

## FEATURES

- ◆ Ultra-wide 4:1 input range
- ◆ Lengthened SIP-9(10) package
- ◆ Full SMD design
- ◆ Temperature range  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- ◆ High efficiency
- ◆ Excellent load and line regulation
- ◆ Indefinite short-circuit protection
- ◆ I/O isolation 1500 VDC
- ◆ Remote On/Off control
- ◆ Fully RoHS compliant
- ◆ 3-year product warranty

## MODEL SELECTION

### WRA<sup>①</sup>24<sup>②</sup>05<sup>③</sup>Z<sup>④</sup>LS<sup>⑤</sup>-2W<sup>⑥</sup>

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

## DESCRIPTION

The WRA(B)-ZLS-2W series is a new family of isolated 2W dc-dc converter modules with regulated output, featuring ultra-wide 4:1 input voltage ranges of 9-36 VDC or 18-75 VDC. The product comes in a ultra-compact SIP-9 plastic package.

An excellent efficiency up to 84% allows  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  operation temperatures at full load. Further features include remote On/Off control and continuous short circuit protection. Typical applications for these ultra-compact converters are battery operated equipment and distributed power architectures in communication, instrumentation and industrial electronics, everywhere where space on the PCB is critical. 1) where the voltage of the input power supply is wide range (voltage range  $\leq 4:1$ ); 2) where isolation is necessary between input and output (isolation voltage  $\leq 1500\text{VDC}$ ); 3) where the regulation of the output voltage and the output ripple noise are demanded.



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## SELECTION GUIDE

Ordercode	Input voltage range	Output voltage	Output current	Efficiency
WRB2403ZLS-2W	9 – 36 VDC (24 VDC nominal)	3.3 VDC	<b>max.</b> 500 mA	71 % <b>typ.</b>
WRB2405ZLS-2W		5 VDC	400 mA	76 %
WRB2412ZLS-2W		12 VDC	165 mA	79 %
WRB2415ZLS-2W		15 VDC	135 mA	80 %
WRA2405ZLS-2W		$\pm 5$ VDC	$\pm 200$ mA	73 %
WRA2412ZLS-2W		$\pm 12$ VDC	$\pm 85$ mA	77 %
WRA2415ZLS-2W		$\pm 15$ VDC	$\pm 65$ mA	79 %
WRA2418ZLS-2W		$\pm 18\text{VDC}$	$\pm 56$ mA	79%
WRB4803ZLS-2W		18 – 75 VDC (48 VDC nominal)	3.3 VDC	500 mA
WRB4805ZLS-2W	5 VDC		400 mA	72 %
WRB4812ZLS-2W	12 VDC		165 mA	78 %
WRB4815ZLS-2W	15 VDC		135 mA	78 %
WRA4805ZLS-2W	$\pm 5$ VDC		$\pm 200$ mA	70 %
WRA4812ZLS-2W	$\pm 12$ VDC		$\pm 85$ mA	76 %
WRA4815ZLS-2W	$\pm 15$ VDC		$\pm 65$ mA	76 %

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

## Input Specifications

Parameter	results
Input current at no load (nominal input)	24 Vin models: 20 mA typ. 48 Vin models: 15 mA typ.
Input current at full load (nominal input)	24 Vin models: 110 mA typ. 48 Vin models: 55 mA typ.
Surge voltage (100 msec. max.)	24 Vin models: 50 V max. 48 Vin models: 100 V max.
Reverse voltage protection	0.5 A max.
Input Filter	capacitor type
Start up time	<1ms (at nominal input and resistive load)

