

FEATURES

- ◆ Efficiency up to 81%
- ◆ 4:1 wide input voltage range
- ◆ I/O Isolation 3000VDC
- ◆ Short circuit protection (automatic recovery)
- ◆ External On/Off control
- ◆ Internal SMD construction
- ◆ Operating temperature: -40°C to +85°C
- ◆ UL94-V0 package
- ◆ RoHS Compliance

MODEL SELECTION

WRF^①24^②05^③Y^④S^⑤-1W^⑥

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

DESCRIPTION

The WRE-ZS-1W&WRF-ZS-1W Series are specially designed for applications where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

- 1) Where the voltage of the input power supply is wide range (voltage range ≤ 4:1);
- 2) Where isolation is necessary between input and output (isolation voltage ≤ 3000VDC);
- 3) Where the regulation of the output voltage and the output ripple noise are demanded.



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SPRODUCT PROGRAM

Part Number	Input			Output			Efficiency (% Typ)
	Voltage (VDC)			Voltage (VDC)	Current (mA)		
	Nominal	Range	Max*		Max	Min	
WRE0505ZS-1W	5	4.5-18	11	±5	±100	±10	72
WRE0512ZS-1W	5	4.5-18	11	±12	±42	±4	76
WRE0515ZS-1W	5	4.5-18	11	±15	±33	±3	75
WRF0505ZS-1W	5	4.5-18	11	5	200	20	72
WRF0509ZS-1W	5	4.5-18	11	9	111	11	74
WRF0512ZS-1W	5	4.5-18	11	12	83	8	76
WRF0515ZS-1W	5	4.5-18	11	15	67	7	75
WRE1205ZS-1W	12	9.0-36	22	±5	±100	±10	76
WRE1212ZS-1W	12	9.0-36	22	±12	±42	±4	80
WRE1215ZS-1W	12	9.0-36	22	±15	±33	±3	80
WRF1205ZS-1W	12	9.0-36	22	5	200	20	76
WRF1209ZS-1W	12	9.0-36	22	9	111	11	78
WRF1212ZS-1W	12	9.0-36	22	12	83	8	80
WRF1215ZS-1W	12	9.0-36	22	15	67	7	80
WRE2405ZS-1W	24	18-36	40	±5	±100	±10	78
WRE2412ZS-1W	24	18-36	40	±12	±42	±4	81
WRE2415ZS-1W	24	18-36	40	±15	±33	±3	81
WRF2405ZS-1W	24	18-36	40	5	200	20	76
WRF2409ZS-1W	24	18-36	40	9	111	11	78
WRF2412ZS-1W	24	18-36	40	12	83	8	81
WRF2415ZS-1W	24	18-36	40	15	67	7	81
WRF2424ZS-1W	24	18-36	40	24	42	4	77
WRE4805ZS-1W	48	18-72	80	±5	±100	±10	76
WRE4812ZS-1W	48	18-72	80	±12	±42	±4	80
WRE4815ZS-1W	48	18-72	80	±15	±33	±3	80
WRF4805ZS-1W	48	18-72	80	5	200	20	76
WRF4809ZS-1W	48	18-72	80	9	111	11	78
WRF4812ZS-1W	48	18-72	80	12	83	8	80
WRF4815ZS-1W	48	18-72	80	15	67	7	80

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

COMMON SPECIFICATIONS

Item	Test conditions	Min.	Ty	Max	Units
Storage humidity	Test Conditions			95	%
Operating temperature		-40			°C
Storage temperature		-55			
Temp. Rise at full load			15		
Lead temperature	1.5mm from case for 10 seconds			300	
No-load power consumption			120		mW
Cooling		Free air convection			
Short circuit protection		Continuous, automatic recovery			
Case material		Plastic (UL94-V0)			
MTBF		1000			K hour
Weight			5		g

ISOLATION SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Isolation voltage	Tested for 1 minute and 1mA max	3000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance	100KHz, 1V		35		pF

OUTPUT SPECIFICATIONS

Item	Test conditions	Min.	Typ.	Max.	Units
Output power		0.1		1	W
Positive voltage accuracy	Refer to recommended circuit		±1	±3	%
Negative voltage accuracy	Refer to recommended circuit		±3	±5	
Load regulation	10% to 100% load(WRF_ZS-1W)		±0.5	±0.75	
	10% to 100% load(WRE_ZS-1W)*		±0.75	±1.0	
Line regulation	Input voltage from Low To high		±0.2	±0.5	
Temperature Drift (Vout)	Refer to recommended circuit			±0.03	%/°C
Ripple & Noise**	20MHz Bandwidth		25	75	mVp-p
Switching frequency	Input voltage range 100% load		300		KHz

*Dual output models unbalanced load (25/100%): ±5%Max.

**Test ripple and noise by " Parallel cable " method.

See detailed operation instructions at Testing of Power Converter section, application notes.

TYPICAL TEMPERATURE CURVE

1) Recommended circuit

If you want to further decrease the input/output ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 1).

However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees (Table 1). General:

Cin: 5V,12V 100μF
 24V,48V 10μF
 Cout: 47μF (Typ.)
 Lin: 4.7μH-120μH
 Lout: 2.2μH-10μH
 Cs: 10μH-22μF

2) CTRL Terminal

When open or high impedance, the converter work well; When this pin is "high" the converter shutdown; It should be note that the input current (Ic) should between 5-10mA, exceeding the maximum 20mA will cause permanence damage to the converter. The value of R Can be derived as follows :

$$R = \frac{V - V - 1.0}{Ic}$$

3) Input current

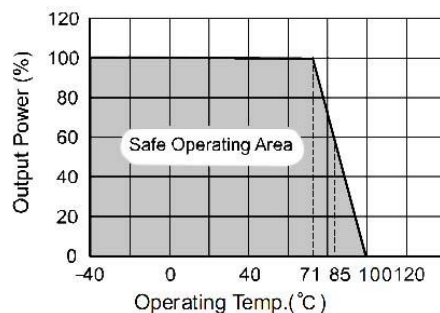
While using unstable power source, please ensure the output voltage and ripple voltage do not exceed indexes of the converter. The preceding power source must be able to provide for converter sufficient starting current Ip (Figure 2).

