



Test Report: GST160A48-R7B

160W 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

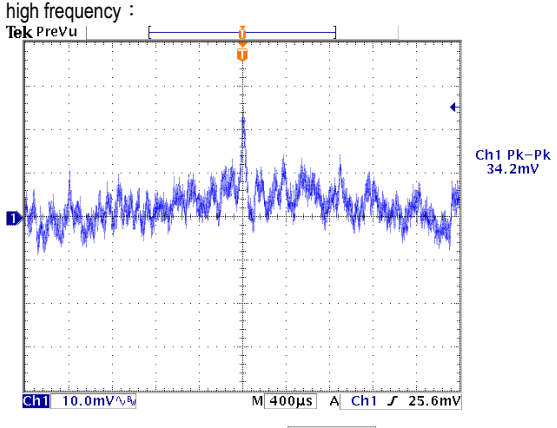
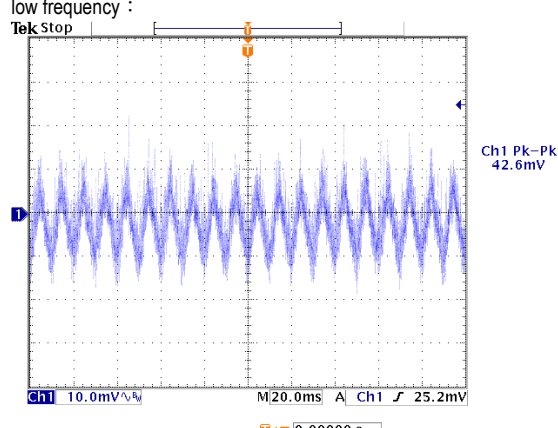
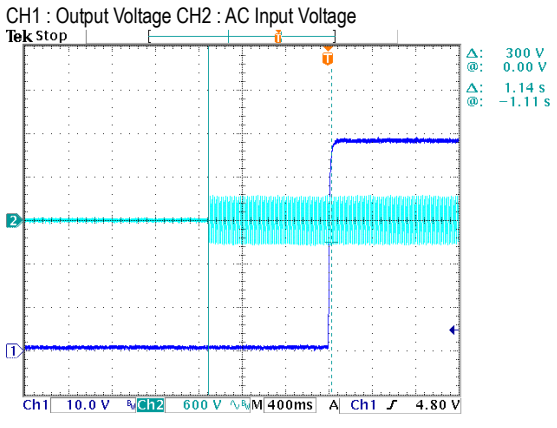
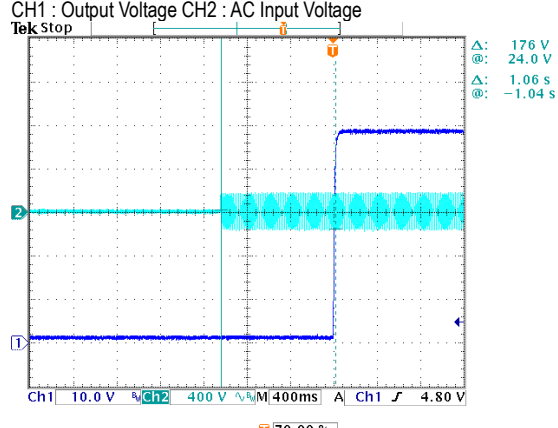
E.M.C. Test

