Wall Industries, Inc.

KR/KRW Series
6 Watt DC/DC Converter
Single and Dual Outputs
2:1 and 4:1 Wide Input Voltage Range

FEATURES

- 6 Watts Output Power
- Output Current up to 1A
- High Efficiency up to 83%
- Fixed Switching Frequency
- Six-Sided Continuous Shield
- Standard 2 x 1 x 0.4 inch Package
- 2:1 and 4:1 Wide Input Voltage Range
- ISO9001 Certified Manufacturing Facilities
- Compliant to RoHS EU Directive 2002/95/EC
- Options: Positive Logic and Negative Logic Remote ON/OFF, Industrial Temperature

APPLICATIONS

- Measurement
- Wireless Network
- Telecom/Datacom
- Industry Control System
- Semiconductor Equipment

SPECIFICATIONS: *KR/KRW Series*

All specifications apply @ 25°C ambient unless otherwise noted

INPUT SPECIFICATIONS

Input Voltage Range
- KR: 12V nominal input: 9-18VDC; 24V nominal input: 18-36VDC; 48V nominal input: 36-75VDC
- KRW: 24V nominal input: 9-36VDC; 48V nominal input: 18-75VDC

Input Filter: Pi Type

Input Surge Voltage (100ms max): 12V input: 36 VDC; 24V input: 50 VDC; 48V input: 100 VDC

Input Reflected Ripple Current (nom. Vin and FL): 20mAp-p

Start Up Time (nom. Vin and constant resistive load): 450ms max.

Remote ON/OFF (Option) (See Note 6)
- (Positive Logic): DC-DC ON: Open or 3.5V < Vr < 12V; DC-DC OFF: Short or 0V < Vr < 1.2V
- (Negative Logic): 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): -0.5mA ~ +1mA

Remote Off State Input Current (nominal Vin): 2.5mA

OUTPUT SPECIFICATIONS

Output Voltage: see table

Voltage Accuracy (nominal Vin and full load): ±1%

Output Current: see table

Output Power: 6 Watts max.

Line Regulation (LL to HL at FL): ±0.2%

Load Regulation (no load to full load): Single Output: ±0.2%; Dual Output: ±1%

Cross Regulation (Dual) (Asymmetrical load 25% / 100% FL): ±5%

Minimum Load: 0%

Ripple/Noise (20 MHz BW): 50mVp-p

Temperature Coefficient: ±0.02% / °C max.

Transient Response Recovery Time
25% load step change, FL to HL ±1% error band: (Single) 200us; (Dual) 200us

PROTECTION SPECIFICATIONS

Over Load Protection (% of full load at nom. input): 170% typ.

Short Circuit Protection: Continuous, automatic recovery

GENERAL SPECIFICATIONS

Efficiency: see table

Switching Frequency
- KR: 300KHz typ.
- KRW: 200KHz typ.

Isolation Voltage (Input to Output): 1600VDC min.

Isolation Resistance: 10^9 ohms min.

Isolation Capacitance: 300pF max.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature
- Standard: -25°C ~ +85°C (with derating)
- "I" suffix (See Note 7): -40°C ~ +85°C (non-derating)
- "I" suffix (KRW series): -40°C ~ +85°C (with derating)

Storage Temperature: -55°C ~ +105°C

Maximum Case Temperature: 100°C

Relative Humidity: 5% to 95% RH

Thermal Impedance (See Note 8)
- Natural Convection: 12°C / Watt
- Natural Convection with Heat-Sink: 10°C / Watt

Thermal Shock: MIL-STD-810F

Vibration: 10~55Hz, 10G, 30 minutes along X, Y, and Z

MTBF (See Note 1): 3.145 x 10^6 hours

PHYSICAL SPECIFICATIONS

Weight: 27g (0.95 oz)

Dimensions: 2.0 x 1.0 x 0.40 inches (50.8 x 25.4 x 10.2 mm)

Case Material: Nickel-coated copper

Base Material: Non-conductive black plastic

Potting material: Epoxy (UL94-V0)

Shielding: six-sided

SAFETY & EMC

Approvals and Standards: IEC60950-1, UL60950-1, EN60950-1

EMI	EN55022		Class A
ESD	EN61000-4-2	Air ± 8KV Contact ± 6KV	Perf. Criteria B
Radiated Immunity	EN61000-4-3	10V/m	Perf. Criteria A
Fast Transient	EN61000-4-4	±2KV	Perf. Criteria B
Surge (See Note 9)	EN61000-4-5	±1KV	Perf. Criteria B
Conducted Immunity	EN61000-4-6	10 Vrms	Perf. Criteria A

Due to advances in technology, specifications subject to change without notice

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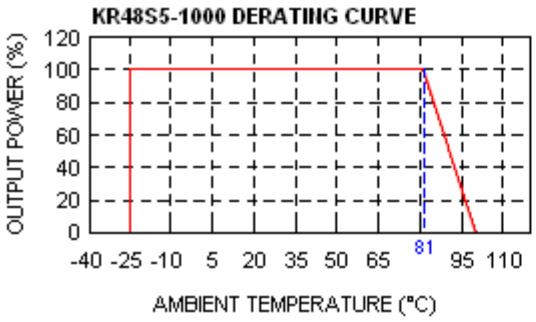
OUTPUT VOLTAGE / CURRENT RATING CHART

