



Test Report: GST160A12-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

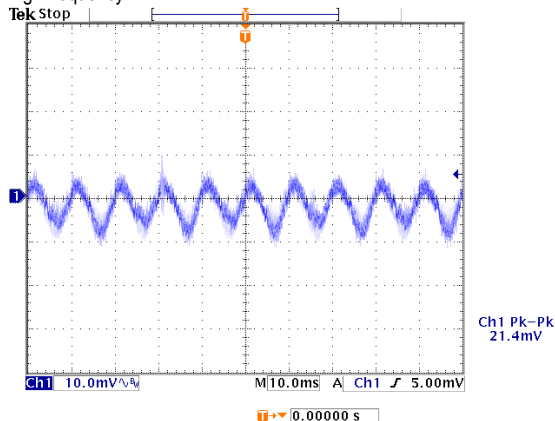
ENVIRONMENT TEST

DESIGN VERIFY TEST

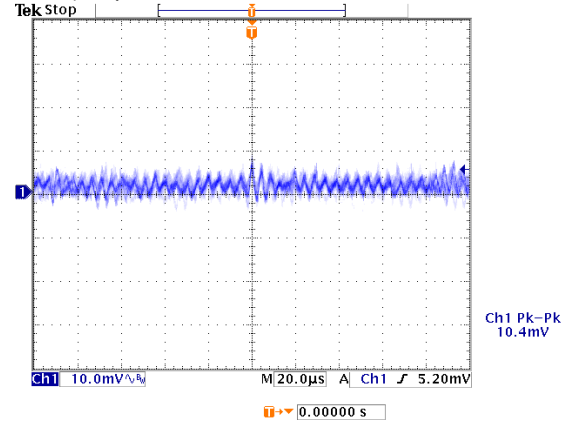
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -5%~ 5%	I/P: 100VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.017 %~ 0.92 %
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: -0.017%~ 0.92 %
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: 21.4mVp-p

high frequency :



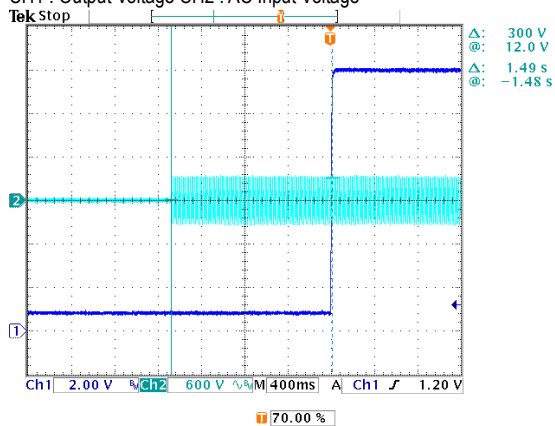
low frequency :



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/ 1488ms 115VAC/ 1628ms
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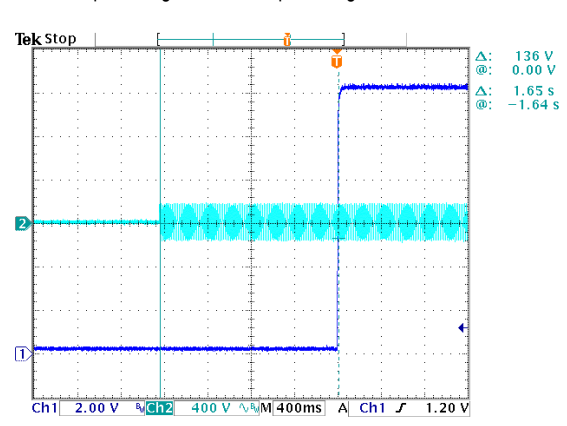
INPUT=230VAC/50HZ @ FULL LOAD

