

voltbricks

DATASHEET

VDR Series VDR250, VDR300

Ultra compact DC/DC converters



Description

Ultra compact isolated single channel DC/DC converters designed for industrial and special purpose applications. These compact units (84,5×52,7×12,85 mm without output pins) have output power up to 300 W and wide operating temperature range -60...+125°C. They have remote On/Off option, full range of protections: overcurrent, short circuit, overvoltage and thermal, and can be connected both in parallel and series.

VDR300 can safely operate in conditions of ionizing radiation and high temperature. Polymer potting sealing protects units from different factors: vibration, dirt, moisture and salt fog. These modules undergo special thermal and limit test including burn-in test with extreme on/off modes.

Engineered in accordance with

- MIL-STD-810G
- EN55022



Description of VDR Series on the manufacturer's website
<https://voltbricks.com/product/vdr>

Features

- Output current up to 33,3 A
- Case operating temperature: -60...+125°C
- 125 °C baseplate operation without derating
- Low-profile design 12,85 mm
- Copper case with mounting flanges
- Short circuit, overcurrent, output overvoltage, thermal protection
- Remote on/off
- Output voltage adjustment
- Switching frequency 400 kHz (fixed)
- Typical efficiency 91% (U_{out}=24 VDC)
- Polymer potting sealing
- No optocouplers
- Power sharing
- Output voltage adjustment
- Switching frequency external synchronization
- No minimum load

Order registration

+65 6950 0011, Global Operations Team

Technical support

support@voltbricks.com

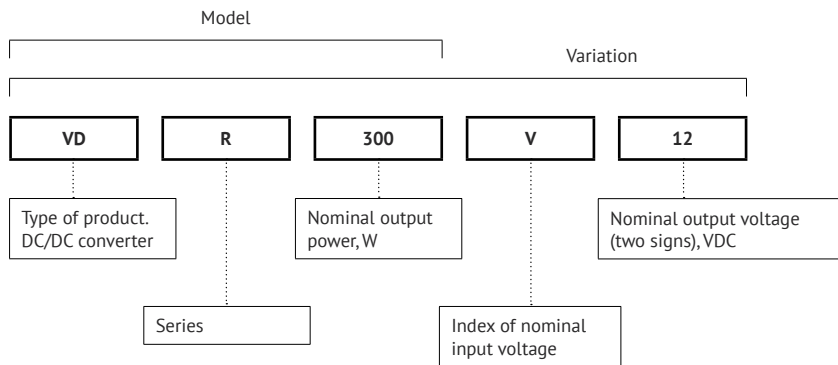
Reliability test

https://support.voltbricks.com/Reliability-Test_ENG.pdf

3D models

<https://support.voltbricks.com/models/VDR300-en.stp>

Ordering information



For more information please contact
 our Global Operations Team

+65 6950 0011

info@voltbricks.com

Output power and current

Model	VDR250					VDR300				
Output power, W	250					300				
Output voltage, VDC	9	12	15	24	28	9	12	15	24	28
Maximal output current, A	27,7	20,8	16,7	10,4	8,9	33,3	25	20	12,5	10,7

Index of nominal input voltage

Parameter	Index "V"	Index "D"
Nominal input voltage, VDC	28	48
Input voltage range, VDC	17...36	36...75
Transient deviation (1 s), VDC	17...40	36...84

Specifications

All specifications valid for normal climatic conditions (ambient temp. 15...35°C; relative humidity 45...80%; air pressure 8,6×10⁴...10,6×10⁴ Pa), U_{in}. nom, I_{out}. nom, unless otherwise stated. It is important to note that the information herein is not full.

