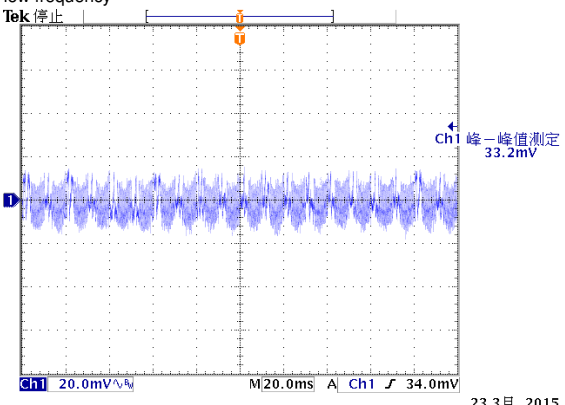
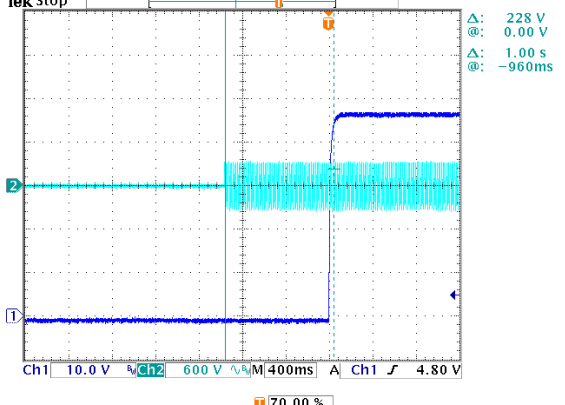
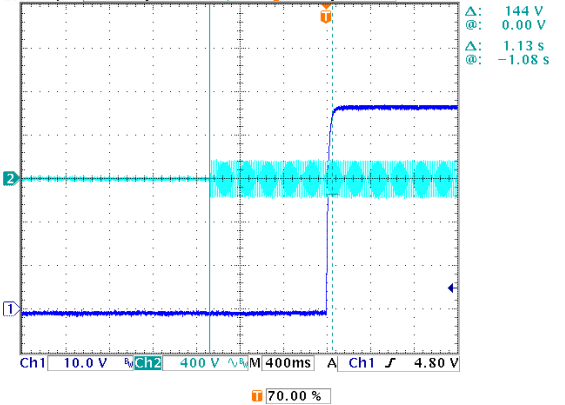
E.M.C. Test

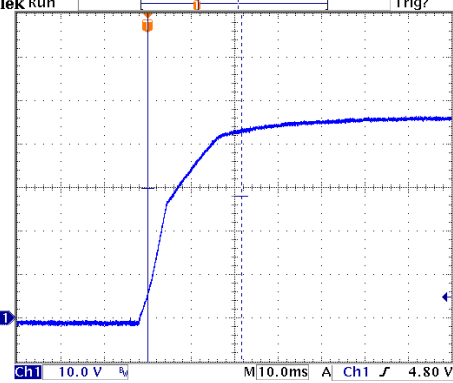
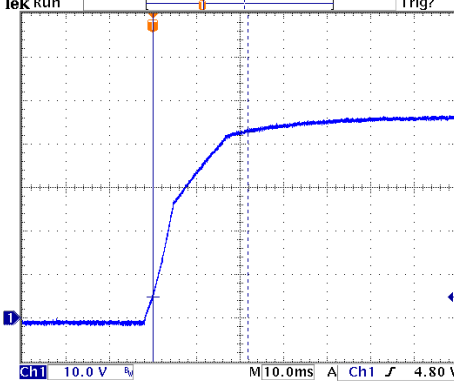
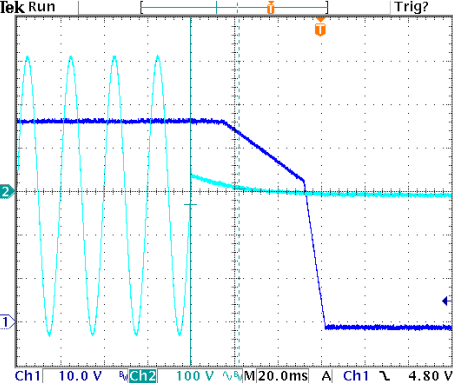
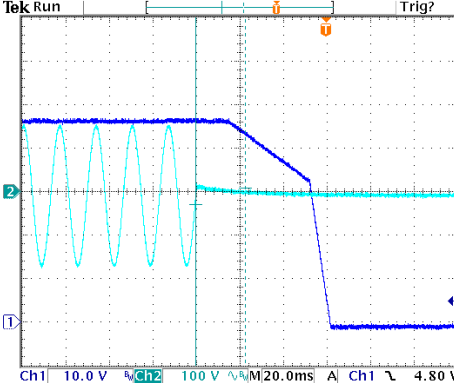
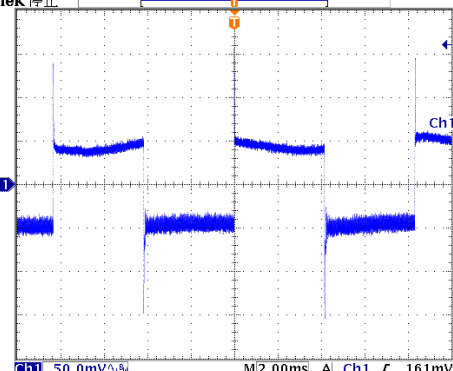
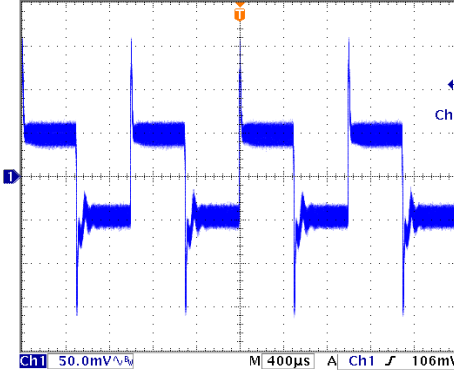
■ RELIABILITY TEST

