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DC–DC

10 Watts
JHM10 Series

xppower.com



- International Medical Approvals
- 4000 VAC Reinforced Insulation
- Meets IEC60601–1, 3rd Edition
- 2 µA Patient Leakage Current
- DIP–24 Package
- EN55011 Level A With No External Components
- 3 Year Warranty

Specification

Input

Input Voltage Range	• 5 V (4.5-9 VDC) 12 V (9-18 VDC) 24 V (18-36 VDC)
Input Current	• See table
Inrush Current	• 20 A max at 36 V
Input Filter	• Pi network
Patient Leakage Current	• 2 µA max
Undervoltage Lockout	• 5 V models, on at >4.4 V, off <4.2 V 12 V models, on at >8.8 V, off <8.3 V 24 V models, on at >17.5 V, off <17.0 V
Input Surge	• 5 V models 15 V for 3 s 12 V models 25 V for 3 s 24 V models 50 V for 3 s

Output

Output Voltage	• See table
Output Voltage Trim	• ±10%
Minimum Load	• No minimum load required
Initial Set Accuracy	• ±1% max on V1, ±2% max on V2
Start Up Delay	• 5 ms typical
Start Up Rise Time	• 2 ms typical
Line Regulation	• ±0.3% max
Load Regulation	• ±2% max 0% to 10% load, ±1% max 10% to 100% load
Cross Regulation	• ±4% max on dual with one output set to 50% load and the other varied from 10% to 100% load (D05 is 20% to 100%)
Transient Response	• 4% max deviation, recovery to within 1% in <500 µs for a 50% load change at 0.25 A/µs rate
Ripple & Noise	• 1% pk-pk max at 20 MHz bandwidth
Overload Protection	• 120% - 200%, trip and restart
Overvoltage Protection	• 115% - 140%
Temperature Coefficient	• ±0.03/°C max
Short Circuit Protection	• Trip and Restart (hiccup mode), auto recovery

General

Efficiency	• See tables
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 max
Switching Frequency	• 80 kHz to 1.2 MHz variable
Power Density	• 20.0 W/in^3
MTBF	• >1 MHrs typical to MIL-STD-217F at 25 °C, GB

Environmental

Operating Temperature	• -40 °C to +80 °C, see derating curve
Case Temperature	• +100 °C max
Storage Temperature	• -40 °C to +100 °C
Operating Humidity	• 5-90%, non-condensing
Cooling	• Natural convection

EMC & Safety

Emissions	• EN55011 & EN55022 level A conducted & radiated with no external components
Immunity	• IEC60601-1-2, EN61204-3
ESD Immunity	• EN61000-4-2, level 2, Perf Criteria A
Radiated Immunity	• EN61000-4-3, 10 V/m Perf Criteria A
EFT/Burst	• EN61000-4-4, level 2 Perf Criteria A
Surge	• EN61000-4-5, level 1 Perf Criteria A
Conducted Immunity	• EN61000-4-6, 10 Vm, Perf Criteria A
Magnetic Field	• EN61000-4-8, 3 A/m Perf Criteria A
Safety Approvals	• ANSI/AMMI ES60601-1 3rd Edition CSA-22.2 No.60601-1:2008 IEC60601-1 3rd Edition

