

Typical Performance

- Conversion efficiency 86%(Typ)
- Isolation voltage 1500Vdc
- Standby Power Loss:0.3W(Typ)
- Ultra fast startup:100ms(Typ)
- Working temperature: -40°C~+85°C
- Output short circuit, Overcurrent protection
- Metal case, Output low ripple
- International Standard Pin, PCB board in-line
- Conversion efficiency 86%(Typ)

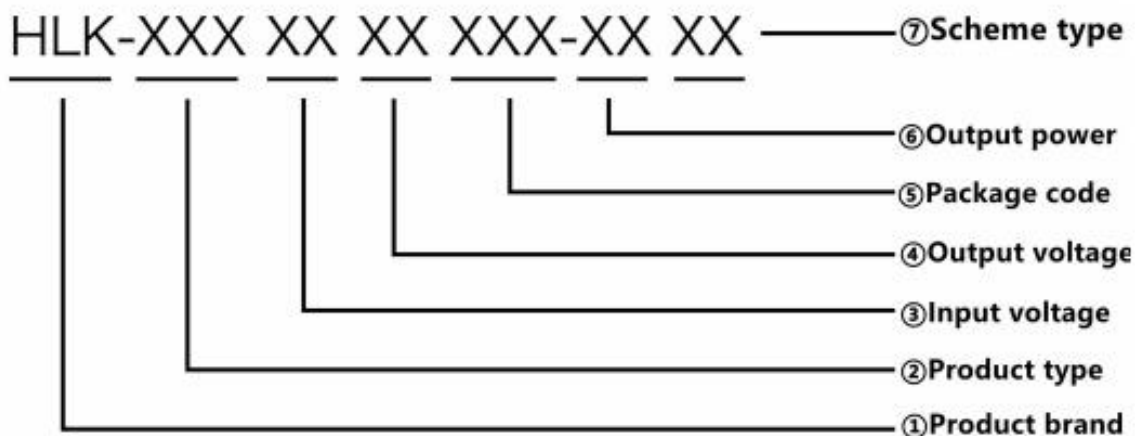
10W, Ultra Wide Voltage ,
Isolated Voltage Regulator Single/Dual Channel, DIP Package,
DC-DC Power Module



RoHS

VR(A)B_LD-10WR3 series products output power of 10W, 2:1 wide voltage input range, efficiency up to 86%, 1500VDC conventional isolation voltage, allowable operating temperature -40°C to +85°C, with output overcurrent, short circuit protection function, widely used in medical, industrial control, electric power, instrumentation, communication, railway and other fields

Product Coding Rules



Product Selection Table

Cer tifi cati on	Model ^①	Input voltage range (Vdc)		Output voltage/current		Ripple and noise	Maximum capacitive load	Efficiency @ full load
		Nominal value ^② (range value)	Maximum	Output voltage (Vdc)	Output current (mA) (Max.Min.) Max./Min.	Fully loaded (mVp-p) (TPY/Max.)	μF Max.	% (Min/TPY)
	VRB1203LD-10WR3	12	25	3.3	2000/0	50/80	4700	75/77
	VRB1205LD-10WR3	(9~18)		5	2000/0	50/80	2200	76/78

