



Test Report: GST160A24-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

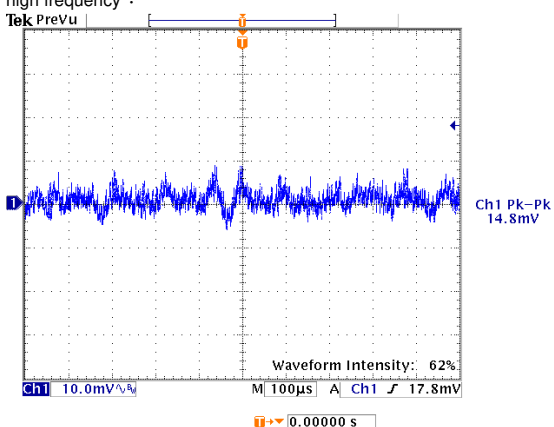
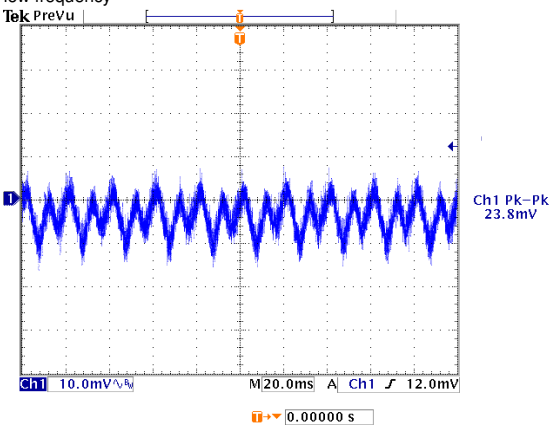
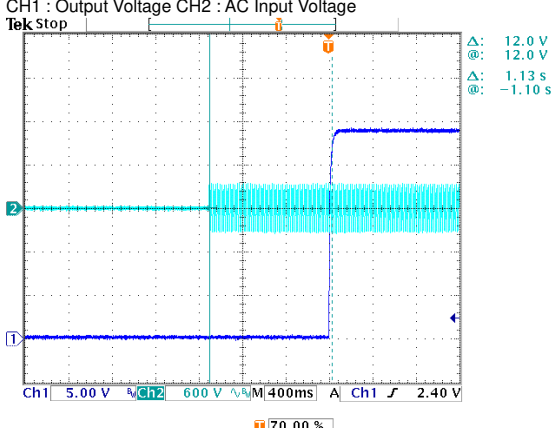
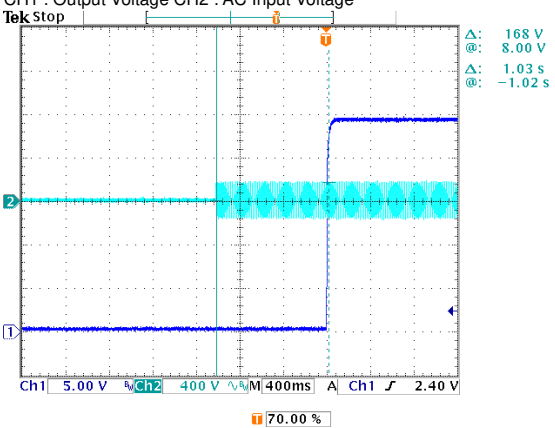
E.M.C. Test