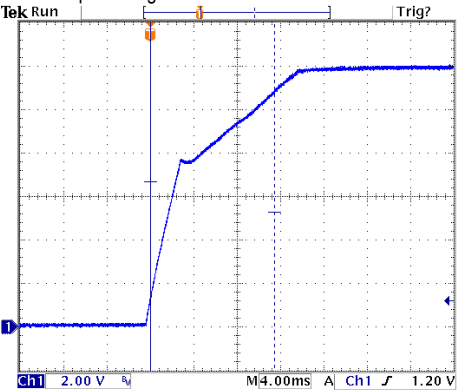
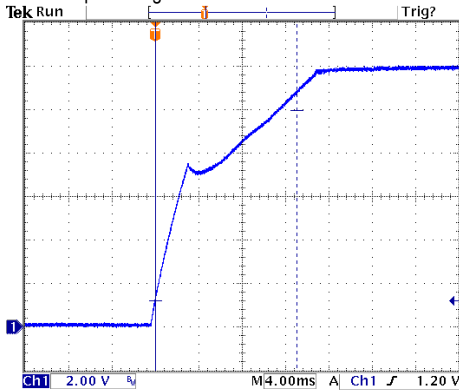
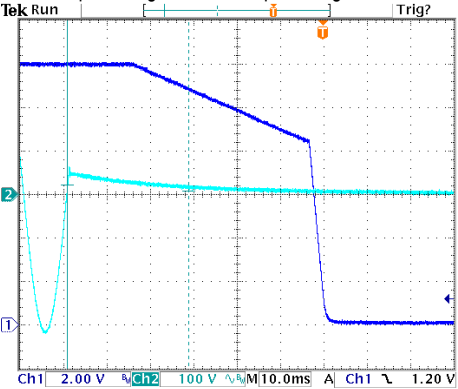
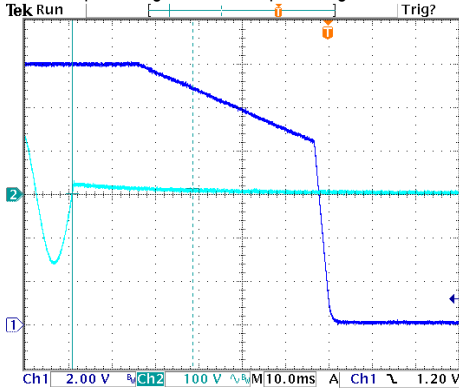
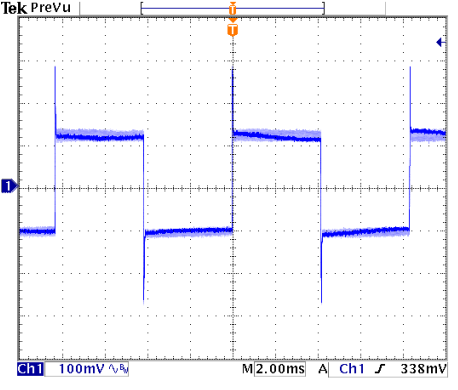
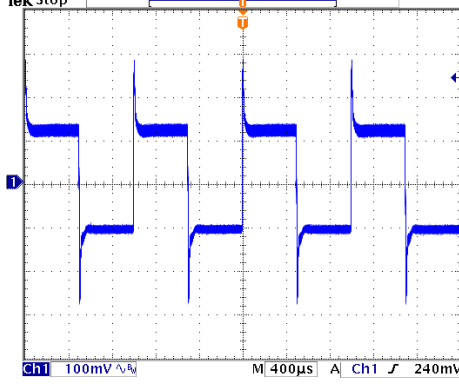
CH1 : Output Voltage CH2 : AC Input Voltage



