



## FEATURES

- ◆ Wide (4:1) Input Range
- ◆ 50 Watt
- ◆ 1500VDC DC I/O Isolation
- ◆ Operating Temperature: -40°C ~ +85°C
- ◆ 2" x 1" Metal Case
- ◆ Regulated Output
- ◆ Single, Dual and Triple Output
- ◆ Metal shielding package
- ◆ Continuous Short Circuit Prot.
- ◆ MTBF > 1000Khours

## MODEL SELECTION

**WRB<sup>①</sup>24<sup>②</sup>05<sup>③</sup>Z<sup>④</sup>MDQ<sup>⑤</sup>-50W<sup>⑥</sup>**

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

## APPLICATIONS

The WRA-ZMDQ-50W & WRB-ZMDQ-50W series is a family of cost effective 50W, single and dual output DC-DC converters with an ultra wide input range of 4:1. These converters are encapsulated in nickel coated brass 2"x1" case with high performance features: 1500VDC input/output isolation voltage, continuous short circuit protection with automatic restart and tight line/load regulation, over current protection, over voltage protection, over temperature protection, high efficiency operation and soft start.



## SELECTION GUIDE

Order	Input Voltage (VDC)	Input Current No Load (mA)	Input Current Full Load (mA)	Output Voltage (VDC)	Output Current Full Load (mA)	Efficiency (%)	Capacitor Load (uF) <sup>2</sup>
WRB2403ZMDQ-50W	9-36	60	1185	3.3	10000	88	20000
WRB2405ZMDQ-50W	9-36	100	1420	5	10000	90	14000
WRB2412ZMDQ-50W	9-36	30	1436	12	4170	89	2000
WRB2415ZMDQ-50W	9-36	30	1420	15	3330	90	2000
WRB4803ZMDQ-50W	18-72	50	593	3.3	10000	88	20000
WRB4805ZMDQ-50W	18-72	60	702	5	10000	90	14000
WRB4812ZMDQ-50W	18-72	30	718	12	4170	89	2000
WRB4815ZMDQ-50W	18-72	30	710	15	3330	90	2000

## Input Specifications

Voltage Range	4:1 Ultra Wide Input (see table)
Input Filter	PI Type
Input Reflected Ripple Current <sup>1</sup>	20 mA pk-pk
Start up Time (Nom. Vin and constant resistive load)	30mS, typ.

## Output Specifications

Voltage Accuracy	± 1% (main out)
Voltage Adjustability (only Single Output)	± 10%, max.
Short Circuit Protection	Indefinite (hiccup, automatic recovery)
Over Load Protection	150% of FL, typ.
Line Regulation	± 0.5% (single&dual) ± 1%
Load Regulation (0% - 100%)	± 0.5% (single) ± 1% / ± 5% (dual main / aux)
Cross Regulation <sup>3</sup>	± 5% (dual)
Ripple & Noise (20Mhz bandwidth / 1.0uF - pk-pk)	100 mV (single&dual) 50
Temperature Coefficient	± 0.02% / °C
Transient Recovery Time <sup>4</sup>	250us, typ.
Transient Response Deviation <sup>4</sup>	± 3%, max.

## General Specifications

I/O Isolation Voltage (3 sec.)	1500 VDC
I/O Isolation Capacitance	1500 pF, typ.
I/O Isolation Resistance	1000 M Ohm, min.
Switching Frequency	330 kHz, typ.
Humidity	95% rel H
Reliability Calculated MTBF (MIL-HDBK-217F)	> 435 khrs (single&dual out)

## Physical Specifications

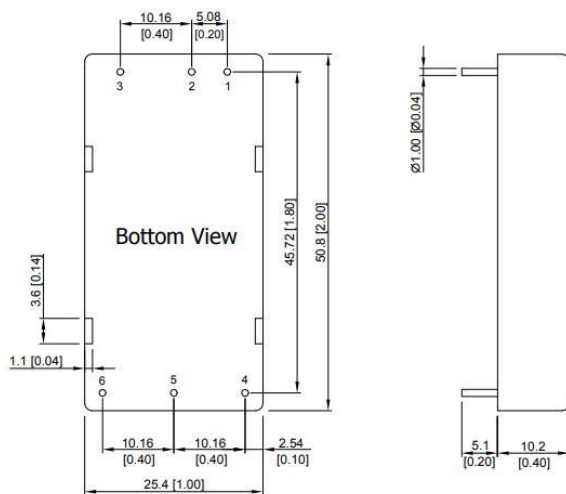
Case Material	Nickel Coated Copper
Potting / Base Material	Epoxy / Plastic (UL94V-0 rated)
Weight	~ 31g, typ.

## Environment Specifications

Operating Temperature	-40 to +50°C (for 100% - ambient)
Maximum Case Temperature	105°C
Storage Temperature	-40 to +125°C
Cooling	Free Air Convection (10mm distance required)
RoHS Conform	Soldering 260°C, max. (1.5mm from case 10s.)

