DATASHEET
Rev. E

Wall Industries, Inc.

JRW SERIES

4:1 Ultra Wide Input Voltage Ranges
Single and Dual Outputs
Standard 2.0" x 1.0" x 0.4" Package
10 Watt DC/DC Power Converters



APPLICATIONS

- Wireless Networks
- Telecom / Datacom
- Measurement Equipment
- Industry Control Systems
- Semiconductor Equipment

OPTIONS

- Positive Remote ON/OFF (Suffix "P")
- Negative Remote ON/OFF (Suffix "R")
- Extended Operating Temperature Range (Suffix "-I")
- Heatsink (Suffix "HS")

FEATURES

- 10 Watts Maximum Output Power
- Single and Dual Outputs
- Standard 2.0" x 1.0" x 0.4" Package
- 4:1 Ultra Wide Input Voltage Ranges
- High Efficiency up to 84%
- No Minimum Load Requirement
- 1600VDC I/O Isolation
- Positive or Negative Remote ON/OFF Control Option
- Fixed Switching Frequency: 300KHz
- Over Voltage, Over Load, and Short Circuit Protected
- Extended Operating Temperature Range Available
- Six-Sided Continuous Shielding
- CE Mark Meets 2006/95/EC, 93/68/EEC, and 2004/108/EC
- UL60950-1, EN60950-1, and IEC60950-1 Safety Approvals
- Compliant to RoHS EU Directive 2002/95/EC
- UL94V-0 Compliant

DESCRIPTION

The JRW series of DC/DC power converters provides 10 watts of output power in a 2.0 x 1.0 x 0.4 inch industry standard package and footprint. This series has single and dual output models with 4:1 ultra wide input voltage ranges of 9-36VDC and 18-75VDC. Some features include high efficiency up to 84%, 1600VDC I/O isolation, and six-sided shielding. This series is also protected against over voltage, over load, and short circuit conditions. This series is RoHS and UL94V-0 compliant and has UL60950-1, EN60950-1, and IEC60950-1 safety approvals.

SPECIFICATIONS: JRW SERIES

All specifications are based on 25°C, Nominal Input Voltage, and Maximum Output Current unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS		Min	Nom	Max	Unit
INPUT SPECIFICATIONS						
Input Voltage Range	24VDC nominal input models		9	24	36	VDC
	48VDC nominal input models		18	48	75	
Input Surge Voltage (100ms max)	24VDC nominal input models				50	VDC
	48VDC nominal input models				100	
Input Reflected Ripple Current				30		mAp-p
Input Filter				Pi type		
OUTPUT SPECIFICATIONS						
Output Voltage				See Table		
Line Regulation	Low line to high line at full load			±0.2		%
Load Regulation	No load to full load	Single Output Models		±0.5		%
		Dual Output Models		±1		
Cross Regulation (Dual Output Models)	Asymmetrical load 25% to 100% full load			±5		%
Voltage Accuracy				±1		%
Output Power					10	W
Output Current				See Table		
Minimum Load			0			%
Ripple & Noise (20MHz Bandwidth)	Nominal Vin and full load	Single Output Models		50		mVp-p
		Dual Output Models		75		
Transient Response Recovery Time	25% load step change			250		µs
Start-Up Time	Nominal Vin and constant resistive load	Power Up		20		ms
Temperature Coefficient					±0.02	%/°C
PROTECTION						
Over Voltage Protection	Zener diode clamp	3.3V output models		3.9		VDC
		5V output models		6.2		
		12V output models		15		
		15V output models		18		
Over Load Protection	% of full load at nominal input				150	%
Short Circuit Protection				hiccup, automatic recovery		
GENERAL SPECIFICATIONS						
Efficiency	Nominal Vin and full load			See Table		
Switching Frequency	Full load to minimum load		270	300	330	KHz
Isolation Voltage	Input to Output	1 minute	1600			VDC
	Input to Case		1600			
	Output to Case		1600			
Isolation Resistance			1			GΩ
Isolation Capacitance					300	pF
REMOTE ON/OFF *(See Note 6)*						
Positive Logic (Suffix P)	DC/DC ON			Open or 3.5V < Vr < 12V		
	DC/DC OFF			Short or 0V < Vr < 1.2V		
Negative Logic (Suffix R)	DC/DC ON			Short or 0V < Vr < 1.2V		
	DC/DC OFF			Open or 3.5V < Vr < 12V		
Input Current of Remote Control Pin	Nominal Vin		-0.5		+1.0	mA
Remote Off State Input Current	Nominal Vin			20		mA
ENVIRONMENTAL SPECIFICATIONS						
Operating Ambient Temperature	Standard	With derating	-25		+85	°C
	"I" Version (suffix –I)	With derating	-40		+85	
Maximum Case Temperature					+100	°C
Storage Temperature			-55		+105	°C
Thermal Impedance *(See Note 8)*	Natural convection			12		°C/Watt
	Natural convection with heatsink			10		
Relative Humidity (non-condensing)			5		95	% RH
Thermal Shock				MIL-STD-810F		
Vibration				MIL-STD-810F		
MTBF *(See Note 1)*	BELLCORE TR-NWT-000332			1,976,000 hours		
	MIL-HDBK-217F			1,416,000 hours		
PHYSICAL SPECIFICATIONS						
Weight				0.95oz (27g)		
Case Material				Nickel-coated copper		
Base Material				Non-conductive black plastic		
Potting Material				Epoxy (UL94V-0)		
Dimensions (L x W x H)				2.00 x 1.00 x 0.40 inches (50.8 x 25.4 x 10.2 mm)		
SAFETY & EMC CHARACTERISTICS						
Safety Approvals						UL60950-1, EN60950-1, IEC60950-1
EMI *(See Note 9)*	EN55022					Class A
ESD	EN61000-4-2	Air ±8KV Contact ±6KV				Perf. Criteria B
Radiated Immunity	EN61000-4-3	10 V/m				Perf. Criteria A
Fast Transient *(See Note 10)*	EN61000-4-4	±2KV				Perf. Criteria B
Surge *(See Note 10)*	EN61000-4-5	±1KV				Perf. Criteria B
Conducted Immunity	EN61000-4-6	10 Vrms				Perf. Criteria A