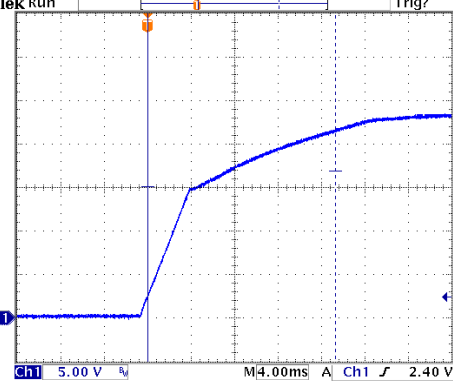
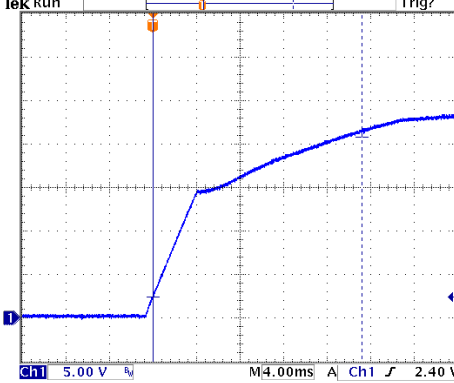
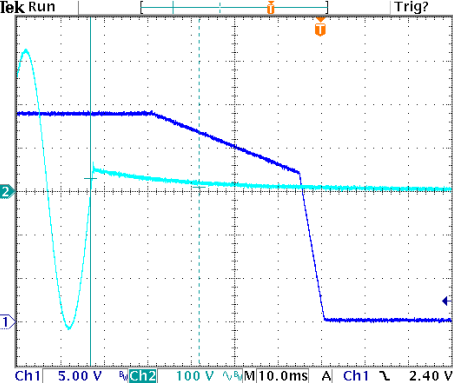
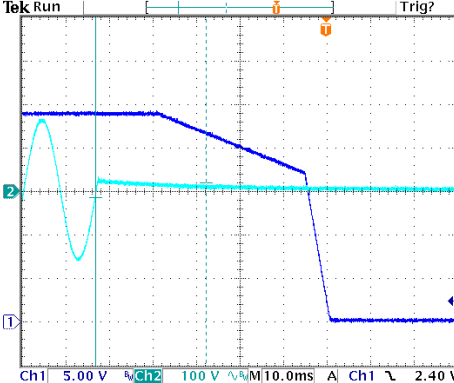
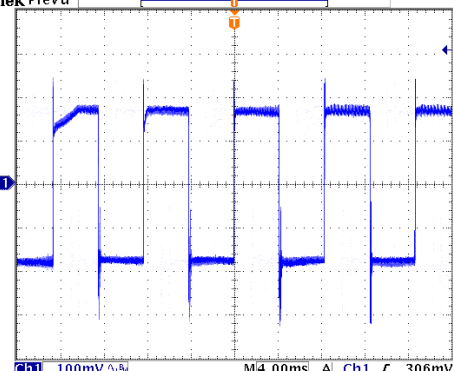
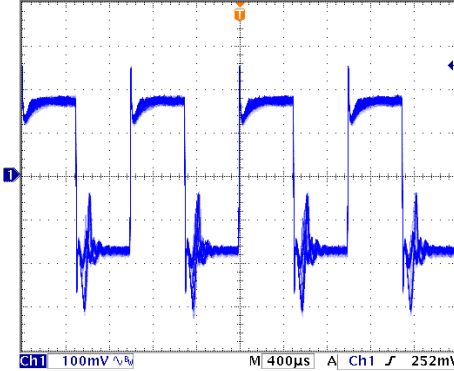
■ RELIABILITY TEST

