Features/产品特点

1. Wide voltage range input (2:1)
2. Standby power consumption: 0.3W
3. Working temperature range: -40 ℃ to+85 ℃
4. Up to 85% efficiency
5. Output short circuit, overcurrent, overload protection
6. International standard pins, PCB board direct installation

1. 宽电压范围输入（ 2:1 ）
2. 待机功耗： 0.3W
3. 工作温度范围： -40℃至+85℃
4. 效率高达85%
5. 输出短路，过流，过载保护
6. 国际标准引脚， PCB 板直插安装

PHINK 维芯达

深圳市维芯达电子有限公司

Power Solutions

DC-DC Converters/转换器

VRBxxxxS-6WR3

Series/系列

5年 超长质保 | 第3代 制造工艺 | 第3代 芯片方案

官方网站：https://www.phink.net.cn

Description/概述

DC-DC module power supply, Wide voltage input, Power 6W, Isolated, Regulated, Single output,SIP packaging

DC-DC 模块电源，宽电压输入，功率6W，隔离，稳压，单路输出，SIP 封装

Model Numbering/命名规则

VRBxxxxS-6WR3

- Series/系列
- Input Voltage/输入电压
- Output Voltage/输出电压
- Product Generation/产品代别
- Output power/输出功率
- Packaging form/封装方式

Selection Guide/选型表

产品型号 Product model	输入电压 Input Voltage Standard value(range)	输出电压 Output Voltage	输出电流 Output Current (mA) (Max./Min.)	效率 Efficiency % (Min./Typ.)	最大容性负载 Maximum capacitive load (μF)
VRB0505S-6WR3(2)	5VDC (4.5-9)	5VDC	1200/0	80/83	1000
VRB0512S-6WR3(2)	5VDC (4.5-9)	12VDC	500/0	83/85	470
VRB0515S-6WR3(2)	5VDC (4.5-9)	15VDC	400/0	83/86	220
VRB0524S-6WR3(2)	5VDC (4.5-9)	24VDC	250/0	83/86	100

产品型号 Product model	输入电压 Input Voltage Standard value(range)	输出电压 Output Voltage	输出电流 Output Current (mA) (Max./Min.)	效率 Efficiency % (Min./Typ.)	最大容性负载 Maximum capacitive load (μF)
VRB1203S-6WR3(2)	12VDC (9-18)	3.3VDC	1500/0	73/77	1800
VRB1205S-6WR3(2)	12VDC (9-18)	5VDC	1200/0	80/83	1000
VRB1209S-6WR3(2)	12VDC (9-18)	9VDC	667/0	82/84	680
VRB1212S-6WR3(2)	12VDC (9-18)	12VDC	500/0	83/85	470
VRB1215S-6WR3(2)	12VDC (9-18)	15VDC	400/0	83/86	220
VRB1224S-6WR3(2)	12VDC (9-18)	24VDC	250/0	83/86	100

产品型号 Product model	输入电压 Input Voltage Standard value(range)	输出电压 Output Voltage	输出电流 Output Current (mA) (Max./Min.)	效率 Efficiency % (Min./Typ.)	最大容性负载 Maximum capacitive load (μF)
VRB2403S-6WR3(2)	24VDC (18-36)	3.3VDC	1500/0	73/77	1800
VRB2405S-6WR3(2)	24VDC (18-36)	5VDC	1200/0	80/83	1000
VRB2409S-6WR3(2)	24VDC (18-36)	9VDC	667/0	82/84	680
VRB2412S-6WR3(2)	24VDC (18-36)	12VDC	500/0	83/85	470
VRB2415S-6WR3(2)	24VDC (18-36)	15VDC	400/0	83/86	220
VRB2424S-6WR3(2)	24VDC (18-36)	24VDC	250/0	83/86	100