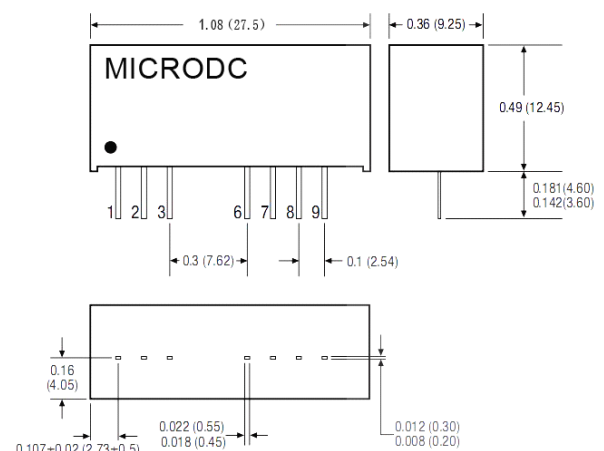
## OUTPUT SPECIFICATIONS

Parameter	results
Voltage set accuracy	$\pm 2\%$
Regulation	- Input variation Vin min. to Vin max. 0.5 % max. - Load variation 25 - 100 % single output models: 0.75 % max. dual output models: 2.0 % max. (balanced load)
Minimum load	25 % of rated max current (operation at lower load condition is safe but a higher output ripple will be experienced)
Temperature coefficient	regulated
Ripple and noise (20 MHz Bandwidth)	50 mVpk-pk max
Transient response (25 % load step change)	300 $\mu\text{s}$ max.
Short circuit protection	constant current (automatic recovery)
Capacitive load	3.3 VDC / 5 VDC models: 2'200 $\mu\text{F}$ max. / 1'000 $\mu\text{F}$ max. 12 VDC / 15VDC models: 170 $\mu\text{F}$ max. / 110 $\mu\text{F}$ max. $\pm 5$ VDC / $\pm 12$ VDC models: 470 $\mu\text{F}$ max. / 100 $\mu\text{F}$ max. (each output) $\pm 15$ VDC models: 47 $\mu\text{F}$ max. (each output)

General Specifications		
Parameter		results
Temperature ranges	- Operating - Case temperature - Storage	-40°C to +85°C +90°C max. -55°C to +105°C
Derating (convection cooling)		3.3 %/K above 70°C
Humidity (non condensing)		95 % rel. H max.
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)		>1 Mio h
Isolation voltage (60 sec.) – Input/Output		1'500 VDC
Isolation capacitance – Input/Output		500 pF max.
Isolation resistance – Input/Output (500 VDC)		>1'000 M Ohm
Switching frequency		100 to 650 kHz (PFM)
Remote On/Off control	- On: - Off: - Off stand by input current	<0.6 VDC or open circuit 2.9 to 15 VDC 1 mA typ / 3 mA max.

Physical Specifications		
Parameter		results
Casing material		non-conductive plastic
Potting material		epoxy (UL 94V-0 rated)
Weight		6.5 g (0.23 oz)
Soldering temperature		max. 260°C / 10 sec.
Environmental compliance	- Reach - RoHS directive 2002/95/EC	<a href="http://www.microdc.cn/uploadfiles/WRA(B)-ZLS-2W.pdf">http://www.microdc.cn/uploadfiles/WRA(B)-ZLS-2W.pdf</a>

All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Outline Dimensions																													
																													
<table border="1"> <thead> <tr> <th colspan="3">Pin-Out</th> </tr> <tr> <th>Pin</th> <th>Single</th> <th>Dual</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>- Vin (GND)</td> <td>- Vin (GND)</td> </tr> <tr> <td>2</td> <td>+Vin (Vcc)</td> <td>+Vin (Vcc)</td> </tr> <tr> <td>3</td> <td>Remote On/Off</td> <td>Remote On/Off</td> </tr> <tr> <td>6</td> <td>On/Off/Vo</td> <td>+Vout</td> </tr> <tr> <td>7</td> <td>ntc</td> <td>Common</td> </tr> <tr> <td>8</td> <td>ntc</td> <td>ntc</td> </tr> <tr> <td>9</td> <td>- Vout</td> <td>- Vout</td> </tr> </tbody> </table>			Pin-Out			Pin	Single	Dual	1	- Vin (GND)	- Vin (GND)	2	+Vin (Vcc)	+Vin (Vcc)	3	Remote On/Off	Remote On/Off	6	On/Off/Vo	+Vout	7	ntc	Common	8	ntc	ntc	9	- Vout	- Vout
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<p>(ntc = not to connect)</p> <p>Dimensions in [mm], ( ) = Inch  Pin diameter <math>\varnothing 0.5 \pm 0.05</math> (<math>0.02 \pm 0.002</math>)  Tolerances <math>\pm 0.5</math> (<math>\pm 0.02</math>)  Pin pitch tolerances <math>\pm 0.2</math> (<math>\pm 0.008</math>)</p>																													

Note:

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

**MICRODC**  
Professional Power Module

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#### RoHS COMPLIANT INFORMATION

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300° C for 10 seconds.  
The pin termination finish on the SIP package type is Tin Plate, Hot Dipped over Matte Tin with Nickel Preplate. The DIP types are Matte Tin over Nickel Preplate. Both types in this series are backward compatible with Sn/Pb soldering systems.



#### REACH COMPLIANT INFORMATION

This series has proven that this product does not contain harmful chemicals, it also has harmful chemical substances through the registration, inspection and approval.