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DATASHEET

VDR Series

VDR400, VDR500

Ultra compact DC/DC converters

Description

Ultra compact isolated single channel DC/DC converters designed for industrial and special purpose applications. These compact units (107×67,7×12,85 mm without output pins) have output power up to 500 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.

VDR500 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

Features

- Output current up to 50 A
- Case operating temperature: –60…+125°C for VDR400
- 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% (Uout.=24 VDC)
- Polymer potting sealing
- No optocouplers
- Power sharing
- Output voltage adjustment
- Switching frequency external synchronization
- No minimum load

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

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/VDR500-en.stp

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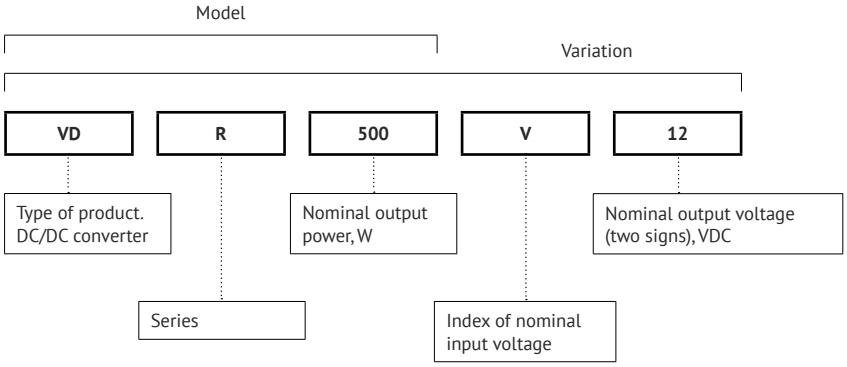
Ordering information



For more information please contact our Global Operations Team
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Output power and current

Model	VDR400					VDR500				
Output power, W	400					450*	500			
Output voltage, VDC	9	12	15	24	28	9	12	15	24	28
Maximal output current, A	44,4	33,3	26,7	16,7	14,3	50	41,7	33,3	20,8	17,9

* The output power is limited by the current of 50 A.

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 $8{,}6\times10^4$…$10{,}6\times10^4$ Pa), Uin. nom, Iout. nom, unless otherwise stated. It is important to note that the information herein is not full.

Output specifications

Parameter		Value
Output voltage adjustment		±5% Uout. nom
Regulation	Input voltage variation (Umin…Umax)	max ±2% Uout. nom
	Load variation (10…100% Imax)	
	Total regulation	±6% Uout. nom
Ripple and noise (p-p)		<2% Uout. nom
Start up time (remote)		<0,1 s
Overload protection level*		<1,5 Pmax
Short circuit protection*		hiccup auto recovery
Overvoltage protection		1,5 Unom, forced restriction
Trancient responce 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≤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		3,3 °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 270 g
Soldering temperature	260°C/5 s
Dimensions	max 107×67,7×12,85 mm without output pins

Description of function

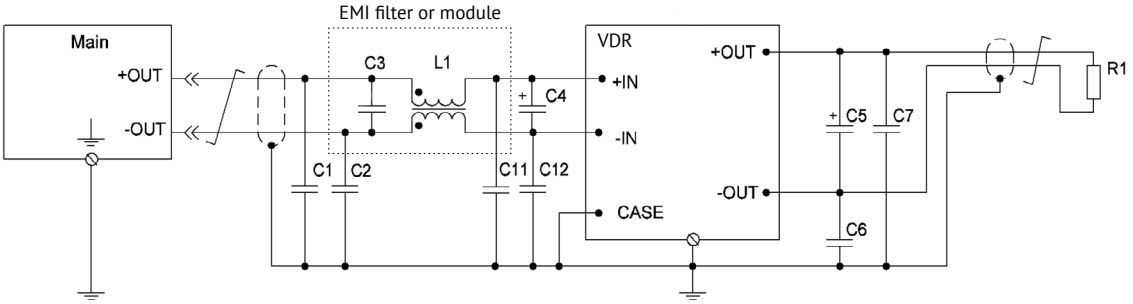

Figure 3. Typical connection with filtration unit.

