



FEATURES

- ◆ Wide (4:1) Input Range
- ◆ DIP-24 metal package
- ◆ 1500VDC Isolation
- ◆ Operating Temperature: -40°C ~ +85°C
- ◆ High efficiency up to 88 %
- ◆ Remote On/Off
- ◆ No minimum load required
- ◆ 3-year product warranty
- ◆ Internal SMD construction
- ◆ RoHS Compliance
- ◆ MTBF>1000Khours

MODEL SELECTION

WRB^①24^②12^③Z^④D^⑤-8W(666)^⑥

- ① Product Series ② Input Voltage
 ③ Output Voltage ④ Wide (4:1) Input Range
 ⑤ DIP Package Style ⑥ Rated Power

APPLICATIONS

The WRA-ZD-8W & WRB-ZD-8W series is a family of high performance 8 Watt dc/dc converter modules featuring ultra wide 4:1 input voltage ranges in a DIP-24 package with industry-standard footprint. Input voltages up to 160 VDC, excellent EMC characteristics and EN 50155 approval make this product the best choice for many demanding applications in railroad and transportation systems. Further standard features include remote On/Off, over voltage protection, under voltage lockout and short circuit protection. Typical applications for these converters are also in wireless networks, telecom/datacom, industry control systems and measurement equipments.



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SELECTION GUIDE

Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ.
WRB2403ZD-8W	9 – 36 VDC	3.3 VDC	2400 mA	85 %
WRB2403ZD-8W	9 – 36 VDC	5 VDC	1600 mA	87 %
WRB2412ZD-8W	9 – 36 VDC	12 VDC	666 mA	86 %
WRB2415ZD-8W	9 – 36 VDC	15 VDC	533 mA	86 %
WRA2405ZD-8W	9 – 36 VDC	±5 VDC	±800 mA	84 %
WRA2412ZD-8W	9 – 36 VDC	±12 VDC	±333 mA	86 %
WRA2415ZD-8W	9 – 36 VDC	±15 VDC	±267 mA	86 %
WRB4803ZD-8W	18 – 75 VDC	3.3 VDC	2400 mA	85 %
WRB4805ZD-8W	18 – 75 VDC	5 VDC	1600 mA	87 %
WRB4812ZD-8W	18 – 75 VDC	12 VDC	666 mA	87 %
WRB4815ZD-8W	18 – 75 VDC	15 VDC	533 mA	88 %
WRA4805ZD-8W	18 – 75 VDC	±5 VDC	±800 mA	84 %
WRA4812ZD-8W	18 – 75 VDC	±12 VDC	±333 mA	87 %
WRA4815ZD-8W	18 – 75 VDC	±15 VDC	±267 mA	87 %
WRB7203ZD-8W	43 – 160 VDC	3.3 VDC	2400 mA	84 %
WRB7205ZD-8W	43 – 160 VDC	5 VDC	1600 mA	85 %
WRB7512ZD-8W	43 – 160 VDC	12 VDC	666 mA	86 %
WRB7515ZD-8W	43 – 160 VDC	15 VDC	533 mA	86 %
WRA7205ZD-8W	43 – 160 VDC	±5 VDC	±800 mA	82 %
WRA7212ZD-8W	43 – 160 VDC	±12 VDC	±333 mA	85 %
WRA7215ZD-8W	43 – 160 VDC	±15 VDC	±267 mA	85 %

*Input voltage can't exceed this value, or will cause the permanent damage.