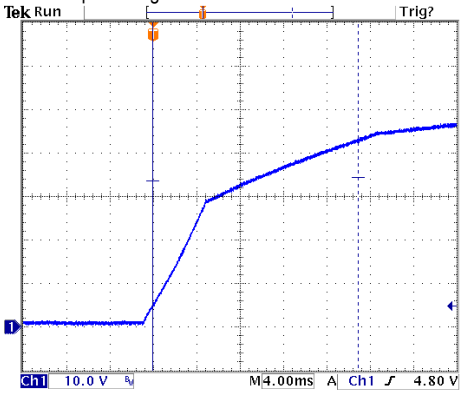
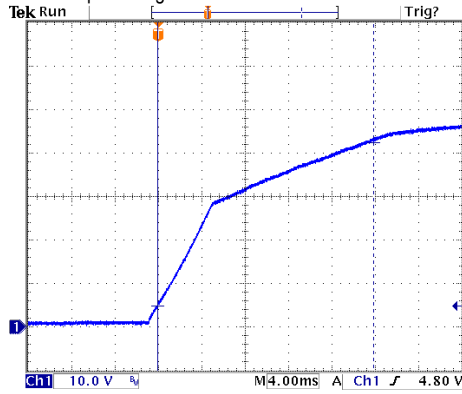
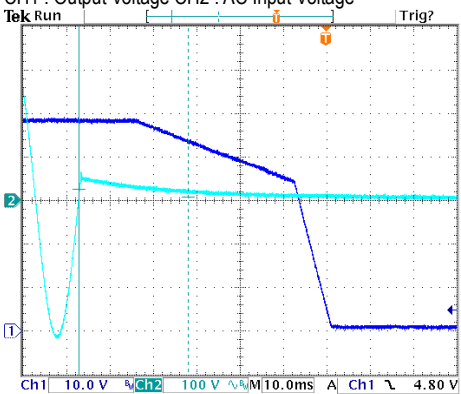
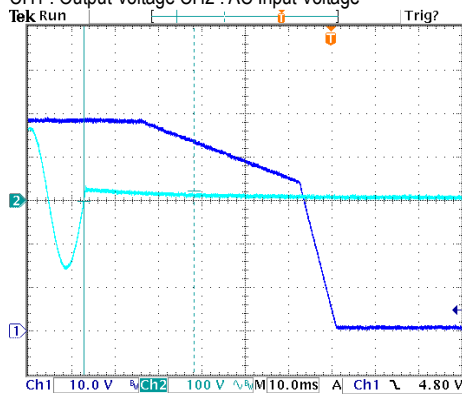
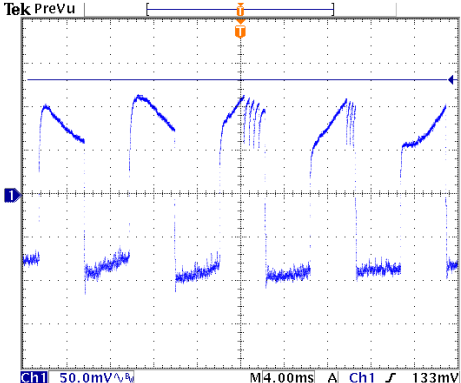
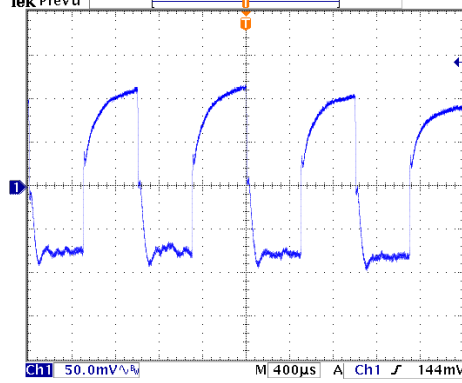
■ RELIABILITY TEST

