MORNSUN
mini power professional

WRA_CS-1W Series

WIDE INPUT ISOLATED & REGULATED
1W OUTPUT DUAL OUTPUT
MINIATURE SIP PACKAGE

RoHS
multi-country patent protection

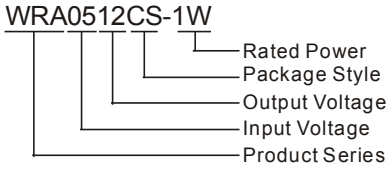
FEATURES

- Wide (2:1) Input Range
- Efficiency Up To 83%
- Operating Temperature: -40°C~+85°C
- 1KVDC Isolation
- Dual Output
- UL94-V0 Package
- No Heat Sink Required
- Industry Standard Pin out
- MTBF>3,500,000 hours
- RoHS Compliance

APPLICATIONS

The WRA_CS-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 =1000VDC);
3) Where the regulation of the output voltage and the output ripple noise are demanded.
These products don't apply to:
1) Where the input voltage t is required to be more than 2:1;
2) Where the isolation voltage between input and output is required to be >1000VDC;

MODEL SELECTION



PRODUCT PROGRAM

Part Number	Input			Output			Efficiency (%, Typ)	Package Style
	Voltage (VDC)			Voltage (VDC)	Current (mA)			
	Nominal	Range	Max*		Max	Min		
WRA0505CS-1W	5	4.5~9VDC	11	±5	±100	±10	71	SIP
WRA0509CS-1W	5	4.5~9VDC	11	±9	±55	±5	71	SIP
WRA0512CS-1W	5	4.5~9VDC	11	±12	±42	±4	77	SIP
WRA0515CS-1W	5	4.5~9VDC	11	±15	±33	±3	78	SIP
WRA1205CS-1W	12	9~18VDC	22	±5	±100	±10	75	SIP
WRA1209CS-1W	12	9~18VDC	22	±9	±55	±5	78	SIP
WRA1212CS-1W	12	9~18VDC	22	±12	±42	±4	77	SIP
WRA1215CS-1W	12	9~18VDC	22	±15	±33	±3	80	SIP
WRA1505CS-1W	15	12~24VDC	30	±5	±100	±10	75	SIP
WRA1509CS-1W	15	12~24VDC	30	±9	±55	±5	79	SIP
WRA1512CS-1W	15	12~24VDC	30	±12	±42	±4	80	SIP
WRA1515CS-1W	15	12~24VDC	30	±15	±33	±3	81	SIP
WRA2405CS-1W	24	18~36VDC	40	±5	±100	±10	75	SIP
WRA2409CS-1W	24	18~36VDC	40	±9	±55	±5	80	SIP
WRA2412CS-1W	24	18~36VDC	40	±12	±42	±4	81	SIP
WRA2415CS-1W	24	18~36VDC	40	±15	±33	±3	81	SIP
WRA4805CS-1W	48	36~72VDC	80	±5	±100	±10	76	SIP
WRA4809CS-1W	48	36~72VDC	80	±9	±55	±5	81	SIP
WRA4812CS-1W	48	36~72VDC	80	±12	±42	±4	82	SIP
WRA4815CS-1W	48	36~72VDC	80	±15	±33	±3	83	SIP

ISOLATION SPECIFICATIONS

Item	Test conditions	Min	Typ	Max	Units
Isolation voltage	Flash tested for 60 seconds	1000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min	Typ	Max	Units
1W Output Power	See Below Products Program	0.1		1	W
Output Voltage Accuracy	Refer To Recommended Circuit		±1	±3	%
Load Regulation	From 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	20Hz-300KHz Bandwidth		40	60	mVp-p
Noise	DC-20MHz Bandwidth		80	150	
Switching Frequency	100% Load, Nominal Input Voltage	200		400	KHz
	10% Load, Nominal Input Voltage	750		1000	

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.

