



Test Report: GST160A36-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

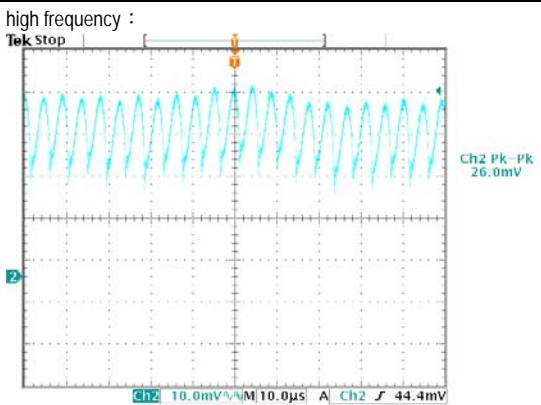
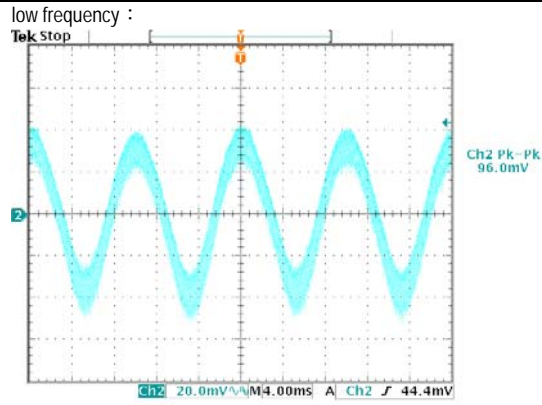
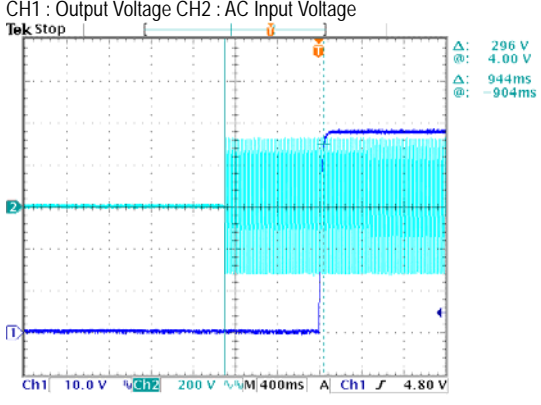
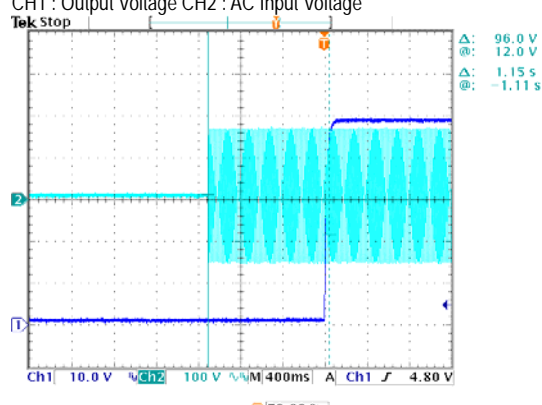
E.M.C. Test

