60W Reliable Triple Output Medical Grade RPT-60 series

User's Manual

ANSI/AAMI ES60601-1
UL62368-1
BS EN/EN60601-1
BS EN/EN62368-1
IEC60601-1
IEC62368-1
TPTC004
Medical
2xMOPP
BF rated

Features

- 4"×2" compact size
- Medical safety approved (2 x MOPP) according to ANSI/AAMI ES60601-1 and IEC/BS EN/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

GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

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 150μA. In addition, it conforms to international medical regulations (2*MOPP) and EMC BS EN/EN55011.

Model Encoding

RPT - 60 A

- A: Output voltage
- 60: Rated wattage
- RPT: Series name

60W Reliable Triple Output Medical Grade RPT-60 series

SPECIFICATION

MODEL		RPT-60A			RPT-60B			RPT-60C		
OUTPUT	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 ~ 0.55A
	RATED POWER	46.5W			50W			50W		
	PEAK LOAD(10sec.) Note.2	51.15W			55W			55W		
	RIPPLE & NOISE (max.) Note.3	80mVp-p	80mVp-p	80mVp-p	80mVp-p	80mVp-p	100mVp-p	80mVp-p	100mVp-p	150mVp-p
	VOLTAGE TOLERANCE Note.4	+3,-2%	±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	300ms, 15ms/230VAC 300ms, 15ms/115VAC at full load								
	HOLD UP TIME (Typ.)	70ms/230VAC 15ms/115VAC at full load								
INPUT	VOLTAGE RANGE	90 ~ 264VAC 127 ~ 370VDC								
	FREQUENCY RANGE	47 ~ 63Hz								
	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								
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℃ (Refer to "Derating Curve")								
	WORKING HUMIDITY	20 ~ 90% RH non-condensing								
	STORAGE TEMP., HUMIDITY	-40 ~ +85℃, 10 ~ 95% RH non-condensing								
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 45℃)								
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes								
	OPERATING ALTITUDE Note.6	3000 meters								
SAFETY & EMC (Note 8)	SAFETY STANDARDS	IEC 60601-1:2005+A1+A2, TUV BS EN/ EN 60601-1:2006+A1+A12+A2, ANSI/AAMI ES60601-1:2005+A2, CAN/CSA C22.2 No. 60601-1:2014+A2, IEC 62368-1:2014, UL 62368-1, 2nd Ed, CSA C22.2 No. 62368-1-14, 2nd Ed, TUV BS EN/ EN 62368-1:2014+A11, EAC TP TC 004 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℃/ 70% RH								
	EMC EMISSION	**Parameter**			**Standard**			**Test Level / Note**		
		Conducted emission			BS EN/EN55011 (CISPR11)			Class B		
		Radiated emission			BS EN/EN55011 (CISPR11)			Class B		
		Harmonic current			BS EN/EN61000-3-2			Class A		
		Voltage flicker			BS EN/EN61000-3-3			-----		
	EMC IMMUNITY	BS EN/EN55035, BS EN/EN60601-1-2								
		Parameter			**Standard**			**Test Level / Note**		
		ESD			BS EN/EN61000-4-2			Level 4, 15KV air ; Level 4, 8KV contact		
		RF field susceptibility			BS EN/EN61000-4-3			Level 3, 10V/m(80MHz~2.7GHz) Table 9, 9~28V/m(385MHz~5.78GHz)		
		EFT bursts			BS EN/EN61000-4-4			Level 3, 2KV		
		Surge susceptibility			BS EN/EN61000-4-5			Level 4, 4KV/Line-FG ; 2KV/Line-Line		
		Conducted susceptibility			BS EN/EN61000-4-6			Level 3, 10V		
		Magnetic field immunity			BS EN/EN61000-4-8			Level 4, 30A/m		
		Voltage dip, interruption			BS EN/EN61000-4-11			100% dip 1 periods, 30% dip 25 periods, 100% interruptions 250 periods		
OTHERS	MTBF	4415.3K hrs min. Telcordia SR-332 (Bellcore) ; 677.8K hrs min. MIL-HDBK-217F (25℃)								
	DIMENSION (L*W*H)	101.6*50.8*29mm or 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℃ 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℃/1000m with fanless models and of 5℃/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." (as available on https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf)