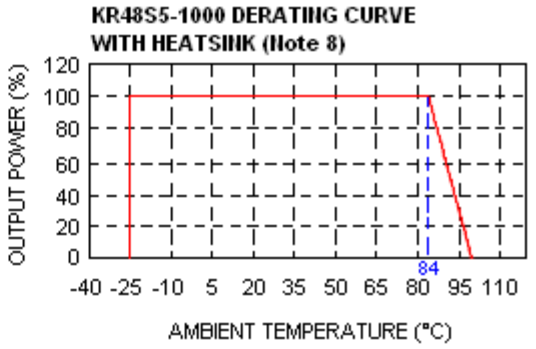
Model Number	Input Range	Output Voltage	Output Current		Output [4] Ripple & Noise	Input Current		Efficiency [4]	Capacitor [5] Load max
			Min. load	Full load		No load [3]	Full load [2]		
KR12S33-1000	12 VDC (9 – 18 VDC)	3.3 VDC	0mA	1000mA	50mVp-p	10mA	382mA	76	3700µF
KR12S5-1000		5 VDC	0mA	1000mA	50mVp-p	10mA	556mA	79	1700µF
KR12S9-620		9 VDC	0mA	620mA	50mVp-p				370µF
KR12S12-470		12 VDC	0mA	470mA	50mVp-p	10mA	610mA	81	290µF
KR12S15-400		15 VDC	0mA	400mA	50mVp-p	15mA	658mA	80	188µF
KR12D5-500		±5 VDC	0mA	±500mA	50mVp-p	20mA	556mA	79	±850µF
KR12D12-230		±12 VDC	0mA	±230mA	50mVp-p	15mA	597mA	81	±140µF
KR12D15-190		±15 VDC	0mA	±190mA	50mVp-p	20mA	609mA	82	±47µF
KR24S33-1000	24 VDC (18 – 36 VDC)	3.3 VDC	0mA	1000mA	50mVp-p	15mA	199mA	73	3700µF
KR24S5-1000		5 VDC	0mA	1000mA	50mVp-p	15mA	282mA	78	1700µF
KR24S9-620		9 VDC	0mA	620mA	50mVp-p				370µF
KR24S12-470		12 VDC	0mA	470mA	50mVp-p	10mA	305mA	81	290µF
KR24S15-400		15 VDC	0mA	400mA	50mVp-p	20mA	325mA	81	188µF
KR24D5-500		±5 VDC	0mA	±500mA	50mVp-p	15mA	278mA	79	±850µF
KR24D12-230		±12 VDC	0mA	±230mA	50mVp-p	20mA	295mA	82	±140µF
KR24D15-190		±15 VDC	0mA	±190mA	50mVp-p	20mA	308mA	91	±47µF
KR48S33-1000	48 VDC (36 – 75 VDC)	3.3 VDC	0mA	1000mA	50mVp-p	5mA	100mA	73	3700µF
KR48S5-1000		5 VDC	0mA	1000mA	50mVp-p	10mA	145mA	76	1700µF
KR48S9-620		9 VDC	0mA	620mA	50mVp-p				370µF
KR48S12-470		12 VDC	0mA	470mA	50mVp-p	10mA	151mA	82	290µF
KR48S15-400		15 VDC	0mA	400mA	50mVp-p	10mA	160mA	82	188µF
KR48D5-500		±5 VDC	0mA	±500mA	50mVp-p	10mA	141mA	78	±850µF
KR48D12-230		±12 VDC	0mA	±230mA	50mVp-p	10mA	149mA	81	±140µF
KR48D15-190		±15 VDC	0mA	±190mA	50mVp-p	10mA	154mA	81	±47µF
KRW24S33-1000	24 VDC (9 – 36 VDC)	3.3 VDC	0mA	1000mA	50mVp-p	5mA	188mA	77	3700µF
KRW24S5-1000		5 VDC	0mA	1000mA	50mVp-p	5mA	274mA	80	1700µF
KRW24S9-620		9 VDC	0mA	620mA	50mVp-p				370µF
KRW24S12-470		12 VDC	0mA	470mA	50mVp-p	5mA	301mA	82	290µF
KRW24S15-400		15 VDC	0mA	400mA	50mVp-p	5mA	325mA	81	188µF
KRW24D5-500		±5 VDC	0mA	±500mA	50mVp-p	5mA	274mA	80	±850µF
KRW24D12-230		±12 VDC	0mA	±230mA	50mVp-p	5mA	295mA	82	±140µF
KRW24D15-190		±15 VDC	0mA	±190mA	50mVp-p	10mA	301mA	83	±47µF
KRW48S33-1000	48 VDC (18 – 75 VDC)	3.3 VDC	0mA	1000mA	50mVp-p	5mA	100mA	73	3700µF
KRW48S5-1000		5 VDC	0mA	1000mA	50mVp-p	10mA	145mA	76	1700µF
KRW48S9-620		9 VDC	0mA	620mA	50mVp-p				370µF
KRW48S12-470		12 VDC	0mA	470mA	50mVp-p	10mA	151mA	82	290µF
KRW48S15-400		15 VDC	0mA	400mA	50mVp-p	10mA	163mA	81	188µF
KRW48D5-500		±5 VDC	0mA	±500mA	50mVp-p	5mA	141mA	78	±850µF
KRW48D12-230		±12 VDC	0mA	±230mA	50mVp-p	10mA	149mA	81	±140µF
KRW48D15-190		±15 VDC	0mA	±190mA	50mVp-p	10mA	154mA	81	±47µF

