



**Features:**

- Universal AC input / Full range
- Built-in active PFC function
- Protections: Short circuit / Overload / Over voltage / Over temperature
- 5"x3" compact size
- Free air convection for 100W and 145W with 20.5 CFM forced air
- With power good and fail signal output
- No load power consumption under 0.75W by PS-ON control (G model)
- Standby 5V@0.8A with fan, @0.6A without fan (G model)
- 3 years warranty

**G: With 5Vsb & no load power consumption < 0.75 W**      RPT **G** - 160A  
**Blank: Basic function (without 5Vsb)**

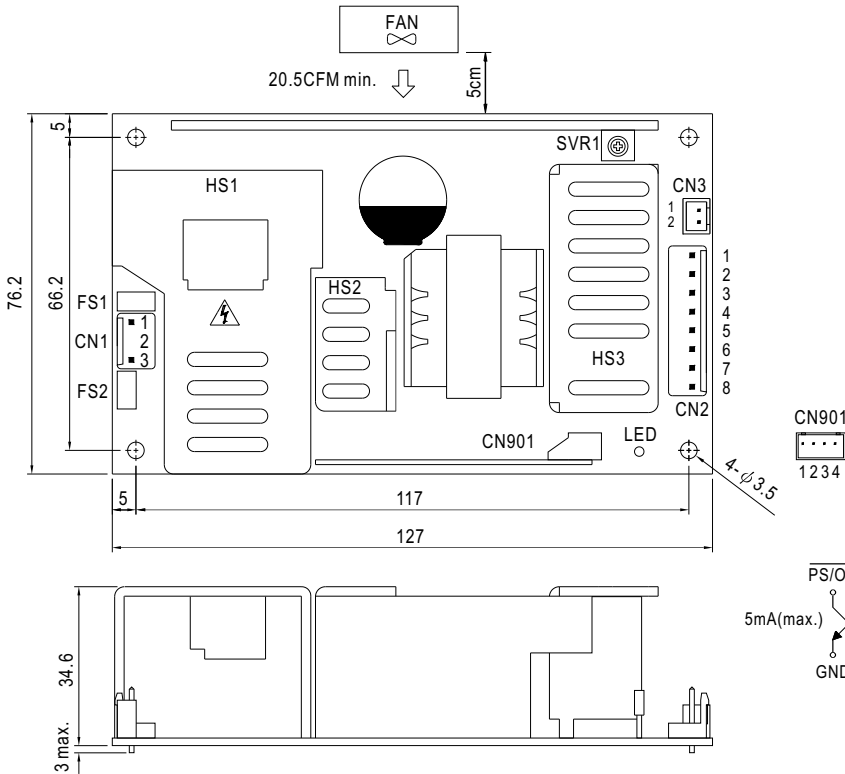


**SPECIFICATION**

MODEL	RPT□-160A			RPT□-160B			RPT□-160C			RPT□-160D							
OUTPUT NUMBER	CH1	CH2	CH3	CH1	CH2	CH3	CH1	CH2	CH3	CH1	CH2	CH3					
<b>DC VOLTAGE</b>	5V	12V	-5V	5V	12V	-12V	5V	15V	-15V	5V	12V	24V					
<b>RATED CURRENT (20.5CFM)</b>	14A	5.5A	1A	14A	5A	1A	14A	3.6A	1A	11A	5A	1.2A					
<b>CURRENT RANGE (convection)</b>	0.6 ~ 9A	0.2 ~ 3.8A	0.1 ~ 0.6A	0.6 ~ 9A	0.2 ~ 3.4A	0.1 ~ 0.8A	0.6 ~ 9A	0.1 ~ 2.6A	0.1 ~ 0.8A	0.3 ~ 8A	0.2 ~ 2.6A	0.15 ~ 1A					
<b>CURRENT RANGE (20.5CFM)</b>	0.6 ~ 14A	0.2 ~ 5.5A	0.1 ~ 1A	0.6 ~ 14A	0.2 ~ 5A	0.1 ~ 1A	0.6 ~ 14A	0.1 ~ 3.6A	0.1 ~ 1A	0.3 ~ 11A	0.2 ~ 5A	0.15 ~ 1.2A					
<b>RATED POWER (convection) Note.7</b>	98.6W			98.4W			99W			98.2W							
<b>RATED POWER (20.5CFM) Note.8</b>	145W			146W			143W			147.8W							
<b>RIPPLE &amp; NOISE (max.) Note.2</b>	100mVp-p	120mVp-p	120mVp-p	100mVp-p	120mVp-p	120mVp-p	100mVp-p	150mVp-p	150mVp-p	100mVp-p	120mVp-p	200mVp-p					
<b>VOLTAGE ADJ. RANGE</b>	CH1:5 ~ 5.5V																
<b>VOLTAGE TOLERANCE Note.3</b>	±2.0%	±5.0%	-5,+7%	±2.0%	±5.0%	-4,+5%	±2.0%	±4.0%	+8.0%	±2.0%	±5.0%	+7,-5%					
<b>LINE REGULATION</b>	±0.5%	±1.0%	±1.0%	±0.5%	±1.0%	±1.0%	±0.5%	±1.0%	±1.0%	±0.5%	±1.0%	±1.0%					
<b>LOAD REGULATION</b>	±1.5%	±3.0%	-5,+6%	±1.5%	±3.0%	-4,+5%	±2.0%	±3.0%	±8.0%	±1.5%	±3.0%	-3,+4%					
<b>SETUP, RISE TIME</b>	1200ms, 30ms/230VAC			2500ms, 30ms/115VAC at full load													
<b>HOLD UP TIME (Typ.)</b>	16ms/230VAC/115VAC at full load																
<b>VOLTAGE RANGE Note.6</b>	90 ~ 264VAC		127 ~ 370VDC														
<b>FREQUENCY RANGE</b>	47 ~ 63Hz																
<b>POWER FACTOR (Typ.)</b>	PF>0.93/230VAC			PF>0.98/115VAC at full load													
<b>EFFICIENCY (Typ.)</b>	84%			84%			83%			83%							
<b>AC CURRENT (Typ.)</b>	1.8A/115VAC		0.9A/230VAC														
<b>INRUSH CURRENT (Typ.)</b>	COLD START 35A/115VAC			70A/230VAC													
<b>LEAKAGE CURRENT</b>	Earth leakage current <300uA / 264VAC, Patient leakage current <100uA/264VAC																
<b>OVERLOAD</b>	105 ~ 135% rated output power			Protection type : Hiccup mode, recovers automatically after fault condition is removed													
