

















■ Features

- 4"×2" compact size
- Medical safety approved (2 x MOPP) according to ANSI/AAMI ES60601-1 and IEC/EN60601-1
- · Suitable for BF application with appropriate system consideration
- Cooling by free air convection
- EMI class B for class I configuration
- Extremely low leakage current
- Protections: Short circuit / Overload / Over voltage
- 3 years warranty

Applications

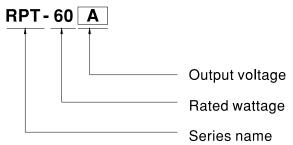
- Oral irrigator
- Hemodialysis machine
- Medical computer monitors
- Sleep apnea devices

Description

RPT-60 is a 60W highly reliable green PCB type medical power supply with a high power density on the 4" by 2" footprint. It accepts 90~264VAC input and offers dual output voltages.

RPT-60 is able to be used for Class I (with FG) system design. The extremely low leakage current is less than 150μ A. In addition, it conforms to international medical regulations (2*MOPP) and EMC EN55011.

■ Model Encoding



File Name:RPT-60-SPEC 2018-01-12



SPECIFICATION

| MODEL | | RPT-60A | | | RPT-60B | | | RPT-60C | | | | |
|-------------|--|---|----------------|---------------|--|-------------|--------------|--|-------------------|------------|--|--|
| | OUTPUT NUMBER | CH1 | CH2 | CH3 | CH1 | CH2 | CH3 | CH1 | CH2 | CH3 | | |
| | DC VOLTAGE | 5V | 12V | -5V | 5V | 12V | -12V | 5V | 15V | -15V | | |
| | RATED CURRENT | 4A | 2A | 0.5A | 4A | 2A | 0.5A | 4A | 1.5A | 0.5A | | |
| | CURRENT RANGE | 0.5 ~ 4.4A | 0.1 ~ 2.2A | 0.1 ~ 0.55A | 0.5 ~ 4.4A | 0.1 ~ 2.2A | 0.1 ~ 0.55A | 0.5 ~ 4.4A | 0.1 ~ 1.65A | 0.1 ~ 0.55 | | |
| | RATED POWER | 46.5W | | | 50W | | | 50W | | | | |
| | PEAK LOAD(10sec.) Note.2 | 51.15W | | | 55W | | | 55W | | | | |
| OUTPUT | RIPPLE & NOISE (max.) Note.3 | | 80mVp-p | 80mVp-p | 80mVp-p | 80mVp-p | 100mVp-p | 80mVp-p | 100mVp-p | 150mVp-p | | |
| | VOLTAGE TOLERANCE Note.4 | | ±6.0% | +9,-8% | +3,-2% | ±6.0% | +10,-6% | +3,-2% | ±6.0% | ±8.0% | | |
| | LINE REGULATION | ±0.5% | ±1.0% | ±1.0% | ±0.5% | ±1.0% | ±2.0% | ±0.5% | ±2.0% | ±2.0% | | |
| | LOAD REGULATION | ±1.5% | ±2.0% | +5,-7% | ±1.5% | ±2.0% | ±5.0% | ±1.5% | ±3.0% | ±4.0% | | |
| | SETUP, RISE TIME | | | | | | 1 ± 3.0 % | 1.070 | 1 ± 3.0 % | 1 -4.0 /6 | | |
| | , | 300ms, 15ms/230VAC 300ms, 15ms/115VAC at full load 70ms/230VAC 15ms/115VAC at full load | | | | | | | | | | |
| | HOLD UP TIME (Typ.) | 70ms/230VAC 15ms/115VAC at full load 90 ~ 264VAC 127 ~ 370VDC | | | | | | | | | | |
| | VOLTAGE RANGE | | | | | | | | | | | |
| | FREQUENCY RANGE | 47 ~ 63Hz | | | | | | | | | | |
| INPUT | EFFICIENCY (Typ.) | 77% | | | 78% 79% | | | | | | | |
| | AC CURRENT (Typ.) | 1.1A/115VAC 0.7A/230VAC | | | | | | | | | | |
| | INRUSH CURRENT (Typ.) | COLD START 60A/230VAC 30A/115VAC | | | | | | | | | | |
| | LEAKAGE CURRENT Note.5 | Earth leakage current < 150 μA/264VAC , Touch current < 100 μA/264VAC | | | | | | | | | | |
| | | 115 ~ 150% rated output power | | | | | | | | | | |
| | OVERLOAD | Protection type: Hiccup mode, recovers automatically after fault condition is removed | | | | | | | | | | |
| PROTECTION | | CH1: 5.75 ~ 6.75V | | | | | | | | | | |
| | OVER VOLTAGE | Protection type : Shut down o/p voltage, re-power on to recover | | | | | | | | | | |
| | WORKING TEMP. | | | | <u>, </u> | | | | | | | |
| | WORKING HUMIDITY | -20 ~ +65°C (Refer to "Derating Curve") 20 ~ 90% RH non-condensing | | | | | | | | | | |
| ENVIRONMENT | STORAGE TEMP., HUMIDITY | · · · · · · · · · · · · · · · · · · · | | | | | | | | | | |
