

## FEATURES

- ◆ DIP24 package
- ◆ Efficiency up to 86%
- ◆ Operating temperature: -40°C to +85°C
- ◆ 3KVDC input/output Isolation
- ◆ Short circuit protection (automatic recovery)
- ◆ Internal SMD construction
- ◆ No heat sink required
- ◆ Industry standard pinout
- ◆ MTBF>1,000,000 hours
- ◆ RoHS Compliance

## MODEL SELECTION

### WRF<sup>①</sup>24<sup>②</sup>05<sup>③</sup>Y<sup>④</sup>D<sup>⑤</sup>-6W<sup>⑥</sup>

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

## DESCRIPTION

The WRE\_YD-6W&WRF\_YD-6W 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 ≤2:1);
- 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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## PRODUCT PROGRAM

Part Number	Input			Output			Efficiency (% Typ)
	Voltage(VDC)			Voltage (VDC)	Current(MA)		
	Nominal	Range	Max*		Max	Min	
WRE0505YD-6W	5	4.5-9	11	±5	±600	±60	76
WRE0512YD-6W	5	4.5-9	11	±12	±250	±25	80
WRE0515YD-6W	5	4.5-9	11	±15	±200	±20	82
WRF0505YD-6W	5	4.5-9	11	5	1200	120	76
WRF0512YD-6W	5	4.5-9	11	12	500	50	80
WRF0515YD-6W	5	4.5-9	11	15	400	40	82
WRE1205YD-6W	12	9-18	20	±5	±600	±60	78
WRE1212YD-6W	12	9-18	20	±12	±250	±25	82
WRE1215YD-6W	12	9-18	20	±15	±200	±20	84
WRF1205YD-6W	12	9-18	20	5	1200	120	78
WRF1212YD-6W	12	9-18	20	12	500	50	82
WRF1215YD-6W	12	9-18	20	15	400	40	84
WRE2405YD-6W	24	18-36	40	±5	±600	±60	80
WRE2412YD-6W	24	18-36	40	±12	±250	±25	84
WRE2415YD-6W	24	18-36	40	±15	±200	±20	86
WRF2405YD-6W	24	18-36	40	5	1200	120	80
WRF2412YD-6W	24	18-36	40	12	500	50	84
WRF2415YD-6W	24	18-36	40	15	400	40	86
WRE4805YD-6W	48	36-72	80	±5	±600	±60	80
WRE4812YD-6W	48	36-72	80	±12	±250	±25	84
WRE4815YD-6W	48	36-72	80	±15	±200	±20	86
WRF4805YD-6W	48	36-72	80	5	1200	120	80
WRF4812YD-6W	48	36-72	80	12	500	50	84
WRF4815YD-6W	48	36-72	80	15	400	40	86

\*Input voltage can exceed this value, or will cause the permanent damage.

## OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Storage humidity	Test Conditions			95	%
Operating temperature		-40		85	°C
Storage temperature		-55		125	°C
Temp. rise at full load			40		°C
Lead temperature	1.5mm from case for 10 seconds			300	°C
No-load power consumption			500		mW
Cooling		Free air convection			
Short circuit protection		Continuous, automatic recovery			
Case material		Plastic (UL94-V0)			
MTBF		1000			K hours
Weight			17		g

### COMMON 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

\*Supply voltage must be discontinued at the end of short circuit duration.

### COMMON SPECIFICATIONS

Item	Test Conditions	Min	Typ.	Max.	Units
Output power	See above 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	From 10% to 100% load		±0.5	±1*	%
Line regulation(at full load)	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		75	150	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.

\*Supply voltage must be discontinued at the end of short circuit duration.

### APPLICATION NOTE

#### 1) 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.

#### 2) Recommended Circuit

All the WRE\_YD-6W & WRF\_YD-6W Series have been tested according to the following recommended testing circuit before leaving factory. This series should be tested under load. Never be tested under no 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 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:

General: Cin: 5V&12V 100μF  
 24V&48V 10μF-47μF  
 Cout: 10μF/100mA

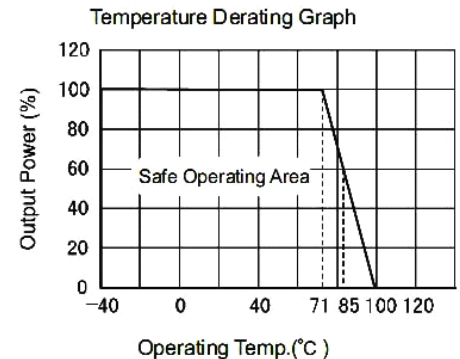
#### 3) Input Current

When it is used in unregulated power supply, be sure that the fluctuating range of the power supply and the rippled voltage do not exceed the module standard. Input current of power supply should afford the startup current of this kind of DC/DC module (See figure 2),

