

Typical Performance

- Ultra wide range input (2:1), 10W output
- Conversion efficiency 91% (Typ)
- Isolation voltage 1500Vdc
- Standby power loss: 0.036W(Typ)
- Ultra fast startup: 1ms(Typ)
- Working temperature: -40°C ~ +85°C
- Input undervoltage, output short circuit, overcurrent, overvoltage protection
- Metal housing, low output ripple

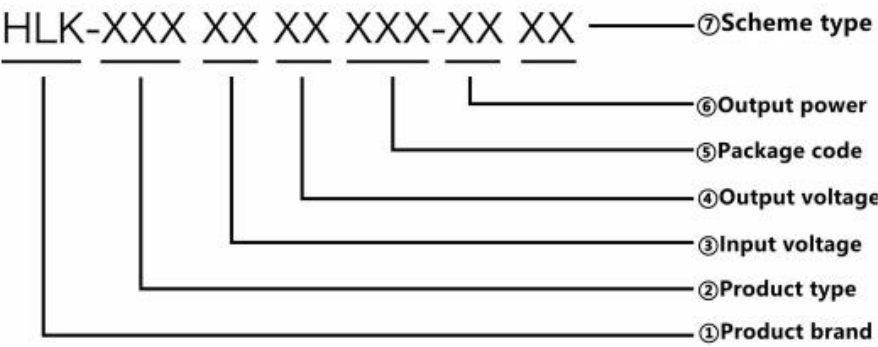
10W, Ultra Wide Voltage Input, Isolated Regulated Single/Dual, DIP Package, DC-DC Modular Power Supply



RoHS

VR(A)B_YMD-10WR3 series products output power of 10W, 2:1 wide voltage input range, efficiency up to 91%, 1500VDC conventional isolation voltage, allowable operating temperature -40 °C to +85 °C, with input under-voltage protection, output over-voltage, over-current, short-circuit protection, bare metal to meet the CISPR32/EN55032CLASSA. Widely used in medical, industrial control, electric power, instrumentation, communication, railroad and other fields.

Product Coding Rules



Product Selection Table

Product model	Input voltage range (Vdc)		Output voltage/current		Ripple and noise	Max. capacitive load	Efficiency @ full load
	Nominal value (range value)	Max.	Output voltage (Vdc)	Output current (mA) (Max.Min.)	Full load (mVp-p) (Tpy/Max.)	μF Max.	% (Min/Tpy)
VRB1203YMD-10WR3	12 (9-18)	40	3.3	2400/0	30/50	2500	80/82
VRB1205YMD-10WR3			5	2000/0	30/50	2200	83/85
VRB1212YMD-10WR3			12	833/0	50/80	470	87/89
VRB1215YMD-10WR3			15	666/0	50/80	330	88/90
VRB1224YMD-10WR3			24	416/0	50/80	220	89/91

VRA1205YMD-10WR3			±5	±1000/0	30/50	1100	83/85
VRA1209YMD-10WR3			±9	±555/0	50/80	470	84/86
VRA1212YMD-10WR3			±12	±416/0	50/80	330	86/88
VRA1215YMD-10WR3			±15	±333/0	50/80	220	88/90
VRA1224YMD-10WR3			±24	±208/0	50/80	100	89/91
VRB2403YMD-10WR3	24 (18-36)	40	3.3	2400/0	30/50	2500	80/82
VRB2405YMD-10WR3			5	2000/0	30/50	2200	83/85
VRB2409YMD-10WR3			9	1111/0	50/80	680	84/86
VRB2412YMD-10WR3			12	833/0	50/80	470	87/89
VRB2415YMD-10WR3			15	666/0	50/80	330	88/90
VRB2424YMD-10WR3			24	416/0	50/80	220	89/91
VRA2405YMD-10WR3			±5	±1000/0	30/50	1100	83/85
VRA2409YMD-10WR3			±9	±555/0	50/80	470	84/86
VRA2412YMD-10WR3			±12	±416/0	50/80	330	86/88
VRA2415YMD-10WR3			±15	±333/0	50/80	220	88/90
VRA2424YMD-10WR3			±24	±208/0	50/80	100	89/91
VRB4803YMD-10WR3	48 (36-72)	80	3.3	2400/0	30/50	2500	80/82
VRB4805YMD-10WR3			5	2000/0	30/50	2200	83/85
VRB4812YMD-10WR3			12	833/0	50/80	680	87/89
VRB4815YMD-10WR3			15	666/0	50/80	470	88/90
VRB4824YMD-10WR3			24	416/0	50/80	220	89/91
VRA4805YMD-10WR3			±5	±1000/0	30/50	1100	83/85
VRA4812YMD-10WR3			±12	±416/0	50/80	330	86/88
VRA4815YMD-10WR3			±15	±333/0	50/80	220	88/90
VRA4824YMD-10WR3			±24	±208/0	50/80	100	89/91
VRB1D03YMD-10WR3	110 (72-144)	180	3.3	2400/0	30/50	2500	80/82
VRB1D05YMD-10WR3			5	2000/0	30/50	2200	83/85
VRB1D12YMD-10WR3			12	833/0	50/80	680	87/89
VRB1D15YMD-10WR3			15	666/0	50/80	470	88/90
VRB1D24YMD-10WR3			24	416/0	50/80	220	89/91
VRA1D05YMD-10WR3			±5	±1000/0	30/50	1100	83/85
VRA1D12YMD-10WR3			±12	±416/0	50/80	330	86/88
VRA1D15YMD-10WR3			±15	±333/0	50/80	220	88/90
VRA1D24YMD-10WR3			±24	±208/0	50/80	100	89/91

