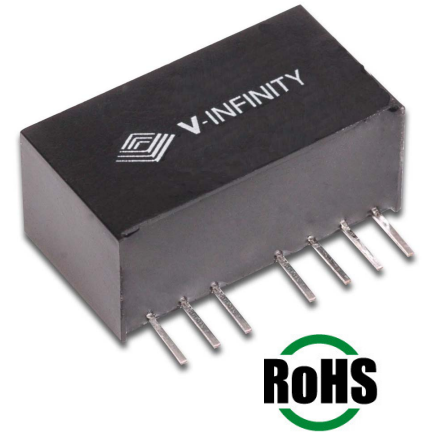


## Description

Designed to convert a wide input voltage range into an isolated regulated voltage, the VWRAS1-SIP series is well suited for providing board-mount local supplies in a wide range of applications, including mixed analog/digital circuits, test & measurement equip., process/machine controls, datacom/telecom fields, etc...

## Features

- Wide (2:1) input range
- High efficiency to 78%
- Regulated
- Dual voltage output
- I/O Isolation 1500VDC
- No heatsink required
- Short circuit protection
- Remote on/off
- MTBF >1,000,000 hrs
- Temperature range: -40°C~+85°C



Model Number	Input Voltage			Output Voltage	Output Current		Efficiency	Package Style
	Nominal	Range	Max.		Max.	Min.		
VWRAS1-D5-D5-SIP	5 Vdc	4.5~9.0 Vdc	11 Vdc	±5 Vdc	±100 mA	±10 mA	71%	SIP
VWRAS1-D5-D9-SIP	5 Vdc	4.5~9.0 Vdc	11 Vdc	±9 Vdc	±55 mA	±5 mA	72%	SIP
VWRAS1-D5-D12-SIP	5 Vdc	4.5~9.0 Vdc	11 Vdc	±12 Vdc	±42 mA	±4 mA	73%	SIP
VWRAS1-D5-D15-SIP	5 Vdc	4.5~9.0 Vdc	11 Vdc	±15 Vdc	±33 mA	±3 mA	73%	SIP
VWRAS1-D12-D5-SIP	12 Vdc	9.0~18.0 Vdc	22 Vdc	±5 Vdc	±100 mA	±10 mA	75%	SIP
VWRAS1-D12-D9-SIP	12 Vdc	9.0~18.0 Vdc	22 Vdc	±9 Vdc	±55 mA	±5 mA	76%	SIP
VWRAS1-D12-D12-SIP	12 Vdc	9.0~18.0 Vdc	22 Vdc	±12 Vdc	±42 mA	±4 mA	77%	SIP
VWRAS1-D12-D15-SIP	12 Vdc	9.0~18.0 Vdc	22 Vdc	±15 Vdc	±33 mA	±3 mA	76%	SIP
VWRAS1-D24-D5-SIP	24 Vdc	18.0~36.0 Vdc	40 Vdc	±5 Vdc	±100 mA	±10 mA	76%	SIP
VWRAS1-D24-D9-SIP	24 Vdc	18.0~36.0 Vdc	40 Vdc	±9 Vdc	±55 mA	±5 mA	77%	SIP
VWRAS1-D24-D12-SIP	24 Vdc	18.0~36.0 Vdc	40 Vdc	±12 Vdc	±42 mA	±4 mA	78%	SIP
VWRAS1-D24-D15-SIP	24 Vdc	18.0~36.0 Vdc	40 Vdc	±15 Vdc	±33 mA	±3 mA	78%	SIP
VWRAS1-D48-D5-SIP	48 Vdc	36.0~72.0 Vdc	80 Vdc	±5 Vdc	±100 mA	±10 mA	75%	SIP
VWRAS1-D48-D9-SIP	48 Vdc	36.0~72.0 Vdc	80 Vdc	±9 Vdc	±55 mA	±5 mA	76%	SIP
VWRAS1-D48-D12-SIP	48 Vdc	36.0~72.0 Vdc	80 Vdc	±12 Vdc	±42 mA	±4 mA	78%	SIP
VWRAS1-D48-D15-SIP	48 Vdc	36.0~72.0 Vdc	80 Vdc	±15 Vdc	±33 mA	±3 mA	78%	SIP

