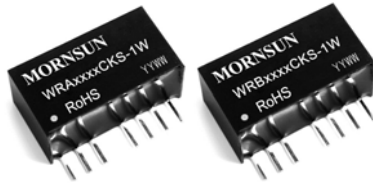


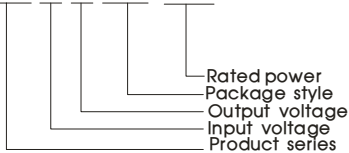
WRA_CKS-1W & WRB_CKS-1W Series 1W, WIDE INPUT, ISOLATED & REGULATED DUAL/SINGLE OUTPUT SIP DC-DC CONVERTER



Patent Protection RoHS

PART NUMBER SYSTEM

WRA2415CKS-1W



FEATURES

- 2:1 wide input range
- 1500VDC Isolation
- Short circuit protection (automatic recovery)
- Remote ON/OFF control
- High Power Density
- Operating Temperature: -40°C to +85°C
- UL94-V0 Package

APPLICATIONS

The WRA_CKS-1W & WRB_CKS-1W series are designed for application where a wide input voltage range, isolated output is required from a distributed power system. For these DC-DC converters, You can reduce the design point of failure and save the development of micro power supply's manpower, material and time costs, also better ensure product quality stability, protect safety and reliability of the end of products.

These products apply to where:

- 1) Input voltage range ≤ 2:1;
- 2) 1.5KVDC input and output isolation;
- 3) Regulated and low ripple noise is required.

SELECTION GUIDE

Model Number	Input Voltage(VDC)		Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(typ.)		Reflected Ripple Current (mA,typ.)	Max. Capacitive Load(μF)	Efficiency (% ,Min./ Typ.) @Max. Load
	Nominal (Range)	Max*		Max.	Min.	@Max. Load	@No Load			
WRB0509CKS-1W	5 (4.5-9.0)	11	9	111	11	282	50	35	680	69/71
WRA2415CKS-1W	24 (18-36)	40	±15	±33	±3	55	10	55	220	74/76
WRB2405CKS-1W	24 (18-36)	40	5	200	20	55	10	55	1000	70/72
WRB2415CKS-1W			15	67	7	52			330	78/80

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

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1000 ms)	5VDC Input Models	-0.7	--	12	VDC
	24VDC Input Models	-0.7	--	50	
Short Circuit Input Power		--	1	--	W
Input Filter		Capacitance Filter			

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Output Power		0.1	--	1	W
Positive voltage accuracy	Refer to recommended circuit	--	±1	±3	%
Negative voltage accuracy		--	±2	±5	
Output Voltage Balance	Dual Output, Balanced Loads	--	±0.3	±0.5	
Line Regulation	Full load, Input voltage from low to high	--	±0.2	±0.5	
Load Regulation	10% to 100% load (WRA_CKS-1W)	--	±0.5	±1.0	
	10% to 100% load (WRB_CKS-1W)	--	±0.5	±0.75	
Transient Recovery Time	25% load step change	--	8	10	ms
Transient Response Deviation		--	±3	±5	%
Temperature Drift	100% full load	--	--	±0.03	%/°C
Ripple & Noise*	20MHz Bandwidth	--	25	75	mVp-p
Short Circuit Protection		Continuous, automatic recovery			

Note: 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.

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Tested for 1 minute and 1mA max	1500	--	--	VDC
Isolation Resistance	Test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input/Output,100KHz/1V	--	35	--	pF
Switching Frequency	Full load, nominal input	--	300	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K hours
Case Material		Plastic(UL94-V0)			
Weight		--	5	--	g

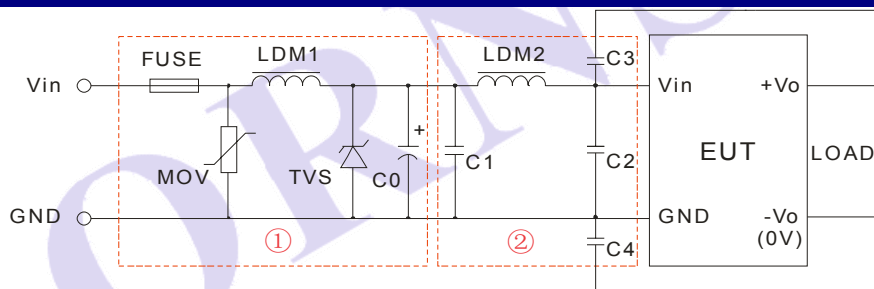
ENVIRONMENTAL SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%
Operating Temperature	Power derating (above 71°C)	-40	--	85	°C
Storage Temperature		-50	--	125	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS A (External Circuit Refer to Figure1-②)			
EMS	ESD	IEC/EN61000-4-2	Contact±6KV	perf. Criteria B	
	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria B (External Circuit Refer to Figure1-①)	
	Surge	IEC/EN61000-4-5	±2KV	perf. Criteria B (External Circuit Refer to Figure1-①)	

