

10W

DC-DC CONVERTER

The JMR10 series is a range of ultra-compact, regulated PCB-mount medical DC-DC converters which offers single and dual output voltages ranging from 5V to 15V. Housed in a ultra-compact DIP24 package, the JMR10 series features a 4:1 input voltage range and offers a $\pm 10\%$ output trim on single output versions. Its low no load power increases efficiency and extends runtime in battery powered applications. The JMR10 series features worldwide medical approvals, 2 x MOPP 5kVAC reinforced isolation and extremely low leakage currents benefitting system designers with easy integration into a wide range of BF and CF rated medical applications including imaging, patient monitoring, surgical equipment, patient treatment and dentistry.



Features

- Regulated single & dual outputs from 5 to 30VDC
- 4:1 input range
- Ultra-compact DIP24 PCB mount package
- Low no-load power
- 10% trim on single output versions
- IEC60601-1 medical safety agency approvals
- 5kVAC reinforced isolation
- 2 x MOPP at 250VAC
- 2 μ A patient leakage current
- Remote On/Off
- Short circuit, overload & overvoltage protection
- -40°C to +100°C operating temperature
- 3 year warranty

Dimensions

31.8 x 20.3 x 10.2mm (1.25" x 0.8" x 0.4")

Applications



Healthcare



Home Healthcare



Industrial Electronics



Medical Diagnostics

More Resources

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Models & Ratings

Model Number	Input Voltage	Output Voltage ⁽¹⁾	Output Current	Efficiency ⁽³⁾	Input Current ⁽⁴⁾		Maximum Capacitive Load
					No Load	Full Load	
JMR1012S05	12V (4.5-18V)	5V	2000mA	84.5%	20mA	987mA	3300 μ F
JMR1012S12		12V	833mA	86.5%	20mA	964mA	470 μ F
JMR1012S15 ⁽⁵⁾		15V	666mA	87%	20mA	957mA	330 μ F
JMR1012D05 ⁽⁵⁾		$\pm 5V$	$\pm 1000mA$	84.5%	20mA	987mA	$\pm 1470\mu F$
JMR1012D12		$\pm 12V$	$\pm 416mA$	86.5%	20mA	962mA	$\pm 680\mu F$
JMR1012D15	$\pm 15V$	$\pm 333mA$	87%	20mA	957mA	$\pm 390\mu F$	
JMR1024S05	24V (9.0-36.0V)	5V	2000mA	85%	6mA	491mA	3300 μ F
JMR1024S12		12V	833mA	88%	6mA	474mA	470 μ F
JMR1024S15 ⁽⁵⁾		15V	666mA	89%	6mA	469mA	330 μ F
JMR1024D05 ⁽⁵⁾		$\pm 5V$	$\pm 1000mA$	85%	6mA	491mA	$\pm 1470\mu F$
JMR1024D12		$\pm 12V$	$\pm 416mA$	88%	6mA	473mA	$\pm 680\mu F$
JMR1024D15	$\pm 15V$	$\pm 333mA$	89%	6mA	468mA	$\pm 390\mu F$	
JMR1048S05	48V (18.0-75.0V)	5V	2000mA	85%	4mA	246mA	3300 μ F
JMR1048S12		12V	833mA	88%	4mA	237mA	470 μ F
JMR1048S15 ⁽⁵⁾		15V	666mA	88%	4mA	237mA	330 μ F
JMR1048D05 ⁽⁵⁾		$\pm 5V$	$\pm 1000mA$	85%	4mA	246mA	$\pm 1470\mu F$
JMR1048D12		$\pm 12V$	$\pm 416mA$	88%	4mA	237mA	$\pm 680\mu F$
JMR1048D15	$\pm 15V$	$\pm 333mA$	88%	4mA	237mA	$\pm 390\mu F$	

Notes:

1. Dual output models can be used to provide a single output of 10V, 24V or 30V.
2. Specifications noted using nominal input voltage and full load at 25°C unless otherwise stated.

3. Measured at full load and nominal input voltage.
4. No load input current reduces to <3mA when module is inhibited.
5. Available for OEM quantities, please contact sales.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage Range	4.5		18	VDC	12V nominal
	9		36		24V nominal
	18		75		48V nominal
Inrush Current			80	A	At nominal input voltage
Input Reflected Ripple		20		mA pk-pk	Through 12 μ H inductor and 47 μ F capacitor
Input Surge			25	VDC for 100ms	12V nominal
			50		24V nominal
			100		48V nominal
Input Current Remote On/Off		2.5	8.0	mA	Idle current using remote "Off". See models and ratings table for no load input current with module "On"
Recommended Input Fuse (Slow blow)		5.0		A	12V nominal
		2.0			24V nominal
		1.0			48V nominal