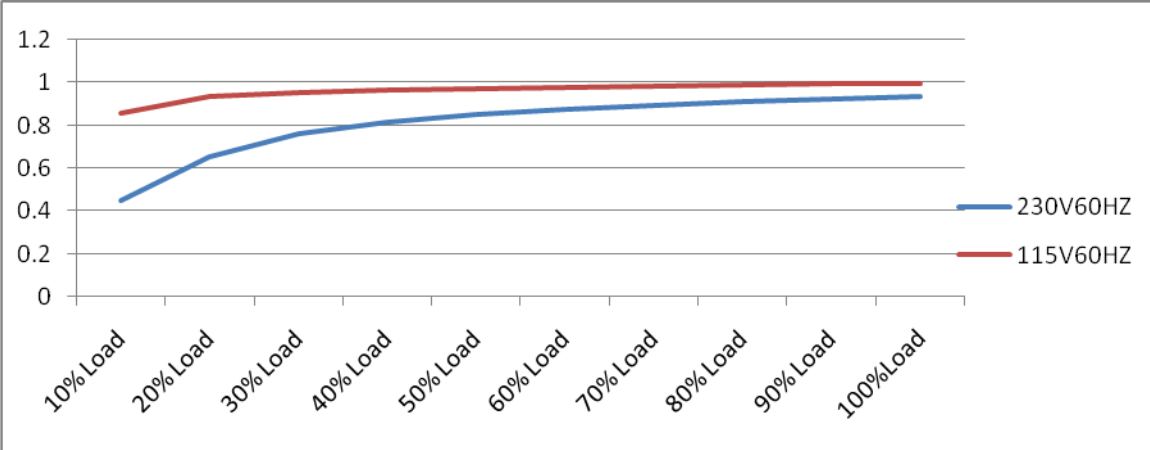
INPUT=115VAC/60HZ @ FULL LOAD

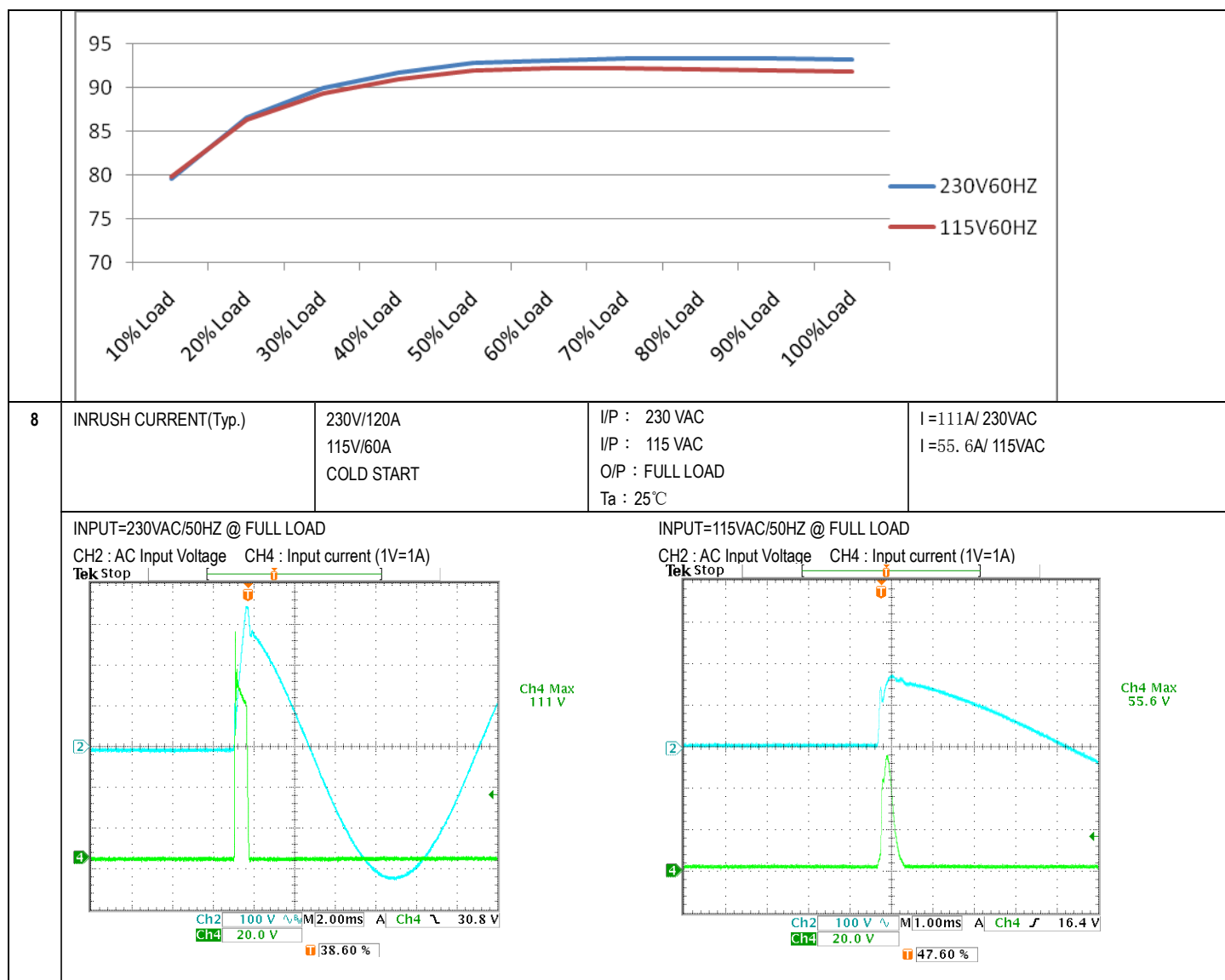
CH1 : Output Voltage CH2 : AC Input Voltage