ENVIRONMENT TEST

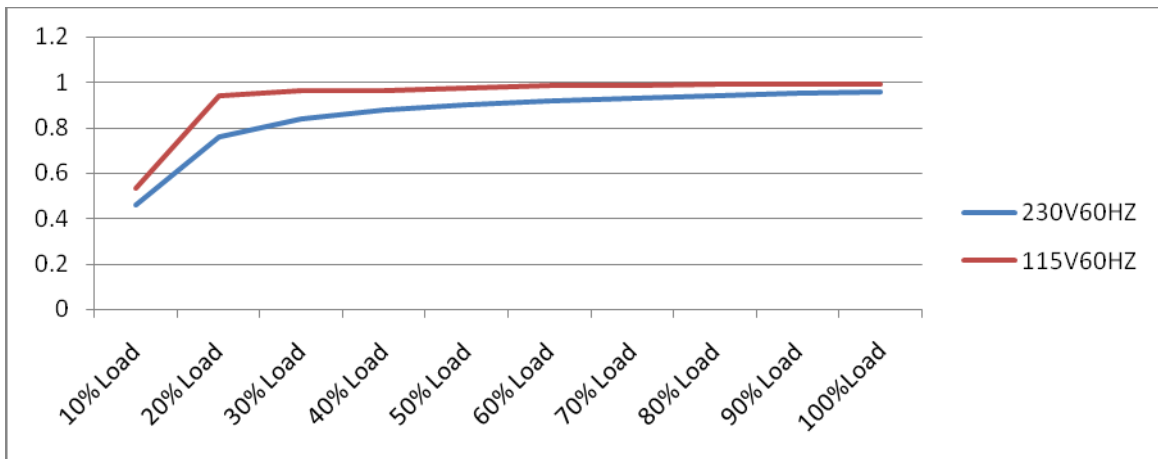
DESIGN VERIFY TEST

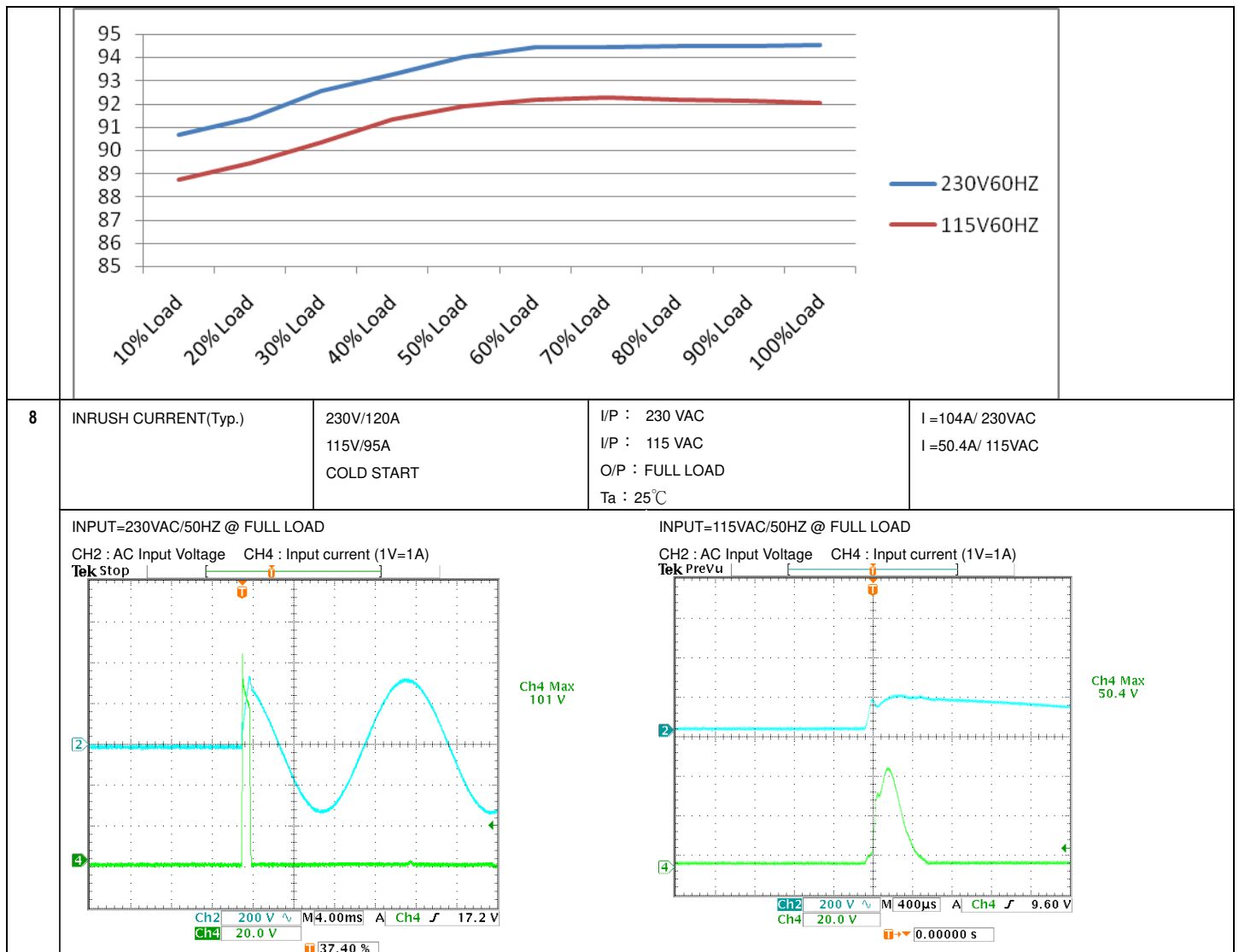
OUTPUT FUNCTION TEST

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℃	V1: -0.207%~ 0.145%
2	LINE REGULATION (Max)	V1: -1%~ 1%	I/P: 100VAC~ 264VAC O/P:FULL LOAD Ta:25℃	V1: 0%~ 0%
3	LOAD REGULATION(Max)	V1: -2%~ 2%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25℃	V1: -0.207%~ 0.145%
4	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25℃	< ±5%
5	RIPPLE & NOISE(Max)	V1: 200mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25℃	V1: 33.2mVp-p
high frequency :  low frequency : 				
6	SET UP TIME(Max)	230VAC/2000ms 115VAC/2000ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25℃	230VAC/ 1000ms 115VAC/ 1130ms
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage  INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 				
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 Tek Run		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage Tek Run	
			
30.00 %		30.00 %	
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 Tek Run		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage Tek Run	
			
70.00 %		70.00 %	
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 Tek 停止		FULL /50% LOAD 50%DUTY / 1KHZ Tek 停止	
			
0.00000 s		0.00000 s	
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℃	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℃	TEST: OK																																	
