

## JHM10 Series



- International Medical Approvals
- 4000 VAC Reinforced Insulation
- Meets IEC60601-1
- 2  $\mu$ A Patient Leakage Current
- DIP-24 Package
- EN55011 Level A With No External Components
- 3 Year Warranty

## Specification

## Input

|                         |  |
|-------------------------|--|
| Input Voltage Range     | <ul style="list-style-type: none"> <li>• 5 V (4.5-9 VDC)</li> <li>• 12 V (9-18 VDC)</li> <li>• 24 V (18-36 VDC)</li> </ul>   |
| Input Current           | <ul style="list-style-type: none"> <li>• See table</li> </ul>  |
| Inrush Current          | <ul style="list-style-type: none"> <li>• 20 A max at 36 V</li> </ul>   |
| Input Filter            | <ul style="list-style-type: none"> <li>• Pi network</li> </ul>   |
| Patient Leakage Current | <ul style="list-style-type: none"> <li>• 2 <math>\mu</math>A max</li> </ul>  |
| Undervoltage Lockout    | <ul style="list-style-type: none"> <li>• 5 V models, on at &gt;4.4 V, off &lt;4.2 V</li> <li>• 12 V models, on at &gt;8.8 V, off &lt;8.3 V</li> <li>• 24 V models, on at &gt;17.5 V, off &lt;17.0 V</li> </ul> |
| Input Surge             | <ul style="list-style-type: none"> <li>• 5 V models 15 V for 3 s</li> <li>• 12 V models 25 V for 3 s</li> <li>• 24 V models 50 V for 3 s</li> </ul>  |

## Output

|                          |  |
|--------------------------|--|
| Output Voltage           | <ul style="list-style-type: none"> <li>• See table</li> </ul>  |
| Output Voltage Trim      | <ul style="list-style-type: none"> <li>• <math>\pm</math>10%</li> </ul>  |
| Minimum Load             | <ul style="list-style-type: none"> <li>• No minimum load required</li> </ul>   |
| Initial Set Accuracy     | <ul style="list-style-type: none"> <li>• <math>\pm</math>1% max on +Vout, <math>\pm</math>2% max on -Vout</li> </ul>   |
| Start Up Delay           | <ul style="list-style-type: none"> <li>• 5 ms typical</li> </ul>   |
| Start Up Rise Time       | <ul style="list-style-type: none"> <li>• 2 ms typical</li> </ul>   |
| Line Regulation          | <ul style="list-style-type: none"> <li>• <math>\pm</math>0.3% max</li> </ul>   |
| Load Regulation          | <ul style="list-style-type: none"> <li>• <math>\pm</math>2% max 0% to 10% load,</li> <li>• <math>\pm</math>1% max 10% to 100% load</li> </ul>                                      |
| Cross Regulation         | <ul style="list-style-type: none"> <li>• <math>\pm</math>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%)</li> </ul> |
| Transient Response       | <ul style="list-style-type: none"> <li>• 4% max deviation, recovery to within 1% in &lt;500 <math>\mu</math>s for a 50% load change at 0.25 A/<math>\mu</math>s rate</li> </ul>    |
| Ripple & Noise           | <ul style="list-style-type: none"> <li>• 1% pk-pk max at 20 MHz bandwidth</li> </ul>   |
| Overload Protection      | <ul style="list-style-type: none"> <li>• 120% - 200%, trip and restart</li> </ul>  |
| Overvoltage Protection   | <ul style="list-style-type: none"> <li>• 115% - 140%</li> </ul>  |
| Temperature Coefficient  | <ul style="list-style-type: none"> <li>• <math>\pm</math>0.03/<math>^{\circ}</math>C max</li> </ul>  |
| Short Circuit Protection | <ul style="list-style-type: none"> <li>• Trip and Restart (hiccup mode), auto recovery</li> </ul>  |

## General

|                             |   |
|-----------------------------|---|
| Efficiency                  | <ul style="list-style-type: none"> <li>• See tables</li> </ul>  |
| Isolation                   | <ul style="list-style-type: none"> <li>• 4000 VAC for 1 min. double/reinforced with a working voltage of 250 VAC. Meets 2 x MOPP per 3rd edition of IEC60601-1</li> <li>• 5000 VAC for 10 ms in accordance with IEC60664-1</li> </ul> |
| Input to Output Capacitance | <ul style="list-style-type: none"> <li>• 20 pF max</li> </ul>   |
| Switching Frequency         | <ul style="list-style-type: none"> <li>• 80 kHz to 1.2 MHz variable</li> </ul>  |
| Power Density               | <ul style="list-style-type: none"> <li>• 20.0 W/in<sup>3</sup></li> </ul>   |
| MTBF                        | <ul style="list-style-type: none"> <li>• &gt;1 Mhrs typical to MIL-STD-217F at 25 <math>^{\circ}</math>C, GB</li> </ul>   |

## Environmental

|                       |  |
|-----------------------|--|
| Operating Temperature | <ul style="list-style-type: none"> <li>• -40 <math>^{\circ}</math>C to +80 <math>^{\circ}</math>C, see derating curve</li> </ul> |
| Case Temperature      | <ul style="list-style-type: none"> <li>• +100 <math>^{\circ}</math>C max</li> </ul>  |
| Storage Temperature   | <ul style="list-style-type: none"> <li>• -40 <math>^{\circ}</math>C to +100 <math>^{\circ}</math>C</li> </ul>                    |
| Operating Humidity    | <ul style="list-style-type: none"> <li>• 5-90%, non-condensing</li> </ul>  |
| Cooling               | <ul style="list-style-type: none"> <li>• Natural convection</li> </ul>   |

