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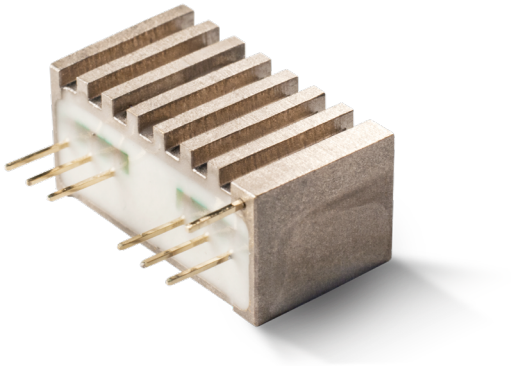
DATASHEET

VDN Series

VDN10

SIP-package DC/DC converters



Description

MDN is a series of isolated DC/DC converters with output power 10 W and ultrawide input voltage ranges (4:1). These produced products are in a compact SIP-8 package (22,3×12,1×10 mm) with small footprint.

An exellent efficiency allows –55...+105°C case operating temperature. These units are designed for using in industrial and special purpose applications and are optimized for operating in harsh environment.

Engineered in accordance with

- MIL-STD-810G
- MIL-STD-461F (CE102)

Features

- 5 year warranty
- Compact SIP-8 package
- Ultrawide input voltage range (4:1)
- Case operating temperature –55...+105°C
- Remote on/off
- High efficiency
- Metal case
- Fixed switching frequency

Description of VDN Series on the manufacturer's website
https://support.voltbricks.com/datasheets/VDN10-en.pdf

Order registration
+65 6950 0011, Global Operations Team

Technical support
support@voltbricks.com

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

VOLTBRICKS PTE. LTD.

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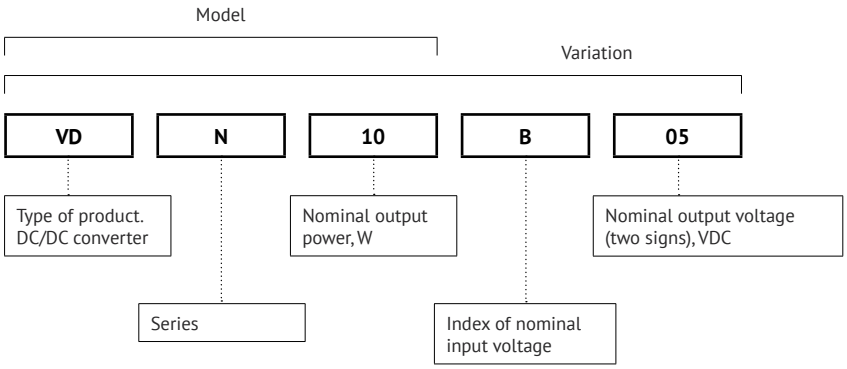
Ordering information



For more information please contact our Global Operations Team

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info@voltbricks.com

Output power and current

A product with special output voltage rating can be made by customized order.

Model	VDN10				
Output power, W	6,6*	10			
Output voltage, VDC	3,3	5	9	12	15
Maximal output current, A	2	2	1,11	0,83	0,67

* The output power is limited by the current of 2 A.

Index of nominal input voltage

Parameter	Index "B"	Index "W"
Nominal input voltage, VDC	12	24
Input voltage range, VDC	9...36	18...75
Transient deviation, 1 s, VDC	9...40	17...84
Typical efficiency for Uout.=12 VDC	86%	86%

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
Voltage set accuracy		max ±2% Uout.nom
Regulation	Line and Load variation	max ±2% Uout. nom
	Temperature regulation	max ±2% Uout.nom
	Total regulation	max ±2,5% Uout. nom
Ripple and noise (p-p)		max 2% Uout. nom
Maximum capacitive load	Output voltage up to 6 V (6 V included)	10000 uF
	above 6 V	2200 uF
Start up time (remote)		max 0,1 s

Protections*

Parameter	Value
Overload protection level	no regulated
Short circuit protection	no regulated
Overvoltage protection	no regulated
Thermal protection level	no regulated
Vibration proof	1…2000 Hz, 200 (20) m/s^2 (g), 0,3 mm
Dust proof	yes
Salt fog resistant	yes
Moisture proof (Tamb.=25°C)	98%

* 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.

Specifications (cont.)