### Note:

1. All specifications measured at TA=25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.

## Output Specifications

Item	Test conditions	Min.	Typ.	Max.	Units
1W Output power				1	W
Output voltage accuracy	Refer to recommended circuit		±1	±3	%
Line Regulation	Input Voltage from low to high		±0.2	±0.5	%
Load Regulation	10% to 100% full load		±0.5	±1.0	%
Temperature drift	Refer to recommended circuit			0.03	%/°C
Output ripple	20 Hz Bandwidth		25	100	mVp-p
Output noise	DC-20MHz Bandwidth		25	100	mVp-p
Switching frequency	100% load, nominal input	180K		550K	Hz

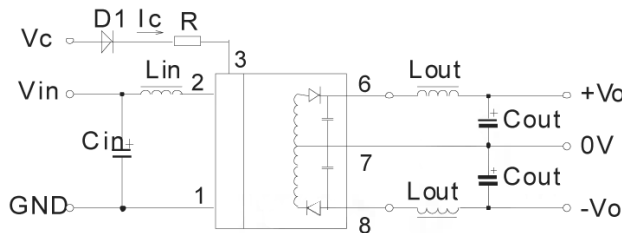
## General Specifications

Output short circuit protection	Continuous
Temperature rise at full load	15°C typ., 35°C max.
Cooling	Free air convection
No-load power consumption	100mW (typical)
Operating temperature range	-40°C to +85°C
Storage temperature range	-50°C to +125°C
Soldering temperature	300°C (1.5mm from case for 10sec.)
Storage humidity range	<95%
Case material	Plastic (UL94-V0)
MTBF	>1,000,000 hrs.

## Isolation Specifications

Item	Test Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Flash tested for 1 min.	1500			Vdc
Isolation Resistance	Test at 500 Vdc	1000			M Ω
Isolation Capacitance	100 K Hz, 1V		80		PF

## Typical Characteristics



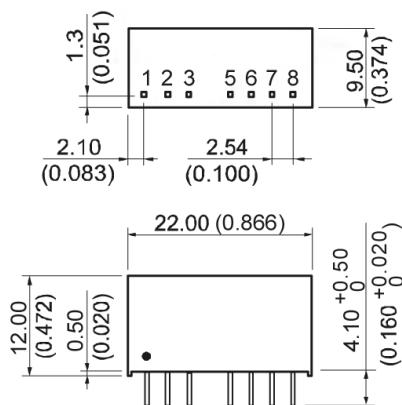
### Recommended circuit

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 as shown on the left.

### General:

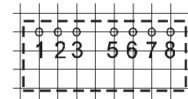
Cin: 5V, 12V 100μF  
 24V, 48V 10μF or 22μF  
 Cout: 100μF (typ)  
 Lin: 4.7μH-120 μH  
 Lout: 2.2μH-10 μH

## Outline Dimensions & Recommended Layout Pattern



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

RECOMMENDED FOOTPRINT  
 Top view, grid: 2.54mm (0.1 inch),  
 diameter: 1.00mm  
 Dual Output & Single Output



### FOOTPRINT DETAILS

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

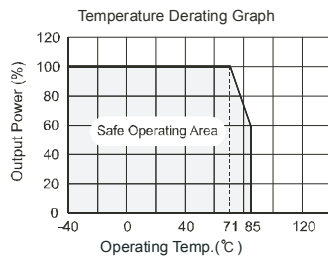
NC: No Connection

**Application Notes:**

- All of the VWRAS1-SIP Series have been tested according to the following recommended testing circuit before leaving the factory. This series should be tested under load(Figure 1). If you want to further decrease the input/output ripple, you can increase capacitance properly or choose capacitors with low ESR. However, the capacitance should not be too high(Table 2).

**Table 2**

Vout	Cout (Max)
±5	±330
±9	±220
±12	±100
±15	±47
±24	±22

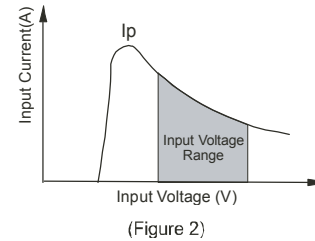
**Figure 1**


- CTRL Terminal

When open or high impedance, the converter will work well; When this pin is 'high'; the converter will shutdown; It should be noted that the input current should remain between 5-10mA,exceeding the maximum 20mA will cause permanent damage to the converter.

- Input current

While using the 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  $I_p$ . (Figure 2)



No parallel connection or plug and play.