| ENVIRONMENT | TEMP. COEFFICIENT | 40 ~ +85°C, 10 ~ 95% RH non-condensing | | | | | | | | | | |
| | VIBRATION | ±0.03%/°C (0~45°C) | | | | | | | | | | |
| | OPERATING ALTITUDE Note.6 | 10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes 6 3000 meters | | | | | | | | | | |
| | OFERATING ALTITUDE Note.0 | | LIV/ ENICODED | 1.15000001.1 | | OATH ANGLAA | ML E000001 1 | | | | | |
| | SAFETY STANDARDS | UL60950-1,TUV EN60950-1,IEC60601-1, EAC TP TC 004,UL ANSI/AAMI ES60601-1, CAN/CSA-C22.2 No. 60601-1:14 - Edition 3 approved, TUV EN60601-1 approved | | | | | | | | | | |
| | ISOLATION LEVEL | Primary-Secondary: 2xMOPP, Primary-Earth:1xMOPP, Secondary-Earth:1xMOPP | | | | | | | | | | |
| | WITHSTAND VOLTAGE | I/P-O/P:4KV/ | C I/P-FG:2 | KVAC O/P-F | G:1.5KVAC | · | | | | | | |
| | ISOLATION RESISTANCE | I/P-O/P. I/P-F | G. O/P-FG:10 | 0M Ohms / 500 |)VDC / 25°C / ' | 70% RH | | | | | | |
| | | Parameter | | | Standard | | | Test Level | / Note | | | |
| | EMC EMISSION | Conducted emission | | | EN55011 (CISPR11) | | | Class B | | | | |
| | | Radiated emission | | | EN55011 (CISPR11) | | | Class B | | | | |
| SAFETY & | | | | | EN61000-3-2 | | | Class A | | | | |
| EMC | | Harmonic current | | | | | | | | | | |
| (Note 8) | | Voltage flicker EN61000-3-3 | | | | | | | | | | |
| | EMC IMMUNITY | EN60601-1- | 2 | | C4 | Standard | | | Tost Loyal / Nata | | | |
| | | Parameter | | | | | | Test Level / Note | | | | |
| | | ESD | | | EN61000-4-2 | | | Level 4, 15KV air ; Level 4, 8KV conta | | | | |
| | | RF field susceptibility | | | EN61000-4-3 | | | Level 3, 10V/m(80MHz~2.7GHz) | | | | |
| | | , , | | | | | | Table 9, 9~28V/m(385MHz~5.78GHz) | | | | |
| | | EFT bursts | | | EN61000-4-4 | | | Level 3, 2KV | | | | |
| | | Surge susceptibility | | | EN61000-4-5 | | | Level 4, 4KV/Line-FG; 2KV/Line-Lir | | | | |
| | | Conducted | susceptibility | / | EN61000-4-6 | | | Level 3, 10V | | | | |
| | | Magnetic fie | eld immunity | | EN61000-4-8 | | | Level 4, 30A/m | | | | |
| | | Voltage dip | interruption | | EN61000-4 | I-11 | | 100% dip 1 periods, 30% dip 25 periods, 100% interruptions 250 periods | | | | |
| | MTBF | 677.8K hrs m | in. MIL-HD | BK-217F (25°C | 5) | | | 100 /0 Interruptions 200 penous | | | | |
| OTHERS | DIMENSION (L*W*H) | 101.6*50.8*29mm or 4" * 2" *1.14" inch | | | | | | | | | | |
| | PACKING | 0.15Kg; 96pcs/15.4Kg/0.89CUFT | | | | | | | | | | |
| NOTE | 33% Duty cycle maximum v Ripple & noise are measure Tolerance: includes set up Touch current was measure The ambient temperature d Length of set up time is me Heat Sink HS1,HS2 can no The power supply is consider a 360mm*360mm metal pla | ally mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature. within every 30 seconds. Average output power should not exceed the rated power. red at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 #f & 47 #f parallel capacitor. to tolerance, line regulation and load regulation. red from primary input to DC output. derating of 3.5°C/1000m with fanless models and of 5°C/1000m with fan models for operating altitude higher than 2000m(6500ff easured at cold first start. Turning ON/OFF the power supply may lead to increase of the set up time. of be shorted. dered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on late with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to please refer to "EMI testing of component power supplies." | | | | | | | | | | |