## EMC &amp; Safety

|                    |  |
|--------------------|--|
| Emissions          | <ul style="list-style-type: none"> <li>• EN55011 &amp; EN55032 level A conducted &amp; radiated with no external components</li> </ul> |
| Immunity           | <ul style="list-style-type: none"> <li>• IEC60601-1-2, EN61204-3</li> </ul>  |
| ESD Immunity       | <ul style="list-style-type: none"> <li>• EN61000-4-2, level 2, Perf Criteria A</li> </ul>  |
| Radiated Immunity  | <ul style="list-style-type: none"> <li>• EN61000-4-3, 10 V/m Perf Criteria A</li> </ul>  |
| EFT/Burst          | <ul style="list-style-type: none"> <li>• EN61000-4-4, level 2 Perf Criteria A</li> </ul>   |
| Surge              | <ul style="list-style-type: none"> <li>• EN61000-4-5, level 1 Perf Criteria A</li> </ul>   |
| Conducted Immunity | <ul style="list-style-type: none"> <li>• EN61000-4-6, 10 Vm, Perf Criteria A</li> </ul>  |
| Magnetic Field     | <ul style="list-style-type: none"> <li>• EN61000-4-8, 3 A/m Perf Criteria A</li> </ul>   |
| Safety Approvals   | <ul style="list-style-type: none"> <li>• ANSI/AMMI ES60601-1</li> <li>• CSA-22.2 No.60601-1</li> <li>• IEC60601-1</li> </ul>           |

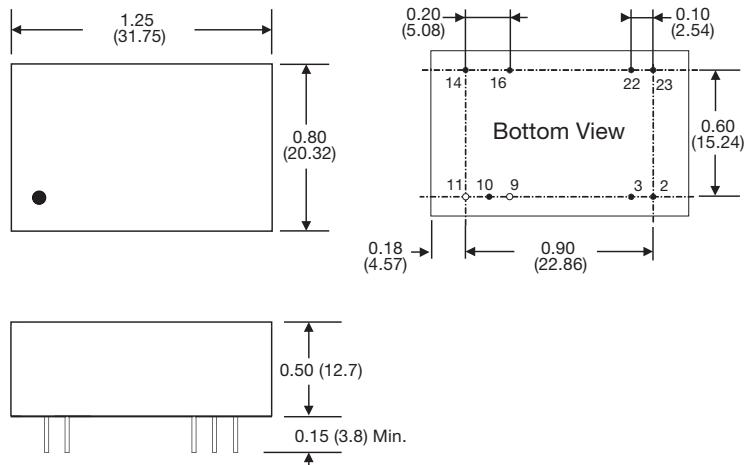
## Models and Ratings

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



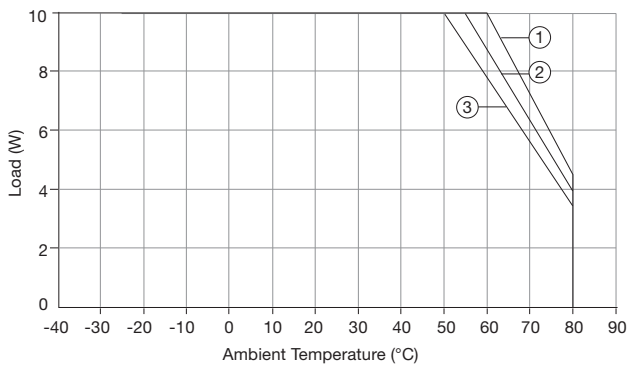
| Pin | Pin Connections |              |
|-----|-----------------|--------------|
|     | Single          | Dual         |
| 2   | -Vin            | -Vin         |
| 3   | -Vin            | -Vin         |
| 9   | No Pin          | Common 0Vout |
| 10  | Trim            | Trim         |
| 11  | No Pin          | -Vout        |
| 14  | +Vout           | +Vout        |
| 16  | -Vout           | Common 0Vout |
| 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)

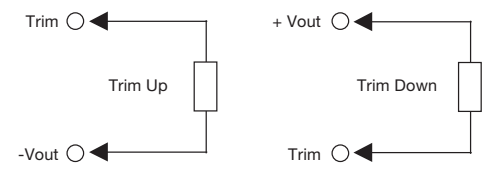
## Application Notes

### Derating Curve



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

### External Output Trim



- |   |  |
|---|--|
| <p>For 5V output:<br/>Trim +10%, R = 3.4 k typical<br/>Trim -10%, R = 1 k typical</p>     | <p>For ±5V output:<br/>Trim +10%, R = 12.0 k typical<br/>Trim -10%, R = 8.0 k typical</p>  |
| <p>For 12V output:<br/>Trim +10%, R = 5.9 k typical<br/>Trim -10%, R = 11.3 k typical</p> | <p>For ±12V output:<br/>Trim +10%, R = 12.8 k typical<br/>Trim -10%, R = 9.5 k typical</p> |
| <p>For 15V output:<br/>Trim +10%, R = 8.3 k typical<br/>Trim -10%, R = 10 k typical</p>   | <p>For ±15V output:<br/>Trim +10%, R = 18 k typical<br/>Trim -10%, R = 14.8 k typical</p>  |

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

## [XP Power:](#)

[JHM1012S05](#) [JHM1005S05](#) [JHM1005D05](#) [JHM1024S12](#) [JHM1024S15](#) [JHM1005S15](#) [JHM1024D15](#) [JHM1005D12](#)  
[JHM1012D05](#) [JHM1024D05](#) [JHM1012S15](#) [JHM1012D15](#) [JHM1024D12](#) [JHM1005D15](#) [JHM1012S12](#)  
[JHM1012D12](#) [JHM1024S05](#) [JHM1005S12](#)