Typical Performance

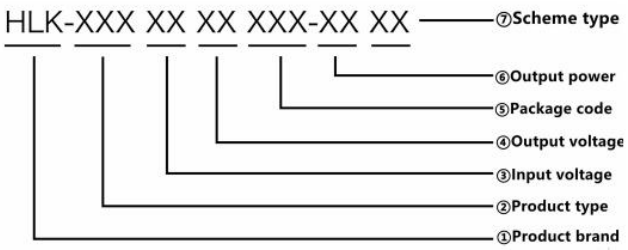
- Ultra wide range input (4:1), 15W output
- Conversion efficiency 91% (Typ)
- Isolation voltage 1500 Vdc
- Ultra-low standby power consumption: 0.036W
- Ultra-fast startup: 1ms (Typ)
- Operating temperature range: -40°C~+85°C
- Input undervoltage protection, output short circuit, overcurrent, overvoltage protection
- Metal housing, low output ripple
- International standard pins, PCB direct mounting

15W, Ultra Wide Voltage Input, Isolated Regulated Single/Dual, DIP Package, DC-DC Modular Power Supply

RoHS

UR(A)B_YMD-15WR3 series products output power of 15W, 4:1 wide voltage input range, efficiency up to 91%, 1500VDC conventional isolation voltage, allowable operating temperature -40 ℃ to +85 ℃, with input under-voltage protection, output over-voltage, over-current, short-circuit protection, bare metal to meet the CISPR32/ EN55032 CLASSA. Widely used in medical, industrial control, electric power, instrumentation, communication, railroad and other fields.

Product Coding Rules



Product List

Product model	Input voltage range (Vdc)		Output voltage/current		Ripple and noise	Max. capacitive load	Efficiency @ full load
	Nominal value (range value)	Max. value	Output voltage (Vdc)	Output current (mA)	Full load (mVp-p) (Typ./Max.)	μF Max.	% (Min./Typ.)
URB2403YMD-15WR3	24 (9~36)	40	3.3	4000/0	30/50	4700	86/88
URB2405YMD-15WR3			5	3000/0	30/50	4700	88/90
URB2412YMD-15WR3			12	1250/0	50/80	100	88/90
URB2415YMD-15WR3			15	1000/0	50/80	820	89/91
URB2424YMD-15WR3			24	625/0	50/80	270	89/91
URA2405YMD-15WR3			±5	±1500/0	30/50	1500	85/87
URA2412YMD-15WR3			±12	±625/0	50/80	470	88/90
URA2415YMD-15WR3			±15	±500/0	50/80	330	88/90
URA2424YMD-15WR3			±24	±313/0	50/80	200	86/88
URB4803YMD-15WR3	48 (18-75)	80	3.3	4000/0	30/50	4700	86/88
URB4805YMD-15WR3			5	3000/0	30/50	4700	88/90
URB4812YMD-15WR3			12	1250/0	50/80	1000	88/90
URB4815YMD-15WR3			15	1000/0	50/80	820	89/91

URB4824YMD-15WR3			24	625/0	50/80	270	89/91
URA4805YMD-15WR3	48 (18-75)	80	±5	±1500/0	30/50	1500	84/86
URA4812YMD-15WR3			±12	±625/0	50/80	470	87/89
URA4815YMD-15WR3			±15	±500/0	50/80	330	87/89
URA4824YMD-15WR3			±24	±313/0	50/80	200	88/90

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℃.

Input Features

Items	Working conditions		Min.	Typ.	Max.	Unit
Input current (full load/no load)	24VDC nominal input series, nominal input voltage	3.3V	-	625/300/50	640/50	mA
		5V	-	694/30	710/50	
		12V	-	694/6947/55	710/35	
		15V	-	687/6937/15	703/15	
		24V	-	687/10937/15	703/20	
		±5V	-	718/25	735/35	
		±12V	-	686/1.5937/15	702/2	
		±15V	-	686/1.5937/15	702/2	
		±24V	-	686/1.5937/15	702/2	
	48VDC nominal input series, nominal input voltage	3.3V	-	313/15	320/30	
		5V	-	348/15	356/30	
		12V	-	344/3	352/11	
		15V	-	344/3	352/11	
		24V	-	344/4	352/11	
		±5V	-	359/1	368/1.5	
		±12V	-	343/1	351/1.5	
		±15V	-	343/1	351/1.5	
		±24V	-	343/1	351/1.5	
Reflected ripple current	Nominal input voltage		-	30	-	mA
Impulse voltage (1sec.max)	24VDC nominal input series		-0.7	-	50	VDC
	48VDC nominal input series		-0.7	-	100	
Start voltage	24VDC nominal input series		-	-	9	
	48VDC nominal input series		-	-	18	
Input under-voltage protection	24VDC nominal input series		5.5	6.5	-	
	48VDC nominal input series		12	15.5	-	
Start time	Nominal input voltage and constant resistance		-	10	-	mS
Input filter type			PI type			
Hot plug			Not support			

