

10W



The 10W JHM10 series is designed for medical applications with 2 x MOPP 4kVAC reinforced isolation and 2µA patient leakage current, it is housed in a DIP24 PCB mount plastic case.

Featuring a 2:1 input voltage range of 4.5 to 9VDC, 9 to 18VDC or 18 to 36VDC with regulated single outputs of 5, 12 & 15VDC, dual outputs ± 5 , ± 12 & ± 15 VDC, adjustable $\pm 10\%$ with a trim resistor.

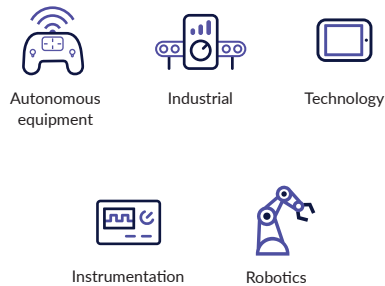
Short circuit, overload & over voltage protection are standard. Operating temperature range is from -40°C to $+80^{\circ}\text{C}$, with derating above $+50^{\circ}\text{C}$.



Features

- ▶ Regulated single & dual outputs
- ▶ 2:1 input range
- ▶ Single outputs 5.0 to 15VDC
- ▶ Dual outputs ± 12 & ± 15 VDC
- ▶ DIP24 package
- ▶ International medical safety approvals
- ▶ 4.0kVAC reinforced isolation
- ▶ 2µA patient leakage current
- ▶ EN55011 level A with no external components
- ▶ -40°C to $+80^{\circ}\text{C}$ operating temperature
- ▶ Full power to $+50^{\circ}\text{C}$
- ▶ 3 year warranty

Applications



Dimensions

31.75 x 15.24 x 10.4mm (1.24" x 0.6" x 0.4")

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Models & ratings

Model number	Input voltage	Output voltage	Output current	Input current		Efficiency ⁽³⁾	Maximum capacitive load
				No load ⁽¹⁾	Full load ⁽²⁾		
JHM1005S05	4.5-9VDC	5.0VDC	2000mA	100mA	2690mA	83.5%	2200µF
JHM1005S12		12.0VDC	833mA	115mA	2640mA	85.0%	1000µF
JHM1005S15		15.0VDC	666mA	115mA	2640mA	85.0%	680µF
JHM1005D05		± 5.0 VDC	± 1000 mA	130mA	2760mA	81.5%	± 1000 µF
JHM1005D12		± 12.0 VDC	± 420 mA	115mA	2695mA	84.0%	± 470 µF
JHM1005D15		± 15.0 VDC	± 333 mA	115mA	2670mA	84.0%	± 470 µF
JHM1012S05	9-18VDC	5.0VDC	2000mA	50mA	1310mA	86.0%	2200µF
JHM1012S12		12.0VDC	833mA	50mA	1280mA	88.0%	1000µF
JHM1012S15		15.0VDC	666mA	50mA	1265mA	89.0%	680µF
JHM1012D05		± 5.0 VDC	± 1000 mA	50mA	1345mA	84.0%	± 1000 µF
JHM1012D12		± 12.0 VDC	± 420 mA	50mA	1290mA	88.0%	± 470 µF
JHM1012D15		± 15.0 VDC	± 333 mA	50mA	1280mA	88.0%	± 470 µF

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Notes:

1. Input current measured at nominal input voltage.
2. Input current measured at lowest input voltage.

3. Typical values.

Models & ratings

Model number	Input voltage	Output voltage	Output current	Input current		Efficiency ⁽³⁾	Maximum capacitive load
				No load ⁽¹⁾	Full load ⁽²⁾		
JHM1024S05	18-36VDC	5.0VDC	2000mA	25mA	645mA	87.0%	2200μF
JHM1024S12		12.0VDC	833mA	25mA	630mA	89.0%	1000μF
JHM1024S15		15.0VDC	666mA	25mA	630mA	89.0%	680μF
JHM1024D05		±5.0VDC	±1000mA	25mA	660mA	85.0%	±1000μF
JHM1024D12		±12.0VDC	±420mA	25mA	640mA	88.0%	±470μF
JHM1024D15		±15.0VDC	±333mA	25mA	635mA	88.0%	±470μF

Notes:

1. Input current measured at nominal input voltage.
2. Input current measured at lowest input voltage.

3. Typical values.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage range	4.5		9	VDC	5VDC nominal
	9		18		12VDC nominal
	18		36		24VDC nominal
Input current	See models & ratings table				
Inrush current			20	A	At 36V
Input filter	Pi network				
Patient leakage current			2	μA	
Undervoltage lockout	On: >4.4V		Off: <4.2V		5VDC models
	On: >8.8V		Off: <8.3V		12VDC models
	On: >17.5V		Off: <17.0V		24VDC models
Input surge		15		VDC	5VDC models (for 300ms)
		25			12VDC models (for 300ms)
		50			24VDC models (for 300ms)

