

VRB_D-30W Series

30W, WIDE INPUT, ISOLATED & REGULATED SINGLE OUTPUT DC-DC CONVERTER

RoHS

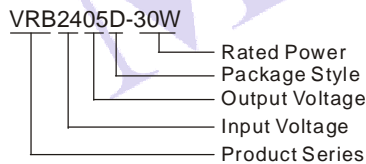
FEATURES

- Efficiency up to 89%
- 2:1 Wide 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
- MTBF>1,000,000 hours
- Industry Standard Pinout

APPLICATION

The VRB_D-30W series offer 30W of output, with 2:1 wide input voltage of 9-18, 18-36 and 36-75VDC and features 1500VDC isolation, short-circuit and over current protection. All models are particularly suited to tele-communications, industrial, test equipments power and other fields.

MODEL SELECTION



MORNSUN Science & Technology Co.,Ltd.

Address: No. 5, Kehui St. 1, Kehui development center, Science Ave., Guangzhou Science City, Luogang district, Guangzhou, P.R.China.

Tel: 86-20-28203030

Fax: 86-20-28203068

<http://www.mornsun-power.com>

PRODUCT PROGRAM

Part Number	Input			Output		Capacitance ⁽³⁾ (max, µF)	Efficiency (%, Typ)
	Voltage (VDC)			Voltage (VDC)	Rated Current (mA) ⁽²⁾		
	Nominal	Range	Max. ⁽¹⁾				
VRB1203D-30W	12	9-18	20	3.3	6000	19500	85
VRB1205D-30W				5	6000	10200	86
VRB1212D-30W				12	2500	3240	86
VRB1215D-30W				15	2000	1100	86
VRB1224D-30W				24	1250	900	87
VRB2403D-30W				24	18-36	40	3.3
VRB2405D-30W	5	6000	10200				88
VRB2412D-30W	12	2500	3300				89
VRB2415D-30W	15	2000	1100				89
VRB2424D-30W	24	1250	900				89
VRB4803D-30W	48	36-75	80				3.3
VRB4805D-30W				5	6000	10200	89
VRB4812D-30W				12	2500	3300	87
VRB4815D-30W				15	2000	1100	88
VRB4824D-30W				24	1250	900	87

Add suffix "H" for heat sink mounted, for example VRB2405D-30WH.

COMMON SPECIFICATIONS

Item	Test conditions	Min.	Typ.	Max.	Units
Storage humidity		5	--	95	%
Operating temperature		-40	--	85	°C
Storage temperature		-55	--	125	
Maximum case temp.		--	--	105	
Lead temperature	1.5mm from case for 10 seconds			300	
Isolation voltage	Test for 1 minute and 1 mA max	1500	--	--	VDC
Isolation resistance		1000	--	--	MΩ
Isolation capacitance	100kHz / 0.1V	--	1000	--	pF
Switching frequency	Nominal, full load	--	300	--	kHz
MTBF	MIL-HDBK-217F	1000	--	--	k hours
Weight		--	50	--	g
Case material		Nickel- coated copper(Six-sided)			

INPUT SPECIFICATIONS

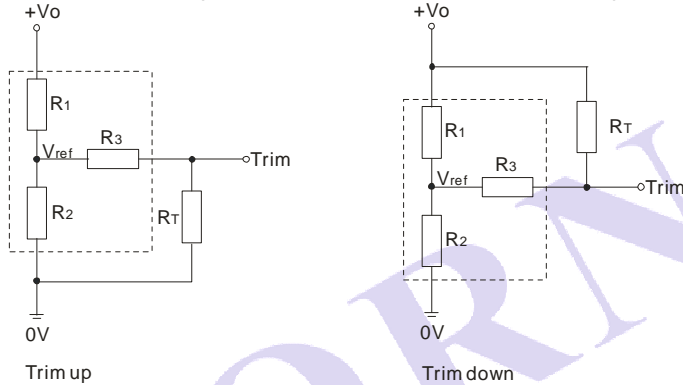
Item	Test conditions	Min.	Typ.	Max.	Units	
Under voltage lockout	Nominal input (12V)	Module ON	--	--	9.0	VDC
		Module OFF	8.0	--	--	
	Nominal input (24V)	Module ON	--	--	17.8	
		Module OFF	16.0	--	--	
	Nominal input (48V)	Module ON	--	--	35.5	
		Module OFF	33.0	--	--	
Start up time		--	10	--	ms	
Input filter		L-C				
CTRL ⁽⁴⁾	Module ON	3.5-12VDC or open circuit				
	Module OFF	0-1.2VDC				