ENVIRONMENT TEST

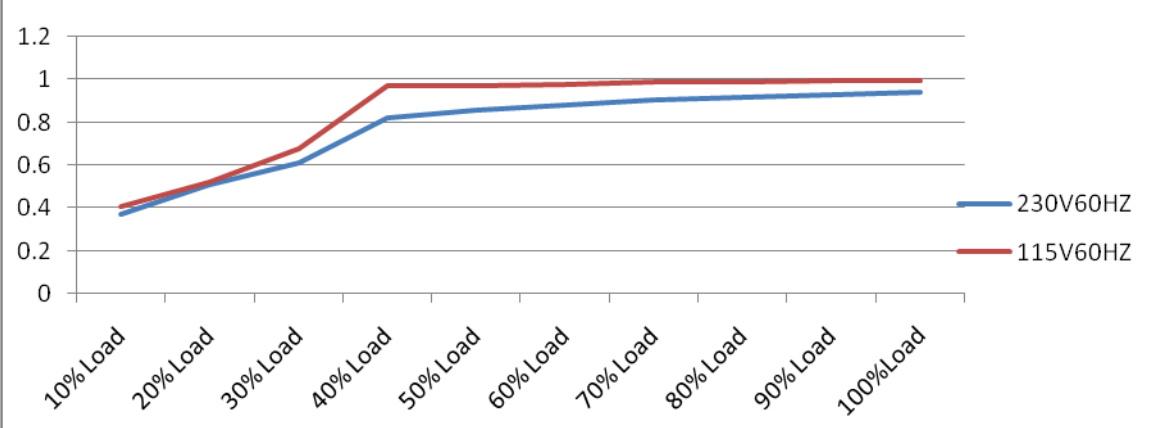
DESIGN VERIFY TEST

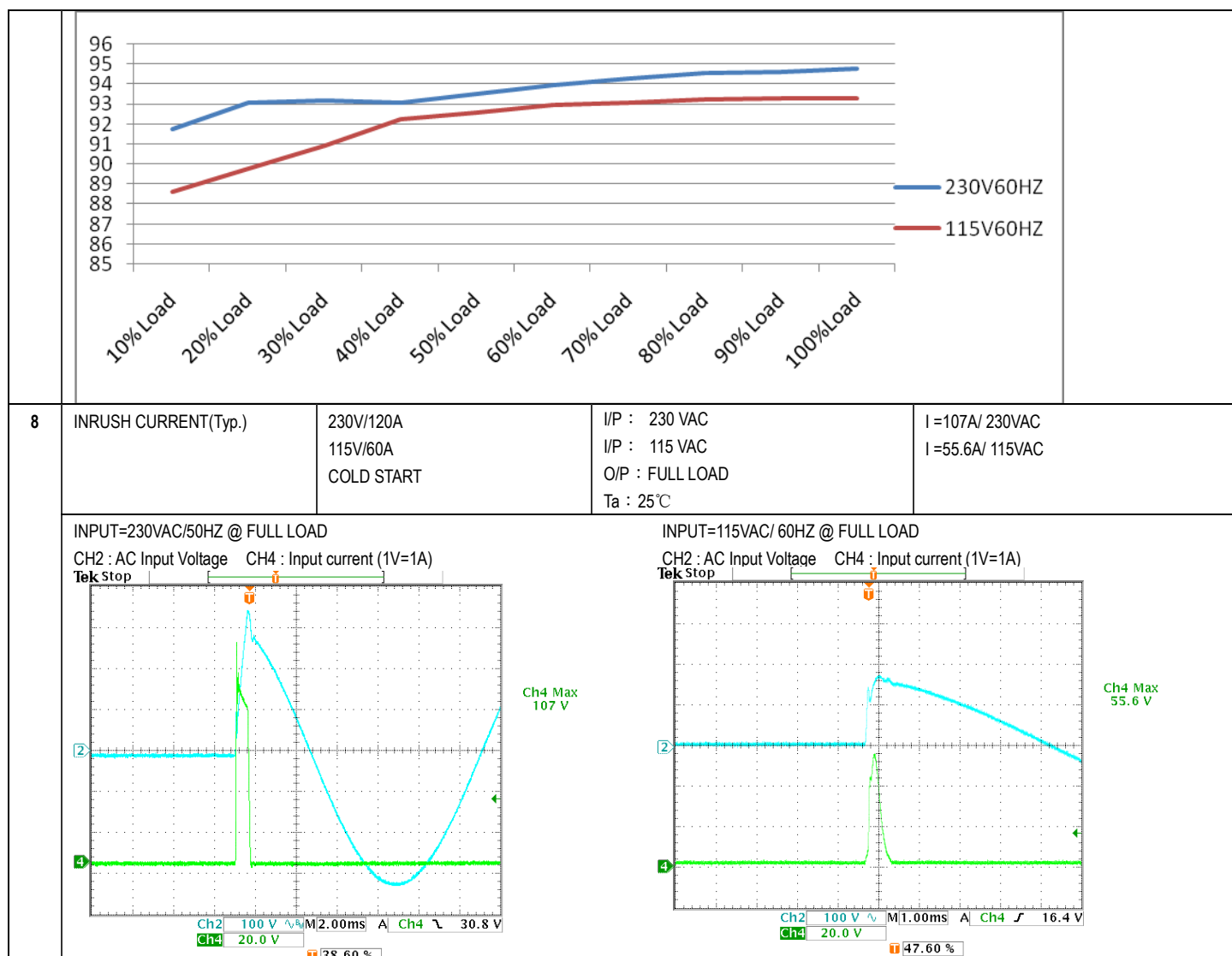
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -3%~ 3%	I/P: 100VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.063 %~0.13 %
2	LINE REGULATION (Max)	V1: -1%~ 1%	I/P: 100VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1: -0.021 %~ 0.021%
3	LOAD REGULATION(Max)	V1: -3%~ 3%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: -0.063 %~ 0.13 %
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: 42.6 mVp-p
high frequency :  Ch1 Pk-Pk 34.2mV low frequency :  Ch1 Pk-Pk 42.6mV				
6	SET UP TIME(Max)	230VAC/2000ms 115VAC/2500ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 1136 ms 115VAC/ 1056ms
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage  Δ: 300 V @: 0.00 V Δ: 1.14 s @: -1.11 s INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage  Δ: 176 V @: 24.0 V Δ: 1.06 s @: -1.04 s				
7	RISE TIME (Max)	230VAC/50ms 115VAC/50ms	I/P : 230 VAC I/P : 115 VAC	230VAC/ 19 ms 115VAC/ 19.9 ms