<b>OVER VOLTAGE</b>	CH1: 5.75 ~ 6.75V			Protection type : Shut down o/p voltage, re-power on to recover													
<b>OVER TEMPERATURE</b>	105°C (TSW1) detect on heatsink of power transistor			90°C (TSW2) detect on heatsink of power transistor													
	Protection type : (TSW1) Shut down o/p voltage, recovers automatically after temperature goes down			Protection type : (TSW2) Shut down o/p voltage, re-power on to recover													
<b>5V STANDBY (G model)</b>	5VSB : 5V@0.6A without fan, 0.8A with fan 20.5CFM ; tolerance ± 2%, ripple : 50mVp-p(max.)																
<b>PS-ON INPUT SIGNAL (G model)</b>	Power on: PS-ON = "Hi" or " > 2 ~ 5V" ; Power off: PS-ON = "Low" or " < 0 ~ 0.5V"																
<b>POWER GOOD / POWER FAIL</b>	500ms>PG>10ms			PF>1ms													
<b>WORKING TEMP.</b>	-20 ~ +70°C (Refer to output load derating curve)																
<b>WORKING HUMIDITY</b>	20 ~ 90% RH non-condensing																
<b>STORAGE TEMP., HUMIDITY</b>	-40 ~ +85°C, 10 ~ 95% RH																
<b>TEMP. COEFFICIENT</b>	±0.03%/°C (0 ~ 50°C)																
<b>VIBRATION</b>	10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes																
<b>SAFETY STANDARDS</b>	UL60601-1, TUV EN60601-1 approved																
<b>WITHSTAND VOLTAGE</b>	I/P-O/P:4KVAC I/P-FG:1.5KVAC O/P-FG:0.5KVAC																
<b>ISOLATION RESISTANCE</b>	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25°C / 70% RH																
<b>EMI CONDUCTION &amp; RADIATION</b>	Compliance to EN55011 (CISPR11), EN55022 (CISPR22) Class B																
<b>HARMONIC CURRENT</b>	Compliance to EN61000-3-2,-3																
<b>EMS IMMUNITY</b>	Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN55024, EN60601-1-2, EN61204-3, medical level, criteria A																
<b>MTBF</b>	191.4Khrs min. MIL-HDBK-217F (25°C)																
<b>DIMENSION</b>	127*76.2*34.6mm (L*W*H)																
<b>PACKING</b>	0.33Kg; 36pcs/12.9Kg/0.79CUFT																
<b>NOTE</b>	<ol style="list-style-type: none"> <li>1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature.</li> <li>2. Ripple &amp; noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf &amp; 47uf parallel capacitor.</li> <li>3. Tolerance : includes set up tolerance, line regulation and load regulation.</li> <li>4. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives.</li> <li>5. HS1,HS2 &amp; HS3 can not be shorted.</li> <li>6. Derating may be needed under low input voltages. Please check the derating curve for more details.</li> <li>7. The rated power includes 5Vsb @ 0.6A.</li> <li>8. The rated power includes 5Vsb @ 0.8A.</li> </ol>																