OUTPUT SPECIFICATIONS

Item	Test conditions	Min.	Typ.	Max.	Units
Output power	See product program	3	--	30	W
Output voltage accuracy	Refer to recommended circuit	--	±1	±3	%
Load regulation	From 10% to 100% load	--	±0.5	±1	
Line regulation	Input voltage from low to high	--	±0.2	±0.5	
Ripple and noise	Tested under 20MHz Band	--	75	150	mV
Transient recovery time	25%load change	--	300	500	us
Transient peak deviation		--	±3	±5	%
Over load protection	Input voltage range	120	130	150	%
Output Short Circuit	Input voltage range	Hiccup, automatics recovery			
Over voltage protection	3.3V output	--	3.9	--	VDC
	5V output	--	6.2	--	
	12V output	--	15	--	
	15V output	--	18	--	
Temperature drift (Vout)	Refer to recommended circuit	--	±0.02	--	%/°C
Trim		--	±10%Vo	--	VDC

TRIM APPLICATION & TRIM RESISTANCE

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

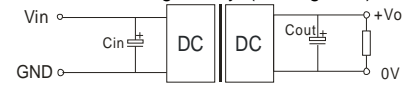
V_o': The trim up/down voltage

Vo	3.3(VDC)	5(VDC)	12(VDC)	15(VDC)	24 (VDC)
Parameter					
R1(KΩ)	4.801	2.883	10.971	14.497	24.872
R2(KΩ)	2.863	2.864	2.864	2.864	2.863
R3(KΩ)	15	10	17.8	17.8	20
Vref(V)	1.24	2.5	2.5	2.5	2.5

APPLICATION NOTE

1) Recommended circuit

All the VRB_D-30W series have been tested according to the following recommended testing circuit before leaving factory. (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

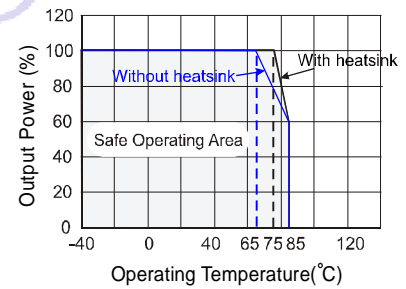
To ensure these series can operate efficiently and reliably, the recommended capacitance of input and output sees the below table.

Output Voltage	Capacitance Cout (μF)	Cin(μF)(12V, 24V,48V input)
3.3V、5V	220	100
12V、15V	100	
24V	47	