产品型号 Product model	输入电压 Input Voltage Standard value(range)	输出电压 Output Voltage	输出电流 Output Current (mA) (Max./Min.)	效率 Efficiency % (Min./Typ.)	最大容性负载 Maximum capacitive load (μF)
VRB4803S-6WR3(2)	48VDC (36-75)	3.3VDC	1500/0	73/77	1800
VRB4805S-6WR3(2)	48VDC (36-75)	5VDC	1200/0	80/83	1000
VRB4809S-6WR3(2)	48VDC (36-75)	9VDC	667/0	82/84	680
VRB4812S-6WR3(2)	48VDC (36-75)	12VDC	500/0	83/85	470
VRB4815S-6WR3(2)	48VDC (36-75)	15VDC	400/0	83/86	220
VRB4824S-6WR3(2)	48VDC (36-75)	24VDC	250/0	83/86	100

Input Characteristics/输入特性

Parameter/参数	Conditions/测试条件	Min.	Typ.	Max.	Units
Input current (Rated Load) 输入电流 (额定负载)	5VDC Nominal voltage input 5VDC标称电压输入	- -	1400	1600	mA
	12VDC Nominal voltage input 12VDC标称电压输入	- -	500	650	mA
	24VDC Nominal voltage input 24VDC标称电压输入	- -	260	320	mA
	48VDC Nominal voltage input 48VDC标称电压输入	- -	130	160	mA

Parameter/参数	Conditions/测试条件	Min.	Typ.	Max.	Units
Input current (No-load) 输入电流（空载）	5VDC Nominal voltage input 5VDC标称电压输入		10	30	mA
	12VDC Nominal voltage input 12VDC标称电压输入	- -	7	30	mA
	24VDC Nominal voltage input 24VDC标称电压输入	- -	7	25	mA
	48VDC Nominal voltage input 48VDC标称电压输入	- -	6	25	mA
Reflected ripple current 反射纹波电流		20	40	50	mA
Input impulse voltage 输入冲击电压	5VDC Nominal voltage input 5VDC标称电压输入	-0.7	- -	16	VDC
	12VDC Nominal voltage input 12VDC标称电压输入	-0.7	- -	25	VDC
	24VDC Nominal voltage input 24VDC标称电压输入	-0.7	- -	50	VDC
	48VDC Nominal voltage input 48VDC标称电压输入	-0.7	- -	100	VDC
Starting voltage 启动电压	5VDC Nominal voltage input 5VDC标称电压输入	- -	- -	4.5	VDC
	12VDC Nominal voltage input 12VDC标称电压输入	- -	- -	9	VDC
	24VDC Nominal voltage input 24VDC标称电压输入	- -	- -	9	VDC
	48VDC Nominal voltage input 48VDC标称电压输入	- -	- -	18	VDC
Under voltage protect 输入欠压保护	5VDC Nominal voltage input 5VDC标称电压输入	3	3.5	- -	VDC
	12VDC Nominal voltage input 12VDC标称电压输入	5.5	6.5	- -	VDC
	24VDC Nominal voltage input 24VDC标称电压输入	5.5	6.5	- -	VDC
	48VDC Nominal voltage input 48VDC标称电压输入	12	15.5	- -	VDC
Start Time 启动时间		- -	10	- -	ms
Remote control foot 遥控脚（Ctrl） （Some models are applicable） （部分型号适用）	Module On 模块开启	Ctrl hovering or connected to TTL high level (3.5-12VDC) Ctrl 悬空或接TTL 高电平(3.5-12VDC)			
	Module shutdown 模块关断	Ctrl connected to GND or low level (0-1.2VDC) Ctrl 接 GND 或低电平(0-1.2VDC)			
	Input current during shutdown 关断时输入电流	- -	6	10	mA
Input filter 输入滤波类型	PI type PI 型				