File Name:RPT-60-SPEC 2018-01-12



SPECIFICATION

| MODEL | | RPT-60D | | | RPT-6003 | | | | | |
|------------|--|--|-------------------------|-----------------------|-------------------|---|---------------------------------------|--|--|--|
| | OUTPUT NUMBER | CH1 | CH2 | CH3 | CH1 | CH2 | CH3 | | | |
| ОИТРИТ | DC VOLTAGE | 5V | 24V | 12V | 3.3V | 5V | 12V | | | |
| | RATED CURRENT | 3.5A | 1A | 0.5A | 5A | 3A | 0.7A | | | |
| | CURRENT RANGE | 0.5 ~ 3.85A | 0.1 ~ 1.1A | 0.1 ~ 0.55A | 0.5 ~ 5.5A | 0.3 ~ 3.3A | 0.1 ~ 0.77A | | | |
| | RATED POWER | 47.5W | | | 39.9W | | | | | |
| | PEAK LOAD(10sec.) Note.2 | 52.25W | | | 43.89W | | | | | |
| | RIPPLE & NOISE (max.) Note.3 | 80mVp-p | 150mVp-p | 80mVp-p | 80mVp-p | 80mVp-p | 80mVp-p | | | |
| | VOLTAGE TOLERANCE Note.4 | +3,-2% | ±6.0% | ±8.0% | +3,-2% | ±8.0% | +10,-6% | | | |
| | LINE REGULATION | ±0.5% | ±2.0% | ±2.0% | ±0.5% | ±1.0% | ±2.0% | | | |
| | LOAD REGULATION | ±1.5% | ±3.0% | ±4.0% | ±1.5% | ±2.0% | +5.5,-5% | | | |
| | SETUP, RISE TIME | 300ms, 15ms/230VA | <u>'</u> | | | | | | | |
| | HOLD UP TIME (Typ.) | 300ms, 15ms/230VAC 300ms, 15ms/115VAC at full load 70ms/230VAC 15ms/115VAC at full load | | | | | | | | |
| | VOLTAGE RANGE | 90 ~ 264VAC 127 ~ 370VDC | | | | | | | | |
| | FREQUENCY RANGE | 47 ~ 63Hz | | | | | | | | |
| | EFFICIENCY (Typ.) | 79% | | | | | | | | |
| NPUT | AC CURRENT (Typ.) | 1.1A/115VAC | 0.7A/230VAC | 75% | | | | | | |
| | INRUSH CURRENT (Typ.) | | | | | | | | | |
| | LEAKAGE CURRENT Note.5 | | | | | | | | | |
| | LLANAGE CORRENT Note.5 | | | | | | | | | |
| | OVERLOAD | 115 ~ 150% rated output power Protection type: Hiccup mode, recovers automatically after fault condition is removed | | | | | | | | |
| PROTECTION | | | cup mode, recovers a | utomatically after la | | | | | | |
| | OVER VOLTAGE | CH1: 3.8 ~ 4.45V Protection type: Shut down o/p voltage, re-power on to recover | | | | | | | | |
| | | | · · · · · | e-power on to recove | r | | | | | |
| | WORKING TEMP. | -20 ~ +65°C (Refer to "Derating Curve") | | | | | | | | |
| | WORKING HUMIDITY | 20 ~ 90% RH non-co | | | | | | | | |
| NVIRONMENT | STORAGE TEMP., HUMIDITY | , | 5% RH non-condensir | ıg | | | | | | |
| | TEMP. COEFFICIENT | ±0.03%/°C (0~45°C) | | | | | | | | |
| | VIBRATION | | nin./1cycle, period for | 60min. each along 2 | X, Y, Z axes | | | | | |
| | OPERATING ALTITUDE Note.6 | 3000 meters | | | | | | | | |
| | SAFETY STANDARDS | UL60950-1,TUV EN60950-1,IEC60601-1, EAC TP TC 004,UL ANSI/AAMI ES60601-1, CAN/CSA-C22.2 No. 60601-1:14 - Edition 3 approved, TUV EN60601-1 approved | | | | | | | | |