ENVIRONMENT TEST

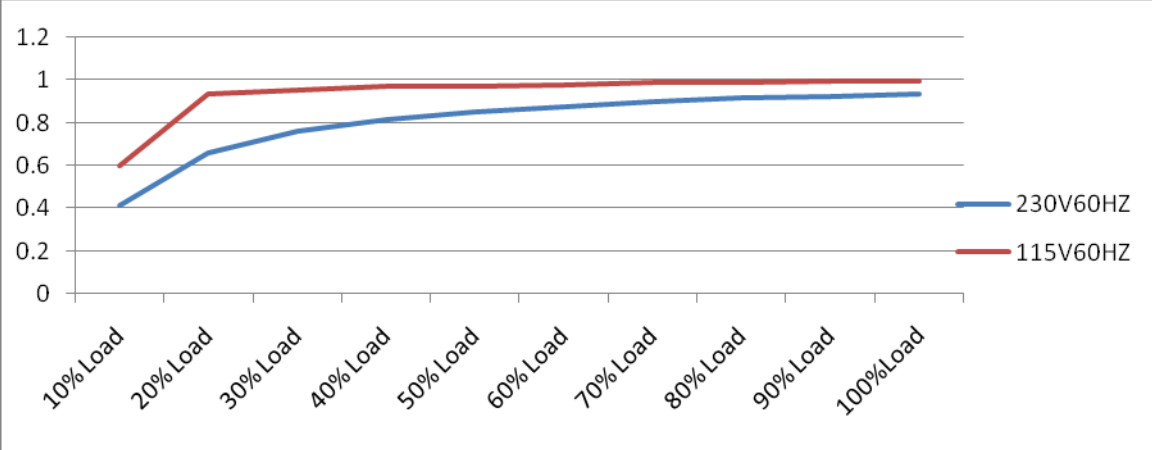
DESIGN VERIFY TEST

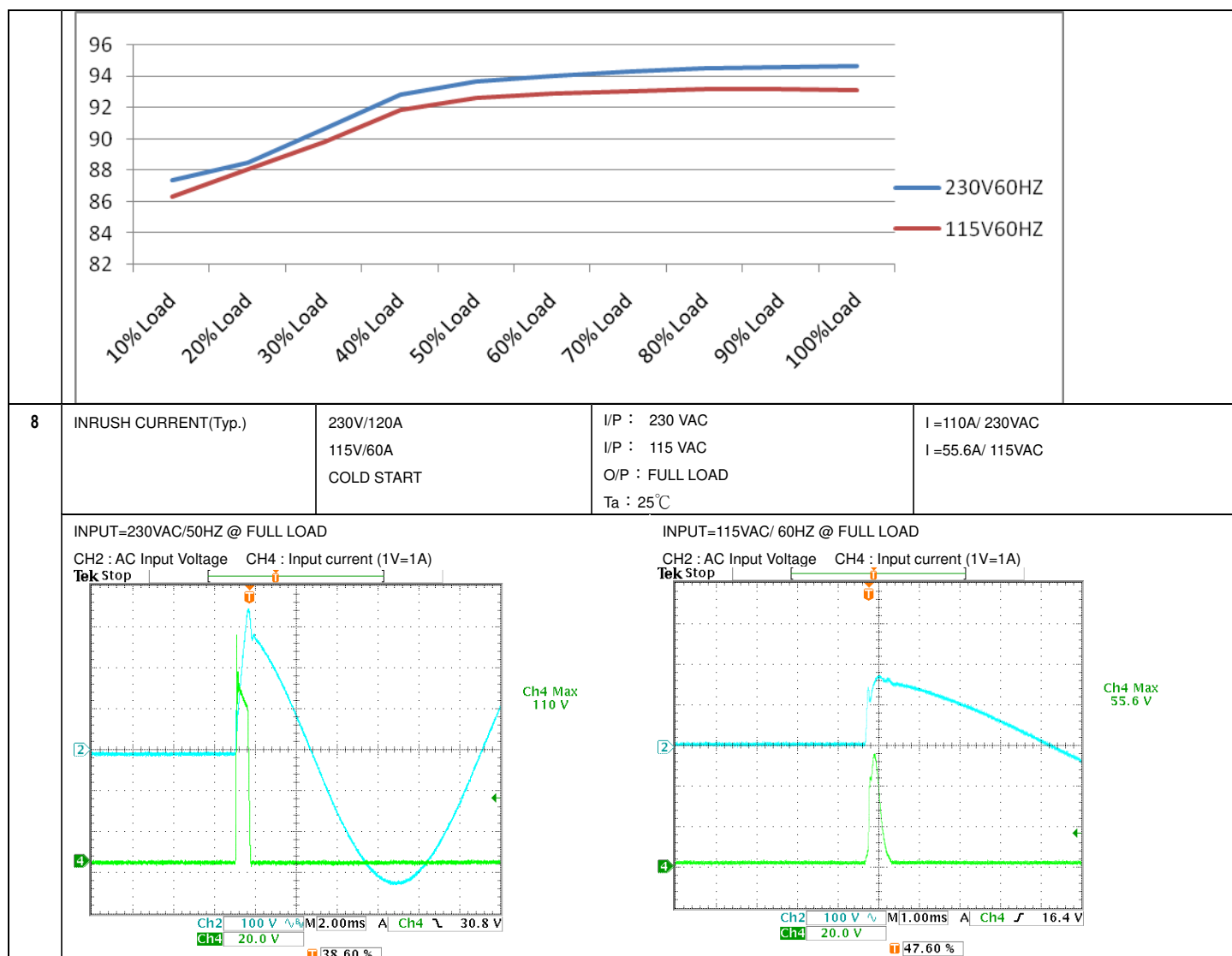
OUTPUT FUNCTION TEST

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: -1.13 %~- 0.042 %
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: -3%~ 3%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: -1.13 %~ -0.042 %
4	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	< ±5%
5	RIPPLE & NOISE(Max)	V1: 150mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 23.8mVp-p
high frequency :  Ch1 Pk-Pk 14.8mV Waveform Intensity: 62% Ch1 10.0mV/V M 100µs A Ch1 17.8mV 0.00000 s low frequency :  Ch1 Pk-Pk 23.8mV Ch1 10.0mV/V M 20.0ms A Ch1 12.0mV 0.00000 s				
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/ 1128ms 115VAC/ 1032ms
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage  Δ: 12.0 V @: 12.0 V Δ: 1.13 s @: -1.10 s Ch1 5.00 V Ch2 600 V M 400ms A Ch1 2.40 V 70.00 % INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage  Δ: 168 V @: 8.00 V Δ: 1.03 s @: -1.02 s Ch1 5.00 V Ch2 400 V M 400ms A Ch1 2.40 V 70.00 %				
7	RISE TIME (Max)	230VAC/50ms 115VAC/50ms	I/P : 230 VAC I/P : 115 VAC	230VAC/ 17.3 ms 115VAC/ 19.2 ms

		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	
			
8		30.00 %	
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 ms 115VAC/ 25.4 ms	
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: 2400mVp-p		I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	
		562mVp-p 564 mVp-p	
FULL /50% LOAD 50%DUTY / 120HZ Tek PreVu		FULL /50% LOAD 50%DUTY / 1KHZ Tek Stop	
			
Ch1 Max 238mV Ch1 Pk-Pk 562mV		Ch1 Max 250mV Ch1 Pk-Pk 564mV	
0.00000 s		0.00000 s	