C1, C2, C6, C7, C11, C12	ceramic capacitor		10000 pF	Y capacitors, part of EMI filter
C4, C3	tantalum capacitor	Input voltage 24 VDC 48 VDC	400 uF 200 uF	Obligatory element, part of EMI filter
	ceramic capacitor	Input voltage 24 VDC 48 VDC	40 uF 20 uF	
C5	tantalum capacitor	Output voltage 5-15 VDC 24-28 VDC	600 uF 200 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		8 mH	initial permeability from 10000 to 20000, part of EMI filter
	C3	ceramic capacitor	Input voltage 24 VDC 48 VDC	40 uF 20 uF	Low ESR, part of EMI filter
		tantalum capacitor	Input voltage 24 VDC 48 VDC	400 uF 200 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 µs. Being disconnected the switch is applied by approximately 5 V, allowable current leakage through the switch should not be over 50 µA.

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.

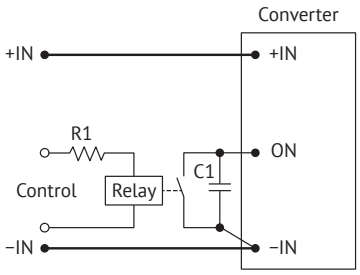

Figure 4 (a). ON/OFF control by relay.

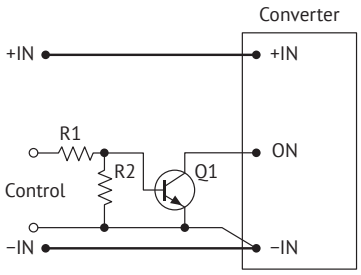

Figure 4 (b). ON/OFF control by bipolar transistor.

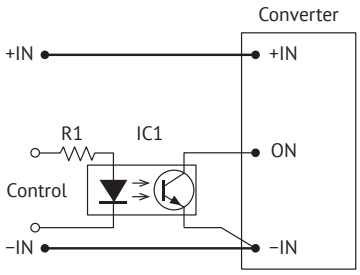

Figure 4 (c). ON/OFF control by optocoupler.

Adjustment

Adjustment of output voltage of a power supply unit within the range of at least ±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).

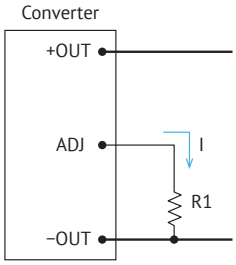

Figure 5 (a). Output voltage increase.

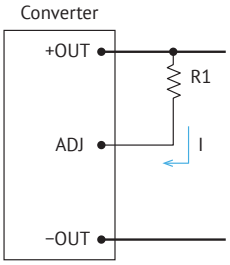

Figure 5 (b). Output voltage decrease.

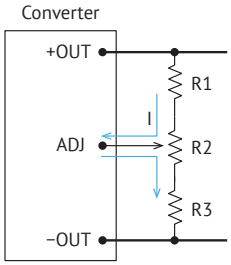

Figure 5 (c). Adjustment by resistive divider.

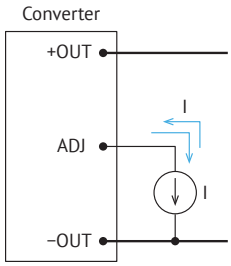

Figure 5 (e). Adjustment by current sourse.

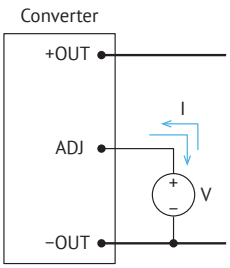

Figure 5 (d). Adjustment by voltage sourse.