General specifications

Parameter		Value
Operating case temperature		–55...+105°C
Operating ambient temperature (on condition the case temperature is maintained)		–55...+85°C
Storage temperature		–55...+125°C
Switching frequency		450 kHz typ, fixed
Input capacitance (10 kHz), external	Index «B» Index «W»	68 uF tantalum + 10 uF ceramic 22 uF tantalum + 4,7 uF ceramic
Isolation voltage (60 s)	input/output, input/case, output/case	1500 VDC
Isolation resistance @ 500 VDC	input/output, input/case, output/case	20 MOhm min
Thermal impedance case-ambient		35°C/W
Remote on/off		2,4...5,5 VDC to "ON" ref. to "– IN"
Typical MTBF		1 263 900 hrs
Warranty		5 years

Physical specifications

Parameter	Value
Form-factor	SIP-8
Case material	brass / nickel
Potting	epoxy polimer
Pin material	phosphor bronze, SnPb plated
Weight	max 15 g
Soldering temperature	max 260°C @ 5 s
Dimensions	max 22,3×12,1×10 mm without output pins

Design topology

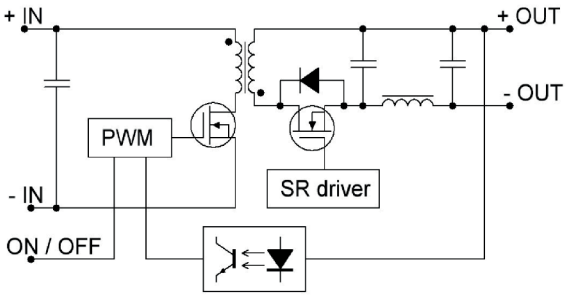

Figure 1. Design topology.

Service functions

Typical connection

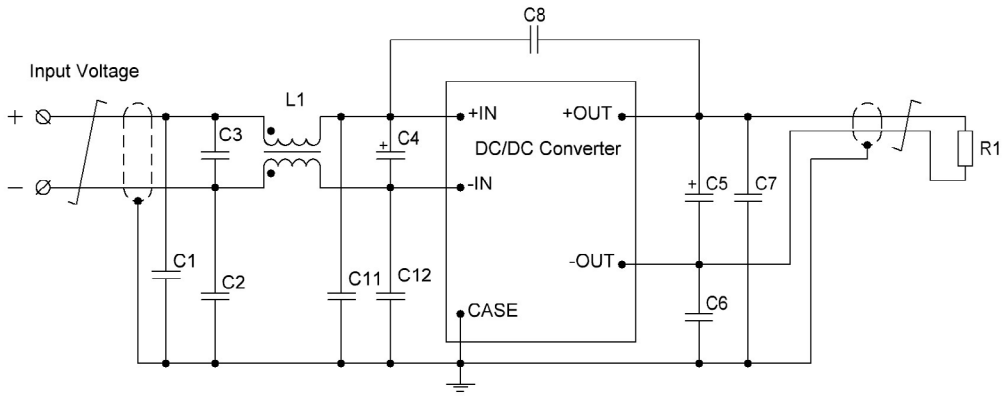

Figure 2. Typical connection diagram VDN10.

C1, C2, C6, C7, C8, C11, C12		ceramic capacitor			10000 pF 1500 VDC min
C4		tantalum capacitor	Input voltage	12 VDC 24 VDC	68 uF 50 V 22 uF 100 V
C5		tantalum capacitor	Output voltage	up to 6 V (incl.) above 6 V	100 uF 33 uF
EMI Filter	L1	common mode choke			8 mH
	C3	ceramic capacitor	Input voltage	12 VDC 24 VDC	10 uF 50 V 4,7 uF 100 V

Remote control

Remote off function is activated by feeding 2,4…5,5 VDC to "–IN" and "ON" pins. The unit is powered on by removing this voltage. To arrange remote power off/on of several units simultaneously it is not allowed to use additional elements in the circuit to connect pins "ON" and "–IN".
If the function of remote power off/on is not used, "ON" output is allowed to be left unconnected.

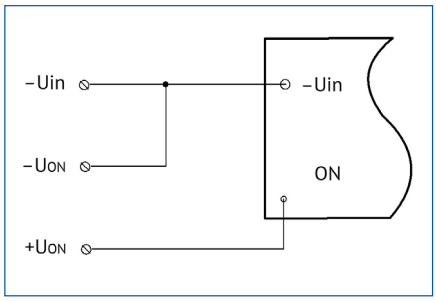

Figure 3. Logic voltage control.

Efficiency

VS load for Index "B"

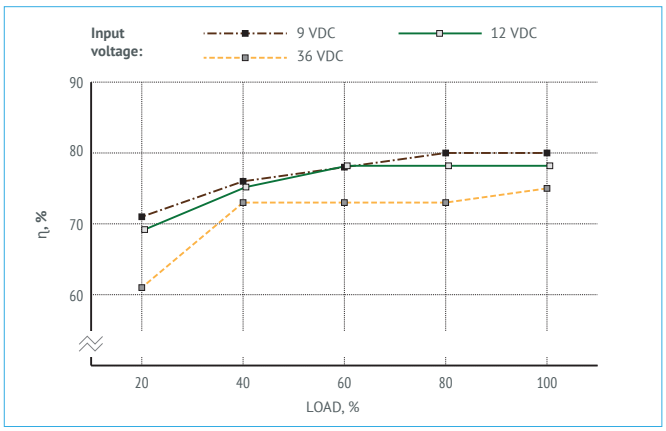

Figure 4 (a). Efficiency of VDN10B3,3.