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	5		30	VDC	See Models & Ratings table
Output Voltage Adjustment	-10		+10	%	See application note
Initial Set Accuracy			± 1	%	At full load
Minimum Load	0			%	No minimum load required
Line Regulation			± 0.5	%	From min to max input voltage
Load Regulation			± 1.0	%	From 0-100% load
Cross Regulation			± 5	%	Dual output, when one output at 25% load other is varied from 10% to full load
Transient Response Deviation	3		5	%	Deviation recovering to within 1% in 250 μ s for 25% load change at 0.1A/ μ s
Ripple & Noise			75/100	mV pk-pk	5V/12-15V outputs, 20MHz bandwidth, measured using 10 μ F ceramic capacitor at nominal Vin
Short Circuit Protection	Continuous, hiccup mode with auto recovery				
Maximum Capacitive Load	See Models & Ratings table				
Temperature Coefficient			0.02	%/°C	
Overload Protection		160		%	At nominal input voltage
Remote On/Off	Output is on if remote on/off (pin 1) is open with reference to pin 2 -Vin Output turns off if 2.2 to 12V is applied to remote On/Off (pin 1) or if connected to a current source of 2-4mA. See application note				

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		87		%	See Models & Ratings table
Isolation: Input to Output	5000			VAC	Reinforced insulation, 2 x MOPP, 60s, production test to 5kVAC
Working Voltage			250	VAC	
Creepage and Clearance	8			mm	
Isolation Resistance	10 ⁹			Ω	Input to output
Isolation Capacitance		17		pF	Input to output
Leakage Current		2		μ A	264VAC, 60Hz
Power Density			1.5	Wcm ³	
Mean Time Between Failure	650			khrs	MIL-HDBK-217F, +25°C GB
Switching Frequency		300		kHz	
Weight		14.0 (0.003)		g (lb)	
Solder Profile			260	°C	Waveflow. 1.5mm (0.05") from case, 10 seconds max.
Case Material	Non conductive black plastic UL94V-0 rated				
Potting Material	Silicone, UL94V-0 rated				
Pin Material	Solder coated brass dia. 0.5mm				
Water Wash	Use deionized water. Dry thoroughly				

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-40		+100	°C	See derating curve
Storage Temperature	-55		+125	°C	
Case Temperature			+110	°C	At nominal input voltage
Humidity Operating & Storage	5		95	%RH	Non-condensing
Cooling	Natural convection				
Operating Altitude			5000	m	Transport altitude 10km

Safety Approvals

Safety Agency	Standard	Notes & Conditions
UL	ANSI/AAMI ES60601-1, UL62368-1	
CSA	CSA C22.2 No. 60601-1	
TUV	EN60601-1	
CB	IEC/EN60601-1	
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55011	Class B	See application notes
Radiated	EN55011	Class B	

EMC: Immunity

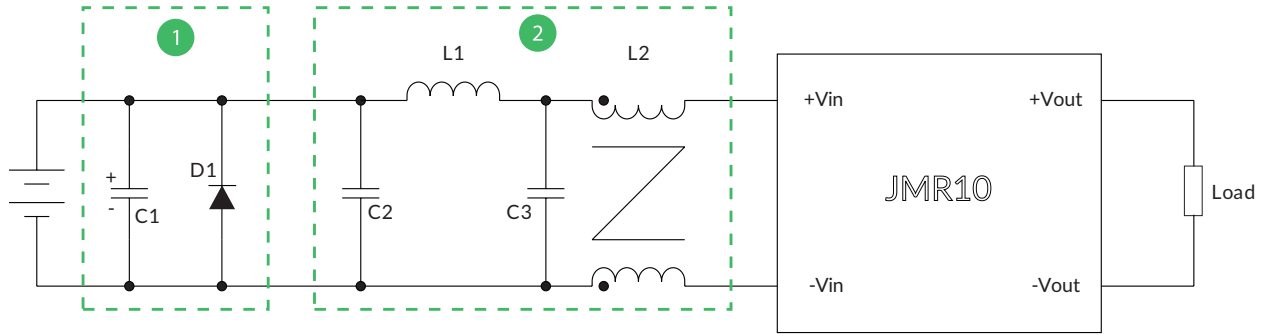
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Medical Device EMC	EN60601-1-2: 2015			IEC60601-1-2:2014 Ed4.0
ESD Immunity	EN61000-4-2	±8kV	A	Contact
		±15kV		Air
Radiated Immunity	EN61000-4-3	10V/m	A	
EFT/Burst	EN61000-4-4	±2kV	A	External component required, see application notes
Surge	EN61000-4-5	±2kV	A	External component required, see application notes
Conducted Immunity	EN61000-4-6	10Vrms	A	
Magnetic Fields	EN61000-4-8	100A/m	A	

Application Notes

EMC Filter

Circuit 1 for Surge & EFT, 2 for EMI class B.