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60W Reliable Triple Output Medical Grade RPT-60 series

SPECIFICATION

MODEL		RPT-60D			RPT-6003		
OUTPUT	OUTPUT NUMBER	CH1	CH2	CH3	CH1	CH2	CH3
	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/230VAC 300ms, 15ms/115VAC at full load					
	HOLD UP TIME (Typ.)	70ms/230VAC 15ms/115VAC at full load					
INPUT	VOLTAGE RANGE	90 ~ 264VAC 127 ~ 370VDC					
	FREQUENCY RANGE	47 ~ 63Hz					
	EFFICIENCY (Typ.)	79%			75%		
	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					
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			CH1: 3.8 ~ 4.45V		
		Protection type : Shut down o/p voltage, re-power on to recover					
ENVIRONMENT	WORKING TEMP.	-20 ~ +65℃ (Refer to "Derating Curve")					
	WORKING HUMIDITY	20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY	-40 ~ +85℃, 10 ~ 95% RH non-condensing					
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 45℃)					
	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	IEC 60601-1:2005+A1+A2, TUV BS EN/ EN 60601-1:2006+A1+A12+A2, ANSI/AAMI ES60601-1:2005+A2, CAN/CSA C22.2 No. 60601-1:2014+A2, IEC 62368-1:2014, UL 62368-1, 2nd Ed, CSA C22.2 No. 62368-1-14, 2nd Ed, TUV BS EN/ EN 62368-1:2014+A11, EAC TP TC 004 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℃ / 70% RH					
	EMC EMISSION	**Parameter**		**Standard**		**Test Level / Note**	
		Conducted emission		BS EN/EN55011 (CISPR11)		Class B	
		Radiated emission		BS EN/EN55011 (CISPR11)		Class B	
		Harmonic current		BS EN/EN61000-3-2		Class A	
		Voltage flicker		BS EN/EN61000-3-3		-----	
	EMC IMMUNITY	BS EN/EN55035, BS EN/EN60601-1-2					
		Parameter		**Standard**		**Test Level / Note**	
		ESD		BS EN/EN61000-4-2		Level 4, 15KV air ; Level 4, 8KV contact	
		RF field susceptibility		BS EN/EN61000-4-3		Level 3, 10V/m(80MHz~2.7GHz) Table 9, 9~28V/m(385MHz~5.78GHz)	
		EFT bursts		BS EN/EN61000-4-4		Level 3, 2KV	
		Surge susceptibility		BS EN/EN61000-4-5		Level 4, 4KV/Line-FG ; 2KV/Line-Line	
		Conducted susceptibility		BS EN/EN61000-4-6		Level 3, 10V	
		Magnetic field immunity		BS EN/EN61000-4-8		Level 4, 30A/m	
		Voltage dip, interruption		BS EN/EN61000-4-11		100% dip 1 periods, 30% dip 25 periods, 100% interruptions 250 periods	
OTHERS	MTBF	4415.3K hrs min. Telcordia SR-332 (Bellcore) ; 677.8K hrs min. MIL-HDBK-217F (25℃)					
	DIMENSION (L*W*H)	101.6*50.8*29mm or 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℃ 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.
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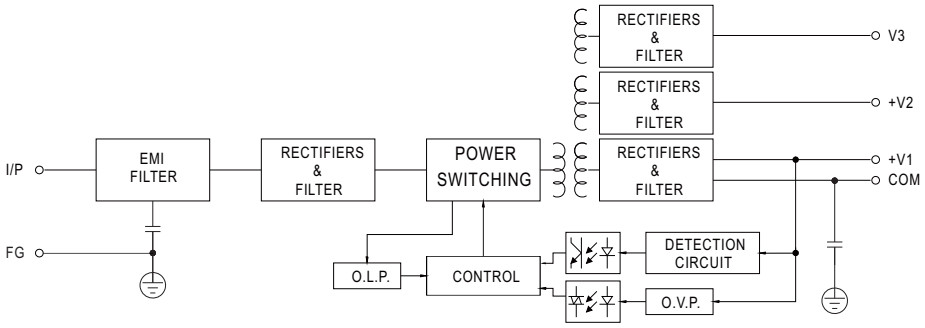
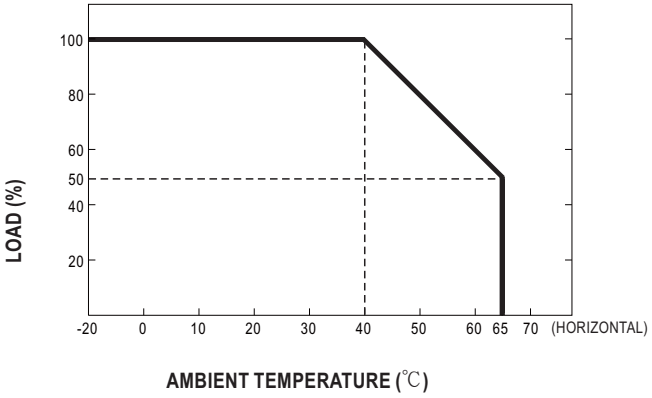
■ Block Diagram