			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/ 25. 2 ms 115VAC/25. 4 ms
	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: 4800mVp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	230mVp-p 214mVp-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℃	78 V~264V																																	
			I/P: LOW-LINE-3V=97V 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/ 1A 115V/ 1.85A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25℃	I=0.777A/ 230VAC I=1.514A/ 115VAC																																	
4	LEAKAGE CURRENT	<0.75 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25℃	L-FG : 0.224 mA N-FG : 0.224 mA																																	
5	NO LOAD CONSUMPTION	< 0.15W	I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25℃	< 0.1121 W < 0.1312 W																																	
6	POWER FACTOR (Typ.)	0.94/ 230VAC 0.98/115VAC	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25℃	PF=0.948/230VAC PF=0.994/115VAC																																	
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>0.40</td><td>0.40</td></tr><tr><td>20%</td><td>0.50</td><td>0.55</td></tr><tr><td>30%</td><td>0.60</td><td>0.65</td></tr><tr><td>40%</td><td>0.80</td><td>1.00</td></tr><tr><td>50%</td><td>0.85</td><td>1.00</td></tr><tr><td>60%</td><td>0.88</td><td>1.00</td></tr><tr><td>70%</td><td>0.90</td><td>1.00</td></tr><tr><td>80%</td><td>0.92</td><td>1.00</td></tr><tr><td>90%</td><td>0.94</td><td>1.00</td></tr><tr><td>100%</td><td>0.95</td><td>1.00</td></tr></tbody></table>					Load (%)	230V60HZ P.F	115V60HZ P.F	10%	0.40	0.40	20%	0.50	0.55	30%	0.60	0.65	40%	0.80	1.00	50%	0.85	1.00	60%	0.88	1.00	70%	0.90	1.00	80%	0.92	1.00	90%	0.94	1.00	100%	0.95	1.00
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7	EFFICIENCY(Typ.)	94%	I/P:230 VAC O/P:FULL LOAD Ta:25℃	94.80%																																	
EFFICIENCY vs LOAD																																					



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 150%	I/P: 264VAC I/P: 230VAC I/P: 100VAC O/P: TESTING Ta:25°C	132.9%/ 264VAC 133.5%/ 230VAC 135.3%/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	58.6V/ 264VAC 58.6V/ 230VAC 58.6V/ 90VAC PROTECTION TYPE : Shot down o/p voltage,re-power on to recover
3	OVER TEMPERATURE PROTECTION	Protection type : Shut down o/p voltage,repower on to recover	I/P: 264VAC I/P: 90VAC O/P: FULL LOAD	O.T.P. Active Protection type : Shut down o/p voltage,repower on to recover
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264VAC I/P: 90VAC O/P: FULL LOAD	NO DAMAGE PROTECTION TYPE : Hiccup mode,recovers automatically after fault

			Ta:25°C	condition is removed
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COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q5 Rated : 12A/ 500 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) 460V (2)488 V (3)430 V
2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : 16A/ 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) 546V (2) 544V (3) 464V
3	P.F.C DIODE	D1 Rated : 9 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) 462V (2) 442V (3) 456V (4) 454V
4	Diode Peak Voltage	Q101 Rated : 30A/ 120 V	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) 108V (2) 10.3V (3) 108V
5	Input Capacitor Voltage	C5 Rated: : 150 μ / 420 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) 418V (2) 418V (3) 408V
6	Control IC Voltage Test	PWM IC U1 Rated : 38V -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) 27.2V (2) 20.2V (3) 20.1V (4) 28.9V

