MORNSUN®

WRD_S-1W & WRD_S-2W Series

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

Patent Protection RoHS

FEATURES

- 2:1 wide input voltage range
- Miniature SIP package
- Input-Output Isolation 1500VDC
  Output-Output Isolation 1000VDC
- Short circuit protection
  (automatic recovery)
- Internal SMD construction
- Operating temperature: -40°C to +85°C
- RoHS Compliance

APPLICATIONS

The WRD_S-1W & WRD_S-2W 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 ≤ 1500VDC);
3) Where isolation is necessary between Vout1 and Vout2 (Isolation Voltage ≤ 1000VDC);
4) Where the regulation of the output voltage and the output ripple noise are demanded.

MODEL SELECTION

WRD050505S-1W

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

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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	5/5	100/100	10/10	70
WRD050909S-1W					9/9	55/55	5/5	71
WRD051212S-1W					12/12	42/42	4/4	73
WRD051515S-1W					15/15	33/33	3/3	72
WRD050505S-2W					5/5	200/200	20/20	67
WRD050909S-2W					9/9	111/111	11/11	71
WRD051212S-2W					12/12	83/83	8/8	72
~~WRD051515S-2W~~					~~15/15~~	~~67/67~~	~~7/7~~	~~73~~
WRD120505S-1W	12	9.0-18	22	20	5/5	100/100	10/10	70
WRD120524S-1W					5/24	100/21	10/2	72
WRD120909S-1W					9/9	55/55	5/5	73
WRD121212S-1W					12/12	42/42	4/4	74
WRD121515S-1W					15/15	33/33	3/3	75
WRD120505S-2W					5/5	200/200	20/20	73
WRD120909S-2W					9/9	111/111	11/11	74
WRD121212S-2W					12/12	83/83	8/8	78
WRD121515S-2W					15/15	67/67	7/7	77
WRD240505S-1W	24	18-36	40	10	5/5	100/100	10/10	71
WRD240512S-1W					5/12	100/42	10/4	78
WRD240515S-1W					5/15	100/33	10/3	79
~~WRD240524S-1W~~					~~5/24~~	~~100/21~~	~~10/2~~	~~65~~
~~WRD240909S-1W~~					~~9/9~~	~~55/55~~	~~5/5~~	~~76~~
WRD241205S-1W					12/5	42/100	4/10	76
WRD241212S-1W					12/12	42/42	4/4	78
WRD241515S-1W					15/15	33/33	3/3	77
WRD240505S-2W					5/5	200/200	20/20	76
WRD240509S-2W					5/9	200/111	20/11	78
WRD240512S-2W					5/12	200/83	20/8	81
WRD240524S-2W					5/24	200/42	20/4	79
WRD240909S-2W					9/9	111/111	11/11	76
WRD241212S-2W					12/12	83/83	8/8	79
WRD241515S-2W					15/15	67/67	7/7	80
WRD480505S-1W	48	36-72	80	5	5/5	100/100	10/10	73
WRD480909S-1W					9/9	55/55	5/5	74
WRD481212S-1W					12/12	42/42	4/4	76
~~WRD481515S-1W~~					~~15/15~~	~~33/33~~	~~3/3~~	~~75~~
WRD480505S-2W					5/5	200/200	20/20	75
WRD480909S-2W					9/9	111/111	11/11	78
WRD481212S-2W					12/12	83/83	8/8	78
WRD481515S-2W					15/15	67/67	7/7	78

Note:
1.Models listed with strike-through text have been officially discontinued.
2.*Input voltage can't exceed this value, or will cause the permanent damage.

ISOLATION SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Input-Output Isolation voltage	Tested for 1 minute and 1mA max	1500			VDC
Output-Output Isolation voltage	Tested for 1 minute and 1mA max	1000			
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance	Input/Output, 100KHz/1V		80		pF

COMMON SPECIFICATIONS

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	
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

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Main output voltage accuracy	Refer to recommended circuit		±1	±3	%
Vice output 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	100% load, input voltage range		300		kHz

Note:1.*Dual output models unbalanced load: ≤ ±5%.
2.**Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

APPLICATION NOTE

1) 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.

2) 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.

3) 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).

