JMR03 series

XP Power

3.5W

DC-DC converters

The JMR03 family of ultra-compact, medically approved, 4:1 input devices provide 2 x MOPP and can be used in BF and CF rated applications with just 2µA leakage current. The ultra-small DIP16 module saves 45% of PCB area and the no load input idle current is greatly reduced giving longer run time in portable battery powered applications.

Features

- Regulated single & dual outputs
- World wide medical certification
- 4:1 input range
- Compact DIP16 package
- 5.0kVAC isolation
- 2 x MOPP at 250VAC working voltage
- Remote On/Off
- -40°C to +90°C operation
- 3 year warranty

Applications

Healthcare

Home healthcare

Medical Diagnostics

Dimensions

24.4 x 14.7 x 10.8 mm (0.96" x 0.58" x 0.43")

More resources

Click the link or scan the code

→ xppower.com

Models & ratings

Model number	Input voltage	Output voltage[1]	Output current	Efficiency[3]	Input current		Maximum capacitive load
					No load[4,5]	Full load	
JMR0312S05	12V (4.5-18V)	5V	700mA	77%	25mA	378mA	1470µF
JMR0312S12		12V	292mA	82%	50mA	356mA	470µF
JMR0312S15		15V	234mA	82%	45mA	356mA	330µF
JMR0312D12		±12V (24V)	±146mA	81%	50mA	360mA	±220µF
JMR0312D15		±15V (30V)	±117mA	81%	60mA	361mA	±160µF

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Notes:

1. Dual output models can be used to provide a single output of 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. At nominal input voltage
5. No load input current reduces to <3mA when module is inhibited

Models & ratings

Model number	Input voltage	Output voltage[1]	Output current	Efficiency[3]	Input current		Maximum capacitive load
					No load[4,5]	Full load	
JMR0324S05	24V (9.0-36.0V)	5V	700mA	78%	20mA	186mA	1470µF
JMR0324S12		12V	292mA	83%	25mA	175mA	470µF
JMR0324S15		15V	234mA	82%	25mA	178mA	330µF
JMR0324D12		±12V (24V)	±146mA	83%	30mA	175mA	±220µF
JMR0324D15		±15V (30V)	±117mA	82%	30mA	178mA	±160µF
JMR0348S05	48V (18.0-75.0V)	5V	700mA	77%	15mA	94mA	1470µF
JMR0348S12		12V	292mA	81%	15mA	90mA	470µF
JMR0348S15		15V	234mA	81%	20mA	90mA	330µF
JMR0348D12		±12V (24V)	±146mA	79%	20mA	92mA	±220µF
JMR0348D15		±15V (30V)	±117mA	80%	20mA	91mA	±160µF

Notes:

1. Dual output models can be used to provide a single output of 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. At nominal input voltage
5. No load input current reduces to <3mA when module is inhibited

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			28	A	
Input reflected ripple		20		mA pk-pk	Through 12µH inductor and 47µF capacitor
Input surge			25	VDC for 100ms	12V nominal
			50		24V nominal
			100		48V nominal
Input current remote On/Off		2.5	3.0	mA	Idle current using remote “Off”. See models and ratings table for no load input current with module “On”
Recommended input fuse (Slow blow)		2.0		A	12V nominal
		1.0			24V nominal
		0.8			48V nominal

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage	5		30	VDC	See Models & ratings table
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 500µs for 25% load change at 0.1A/µs
Ripple & noise			75	mV pk-pk	20MHz bandwidth. Measured using 0.1µF ceramic capacitor at nominal Vin
Short circuit protection	Continuous, with auto recovery				
Maximum capacitive load	See Models & Ratings table				
Temperature coefficient			0.02	%/ °C	
Overload protection	120		230	%	At nominal input voltage
Remote On/Off	Output is on if remote on/off (pin 2) is open Output turns off if 2-4mA is applied to remote On/Off (pin 2). See application note				

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency		82		%	See Models & ratings table
Isolation: Input to output	4000			VAC	Reinforced insulation, 2 x MOPP, 60s, production test to 5kVAC
Working voltage			250/400	VAC/VDC	
Creepage and clearance	8			mm	
Isolation resistance	10^9			Ω	Input to output
Isolation capacitance		10	20	pF	Input to output
Leakage current			2	µA	264VAC, 60Hz
Power density		0.90 (14.8)		W/cm^3 (W/in^3)	
Mean time between failure	776			khrs	MIL-HDBK-217F, +25°C GB
Switching frequency	100		600	kHz	
Weight		7.27 (0.016)		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		+90	°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	