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: 6.84mA I/P-FG:8.18mA 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 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	MODEL : GST160A24-R7B 1. ROOM AMBIENT BURN-IN : 1HRS I/P : 230VAC O/P : FULL LOAD Ta= 19.2 °C 2. HIGH AMBIENT BURN-IN : 1HRS I/P : 230VAC O/P : FULL LOAD Ta= 51.9°C <table><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 19.2 °C</th><th>HIGH AMBIENT Ta= 51.9 °C</th></tr><tr><td>1</td><td>LF1</td><td>42.8°C</td><td>73.4°C</td></tr><tr><td>2</td><td>LF2</td><td>46.0°C</td><td>76.6°C</td></tr><tr><td>3</td><td>L1</td><td>49.0°C</td><td>79.1°C</td></tr><tr><td>4</td><td>L2</td><td>49.3°C</td><td>79.4°C</td></tr><tr><td>5</td><td>D2</td><td>49.4°C</td><td>79.4°C</td></tr><tr><td>6</td><td>C5</td><td>48.5°C</td><td>78.8°C</td></tr><tr><td>7</td><td>RTH2</td><td>51.5°C</td><td>82.0°C</td></tr><tr><td>8</td><td>T1 芯</td><td>60.0°C</td><td>88.8°C</td></tr><tr><td>9</td><td>C101</td><td>51.3°C</td><td>81.4°C</td></tr><tr><td>10</td><td>C102</td><td>52.8°C</td><td>82.9°C</td></tr><tr><td>11</td><td>BD1</td><td>50.7°C</td><td>80.8°C</td></tr><tr><td>12</td><td>Q1</td><td>49.7°C</td><td>79.9°C</td></tr><tr><td>13</td><td>D1</td><td>50.1°C</td><td>80.3°C</td></tr><tr><td>14</td><td>Q6</td><td>50.4°C</td><td>80.7°C</td></tr><tr><td>15</td><td>Q5</td><td>51.5°C</td><td>81.5°C</td></tr><tr><td>16</td><td>Q101</td><td>52.1°C</td><td>82.3°C</td></tr><tr><td>17</td><td>Q102</td><td>51.8°C</td><td>82.0°C</td></tr><tr><td>18</td><td>T1Coil</td><td>61.3°C</td><td>91.0°C</td></tr><tr><td>19</td><td>C13</td><td>54.9°C</td><td>84.4°C</td></tr><tr><td>20</td><td>ZNR1</td><td>45.5°C</td><td>76.0°C</td></tr><tr><td>21</td><td>C11</td><td>49.0°C</td><td>79.1°C</td></tr><tr><td>22</td><td>R5</td><td>49.5°C</td><td>79.6°C</td></tr><tr><td>23</td><td>C81</td><td>52.5°C</td><td>82.3°C</td></tr><tr><td>24</td><td>U101</td><td>54.7°C</td><td>84.6°C</td></tr></table>			NO	Position	ROOM AMBIENT Ta= 19.2 °C	HIGH AMBIENT Ta= 51.9 °C	1	LF1	42.8°C	73.4°C	2	LF2	46.0°C	76.6°C	3	L1	49.0°C	79.1°C	4	L2	49.3°C	79.4°C	5	D2	49.4°C	79.4°C	6	C5	48.5°C	78.8°C	7	RTH2	51.5°C	82.0°C	8	T1 芯	60.0°C	88.8°C	9	C101	51.3°C	81.4°C	10	C102	52.8°C	82.9°C	11	BD1	50.7°C	80.8°C	12	Q1	49.7°C	79.9°C	13	D1	50.1°C	80.3°C	14	Q6	50.4°C	80.7°C	15	Q5	51.5°C	81.5°C	16	Q101	52.1°C	82.3°C	17	Q102	51.8°C	82.0°C	18	T1Coil	61.3°C	91.0°C	19	C13	54.9°C	84.4°C	20	ZNR1	45.5°C	76.0°C	21	C11	49.0°C	79.1°C	22	R5	49.5°C	79.6°C	23	C81	52.5°C	82.3°C	24	U101	54.7°C	84.6°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= 50.4 °C HUMIDITY= 95 %R.H	TEST : OK																																																																																																				
5	TEMPERATURE COEFFICIENT	± 0.03 %/°C (0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.004 %/°C (0~50°C)																																																																																																				

6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -20℃~ +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 102 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) 305143HRS (2) 64627HRS (3) 87638HRS (4) 132804HRS
10	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE : 236.4KHRS	
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

2007/3/20 A50-S014