



VRB_LD-30W Series

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

RoHS

FEATURES

- High efficiency up to 88%
- 2:1 wide input voltage range
- 1.5KVDC input/output isolation
- Six-sided metal shield
- Short circuit protection (automatic recovery)
- Operating temperature: -40°C ~ +85°C
- Internal SMD construction
- Industry standard pinout
- MTBF>1,000,000 hours

PRODUCT PROGRAM

Part Number	Input			Output		Efficiency (%)	Capacitor Load ⁽³⁾ (max,µF)
	Voltage (VDC)			Voltage (VDC)	Current ⁽²⁾ (mA)		
	Nominal	Range	Max ⁽¹⁾				
VRB2403LD-30W	24	18 - 36	40	3.3	6000	86	6800
VRB2405LD-30W				5	6000	86	6800
VRB2412LD-30W				12	2500	87	680
VRB2415LD-30W				15	2000	87	680
VRB4803LD-30W	48	36-75	80	3.3	6000	84	6800
VRB4805LD-30W				5	6000	86	6800
VRB4812LD-30W				12	2500	88	680
VRB4815LD-30W				15	2000	87	680
VRB4824LD-30W				24	1250	88	470

Note: Add suffix "H" for heatsink mounted, for example VRB4812LD-30WH.

APPLICATION

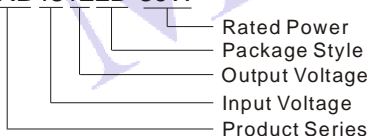
The VRB_LD-30W series offer 30W of output, with 2:1 wide input voltage of 18-36VDC, 36-75VDC and features 1500VDC isolation, over current and short-circuit protection, as well as six-sided metal shielding. All models are particularly suited to tele-communications, industrial, test equipments power.

INPUT SPECIFICATIONS

Item	Test conditions	Min.	Typ.	Max.	Units	
Start-up time		--	10	--	ms	
Under Voltage lock out	Nominal (24V)	Models ON	--	--	17.8	VDC
		Models OFF	16	--	--	
	Nominal (48V)	Models ON	--	--	35.8	
		Models OFF	33	--	--	
Input filter		L-C				
Ctrl ⁽⁴⁾	Models ON	3-40VDC				
	Models OFF	0-1.2VDC				
	Input current (Models OFF)	--	--	1	mA	

MODEL SELECTION

VRB4812LD-30W



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 Nominal input	--	±0.5	±1	
Line regulation	Input voltage from low to high 100% load	--	±0.2	±0.5	
Ripple and noise	20MHz bandwidth	--	50	120	
Transient recovery time	25%~ 50%~25% load or	--	200	500	us
Transient peak deviation	50%~75%~50%load step change	--	--	±5	%
Over current protection	Input voltage range	--	130	150	%
Short circuit protection	Input voltage range	Hiccup, automatic 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

MORNSUN Science & Technology co.,Ltd.

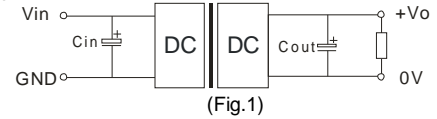
Address: 2th floor 6th building, Huangzhou Industrial District, Guangzhou, China
Tel: 86-20-38601850
Fax: 86-20-38601272
[Http://www.mornsun-power.com](http://www.mornsun-power.com)

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.	On work temperature curve	--	--	105	
Lead temperature	1.5mm from case for 10 seconds	--	--	300	
Isolation voltage	Test for 1 minute and 1mA max	1500	--	--	
Isolation resistance	Test at 500VDC	1000	--	--	MΩ
Isolation capacitance	100kHz/0.1V	--	1000	--	pF
Switching frequency	Nominal, full load	--	300	--	kHz
Cooling	Free Air Convection				
Case material	Nickel- coated copper(Six-sided)				
MTBF	MIL-HDBK-217F	1000	--	--	k hours
Weight		--	40	--	g

RECOMMENDED CIRCUIT

1) Recommended Circuit



In order to obtain better performance for the DC/DC models, it's recommended that use input and output filters as Fig.1 shown.