Remarks/备注: **This product does not support hot plug /此产品不支持热插拔**

Output Characteristic/输出特性

Parameter/参数	Conditions/测试条件	Min.	Typ.	Max.	Units
Output voltage accuracy 输出电压精度	0% -100% Load 0% -100%负载	- -	+/-1	+/-3	%
Linear regulation rate 线性调节率	Input voltage variation+/- 1% 输入电压变化+/-1%	- -	+/-0.2	+/-0.5	%
Load regulation rate 负载调节率	10% to 100% load 10%-100% 负载	- -	+/-0.5	+/-1.5	%
Ripple & Noise 波纹和噪声	Pure resistive load, 20MHz bandwidth 纯电阻负载，20MHz 带宽	- -	30	85	mVp-p
Dynamic response step deviation 动态响应阶跃偏差		- -	+/-3	+/-5	%
Dynamic response recovery time 动态响应恢复时间			300	500	μ s
Temperature drift coefficient 温度漂移系数	100% load 满载	- -	+/-0.03	- -	%/℃
Output overvoltage protection 输出过压保护	Full voltage range input 全电压范围输入	110	- -	160	%Vo
Output overcurrent protection 输出过流保护	Full voltage range input 全电压范围输入	110	140	190	%Io
Short Circuit Protection 输出短路保护	Full voltage range input 全电压范围输入	Sustainable, Self-healing 可持续、自恢复			

Note: 1) For product models with output voltages of ± 5VDC and ± 9VDC, the maximum output voltage accuracy is ± 5% under 0% -5% load conditions;
2) When tested under 0% -100% load working conditions, the indicator of load adjustment rate is ± 5%;
3) 0% -5% load ripple&noise less than or equal to 5% Vo. The twisted pair test method for ripple and noise can add capacitive load at the output end to reduce light load ripple.

注：1）输出电压为±5VDC、 ±9VDC 的产品型号，在 0%-5%负载条件下，输出电压精度最大值为±5%；
2）按 0%-100%负载工作条件测试时，负载调整率的指标为±5%；
3）0%-5%的负载纹波&噪声小于等于 5%Vo.纹波和噪声的测试方法双绞线测试法，可以在输出端加容性负载降低轻载纹波。

General Characteristics/通用特性

Parameter/参数	Conditions/测试条件	Min.	Typ.	Max.	Units
Isolation voltage 隔离电压	Input-output, Test time 1 minute, Leakage current less than 1 mA 输入-输出，测试时间1分钟，漏电流小于1 mA	1500	- -	- -	VDC
Insulation resistance 绝缘电阻	Input-output, Insulation voltage 500VDC 输入-输出，绝缘电压500VDC	1000	- -	- -	MΩ
Isolation capacitance 隔离电容	Input-output, 100KHz/0.1V 输入-输出，100KHz/0.1V	- -	1000	- -	pF
Working temperature 工作温度	Temperature ≥ 71 ℃ for derating (See Figure 4) 温度≥71℃时，降额使用（见图4）	-40	- -	+85	℃
Storage temperature 储存温度		-55	- -	+125	℃
Storage humidity 储存湿度	Non condensing 无凝结	- -	- -	95	%RH
Maximum temperature of the casing during operation 工作最大壳温	Ta=25 ℃, Nominal input, Full output Ta=25℃ ,标称电压输入，满载	- -	- -	100	℃

Parameter/参数	Conditions/测试条件	Min.	Typ.	Max.	Units
Soldering temperature resistance of pins 引脚耐焊接温度	The distance from the welding spot to the shell is 1.5mm, 10 seconds 焊点到壳体的距离为1.5mm，10秒	- -	- -	300	℃
Switching frequency 开关频率	Full load, Nominal input voltage 满载，标称输入电压	- -	270	- -	kHz
Vibrate 振动		10-55Hz,10G,30Min.alongX,YandZ			
Mean time between failures【MTBF】 平均无故障时间	MIL-HDBK-217F@25℃	2000	- -	- -	kHours

