



Test Report: GST220A12-R7B

220W 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

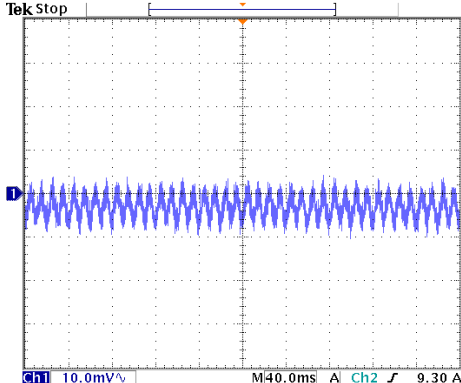
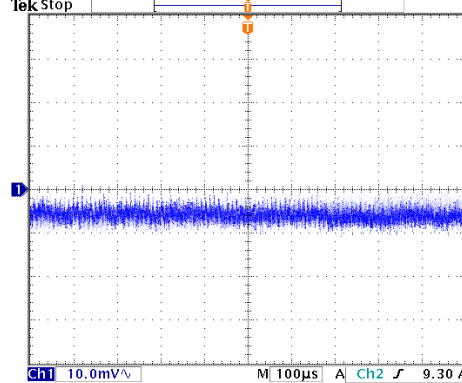
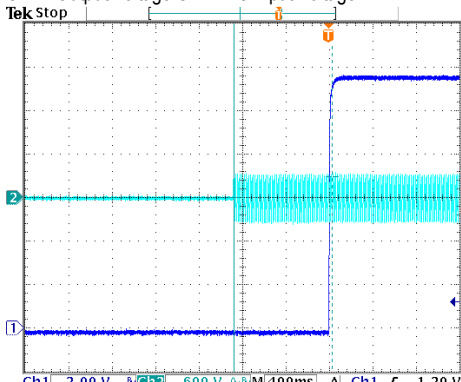
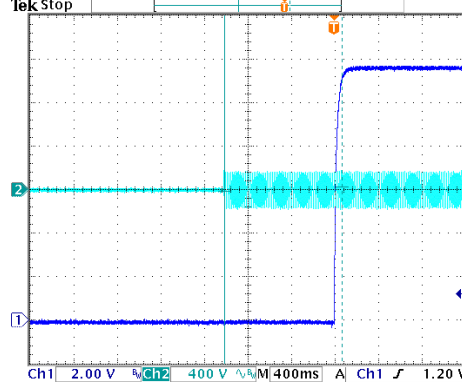
E.M.C. Test