VRB1212LD-10WR3			12	833/0	50/80	1500	80/82
VRB1215LD-10WR3			15	666/0	50/80	1000	81/83
VRB1224LD-10WR3			24	416/0	50/80	470	82/84
VRA1205LD-10WR3			±5	±1000/0	30/50	1000	76/78
VRA1212LD-10WR3			±12	±416/0	50/80	800	80/82
VRA1215LD-10WR3			±15	±333/0	50/80	470	81/83
VRA1224LD-10WR3			±24	±208/0	50/80	220	82/84
VRB2403LD-10WR3			24 (18~36)	40	3.3	2000/0	50/80
VRB2405LD-10WR3	5	2000/0			50/80	2200	76/78
VRB2412LD-10WR3	12	833/0			50/80	1500	81/83
VRB2415LD-10WR3	15	666/0			50/80	1000	83/85
VRB2424LD-10WR3	24	416/0			50/80	470	84/86
VRA2405LD-10WR3			±5	±1000/0	50/80	1000	76/78
VRA2412LD-10WR3			±12	±416/0	50/80	800	81/83
VRA2415LD-10WR3			±15	±333/0	50/80	470	83/85
VRA2424LD-10WR3			±24	±208/0	50/80	220	84/86
VRB4803LD-10WR3	48 (36-72)	80	3.3	2000/0	50/80	4700	75/77
VRB4805LD-10WR3			5	2000/0	50/80	2200	76/78
VRB4812LD-10WR3			12	833/0	50/80	1500	81/83
VRB4815LD-10WR3			15	666/0	50/80	1000	83/85
VRB4824LD-10WR3			24	416/0	50/80	470	84/86
VRA4805LD-10WR3			±5	±1000/0	50/80	1000	76/78
VRA4812LD-10WR3			±12	±416/0	50/80	800	81/83
VRA4815LD-10WR3			±15	±333/0	50/80	470	83/85
VRA4824LD-10WR3	±24	±208/0	50/80	220	84/86		
VRB1D03LD-10WR3	110 (72-144)	180	3.3	2000/0	50/80	4700	75/77
VRB1D05LD-10WR3			5	2000/0	50/80	2200	76/78
VRB1D12LD-10WR3			12	833/0	50/80	1500	81/83
VRB1D15LD-10WR3			15	666/0	50/80	1000	83/85
VRB1D24LD-10WR3			24	416/0	50/80	470	84/86
VRA1D05LD-10WR3			±5	±1000/0	50/80	1000	76/78
VRA1D12LD-10WR3			±12	±416/0	50/80	800	81/83
VRA1D15LD-10WR3			±15	±333/0	50/80	470	83/85
VRA1D24LD-10WR3			±24	±208/0	50/80	220	84/86

Test conditions: Unless otherwise specified, all parameters are measured at nominal input voltage, pure resistive rated load and 25°C room temperature.

Input Features

Project	Working conditions	Min.	Typ.	Max.	Unit	
Input current (full load/no load)	12VDC nominal input series	3.3V Output	--	714/25	733/42	mA
		5.0V Output	--	1067/2	1096/42	
		12.0V Output	--	845/25	867/42	

	24VDC nominal input series	15.0V Output	--	1003/2	1028/42	
		24.0V Output	--	911/25	1015/42	
		3.3V Output	--	357/13	366/21	
		5.0V Output	--	533/13	548/21	
		12.0V Output	--	423/13	434/21	
		15.0V Output	--	502/13	514/21	
	48VDC nominal input series	24.0V Output	--	455/13	508/21	
		3.3V Output	--	179/7	183/11	
		5.0V Output	--	267/7	274/11	
		12.0V Output	--	212/7	217/11	
		15.0V Output	--	251/7	257/11	
	110VDC nominal input series	24.0V Output	--	228/7	148/11	
		3.3V Output	--	78/3	80/2	
		5.0V Output	--	116/3	119/5	
12.0V Output		--	109/3	111/5		
15.0V Output		--	209/3	214/5		
Reflected ripple current	24.0V Output	--	105/3	107/5		
	12VDC nominal input series	--	60	--	mA	
	24VDC nominal input series	--	40	--		
	48VDC nominal input series	--	30	--		
110VDC nominal input series	--	20	--			
Impulse voltage (Isec.max)	12VDC nominal input series	-0.7	--	30	VDC	
	24VDC nominal input series	-0.7	--	50		
	48VDC nominal input series	-0.7	--	100		
	110VDC nominal input series	-0.7	--	200		
Start voltage	12VDC nominal input series	--	--	9	VDC	
	24VDC nominal input series	--	--	18		
	48VDC nominal input series	--	--	36		
	110VDC nominal input series	--	--	72		
Input under-voltage protection	12VDC nominal input series	--	--	--		
	24VDC nominal input series	--	--	--		
	48VDC nominal input series	--	--	--		
	110VDC nominal input series	--	--	--		
Start time	12VDC nominal input series	-	100	-	mS	
Input filter type	24VDC nominal input series	PI Type				
Hot plug	48VDC nominal input series	Not support				
CNT (Ctrl) *	110VDC nominal input series	Ctrl dangling or TTL high level (3.5-12VDC)				
	12VDC nominal input series	Ctrl Connect to GND or low level (0-1.2VDC)				
	24VDC nominal input series	-	0	1	mA	

Note: * The voltage of the Ctrl control pin is relative to the input pin GND, this series of products does not have this function.