| | ISOLATION LEVEL | Primary-Secondary: 2xMOPP, Primary-Earth:1xMOPP, Secondary-Earth:1xMOPP | | | | | | | | |
| | WITHSTAND VOLTAGE | I/P-O/P:4KVAC I/ | P-FG:2KVAC O/P-F | G:1.5KVAC | | | | | | |
| | ISOLATION RESISTANCE | I/P-O/P, I/P-FG, O/F | P-FG:100M Ohms / 50 | 0VDC / 25 / 70% | RH | | | | | |
| | | Parameter | | Standard | Test Level / Note | | | | | |
| | EMC EMISSION | Conducted emission | on | EN55011 (CISPF | R11) | Class B | | | | |
| | | Radiated emission | | EN55011 (CISPF | | Class B | | | | |
| SAFETY & | | Harmonic current | | EN61000-3-2 | , | Class A | | | | |
| EMC | | Voltage flicker | | EN61000-3-3 | | | | | | |
| (Note 9) | EMC IMMUNITY | EN60601-1-2 | | 1 | | | | | | |
| | | Parameter | | Standard | | Test Level / Note | | | | |
| | | ESD | | EN61000-4-2 | | Level 4, 15KV air ; Level 4, 8KV conta | | | | |
| | | 200 | | LN01000 4 2 | | Level 3, 10V/m(80MHz~2.7GHz) | | | | |
| | | RF field susceptib | ility | EN61000-4-3 | | Table 9, 9~28V/m(385MHz~5.78GHz) | | | | |
| | | EFT bursts | | EN61000-4-4 | | Level 3, 2KV | | | | |
| | | Surge susceptibil | itv | EN61000-4-5 | | Level 4, 4KV/Line-FG; 2KV/Line-Lin | | | | |
| | | Conducted susce | • | EN61000-4-6 | | Level 3, 10V | | | | |
| | | Magnetic field imr | • | EN61000-4-8 | | | · · · · · · · · · · · · · · · · · · · | | | |
| | | wagnetic neid iiii | numty | L1401000-4-0 | | Level 4, 30A/m 100% dip 1 periods, 30% dip 25 periods, | | | | |
| | | Voltage dip, interr | uption | EN61000-4-11 | | 100% dip 1 perior | | | | |
| OTHERS | MTBF | 677.8K hrs min. MIL-HDBK-217F (25°C) | | | | | | | | |
| | DIMENSION (L*W*H) | 101.6*50.8*29mm o | r 4" * 2" *1.14" inch | | | | | | | |
| | PACKING | 0.15Kg; 96pcs/15.4Kg/0.89CUFT | | | | | | | | |
| NOTE | 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature. 2. 33% Duty cycle maximum within every 30 seconds. Average output power should not exceed the rated power. 3. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 µf & 47 µf parallel capacitor. 4. Tolerance: includes set up tolerance, line regulation and load regulation. 5. Touch current was measured from primary input to DC output. 6. The ambient temperature derating of 3.5°C/1000m with fanless models and of 5°C/1000m with fan models for operating altitude higher than 2000m(650 regulation). 7. Length of set up time is measured at cold first start. Turning ON/OFF the power supply may lead to increase of the set up time. 8. Heat Sink HS1,HS2 can not be shorted. 9. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit of a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how perform these EMC tests, please refer to "EMI testing of component power supplies." | | | | | | | | | |