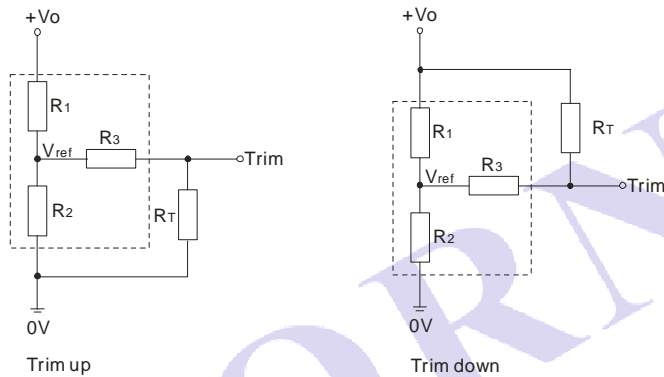
2) Recommended capacitance

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

3) No parallel connection or plug and play

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

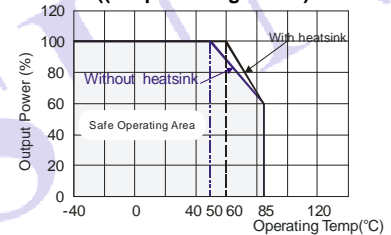
a: User-defined parameter, no actual meanings.

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

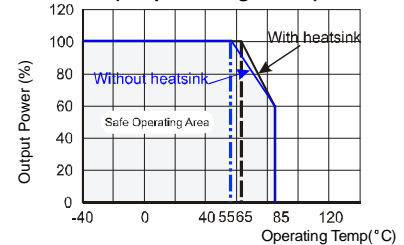
Vo Parameter	3.3 (VDC)	5 (VDC)	12 (VDC)	15 (VDC)	24 (VDC)
R1(kΩ)	4.801	2.883	10.971	14.497	24.872
R2(kΩ)	2.863	2.864	2.864	2.864	2.863
R3(kΩ)	15	10	17.8	17.8	20
Vref(V)	1.24	2.5	2.5	2.5	2.5

DERATING & EFFICIENCY CURVE

1) Temperature derating curve ((Output Voltage ≤ 5V)



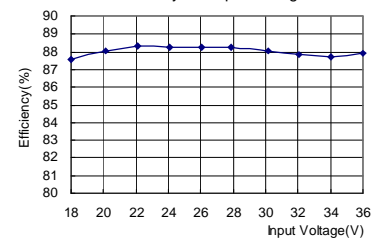
(Output Voltage > 5V)