Output Characteristics

Project	12VDC nominal input series 24VDC nominal input series	+Vo1			-Vo2		
		Min.	Typ.	Max.	Min.	Typ.	Max.
Output load	48VDC nominal input series	0%	-	100%	0%	-	100%
Output voltage accuracy	110VDC nominal input series	-	±1.0%	±2.0%	-	±2.0%	±3.0%
Linear adjustment rate	12VDC nominal input series	-	±0.2%	±0.5%	-	±1.5%	±2%
Load regulation	24VDC nominal input series	-	±0.5%	±1%	-	±4.0%	±5.0%
Ripple & Noise	48VDC nominal input series	-	50 mVp-p	80 mVp-p	-	50 mVp-p	80 mVp-p
Turn on delay time	110VDC nominal input series	-	100ms	-	-	100ms	-
Output Current Voltage	Input voltage range	-	No adjustment end	-	-	No adjustment end	-
Dynamic response step deviation	25% nominal load step	-	±3.0%	±5.0%	-	±3.0%	±5.0%
Dynamic response recovery time		-	300µs	500µs	-	300µs	500µs
Output over voltage protection	Universal AC input	-	-	-			
Output over-current protection	Input voltage range	110%Io	150%Io	200%Io			
Output short circuit protection	Input voltage range	Sustainable, self-healing					

Note: ① For product models with output voltage of ±5VDC and ±9VDC, the maximum accuracy of output voltage is ±5% under the condition of 0% to 5% load;

② According to 0%-100% load working conditions test, load adjustment rate index is ±5%;

(3) 0%-5% load ripple & noise is less than or equal to 5%Vo. Test methods for ripple and noise The twisted pair test method can add capacitive load at the output end to reduce light load ripple