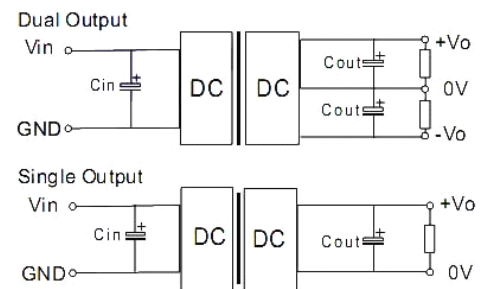
General:  $I_p \leq 1.4 \cdot I_{in-max}$

#### 4) No parallel connection or plug and play

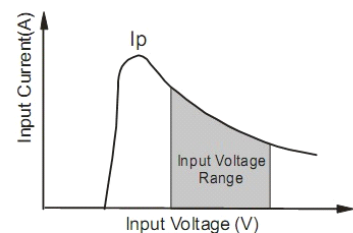
### TYPICAL CHARACTERISTICS



### RECOMMENDED CIRCUIT



(Figure 1)



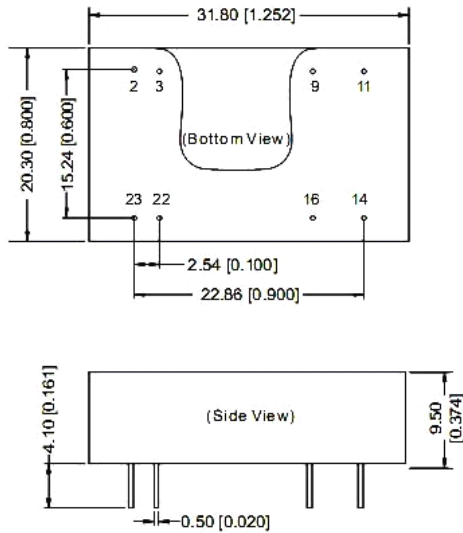
(Figure 2)

EXTERNAL CAPACITOR TABLE (TABLE 1)

Output External Capacitor Table (Table 1)			
Single Vout (VDC)	Cout (uF)	Dual Vout (VDC)	Cout (uF)
5	1000	±5	680
12	470	±12	330
15	330	±15	220

### OUTLINE DIMENSIONS & FOOTPRINT DETAILS

#### MECHANICAL DIMENSIONS

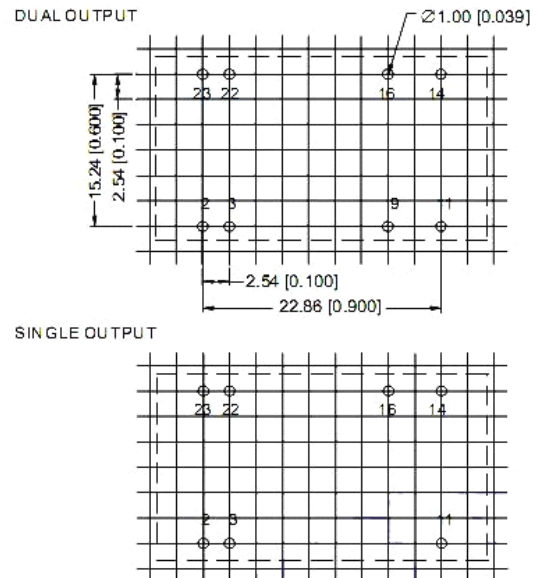


Note:  
Unit:mm[inch]  
Pin diameter tolerances  $\pm 0.10\text{mm}$  [ $\pm 0.004\text{inch}$ ]  
General tolerances  $\pm 0.25\text{mm}$  [ $\pm 0.010\text{inch}$ ]

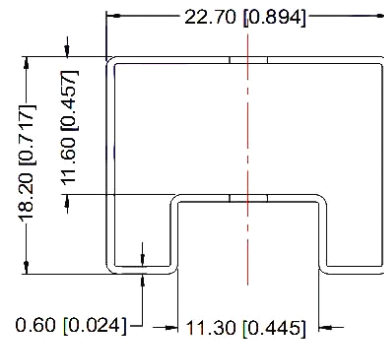
FOOTPRINT DETAILS		
Pin	Single	Dual
2,3	GND	GND
9	No Pin	0V
11	NC	-Vo
14	+Vo	+Vo
16	0V	0V
22,23	Vin	Vin

NC: No connection.

#### RECOMMENDED FOOTPRINT(TOP VIEW)



#### 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: 15pcs  
L=220mm[8.661inch] Tube Quantity: 6pcs

#### 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.