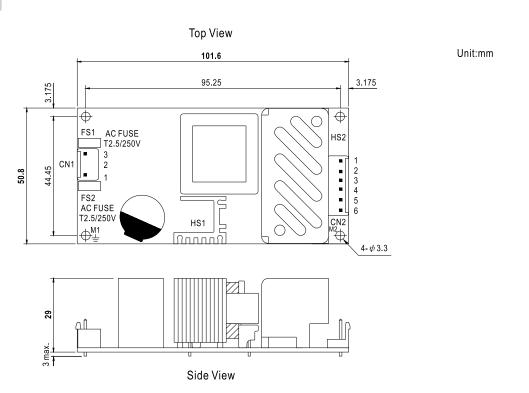
File Name:RPT-60-SPEC 2018-01-12



■ Block Diagram fosc: 100KHz RECTIFIERS الفات الفات & FILTER RECTIFIERS & FILTER -o +V2 36 POWER RECTIFIERS RECTIFIERS -o +V1 & FILTER & FILTER FILTER SWITCHING O COM DETECTION CIRCUIT CONTROL O.L.P. O.V.P. ■ Derating Curve 100 60 50 LOAD (%) 40 20 60 65 70 (HORIZONTAL) -20 30 AMBIENT TEMPERATURE (°C) ■ Output Derating VS Input Voltage 100 90 80 70 LOAD (%) 60 50 40 115 120 140 160 180 200 220 240 264 INPUT VOLTAGE (VAC) 60Hz



■ Mechanical Specification



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

| Pin No. | Assignment | Mating Housing | Terminal |
|---------|------------|--------------------------|-----------------------------------|
| 1 | AC/N | ICTVIID | ICT CVIII OAT DA A |
| 2 | No Pin | JST VHR or equivalent | JST SVH-21T-P1.1 or equivalent |
| 3 | AC/L | or oquivaloni | |

DC Output Connector (CN2): JST B6P-VH or equivalent

| Pin No. | Assignment | Mating Housing | Terminal | | |
|---------|------------|----------------|------------------|--|--|
| 1,2 | V1 | | | | |
| 3,4 | COM | JST VHR | JST SVH-21T-P1.1 | | |
| 5 | V2 | or equivalent | or equivalent | | |
| 6 | V3 | | | | |

\pm : Grounding Required



✓ 1.HS1,HS2 cannot be shorted.

2.M1 is safety ground. For better EMC performance, Please secure an electrical connection between M1,M2 and chassis grounding.