

TOTAL POWER INT'L

MSJR100 Series

2 Watts SMD DC/DC Converters

Single and Dual Outputs

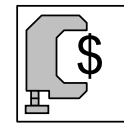
Key Features

- 30mV P-P Ripple and Noise
- I/O Isolation 1000VDC
- Short Circuit Protection
- Low Cost
- SMT Technology
- Regulated Outputs
- EMI Complies With EN55022 Class A
- MTBF > 800,000 Hours

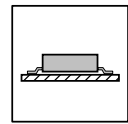
MSJR100 2W can withstand lead temperatures up to +230°C. They are compatible with virtually all contemporary pick-and-place and solder-reflow processes.

The series consists of 20 models with input voltages of 5V, 12V, 24V and 48V and offers standard dual output voltages of 5V, 12V, 15V, $\pm 12V$ and $\pm 15V$.

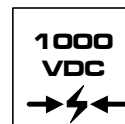
The MSJR100 series is fully line and load regulated with excellent selection for a wide variety of applications including data communication equipments, distributed power systems, telecommunication equipments, and industrial robot systems.



Low Cost



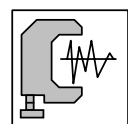
SMD



I/O Isolation



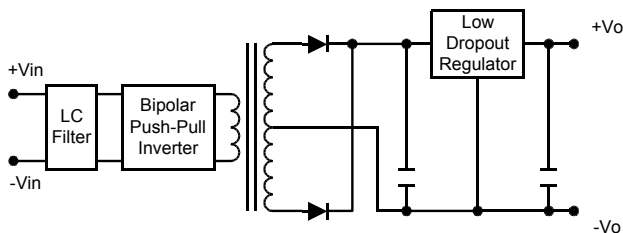
EN55022



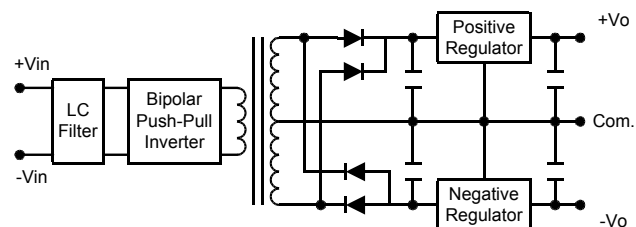
Low Noise

Block Diagram

Single Output



Dual Output



MSJR100 Series

Model Selection Guide

Model Number	Input Voltage	Output Voltage	Output Current		Input Current		Reflected Ripple Current	Efficiency
			Max.	Min.	@Max. Load	@No Load		@Max. Load
	VDC	VDC	mA	mA	mA (Typ.)	mA (Typ.)	mA (Typ.)	% (Typ.)
MSJR101	5 (4.5 ~ 5.5)	5	400	0	667	100	80	60
MSJR102		12	165		660			60
MSJR103		15	133		665			60
MSJR104		±12	±83		664			60
MSJR105		±15	±66		660			60
MSJR111	12 (10.8 ~ 13.2)	5	400	0	278	40	20	60
MSJR112		12	165		275			60
MSJR113		15	133		277			60
MSJR114		±12	±83		277			60
MSJR115		±15	±66		275			60
MSJR121	24 (21.6 ~ 26.4)	5	400	0	139	20	20	60
MSJR122		12	165		138			60
MSJR123		15	133		138			60
MSJR124		±12	±83		138			60
MSJR125		±15	±66		138			60
MSJR131	48 (43.2 ~ 52.8)	5	400	0	70	12	15	60
MSJR132		12	165		69			60
MSJR133		15	133		69			60
MSJR134		±12	±83		69			60
MSJR135		±15	±66		69			60

Absolute Maximum Ratings

Parameter	Min.	Max.	Unit	
Input Surge Voltage (1000 mS)	5VDC Input Models	-0.7	7.5	VDC
	12VDC Input Models	-0.7	15	VDC
	24VDC Input Models	-0.7	30	VDC
	48VDC Input Models	-0.7	55	VDC
Lead Temperature (1.5mm from case for 10 Sec.)	---	260	°C	
Internal Power Dissipation	---	2,500	mW	

Exceeding these values can damage the module. These are not continuous operating ratings.

Note :

- Specifications typical at Ta=+25°C, resistive load, nominal input voltage, rated output current unless otherwise noted.
- Transient recovery time is measured to within 1% error band for a step change in output load of 50% to 100%.
- Ripple & Noise measurement bandwidth is 0-20 MHz.
- All DC/DC converters should be externally fused at the front end for protection.
- Other input and output voltage may be available, please contact factory.
- Specifications subject to change without notice.