Outline dimensions

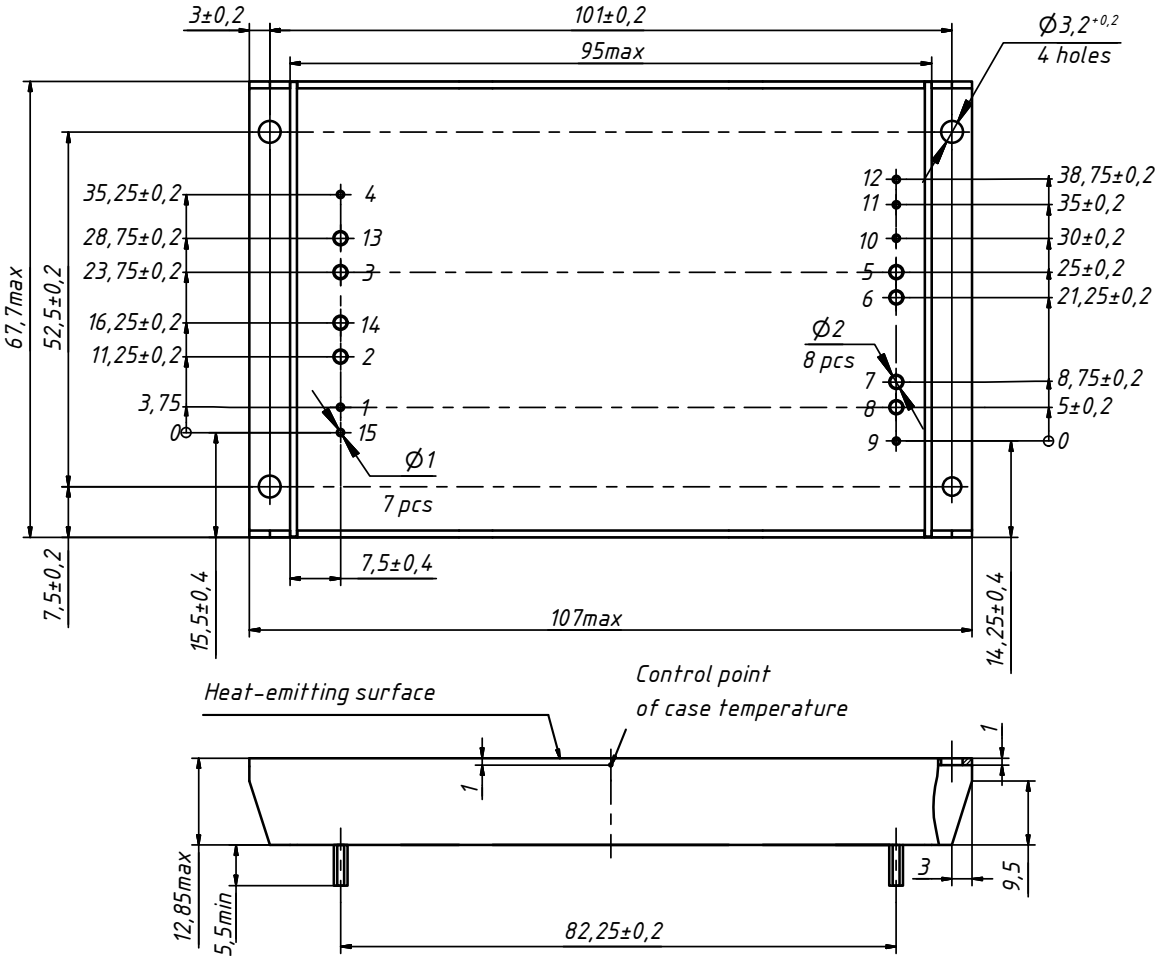

Figure. 14. Flanged units.