CNT (Ctrl)*	Module turned on	Ctrl suspended or connected to TTL high (3.5-12VDC)			
	Module turned off	Ctrl to GND or low (0-1.2VDC)			
	Input current at shutdown	-	2	7	mA

Note: *The voltage at the Ctrl control pin is relative to the input pin, GND.

Output Features

Items	Working and testing conditions	+Vo1			-Vo2		
		Min.	Typ.	Max.	Min.	Typ.	Max.
Output load	Percentage of load	0%	-	100%	0%	-	100%
Output voltage accuracy		-	±1.0%	±2.0%	-	±2.0%	±3.0%
Linear rate of adjustment	Input voltage range	-	±0.2%	±0.5%	-	±1.5%	±2%
Load adjustment ratio	20%~100% rated load,balance the load	-	±0.5%	±1%	-	±4.0%	±5.0%
Ripple & Noise	Pure resistive load, 20MHz bandwidth, peak to peak, 5%~100% load	-	50 mVp-p	80 mVp-p	-	50 mVp-p	80 mVp-p
Start delay time		-	1ms	-	-	1ms	-
Output voltage adjustment	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 The maximum value of output voltage accuracy is ±5% under 0%-5% load conditions for product models with output voltage of ±5VDC and ±9VDC; ② The index of load adjusting rate is ±5% when tested under 0%-5% 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 on the output to reduce the light load ripple.

General Characteristics

Items	Working conditions	Min.	Typ.	Max.	Unit
Insulation voltage	Input-Output, test time 1 minute, leakage current less than 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	℃
Storage temperature		-40	--	+125	

Shell temperature rise		--	--	+100	
Storage humidity	No condensation	5	--	95	%RH
Solder resistance	The solder joint is 1.5mm away from the shell,	--	--	+300	℃
Switching frequency	PWM mode	--	250	--	KHz
Vibration		10-55Hz,10G,30Min.alongX,YandZ			
Shell material		Aluminum alloy shell			
Minimum time between failures	MIL-HDBK-217F@25℃	--	$2X10^5$	--	Hrs

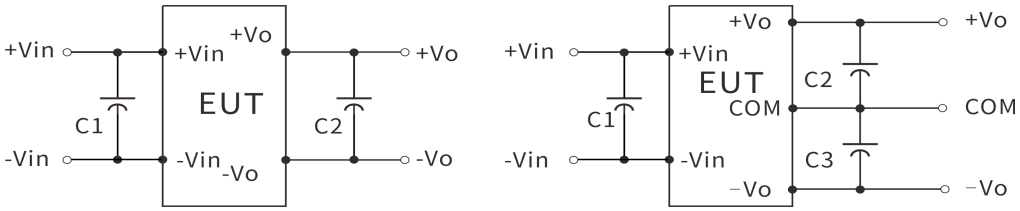
Reference Design

1. Recommended Test Circuit

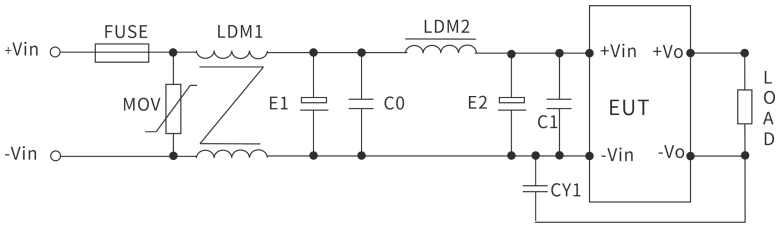
General recommended capacitance: C1: 47-100μF; C2, C3: 10-22μF.

All DC/DC converters of this series are tested in accordance with the recommended test circuit (Figure 1) before leaving the factory.

If you require further reduction of input and output ripple, you can increase the input and output external capacitors C1, C2, C3 or choose series equivalent impedance value of small capacitors, but the capacitance value can not be greater than the maximum capacitive load of the product.



