CUI INC®

SERIES: VRX3-DIP | **DESCRIPTION:** DC-DC CONVERTER

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FEATURES

- 3 W isolated output
- wide input (2:1)
- industry standard 10 pin DIP package
- no heatsink required
- unregulated outputs
- 1,500 V isolation
- short circuit protection
- wide temperature (-40~85°C)
- efficiency up to 80%

RoHS

MODEL	input voltage typ (Vdc)	input voltage range (Vdc)	output voltage (Vdc)	output current min (mA)	output current max (mA)	output power max (W)	ripple and noise[1] typ (mVp-p)	efficiency typ (%)
VRA3-D5-D5-DIP	5	4.5~9.0	±5	±30	±200	3	50	68
VRA3-D5-D9-DIP	5	4.5~9.0	±9	±16	±167	3	50	70
VRA3-D5-D12-DIP	5	4.5~9.0	±12	±12	±125	3	50	72
VRA3-D5-D15-DIP	5	4.5~9.0	±15	±10	±100	3	50	73
VRA3-D12-D5-DIP	12	9.0~18.0	±5	±30	±200	3	50	74
VRA3-D12-D9-DIP	12	9.0~18.0	±9	±16	±167	3	50	76
VRA3-D12-D12-DIP	12	9.0~18.0	±12	±12	±125	3	50	78
VRA3-D12-D15-DIP	12	9.0~18.0	±15	±10	±100	3	50	79
VRA3-D24-D5-DIP	24	18.0~36.0	±5	±30	±200	3	50	77
VRA3-D24-D9-DIP	24	18.0~36.0	±9	±16	±167	3	50	78
VRA3-D24-D12-DIP	24	18.0~36.0	±12	±12	±125	3	50	79
VRA3-D24-D15-DIP	24	18.0~36.0	±15	±10	±100	3	50	80
VRA3-D48-D5-DIP	48	36.0~72.0	±5	±30	±200	3	50	77
VRA3-D48-D9-DIP	48	36.0~72.0	±9	±16	±167	3	50	78
VRA3-D48-D12-DIP	48	36.0~72.0	±12	±12	±125	3	50	79
VRA3-D48-D15-DIP	48	36.0~72.0	±15	±10	±100	3	50	80
VRB3-D5-S5-DIP	5	4.5~9.0	5	60	600	3	50	68
VRB3-D5-S9-DIP	5	4.5~9.0	9	33	333	3	50	70
VRB3-D5-S12-DIP	5	4.5~9.0	12	25	250	3	50	72
VRB3-D5-S15-DIP	5	4.5~9.0	15	20	200	3	50	73
VRB3-D12-S5-DIP	12	9.0~18.0	5	60	600	3	50	74
VRB3-D12-S9-DIP	12	9.0~18.0	9	33	333	3	50	76
VRB3-D12-S12-DIP	12	9.0~18.0	12	25	250	3	50	78
VRB3-D12-S15-DIP	12	9.0~18.0	15	20	200	3	50	77
VRB3-D24-S5-DIP	24	18.0~36.0	5	60	600	3	50	77
VRB3-D24-S9-DIP	24	18.0~36.0	9	33	333	3	50	78
VRB3-D24-S12-DIP	24	18.0~36.0	12	25	250	3	50	79
VRB3-D24-S15-DIP	24	18.0~36.0	15	20	200	3	50	80
VRB3-D48-S5-DIP	48	36.0~72.0	5	60	600	3	50	77
VRB3-D48-S9-DIP	48	36.0~72.0	9	33	333	3	50	78
VRB3-D48-S12-DIP	48	36.0~72.0	12	25	250	3	50	79
VRB3-D48-S15-DIP	48	36.0~72.0	15	20	200	3	50	80

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

PART NUMBER KEY

VR X 3 - DXX - X XX -DIP

Base Number:
A = dual output voltage
Ex: VRA3-D5-**D**5-DIP
B = single output voltage
Ex: VRB3-D5-**S**5-DIP

Input Voltage

Output:
S = single
D = dual

Output Voltage

Packaging Style

INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage	5 V model	4.5	5	9.0	Vdc
	12 V model	9.0	12	18.0	Vdc
	24 V model	18.0	24	36.0	Vdc
	48 V model	36.0	48	72.0	Vdc

OUTPUT

parameter	conditions/description		min	typ	max	units
line regulation	input voltage from low to high			±0.2	±0.5	%
load regulation	measured from 10% load to full load	VRA3 models		±0.5	±1.0	%
		VRB3 models		±0.5	±0.75	%
voltage accuracy	positive			±1	±3	%
	negative			±3	±5	%
ripple and noise	20 MHz bandwidth			50	100	mVp-p
switching frequency	100% load, input voltage range			300		kHz
temperature coefficient				±0.03		%/°C