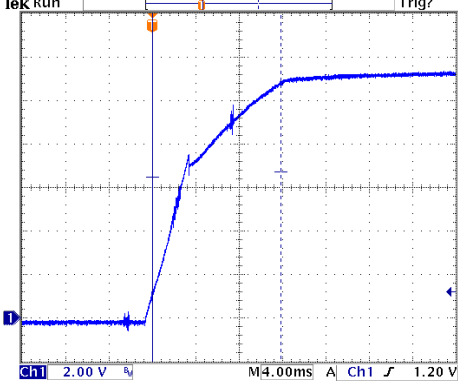
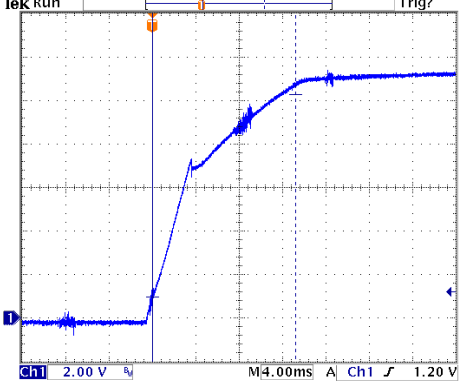
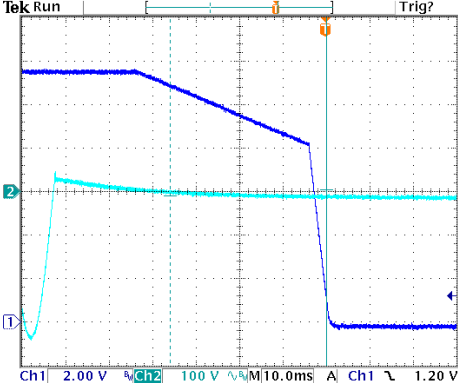
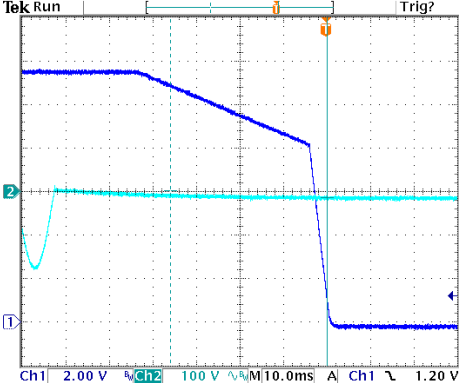
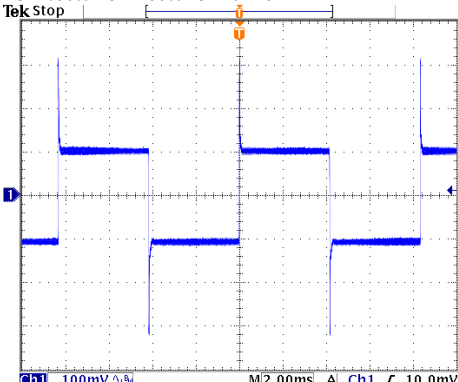
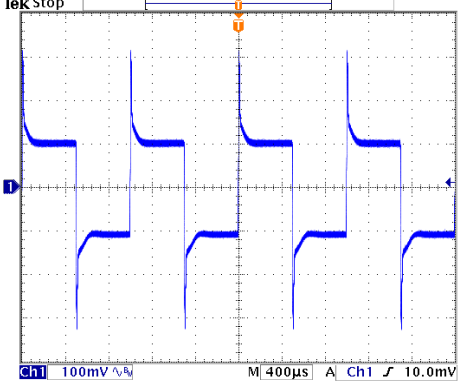
■ RELIABILITY TEST