General Specifications

Temperature ranges	– Operating	-40°C to +85°C
	– Case temperature	+105°C max.
	– Storage	-55°C to +125°C
Power derating		3 %/K above +70°C
Thermal impedance	– Natural convection	18.2°C/W
	– Natural convection with heat sink	15.8°C/W
Humidity (non condensing)		5 – 95 % rel. H max.
Isolation voltage(60 sec.)	– Input / Output	1500 VDC
Isolation resistance	– Input / Output	>1000 M Ohm
Isolation capacitance	– Input / Output	1500 pF max.
Switching frequency		300 kHz typ. (pulse width modulation PWM)
Thermal shock, mechanical shock & vibration		http://microdc.cn/uploadfiles/WRA-ZD-8W&WRB-ZD-8W.PDF
	– Test conditions	
Safety standards		UL/cUL 60950-1, IEC/EN 60950-1, EN 50155
Safety approvals	– UL/cUL	
Remote On/Off	– On:	3.0 ... 12 VDC or open circuit
	– Off:	0 ... 1.2 VDC or short circuit pin 1 and pin 2/3
	– Off idle current:	2.5 mA
Reliability, calculated MTBF(MIL-HDBK-217F, at +25°C, ground benign)		1 Mio. h
Environmental	– Reach	
	– RoHS	RoHS directive 2002/95/EC

Physical Specification

Casing material	copper, nickel plated
Baseplate material	non conductive FR4
Potting material	epoxy (UL94V-0 rated)
Weight	18 g (0.63 oz)
Soldering temperature	max. 265°C / 10 sec.

Input Specifications

Input current (no load)	9-36 Vin, 3.3 VDC & 5 VDC models:	40 mA typ.
	9-36 Vin other models:	25 mA typ.
	18-75 Vin, 3.3 VDC & 5 VDC models:	20 mA typ.
	18-75 Vin other models:	13 mA typ.
	43-160 Vin, 3.3 VDC & 5 VDC models:	8 mA typ.
Input current (full load)	43-160 Vin other models:	5 mA typ.
	9-36 Vin models:	410 mA typ
	18-75 Vin models:	210 mA typ
Input voltage variation (dv/dt)	43-160 Vin models:	90 mA typ.
		5 V/ms, max.
		(complies with ETS300 132 part 4.4)
Start-up voltage	9-36 Vin models:	9.0 VDC (or lower)
	18-75 Vin models:	18 VDC (or lower)
	43-160 Vin models:	43 VDC (or lower)
Under voltage shut down (lock-out circuit)	9-36 Vin models:	8.0 VDC typ.
	18-75 Vin models:	16 VDC typ.
	43-160 Vin models:	42 VDC typ.
Surge voltage (100 msec. max.)	9-36 Vin models:	50 V max.
	18-75 Vin models:	100 V max.
	43-160 Vin models:	170 V max.
Reflected ripple current		20 mAp-p typ.
Conducted noise		EN 55022 class A with external components see application note:
ESD (electrostatic discharge)		EN 61000-4-2, air ±8 kV, contact ±6 kV, perf. criteria A
Radiated immunity		EN 61000-4-3, 20 V/m, perf. criteria A
Fast transient / surge (with external input capacitor)		EN 61000-4-4, ±2 kV, perf. criteria A
		EN 61000-4-5, ±2 kV perf. criteria A
	- external input capacitor	24/48 Vin models: Nippon chemi-con KY 220 µF, 100 V, ESR 48 mOhm 110 Vin models: Nippon chemi-con KX J 150 µF, 200 V, ESR 48 mOhm
Conducted immunity		EN 61000-4-6, 10 Vrms, perf. criteria A

Output Specifications

Voltage set accuracy		±1 %
Regulation	- Input variation Vin min. to Vin max.	0.2 % max.
	- Load variation 0 - 100 %	single output models: 0.5 % max. dual output models: 1 % max.
	- Load cross variation 25 % / 100 %	5 % max.
		not required
Minimum load		not required
Temperature coefficient		±0.02 %/K
Ripple and noise (20 MHz bandwidth)	24/48 Vin models:	50 mVp-p typ.
	110 Vin models:	75 mVp-p typ.
Start up time (constant resistive load)	- Power On	450 ms typ.
	- Remote On	5 ms typ.
Transient Response(25% load step change)		250 µs typ.
Short circuit protection		indefinite (automatic recovery)
Over load protection		150 % of Iout max. typ.
Over voltage protection(only single output models)	3.3 V output:	3.9 V
	5 V output:	6.2 V
	12 V output:	15 V
	15 V output:	18 V
Capacitive load	3.3 VDC & 5 VDC models:	1330 µF
	12 VDC models:	288 µF
	15 VDC models:	200 µF
	±5 VDC models:	900 µF (each output)
	±12 VDC models:	133 µF (each output)
	±15 VDC models:	90 µF (each output)