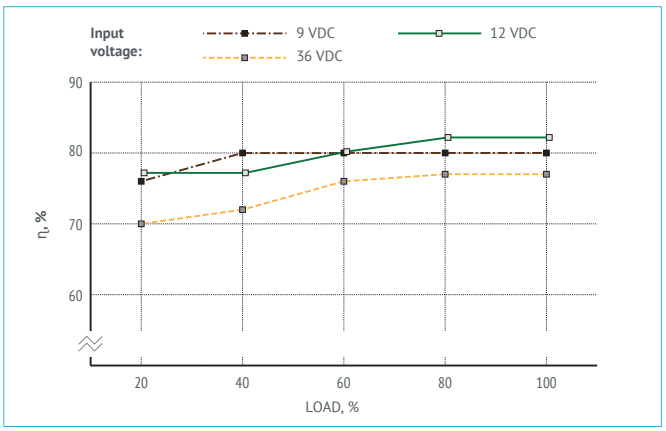

Figure 4 (b). Efficiency of VDN10B05.

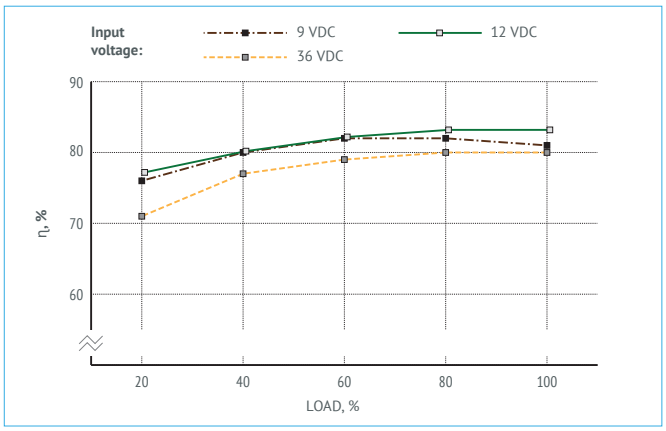

Figure 4 (c). Efficiency of VDN10B09.

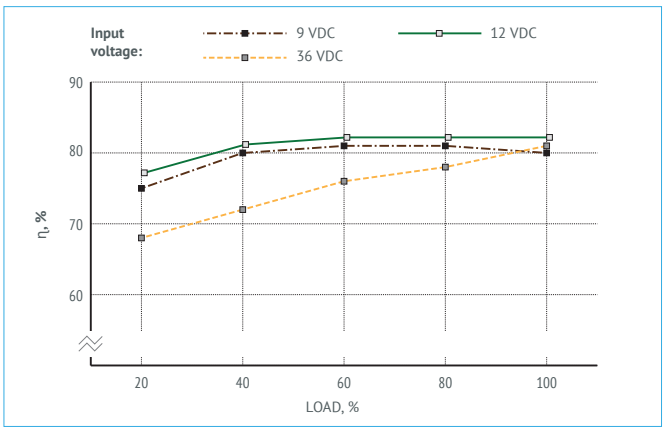

Figure 4 (d). Efficiency of VDN10B12.

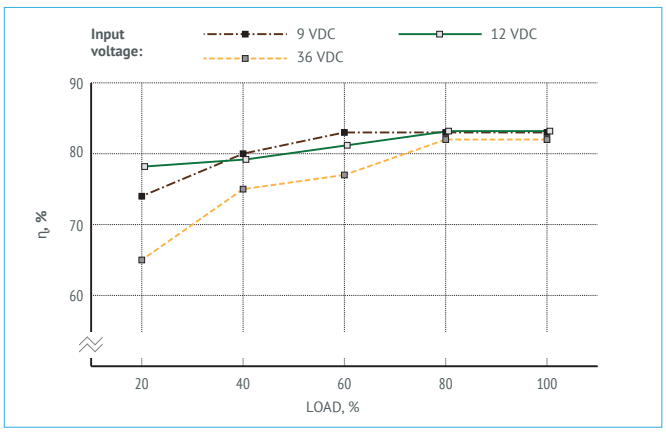

Figure 4 (e). Efficiency of VDN10B15.