2) Efficiency Vs Input voltage

VRB2415LD-30W

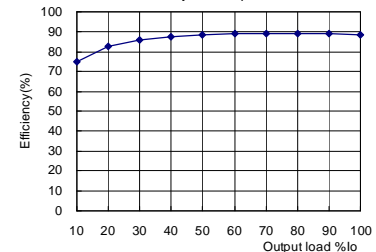
Efficiency VS Input Voltage



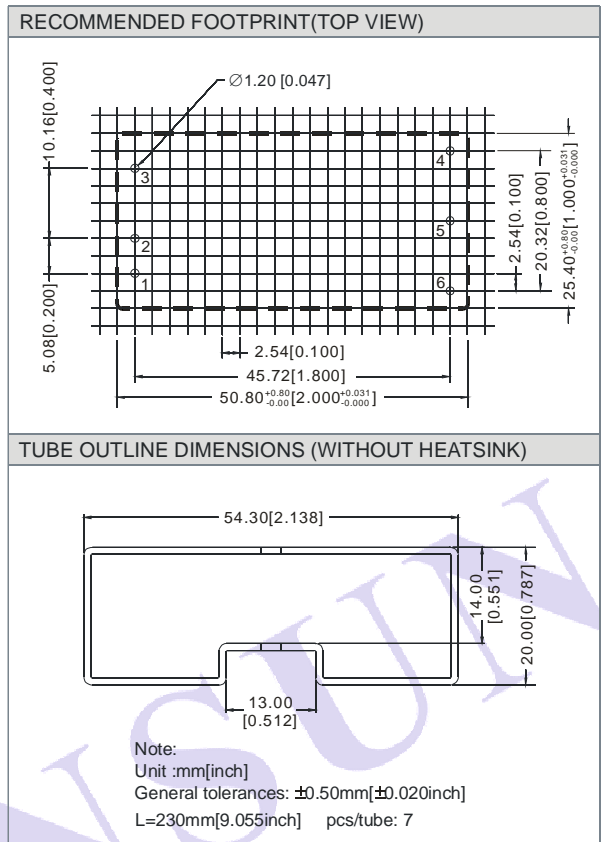
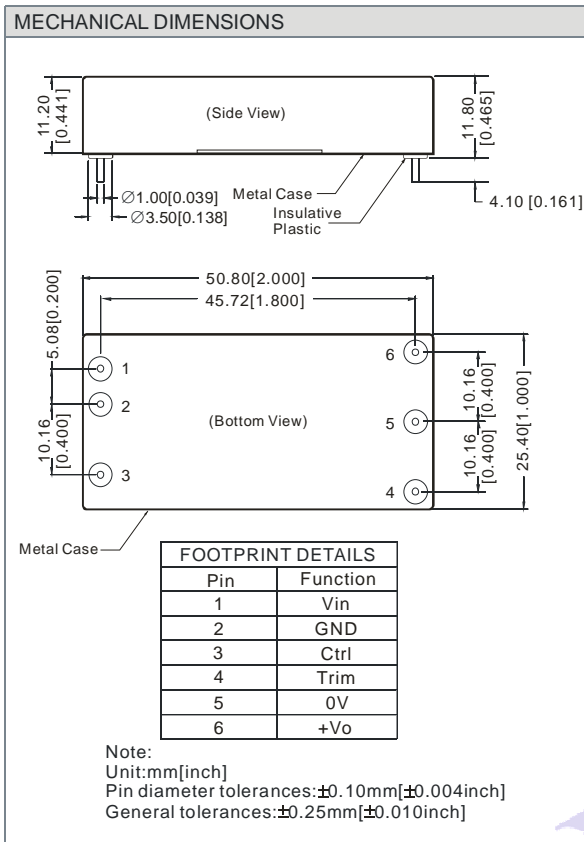
3) Efficiency Vs Output Load

VRB2415LD-30W

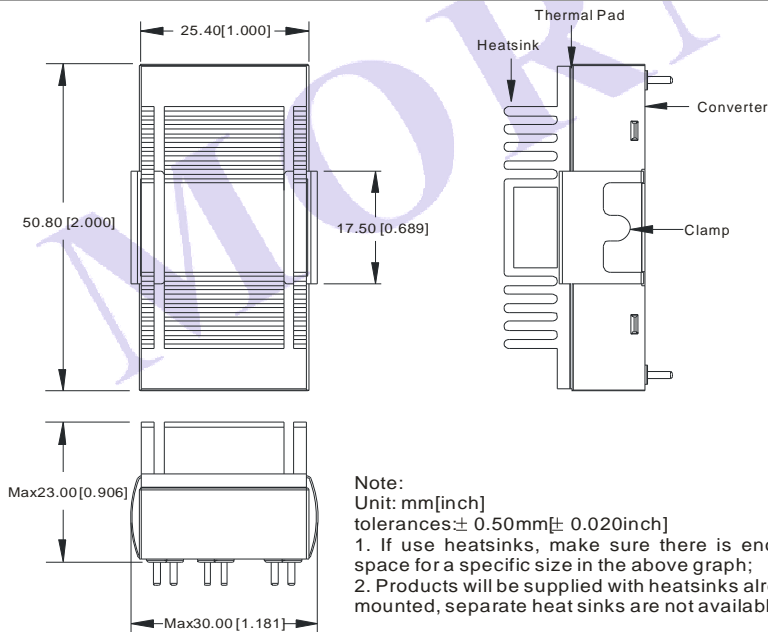
Efficiency VS Output load



OUTLINE DIMENSIONS & FOOTPRINT DETAILS



HEATSINK ASSEMBLY



PACKAGE DIAGRAM(WITH HEATSINK)



Package box:
L*W*H=255*170*80mm
Package quantity: 24pcs

NOTE

1. Input voltage above it may cause permanent damage to the device.
2. Minimum operating current is 10% of rated current, if less than 10% rated current, output ripple may increase rapidly, the amplitude $\leq 1V$.
3. Capacitor MAX load tested at nominal input voltage, full load 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 $T_A=25^\circ C$, 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.