7	RISE TIME (Max)	230VAC/50ms 115VAC/50ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 11.4 ms 115VAC/ 13 ms
	<div> <div> INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage </div> <div>  </div> </div>			
	<div> <div> INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage </div> <div>  </div> </div>			
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/ 28 ms 115VAC/ 27.8 ms
	<div> <div> INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage </div> <div>  </div> </div>			
	<div> <div> INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage </div> <div>  </div> </div>			
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	554mVp-p 548mVp-p
	<div> <div> FULL /50% LOAD 50%DUTY / 120HZ </div> <div>  </div> </div>			
	<div> <div> FULL /50% LOAD 50%DUTY / 1KHZ </div> <div>  </div> </div>			

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℃	79V~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=0.683A/ 230VAC I=1.302A/ 115VAC																																	
4	LEAKAGE CURRENT	<0.75 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25℃	L-FG : 0.469 mA N-FG : 0.469 mA																																	
5	NO LOAD CONSUMPTION	< 0.15W	I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25℃	< 0.1056 W < 0.1221 W																																	
6	POWER FACTOR (Typ.)	0.93/ 230VAC 0.98/115VAC	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25℃	PF= 0.939/230VAC PF= 0.993/115VAC																																	
<p>P.F vs LOAD</p>  <table><caption>P.F vs LOAD Data</caption><thead><tr><th>Load</th><th>230V60HZ P.F</th><th>115V60HZ P.F</th></tr></thead><tbody><tr><td>10% Load</td><td>0.45</td><td>0.85</td></tr><tr><td>20% Load</td><td>0.65</td><td>0.90</td></tr><tr><td>30% Load</td><td>0.75</td><td>0.92</td></tr><tr><td>40% Load</td><td>0.80</td><td>0.93</td></tr><tr><td>50% Load</td><td>0.83</td><td>0.94</td></tr><tr><td>60% Load</td><td>0.85</td><td>0.95</td></tr><tr><td>70% Load</td><td>0.87</td><td>0.96</td></tr><tr><td>80% Load</td><td>0.89</td><td>0.97</td></tr><tr><td>90% Load</td><td>0.91</td><td>0.98</td></tr><tr><td>100% Load</td><td>0.95</td><td>0.99</td></tr></tbody></table>					Load	230V60HZ P.F	115V60HZ P.F	10% Load	0.45	0.85	20% Load	0.65	0.90	30% Load	0.75	0.92	40% Load	0.80	0.93	50% Load	0.83	0.94	60% Load	0.85	0.95	70% Load	0.87	0.96	80% Load	0.89	0.97	90% Load	0.91	0.98	100% Load	0.95	0.99
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7	EFFICIENCY(Typ.)	90%	I/P:230 VAC O/P:FULL LOAD Ta:25℃	92.54 %																																	
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	126.96%/ 264VAC 127.73%/ 230VAC 127.22%/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	13.9V/ 264VAC 13.9V/ 230VAC 13.9V/ 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 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 : 12A/ 500V	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) 456V (2) 480V (3) 428V
2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : 13.8 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) 574V (2) 574V (3) 460V
3	P.F.C DIODE	D1 Rated : 9A/ 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 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) 450V (2) 447V (3) 432V (4) 444V (1) 426V (2) 424V (3) 432V (4) 428V
4	Diode Peak Voltage	Q101 Rated : 120 A/40 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)29.6 V (2) 10.4V (3) 29.4V
5	Input Capacitor Voltage	C5 Rated: : 150 μ / 420V 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) 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°C	U1: (1) 25.0V (2) 20.2V (3) 20.2V (4) 27.6V

