JHM15 Series

DC-DC Converter

XP Power

15 Watts

- International Medical Approvals
- 4000 VAC Reinforced Insulation
- Medical Approval, IEC60601-1, 3rd Edition
- 2 µA Patient Leakage Current
- Compact 1 x 1.6" Footprint
- EN55011 Level A With No External Components
- 3 Year Warranty

Dimensions:

JHM15:
1.60 x 1.00 x 0.40" (40.60 x 25.40 x 10.20 mm)

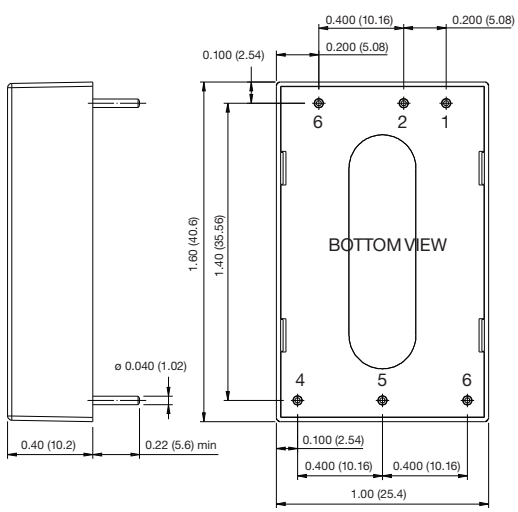
Models & Ratings

Input Voltage	Output Voltage	Output Current	Input Current		Maximum Capacitive Load[3]	Efficiency[4]	Model Number
			No Load[1]	Full Load[2]			
9-18 V	5.0 V	3000 mA	9.2 mA	1930 mA	3000 µF	87%	JHM1512S05
	12.0 V	1250 mA	6.5 mA	1938 mA	1330 µF	86%	JHM1512S12
	15.0 V	1000 mA	8.0 mA	1944 mA	1000 µF	86%	JHM1512S15
	±5.0 V	±1500 mA	6.6 mA	1955 mA	±1470 µF	84%	JHM1512D05
	±12.0 V	±625 mA	11.2 mA	1911 mA	±660 µF	87%	JHM1512D12
	±15.0 V	±500 mA	11.0 mA	1879 mA	±550 µF	88%	JHM1512D15
18-36 V	5.0 V	3000 mA	5.6 mA	972 mA	3000 µF	86%	JHM1524S05
	12.0 V	1250 mA	6.1 mA	968 mA	1830 µF	85%	JHM1524S12
	15.0 V	1000 mA	6.4 mA	966 mA	1000 µF	87%	JHM1524S15
	±5.0 V	±1500 mA	5.4 mA	981 mA	±1470 µF	83%	JHM1524D05
	±12.0 V	±625 mA	7.3 mA	954 mA	±660 µF	87%	JHM1524D12
	±15.0 V	±500 mA	8.5 mA	943 mA	±550 µF	87%	JHM1524D15

Notes

1. Input current measured at nominal input voltage.
2. Input current measured at lowest input voltage.
3. Maximum capacitive load is per output.
4. Typical values.

Mechanical Details



Pin Connections		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	Trim	-Vout
5	-Vout	Common
6	N/C	N/C

Notes

1. All dimensions are in inches (mm)
2. Weight: 0.04 lbs (20 g) approx.
3. Pin diameter: 0.02 ±0.002 (0.5 ±0.05)
4. Pin pitch tolerance: ±0.01 (±0.25)
5. Case tolerance: ±0.02 (±0.5)

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage Range	9		18	VDC	12 V nominal
	18		36	VDC	24 V nominal
Input Current					See Models and Ratings table
Inrush Current			20	A	at 36 V
Input Filter	Pi type				
Patient Leakage Current			2	µA	
Undervoltage Lockout	On at >8.8 V. Off <8.3 V				12 V models
	On at >17.5 V. Off <17.0 V				24 V models
Input Surge			25	VDC	12 V models for 3 s
			50	VDC	24 V models for 3 s