Output specifications

Parameter		Value
Output voltage adjustment		±5% U _{out} . nom
Regulation	Input voltage variation (U _{min} ...U _{max})	max ±2% U _{out} . nom
	Load variation (10...100% I _{max})	
	Total regulation	±6% U _{out} . nom
Ripple and noise (p-p)		<2% U _{out} . nom
Start up time (remote)		<0,1 s
Overload protection level*		<1,5 P _{max}
Short circuit protection*		hiccup auto recovery
Overvoltage protection		1,5 U _{nom} , forced restriction
Transient response deviation		±10% (50% load step change, 500 us front time)
Remote on/off		Off.: 0...1,1 VDC or connection of pins "ON" and "-IN", I _s ≤5 mA

* Parameters are stated for the information purposes and could not be used at long term work, exceeding maximum output current, at work outside of a range of operating temperatures.

General specifications

Parameter		Value
Case temperature	Operating (natural convection)	-60...+125°C
	Storage	-60...+125°C
Switching frequency		400 kHz typ. (fixed, pulse width modulation)
Isolation voltage (60 s)	input/output, input/case, output/case	500 VAC 50 Hz
		750 VDC
Isolation resistance @ 500 VDC	input/output, input/case, output/case	20 MOhm min
Thermal impedance		5,3°C/W
Thermal protection level		118...125 °C, clamp, auto recovery
Vibration and dust proof, salt fog resistant		+
Typical MTBF		1 737 900 hrs
Warranty		5 years

Specifications (cont.)

Physical specifications

Parameter	Value
Case material	copper alloy with nickel electroplating coating
Potting	polymer
Pin material	bronze
Weight	max 160 g
Soldering temperature	260°C/5 s
Dimensions	max 84,5×52,7×12,85 mm without output pins

Description of function

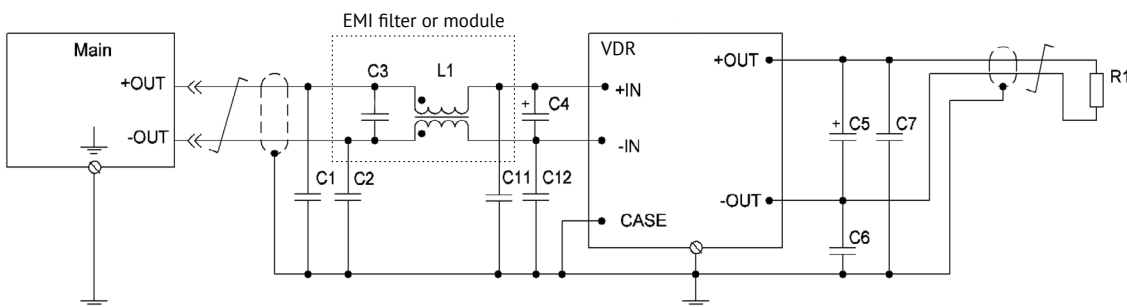


Figure 3. Typical connection with filtration unit.

C1, C2, C6, C7, C11, C12	ceramic capacitor			10000 pF	Y capacitors, part of EMI filter
C4	tantalum capacitor	Input voltage	24 VDC 48 VDC	200 uF 100 uF	Obligatory element, part of EMI filter
	ceramic capacitor	Input voltage	24 VDC 48 VDC	15 uF 10 uF	
C5	tantalum capacitor	Output voltage	5-15 VDC 24-28 VDC	600 uF 130 uF	Usage of this capacitor is advisory and influences the value of output voltage transient deviation

A1

EN55022 Class A EMI Filter	L1	common mode choke		2 mH	initial permeability from 10000 to 20000, part of EMI filter	
	C3	ceramic capacitor	Input voltage	24 VDC 48 VDC	15 uF 10 uF	Low ESR, part of EMI filter
		tantalum capacitor	Input voltage	24 VDC 48 VDC	200 uF 100 uF	

Typical connection

Remote control

Function of remote control by a signal allows to control the unit's operation using mechanical relay or electric switch of "open collector" type.

The unit should be powered off by connecting "ON" output to "-IN" output. The switch can carry current of up to 5 mA, the max voltage drop on the switch should be less than 1,1 V.

The unit is powered on by disconnecting the switch within the time less then 5 μ s. Being disconnected the switch is applied by approximately 5 V, allowable current leakage through the switch should not be over 50 μ A.