Environmental Specifications

Parameter	Conditions	Min.	Max.	Unit
Operating Temperature	Ambient	-40	+60	°C
Operating Temperature	Case	-40	+90	°C
Storage Temperature		-40	+125	°C
Humidity		---	95	%
Cooling	Free-Air Convection			

MSJR100 Series

Input Specifications

Parameter	Model	Min.	Typ.	Max.	Unit
Input Voltage Range	5V Input Models	4.5	5	5.5	VDC
	12V Input Models	10.8	12	13.2	
	24V Input Models	21.6	24	26.4	
	48V Input Models	43.2	48	52.8	
Reverse Polarity Input Current	All Models	---	---	0.5	A
Short Circuit Input Power		---	---	2500	mW
Input Filter		Pi Filter			

Output Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		---	±2.0	±4.0	%
Output Voltage Balance	Dual Output Balance Load	---	±3.0	±6.0	%
Line Regulation	Vin=Min. to Max.	---	±0.2	±0.5	%
Load Regulation	Io=10% to 100%	---	±0.3	±1.0	%
Ripple & Noise (20MHz)		---	30	50	mV P-P
Ripple & Noise (20MHz)	Over Line, Load & Temp	---	---	75	mV P-P
Ripple & Noise (20MHz)		---	---	5	mV rms.
Over Load		120	---	---	%
Transient Recovery Time	50% Load Step Change	---	---	50	uS
Transient Response Deviation		---	---	±6	%
Temperature Coefficient		---	±0.01	±0.02	%/°C
Output Short Circuit	Continuous				

General Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	60 Seconds	1000	---	---	VDC
Isolation Test Voltage	Flash Tested for 1 Second	1100	---	---	VDC
Isolation Resistance	500VDC	1000	---	---	MΩ
Isolation Capacitance	100KHz, 1V	---	120	160	pF
Switching Frequency		30	60	120	KHz
MTBF	MIL-HDBK-217F @ 25°C, Ground Benign	800	---	---	K Hours

Capacitive Load

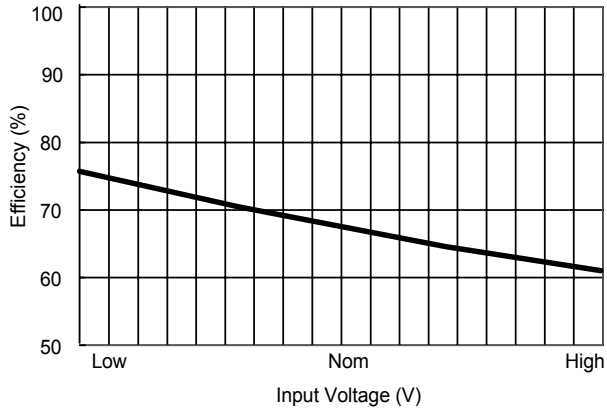
Models by Vout	5V	12V	15V	±12V #	±15V #	Unit
Maximum Capacitive Load	470	470	470	220	220	uF

Note: # For each output .

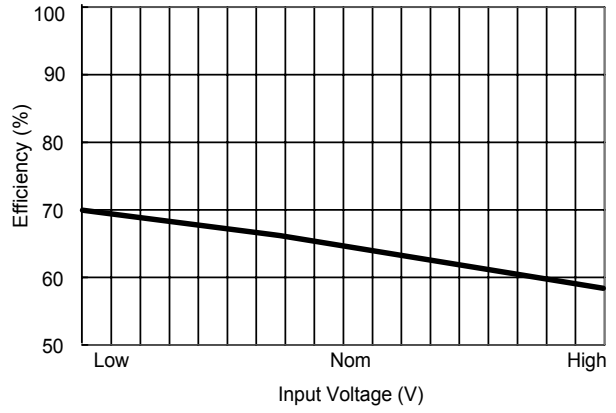
Input Fuse Selection Guide

5V Input Models	12V Input Models	24V Input Models	48V Input Models
1500mA Slow – Blow Type	700mA Slow – Blow Type	350mA Slow – Blow Type	135mA Slow – Blow Type