### OUTLINE DIMENSIONS & FOOTPRINT DETAILS

#### Mechanical Dimensions

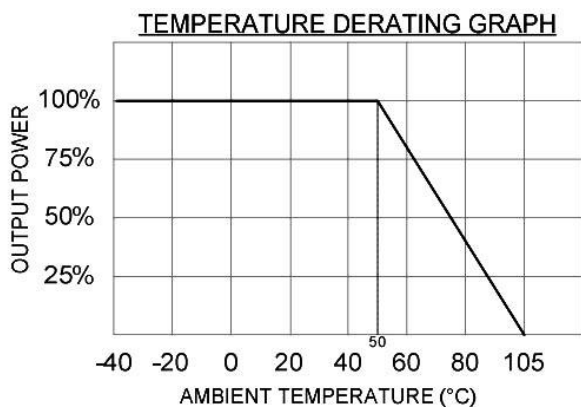


#### Pin Connections

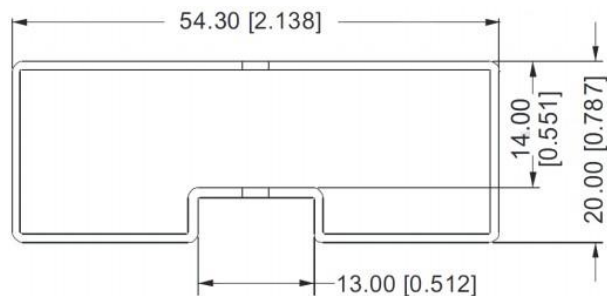
Pin	Function
1	+Vin
2	-Vin
3	Remote On/Off
4	+Vout
5	-Vout
6	Trim

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: X.X±0.25 (X.XX±0.01)  
X.XX±0.13 (X.XXX±0.005)
- ▶ Pin diameter  $\varnothing 1.0 \pm 0.05$  (0.04±0.002)

#### TEMPERATURE DERATING GRAPH



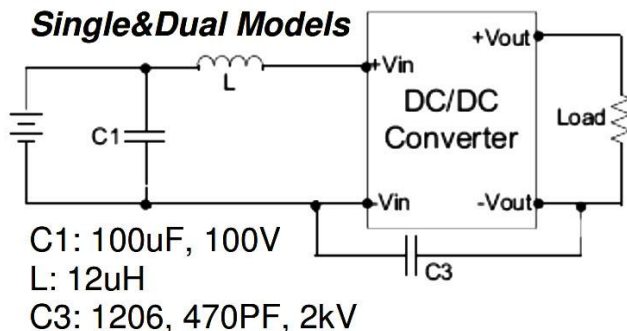
#### TUBE OUTLINE DIMENSIONS



Unit :mm[inch]  
 General tolerances:±0.50mm[±0.020inch]  
 L=230mm[9.055inch] Tube Quantity: 7pcs

### EMI Filter

Input filter components (C1, C3, L) are used to help meet conducted emissions requirement. These components should be mounted as close as possible to the module; all leads should be minimized to decrease radiated noise.

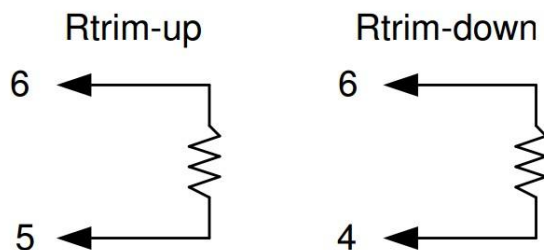


### EMC SPECIFICATIONS

Radiated Emissions	EN 55022	CLASS A
Conducted Emissions <sup>5</sup>	EN 55022	CLASS A
ESD	EN 61000-4-2	Perf. Criteria A
RS	EN 61000-4-3	Perf. Criteria A
EFT <sup>6</sup>	EN 61000-4-4	Perf. Criteria A
Surge <sup>6</sup>	EN 61000-4-5	Perf. Criteria A
CS	EN 61000-4-6	Perf. Criteria A
PFMF	EN 61000-4-8	Perf. Criteria A

### External Output Trimming

Output can be externally trimmed.  
(Single output models only!)



### Over Voltage Protection(Zener diode clamp)

3.3 Vout:	3.9 V
5 Vout	6.2 V
5.1 Vout	6.2 V
12 Vout	15 V
15 Vout	18 V

### Under Input Voltage Lockout (typ.)

24 Vin Models	Module ON/OFF 8.6V / 7.9V
48 Vin Models	Module ON/OFF 17.8V / 16V

### Remote ON/OFF Control<sup>7</sup>

ON:	3 -12 VDC or open circuit
OFF:	0 – 1.2 VDC or short circuit PIN2 and PIN3
OFF idle current:	5mA, typ.

1 = Measured Input reflected ripple current with a simulated source inductance of 12uH.

2 = Tested by minimal Vin and constant resistive load.

3 = Dual: One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.

4 = Tested by nominal Vin and 25% load step change (75% - 50% - 25% of Io)

5 = The WRA-ZMDQ-50W&WRB-ZMDQ-50W series can meet EN55022 Class A With an external filter in parallel with the input pins.

6 = An external filter capacitor is required if the module has to meet EN61000-4-4 and EN61000-4-5