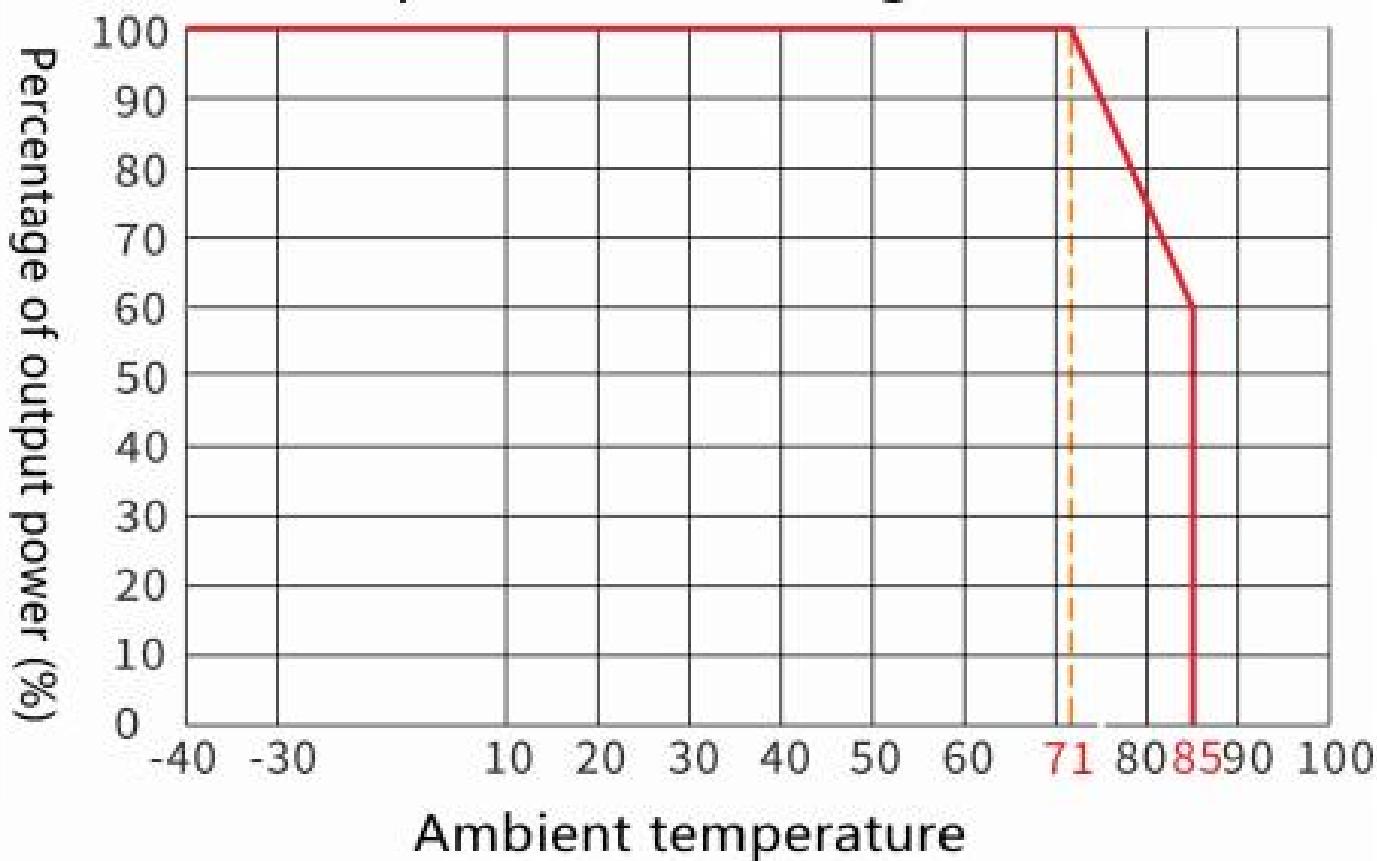
General Characteristics

Project	Working conditions	Min	Typ.	Max.	Unit
Insulation voltage	Input-output, test time: 1m, leakage current <	150	--	--	VDC
Insulation resistance	Input-output, isolation voltage: 500VDC	100	--	--	MΩ
Isolation	Input-output, 100KHz/0.1V	--	1000	--	pF

Working temperature	Please refer to the temperature derating curve for use	-40	--	+85	°C
Storage temperature		-40	--	+125	
Shell temperature		--	--	+100	
Storage humidity	No condensation	5	--	95	%RH
Pin Soldering	The solder joint is 1.5mm away from the shell, 10s	--	--	+300	°C
Switching frequency	PWM mode	--	250	--	KHz
Vibration		10-55Hz,10G,30Min.alongX,YandZ			
Shell material		Aluminum alloy shell			
Minimum time between	MIL-HDBK-217F@25°C	--	2X10 ⁵	--	Hrs

Product Characteristics Curve

Temperature derating curve



Reference Design

1、 Recommended test circuit

Generally recommended capacitors: C1: 47-100 μ F; C2、 C3: 10-22 μ F.

All DC/DC converters of this series are tested in accordance with the recommended test circuit (FIG. 1) before they are shipped.

If the input and output ripple is required to be further reduced, the input and output external capacitors C1, C2 and C3 can be increased or the capacitors with small series equivalent impedance value can be selected, but the capacitance value cannot be greater than the maximum capacitive load of the product.

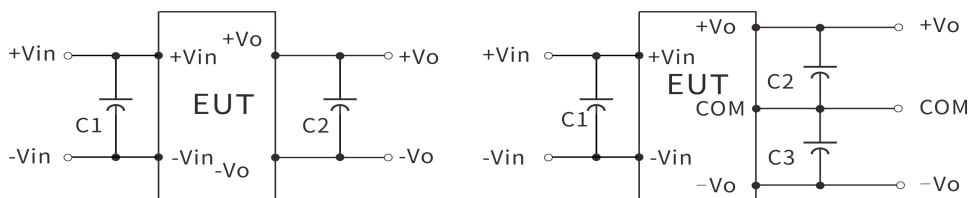
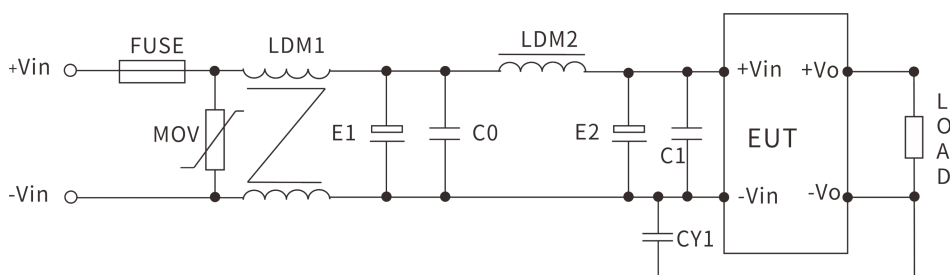