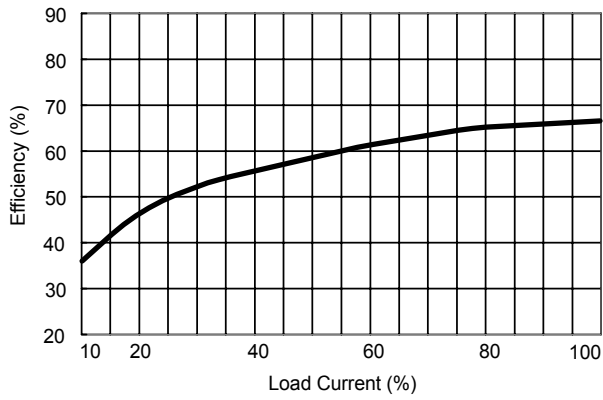
MSJR100 Series



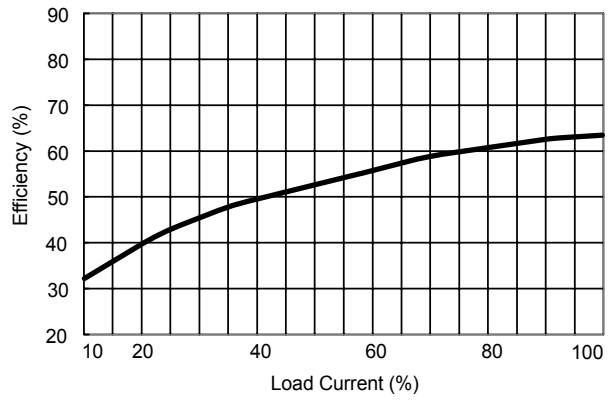
Efficiency vs Input Voltage (Single Output)



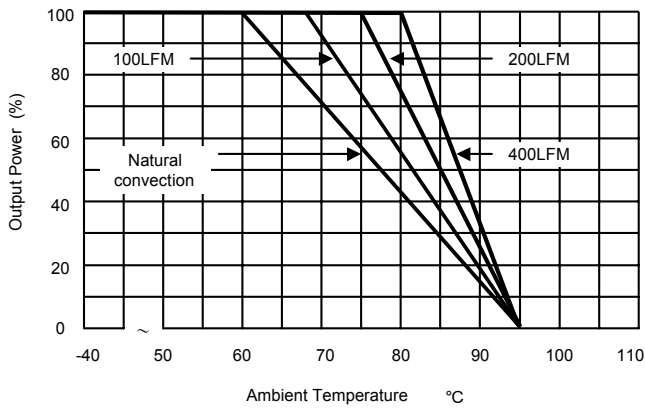
Efficiency vs Input Voltage (Dual Output)



Efficiency vs Output Load (Single Output)



Efficiency vs Output Load (Dual Output)

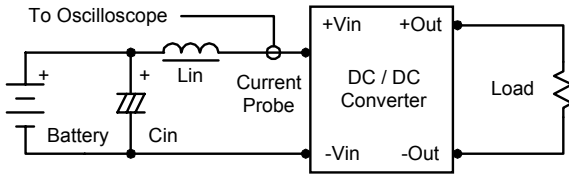


Derating Curve

MSJR100 Series

Test Configurations

Input Reflected-Ripple Current Test Setup



Input reflected-ripple current is measured with an inductor L_{in} (4.7uH) and C_{in} (220uF, ESR < 1.0Ω at 100 KHz) to simulate source impedance.

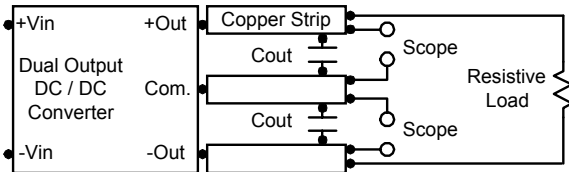
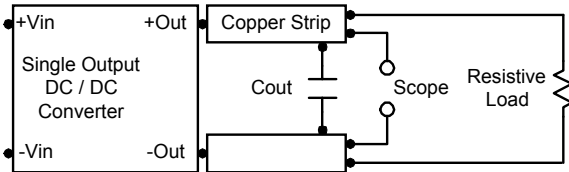
Capacitor C_{in} , offsets possible battery impedance.

Current ripple is measured at the input terminals of the module, measurement bandwidth is 0–500 KHz.

Peak-to-Peak Output Noise Measurement Test

Use a C_{out} 0.33uF ceramic capacitor.

Scope measurement should be made by using a BNC socket, measurement bandwidth is 0–20 MHz. Position the load between 50 mm and 75 mm from the DC/DC Converter.



Design & Feature Considerations

Maximum Capacitive Load

The MSJR100 series has limitation of maximum connected capacitance at the output.

The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the startup time.

For optimum performance we recommend 220uF maximum capacitive load for dual outputs and 470uF capacitive load for single outputs.

The maximum capacitance can be found in the data.

Input Source Impedance

The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module.