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	5		15	V	See Models and Ratings table
Output Voltage Trim			±10	%	Via external resistors, see Application Notes
Initial Set Accuracy			±1	%	on V1
			±2	%	on V2 of dual output models
Minimum Load	0			A	No minimum load required
Start Up Delay		5		ms	
Start Up Rise Time		2		ms	
Line Regulation			±0.3	%	
Load Regulation			±2	%	0 - 10% load
			±1	%	10 - 100% load
Cross Regulation			±4	%	On dual output models with one output set to 50% load and the other varied from 10% to 100% load (D05 20% to 100%)
Transient Response			4	% deviation	Recovery to within 1% in <500 µs for a 50% load change at 0.25 A/µs rate
Ripple & Noise			1	% pk-pk	20 MHz bandwidth
Short Circuit Protection					Trip & Restart (hiccup mode), auto recovery
Overload Protection	120		200	%	Trip & Restart (hiccup mode)
Overvoltage Protection	115		140	%	Non latching, auto recovery
Temperature Coefficient			0.03	%/°C	

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		86		%	See Models and Ratings table
Isolation			4000	VAC	For 1 min. Double/reinforced with a working voltage of 250 VAC. Meets 2 x MOPP per 3rd edition of IEC60601-1 5000 VAC for 10 ms in accordance with IEC60664-1
Input to Output Capacitance			20	pF	
Switching Frequency		250		kHz	
Power Density			23	W/in^3	
Mean Time Between Failure		>1		MHrs	MIL-HDBK-217F, +25 °C GB
Weight		0.04 (20.0)		lb (g)	

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-40		+80	°C	See derating curve
Storage Temperature	-55		+100	°C	
Case Temperature			+100	°C	
Humidity	5		90	%RH	Non-condensing
Cooling					Natural convection
Shock	±3 shocks in each plane, total 18 shocks of 30 g : 11 ms halfsine. Conforms to EN60068-2-27 & EN60068-2-47				
Vibration	10-500 Hz at 2 g sweep and endurance at resonance in all 3 planes. Conforms to EN60068-2-6				

EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55011 & EN55022	Level A	
Radiated	EN55011 & EN55022	Level A	

EMC: Immunity

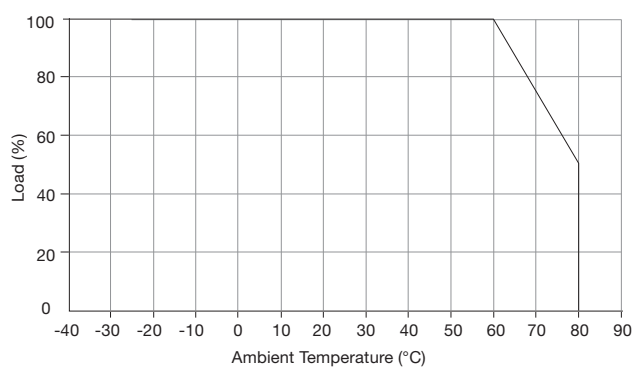
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Immunity	IEC60601-1-2, EN61204-3			
ESD Immunity	EN61000-4-2	2	A	
Radiated Immunity	EN61000-4-3	10 V/m	A	
EFT/Burst	EN61000-4-4	2	A	
Surges	EN61000-4-5	1	A	
Conducted Immunity	EN61000-4-6	10 Vm	A	
Magnetic Fields	EN61000-4-8	3 A/m	A	
Safety Approvals	ANSI/AMMI ES60601-1 3rd Edition, CSA-22.2 No.60601-1:2008, IEC60601-1 3rd Edition			

Safety Approvals

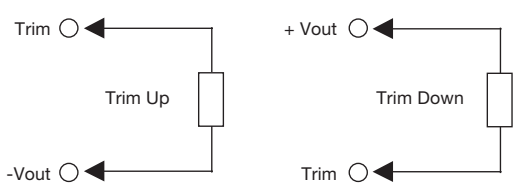
Safety Agency	Safety Standard	Notes & Conditions
CB Report	IEC60601-1 Ed 3 Including Risk Management	Medical
UL	ANSI/AAMI ES60601-1 3rd Ed. & CSA C22.2, No.60601-1:2008	Medical

Application Notes

Derating Curve



External Output Trim



For 5 V output:
Trim +10%, R = 3.4 k typical
Trim -10%, R = 1.1 k typical

For 12 V output:
Trim +10%, R = 5.9 k typical
Trim -10%, R = 11.3 k typical

For 15 V output:
Trim +10%, R = 8.4 k typical
Trim -10%, R = 10.4 k typical

For ±5 V output:
Trim +10%, R = 12.0 k typical
Trim -10%, R = 8.0 k typical

For ±12 V output:
Trim +10%, R = 12.8 k typical
Trim -10%, R = 9.5 k typical

For ±15 V output:
Trim +10%, R = 18 k typical
Trim -10%, R = 14.8 k typical