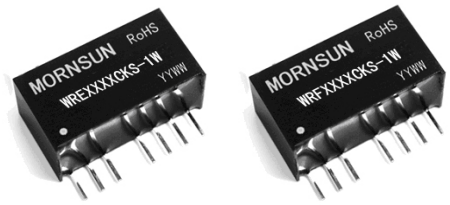
MORNSUN
Industrial DC&AC converter professional

WRE_CKS-1W & WRF_CKS-1W Series

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



multi-country patent protection **RoHS**

FEATURES

Efficiency up to 81%
Wide (2:1) Input 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

APPLICATIONS

The WRE_CKS-1W & WRF_CKS-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(isolation voltage≤3000VDC);
3) Where the regulation of the output voltage and the output ripple noise are demanded.

MODEL SELECTION

WRE2412CKS-1W

- Rated Power
- Package Style
- Output Voltage
- Input Voltage
- Product Series

PRODUCT PROGRAM

Part Number	Input			Output			Efficiency (%, Typ)
	Voltage (VDC)			Voltage (VDC)	Current (mA)		
	Nominal	Range	Max**		Max	Min	
WRE0505CKS-1W *	5	4.5-9.0	11	±5	±100	±10	72
WRE0509CKS-1W *				±9	±55	±6	74
WRE0512CKS-1W *				±12	±42	±4	76
WRE0515CKS-1W *				±15	±33	±3	75
WRF0505CKS-1W *				5	200	20	72
WRF0509CKS-1W *				9	111	11	74
WRF0512CKS-1W *				12	83	8	76
WRF0515CKS-1W *				15	67	7	75
WRE1205CKS-1W	12	9.0-18	22	±5	±100	±10	76
WRE1209CKS-1W				±9	±55	±6	78
WRE1212CKS-1W				±12	±42	±4	80
WRE1215CKS-1W				±15	±33	±3	80
WRF1205CKS-1W				5	200	20	76
WRF1209CKS-1W				9	111	11	78
WRF1212CKS-1W				12	83	8	80
WRF1215CKS-1W				15	67	7	80
WRE2405CKS-1W	24	18-36	40	±5	±100	±10	78
WRE2409CKS-1W				±9	±55	±6	79
WRE2412CKS-1W				±12	±42	±4	81
WRE2415CKS-1W				±15	±33	±3	81
WRF2405CKS-1W				5	200	20	76
WRF2409CKS-1W				9	111	11	78
WRF2412CKS-1W				12	83	8	81
WRF2415CKS-1W				15	67	7	81
WRE4805CKS-1W *	48	36-72	80	±5	±100	±10	76
WRE4809CKS-1W *				±9	±55	±6	78
WRE4812CKS-1W *				±12	±42	±4	80
WRE4815CKS-1W *				±15	±33	±3	80
WRF4805CKS-1W *				5	200	20	76
WRF4809CKS-1W *				9	111	11	78
WRF4812CKS-1W *				12	83	8	80
WRF4815CKS-1W *				15	67	7	80

* Designing.
**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
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_CKS-1W)		±0.5	±0.75	
	10% to 100% load(WRE_CKS-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.

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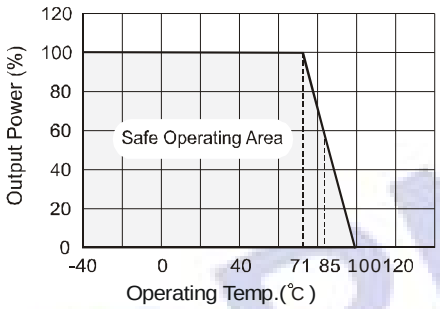
COMMON SPECIFICATION

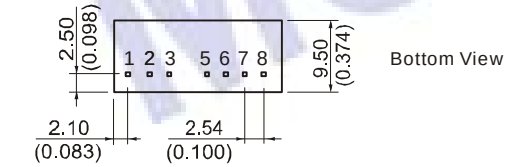
Item	Test Conditions	Min	Typ	Max	Units
Storage Humidity				95	%
Operating Temperature		-40		85	°C
Storage Temperature		-55		125	
Temp. Rise at Full Load			15		
Lead Temperature	1.5mm from case for 10 seconds			300	
Isolation voltage	Tested for 1 minute and 1mA max	3000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation Capacitance	100KHz,1V		35		PF
No-load power consumption			120		mW
Cooling		Free Air Convection			
Short Circuit Protection		Continuous, Automatic recovery			
Case Material		Plastic(UL94-V0)			
MTBF		1000			K hours
Weight			5		g

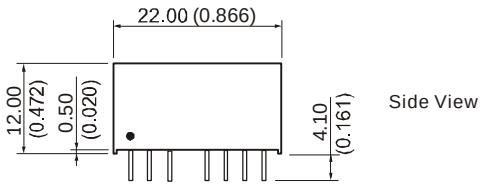
Note:
1. All specifications measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
4. See below recommended circuits for more details.

TYPICAL TEMPERATURE CURVE



OUTLINE DIMENSIONS & FOOTPRINT DETAILS

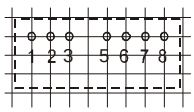




First Angle Projection

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

Dual/Single Output



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

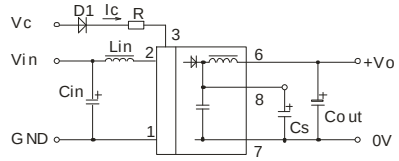
Note:
Unit:mm(inch)
Pin section:0.50*0.30mm(0.020*0.012inch)
Pin section tolerances:±0.10mm(±0.004inch)
General tolerances:±0.25mm(±0.010inch)

APPLICATION NOTE

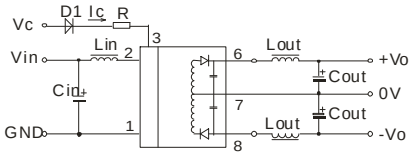
Recommended circuit

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).

Single Output



Dual Output



(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: 10μF-22μF

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

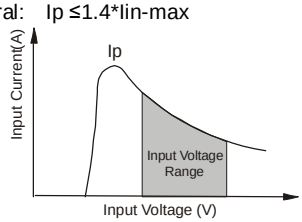
CTRL Terminal

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 :

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

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.