Models and Ratings

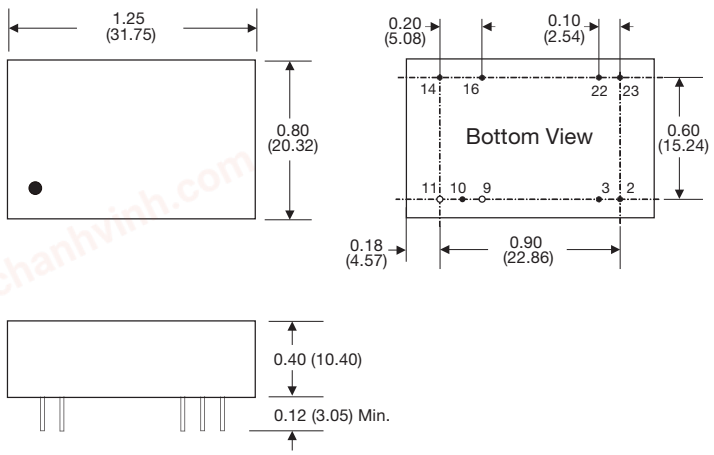
JHM10

Input Voltage	Output Voltage	Output Current	Input Current		Maximum Capacitive Load	Efficiency[3]	Model Number
			No Load[1]	Full Load[2]			
4.5-9 V	5.0 V	2000 mA	100 mA	2690 mA	2200 µF	83.5%	JHM1005S05
	12.0 V	833 mA	115 mA	2640 mA	1000 µF	85.0%	JHM1005S12
	15.0 V	666 mA	115 mA	2640 mA	680 µF	85.0%	JHM1005S15
	±5.0 V	±1000 mA	130 mA	2760 mA	±1000 µF	81.5%	JHM1005D05
	±12.0 V	±420 mA	115 mA	2695 mA	±470 µF	84.0%	JHM1005D12
	±15.0 V	±333 mA	115 mA	2670 mA	±470 µF	84.0%	JHM1005D15
9-18 V	5.0 V	2000 mA	50 mA	1310 mA	2200 µF	86.0%	JHM1012S05
	12.0 V	833 mA	50 mA	1280 mA	1000 µF	88.0%	JHM1012S12
	15.0 V	666 mA	50 mA	1265 mA	680 µF	89.0%	JHM1012S15
	±5.0 V	±1000 mA	50 mA	1345 mA	±1000 µF	84.0%	JHM1012D05
	±12.0 V	±420 mA	50 mA	1290 mA	±470 µF	88.0%	JHM1012D12
	±15.0 V	±333 mA	50 mA	1280 mA	±470 µF	88.0%	JHM1012D15
18-36 V	5.0 V	2000 mA	25 mA	645 mA	2200 µF	87.0%	JHM1024S05
	12.0 V	833 mA	20 mA	630 mA	1000 µF	89.0%	JHM1024S12
	15.0 V	666 mA	20 mA	630 mA	680 µF	89.0%	JHM1024S15
	±5.0 V	±1000 mA	20 mA	660 mA	±1000 µF	85.0%	JHM1024D05
	±12.0 V	±420 mA	25 mA	640 mA	±470 µF	88.0%	JHM1024D12
	±15.0 V	±333 mA	25 mA	635 mA	±470 µF	88.0%	JHM1024D15

Notes

1. Input current measured at nominal input voltage.
2. Input current measured at lowest input voltage.
3. Typical values.

Mechanical Details



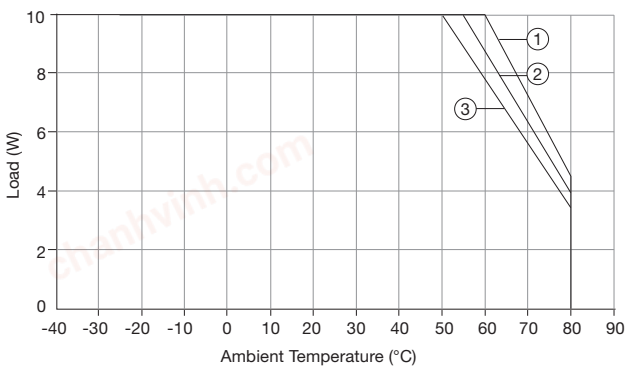
Pin Connections		
Pin	Single	Dual
2	-Vin	-Vin
3	-Vin	-Vin
9	No Pin	Common
10	Trim	Trim
11	No Pin	-Vout
14	+Vout	+Vout
16	-Vout	Common
22	+Vin	+Vin
23	+Vin	+Vin

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: ±0.01 (±0.25)
5. Case tolerance: ±0.02 (±0.5)

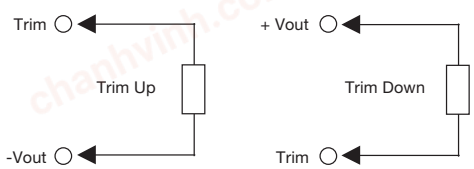
Application Notes

Derating Curve



(1) JHM1012/24 S05, S12,S15, D12, D15
(2) JHM1012/24 D05, JHM1005S05, S12, S15, D12, D15
(3) JHM1005D05

External Output Trim



For 5 V output:
Trim +10%, R = 3.4 k typical
Trim -10%, R = 1 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 = 5.9 k typical
Trim -10%, R = 11.3 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 = 8.3 k typical
Trim -10%, R = 10 k typical

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