MODEL SELECTION TABLES

SINGLE OUTPUT MODELS										
Model Number	Input Voltage Range	Output Voltage	Output Current		Input Current		Output [4] Ripple & Noise	Output Power	Efficiency [4]	Maximum [5] Capacitive Load
			Min. Load	Full Load	No Load [3]	Full Load [2]				
JRW24S33-2500	24 VDC (9 – 36 VDC)	3.3 VDC	0mA	2500mA	13mA	465mA	50mVp-p	8.25W	78%	6800µF
JRW24S5-2000		5 VDC	0mA	2000mA	11mA	548mA	50mVp-p	10W	80%	4700µF
JRW24S12-830		12 VDC	0mA	830mA	16mA	519mA	50mVp-p	10W	84%	690µF
JRW24S15-660		15 VDC	0mA	670mA	26mA	544mA	50mVp-p	10W	81%	470µF
JRW48S33-2500	48 VDC (18 – 75 VDC)	3.3 VDC	0mA	2500mA	10mA	239mA	50mVp-p	8.25W	76%	6800µF
JRW48S5-2000		5 VDC	0mA	2000mA	9mA	270mA	50mVp-p	10W	81%	4700µF
JRW48S12-830		12 VDC	0mA	830mA	9mA	259mA	50mVp-p	10W	84%	690µF
JRW48S15-660		15 VDC	0mA	670mA	11mA	262mA	50mVp-p	10W	84%	470µF

DUAL OUTPUT MODELS										
Model Number	Input Voltage Range	Output Voltage	Output Current		Input Current		Output [4] Ripple & Noise	Output Power	Efficiency [4]	Maximum [5] Capacitive Load
			Min. Load	Full Load	No Load [3]	Full Load [2]				
JRW24D5-1000	24 VDC (9 – 36 VDC)	±5 VDC	0mA	±1000mA	15mA	534mA	75mVp-p	10W	82%	±680µF
JRW24D12-420		±12 VDC	0mA	±416mA	15mA	547mA	75mVp-p	10W	80%	±330µF
JRW24D15-330		±15 VDC	0mA	±333mA	22mA	548mA	75mVp-p	10W	80%	±110µF
JRW48D5-1000	48 VDC (18 – 75 VDC)	±5 VDC	0mA	±1000mA	12mA	267mA	75mVp-p	10W	82%	±680µF
JRW48D12-420		±12 VDC	0mA	±416mA	20mA	281mA	75mVp-p	10W	78%	±330µF
JRW48D15-330		±15 VDC	0mA	±333mA	20mA	270mA	75mVp-p	10W	81%	±110µF