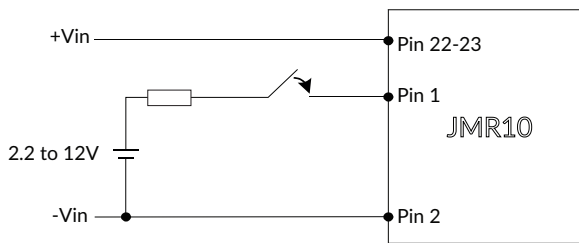
Single Output



Model Number	D1	C1 ⁽¹⁾	C2, C3	L1	L2
JMR1012XXX	SMDJ26A	470μF/100V	MLCC, 22μF, 35V	2.2μH	LFD648074-52UH-3.14A
JMR1024XXX	SMDJ58A	330μF/100V	MLCC, 4.7μF, 50V	4.7μH	LFD649075-175UA-1.76A
JMR1048XXX	SMDJ120A	330μF/100V	MLCC, 2.2μF, 100V	6.8μH	LFD649075-419UH-0.78A

⁽¹⁾ Nippon CHEMI-CON KY series

Remote On/Off

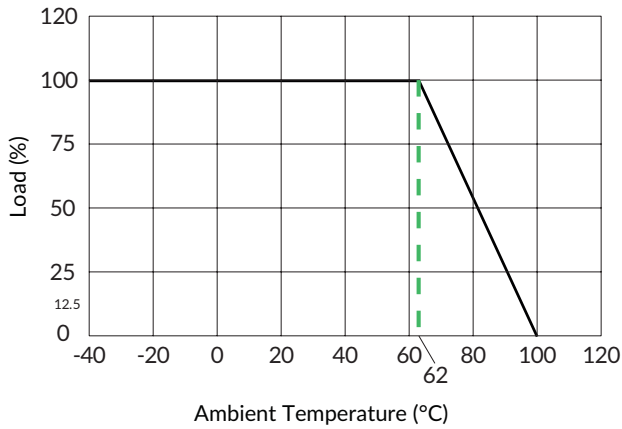


Module "On" if pin 1 is open circuit
 Module "Off" if pin 1 is connected to current source of 2-4mA, or a voltage of 2.2 to 12V is applied to pin 1 WRT pin 2.

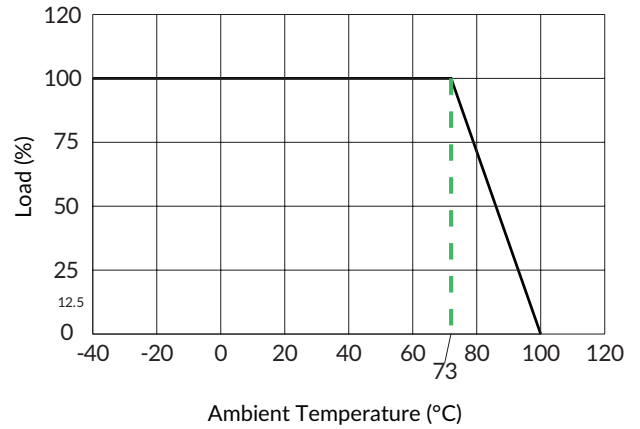
Application Notes

Derating Curves

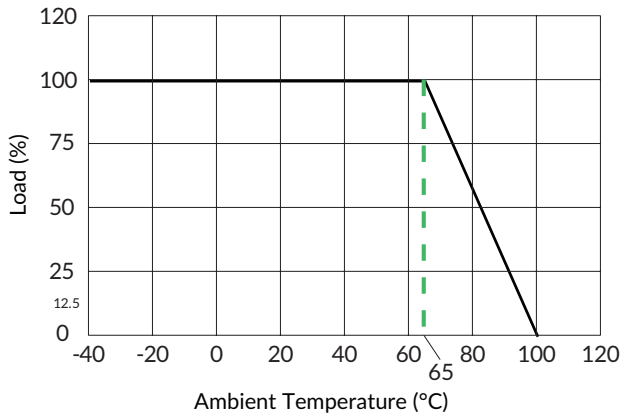
JMR1012S05, JMR1012D05, JMR1024S05, JMR1024D05



JMR1012S12, JMR1012D12, JMR12S15, JMR12D15



JMR1048S05, JMR1048D05



JMR1024S12, JMR1024S15, JMR1024D12, JMR1024D15,
JMR1048S12, JMR1048S15, JMR1048D12, JMR1048D15