ENVIRONMENT TEST

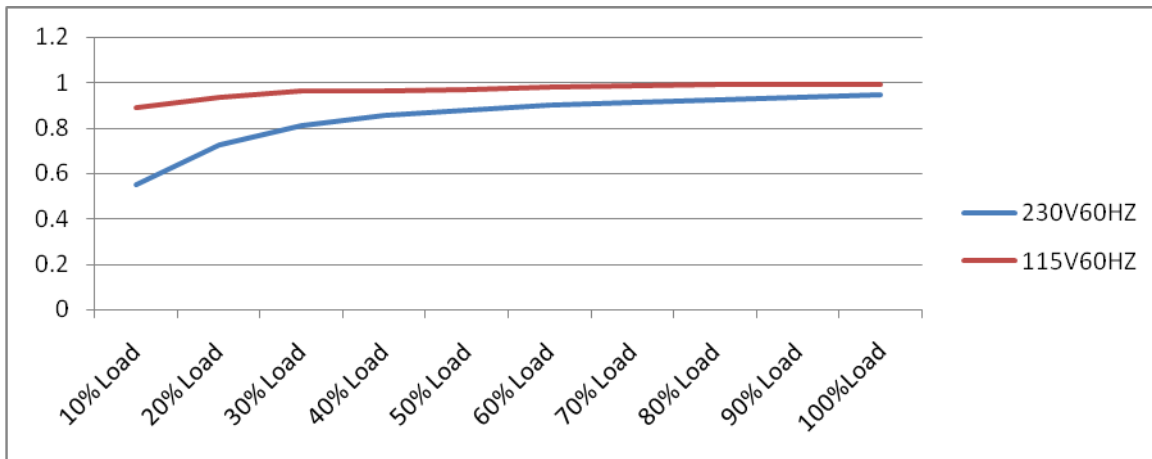
DESIGN VERIFY TEST

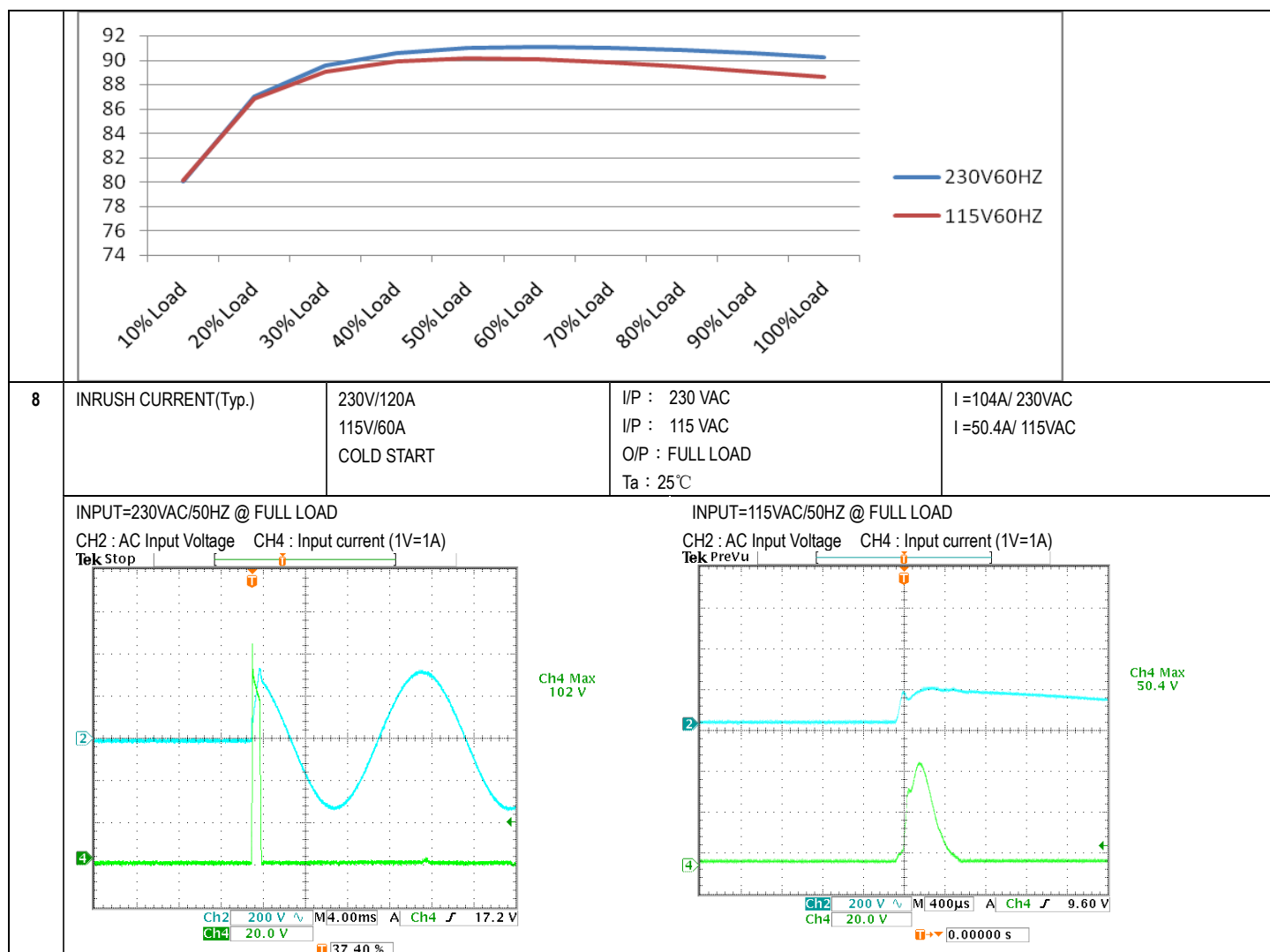
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -5%~ 5%	I/P: 100VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -2.1%~ 1.68%
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: -5%~ 5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: -2.1%~ 1.68%
4	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	< ±5%
5	RIPPLE & NOISE(Max)	V1: 80mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 14.6mVp-p
<div> <div> <p>high frequency :</p>  <p>Ch1 Pk-Pk 14.6mV</p> </div> <div> <p>low frequency :</p>  <p>Ch1 Pk-Pk 11.8mV</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/ 904ms 115VAC/ 1080ms
<div> <div> <p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1 : Output Voltage CH2 : AC Input Voltage</p>  <p>Δ: 288 V @: 0.00 V Δ: 904ms @: -880ms</p> </div> <div> <p>INPUT=115VAC/60HZ @ FULL LOAD</p> <p>CH1 : Output Voltage CH2 : AC Input Voltage</p>  <p>Δ: 40.0 V @: -16.0 V Δ: 1.08 s @: -1.02 s</p> </div> </div>				
7	RISE TIME (Max)	230VAC/50ms 115VAC/50ms	I/P : 230 VAC I/P : 115 VAC	230VAC/ 11.8ms 115VAC/ 13.2ms

