JHL03 Series

DC-DC Converter

XP Power

3 Watts

- International Medical Approvals
- 4000 VAC Reinforced Insulation
- Meets IEC60601-1, 3rd Edition
- 2 MOPP Isolation at 250 VAC
- 2 µA Patient Leakage Current
- DIP24 Package
- EN55011 Level A With No External Components
- 3 Year Warranty

Dimensions:

JHL03:
1.25 x 0.80 x 0.40″ (31.15 x 20.32 x 10.20 mm)

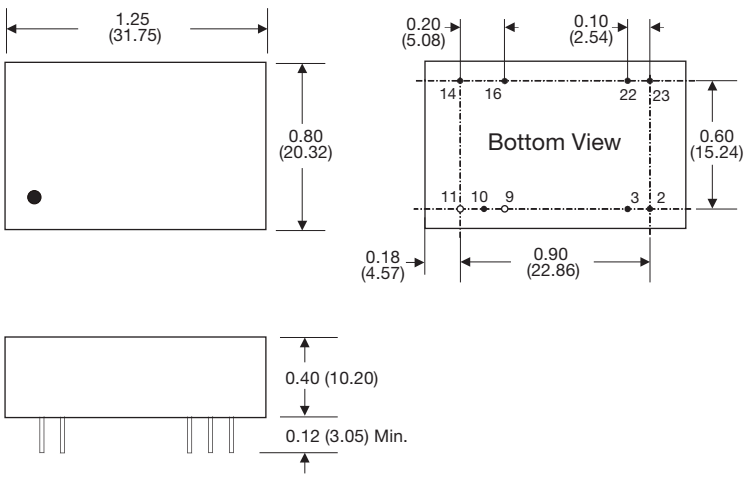
Models & Ratings

Input Voltage	Output Voltage	Output Current	Input Current		Maximum Capacitive Load[3]	Efficiency[4]	Model Number
			No Load[1]	Full Load[2]			
10-17 V	5.0 V	600 mA	56 mA	325 mA	720 µF	76%	JHL0312S05
	12.0 V	250 mA	72 mA	316 mA	300 µF	78%	JHL0312S12
	15.0 V	200 mA	67 mA	315 mA	240 µF	78%	JHL0312S15
	±12.0 V	±125 mA	43 mA	304 mA	±140 µF	81%	JHL0312D12
	±15.0 V	±100 mA	56 mA	303 mA	±120 µF	80%	JHL0312D15
20-30 V	5.0 V	600 mA	38 mA	167 mA	720 µF	74%	JHL0324S05
	12.0 V	250 mA	37 mA	165 mA	300 µF	78%	JHL0324S12
	15.0 V	200 mA	23 mA	146 mA	240 µF	82%	JHL0324S15
	±12.0 V	±125 mA	29 mA	150 mA	±140 µF	80%	JHL0324D12
	±15.0 V	±100 mA	42 mA	166 mA	±120 µF	80%	JHL0324D15

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
2	-Vin	-Vin
3	-Vin	-Vin
9	No Pin	Common
10	Trim	Trim
11	No Pin	-Vout
14	+Vout	+Vout
16	-Vout	Common
22	+Vin	+Vin
23	+Vin	+Vin

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: ±0.014 (±0.35)
5. Case tolerance: ±0.02 (±0.5)

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage Range	10		17	VDC	12 V nominal
	20		30	VDC	24 V nominal
Input Current					See Models and Ratings table
Inrush Current			25	A	At 30 VDC input
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		30	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			±1	%	0 - 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	%	
Temperature Coefficient			0.03	%/°C	

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		80		%	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
Patient Leakage Current			2	µA	
Input to Output Capacitance			20	pF	
Switching Frequency		250		kHz	
Power Density			7.5	W/in³	
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	-20		+80	°C	See derating curve
Storage Temperature	-40		+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	Level A	
Radiated	EN55011	Level A	

EMC: Immunity

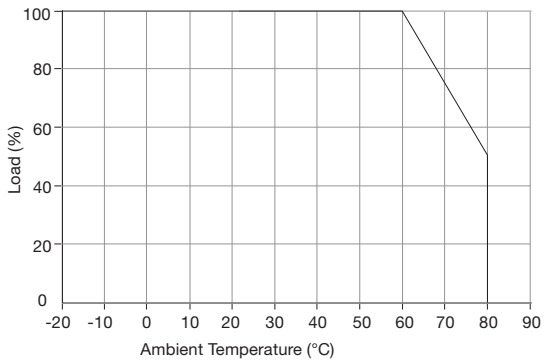
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Immunity	IEC60601-1-2	Ed 4.0: 2014	As Below	
ESD Immunity	EN61000-4-2	±8 kv Contact, ±15 kv Air	A	
Radiated Immunity	EN61000-4-3	10 V/m	A	80 MHz - 2.7 GHz plus discrete communication proximity field frequencies
EFT/Burst	EN61000-4-4	2	A	
Surges	EN61000-4-5	1	A	
Conducted Immunity	EN61000-4-6	3 Vm	A	
Magnetic Fields	EN61000-4-8	30 A/m	A	
Safety Approvals	ANSI/AMMI ES60601-1 3rd Edition, CSA-22.2 No.60601-1:2008, IEC60601-1 3rd Edition			

Safety Approvals

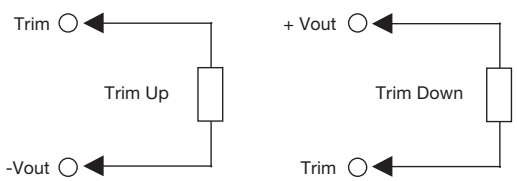
Safety Agency	Safety Standard	Notes & Conditions
CB Report	IEC60601-1 Including Risk Management	Medical
UL	ANSI/AAMI ES60601-1 3rd Ed. & CSA C22.2, No.60601-1:2008	Medical

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 ±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