Note: 1. Due to limited space, the above is only a typical product list, if you need products other than those listed, please contact our sales department.

2. Maximum capacitive load indicates the maximum capacitive load that can be connected to +Vo or -Vo. If this value is exceeded, the product will not start normally.

3. Input voltage exceeding the maximum value may cause permanent damage to the product.

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

Input Features

Items	Working conditions		Min.	Typ.	Max.	Unit.
Input current (full load/no load)	12VDC nominal input series, nominal input voltage	3.3V	-	804/2	826/4	mA
		Others	-	980/2	1004/4	
	24VDC nominal input series, nominal input voltage	3.3V	-	402/1	413/2	
		Others	-	490/1	502/2	
	48VDC nominal input series, nominal input voltage	3.3V	-	201/0.5	207/1	
		Others	-	245/0.5	251/1	
	110VDC nominal input series, nominal input voltage	3.3V	-	87/0.3	90/0.5	
		Others	-	100/0.3	109/0.5	
Reflected ripple current	12VDC nominal input series, nominal input voltage		-	60	-	mA
	24VDC nominal input series, nominal input voltage		-	40	-	
	48VDC nominal input series, nominal input voltage		-	30	-	
	110VDC nominal input series, nominal input voltage		-	20	-	
Impulse voltage (Isec.max)	12VDC nominal input series, nominal input voltage		-0.7		30	
	24VDC nominal input series, nominal input voltage		-0.7	-	50	
	48VDC nominal input series, nominal input voltage		-0.7	-	100	
	110VDC nominal input series, nominal input voltage		-0.7	-	200	
Start voltage	12VDC nominal input series, nominal input voltage				9	VDC
	24VDC nominal input series, nominal input voltage		-	-	9	
	48VDC nominal input series, nominal input voltage		-	-	18	
	110VDC nominal input series, nominal input voltage		-	-	40	
Input under-voltage protection	12VDC nominal input series, nominal input voltage		5.5	6.5		
	24VDC nominal input series, nominal input voltage		5.5	6.5	-	
	48VDC nominal input series, nominal input voltage		12	15.5	-	
	110VDC nominal input series, nominal input voltage		32	36	-	
Start time	Nominal input voltage and constant resistance load		-	1	-	mS
Input filter type			PI Type			
Hot plug			Not support			
CNT (Ctrl)*	Module turned on		Ctrl dangling or TTL high level (3.5-12VDC)			
	Module turned off		Ctrl connect to GND or low level (0-1.2VDC)			
	Input current at shutdown		-	0	1	mA

Output Features

Items	Working and testing conditions	+Vo1			-Vo2		
		Min.	Typ.	Max.	Min.	Typ.	Max.
Output load	Load percentage	0%	-	100%	0%	-	100%
Output voltage accuracy		-	±1.0%	±2.0%	-	±2.0%	±3.0%
Linear adjustment rate	Input voltage range	-	±0.2%	±0.5%	-	±1.5%	±2%
Load regulation	20%~100% rated load, balance the load	-	±0.5%	±1%	-	±4.0%	±5.0%