Efficiency

VS load for Index "W"

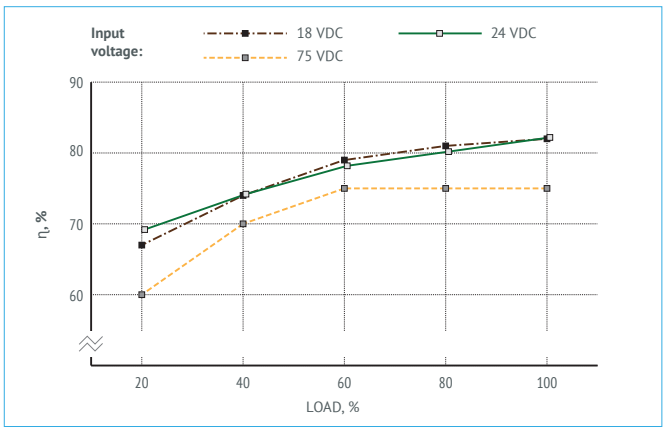

Figure 5 (a). Efficiency of VDN10W3,3.

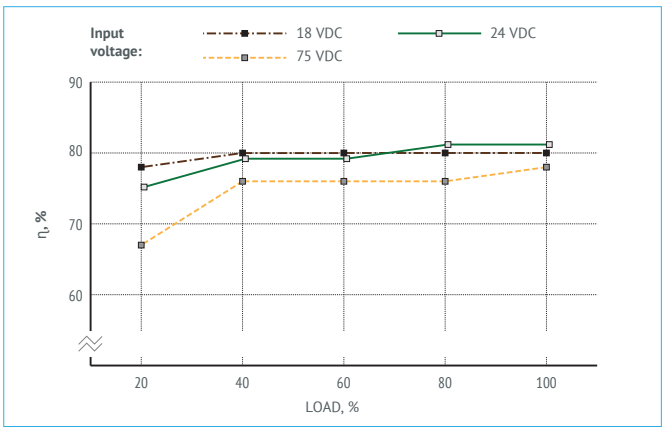

Figure 5 (b). Efficiency of VDN10W05.

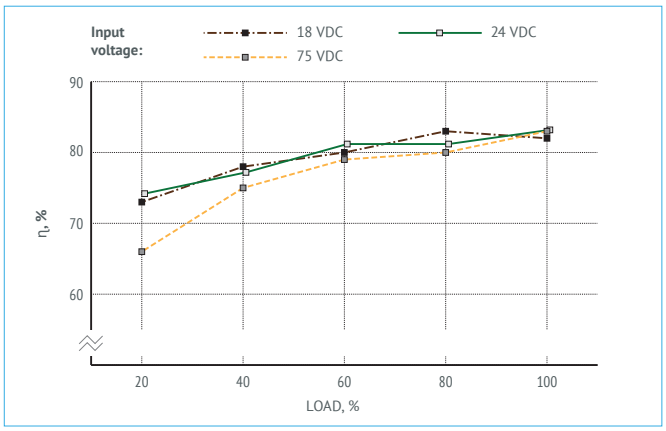

Figure 5 (c). Efficiency of VDN10W09.

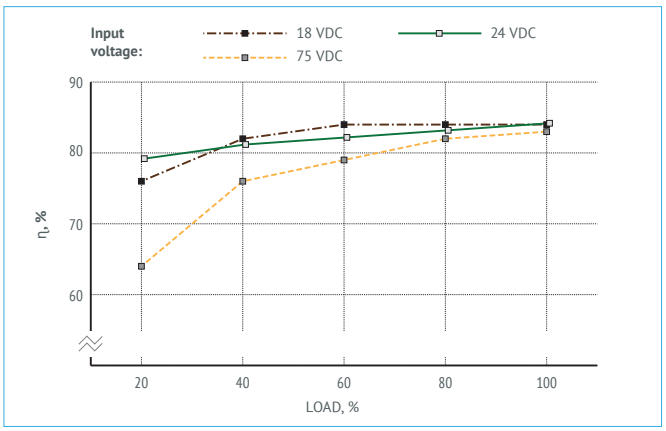

Figure 5 (d). Efficiency of VDN10W12.

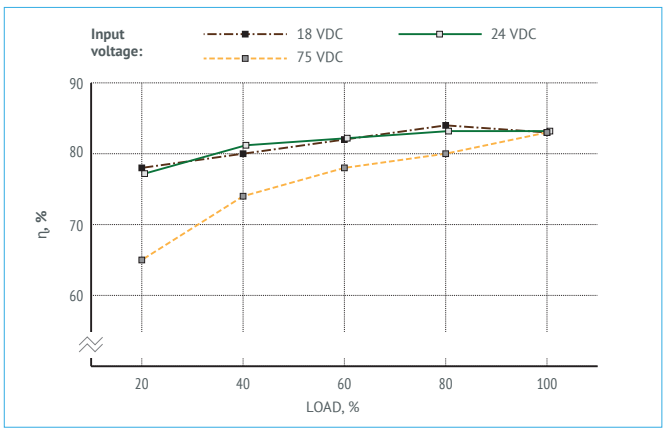

Figure 5 (e). Efficiency of VDN10W15.