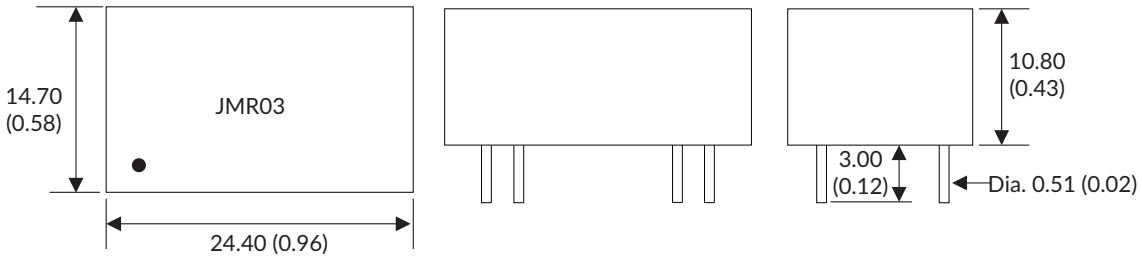
EMC: emissions

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			
ESD immunity	EN61000-4-2	±8kV	A	Air
		±15kV		Contact
Radiated immunity	EN61000-4-3	10V/m	A	
EFT/Burst	EN61000-4-4	±2kV	A	External input capacitor required 330µF/100V
Surge	EN61000-4-5	±2kV	A	External input capacitor required 330µF/100V
Conducted immunity	EN61000-4-6	10Vrms	A	
Magnetic fields	EN61000-4-8	100A/m	A	

Mechanical details

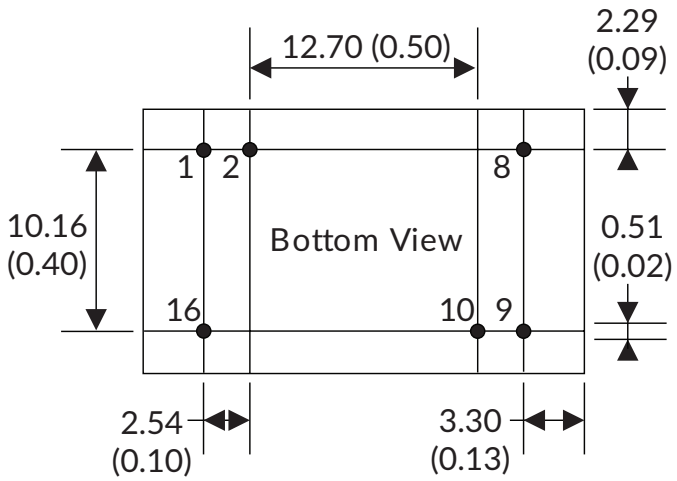


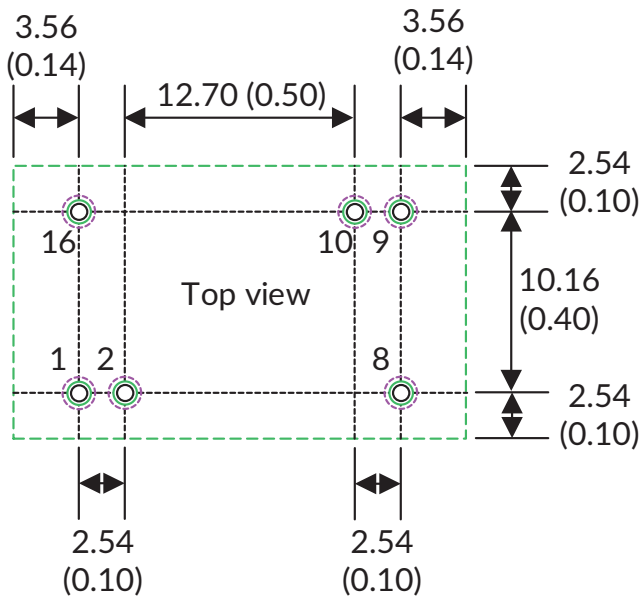
Pin connections		
Pin	**Single**	**Dual**
1	-Vin	-Vin
2	CTRL	CTRL
8	NC	Common
9	+Vout	+Vout
10	-Vout	-Vout
16	+Vin	+Vin

Recommended PCB footprint

There should be at least 8mm distance between primary and secondary circuit.