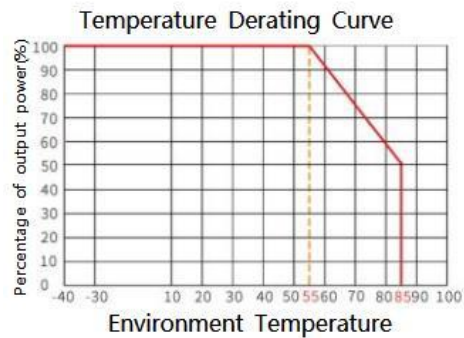
Ripple & Noise	Pure resistive load, 20MHz bandwidth, peak-to-peak	-	50mVp-p	80mVp-p	-	50mVp-p	80mVp-p
Turn on delay time		-	1ms	-	-	1ms	-
Output current voltage	Input voltage range	-	No adjustment end	-	-	No adjustment end	-
Dynamic response step deviation	25% nominal load step	-	±3.0%	±5.0%	-	±3.0%	±5.0%
Dynamic response recovery time		-	300μs	500μs	-	300μs	500μs
Output over voltage protection	Full voltage range input	110%Vo	-	160%Vo			
Output over-current protection	Full voltage range input	110%Io	150%Io	200%Io			
Output short circuit protection	Full voltage range input	Sustainable, self-recovery					

- ① Product models with output voltage of ±5VDC and ±9VDC, the maximum value of output voltage accuracy is ±5% under 0%-5% load conditions;
- ② The index of load adjustment rate is ±5% when tested under 0%-100% load working conditions;
- ③ 0%-5% load ripple & noise is less than or equal to 5% Vo. Ripple and noise test method twisted pair test method, you can add capacitive load at the output to reduce light load ripple.

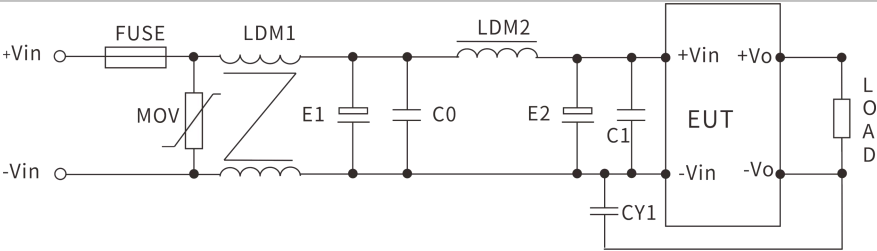
General Characteristics

Items	Working conditions	Min.	Typ.	Max.	Unit
Insulation voltage	Input-output, test time:1m, leakage current < 1mA	1500	--	--	VDC
Insulation resistance	Input-output, isolation voltage: 500VDC	1000	--	--	MΩ
Isolation capacitance	Input-output, 100KHz/0.1V	--	1000	--	pF
Working temperature	Use the reference temperature derating curve	-40	--	+85	°C
Storage temperature		-40	--	+125	
Shell temperature rise		--	--	+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 plastic bottom cover			
Minimum time between failures	MIL-HDBK-217F@25°C	--	2X10 ⁵	--	Hrs

Product Characteristics Curve



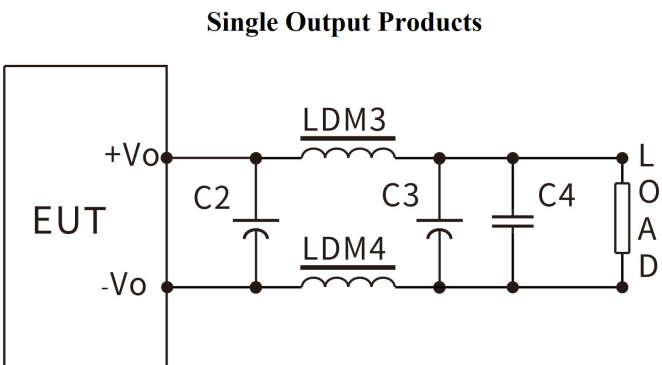
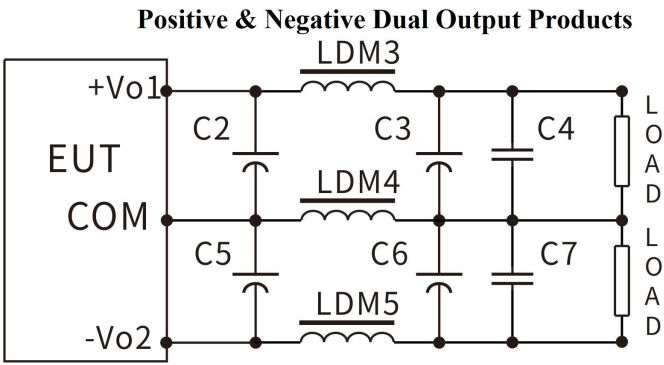
EMC Peripheral Recommended Circuits



Recommended parameters: the following are typical parameters, please adjust according to the actual use of the environment accordingly.