3	INPUT CURRENT (Typ.)	230V/ 2A 115V/ 4A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25℃	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℃	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℃	< 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℃	PF=0.943/230VAC PF=0.993/115VAC																																	
P.F vs LOAD  <table><caption>Approximate data points from P.F vs LOAD graph</caption><thead><tr><th>Load (%)</th><th>230V60HZ P.F</th><th>115V60HZ P.F</th></tr></thead><tbody><tr><td>10%</td><td>0.45</td><td>0.55</td></tr><tr><td>20%</td><td>0.80</td><td>0.95</td></tr><tr><td>30%</td><td>0.85</td><td>0.98</td></tr><tr><td>40%</td><td>0.88</td><td>0.98</td></tr><tr><td>50%</td><td>0.90</td><td>0.98</td></tr><tr><td>60%</td><td>0.92</td><td>0.98</td></tr><tr><td>70%</td><td>0.94</td><td>0.98</td></tr><tr><td>80%</td><td>0.96</td><td>0.98</td></tr><tr><td>90%</td><td>0.98</td><td>0.98</td></tr><tr><td>100%</td><td>1.00</td><td>0.98</td></tr></tbody></table>					Load (%)	230V60HZ P.F	115V60HZ P.F	10%	0.45	0.55	20%	0.80	0.95	30%	0.85	0.98	40%	0.88	0.98	50%	0.90	0.98	60%	0.92	0.98	70%	0.94	0.98	80%	0.96	0.98	90%	0.98	0.98	100%	1.00	0.98
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7	EFFICIENCY(Typ.)	94.5%	I/P:230 VAC O/P:FULL LOAD Ta:25℃	94.54%																																	
EFFICIENCY vs LOAD																																					



