

**SERIES:** VWRAT2 | **DESCRIPTION:** DC-DC CONVERTER

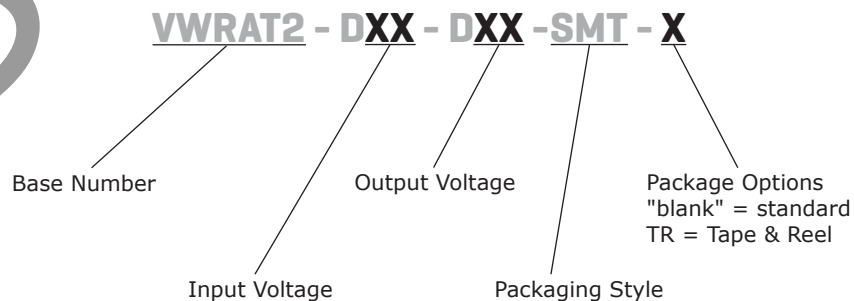
**FEATURES**

- 2 W isolated output
- wide input (2:1)
- industry standard 16 pin SMT package style
- dual regulated outputs
- 1,500 V isolation
- short circuit protection
- wide temperature (-40~85°C)
- efficiency up to 78%


**MODEL**

MODEL	input voltage		output voltage (Vdc)	output current		output power max (W)	ripple and noise <sup>1</sup> typ (mVp-p)	efficiency typ (%)
	typ (Vdc)	range (Vdc)		min (mA)	max (mA)			
VWRAT2-D12-D5-SMT	12	9~18	±5	±20	±200	2	35	74
VWRAT2-D12-D9-SMT	12	9~18	±9	±11	±111	2	35	78
VWRAT2-D12-D12-SMT	12	9~18	±12	±8	±83	2	35	78
VWRAT2-D12-D15-SMT	12	9~18	±15	±7	±67	2	35	78
VWRAT2-D24-D5-SMT	24	18~36	±5	±20	±200	2	35	74
VWRAT2-D24-D9-SMT	24	18~36	±9	±11	±111	2	35	79
VWRAT2-D24-D12-SMT	24	18~36	±12	±8	±83	2	35	78
VWRAT2-D24-D15-SMT	24	18~36	±15	±7	±67	2	35	78

Notes: 1. ripple and noise are measured at 20 MHz BW

**PART NUMBER KEY**


**INPUT**

parameter	conditions/description	min	typ	max	units
operating input voltage	12 V model	9	12	18	Vdc
	24 V model	18	24	36	Vdc

**OUTPUT**

parameter	conditions/description	min	typ	max	units
line regulation	measured from low line to high line		±0.2	±0.5	%
load regulation	measured from 10% to 100% full load		±0.5	±1	%
voltage accuracy	positive		±1	±3	%
	negative	refer to recommended circuit		±3	±5
ripple & noise			35	150	mVp-p
switching frequency	100% load, nominal input voltage		300		kHz
temperature coefficient				±0.03	%/°C

**PROTECTIONS**

parameter	conditions/description	min	typ	max	units
short circuit protection	continuous, automatic recovery				

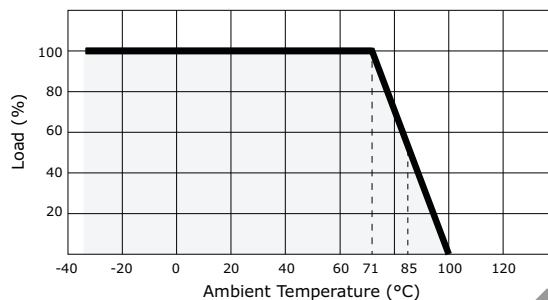
**SAFETY AND COMPLIANCE**

parameter	conditions/description	min	typ	max	units
isolation voltage	tested for 1 minute, at 1 mA max.	1,500			Vdc
insulation resistance	at 500 Vdc	1,000			MΩ
isolation capacitance	input to output		85		pF
RoHS compliant	yes				
MTBF		1,000,000			hours