Physical Characteristics/物理特性

Parameter/参数	Content/内容
Housing material 外壳材料	Black flame retardant and heat-resistant plastic (UL94V-0) 黑色阻燃耐热塑料（UL94V-0）
Overall dimensions 外形尺寸	23.20 × 9.90 × 12.90 mm
Weight 重量	5.1g(Typ.)
Cooling mode 冷却方式	Natural air cooling 自然风冷

EMC Characteristics/EMC特性

Parameter	Category	Content	
EMI	Conductive distVRBance 传导骚扰	CISPR32/EN55032 CLASS A（The recommended circuit is shown in Figure 2）	
	Radiation distVRBance 辐射骚扰	CISPR32/EN55032 CLASS A（The recommended circuit is shown in Figure 2）	
EMS	Electrostatic Discharge 静电放电	IEC/EN61000-4-2 Contact ±4kV	perf. CriteriaB
	Radiated Immunity 辐射抗扰度	IEC/EN61000-4-3 10V/m	perf. CriteriaA
	Pulse group Immunity 脉冲群抗扰度	IEC/EN61000-4-4 ±2kV	perf. CriteriaB
	Surge Immunity 浪涌抗扰度	IEC/EN61000-4-5 line to line ±2kV	perf. CriteriaB
	Conducted distVRBance immunity 传导骚扰抗扰度	IEC/EN61000-4-6 3 Vr.m.s	perf. CriteriaA
	Voltage dips, and short-term interruptions immunity 电压骤降和短期中断抗扰度	IEC/EN61000-4-29 0%, 70%	perf. CriteriaB

Circuit Design and Application/电路设计与应用

Figure 1: Application circuit

图1 ：应用电路

Table 1:
Recommended Capacitive Load Values
推荐电容负载值

Vin(VDC)	Cin(μF)	Vo(VDC)	Cout(μF)
Nominal voltage 标称电压	100	Nominal voltage 标称电压	10

Figure 2: EMC Typical Recommended Circuits

图2:EMC典型推荐电路

Table 2:
Recommended Circuit Parameter Values
推荐电路参数

Category	Component	Value
EMI	MOV	14D560K
	E1/E2	100μF
	C0/C1	1μF
	CY1	1nF/2KV
	LDM1	10mH
	LDM2	10μH

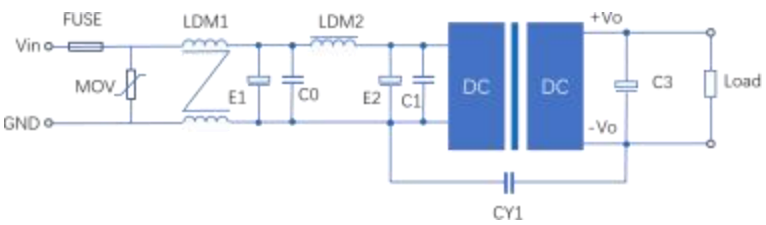
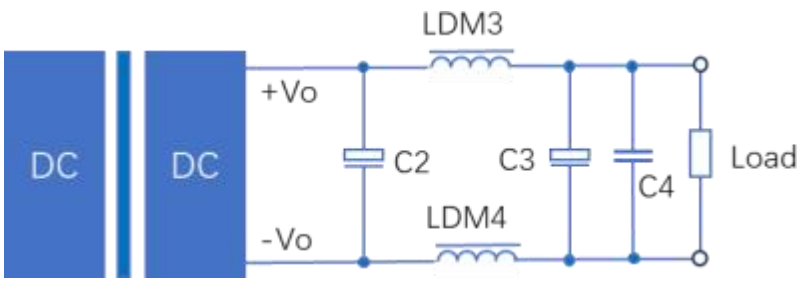