To arrange remote power off/on of several units simultaneously it is not allowed to use additional elements in the circuit to connect outputs "ON" and "-IN" and a switch.

If the function of remote power off/on is not used, "ON" output is allowed to be left unconnected.

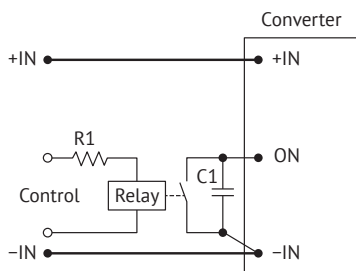


Figure 4 (a). ON/OFF control by relay.

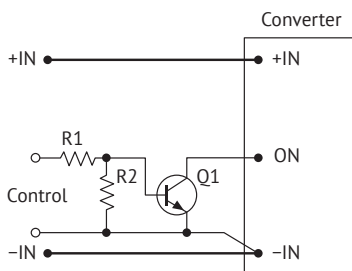


Figure 4 (b). ON/OFF control by bipolar transistor.

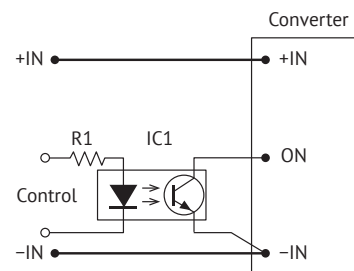


Figure 4 (c). ON/OFF control by optocoupler.

Adjustment

Adjustment of output voltage of a power supply unit within the range of at least $\pm 5\%$ can be done by connecting "ADJ" output (if available) through "-OUT" output to increase output voltage, or through "+OUT" output to decrease the output voltage.

In case of using variable resistor Rvar and outside resistors (R1, R2) it is possible to fulfill the adjustment both to increase and decrease the output voltage.

If you need to control the output voltage of a power supply unit by a signal from external source of current or voltage, e.g. in micro-controller automated control systems using DAC, the external current or voltage signal should be supplied to the adjustment output relating to "-OUT" output, as shown in the drawings (e) and (d).

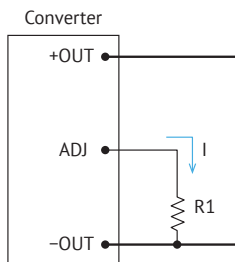


Figure 5 (a). Output voltage increase.

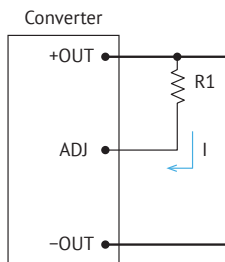


Figure 5 (b). Output voltage decrease.

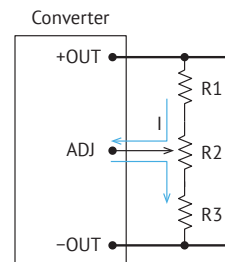


Figure 5 (c). Adjustment by resistive divider.

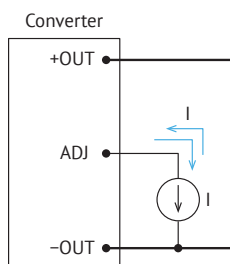


Figure 5 (e). Adjustment by current source.

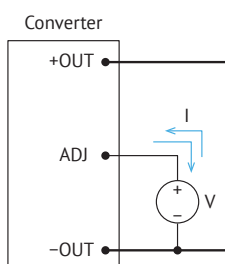


Figure 5 (d). Adjustment by voltage source.