Device code	12V input	24V input	48V input	110V input
FMSE fuse	Connect the corresponding fuse according to customer's requirement			
MOV Varistor	14D560K	14D560K	14D101K	14D201K
LDM1 common mode inductor	10mH	10mH	15mH	30mH
E1, E2 electrolytic capacitors	100μF/50V	100μF/50V	100μF/100V	63μF/200V
C0, C1 ceramic capacitors	1μF/50V	1μF/50V	1μF/100V	0.47μF/250V
LDM2 differential mode inductor	10μH	10μH	15μH	68μH
CY1 safety Y2 capacitor	1nF/250Vac			

Output Filter Peripheral Recommended Circuit



For ripple & noise requirements in general, the peripheral recommended to use only C2, C5 can be; for ripple & noise requirements of strict; recommended to use the above circuit.

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

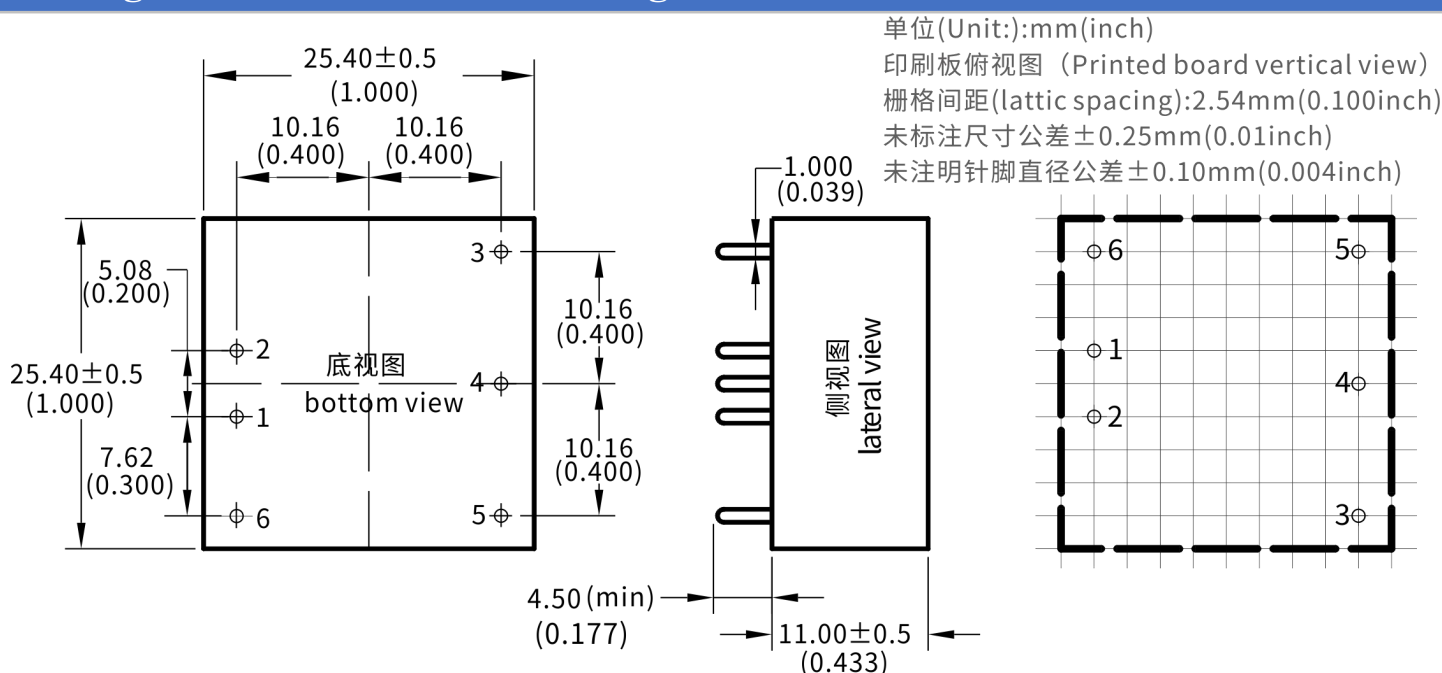
2. 3% minimum load must be guaranteed for capacitive load, otherwise it will cause module output abnormality.