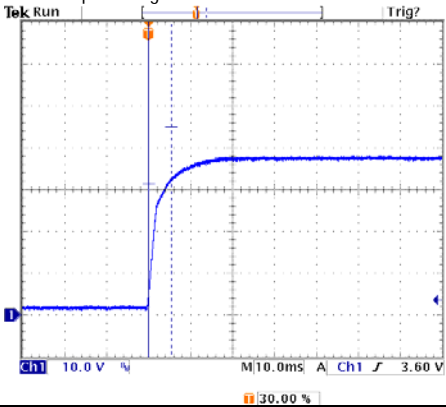
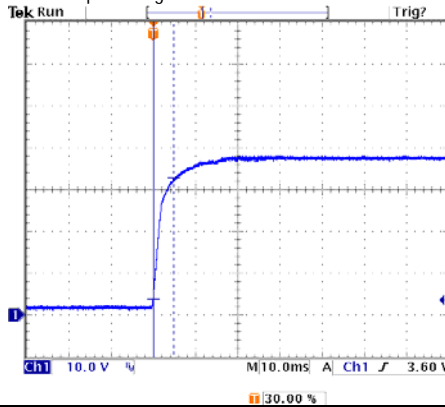
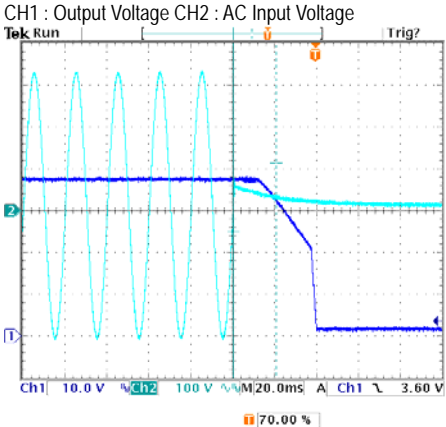
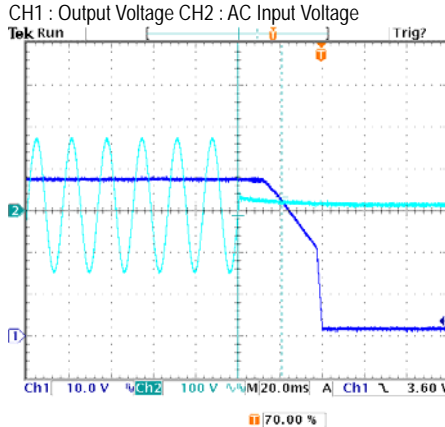
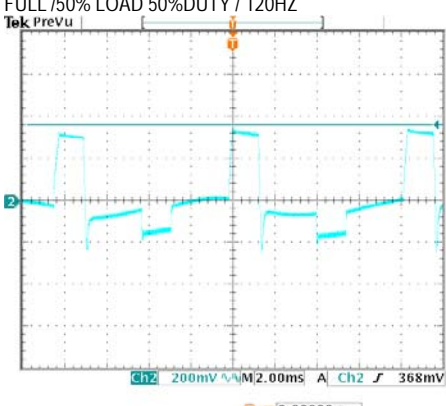
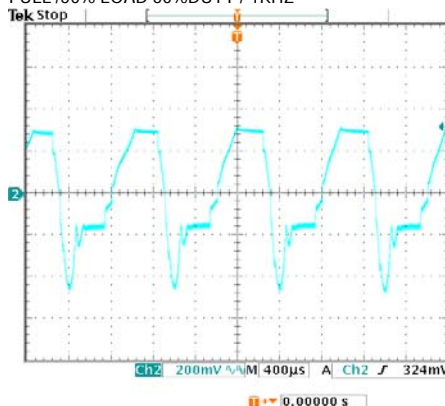
■ RELIABILITY TEST

ENVIRONMENT TEST

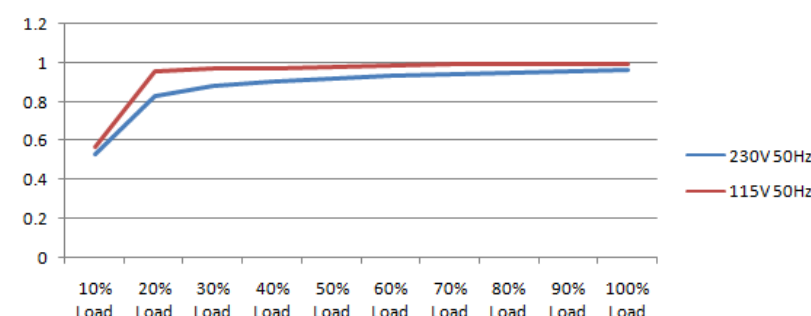
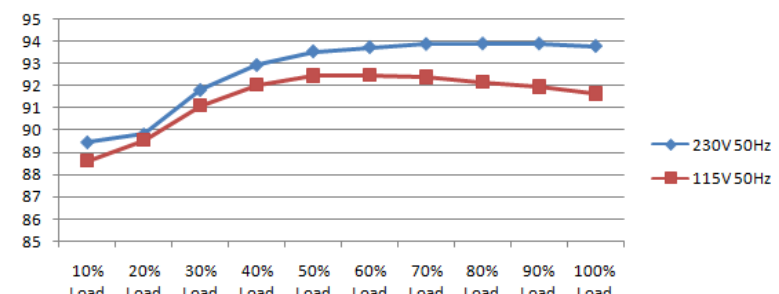
DESIGN VERIFY TEST