Outline dimensions

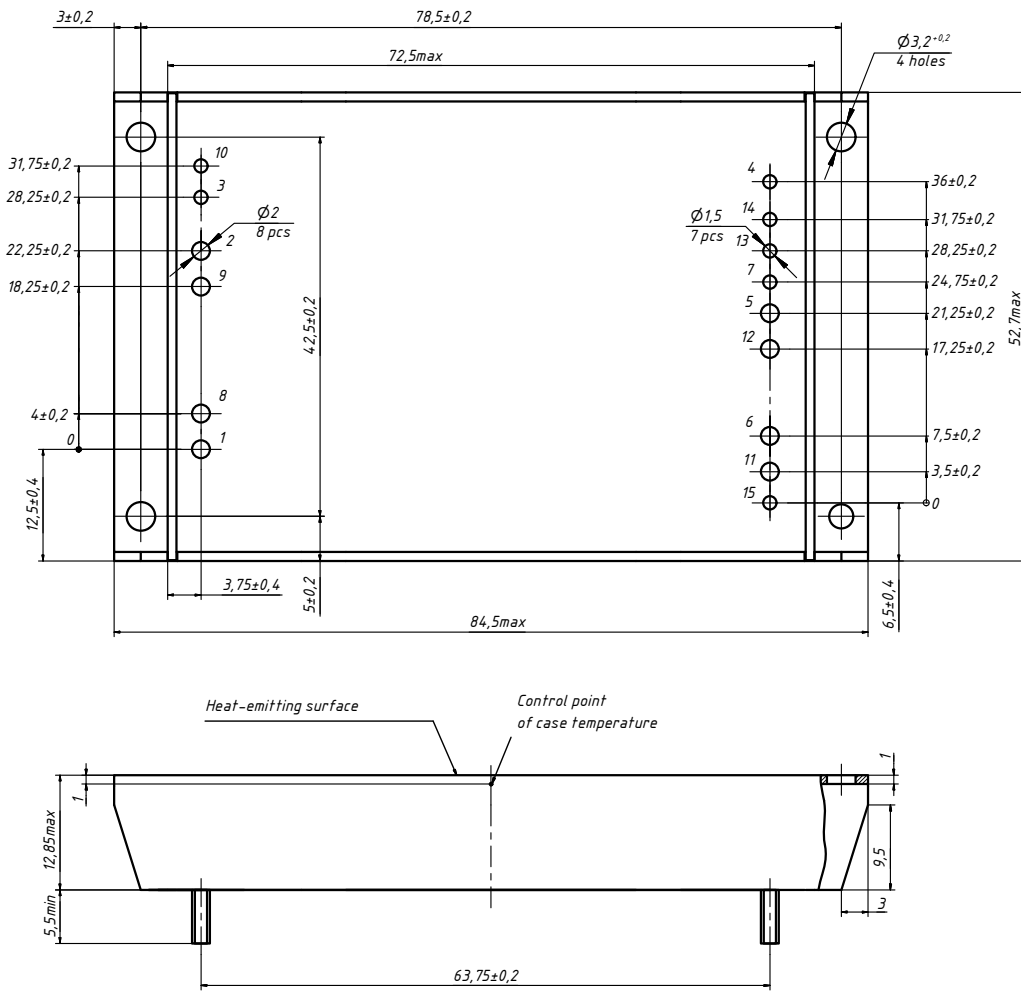


Figure 14. Flanged units.

Pin out

Pin #	1,8	2,9	3	4	5,12	6,11	7	10	13	14	15
Function	+IN	-IN	ON	CASE	+OUT	-OUT	+RS	SYNC	TRIM	PARAL	-RS

Heatsink

Part number	Ribs configuration	Dimensions A×B×H×D, mm	Area, cm ²	Weight, g
752695.006	Longitudinal	84,5×52×14×4	218	90
752695.006-01	Longitudinal	84,5×52×24×4	383	

