



E-Star Power Development Co., Ltd. (E-STAR)

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60W Open Frame Medical power supply < RPD-60



ANSI/AAMI ES60601-1
UL60950-1



EN60601-1



EN60950-1



IEC60601-1



Medical



2xMOPP



BF rated

■ 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

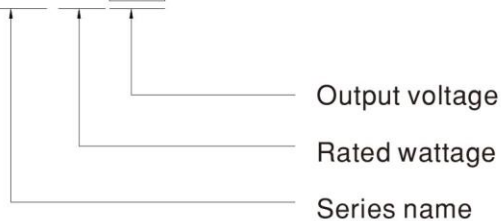
■ Description

RPD-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 .

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

■ Model Encoding

RPD- 60 A





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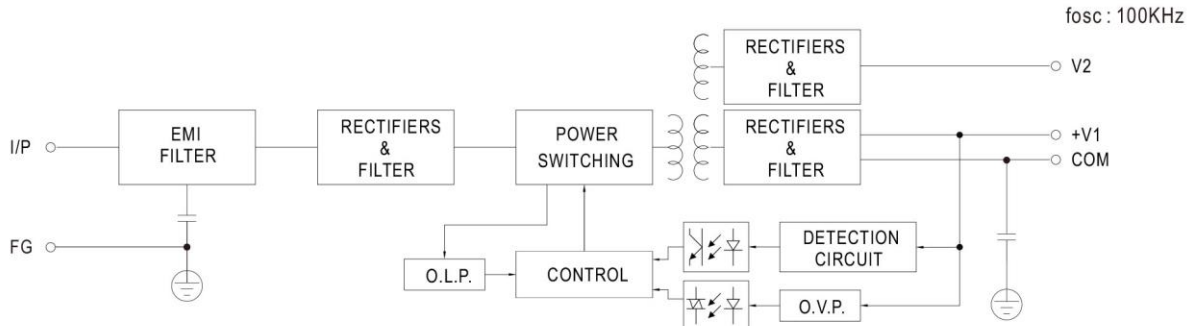
SPECIFICATION

MODEL		RPD-60A		RPD-60B	
OUTPUT	OUTPUT NUMBER	CH1	CH2	CH1	CH2
	DC VOLTAGE	5V	12V	5V	24V
	RATED CURRENT	5A	2A	3.5A	1.5A
	CURRENT RANGE	0.5 ~ 5.5A	0.1 ~ 2.2A	0.5 ~ 3.85A	0.1 ~ 1.65A
	RATED POWER	49W		53.5W	
	PEAK LOAD(10sec.) Note.2	53.9W		58.85W	
	RIPPLE & NOISE (max.) Note.3	80mVp-p	80mVp-p	80mVp-p	100mVp-p
	VOLTAGE TOLERANCE Note.4	+3,-2%	±6.0%	+3,-2%	+8,-4%
	LINE REGULATION	±0.5%	±1.0%	±0.5%	±1.0%
	LOAD REGULATION	±1.5%	±2.0%	±1.5%	±2.0%
SETUP, RISE TIME	300ms, 15ms/230VAC		300ms, 15ms/115VAC at full load		
HOLD UP TIME (Typ.)	70ms/230VAC	14ms/115VAC at full load			
INPUT	VOLTAGE RANGE	90 ~ 264VAC	127 ~ 370VDC		
	FREQUENCY RANGE	47 ~ 63Hz			
	EFFICIENCY (Typ.)	78%		82%	
	AC CURRENT (Typ.)	1.1A/115VAC	0.7 A/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				
PROTECTION	OVERLOAD	115 ~ 150% rated output power Protection type : Hiccup mode, recovers automatically after fault condition is removed			
	OVER VOLTAGE	CH1: 5.75 ~ 6.75V Protection type : Shut down o/p voltage, re-power on to recover			
ENVIRONMENT	WORKING TEMP.	-20 ~ +65°C (Refer to "Derating Curve")			
	WORKING HUMIDITY	20 ~ 90% RH non-condensing			
	STORAGE TEMP., HUMIDITY	-40 ~ +85°C, 10 ~ 95% RH non-condensing			
	TEMP. COEFFICIENT	±0.03%/°C (0 ~ 45°C)			
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes			
OPERATING ALTITUDE Note.6	3000 meters				
SAFETY & EMC (Note 9)	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-FG:1.5KVAC			
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25°C / 70% RH			
	EMC EMISSION	Parameter	Standard		Test Level / Note
		Conducted emission	EN55011 (CISPR11)		Class B
		Radiated emission	EN55011 (CISPR11)		Class B
		Harmonic current	EN61000-3-2		Class A
	Voltage flicker	EN61000-3-3		-----	
	EMC IMMUNITY	EN60601-1-2			
Parameter		Standard		Test Level / Note	
ESD		EN61000-4-2		Level 4, 15KV air ; Level 4, 8KV contact	
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-Line	
Conducted susceptibility		EN61000-4-6		Level 3, 10V	
Magnetic field immunity		EN61000-4-8		Level 4, 30A/m	
Voltage dip, interruption	EN61000-4-11		100% dip 1 periods, 30% dip 25 periods, 100% interruptions 250 periods		
OTHERS	MTBF	677.8K hrs min. MIL-HDBK-217F (25°C)			
	DIMENSION (L*W*H)	101.6*50.8*29mm or 4" * 2" * 1.14" inch			
	PACKING	0.15Kg; 96pcs/15.4Kg/0.89CUFT			
NOTE	<p>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 0.1μf & 47μf 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(6500ft). 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 on 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 to perform these EMC tests, please refer to "EMI testing of component power supplies."</p>				