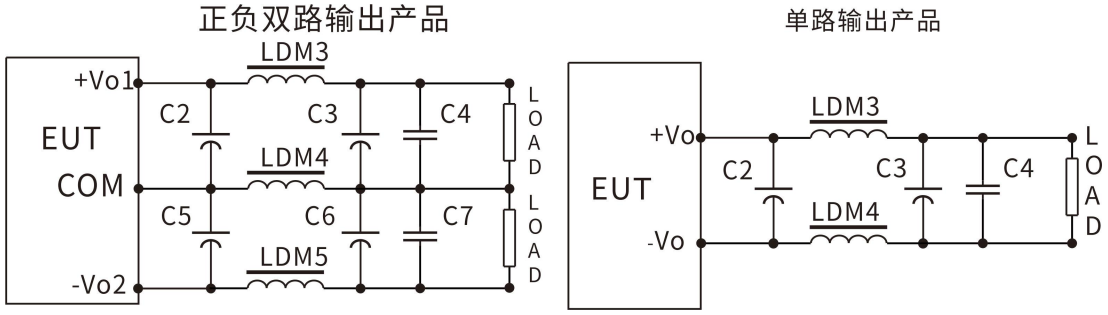
2. EMC Solutions Recommended Circuit Parameter:



Items	24V input	48V input
FMSE fuse	Access to the corresponding fuses according to customer needs	
MOV piezoresistor	14D560K	14D101K
LDM1common mode inductor	10mH	15mH
E1, E2 electrolytic capacitor	100μF/50V	100μF/100V
C0, C1 ceramic capacitor	1μF/50V	1μF/100V
LDM2 differential mode inductor	10μH	15μH
CY1 safety Y2 capacitor	1nF/250Vac	

3. Output Filter Peripheral Recommended Circuit

Ripple & noise requirements in general, the peripheral recommended only use C2, C5 can be; ripple & noise requirements of strict; recommended use of 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 marked in the manual, otherwise the module will not start normally.

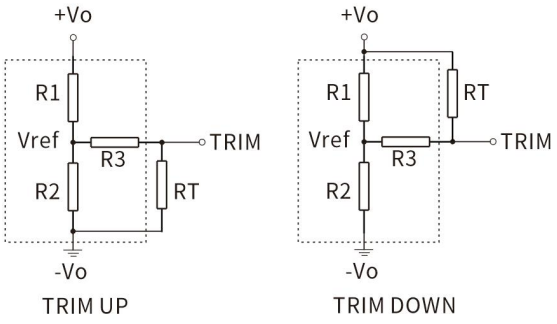
2. 3% minimum load must be guaranteed for capacitive load, otherwise it will cause module output abnormality.

3. LDM5 is only used for dual output products.

Parameters recommend:

Items	3.3V output	±5V or 5V output	±/9V/12V output	±15V or 15V output	±24V or 24V output
LDM3 inductor	0.47μH	1μH	2.2μH	2.2μH	4.7μH
LDM4 inductor	0.47μH	1μH	2.2μH	2.2μH	4.7μH
LDM5 inductor	-	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 ceramic capacitor	1μF/50V				

4. Use of Trim and Calculation of Trim Resistance



Trim 的使用电路(虚线框为产品内部)

Trim 电阻的计算公式:

$$\text{UP:}\quad RT=\frac{®*R2}{R2-®}-R3 \qquad ®=\frac{Vref}{Vo-Vref}*R1$$

$$\text{down:}\quad RT=\frac{®*R1}{R1-®}-R3 \qquad ®=\frac{Vo-Vref}{Vref}*R2$$

RT为TRIM电阻

®为自定义参数,无实质含义

Reference Notes:

Vout(V)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	30	18.261	84.5	1.25
5	45.3	14.778	84.5	1.25
9	30	11.441	120	2.5
12	56	14.571	84.5	2.5
15	56	11.218	154	2.5
24	84.5	9.791	84.5	2.5

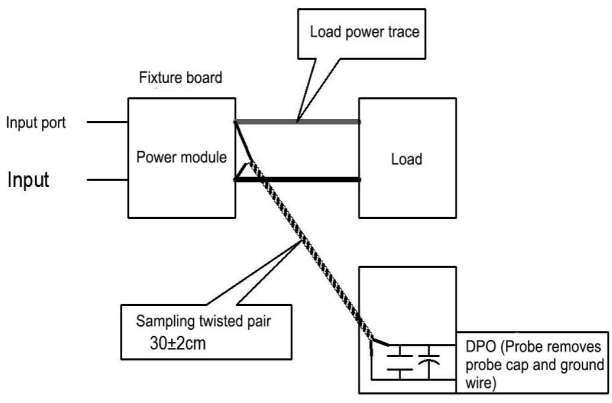
5. Ripple & Noise Test: (Twisted Pair Method 20 MHZ Bandwidth)