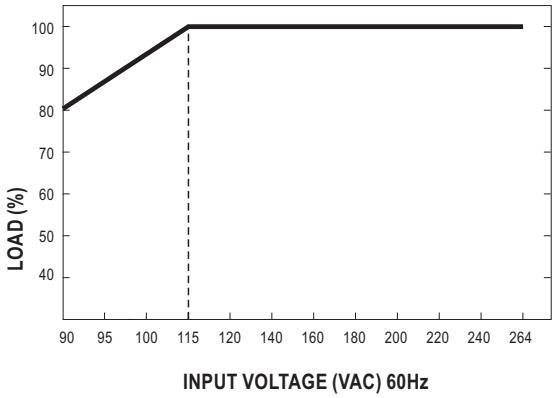
fosc : 100KHz



■ Derating Curve



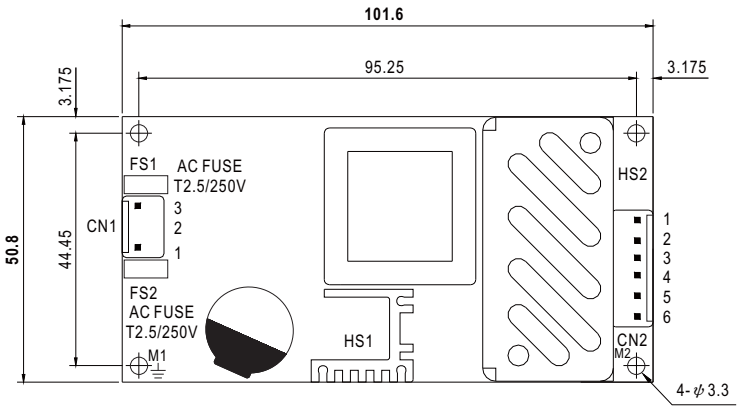
■ Output Derating VS Input Voltage

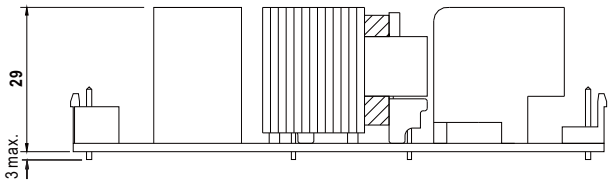


■ Mechanical Specification

(Unit: mm , tolerance ± 1mm)

Top View





Side View

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	V3		

⏚ : 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.

■ Installation Manual

Please refer to : http://www.meanwell.com/manual.html