			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/ 26ms 115VAC/ 26ms
	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	636mVp-p 636mVp-p
	FULL /50% LOAD 50%DUTY / 120HZ 		FULL /50% LOAD 50%DUTY / 1KHZ 	

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																	
1	INPUT VOLTAGE RANGE	100VAC~264VAC	I/P:TESTING O/P:FULL LOAD Ta:25℃	73V~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=0.880A/ 230VAC I=1.732A/ 115VAC																																	
4	LEAKAGE CURRENT	<0.75 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25℃	L-FG : 0.334 mA N-FG : 0.334 mA																																	
5	NO LOAD CONSUMPTION	< 0.15W	I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25℃	< 0.0938 W < 0.0993 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=0.954/230VAC PF=0.993/115VAC																																	
<p>P.F vs LOAD</p>  <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>0.90</td><td>0.92</td></tr><tr><td>20%</td><td>0.95</td><td>0.98</td></tr><tr><td>30%</td><td>0.98</td><td>0.99</td></tr><tr><td>40%</td><td>0.99</td><td>1.00</td></tr><tr><td>50%</td><td>1.00</td><td>1.00</td></tr><tr><td>60%</td><td>1.00</td><td>1.00</td></tr><tr><td>70%</td><td>1.00</td><td>1.00</td></tr><tr><td>80%</td><td>1.00</td><td>1.00</td></tr><tr><td>90%</td><td>1.00</td><td>1.00</td></tr><tr><td>100%</td><td>1.00</td><td>1.00</td></tr></tbody></table>					Load (%)	230V60HZ P.F	115V60HZ P.F	10%	0.90	0.92	20%	0.95	0.98	30%	0.98	0.99	40%	0.99	1.00	50%	1.00	1.00	60%	1.00	1.00	70%	1.00	1.00	80%	1.00	1.00	90%	1.00	1.00	100%	1.00	1.00
Load (%)	230V60HZ P.F	115V60HZ P.F																																			
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80%	1.00	1.00																																			
90%	1.00	1.00																																			
100%	1.00	1.00																																			
7	EFFICIENCY(Typ.)	90%	I/P:230 VAC O/P:FULL LOAD Ta:25℃	90.27%																																	
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	126.47%/ 264VAC 126.27%/ 230VAC 126.47%/100VAC PROTECTION TYPE : Hiccup mode,recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	12.6V~16.2V	I/P: 264VAC I/P: 230VAC I/P: 90VAC O/P: MIN LOAD Ta:25°C	14.7V/ 264VAC 14.7V/ 230VAC 14.7V/ 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)480V (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°C	VDS: (1) 522V (2) 520V (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 I/P:Low-Line -3V = 97V 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) 446V (4) 446V (1) 436V (2) 436V (3) 440V (4) 438V
4	Diode Peak Voltage	Q101 Rated : 120 A/ 40V	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	Q101: VDS: (1)30.0 V (2) 11.6V (3) 30.0V
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)424V (3)424V
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) 26.3V (2) 20.2V (3) 20.2V (4) 29.3V

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC/min I/P-FG:2KVAX\IC/min	I/P-O/P: 3.6 KVAC/min I/P-FG:2.4KVAX\IC/min Ta:25°C	I/P-O/P:6.75mA I/P-FG:3.75mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ	I/P-O/P: 500 VDC Ta:25°C	I/P-O/P: 9999MΩ 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 LIGHT INDUSTRY AIR : 8KV / Contact : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
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
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
7	Test by certified Lab & Test Report Prepare			

RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																																				
1	TEMPERATURE RISE TEST	<div>MODEL : GST220A12-R7B</div> <div>1. ROOM AMBIENT BURN-IN : 1HRS</div> <div>I/P : 230VAC O/P : FULL LOAD Ta=32.6 °C</div> <div>2. HIGH AMBIENT BURN-IN : 1HRS</div> <div>I/P : 230VAC O/P : FULL LOAD Ta=51.1°C</div> <table><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 32.6 °C</th><th>HIGH AMBIENT Ta= 51.1 °C</th></tr><tr><td>1</td><td>LF1</td><td>76.8°C</td><td>93.3°C</td></tr><tr><td>2</td><td>LF2</td><td>62.8°C</td><td>78.9°C</td></tr><tr><td>3</td><td>L2</td><td>64.4°C</td><td>80.4°C</td></tr><tr><td>4</td><td>C2</td><td>60.4°C</td><td>76.6°C</td></tr><tr><td>5</td><td>C11</td><td>65.1°C</td><td>81.0°C</td></tr><tr><td>6</td><td>R5</td><td>67.1°C</td><td>83.2°C</td></tr><tr><td>7</td><td>D3</td><td>65.9°C</td><td>82.2°C</td></tr><tr><td>8</td><td>BD1</td><td>66.1°C</td><td>82.4°C</td></tr><tr><td>9</td><td>D2</td><td>67.6°C</td><td>83.8°C</td></tr><tr><td>10</td><td>Q2</td><td>66.9°C</td><td>83.2°C</td></tr><tr><td>11</td><td>L1</td><td>69.0°C</td><td>84.8°C</td></tr><tr><td>12</td><td>C5</td><td>70.2°C</td><td>86.2°C</td></tr><tr><td>13</td><td>C81</td><td>68.5°C</td><td>84.5°C</td></tr><tr><td>14</td><td>Q5</td><td>68.1°C</td><td>84.3°C</td></tr><tr><td>15</td><td>C101</td><td>68.6°C</td><td>84.9°C</td></tr><tr><td>16</td><td>C13</td><td>71.1°C</td><td>87.3°C</td></tr><tr><td>17</td><td>T1</td><td>87.0°C</td><td>104.6°C</td></tr><tr><td>18</td><td>U4</td><td>70.9°C</td><td>87.5°C</td></tr><tr><td>19</td><td>TSW1</td><td>63.9°C</td><td>80.4°C</td></tr><tr><td>20</td><td>CASE</td><td>57.3°C</td><td>76.4°C</td></tr><tr><td>21</td><td>RTH2</td><td>64.9°C</td><td>81.4°C</td></tr><tr><td>22</td><td>Q102</td><td>79.2°C</td><td>95.9°C</td></tr><tr><td>23</td><td>C109</td><td>76.4°C</td><td>93.0°C</td></tr><tr><td>24</td><td>U1</td><td>74.6°C</td><td>90.7°C</td></tr></table>			NO	Position	ROOM AMBIENT Ta= 32.6 °C	HIGH AMBIENT Ta= 51.1 °C	1	LF1	76.8°C	93.3°C	2	LF2	62.8°C	78.9°C	3	L2	64.4°C	80.4°C	4	C2	60.4°C	76.6°C	5	C11	65.1°C	81.0°C	6	R5	67.1°C	83.2°C	7	D3	65.9°C	82.2°C	8	BD1	66.1°C	82.4°C	9	D2	67.6°C	83.8°C	10	Q2	66.9°C	83.2°C	11	L1	69.0°C	84.8°C	12	C5	70.2°C	86.2°C	13	C81	68.5°C	84.5°C	14	Q5	68.1°C	84.3°C	15	C101	68.6°C	84.9°C	16	C13	71.1°C	87.3°C	17	T1	87.0°C	104.6°C	18	U4	70.9°C	87.5°C	19	TSW1	63.9°C	80.4°C	20	CASE	57.3°C	76.4°C	21	RTH2	64.9°C	81.4°C	22	Q102	79.2°C	95.9°C	23	C109	76.4°C	93.0°C	24	U1	74.6°C	90.7°C
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18	U4	70.9°C	87.5°C																																																																																																					
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24	U1	74.6°C	90.7°C																																																																																																					
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 127 % 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= 49.8 °C HUMIDITY= 95 %R.H	TEST : OK																																																																																																				
5	TEMPERATURE COEFFICIENT	± 0.03 %/°C (0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.008 %/°C (0~50°C)																																																																																																				

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℃~ +70℃ 2. Temperature change rate : 25℃ / 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℃	TEST : OK
9	CAPACITOR LIFE CYCLE	SUPPOSE C 109 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 50 ℃ LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50 ℃ LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50 ℃ LIFE TIME	(1) 131599HRS (2) 26362HRS (3) 54213HRS (4) 94394HRS
10	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE : 209.47 KHRS	
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 50,000 hours @ TA 50℃	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

12.10.30 A50-F031