**Mechanical Specification**

Unit:mm



AC Input Connector (CN1) : JST B3P-VH or equivalent

Pin No.	Assignment	Mating Housing	Terminal
1	AC/N	JST VHR or equivalent	JST SVH-21T-P1.1 or equivalent
2	No Pin		
3	AC/L		

DC Output Connector (CN2) : JST B8P-VH or equivalent

Pin No.	Assignment	Mating Housing	Terminal
1,2,3,4	COM	JST VHR or equivalent	JST SVH-21T-P1.1 or equivalent
5,6	CH1		
7	CH2		
8	CH3		

Power Good Connector(CN3):JST B2B-XH or equivalent

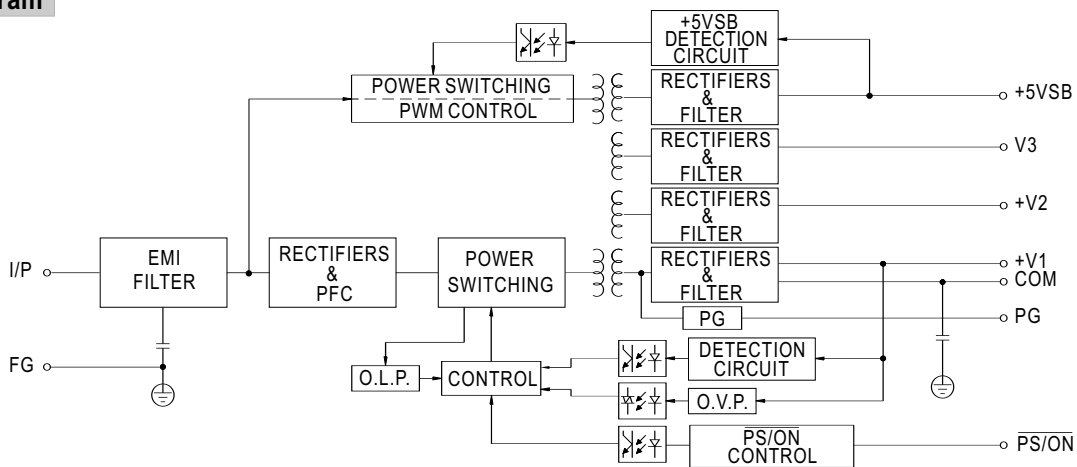
Pin No.	Status	Mating Housing	Terminal
1	PG	JST XHP or equivalent	JST SXH-001T-P0.6 or equivalent
2	GND		

5VSB Connector(CN901) : JST B-XH or equivalent

Pin No.	Assignment	Mating Housing	Terminal
1	PS/ON	JST XHP or equivalent	JST SXH-001T or equivalent
2,4	GND		
3	5VSB		

⚠ HS1,HS2,HS3 can not be shorted

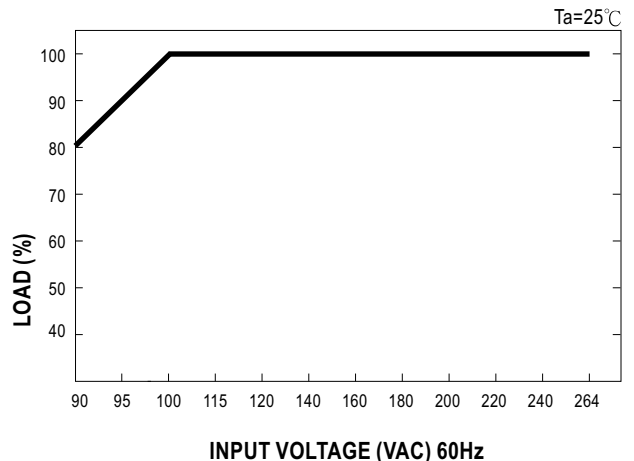
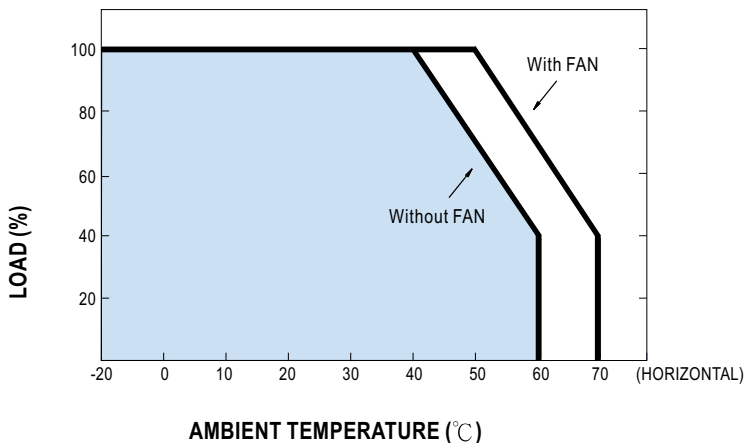
**Block Diagram**