Power derating

VS ambient temperature and baseplate temperature

Converter is able to operate with 100% load within the complete range of **case operating temperature (–60...+105 °C)**. On condition the case temperature is kept from –60°C to 105 °C the converter will operate without derating regardless of the ambient temperature.

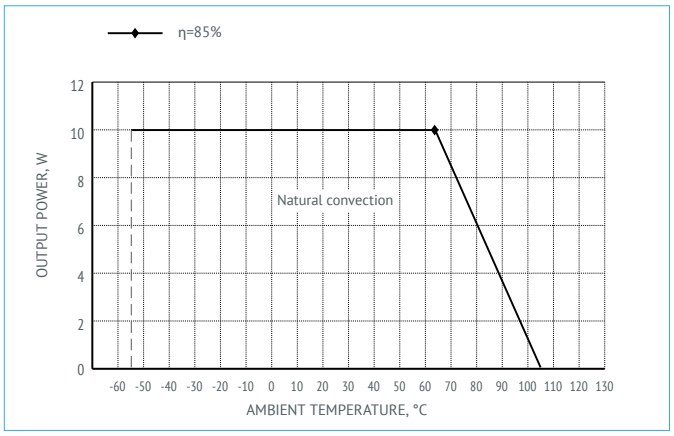

Figure 6. Power derating of VDN10.

Oscillograph charts

Charts of VDN10B15

Testing conditions Uin.=12 VDC, Iout.=0,67 A, Tamb.=25°C, Uout.=15 VDC, Cout.=33 uF
The database of regulated parameters of the maunfactured products is available.
Pls. contact your personal manager or customer support service to get necessary information.

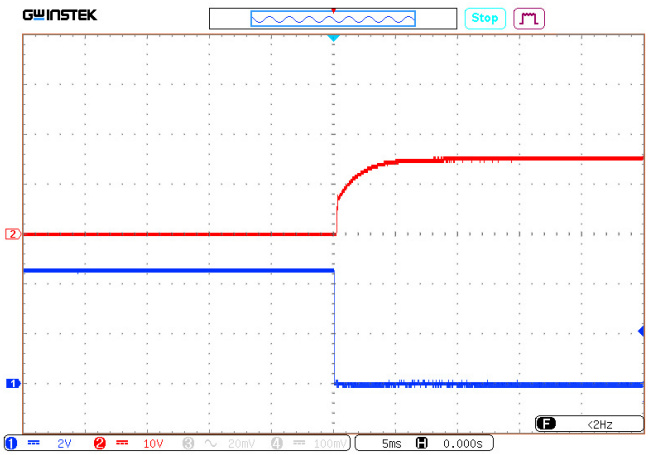

Figure 7 (a). Oscillograph chart of setting output voltage after supplying remote control signal to ON-input.

Ray 1 (blue) – voltage at ON-input. Scale 2 V/div.
Ray 2 (red) – output voltage. Scale 10 V/div.
Time scale 5 ms/div.

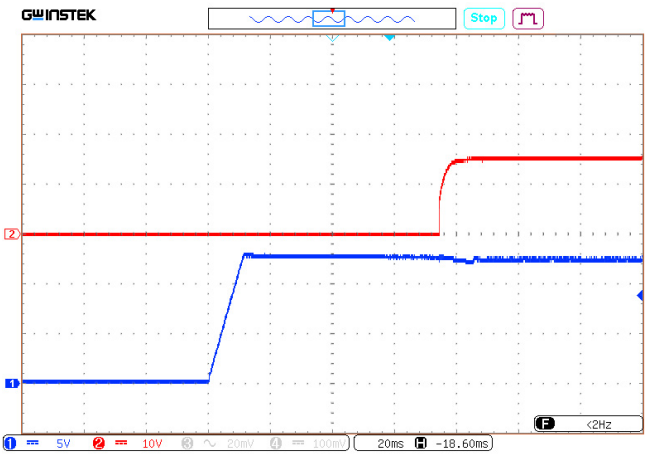

Figure 7 (b). Oscilliograph chart of output voltage after supplying the input voltage.

Ray 1 (blue) – intput voltage. Scale 5 V/div.
Ray 2 (red) – output voltage. Scale 10 V/div.
Time scale 20 ms/div.