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)

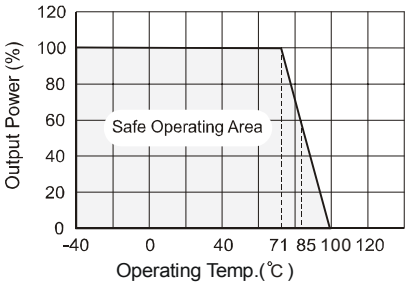
Cin: 5V & 12V 100μF
24V & 48V 10μF-47μF
Lin: 10μH-120μH
Cout: 100μF(TYP)

4) Input current

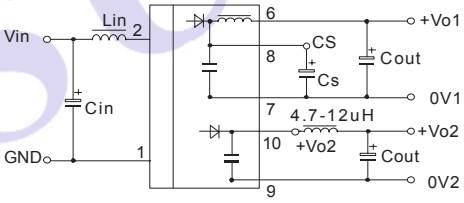
While using unstable power source, please ensure the output voltage and ripple voltage do not exceed indexes of the converter. The preceding power source must be able to provide for converter sufficient starting current Ip (Figure 2). General: Ip ≤1.4*Iin-max

5) No parallel connection or plug and play

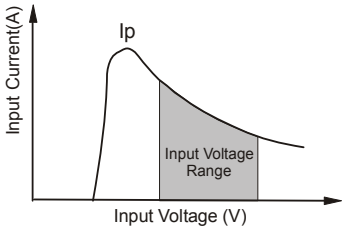
TYPICAL TEMPERATURE CURVE



RECOMMENDED CIRCUIT



(Figure 1)



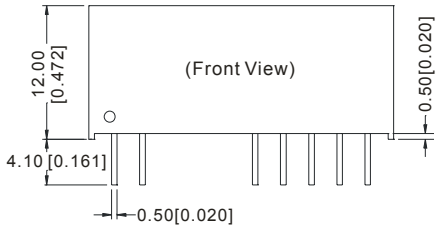
(Figure 2)

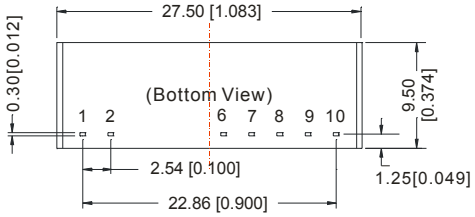
External Capacitor Table (Table 1)

Vout(VDC)	2W:Cout(uF)	1W:Cout(uF)
5	680	470
9	470	330
12	330	220
15	220	100
24	100	47

OUTLINE DIMENSIONS & FOOTPRINT DETAILS

MECHANICAL DIMENSIONS

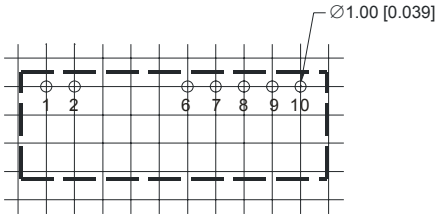




FOOTPRINT DETAILS	
Pin	Function
1	GND
2	Vin
6	+Vo1
7	0V1
8	CS
9	0V2
10	+Vo2

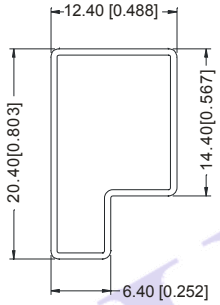
Note:
Unit:mm[inch]
Pin section tolerances: ±0.10mm[±0.004inch]
General tolerances:±0.25mm[±0.010inch]

RECOMMENDED FOOTPRINT



Note: grid 2.54*2.54mm.

TUBE OUTLINE DIMENSIONS



Note:
Unit :mm[inch]
General tolerances:±0.50mm[±0.020inch]
L=530mm[20.866inch] Tube Quantity: 18pcs
L=220mm[8.661inch] Tube Quantity: 7pcs
Short tube inner package dimensions: L*W*H= 255*170*80mm
Short tube outer package dimensions: L*W*H= 375*280*270mm
Long tube inner package dimensions: L*W*H= 580*200*100mm
Long tube outer package dimensions(with two inner package boxes):
L*W*H= 600*215*220mm
Long tube outer package dimensions(with three inner package boxes):
L*W*H= 600*215*325mm

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 Ta=25°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.