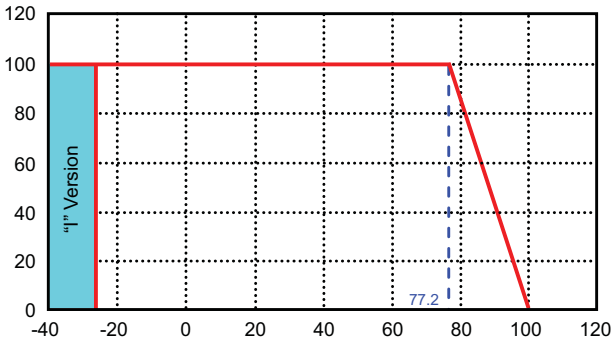
NOTES

1. BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C.
   MIL-HDBK-217F Notice2 @Ta=25°C, Full load (Ground, Benign, controlled environment).
2. Maximum value at nominal input voltage and full load.
3. Typical value at nominal input voltage and no load.
4. Typical value at nominal input voltage and full load.
5. Test by minimum Vin and constant resistive load.
6. The on/off control pin is referenced to –Vin.
   To order positive logic remote on/off, add the suffix "P" to the model number (Ex: JRW24S15-660P).
   To order negative logic remote on/off, add the suffix "R" to the model number (Ex: JRW24S15-660R).
7. "I" type models are more efficient; therefore, they can be operated over a more extensive temperature range than the standard version.
   To order extended operating temperature range, add the suffix "-I" to the model number (Ex: JRW24S15-660-I).
8. Heatsink is optional and P/N: 7G-0020C-F.
9. The JRW series can meet EN55022 Class A with external capacitors in parallel connected to the input pins.
   Recommended: 24Vin: 2.2µF/50V 1812 MLCC
   48Vin: 1.5µF/100V 1812 MLCC
10. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor suggested is Nippon chemi-con KY series, 220µF /100V, ESR 48mΩ.

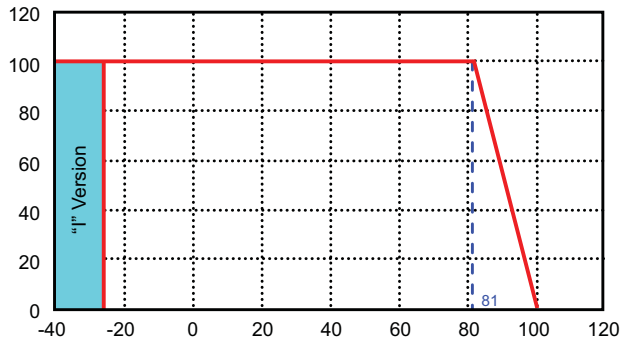
CAUTION: This power module is not internally fused. An input line fuse must always be used.