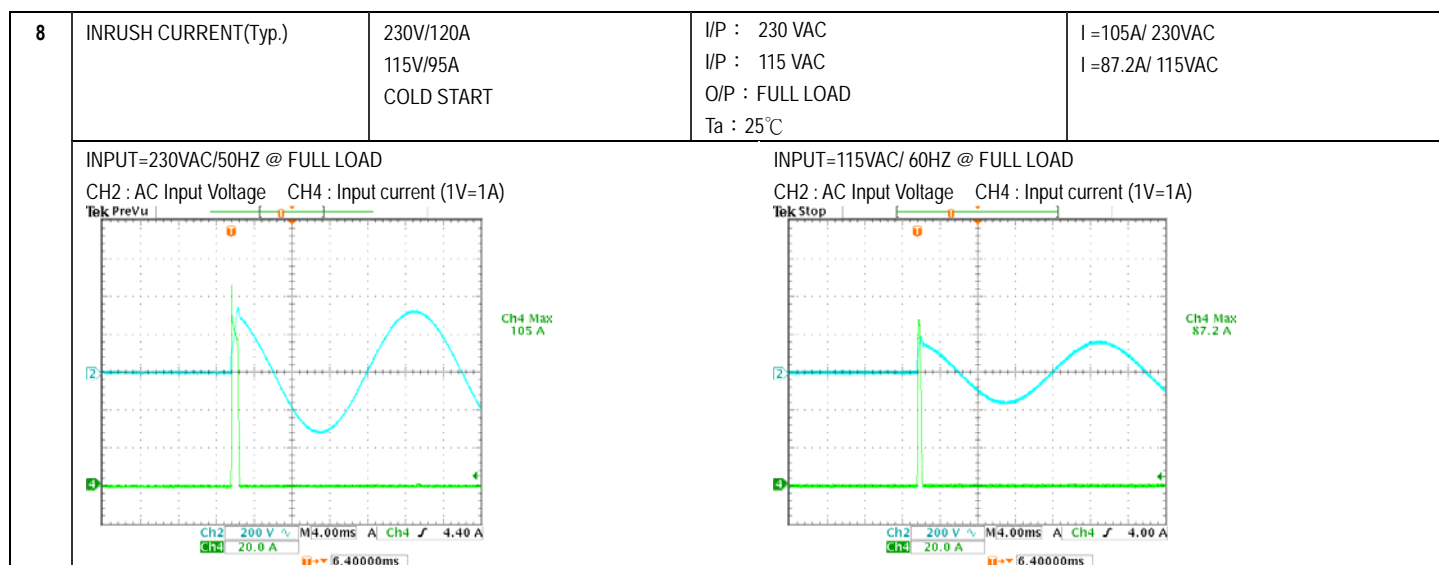
OUTPUT FUNCTION TEST

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: -0.072 %~0.17 %
2	LINE REGULATION (Max)	V1: -1%~ 1%	I/P: 100VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1: -0.023 %~ 0.023%
3	LOAD REGULATION(Max)	V1: -3%~ 3%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: -0.072 %~ 0.17 %
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: 96 mVp-p
<div> <div> <p>high frequency :</p>  </div> <div> <p>low frequency :</p>  </div> </div>				
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/ 944 ms 115VAC/ 1150ms
<div> <div> <p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>  </div> <div> <p>INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>  </div> </div>				
7	RISE TIME (Max)	230VAC/50ms 115VAC/50ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 5. 4 ms 115VAC/ 4. 8 ms

		<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1 : Output Voltage</p> 		<p>INPUT=115VAC/60HZ @ FULL LOAD</p> <p>CH1 : Output Voltage</p> 	
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/ 20. 4 ms 115VAC/20. 8 ms	
		<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1 : Output Voltage CH2 : AC Input Voltage</p> 		<p>INPUT=115VAC/60HZ @ FULL LOAD</p> <p>CH1 : Output Voltage CH2 : AC Input Voltage</p> 	
9	DYNAMIC LOAD	V1: 3600mVp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	596mVp-p 784mVp-p	
		<p>FULL /50% LOAD 50%DUTY / 120HZ</p> 		<p>FULL /50% LOAD 50%DUTY / 1KHZ</p> 	

