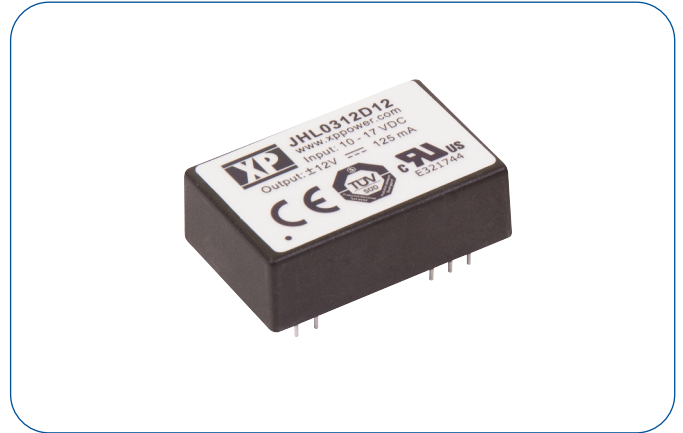


### 3 Watts

- International Medical Approvals
- 4000 VAC Reinforced Insulation
- Meets IEC60601-1, 3rd Edition
- 2 MOPP Isolation at 250 VAC
- 2  $\mu$ A 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

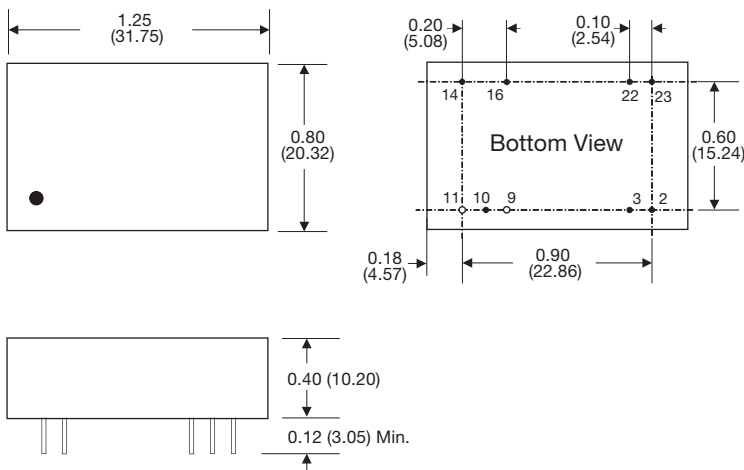
Input Voltage	Output Voltage	Output Current	Input Current		Maximum Capacitive Load <sup>(3)</sup>	Efficiency <sup>(4)</sup>	Model Number
			No Load <sup>(1)</sup>	Full Load <sup>(2)</sup>			
10-17 V	5.0V	600 mA	56 mA	325 mA	720 $\mu$ F	76%	JHL0312S05
	12.0V	250 mA	72 mA	316 mA	300 $\mu$ F	78%	JHL0312S12
	15.0V	200 mA	67 mA	315 mA	240 $\mu$ F	78%	JHL0312S15
	$\pm$ 12.0V	$\pm$ 125 mA	43 mA	304 mA	$\pm$ 140 $\mu$ F	81%	JHL0312D12
	$\pm$ 15.0V	$\pm$ 100 mA	56 mA	303 mA	$\pm$ 120 $\mu$ F	80%	JHL0312D15
20-30 V	5.0V	600 mA	38 mA	167 mA	720 $\mu$ F	74%	JHL0324S05
	12.0V	250 mA	37 mA	165 mA	300 $\mu$ F	78%	JHL0324S12
	15.0V	200 mA	23 mA	146 mA	240 $\mu$ F	82%	JHL0324S15
	$\pm$ 12.0V	$\pm$ 125 mA	29 mA	150 mA	$\pm$ 140 $\mu$ F	80%	JHL0324D12
	$\pm$ 15.0V	$\pm$ 100 mA	42 mA	166 mA	$\pm$ 120 $\mu$ F	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	Pin Connections	
	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  $\pm$  0.002 (0.5  $\pm$  0.05)
4. Pin pitch tolerance:  $\pm$ 0.014 ( $\pm$ 0.35)
5. Case tolerance:  $\pm$ 0.02 ( $\pm$ 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 30VDC input
Input Filter	Pi type				
Patient Leakage Current			2	µA	
Undervoltage Lockout	On at >8.8V. Off <8.3V				12 V models
	On at >17.5V. Off <17.0V				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/in <sup>3</sup>	
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

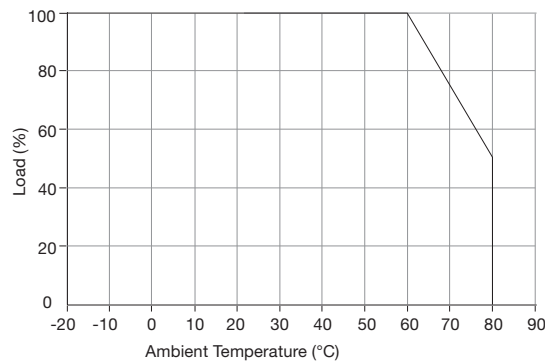
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Immunity	IEC60601-1-2	Ed 4.0: 2014	As Below	
ESD Immunity	EN61000-4-2	±8 kv Contact, ±15 kv Air	A	
Radiated Immunity	EN61000-4-3	10 V/m	A	80 MHz - 2.7 GHz plus discrete communication proximity field frequencies
EFT/Burst	EN61000-4-4	2	A	
Surges	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

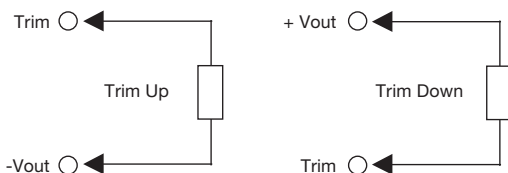
Safety Agency	Safety Standard	Notes & Conditions
CB Report	IEC60601-1 Including Risk Management	Medical
UL	ANSI/AAMI ES60601-1 3rd Ed. & CSA C22.2, No.60601-1:2008	Medical
EN	EN60601-1	Medical

### 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

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[JHL0324S12](#) [JHL0324D15](#)