CHARACTERISTICS

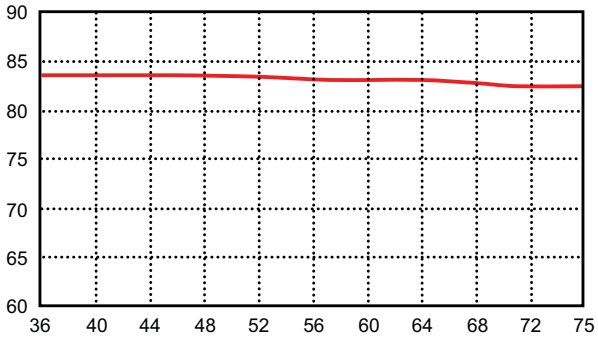
Derating Curve



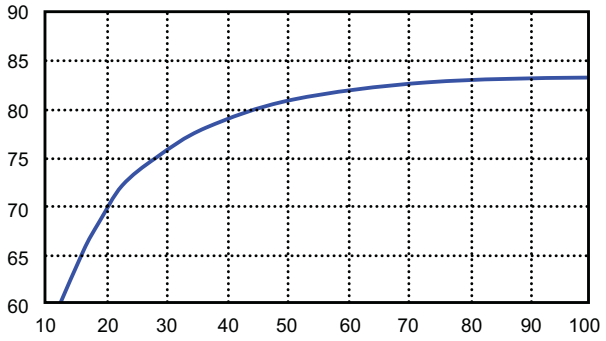
Derating Curve with Heatsink



Efficiency vs Input Voltage

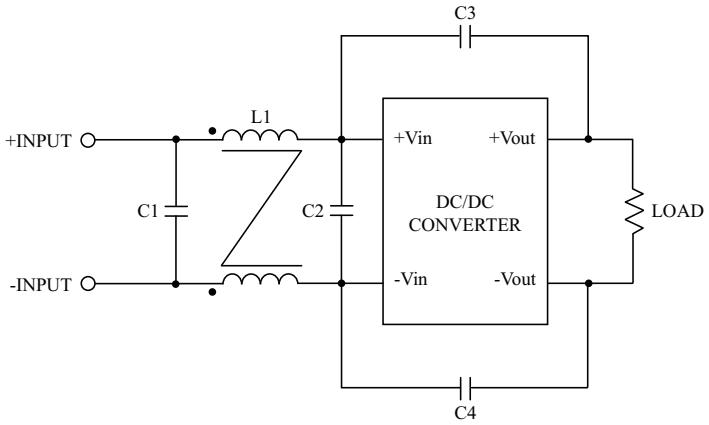


Efficiency vs Output Load

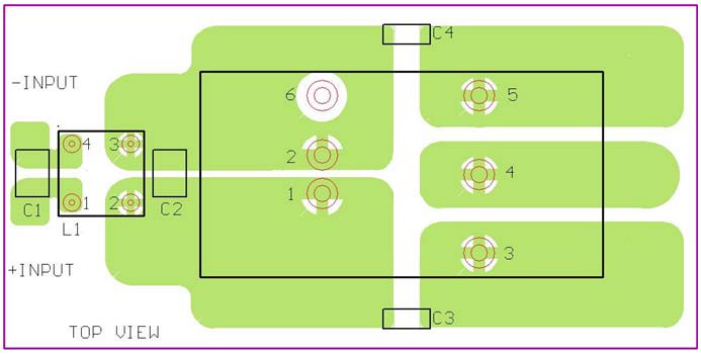


EMI FILTER

Recommended Filter for EN55022 Class B Compliance



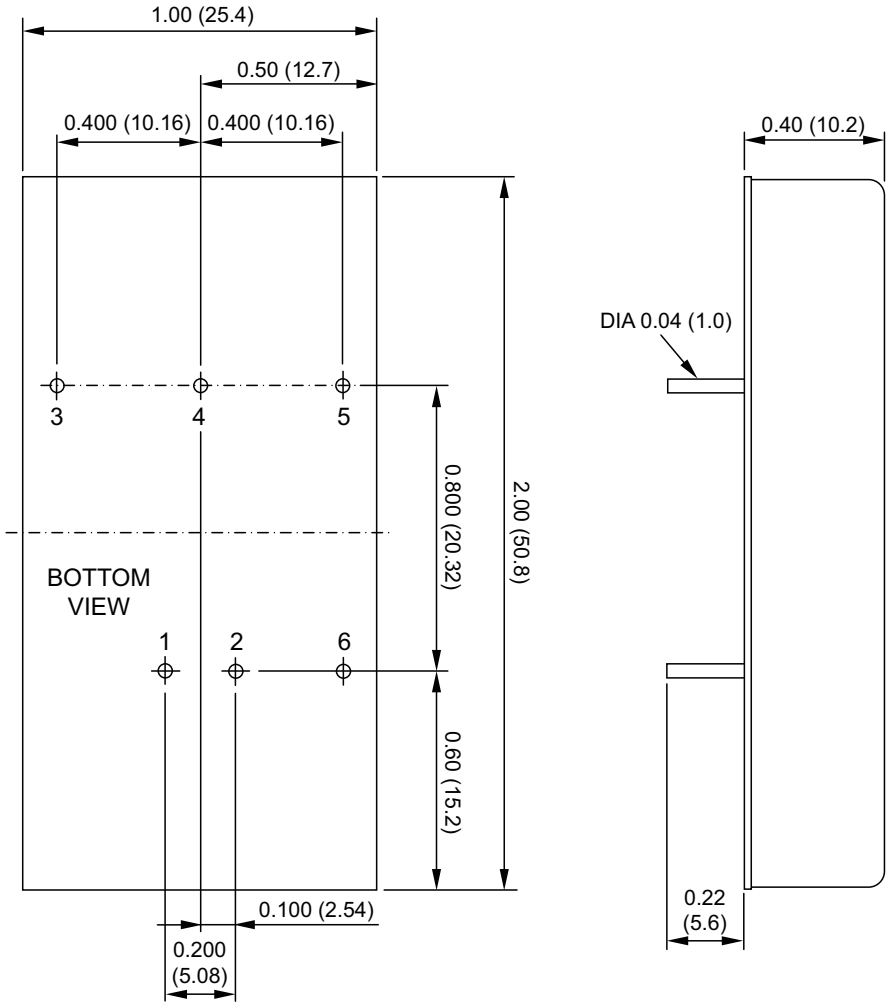
Recommended EN55022 Class B Filter Circuit Layout



The components used in the figure above are as follows:

Model	C1	C2	C3	C4	L1
24VDC nominal input	2.2µF/50V 1812 MLCC	N/A	1000P/2KV MLCC	1000P/2KV MLCC	325µH Common Choke PMT-050
48VDC nominal input	2.2µF/100V 1812 MLCC	2.2µF/100V 1812 MLCC	1000P/2KV MLCC	1000P/2KV MLCC	325µH Common Choke PMT-050

MECHANICAL DRAWING



Unit: inches (mm)

PIN CONNECTIONS		
Pin	**Single**	**Dual**
1	+Input	+Input
2	-Input	-Input
3	+Output	+Output
4	No Pin	Common
5	-Output	-Output
6	CTRL (optional)	CTRL (optional)

Tolerance: X.XX±0.02 (X.X±0.5)
X.XXX±0.01 (X.XX±0.25)

Pin Pitch Tolerance: ±0.01 (±0.25)

COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001-2008 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

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