Parameter	Conditions	Min.	Typ.	Max.	Units
Output power	See below products program	0.6		6	W
Positive voltage accuracy	Refer to recommended circuit		±1	±3	%
Negative voltage accuracy	Refer to recommended circuit		±3	±5	%
Load regulation	Form 10% to 100% load		±0.5	±2*	%
Line regulation	Input voltage from low to high		±0.2	±0.5	%
Temperature drift (Vout)	Refer to recommended circuit		±0.02		%/°C
Ripple**	20MHz Bandwidth		20	50	mVp-p
Noise**	20MHz Bandwidth		50	100	mVp-p
Switching frequency	100% load, input voltage range		300		KHz

* Dual output models unbalanced load: ±5%.

** Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

APPLICATION NOTE

Requirement on output load

In order to ensure the product operate efficiently and reliably, in addition to a max load (namely full load), a minimum load is specified for this kind of DC/DC converter. Make sure the specified range of input voltage is not exceeded, the minimum output load **no less than 10% load**. If the actual load is less than the specified minimum load, the output ripple may increase sharply while its efficiency and reliability will reduce greatly. If the actual output power is very small, please add an appropriate resistor as extra loading, or contact our company for other lower output power products.

Recommended Circuit

All the WRA_ZD-8W & WRB_ZD-8W Series have been tested according to the following recommended testing circuit before leaving factory. This series should be tested under load (see Figure 1).

If you want to further decrease the input/output ripple, you can increase capacitance properly or choose capacitors with low ESR. However, the capacitance should not be too high, or may cause start-up problem.

General: Cin: 24V & 48V 10μF-47μF
Cout: 10μF/100mA

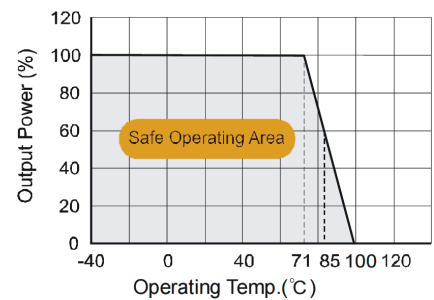
Input current

While using unstable power source, please ensure the output voltage and ripple voltage do not exceed indexes of the converter. The preceding power source must be able to provide for converter sufficient starting current Ip (Figure 2).

General: $I_p \leq 1.6 \cdot I_{in-max}$

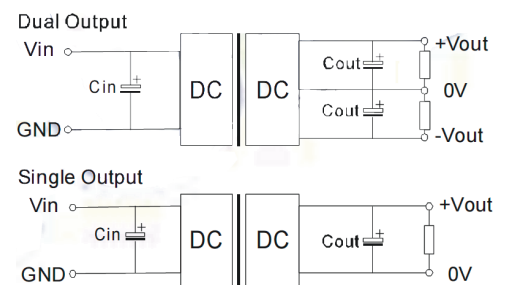
No parallel connection or plug and play

Temperature Derating Graph

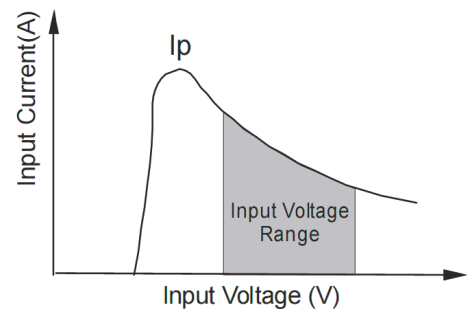


RECOMMENDED CIRCUIT

Output Graph



(Figure 1)