3) No parallel connection or plug and play

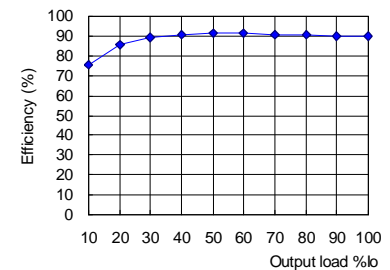
DERATING&EFFICIENCY CURVE

1) Temperature derating curve



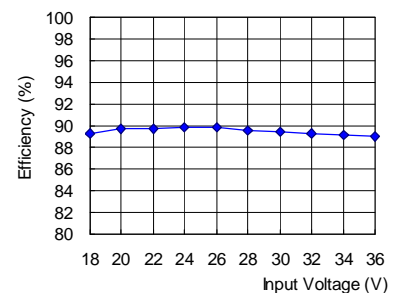
2) Curve of Efficiency VS output load

VRB2405D-30W



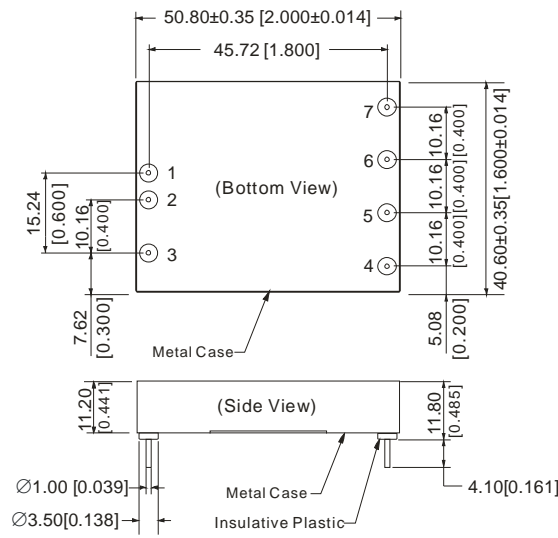
3) Curve of Efficiency VS input Voltage

VRB2405D-30W



OUTLINE DIMENSIONS & FOOTPRINT DETAILS

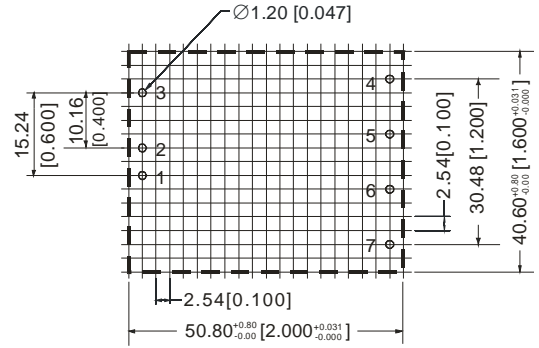
MECHANICAL DIMENSIONS



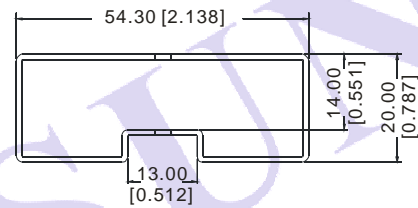
FOOTPRINT DETAILS	
Pin	Function
1	Vin
2	GND
3	Ctrl
4	Trim
5	0V
6	+Vo
7	No pin

Unit:mm[inch]
 Pin diameter tolerances:±0.10mm[±0.004inch]
 General tolerances:±0.25mm[±0.010inch]

RECOMMENDED FOOTPRINT

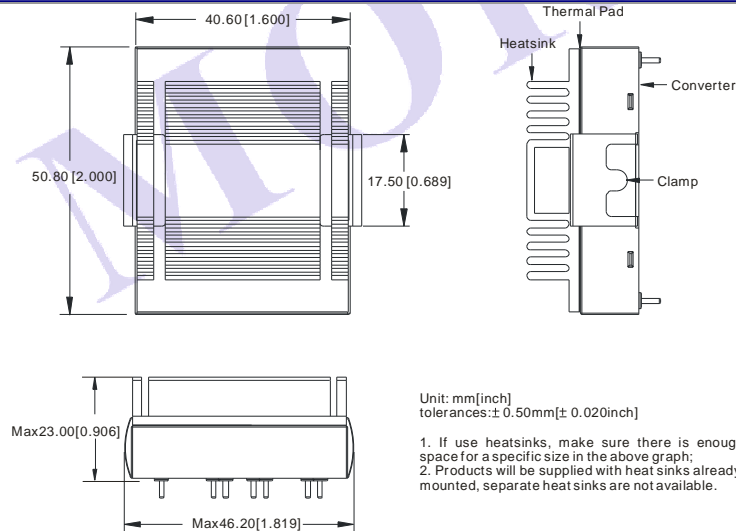


TUBE OUTLINE DIMENSIONS (WITHOUT HEATSINK)



Unit :mm[inch]
 General tolerances: ±0.50mm[±0.020inch]
 L=230mm[9.055inch] Pcs/Tube:4

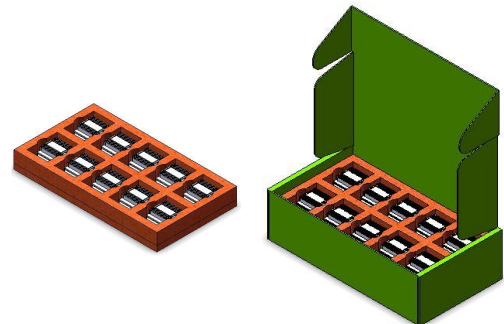
HEATSINK ASSEMBLY



Unit: mm[inch]
 tolerances:±0.50mm[±0.020inch]

1. If use heatsinks, make sure there is enough space for a specific size in the above graph;
2. Products will be supplied with heat sinks already mounted, separate heat sinks are not available.

PACKAGE DIAGRAM (WITH HEATSINK)



Package box:
 L*W*H=355*192*93mm
 Package quantity: 20pcs

NOTES

1. Input voltage can't exceed this value, or will cause the permanent damage.
2. Minimum operating current for 10% of rated current, if less than 10% rated current, output ripple may increase rapidly, the amplitude ≤ 1V.
3. Capacitor MAX load tested at nominal input voltage and constant resistive load.
4. The CTRL control pin voltage is referenced to GND.
5. Only typical model listed. Non-standard models will be different from the above, please contact us for more details.
6. All specifications are measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
7. In this datasheet, all the test methods of indications are based on corporate standards.