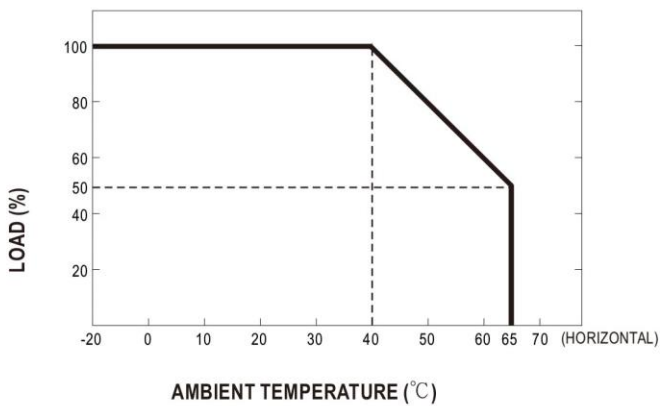


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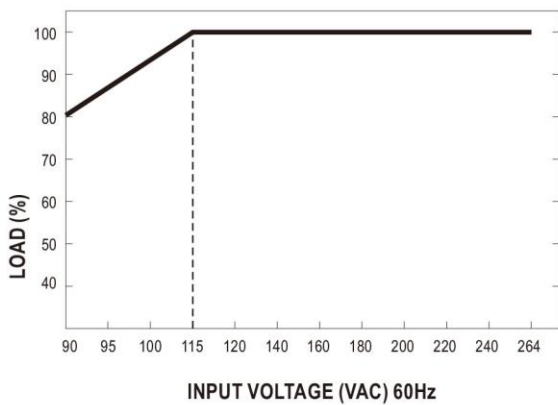
Block Diagram



Derating Curve

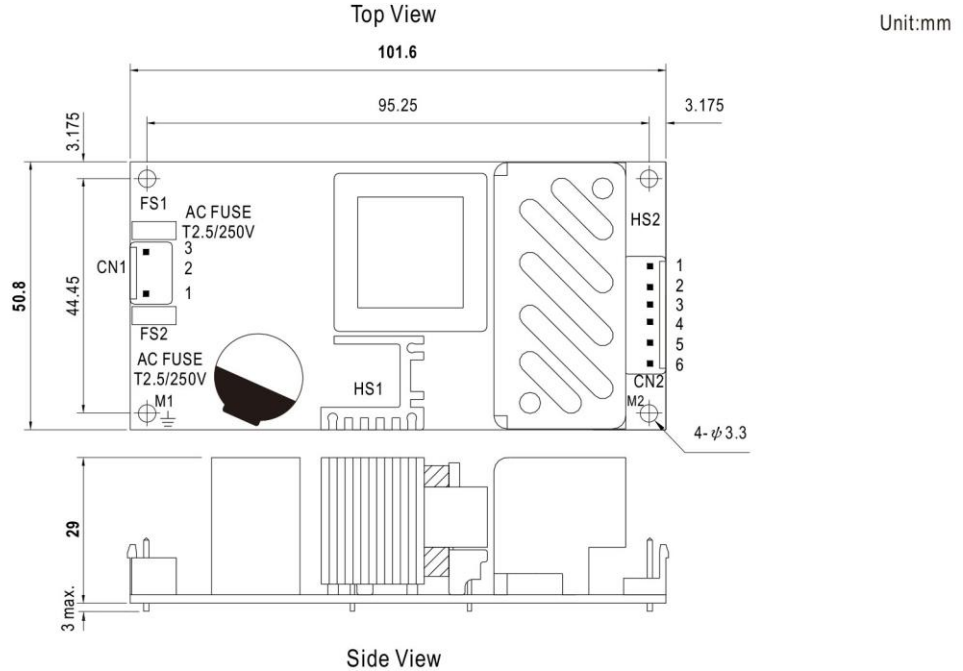


Output Derating VS Input Voltage



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Mechanical Specification



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 B6P-VH or equivalent

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

⏏ : 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.