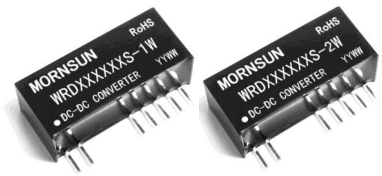
MORNSUN
Industrial DC&AC converter professional

WRD_S-1W & WRD_S-2W Series

1W & 2W, WIDE INPUT, ISOLATED & REGULATED TWIN OUTPUT SIP DC-DC CONVERTER



multi-country patent protection **RoHS**

FEATURES

Wide (2:1) Input Range
Miniature SIP Package
I/0 Isolation 1000VDC
Short Circuit Protection(automatic recovery)
External On/Off control
Internal SMD construction
Operating Temperature: -40°C to +85°C
RoHS Compliance

APPLICATIONS

The WRD_S-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 ≤2:1);

2) Where isolation is necessary between input and output & Vout1 and Vout2 (Isolation Voltage ≤1000VDC);

3) Where the regulation of the output voltage and the output ripple noise are demanded.

MODEL SELECTION

WRD051212S-1W

- Rated Power
- Package Style
- 2nd Output Voltage
- 1st Output Voltage
- Input Voltage
- Product Series

PRODUCT PROGRAM

Part Number	Input				Output			Efficiency (%, Typ)
	Voltage (VDC)			No-load (mA)(Typ)	Voltage (VDC)	Current (mA)		
	Nominal	Range	Max*			Max	Min	
WRD050505S-1W	5	4.5-9.0	11	40	5	100	10	70
WRD050909S-1W					9	55	5	71
WRD051212S-1W					12	42	4	73
WRD051515S-1W					15	33	3	72
WRD050505S-2W					5	200	20	67
WRD050909S-2W					9	111	11	71
WRD051212S-2W					12	83	8	72
WRD051515S-2W					15	67	7	73
WRD120505S-1W	12	9.0-18	22	20	5	100	10	73
WRD120909S-1W					9	55	5	76
WRD121212S-1W					12	42	4	78
WRD121515S-1W					15	33	3	78
WRD120505S-2W					5	200	20	75
WRD120909S-2W					9	111	11	77
WRD121212S-2W					12	83	8	80
WRD121515S-2W					15	67	7	79
WRD240505S-1W	24	18-36	40	10	5	100	10	76
WRD240909S-1W					9	55	5	77
WRD241212S-1W					12	42	4	78
WRD241515S-1W					15	33	3	77
WRD240505S-2W					5	200	20	76
WRD240909S-2W					9	111	11	78
WRD241212S-2W					12	83	8	80
WRD241515S-2W					15	67	7	79
WRD480505S-1W	48	36-72	80	5	5	100	10	73
WRD480909S-1W					9	55	5	75
WRD481212S-1W					12	42	4	77
WRD481515S-1W					15	33	3	77
WRD480505S-2W					5	200	20	75
WRD480909S-2W					9	111	11	78
WRD481212S-2W					12	83	8	79
WRD481515S-2W					15	67	7	78

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

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min	Typ	Max	Units
Positive voltage accuracy	Refer to recommended circuit		±1	±3	%
Negative voltage accuracy	Refer to recommended circuit		±3	±5	
Load regulation	10% to 100% load		±0.5	±1*	
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		50	100	mVp-p
Switching frequency	Input voltage range 100% load		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.

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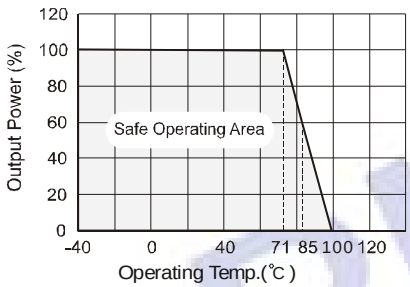
COMMON SPECIFICATION

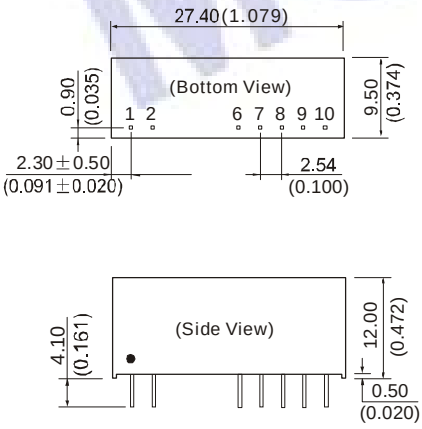
Item	Test Conditions	Min	Typ.	Max	Units
Storage humidity				95	%
Operating temperature		-40		85	°C
Storage temperature		-55		125	
Temp. rise at full load			15		
Lead temperature	1.5mm from case for 10 seconds			300	
Isolation voltage	Tested for 1 minute and 1mA max	1000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation Capacitance	100KHz,1V		80		pF
No-load power consumption			0.1		W
Cooling		Free Air Convection			
Short circuit protection		Continuous			
Case material		Plastic(UL94-V0)			
MTBF		1000			K hours
Weight			5.8		g

Note:
1. All specifications measured at T_A=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2. See below recommended circuits for more details.

TYPICAL TEMPERATURE CURVE

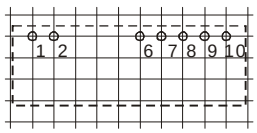


OUTLINE DIMENSIONS & FOOTPRINT DETAILS



First Angle Projection

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



FOOTPRINT DETAILS

Pin	Function
1	GND
2	Vin
6	+Vo1
7	0V1
8	CS
9	0V2
10	+Vo2

Note:
Unit:mm(inch)
Pin section:0.50*0.30mm(0.020*0.012inch)
Pin section tolerances:±0.05mm(±0.002inch)
General tolerances:±0.25mm(±0.010inch)

APPLICATION NOTE

CS Pin

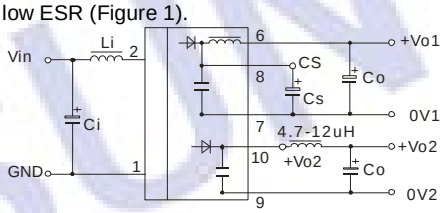
By connecting a low ESR capacitor between this terminal and the pin-7(Figure 1), the output ripple and noise may be further improved. Generally, the capacitance is no greater than 47uF.

Requirement on Output Load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load is not less than 10% of the full load, If the actual load is less than the specified minimum load, the output ripple may increase sharply. 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

If you want to further decrease the input/output ripple, you can increase capacitance properly or choose capacitors with low ESR (Figure 1).



(Figure 1)

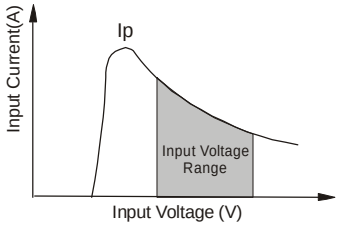
However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees (Table 1)Cin： 5V & 12V 100μF
24V & 48V 10μF-47μF
Lin： 10μH-120μH
Cout：100μF(TYP)

Extemal Capacitor Table(Table 1)

Vout(VDC)	2W:Cout(uF)	1W:Cout(uF)
5	680	470
9	470	330
12	330	220
15	220	100

Input current

While using unstable power source, please ensure the output voltage and ripple voltage do not excced indexes of the converter. The preceding power source must be able to provide for converter sufficient starting current Ip (Figure 2). General: Ip ≤1.4*Iin-max



(Figure 2)

No parallel connection or plug and play.