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage	See models & ratings table				
Output voltage trim		±10		%	
Minimum load	0			%	No minimum load required
Initial set accuracy			±1	%	On +Vout, ±2% max on -Vout
Start up delay		5		ms	
Start up rise time		2		ms	
Line regulation			±0.3	%	
Load regulation			±2	%	0% to 10% load
			±1		10% to 100% load
Cross regulation			4	%	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			3	%	Deviation, recovery to within 1% in <500μs for a 50% load change at 0.25A/μs rate
Ripple & noise		1		% pk-pk	20MHz bandwidth
Overload protection	120		200	%	Trip and restart
Overvoltage protection	115		140	%	
Short circuit protection	Trip & restart (hiccup) with auto recovery				
Temperature coefficient		±0.03		%/ °C	

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency	See models & ratings table				
Isolation	4000VAC for 1min. double/reinforced with a working voltage of 250VAC. Meets 2 x MOPP per 3rd edition of IEC60601-1 5000VAC for 10ms in accordance with IEC60664-1				
Input to output capacitance			20	pF	
Switching frequency		80		kHz	To 1.2MHz variable
Power density		1.2 (20.0)		W/cm ³ (W/in ³)	
Mean time between failure		>1		Mhrs	MIL-STD-217F at +25°C, GB

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Operating temperature	-40		+80	°C	See derating curve
Storage temperature	-40		+100	°C	
Case temperature			+100	°C	
Cooling	Convection cooled				
Operating humidity	5		90	%	Non condensing

Safety approvals

Certification	Standard	Notes & conditions
UL	ANSI/AMMI ES60601-1, CSA-22.2 No.60601-1	
EN	IEC60601-1	
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

Emissions - EMC

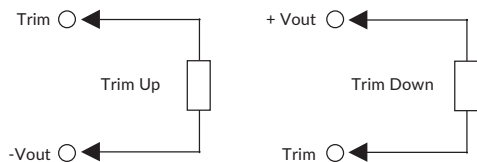
Phenomenon	Standard	Test level	Notes & conditions
Conducted	EN55011/EN55032	Class A	With no external components, see application note
Radiated	EN55011/EN55032	Class A	

Immunity - EMC

Phenomenon	Standard	Test level	Criteria	Notes & conditions
ESD immunity	EN61000-4-2		A	8kV contact discharge
Radiated immunity	EN61000-4-3	3V/m	A	

Application notes

External output trim



For 5V output:
Trim +10%, R = 3.4 kΩ typical
Trim -10%, R = 1 kΩ typical

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

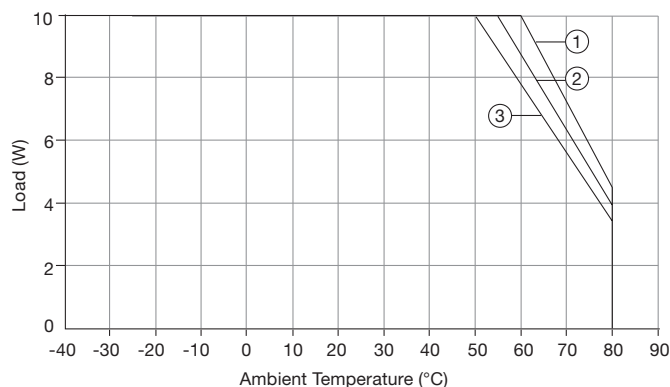
For 15V output:
Trim +10%, R = 8.3 kΩ typical
Trim -10%, R = 10 kΩ typical

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

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

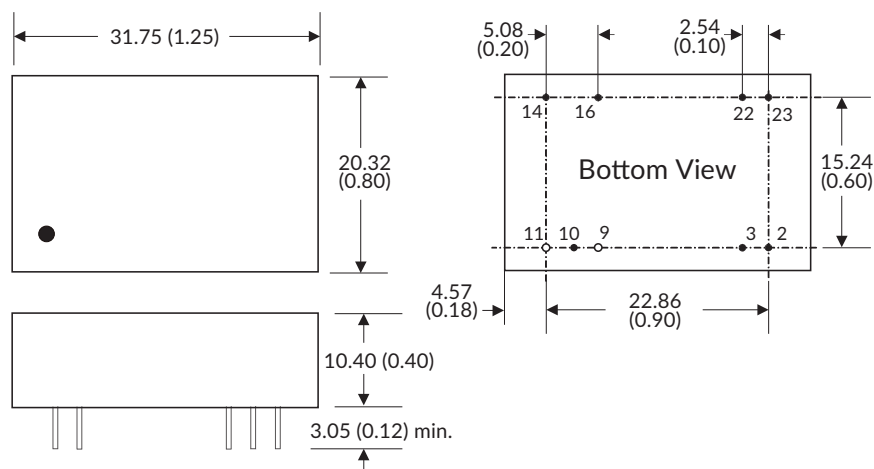
For ±15V output:
Trim +10%, R = 18 kΩ typical
Trim -10%, R = 14.8 kΩ typical

Derating curve



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

Mechanical details



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