Through hole diameter 0.8mm (0.031")
Pad diameter top side 1.0mm (0.039")
Pad diameter bottom side 2.0mm (0.079")





Notes:

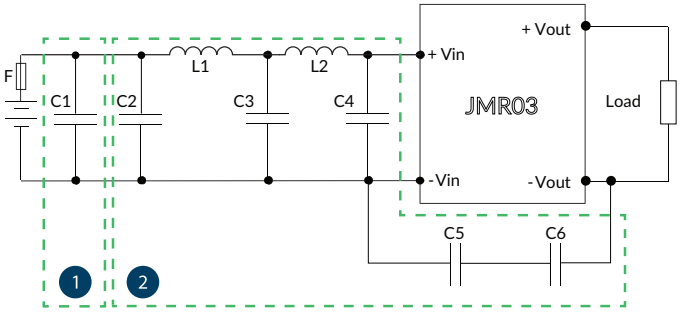
1. All dimensions are in mm (inches)
2. Weight: 7.27 (0.016) g(lbs) approx.
3. Pin diameter: 0.5 ±0.05 (0.02 ±0.002)
4. Pin pitch tolerance: ±0.35 (±0.014)
5. Case tolerance: ±0.5 (±0.02)

Application notes

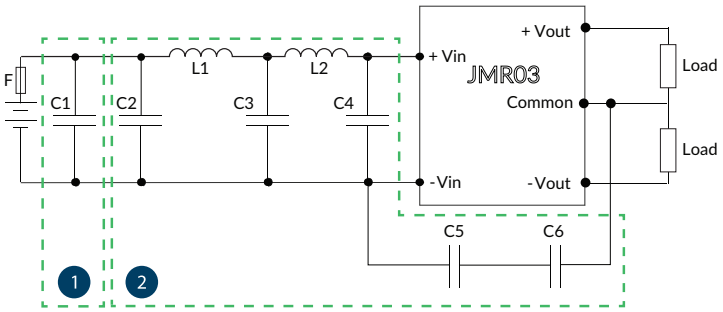
EFT and EMC Class B circuitry

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

Single output

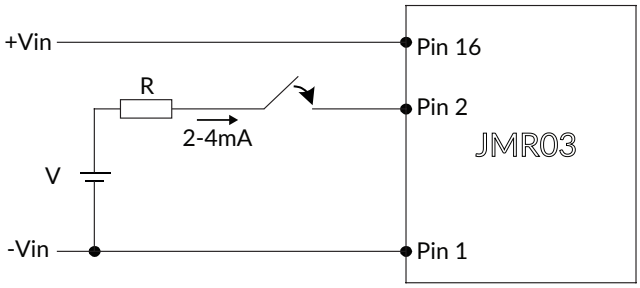


Dual output



Model number	Fuse (Slow blow)	C1	C2, C3, C4	C5	C6	L1	L2
JMR0312XXX	2.0A	NIPPON chemi-con KY series 220µF, 100V	MLCC, 22µF, 35V	68pF/400 VAC Y1	68pF/400 VAC Y1	2.2µH	2.2µH
JMR0324XXX	1.0A		MLCC, 10µF, 50V			33µH	33µH
JMR0348XXX	0.8A		MLCC, 4.7µF, 100V			4.7µH	4.7µH

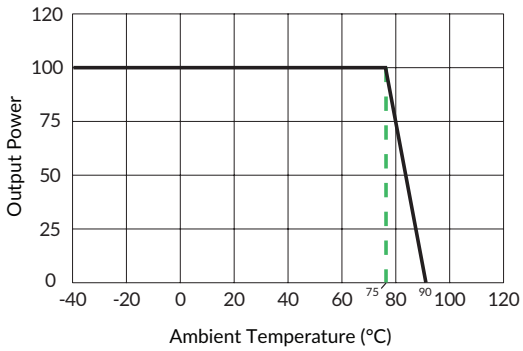
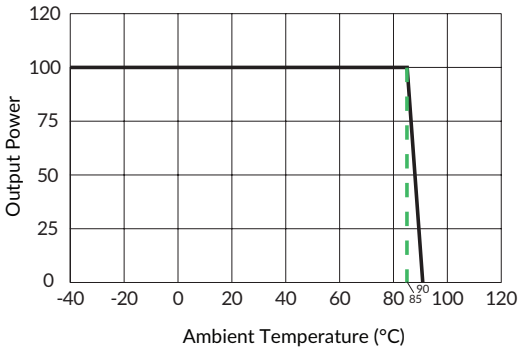
Remote On/Off



Module "On" if pin 2 is open circuit
Module "Off" if connected to current source of 2-4mA
If R=1k and V=5V the current is 2.15mA

Derating curves

JMR0312S05, JMR0324S05, JMR0348S05, JMR0348D12, JMR0348D15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