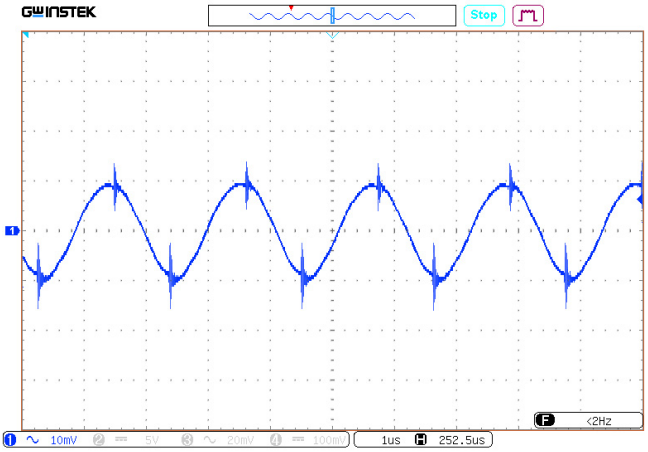

Figure 7 (c). Oscillograph chart of output voltage ripple.

Ripple of output voltage. Scale 10 mV/div. Time scale 1 us/div.

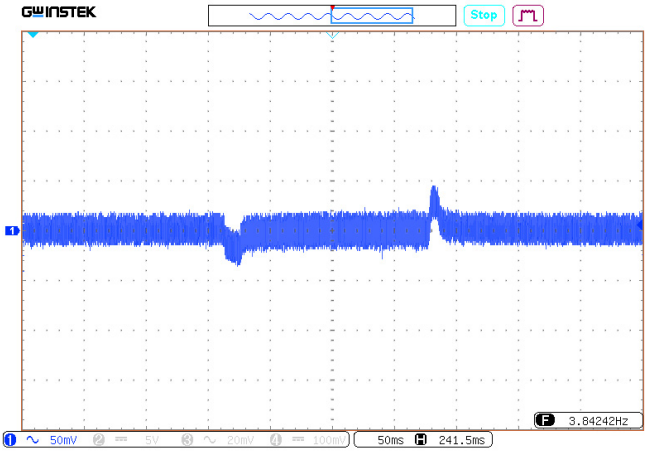

Figure 7 (d). Oscillograph chart of voltage transient deviation during load "drop/rise" 0...100 %.

Ray 1 (blue) — output voltage. Scale 50 mV/div. Time scale 50 ms/div.

Charts of VDN10W15

Testing conditions Uin.=24 VDC, Iout.=0,67 A, Tamb.=25°C, Uout.=15 VDC, Cout.=33 uF
The database of regulated parameters of the maunfactured products is available.
Pls. contact your personal manager or customer support service to get necessary information.

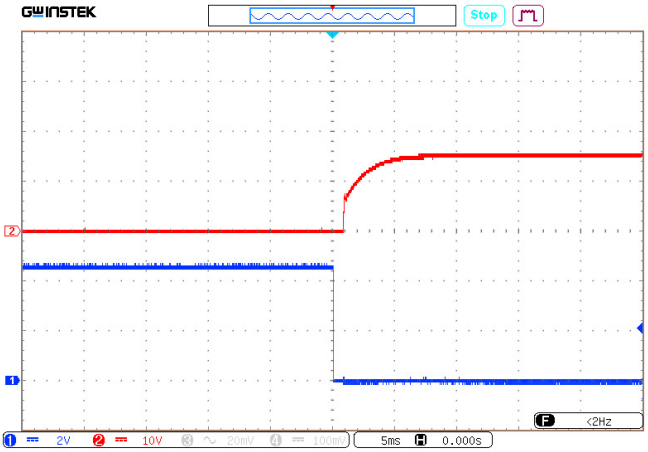

Figure 8 (a). Oscillograph chart of setting output voltage after supplying remote control signal to ON-input.

Ray 1 (blue) — voltage at ON-input. Scale 2 V/div.
Ray 2 (red) — output voltage. Scale 10 V/div.
Time scale 5 ms/div.

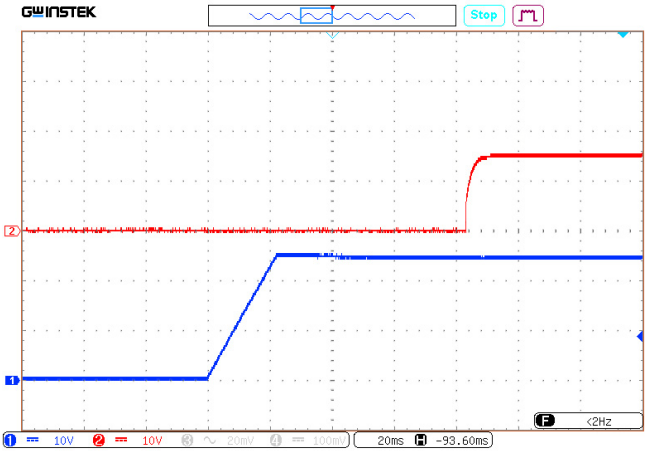

Figure 8 (b). Oscilliograph chart of output voltage after supplying the input voltage.