General: Ip ≤ 1.4Iin-max

4) No parallel connection or plug and play

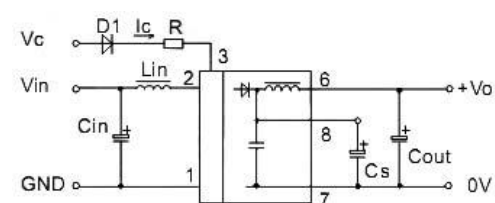
APPLICATION NOTE

Temperature Derating Graph

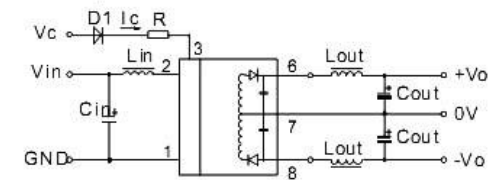


RECOMMENDED CIRCUIT

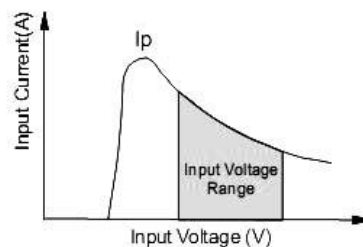
Single Output



Dual Output



(Figure 1)



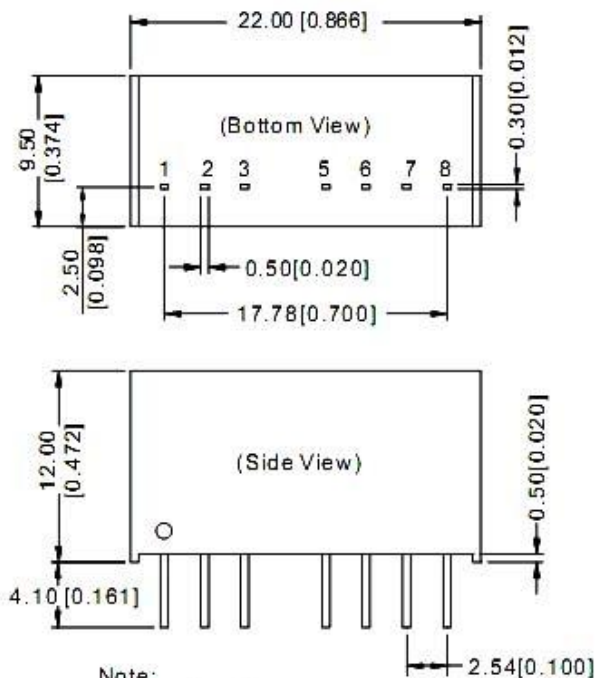
(Figure 2)

External Capacitor Table (Table 1)

Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout (μF)
5	680	±5	330
9	560	±9	270
12	470	±12	220
15	330	±15	150

OUTLINE DIMENSIONS & FOOTPRINT DETAILS

MECHANICAL DIMENSIONS



Note:
Unit:mm[inch]
Pin section tolerances: $\pm 0.10\text{mm}$ [$\pm 0.004\text{inch}$]
General tolerances: $\pm 0.25\text{mm}$ [$\pm 0.010\text{inch}$]

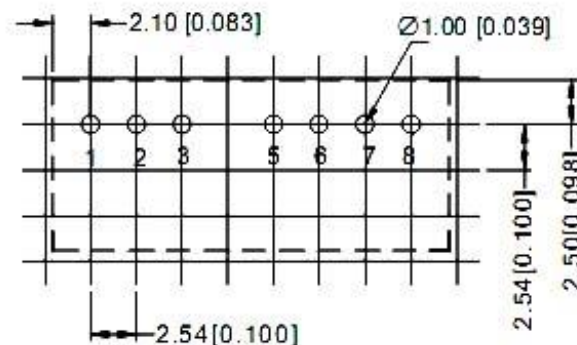
FOOTPRINT DETAILS

Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	CTRL	CTRL
5	NC	NC
6	+Vo	+Vo
7	0V	0V
8	CS	-Vo

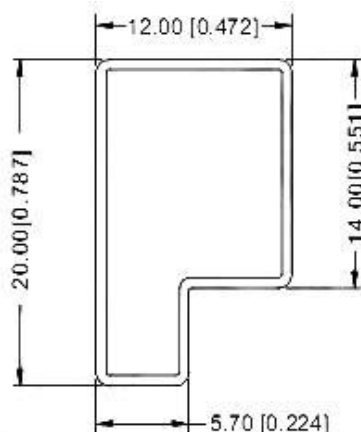
NC:No connection

RECOMMENDED FOOTPRINT

mm(0.1inch)
diameter:1.00mm(0.039inch)



TUBE OUTLINE DIMENSIONS



Note:
Unit :mm[inch]
General tolerances: $\pm 0.50\text{mm}$ [$\pm 0.020\text{inch}$]
L=530mm[20.866inch] Tube Quantity: 22pcs
L=220mm[8.661inch] Tube Quantity: 8pcs

Use dual output simultaneously, forbid opening 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 $T_a=25^\circ\text{C}$, 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.

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.