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°C	78V~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°C	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°C	I = 0.774A/ 230VAC I =1.476A/ 115VAC
4	LEAKAGE CURRENT	<0.75 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.480 mA N-FG : 0.480 mA
5	NO LOAD CONSUMPTION	< 0.15W	I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25°C	< 0.1083 W < 0.1228 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°C	PF=0.953/230VAC PF=0.994/115VAC
P.F vs LOAD 				
7	EFFICIENCY(Typ.)	93%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	94.59%
	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	126.08%/ 264VAC 125.3%/ 230VAC 126.23%/100VAC PROTECTION TYPE : Hiccup mode,recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	25.2V~32.4V	I/P: 264VAC I/P: 230VAC I/P: 90VAC O/P: MIN LOAD Ta:25°C	28.2V/ 264VAC 28.2V/ 230VAC 28.2V/ 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,repower on to recover
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 : 12 A/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℃	VDS: (1) 458V (2) 464V (3)424V
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) 514V (2) 518V (3) 462V
3	P.F.C DIODE	D1 Rated : 9 A/ 600V	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) 436V (2) 432V (3) 432V (4) 432V
4	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) Full Load Continue Ta:25℃	Q101: VDS: (1) 57.2V (2) 6.40V (3) 56.4V
5	Input Capacitor Voltage	C5 Rated: : 150 μ / 420 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)417V (2)417V (3) 410V
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℃	U1: (1) 25.8V (2) 20.2V (3) 20.2V (4) 29.0V