**ENVIRONMENTAL**

parameter	conditions/description	min	typ	max	units
operating temperature		-40		85	°C
storage temperature		-55		125	°C
storage humidity	non-condensing			95	%
temperature rise	at full load		15		°C
lead temperature	for 10 seconds			300	°C

## DERATING CURVES

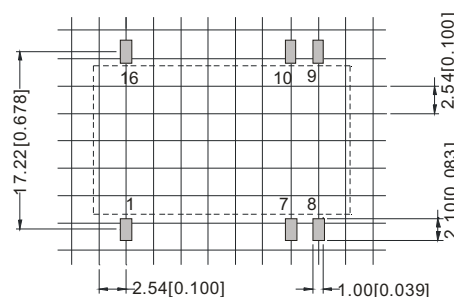
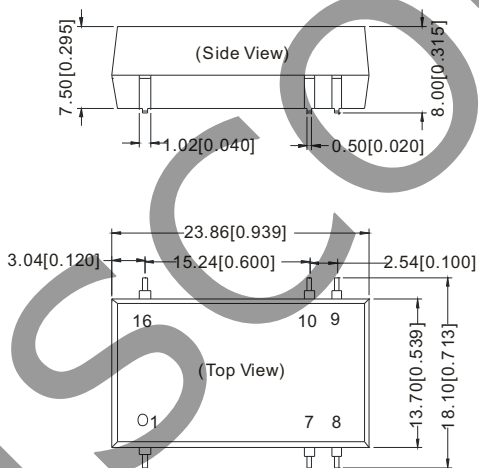


## MECHANICAL

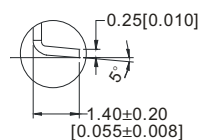
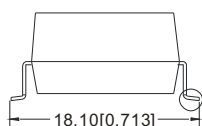
parameter	conditions/description	min	typ	max	units
dimensions	0.939 x 0.713 x 0.315 (23.86 x 18.10 x 8.10 mm)				inch
case material	UL94-V0 epoxy resin				
weight			5.2		g

## MECHANICAL DRAWING

units: mm [inches]  
 tolerance:  $\pm 0.25$  [ $\pm 0.010$ ]  
 pin section tolerance:  $\pm 0.10$  mm [ $\pm 0.004$ ]



PIN CONNECTIONS	
PIN	FUNCTION
1	GND
7	NC
8	0 V
9	+Vo
10	-Vo
16	+Vin



## APPLICATION NOTES

### 1. Requirement on Output Load

In order to ensure the product operates efficiently and reliably, make sure the specified range of input voltage is not exceeded and the minimum output load is not less than 10% load. If the actual load is less than the specified minimum load, the output ripple may increase sharply while its efficiency and reliability will reduce greatly. If the actual output power is very small, please add an appropriate resistor as extra loading.

### 2. Recommended Circuit

All VWRBT2 converters have been tested according to the following recommended testing circuit before leaving the factory. This series should be tested under load, never under no load (Figure 1).

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	12 V 24, 48 V	100 $\mu$ F 10 ~ 47 $\mu$ F
Cout	10 $\mu$ F / 100 mA	

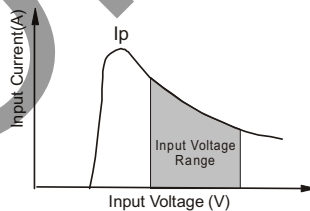
Table 1

Vout (Vdc)	Cout ( $\mu$ F)
$\pm 5$	680
$\pm 9$	470
$\pm 12$	330
$\pm 15$	220

### 3. 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  $I_p$ .

General:  $I_p \leq 1.4 * I_{in-max}$



### 4. No parallel connection or plug and play

### 5. Solderability

reflow soldering, 240°C max.

## REVISION HISTORY

rev.	description	date
1.0	initial release	06/16/2008
1.01	new template applied, V-Infinity branding removed, application notes updated	09/10/2012
1.02	added TR package option	11/01/2012

The revision history provided is for informational purposes only and is believed to be accurate.



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