Figure 3: Ripple application and testing

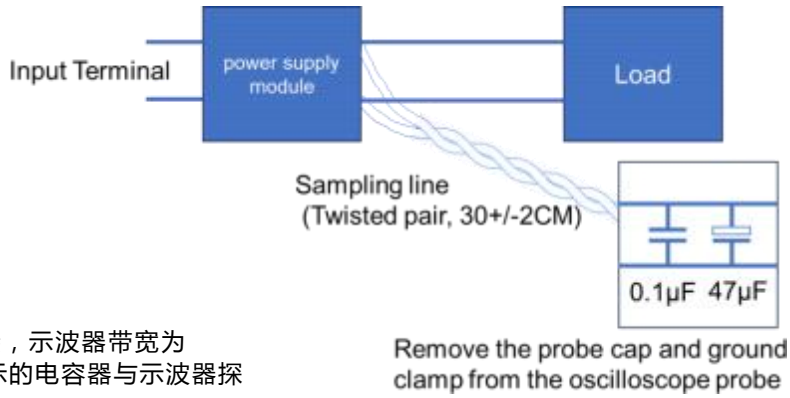
图3:纹波应用及测试



When using in situations with strict requirements for ripple and noise, it is recommended to use the circuit shown in the figure above.

在对纹波和噪声有严格要求的情况下使用时，建议使用上图所示的电路。

The testing method for ripple and noise is to use a 12 # twisted pair connection, with an oscilloscope bandwidth of 20MHZ and a 100M bandwidth oscilloscope probe. The capacitor shown in the above figure is connected in parallel to the oscilloscope probe, and the sampling mode of the oscilloscope is SAMPLE.



纹波和噪声的测试方法是使用12#双绞线连接，示波器带宽为20MHZ ，示波器探头带宽为100M。上图所示的电容器与示波器探头并联，示波器的采样模式为SAMPLE。

Product Characteristic Curve/产品特性曲线

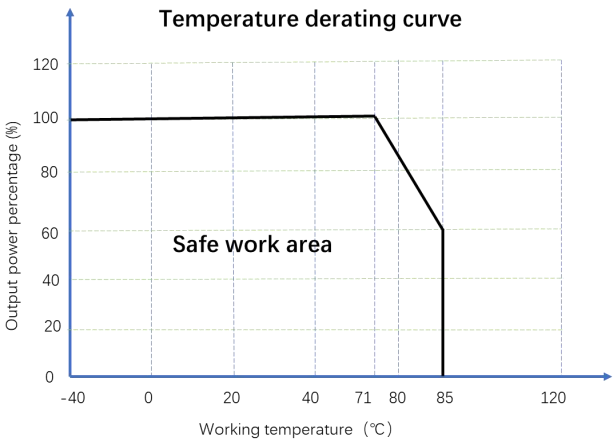


Figure 4: Temperature Derating Curve

图4 ：温度减额曲线

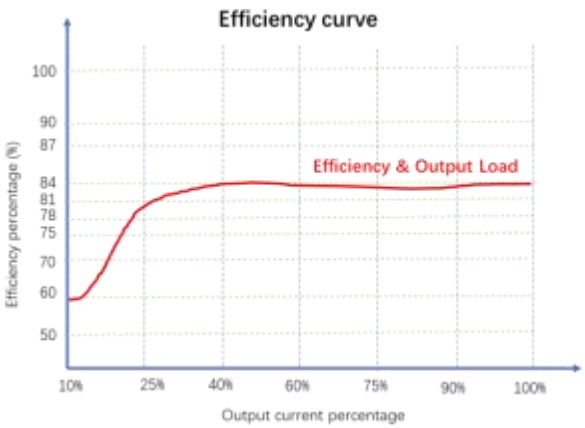


Figure 5: Efficiency VS Output Load (Nominal Voltage Input)