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:3.6KVAC/min I/P-FG:2.4KVAC/min Ta:25℃	I/P-O/P: 6.94mA I/P-FG:7.94mA 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	IEC61000-4-5 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 : GST160A24-R7B 1. ROOM AMBIENT BURN-IN : 1HRS I/P : 230VAC O/P : FULL LOAD Ta= 19.2 ℃ 2. HIGH AMBIENT BURN-IN : 1HRS I/P : 230VAC O/P : FULL LOAD Ta= 51.9℃ <table><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 19.2 ℃</th><th>HIGH AMBIENT Ta= 51.9 ℃</th></tr><tr><td>1</td><td>LF1</td><td>42.8℃</td><td>73.4℃</td></tr><tr><td>2</td><td>LF2</td><td>46.0℃</td><td>76.6℃</td></tr><tr><td>3</td><td>L1</td><td>49.0℃</td><td>79.1℃</td></tr><tr><td>4</td><td>L2</td><td>49.3℃</td><td>79.4℃</td></tr><tr><td>5</td><td>D2</td><td>49.4℃</td><td>79.4℃</td></tr><tr><td>6</td><td>C5</td><td>48.5℃</td><td>78.8℃</td></tr><tr><td>7</td><td>RTH2</td><td>51.5℃</td><td>82.0℃</td></tr><tr><td>8</td><td>T1 芯</td><td>60.0℃</td><td>88.8℃</td></tr><tr><td>9</td><td>C101</td><td>51.3℃</td><td>81.4℃</td></tr><tr><td>10</td><td>C102</td><td>52.8℃</td><td>82.9℃</td></tr><tr><td>11</td><td>BD1</td><td>50.7℃</td><td>80.8℃</td></tr><tr><td>12</td><td>Q1</td><td>49.7℃</td><td>79.9℃</td></tr><tr><td>13</td><td>D1</td><td>50.1℃</td><td>80.3℃</td></tr><tr><td>14</td><td>Q6</td><td>50.4℃</td><td>80.7℃</td></tr><tr><td>15</td><td>Q5</td><td>51.5℃</td><td>81.5℃</td></tr><tr><td>16</td><td>Q101</td><td>52.1℃</td><td>82.3℃</td></tr><tr><td>17</td><td>Q102</td><td>51.8℃</td><td>82.0℃</td></tr><tr><td>18</td><td>T1Coil</td><td>61.3℃</td><td>91.0℃</td></tr><tr><td>19</td><td>C13</td><td>54.9℃</td><td>84.4℃</td></tr><tr><td>20</td><td>ZNR1</td><td>45.5℃</td><td>76.0℃</td></tr><tr><td>21</td><td>C11</td><td>49.0℃</td><td>79.1℃</td></tr><tr><td>22</td><td>R5</td><td>49.5℃</td><td>79.6℃</td></tr><tr><td>23</td><td>C81</td><td>52.5℃</td><td>82.3℃</td></tr><tr><td>24</td><td>U101</td><td>54.7℃</td><td>84.6℃</td></tr></table>			NO	Position	ROOM AMBIENT Ta= 19.2 ℃	HIGH AMBIENT Ta= 51.9 ℃	1	LF1	42.8℃	73.4℃	2	LF2	46.0℃	76.6℃	3	L1	49.0℃	79.1℃	4	L2	49.3℃	79.4℃	5	D2	49.4℃	79.4℃	6	C5	48.5℃	78.8℃	7	RTH2	51.5℃	82.0℃	8	T1 芯	60.0℃	88.8℃	9	C101	51.3℃	81.4℃	10	C102	52.8℃	82.9℃	11	BD1	50.7℃	80.8℃	12	Q1	49.7℃	79.9℃	13	D1	50.1℃	80.3℃	14	Q6	50.4℃	80.7℃	15	Q5	51.5℃	81.5℃	16	Q101	52.1℃	82.3℃	17	Q102	51.8℃	82.0℃	18	T1Coil	61.3℃	91.0℃	19	C13	54.9℃	84.4℃	20	ZNR1	45.5℃	76.0℃	21	C11	49.0℃	79.1℃	22	R5	49.5℃	79.6℃	23	C81	52.5℃	82.3℃	24	U101	54.7℃	84.6℃
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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 ℃	TEST : OK																																																																																																				
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 ℃ NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 50.4 ℃ HUMIDITY= 95 %R.H	TEST : OK																																																																																																				
5	TEMPERATURE COEFFICIENT	± 0.03 %/℃ (0~50℃)	I/P : 230 VAC O/P : FULL LOAD	± 0.004 %/℃ (0~50℃)																																																																																																				

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 30,000 hours @ TA 50℃	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

2007/3/20 A50-S014