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC/min I/P-FG:2KVAC	I/P-O/P: 3.6 KVAC/min I/P-FG:2.4KVAC Ta:25°C	I/P-O/P: 6.94mA I/P-FG:8.07mA 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 : GST160A12-R7B</div> <div>1. ROOM AMBIENT BURN-IN : 1HRS</div> <div>I/P : 230VAC O/P : FULL LOAD Ta= 21.3 ℃</div> <div>2. HIGH AMBIENT BURN-IN : 1HRS</div> <div>I/P : 230VAC O/P : FULL LOAD Ta= 52.8℃</div> <table><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 21.3 ℃</th><th>HIGH AMBIENT Ta= 52.8 ℃</th></tr><tr><td>1</td><td>LF1</td><td>43.6℃</td><td>74.6℃</td></tr><tr><td>2</td><td>LF2</td><td>47.0℃</td><td>78.0℃</td></tr><tr><td>3</td><td>L1</td><td>49.3℃</td><td>79.9℃</td></tr><tr><td>4</td><td>L2</td><td>50.1℃</td><td>80.9℃</td></tr><tr><td>5</td><td>D2</td><td>50.7℃</td><td>81.3℃</td></tr><tr><td>6</td><td>C5</td><td>51.8℃</td><td>82.2℃</td></tr><tr><td>7</td><td>RTH2</td><td>53.7℃</td><td>84.7℃</td></tr><tr><td>8</td><td>T1 芯</td><td>60.9℃</td><td>91.1℃</td></tr><tr><td>9</td><td>C101</td><td>62.3℃</td><td>92.9℃</td></tr><tr><td>10</td><td>C102</td><td>64.5℃</td><td>94.9℃</td></tr><tr><td>11</td><td>BD1</td><td>51.6℃</td><td>82.1℃</td></tr><tr><td>12</td><td>Q1</td><td>51.1℃</td><td>81.7℃</td></tr><tr><td>13</td><td>D1</td><td>51.8℃</td><td>82.4℃</td></tr><tr><td>14</td><td>Q6</td><td>51.7℃</td><td>82.3℃</td></tr><tr><td>15</td><td>Q5</td><td>52.2℃</td><td>83.0℃</td></tr><tr><td>16</td><td>Q101</td><td>57.0℃</td><td>87.6℃</td></tr><tr><td>17</td><td>Q102</td><td>58.0℃</td><td>88.8℃</td></tr><tr><td>18</td><td>U1</td><td>57.8℃</td><td>88.0℃</td></tr><tr><td>19</td><td>T1Coil</td><td>56.5℃</td><td>86.7℃</td></tr><tr><td>20</td><td>C13</td><td>71.5℃</td><td>99.3℃</td></tr><tr><td>21</td><td>ZNR1</td><td>45.9℃</td><td>77.0℃</td></tr><tr><td>22</td><td>C11</td><td>50.1℃</td><td>80.7℃</td></tr><tr><td>23</td><td>R5</td><td>50.7℃</td><td>81.2℃</td></tr><tr><td>24</td><td>C81</td><td>54.0℃</td><td>84.4℃</td></tr><tr><td>25</td><td>U101</td><td>59.4℃</td><td>89.4℃</td></tr></table>			NO	Position	ROOM AMBIENT Ta= 21.3 ℃	HIGH AMBIENT Ta= 52.8 ℃	1	LF1	43.6℃	74.6℃	2	LF2	47.0℃	78.0℃	3	L1	49.3℃	79.9℃	4	L2	50.1℃	80.9℃	5	D2	50.7℃	81.3℃	6	C5	51.8℃	82.2℃	7	RTH2	53.7℃	84.7℃	8	T1 芯	60.9℃	91.1℃	9	C101	62.3℃	92.9℃	10	C102	64.5℃	94.9℃	11	BD1	51.6℃	82.1℃	12	Q1	51.1℃	81.7℃	13	D1	51.8℃	82.4℃	14	Q6	51.7℃	82.3℃	15	Q5	52.2℃	83.0℃	16	Q101	57.0℃	87.6℃	17	Q102	58.0℃	88.8℃	18	U1	57.8℃	88.0℃	19	T1Coil	56.5℃	86.7℃	20	C13	71.5℃	99.3℃	21	ZNR1	45.9℃	77.0℃	22	C11	50.1℃	80.7℃	23	R5	50.7℃	81.2℃	24	C81	54.0℃	84.4℃	25	U101	59.4℃	89.4℃
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25	U101	59.4℃	89.4℃																																																																																																									
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	± 0.0083 %/℃ (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) 154993HRS (2) 29620HRS (3) 67945HRS (4) 132990HRS
10	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE : 236.4 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

2007/3/20 A50-S014