图5 ：效率与输出负载（标称电压输入）

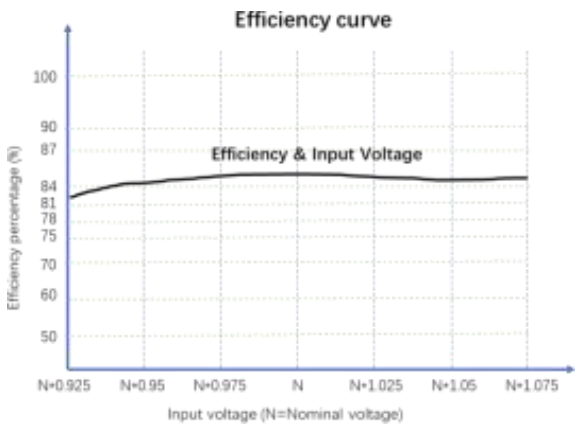


Figure 6: Efficiency VS Input Voltage (100% Load)

图6 ：效率与输入电压（ 100%负载）

Overall Dimensions and Pin Functions/外形尺寸和引脚功能

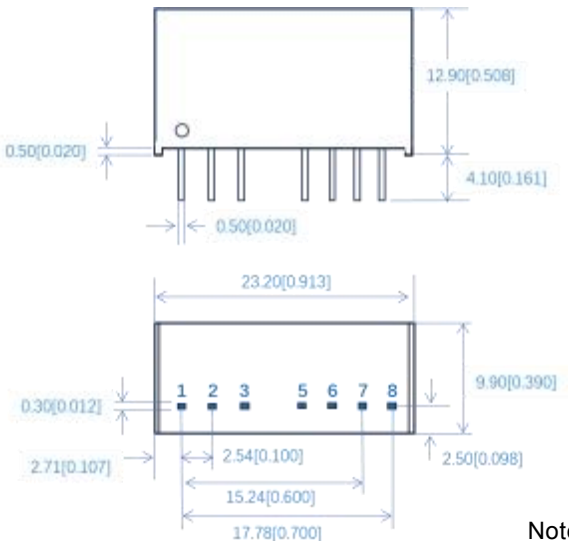


Figure 7: Overall dimensions

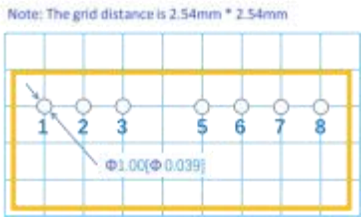


Table 3: Pin Function Table

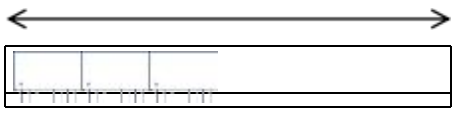
Pin	Function
1	GND
2	Vin
3	Ctrl
5	NC
6	+Vo
7	0V
8	NC

*NC不能与任何外部电路连接

*NC cannot be connected to any external circuits

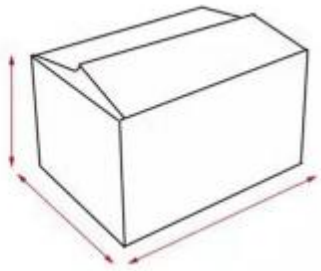
Note:
Dimensions in mm
Terminal diameter tolerance:+/-0.10
Undeclared tolerance:+/-0.50

Packaging Method/包装方式



16 Pieces/Tube

432 Pieces/Inner box



2160 Pieces/Outer box

Notes & Instructions/注释和说明

1. The input voltage shall not exceed the specified range value, otherwise permanent and unrecoverable damage may be caused;
2. Unless otherwise specified, the parameters in this manual are measured at 25 ℃, 40%~75% humidity, input nominal voltage and output pure resistance mode under full load;
3. All index test methods are based on the company's enterprise standards.
4. The copyright and the final interpretation right of the product belong to product provider.

1. 输入电压不得超过规定的范围值，否则可能造成永久性和不可恢复的损坏；
2. 除非另有规定，否则本手册中的参数是在25℃、湿度40%~75%、输入标称电压和输出纯电阻模式下满负荷测量的；
3. 所有指标测试方法均基于本公司的企业标准；
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