Figure 1

2、 EMC solutions -- Recommended circuits



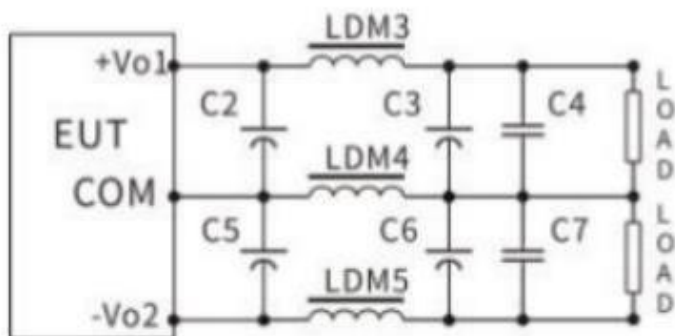
Parameter Recommendation :

Device code	12V input product	24V input product	48V input product	110V input product
FMSE fuse	Connect the corresponding fuse according to customer's requirement			
MOV varistor	14D330K	14D560K	14D101K	14D201K
LDM1 common mode inductor	2mH	10mH	15mH	30mH
E1、 E2 electrolytic capacitors	470 μ F/50V	220 μ F/50V	100 μ F/100V	63 μ F/200V
LDM2 differential mode inductance	4.7 μ H	10 μ H	15 μ H	68 μ H
CY1 safety gauge Y2 capacitance	1nF/250Vac			

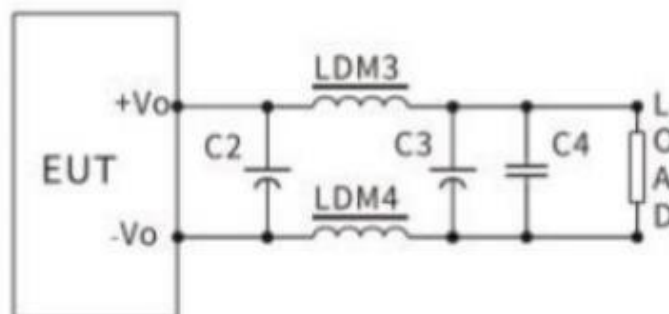
3、 Output filtering peripheral recommended circuit

When the requirements of ripple and noise are general, it is recommended to use C2 and C5 only. When the requirements of ripple and noise are strict; The circuit above is recommended.

Positive and negative dual output products



Single output product



Note: 1. C2, C3, C5 and C6 use high frequency and low resistance electrolytic capacitors, and the total capacity shall not exceed the maximum capacitive load marked in the manual; otherwise, the module will fail to start normally.

2. When the capacitive load is applied, the minimum load of 3% must be ensured; otherwise, the module output will be abnormal.

3. LDM5 is only used for double output products

Parameter Recommendation :

LDM3 inductance	0.47 μ H	1 μ H	2.2 μ H	2.2 μ H	4.7 μ H
LDM4 inductance	0.47 μ H	1 μ H	2.2 μ H	2.2 μ H	4.7 μ H
LDM5 inductance	-	1 μ H	2.2 μ H	2.2 μ H	4.7 μ H
C2、C3 electrolytic capacitor	220 μ F	220 μ F	100 μ F	100 μ F	68 μ F
C5、C6 electrolytic capacitor	220 μ F	220 μ F	100 μ F	100 μ F	68 μ F
C4、C7 electrolytic capacitor	1 μ F/50V				