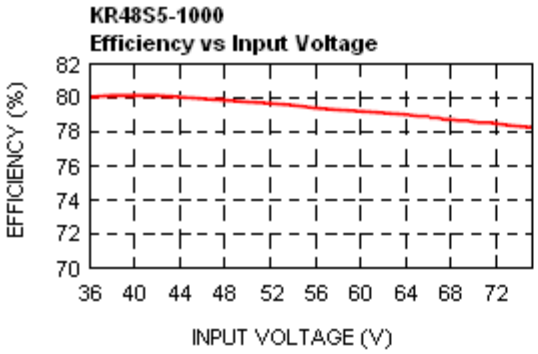
NOTES

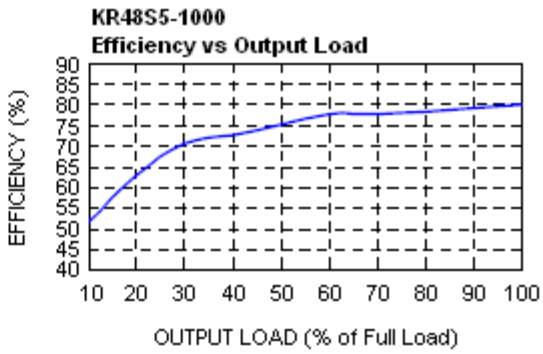
1. BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40ºC. (Ground fixed and controlled environment)
2. Maximum value at nominal input voltage and full load of standard type.
3. Typical value at nominal input voltage and no load.
4. Typical value at nominal input voltage and full load.
5. Test by minimum Vin and constant resistive load.
6. The ON/OFF control pin voltage is referenced to -Vin.
   To order positive logic ON-OFF control add the suffix “P” (Ex: KR48S5-1000P)
   To order negative logic ON-OFF control add the suffix “R” (Ex: KR48S5-1000R)
7. The industrial “I” suffix for the 2:1 input version is more efficient; therefore, it can be operated in a more extensive temperature range than “standard” and “I” suffix 4:1 input versions.
   To order industrial temperature range (-40°C ~ +85°C) add the suffix “I” to the part number (Ex: KR48S5-1000I)
8. Heat sink is optional, consult factory.
9. An external filter capacitor is required if the module has to meet EN61000-4-5. The filter capacitor Wall Industries suggests: Nippon chemi-con KY Series 220uF/100V ESR 48mΩ.

DERATING CURVE & EFFICIENCY GRAPHS

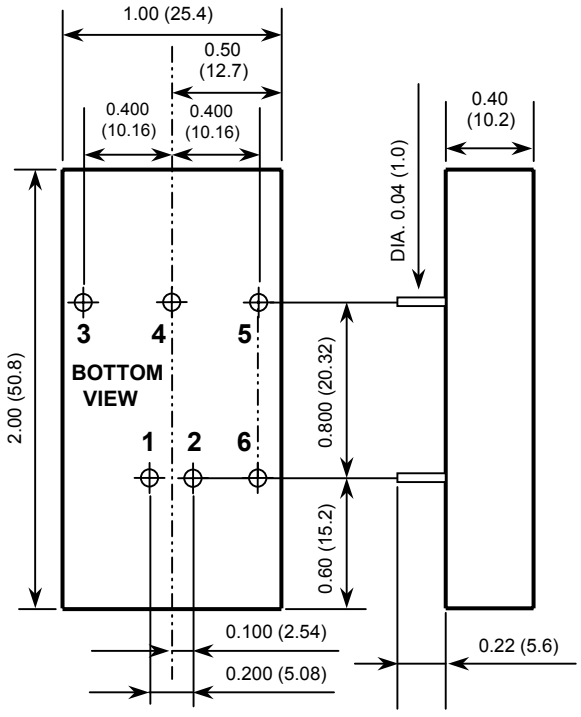








MECHANICAL DRAWING



PIN CONNECTION		
PIN	**SINGLE**	**DUAL**
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	No Pin	Common
5	-Vout	-Vout
6	Control (option)	Control (option)

1. All dimensions in Inches (mm)
   Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)