PROTECTIONS

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

SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	for 1 minute at 1 mA max.	1,500			Vdc
isolation resistance	at 500 Vdc	1,000			MΩ
isolation capacitance	input to output at 100 kHz / 1 V		85		pF
MTBF		1,000,000			hours
RoHS compliant	yes				

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	1.5 mm from case for 10 seconds			300	°C

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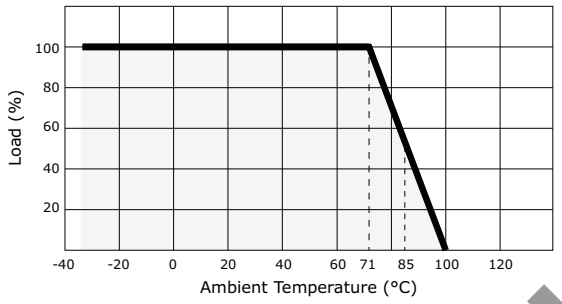
DERATING CURVES

1. output power vs. ambient temperature

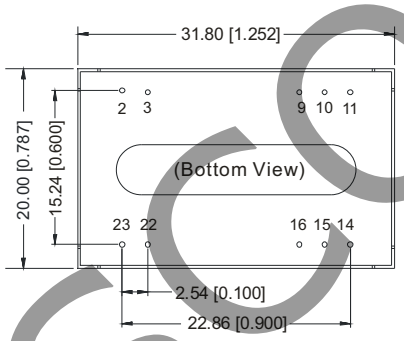


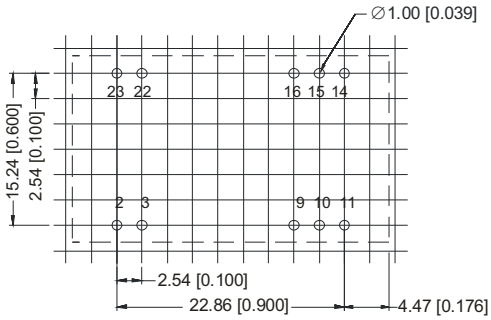
MECHANICAL

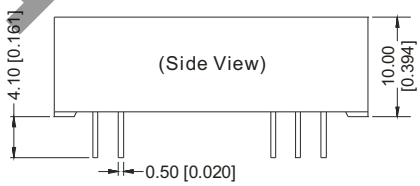
parameter	conditions/description	min	typ	max	units
dimensions	1.252 x 0.787 x 0.394 (31.80 x 20.00 x 10.00 mm)				inch
case material	stainless steel				
weight			14		g

MECHANICAL DRAWING

units: mm [inches]
tolerance: ±0.25 [±0.010]
pin section tolerance: ±0.10 mm [±0.004]







PIN CONNECTIONS		
SERIES	VRA3	VRB3
PIN	FUNCTION	FUNCTION
2,3	GND	GND
9	NC	0 V
10,15	NC	NC
11	NC	-Vo
14	+Vo	+Vo
16	0 V	0 V
22,23	+Vin	+Vin

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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 VRX3 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 see (Table 1).

General:

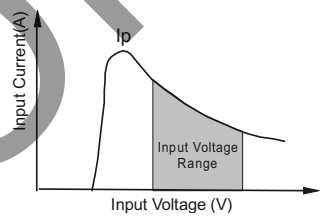
Cin	5, 12 V 24, 48 V	100 µF 10 ~ 22 µF
Cout	10 µF / 100 mA	

Table 1

VRA3 Vout (Vdc)	Cout (µF)	VRB3 Vout (Vdc)	Cout (µF)
±5	680	5	1,000
±9	470	9	680
±12	330	12	470
±15	220	15	330

3. **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.

   General: Ip ≤1.4*Iin-max



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

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REVISION HISTORY

rev.	description	date
1.0	initial release	05/09/2012
1.01	V-Infinity branding removed	09/11/2012

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

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CUI offers a two (2) year limited warranty. Complete warranty information is listed on our website.

CUI reserves the right to make changes to the product at any time without notice. Information provided by CUI is believed to be accurate and reliable. However, no responsibility is assumed by CUI for its use, nor for any infringements of patents or other rights of third parties which may result from its use.

CUI products are not authorized or warranted for use as critical components in equipment that requires an extremely high level of reliability. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.