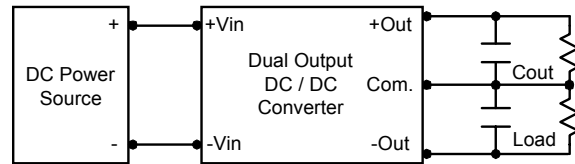
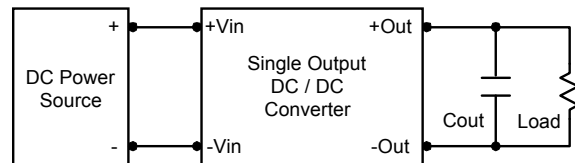
In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup.

Capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100 KHz) capacitor of a 2.2uF for the 5V input devices, a 1.0uF for the 12V input devices and a 0.47uF for the 24V and 48V devices.

Output Ripple Reduction

A good quality low ESR capacitor placed as close as practicable across the load will give the best ripple and noise performance.

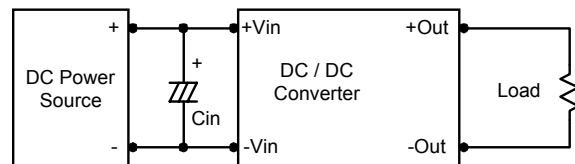
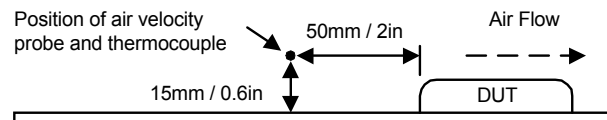
To reduce output ripple, it is recommended to use 1.5uF capacitors at the output.



Thermal Considerations

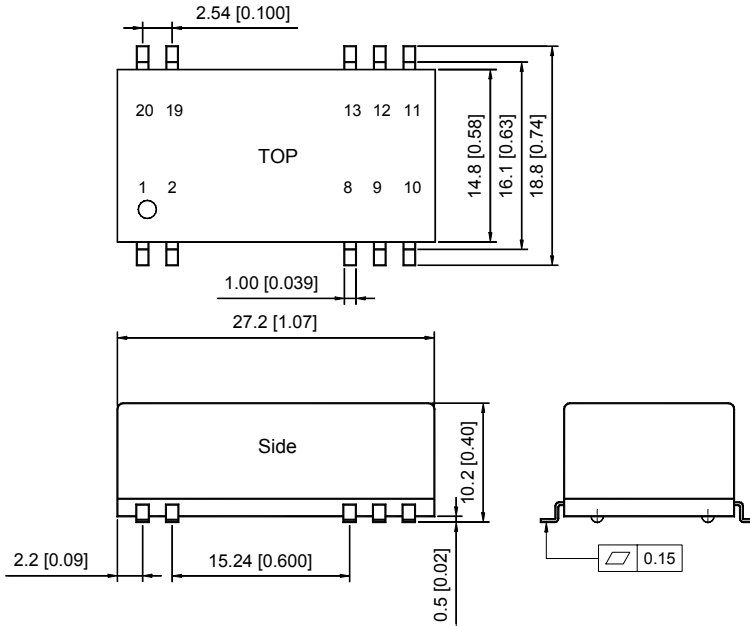
Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 85°C.

The derating curves are determined from measurements obtained in an experimental apparatus.



MSJR100 Series

Mechanical Data

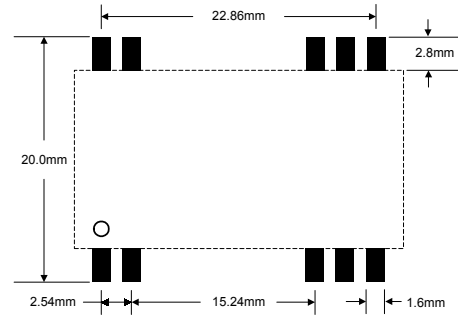


Tolerance	Millimeters	Inches
	.X±0.25	.XX±0.01
	.XX±0.25	.XXX±0.01
Pin	±0.05	±0.002

Connecting Pin Patterns

Top View (2.54 mm / 0.1 inch grids)

Connecting Pin Patterns



Pin Connections

Pin	Single Output	Dual Output
1	-Vin	-Vin
2	-Vin	-Vin
8	NC	Common
9	NC	NC
10	NC	-Vout
11	+Vout	+Vout
12	NC	NC
13	-Vout	Common
19	+Vin	+Vin
20	+Vin	+Vin

NC: No Connection

Physical Characteristics

Case Size	: 27.2×14.8×10.2 mm 1.07×0.58×0.4 inches
Case Material	: Non-Conductive Black Plastic
Weight	: 8.1g
Flammability	: UL94V-0

Units are encapsulated in a low thermal resistance molding compound which has excellent chemical resistance and electrical properties in high humidity environment and over a wide operating temperature range. The encapsulant and outer shell of the unit have UL94V-0 ratings. The leads are tin plated for better soldering.