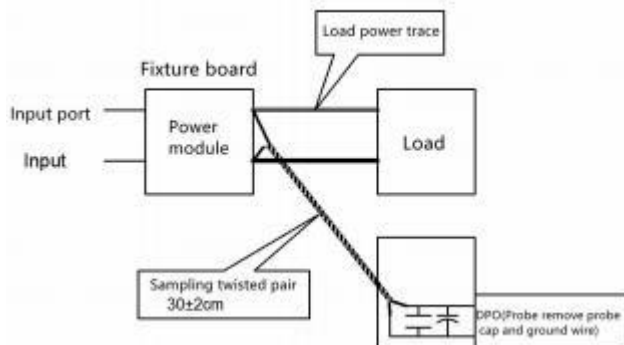
3、Ripple & noise test :(twisted pair method 20MHZ bandwidth)

Test method:

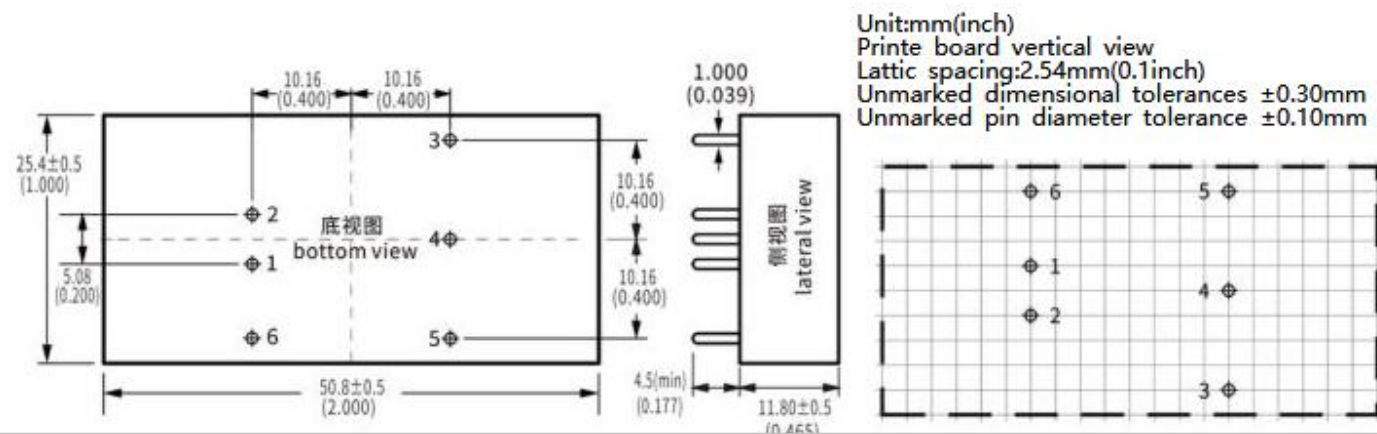
1. Ripple noise is connected by 12# twisted pair wire, oscilloscope bandwidth is set as 20MHz, 100M bandwidth probe, and 0.1uF polypropylene capacitor and 47uF high frequency and low resistance electrolytic capacitor are connected in parallel on the probe end. Sample sampling mode is used for oscilloscope sampling.

2. Schematic diagram of output ripple noise test:

The power input is connected to the input power supply and the power output is connected to the electronic load via the jig board. The test is directly sampled from the power output port with a 30cm±2cm sampling line alone. Power line according to the size of the output current to select the corresponding wire diameter of the insulated leather wire.



Package Size and Pin Function Diagram



Single(S)	1	2	3	4	5	6
	-Vin	+Vin	+Vo	Trim	GND	NC
Dual(D)	Input negative	Input positive	Output positive	Voltage regulator end	Output ground	No contact
	-Vin	+Vin	+Vo1	COM	-Vo2	NC
	Input negative	Input positive	Output positive1	Commons	Output negative 2	No contact

* Note: If the pin definition of the power module is not consistent with the selection manual, the label on the object shall prevail.

Package Description

Package code	LxWxH	
B1	50.8X25.4X11.0mm	2.000X1.000X0.433inch

Contact

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