fosc :100KHz

**Derating Curve**

**Output Derating VS Input Voltage**



MODEL : RPT-160A

## OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1 : 100 mVp-p (Max) V2 : 120 mVp-p (Max) V3 : 120 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 39.4 mVp-p (Max) V2 : 41.6 mVp-p (Max) V3 : 97.2 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 5 V- 5.5 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	4.833 V- 5.651 V / 230 VAC 4.839 V- 5.661 V / 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : 2 %- -2 % (Max) V2 : 5 %- -5 % (Max) V3 : 7 %- -5 % (Max)	I/P : 100 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : 0.5 %- -0.5 % V2 : 2.1 %- -2.1 % V3 : 4.5 %- -4.5 %	P
4	LINE REGULATION	V1 : 0.5 %- -0.5 % (Max) V2 : 1 %- -1 % (Max) V3 : 1 %- -1 % (Max)	I/P : 100 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0 %- 0 % V2 : 0 %- 0 % V3 : 0.13 %- -0.13 %	P
5	LOAD REGULATION	V1 : 1.5 %- -1.5 % (Max) V2 : 3 %- -3 % (Max) V3 : 6 %- -5 % (Max)	I/P : 230 VAC O/P : FULL -MIN LOAD Ta : 25°C	V1 : 0.36 %- -0.36 % V2 : 0.15 %- -0.15 % V3 : 3 %- -3 %	P
6	CROSS REGULATION	V1 : 1.5 %- -1.5 % (Max) V2 : 3 %- -3 % (Max) V3 : 6 %- -5 % (Max)	I/P : 230 VAC O/P : Testing O/P 60%LOAD Other O/P 40%LOAD Change Ta : 25°C	V1 : 0.24 %- -0.24 % V2 : 1.6 %- -1.6 % V3 : 5.4 %- -2.5 %	P
7	SET UP TIME	230VAC : 1200 ms (Max) 115 VAC : 2500 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 930 ms 115VAC/ 1860 ms	P
8	RISE TIME	230VAC : 30 ms (Max) 115VAC : 30 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 5.8 ms 115VAC/ 6 ms	P
9	HOLD UP TIME	230VAC : 16 ms (TYP) 115VAC : 16 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 36 ms 115VAC/ 27 ms	P
10	OVER/UNDER SHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : < 5 %	P
11	DYNAMIC LOAD	V1 : 1000 mVp-p	I/P : 230 VAC O/P : FULL /Min LOAD 90%DUTY/1KHZ Ta : 25°C	99 mVp-p	P

## INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	72 V~264V	P
			I/P : LOW-LINE-3V= 87 V HIGH-LINE+15%=300 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN ( AC POWER ON/OFF NO DAMAGE )	TEST : OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 100 VAC ~ 264 VAC O/P : FULL-MIN LOAD Ta : 25°C	TEST : OK	P
3	POWER FACTOR	0.93 / 230 VAC(TYP) 0.98 / 115 VAC(TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.95 / 230 VAC PF= 0.99 / 115 VAC	P
4	EFFICIENCY	84% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	84 %	P
5	INPUT CURRENT	230V/ 0.9 A (TYP) 115V/ 1.8 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 0.79 A/ 230 VAC I = 1.56 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 70 A (TYP) 115V/ 35 A (TYP) COLD START	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 57 A/ 230 VAC I = 29 A/ 115 VAC	P
7	LEAKAGE CURRENT	EARTH LEAKAGE CURRENT<300 uA  PATIENT LEAKAGE CURRENT<100 uA	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	FOR EARTH : L-FG : 96.8 uA N-FG : 106.9 uA  FOR PATIENT L-FG : 90.2 uA N-FG : 90.1 uA	P

## PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 %~ 135 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	118 %/ 230 VAC 118 %/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1 : 5.75 V~ 6.75 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	6.33 V/ 230 VAC 6.3 V/ 115 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC : TSW1 : 105 ± 5°C detect on heatsink of power transistor  TSW2 : 90 ± 5°C detect on heatsink of power transistor  Protection type : TSW1 : Shut down o/p voltage, recovers automatically after temperature goes down TSW2 : Shut down o/p voltage, re-power on to recover  NO DAMAGE	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active TSW1 : Shut down o/p voltage, recovers automatically after temperature goes down  TSW2 : Shut down o/p voltage, re-power on to recover	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Hiccup Mode	P

## CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	POWER GOOD SIGNAL	DELAY 10ms ~ 500ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	89 ms/ 230 VAC 91 ms/ 115 VAC	P
2	POWER FAIL SIGNAL	> 1ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	9.4 ms/ 230 VAC 9.4 ms/ 115 VAC	P

## ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	TEMPERATURE RISE TEST	MODEL : RPT-160A WITH FAN 1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta= 26.7 °C 2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta= 50.7 °C			P
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230 VAC O/P : 120 % LOAD Ta : 25°C	TEST : OK	
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 230 VAC O/P : 100 % LOAD Ta= -25 °C	TEST : OK	P
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 °C HUMIDITY= 95 %R.H	TEST : OK	P
5	TEMPERATURE COEFFICIENT	± 0.03 % (0-50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.008 % (0-50°C)	P
6	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10-500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 2G (5) Test Time : 1 hour in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK	P

### SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P : 4 KVAC/min I/P-FG : 1.5 KVAC/min O/P-FG : 0.5 KVAC/min	I/P-O/P : 4.2 KVAC/min I/P-FG : 1.8 KVAC/min O/P-FG : 0.6 KVAC/min Ta : 25°C	I/P-O/P : 1.654 mA I/P-FG : 1.514 mA O/P-FG : 0.182 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ I/P-FG : 500VDC>100MΩ O/P-FG : 500VDC>100MΩ	I/P-O/P : 500 VDC I/P-FG : 500 VDC O/P-FG : 500 VDC Ta : 25°C /70%RH	I/P-O/P : 30 GΩ I/P-FG : 30 GΩ O/P-FG : 30 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	9 mΩ	P
4	APPROVAL	TUV : Certificate NO : UL : File NO :			N/A

### E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A CLASS D	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	PASS	P
2	CONDUCTION	EN55022 EN55011 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 EN55011 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 MEDICAL AIR : 8KV / Contact : 6KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 MEDICAL INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 MEDICAL L-N : 1KV L,N-PE : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

### M.T.B.F & LIFE CYCLE CALCULATION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	RPT-160A WITH FAN : SUPPOSE I/P : 230VAC O/P : FULL LOAD I/P : 230VAC O/P : FULL LOAD	C 105 IS THE MOST CRITICAL COMPONENT Ta= 25 °C LIFE TIME= 201640 HRS Ta= 50 °C LIFE TIME= 26809 HRS		P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 191.4KHRS			P

### COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor ( D to S) or (C to E) Peak Voltage	Q3 Rated 2SK3568 12A/500V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short Ta : 25°C	(1) 412 V (2) 422 V	P
2	Diode Peak Voltage	Q101 Rated IRL3103PbF 64A/30V  D200 Rated STPS2045CT 20A/45V  D300 Rated FME-220A 20A/100V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Output Short Ta : 25°C	(1) 28.4 V (2) 26.8 V  (1) 39.8 V (2) 32.6 V  (1) 27.6 V (2) 25.2 V	P
3	Input Capacitor Voltage	C5 Rated 120u/420V 105°C	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 384.7 V (2) 385.5 V (3) 385.5 V	P
4	Control IC Voltage Test	U 1 Rated FAN4801 : 12V-30V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 14.209 V (2) 14.262 V (3) 14.276 V	P
5	P.F.C Transistor ( D to S) or (C to E) Peak Voltage	Q1 Rated IRFP460A 20A/500V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short Ta : 25°C	(1) 460 V (2) 412 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2009/1/10	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2009/6/16	PRODUCT SAMPLE W0901A22	PASS	SANFORD SU	VINCENT TSENG

2003/12/12 A50-F023