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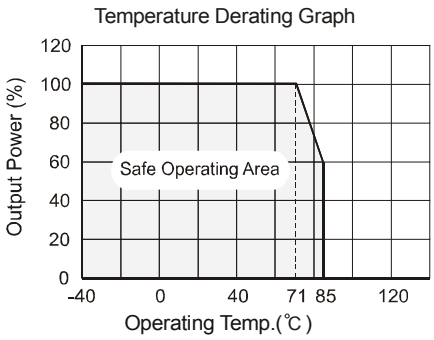
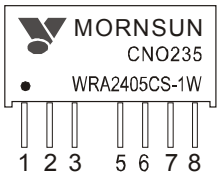
COMMON SPECIFICATION

Output Short Circuit Protection	Continuous
Temperature Rise at Full Load	30°C (TYP)
Cooling	Free Air Convection
No-load Power Consumption	100mW (typical)
Operating Temperature Range	-40°C~+85°C
Storage Temperature Range	-55°C ~+125°C
Lead Temperature***	300°C (1.5mm from case for 10 seconds)
Storage Humidity Range	≤ 95%
Case Material	Plastic (UL94-V0)
MTBF	>3,500,000 hours
***Lead Temperature 1.5mm from case for 10 seconds.	

TYPICAL CHARECTERISTICS

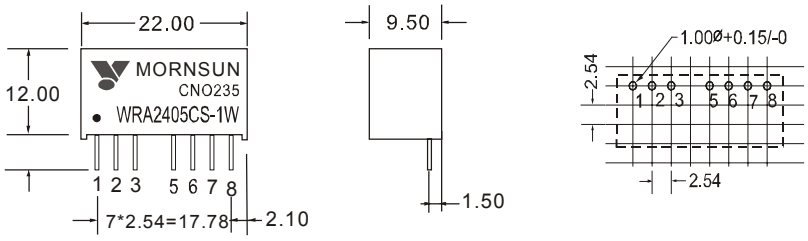


FOOTPRINT DETAILS



Pin	Function
1	GND
2	Vin
3	CTRL
5	NC
6	+Vo
7	OV
8	-Vo

OUTLINE DIMENSIONS & RECOMMENDED FOOTPRINT



Note: All Pins on a 2.54mm pitch; All Pin diameters are 0.50 mm(Tolerance:±0.25); all dimensions in mm.

APPLICATION NOTE

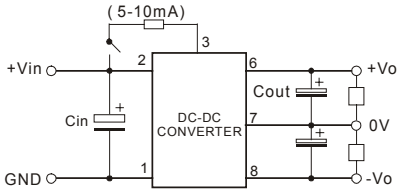
Recommended Circuit

All the WRA_CS-1W 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). To further decrease the input/output ripple, can increase capacitance properly or choose capacitors with low ESR. However, the capacitance should not be too high.(See Table 2).If you want to use the products in high EMI, please choose our metal packaged products.

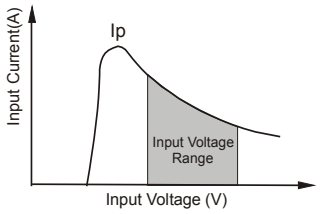
CS Pin

By connecting a low ESR capacitor between this terminal and the pin-7 (connecting to the anode of the capacitor), the output ripple and noise may be further improved. When the output power is down to 1W, it is suggested to connect a capacitor (Cs) between the terminal CS and the terminal 0V. Generally, the capacitance is no greater than 100uF

When the output power is up to 1W, it is suggested to connect a capacitor (Cs) between the CS and the 0V, otherwise perpetual damage might be done. (See Table 1)



<Figure 1>



(Figure 2)

Input Current

Nominal input voltage range. The input current of the power supply must be sufficient to the startup current (Ip) of the DC/DC module (see Figure 2)

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% full load, the product never work under no load!*** If the actual load is less than the specified minimum load, the output ripple will increase sharply while its efficiency and reliability will reduce greatly. If the actual output power is very small, a proper resistor is needed at the output end in order to increasing the load, or contact our company for other lower output power products.

No parallel connection or plug and play.

CS Capacitor Table(Table 1)

Vout	5V	9V	12V	15V
CS	47uF-100uF		22uF-47uF	

External Capacitor Table(Table 2)

Vin	C_{in}	C_{out} (0+70°C)	C_{out} (-40+85°C)
5V & 12V	100uF	100uF (electrolytic capacitor)	47uF (tantalum capacitor)
24V & 48V	10uF		

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