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℃	VDS: (1)484V (2) 486V (3) 440V
2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : 15.8 A/ 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℃	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℃	(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℃	Q101: VDS: (1) 106V (2) 11.4V (3) 106V
5	Input Capacitor Voltage	C5 Rated: : 220 μ /450 V 105 ℃	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℃	(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℃	(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℃	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℃	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><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 27 °C</th><th>HIGH AMBIENT Ta= 53.8 °C</th></tr><tr><td>1</td><td>LF2</td><td>61.0℃</td><td>89.0℃</td></tr><tr><td>2</td><td>L2</td><td>63.0℃</td><td>91.4℃</td></tr><tr><td>3</td><td>C2</td><td>59.4℃</td><td>85.9℃</td></tr><tr><td>4</td><td>C11</td><td>62.6℃</td><td>91.4℃</td></tr><tr><td>5</td><td>C1</td><td>60.5℃</td><td>89.2℃</td></tr><tr><td>6</td><td>BD1</td><td>63.0℃</td><td>90.5℃</td></tr><tr><td>7</td><td>D2</td><td>64.7℃</td><td>92.7℃</td></tr><tr><td>8</td><td>Q2</td><td>63.6℃</td><td>91.9℃</td></tr><tr><td>9</td><td>L1</td><td>65.9℃</td><td>95.0℃</td></tr><tr><td>10</td><td>C5</td><td>66.7℃</td><td>95.5℃</td></tr><tr><td>11</td><td>C81</td><td>65.5℃</td><td>94.1℃</td></tr><tr><td>12</td><td>C13</td><td>69.1℃</td><td>98.2℃</td></tr><tr><td>13</td><td>T1</td><td>74.5℃</td><td>105.0℃</td></tr><tr><td>14</td><td>U4</td><td>66.7℃</td><td>94.7℃</td></tr><tr><td>15</td><td>TSW1</td><td>59.5℃</td><td>88.7℃</td></tr><tr><td>16</td><td>RTH2</td><td>63.1℃</td><td>90.6℃</td></tr><tr><td>17</td><td>Q102</td><td>70.5℃</td><td>100.9℃</td></tr><tr><td>18</td><td>C109</td><td>68.6℃</td><td>98.3℃</td></tr><tr><td>19</td><td>U1</td><td>71.4℃</td><td>99.6℃</td></tr></table>			NO	Position	ROOM AMBIENT Ta= 27 °C	HIGH AMBIENT Ta= 53.8 °C	1	LF2	61.0℃	89.0℃	2	L2	63.0℃	91.4℃	3	C2	59.4℃	85.9℃	4	C11	62.6℃	91.4℃	5	C1	60.5℃	89.2℃	6	BD1	63.0℃	90.5℃	7	D2	64.7℃	92.7℃	8	Q2	63.6℃	91.9℃	9	L1	65.9℃	95.0℃	10	C5	66.7℃	95.5℃	11	C81	65.5℃	94.1℃	12	C13	69.1℃	98.2℃	13	T1	74.5℃	105.0℃	14	U4	66.7℃	94.7℃	15	TSW1	59.5℃	88.7℃	16	RTH2	63.1℃	90.6℃	17	Q102	70.5℃	100.9℃	18	C109	68.6℃	98.3℃	19	U1	71.4℃	99.6℃
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12	C13	69.1℃	98.2℃																																																																																	
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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℃	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 %/℃(0~50℃)	I/P : 230 VAC O/P : FULL LOAD	± 0.003 %/℃(0~50℃)																																																																																
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40℃~ +85℃ 2. Temperature change rate : 25℃ / 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	1. Thermal shock Temperature : $-30^{\circ}\text{C} \sim +70^{\circ}\text{C}$ 2. Temperature change rate : $25^{\circ}\text{C} / \text{MIN}$ 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	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
9	CAPACITOR LIFE CYCLE	SUPPOSE C 109 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) 162961HRS (2) 23556HRS (3) 52689HRS (4) 86715HRS
10	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE : 209.4 KHRS	
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 50°C	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

12.10.30 A50-F031