Ray 1 (blue) — input voltage. Scale 10 V/div.
Ray 2 (red) — output voltage. Scale 10 V/div.
Time scale 20 ms/div.

Oscillograph charts

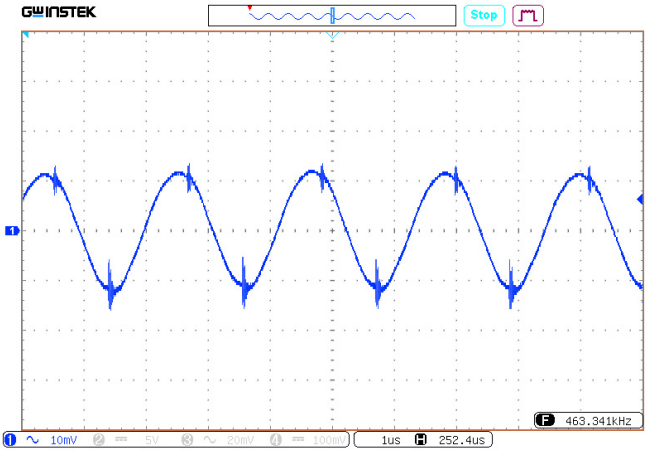

Figure 8 (c). Oscillograph chart of output voltage ripple.

Ripple of output voltage. Scale 10 mV/div. Time scale 1 us/div.

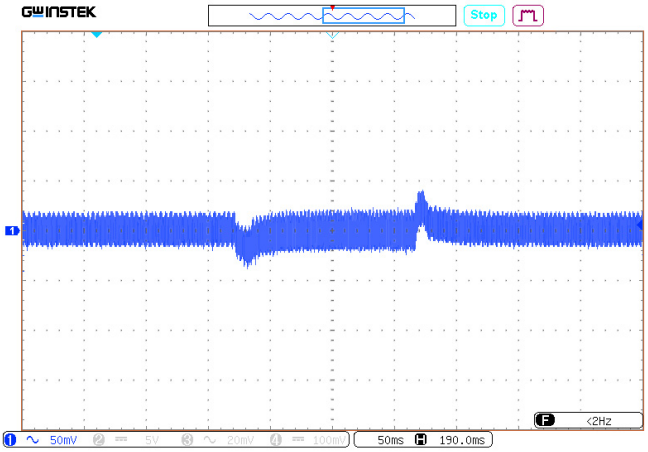

Figure 8 (d). Oscillograph chart of voltage transient deviation during load "drop/rise" 0...100 %.

Ray 1 (blue) — output voltage. Scale 50 mV/div. Time scale 50 ms/div.

Noise spectrogram

Spectrogram of VDN10B15 with typical connection diagram

Testing according to MIL-STD-461F CE102. (Tcase=25°C, Vin.=+12 V, full load, unless otherwise specified)

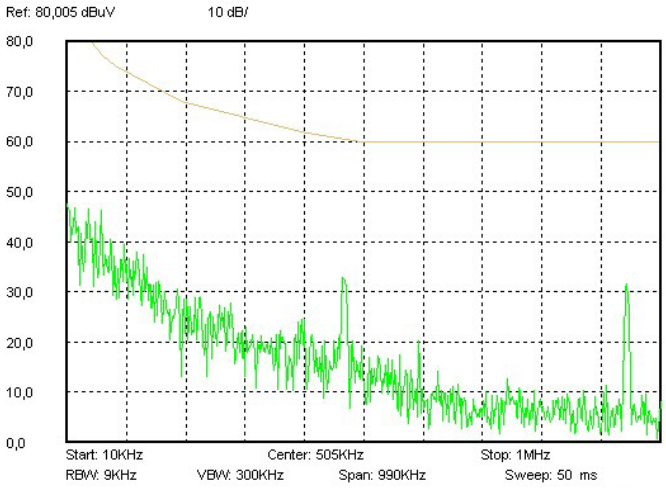

Figure 9 (a). Spectrogram 0,01–1 MHz.

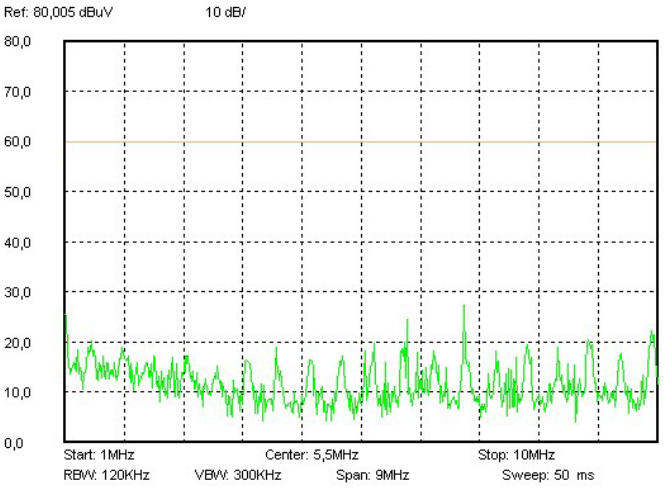

Figure 9 (b). Spectrogram 1–10 MHz.