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																	
1	INPUT VOLTAGE RANGE	85VAC~264VAC	I/P:TESTING O/P:FULL LOAD Ta:25℃	80 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. 772A/ 230VAC I =1. 501A/ 115VAC																																	
4	LEAKAGE CURRENT	<0.75 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25℃	L-FG : 0. 63 mA N-FG : 0. 63 mA																																	
5	NO LOAD CONSUMPTION	< 0.15W	I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25℃	< 0.114 W < 0.132 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=0.958/230VAC PF=0.994/115VAC																																	
<p>P.F vs LOAD</p>  <table><caption>P.F vs LOAD Data (Estimated)</caption><thead><tr><th>Load (%)</th><th>230V 50Hz P.F</th><th>115V 50Hz P.F</th></tr></thead><tbody><tr><td>10%</td><td>0.55</td><td>0.55</td></tr><tr><td>20%</td><td>0.85</td><td>1.00</td></tr><tr><td>30%</td><td>0.88</td><td>1.00</td></tr><tr><td>40%</td><td>0.90</td><td>1.00</td></tr><tr><td>50%</td><td>0.92</td><td>1.00</td></tr><tr><td>60%</td><td>0.94</td><td>1.00</td></tr><tr><td>70%</td><td>0.95</td><td>1.00</td></tr><tr><td>80%</td><td>0.96</td><td>1.00</td></tr><tr><td>90%</td><td>0.97</td><td>1.00</td></tr><tr><td>100%</td><td>0.98</td><td>1.00</td></tr></tbody></table>					Load (%)	230V 50Hz P.F	115V 50Hz P.F	10%	0.55	0.55	20%	0.85	1.00	30%	0.88	1.00	40%	0.90	1.00	50%	0.92	1.00	60%	0.94	1.00	70%	0.95	1.00	80%	0.96	1.00	90%	0.97	1.00	100%	0.98	1.00
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7	EFFICIENCY(Typ.)	92%	I/P:230 VAC O/P:FULL LOAD Ta:25℃	93. 60%																																	
<p>EFFICIENCY vs LOAD</p>  <table><caption>EFFICIENCY vs LOAD Data (Estimated)</caption><thead><tr><th>Load (%)</th><th>230V 50Hz Efficiency (%)</th><th>115V 50Hz Efficiency (%)</th></tr></thead><tbody><tr><td>10%</td><td>89.5</td><td>88.5</td></tr><tr><td>20%</td><td>92.5</td><td>91.5</td></tr><tr><td>30%</td><td>93.5</td><td>92.5</td></tr><tr><td>40%</td><td>94.0</td><td>93.0</td></tr><tr><td>50%</td><td>94.2</td><td>93.2</td></tr><tr><td>60%</td><td>94.3</td><td>93.3</td></tr><tr><td>70%</td><td>94.4</td><td>93.4</td></tr><tr><td>80%</td><td>94.5</td><td>93.5</td></tr><tr><td>90%</td><td>94.5</td><td>93.5</td></tr><tr><td>100%</td><td>94.5</td><td>92.5</td></tr></tbody></table>					Load (%)	230V 50Hz Efficiency (%)	115V 50Hz Efficiency (%)	10%	89.5	88.5	20%	92.5	91.5	30%	93.5	92.5	40%	94.0	93.0	50%	94.2	93.2	60%	94.3	93.3	70%	94.4	93.4	80%	94.5	93.5	90%	94.5	93.5	100%	94.5	92.5
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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	133.9%/ 264VAC 135.8%/ 230VAC 135.4%/100VAC PROTECTION TYPE : Hiccup mode,recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	37.8V~48.6V	I/P: 264VAC I/P: 230VAC I/P: 90VAC O/P: MIN LOAD Ta:25°C	42.7V/ 264VAC 42.7V/ 230VAC 42.7V/ 90VAC PROTECTION TYPE : Hiccup mode@10%load
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/ 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) 464V (2) 484 V (3) 432 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) 542V (2) 540V (3) 468V

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) 472V (2) 458V (3) 464V (4) 458V
4	Diode Peak Voltage	Q101 Rated : 30A/ 100 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) 90V (2) 9.8V (3) 90V
5	Input Capacitor Voltage	C5 Rated: : 150 μ / 420 V	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) 416V (2) 416V (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) 27.6V (2) 20.8V (3) 20.4V (4) 28.7V

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: 6.92mA I/P-FG:8.32mA 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 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 °C			
		2. HIGH AMBIENT BURN-IN : 1HRS I/P : 230VAC O/P : FULL LOAD Ta= 51.9°C			
		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		
2	OVER LOAD BURN-IN TEST	NO DAMAGE	I/P : 230 VAC	TEST : OK	
		1 HOUR (MIN)	O/P : 130 % LOAD Ta : 25°C		
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°C~ +85°C 2. Temperature change rate : 25°C / 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°C~ +70°C 2. Temperature change rate : 25°C / 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 102 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) 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°C		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

2007/3/20 A50-S014