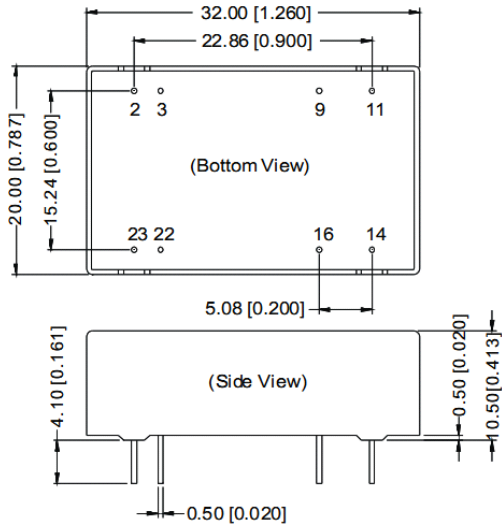
(Figure 2)

Output External Capacitor Table (Table 1)

Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout (μF)
3.3	2200	±5	680
5	1000	±12	330
12	470	±15	220
15	330	--	--

OUTLINE DIMENSIONS & FOOTPRINT DETAILS

MECHANICAL DIMENSIONS



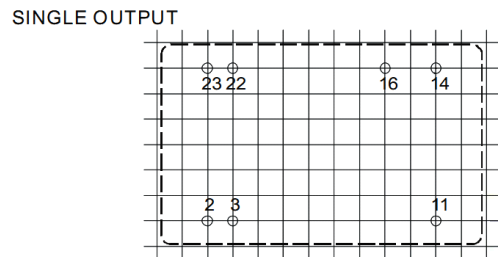
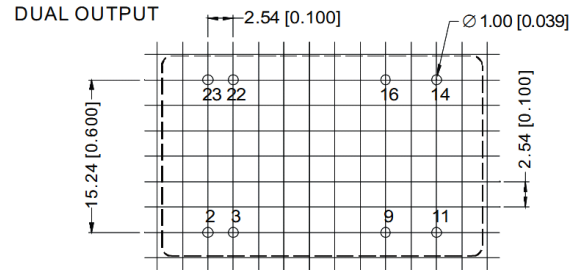
Note:

Unit:mm[inch]

Pin section tolerances:±0.10mm[±0.004inch]

General tolerances:±0.25mm[±0.010inch]

RECOMMENDED FOOTPRINT



RECOMMENDED FOOTPRINT
Top view grid:2.54mm(0.1inch)
diameter:1.00mm(0.039inch)

FOOTPRINT DETAILS

Pin	Single	Dual
2, 3	GND	GND
9	NC	0V
11	NC	-Vo
14	+Vo	+Vo
16	0V	0V
22, 23	Vin	Vin

NC:No connection

When the environment temperature is higher than 71°C, the product output power should be less than 60% of the rated power.

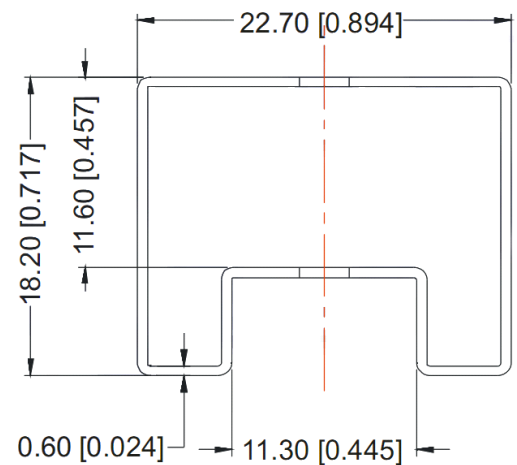
No parallel connection or plug and play.

Use dual output simultaneously,forbid pening output pin (0V) to use as single output.

Note:

1. The load shouldn't be less than 10%, otherwise ripple will increase dramatically.
2. Operation under 10% load will not damage the converter; However, they may not meet all specification listed.
3. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on corporate standards.
5. Only typical models listed, other models may be different, please contact our technical person for more details.

TUBE OUTLINE DIMENSIONS



Note:

Unit :mm[inch]

General tolerances:±0.50mm[±0.020inch]

L=530mm[20.866inch] Tube Quantity: 15pcs

L=220mm[8.661inch] Tube Quantity: 6pcs