EMC RECOMMENDED CIRCUIT

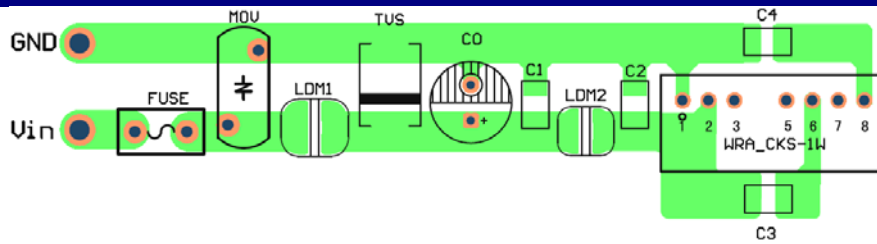


(Figure1)

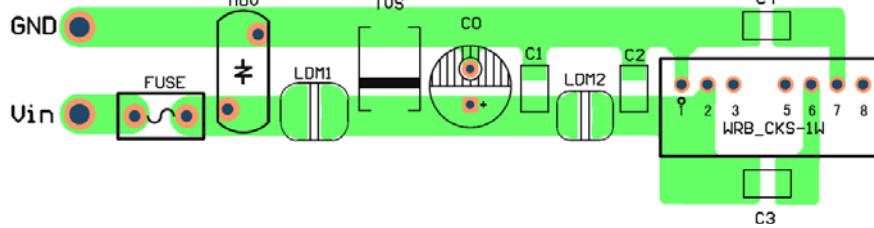
Recommended external circuit parameters	Vin:5V	Vin:24V	
	WRB_CKS-1W	WRA_CKS-1W	WRB_CKS-1W
FUSE	Choose according to practical input current		
MOV	--	10D560K	
LDM1	--	56μH	
TVS	SMCJ13A	SMCJ48A	
C0	680μF/16V	120μF/50V	
C1	4.7μF/50V	4.7μF/50V	
LDM2	12μH	12μH	
C2	1μF/50V	--	1μF/50V
C3	--	100pF/2KV	--
C4	100pF/2KV	--	100pF/2KV

Note: 1. In Figure 1, part ① is EMS Recommended external circuit, part ② is EMI recommended external circuit. Choose according to requirements.
2. If there is no recommended parameters, the model no require the external component.

EMC RECOMMENDED CIRCUIT PCB LAYOUT

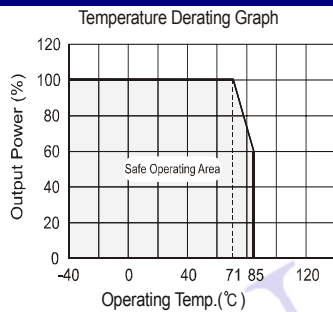


(Figure 2)



(Figure 3)

PRODUCT TYPICAL CURVE



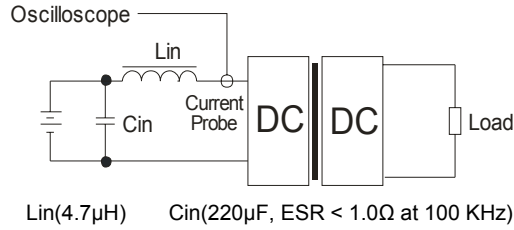
OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING

MECHANICAL DIMENSIONS																													
<p>(Front View)</p> <p>(Bottom View)</p>																													
<table border="1"> <thead> <tr> <th colspan="3">FOOTPRINT DETAILS</th> </tr> <tr> <th>Pin</th> <th>Single</th> <th>Dual</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>GND</td> <td>GND</td> </tr> <tr> <td>2</td> <td>Vin</td> <td>Vin</td> </tr> <tr> <td>3</td> <td>CTRL</td> <td>CTRL</td> </tr> <tr> <td>5</td> <td>NC</td> <td>NC</td> </tr> <tr> <td>6</td> <td>+Vo</td> <td>+Vo</td> </tr> <tr> <td>7</td> <td>0V</td> <td>0V</td> </tr> <tr> <td>8</td> <td>CS</td> <td>-Vo</td> </tr> </tbody> </table>			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
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																											
<p>NC: No connection</p> <p>Note: Unit:mm[inch] Pin section tolerances: $\pm 0.10\text{mm}$ [$\pm 0.004\text{inch}$] General tolerances: $\pm 0.25\text{mm}$ [$\pm 0.010\text{inch}$]</p>																													
RECOMMENDED FOOTPRINT																													
<p>Note: grid 2.54*2.54 mm</p>																													
TUBE OUTLINE DIMENSIONS																													
<p>Note: Unit :mm[inch] General tolerances: $\pm 0.50\text{mm}$ [$\pm 0.020\text{inch}$] L=530mm[20.866inch] Devices per tube quantity: 22pcs L=220mm[8.661inch] Devices per tube quantity: 8pcs Short tube inner package dimensions: L*W*H= 255*170*80mm Short tube outer package dimensions(with six inner package boxes): 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</p>																													

TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor L_{in} and C_{in} to simulate source impedance.



DESIGN CONSIDERATIONS

1) Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load **could not be less than 10% of the full load**. If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load, or use our company's products with a lower rated output power.

2) Overload Protection

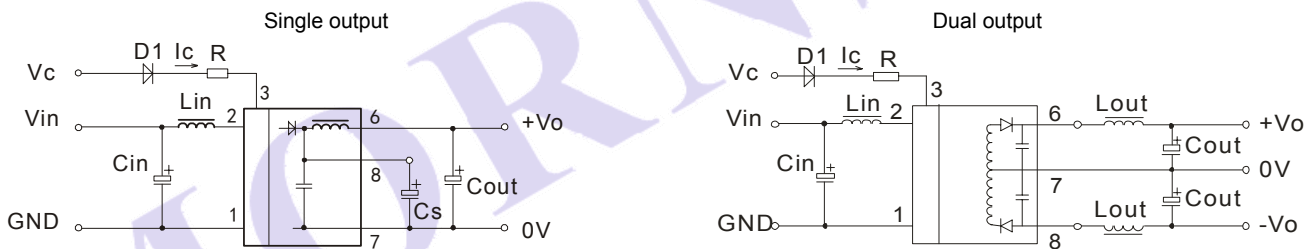
Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is add a circuit breaker to the circuit.

3) 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 4).

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 must less than the Max. Capacitive Load.

General: C_{in} : 5V 100 μF ;
 24V 10 μF
 C_{out} : 47 μF (Typ.)
 L_{in} : 4.7 $\mu H \sim 120\mu H$
 L_{out} : 2.2 $\mu H \sim 10\mu H$
 C_s : 10 $\mu F \sim 22\mu F$



(Figure 4)

4) CTRL Terminal

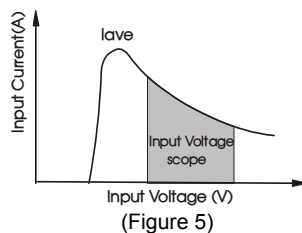
When open or high impedance, the converter work well; When this pin is 'high'; the converter shutdown; It should be note that the input current should between 5-10mA,exceeding the maximum 20mA will cause permanence damage to the converter. The value of R can be derived as follows:

$$R = \frac{V_C - V_D - 1.0}{I_C}$$

5) Input current

Nominal input voltage range.The input current of the power supply must be sufficient to the startup current (Iave) of the DC/DC module(Figure 5).

General: $V_{in}=5V$ $I_{ave} = 484mA$
 $V_{in}=24V$ $I_{ave} = 112mA$



(Figure 5)

6) Cannot use in parallel and hot swap

Note:

1. Packing Information please refer to 'Product Packing Information'. The Packing bag number of Horizontal package : 58210004;
2. Recommend to use module with more than 10% load, if not, the ripple of the product may exceeds the specification, but does not affect the reliability of the product;
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.
6. Our company offer custom products.
7. Specifications subject to change without notice.

MORNSUN Science & Technology Co.,Ltd.

Address: No. 5, Kehui St. 1, Kehui development center, Science Ave., Guangzhou Science City, Luogang district, Guangzhou,P.R.China.

Tel: 86-20-38601850

Fax:86-20-38601272

[Http://www.mornsun-power.com](http://www.mornsun-power.com)