3. LDM5 is only used for dual output products.

Parameter recommendation:

Device code	3.3V output	±5V or 5V output	±9V/12V or 9V/12V output	±15V or 15V output	±24V or 24V output
LDM3 inductance	0.47μH	1μH	2.2μH	2.2μH	4.7μH
LDM4 inductance	0.47μH	1μH	2.2μH	2.2μH	4.7μH
LDM5 inductance	-	1μH	2.2μH	2.2μH	4.7μH
C2, C3 electrolytic capacitor	220μF	220μF	100μF	100μF	68μF
C5, C6 electrolytic capacitor	220μF	220μF	100μF	100μF	68μF
C4, C7 electrolytic capacitor	1μF/50V				

Package Size and Pin Function Diagram



*** Note: If the definition of each pin of the power supply module is not in accordance with the selection manual, the label on the physical label shall prevail.**

	1	2	3	4	5	6
Single(S)	-Vin	+Vin	+Vo	NP	-Vo	CTRL
Dual(D)	-Vin	+Vin	+Vo1	COM	-Vo2	CTRL

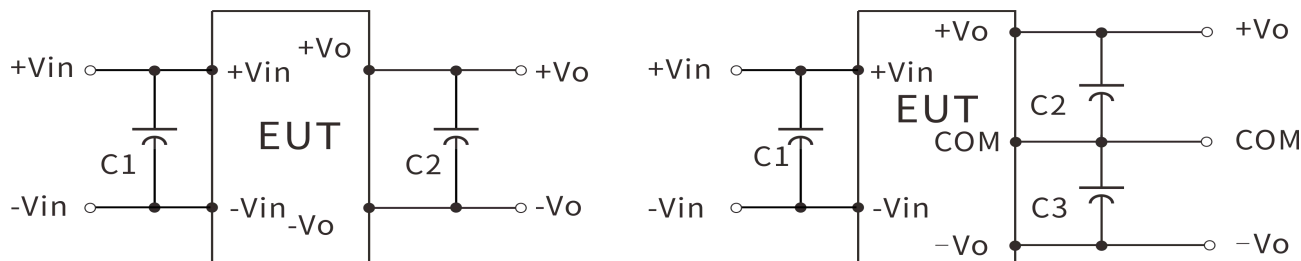
Package Description

Package code	LxWxH	
A3	25.4X25.4X11.0mm	1.000X1.000X0.433inch

Test Application Reference

Recommended test circuit 1, DC/DC test circuit:

General recommended capacitance: C1: 47-100 μ F; C2, C3: 10-22 μ F.



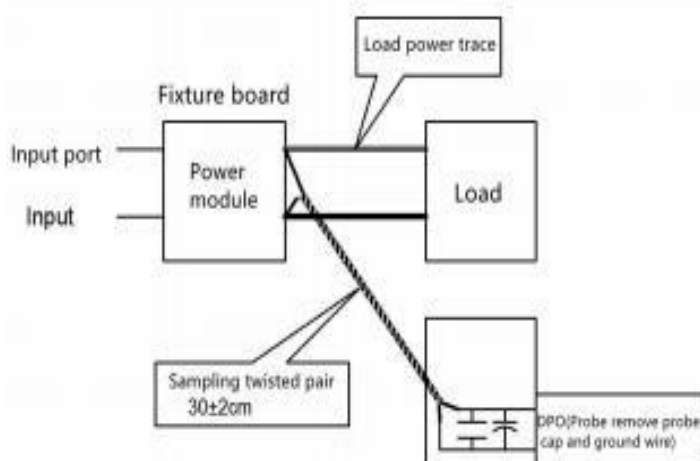
Ripple & Noise Test: (Twisted Pair Method 20MHZ Bandwidth)

Test method:

1. Ripple noise is the use of 12 # twisted pair connection, oscilloscope bandwidth is set to 20MHz, 100M bandwidth probe, and in the probe end in parallel with 0.1 μ F polypropylene capacitors and 47 μ F high-frequency low-resistance electrolytic capacitors, the oscilloscope sampling using Sample sampling mode.

2. Output ripple noise test schematic:

Connect the power input to the input power supply, the power output is connected to the electronic load through the fixture board, and the test is conducted with a 30cm $\pm$ 2cm sampling line directly from the power output port. Power line according to the size of the output current to select the appropriate wire diameter of the wire with insulation.



Contact

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