Spectrogram of VDN10W15 with typical connection diagram

Testing according to MIL-STD-461F CE102. (Tcase=25°C, Vin.=+12 V, full load, unless otherwise specified)

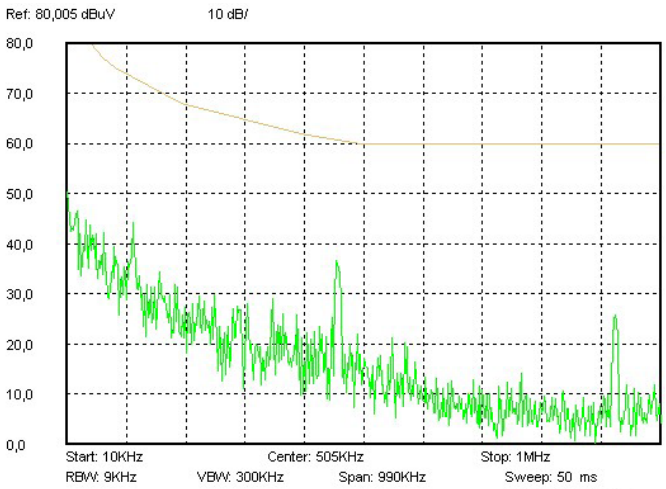

Figure 10 (a). Spectrogram 0,01–1 MHz.

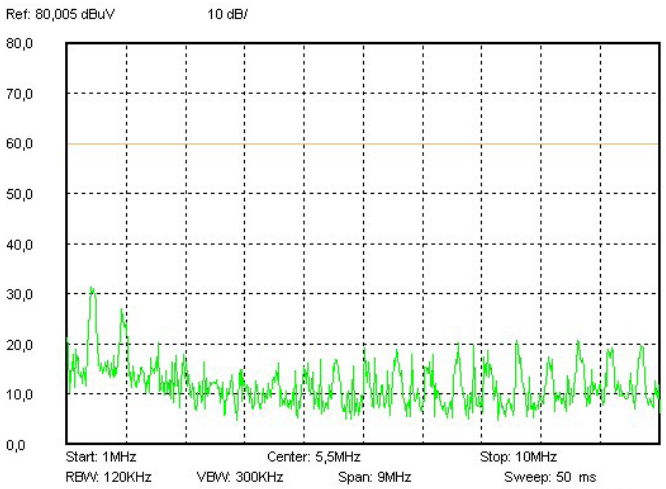

Figure 10 (b). Spectrogram 1–10 MHz.

Outline dimensions

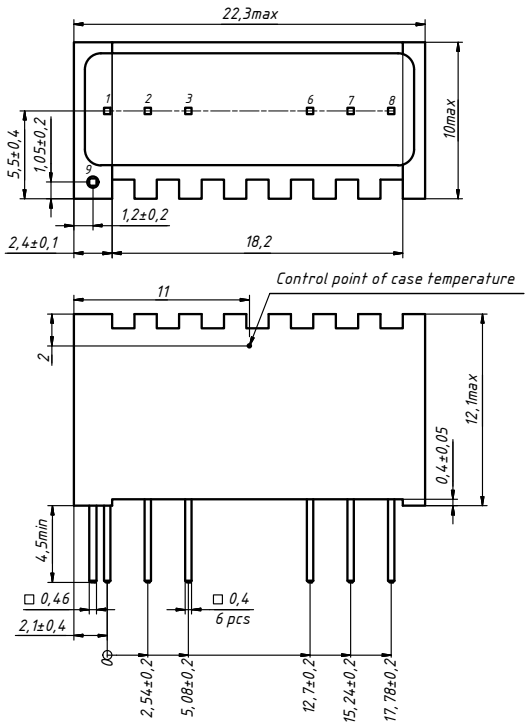

Figure 11.

Pin out

Pin #	1	2	3	6	7	8	9
Function	–IN	+IN	ON	+OUT	–OUT	NOT USE	CASE

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Manufacturer of reliable DC/DC converters and power supply systems

This datasheet is valid for the following units: VDN10B3.3; VDN10B05; VDN10B09; VDN10B12; VDN10B15; VDN10W3.3; VDN10W05; VDN10W09; VDN10W12; VDN10W15; VDN10B3.3; VDN10B05; VDN10B09; VDN10B12; VDN10B15; VDN10W3.3; VDN10W05; VDN10W09; VDN10W12; VDN10W15.