Test Methods:

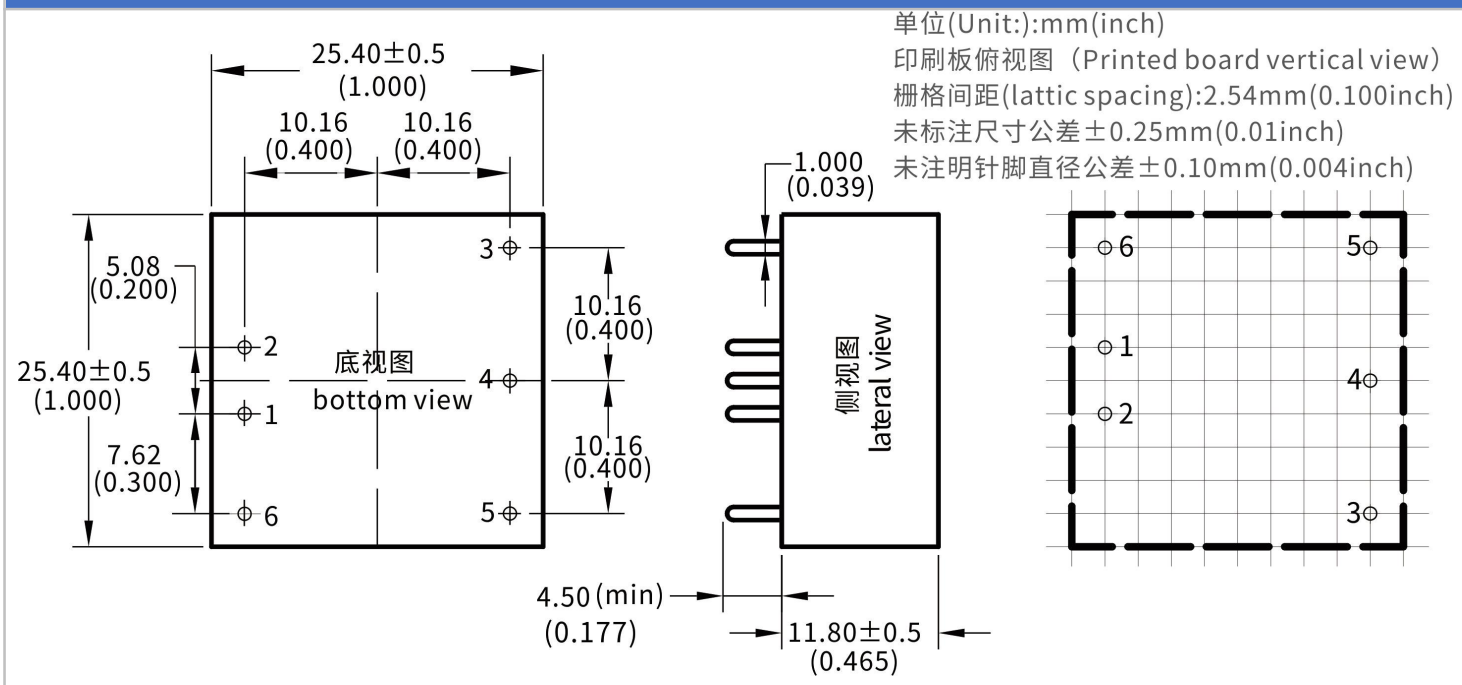
1. Ripple noise is the use of 12 # twisted pair connection, oscilloscope bandwidth is set to 20MHz, 100M bandwidth probe, and at the probe end in parallel with 0.1uF polypropylene capacitors and 47uF high-frequency low-resistance electrolytic capacitors, the oscilloscope sampling using Sample sampling 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±2cm sampling line directly from the power output port. Power line according to the size of the output current to select the appropriate diameter of the wire with insulating skin.



Package Size and Pin Function Diagram



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

***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.**

Package Description

Package code	L x W x H	
YMD	25.4*25.4*11.8mm	1.000X1.000X0.465 inch

Contact

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