Pin out

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

Heatsink

Part number	Ribs configuration	Dimensions A×B×H×D, mm	Area, cm²	Weight, g
752695.007	Longitudinal	107×67×14×4	358	150
752695.007-01	Longitudinal	107×67×24×4	631	222

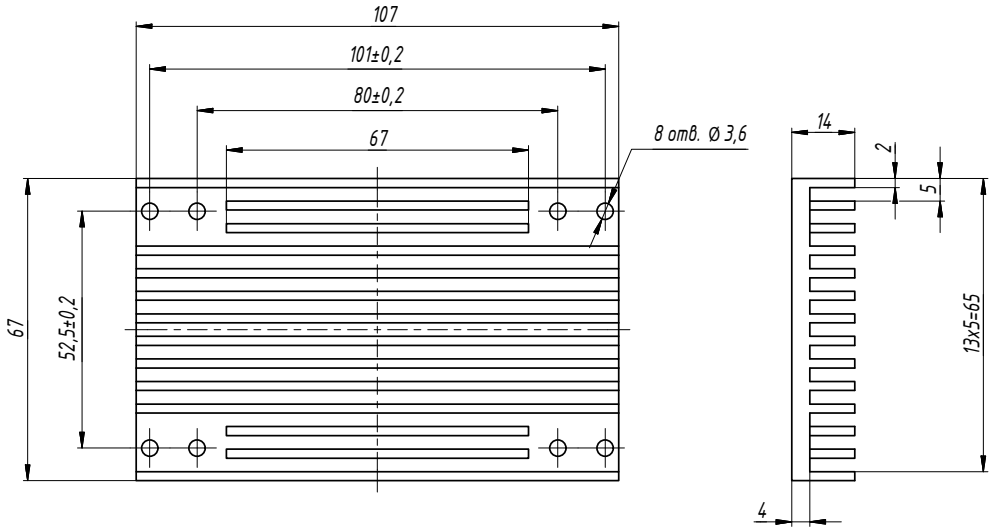

Figure. 15. *752695.007.*

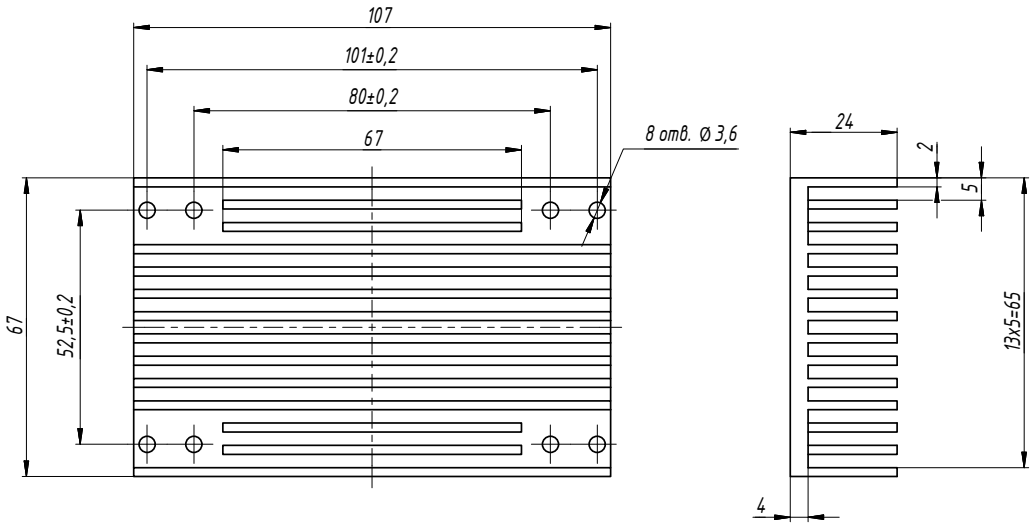

Figure. 16. *752695.007-01.*

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Manufacturer of reliable DC/DC converters and power supply systems

This datasheet is valid for the following units: VDR400A09; VDR400A12; VDR400A15; VDR400A24; VDR400A28; VDR400V09; VDR400V12; VDR400V15; VDR400V24; VDR400V28; VDR400D09; VDR400D12; VDR400D15; VDR400D24; VDR400D28; VDR500A09; VDR500A12; VDR500A15; VDR500A24; VDR500A28; VDR500V09; VDR500V12; VDR500V15; VDR500V24; VDR500V28; VDR500D09; VDR500D12; VDR500D15; VDR500D24; VDR500D28.