



VRAx24D-20W & VRBx24D-20W Series

**20W, WIDE INPUT, ISOLATED & REGULATED
SINGLE&DUAL OUTPUT DC-DC CONVERTER**

RoHS

FEATURES

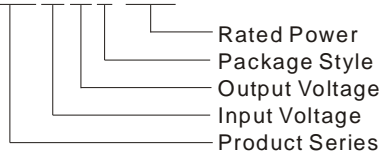
- Efficiency up to 85%
- Wide (2:1) Input Voltage Range
- 1.5KVDC Input/Output Isolation
- Over Voltage protection
- Over Current protection
- Output Short Circuit Protection
- Operating Temperature: -40°C ~ +85°C
- Internal SMD construction
- Metal Shielding Package
- Industry Standard Pinout
- MTBF>1,000,000 hours
- RoHS Compliance

APPLICATION

The VRA_D-20W & VRB_D-20W series offer 20W of output, with 2:1 wide input voltage range of 9-18, 18-36 and 36-75VDC, and features 1500VDC isolation, over current, over voltage and short circuit protection. All models are particularly suited to tele-communications, industrial, test equipments power etc.

MODEL SELECTION

VRAx24D-20W



MORNSUN America

43 Broad Street
Hudson, MA 01749
Tel: 978-567-9610
Fax: 978-567-9601
<http://www.mornsunamerica.com>

PRODUCT PROGRAM

Part Number	Input			Output		Efficiency (% Typ)	Capacitance ⁽²⁾ (max, µF)
	Voltage (VDC)			Voltage (VDC)	Current (mA)		
	Nominal	Range	Max. ⁽¹⁾				
VRA1224D-20W	12	9-18	20	±24	±416	82	±300
VRB1224D-20W				24	833	83	500
VRA2424D-20W	24	18-36	40	±24	±416	84	±300
VRB2424D-20W				24	833	85	500
VRA4824D-20W	48	36-75	80	±24	±416	84	±300
VRB4824D-20W				24	833	85	500

COMMON SPECIFICATIONS

Item	Test conditions	Min.	Typ.	Max.	Units
Storage humidity		5	--	95	%
Operating temperature		-40	--	85	°C
Storage temperature		-55	--	105	
Temp. rise at full load		--	--	80	
Isolation voltage	Test for 1 minute and 1 mA max	1500	--	--	VDC
Isolation resistance		500	--	--	MΩ
Isolation capacitance	100kHz / 1V	--	1000	--	pF
Switching frequency	Nominal, full load	--	300	--	kHz
MTBF		1000	--	--	k hours
Case material		Aluminous alloy			
Weight		--	39	--	g

INPUT SPECIFICATIONS

Item	Test conditions	Min.	Typ.	Max.	Units
Start voltage	12V input models	--	8.8	9	VDC
	24V input models	--	17.8	18	
	48V input models	--	35	36	
Input filter		L-C			
Start up time		--	20	--	ms
CTRL ⁽³⁾ (Reference point: GND)	Models on	3.5-40VDC or open circuit			
	Models off	0-1.2VDC			

OUTPUT SPECIFICATIONS

Item	Test conditions	Min.	Typ.	Max.	Units
Positive voltage accuracy	Refer to recommended circuit	--	±1	±3	%
Negative voltage accuracy	Refer to recommended circuit	--	±3	±5	
Load regulation	From 10% to 100% load	--	±0.5	±1	
Line regulation	Input voltage from low to high	--	±0.2	±0.5	
Cross regulation	Dual output	--	--	±5	
Ripple and noise	20MHz bandwidth	50	75	250	mV
Transient recovery time		--	200	500	us
Transient peak deviation	25%load change	±2	±3	±5	%
Over load protection*	Input voltage range	120	140	--	%
Output Short Circuit **	VRB1224D-20W model	--	--	30	S
	The other models	Hiccup, automatics recovery			
Over voltage protection (half of rate load)	24V output	26.4	--	31.2	VDC
Temperature drift (Vout)		--	±0.02	--	%/°C
Trim	Single output models	--	±10%Vo	--	VDC

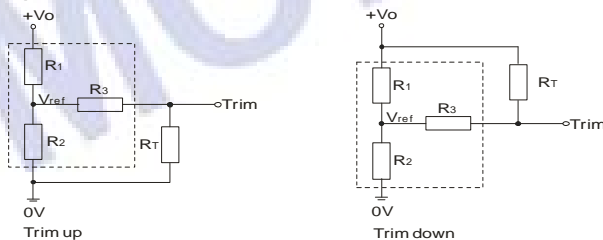
*Test ripple and noise by "parallel cable" method.

**The short circuit time of VRB1224D-20W model is no more than 30s, due to short-circuit in different ways.

TRIM APPLICATION & TRIM RESISTANCE

Application circuit for TRIM (Part in broken line is the interior of models)

—Single output models



Formula for resistance of Trim

$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3 \quad a = \frac{V_{ref}}{V_o' - V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \quad a = \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2$$

Note: Value for R1, R2, R3, and Vref refer to the following table.

R_T: Resistance of Trim

a: User-defined parameter, no actual meanings

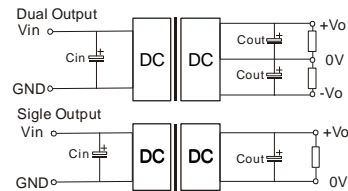
V_{o'}: The trim up/down voltage

Parameter \ V _o	24V
R1(KΩ)	24.872
R2(KΩ)	2.863
R3(KΩ)	20
Vref(V)	2.5

RECOMMENDED CIRCUIT

1) Recommended circuit

All the VRA_D-20W & VRB_D-20W series have been tested according to the following recommended testing circuit before leaving factory. This series should be tested under load. Never be tested under no load (see Figure 1).



(Figure 1)

If you want to further decrease the output ripple, you can increase capacitance properly or choose capacitors with low ESR. However, the capacitance can't exceed the maximum capacitor load in the list.

2) Recommended capacitance

For better performance and more reliable, output capacitance refer to the below table.

Output voltage	Capacitance		Cin(12V,24V/48V output)
	Single output	Dual output	
24V	100μF	100μF	100μF
24V	100μF	100μF	

3) No parallel connection or plug and play DERATING CURVE