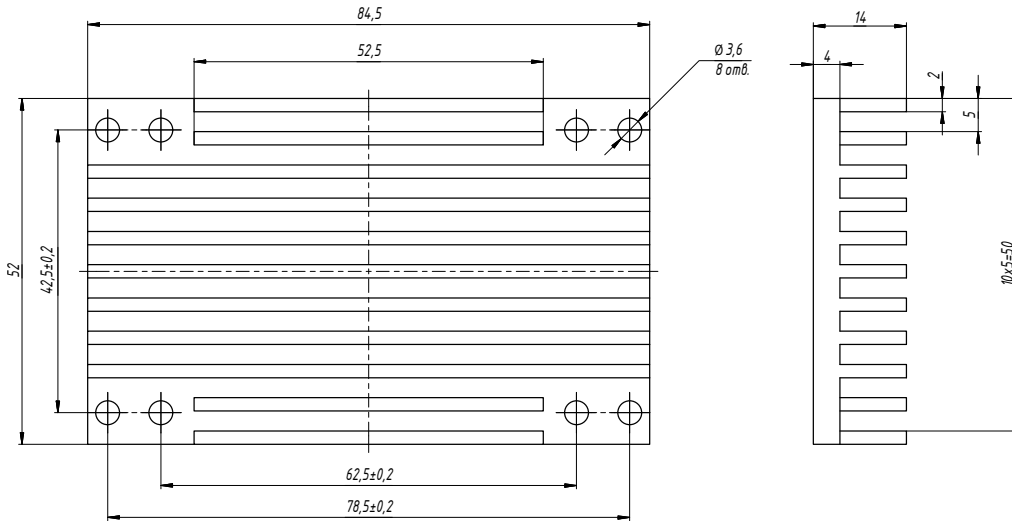


Figure 15. 752695.006.

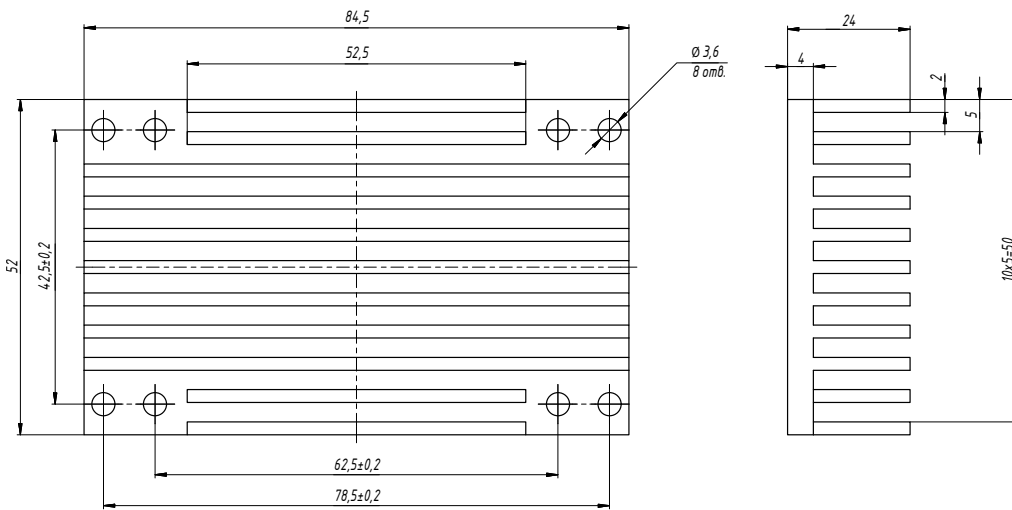


Figure 16. 752695.006-01.

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www.voltbricks.com info@voltbricks.com

VOLTBRICKS PTE. LTD.

105 Cecil street

#15-01 The OCTAGONE

Singapore 069534

+65 6950 0011

Manufacturer of reliable DC/DC converters and power supply systems

This datasheet is valid for the following units: VDR250A09; VDR250A12; VDR250A15; VDR250A24; VDR250A28; VDR250V09; VDR250V12; VDR250V15; VDR250V24; VDR250V28; VDR250D09; VDR250D12; VDR250D15; VDR250D24; VDR250D28; VDR300A09; VDR300A12; VDR300A15; VDR300A24; VDR300A28; VDR300V09; VDR300V12; VDR300V15; VDR300V24; VDR300V28; VDR300D09; VDR300D12; VDR300D15; VDR300D24; VDR300D28.