Typical Characteristics

- Wide input range (4:1), Output: 40W
- Conversion efficiency: 91%(Typ.)
- Isolation voltage: 1500Vdc
- Ultra-low standby power consumption: 0.048W(Typ.)
- Ultra-fast startup: 1ms (Typ.)
- Working temperature: -40℃~+85℃
- Protection: input undervoltage, output short-circuit, overcurrent, overvoltage
- Metal housing, low output ripple
- Industrial standard pin out, through-hole mounting on PCBs

40W, ultra-wide input voltage range, isolated regulated single- or dual-output, DIP package, DC-DC power module



RoHS

URB_LD-40WR3 and URA_LD-40WR3 series feature an output power of 40W, a 4:1 wide input voltage range, efficiency up to 91%, a standard isolation voltage of 1500 VDC, an operating temperature range of -40° C to +85° C, and features input under-voltage protection as well as output over-voltage, over-current, and short-circuit protection. The bare unit complies with CISPR 32/EN 55032 Class A and is widely used in medical, industrial control, power, instrumentation, communications, and railway applications.

Model Number Description

UR x xx xx LD - 40W R3

- R3: Suffix (3rd-generation product)
- 40W: Rated output power (40W)
- LD: Package type (50.8 x 25.4 mm)
- xx: Output voltage (rated)
- xx: Input voltage (rated)
- x: No. of output channels (B: single, A: dual, 1500 Vdc isolation)
- UR: Product series (UR indicates 4:1 input)

Product selection table

Certific	Model number	Input voltage range (Vdc)		Output Voltage/Current		Ripple and Noise	Maximum capacitive load②	Efficiency@ Full load
		Rated (range)	Max③	Output V (Vdc)	Output I (mA) (Max. Min.)	Full load (mVp-p) (Typ. /Max.)	μF Max.	% (Min. /Typ.)
	URB2405LD-40WR3	24 (9-36)	40	5	8000/0	50/100	15000	86/88
	URB2409LD-40WR3			9	4444/0	50/100	4700	85/87
	URB2412LD-40WR3			12	3333/0	50/100	3000	86/88
	URB2415LD-40WR3			15	2666/0	50/100	2200	88/90
	URB2424LD-40WR3			24	1666/0	50/100	1300	88/90

	URA2405LD-40WR3			±5	±4000/0	50/100	1000	82/84
	URA2412LD-40WR3			±12	±1666/0	50/100	1000	85/87
	URA2415LD-40WR3			±15	±1333/0	50/100	680	85/87
	URA2424LD-40WR3			±24	±833/0	50/100	470	85/87
	URB4805LD-40WR3	48 (18-75)	80	5	8000/0	50/100	15000	83/86
	URB4812LD-40WR3			12	3333/0	50/100	3000	86/88
	URB4815LD-40WR3			15	2666/0	50/100	2200	88/90
	URB4824LD-40WR3			24	1666/0	50/100	1300	88/90
	URA4812LD-40WR3			±12	±1666/0	50/100	1000	85/87
	URA4815LD-40WR3			±15	±1333/0	50/100	680	85/87
	URA4824LD-40WR3			±24	±833/0	50/100	470	85/87

Note: 1. Due to space limitations, the above is only a list of representative products. For products not included in this list, please contact our Sales Department.

2. The 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 properly.

3. Exceeding the maximum input voltage may cause permanent damage to the product.

Test Conditions: Unless otherwise specified, all parameter measurements were taken at the rated input voltage, with a purely resistive rated load, and at an ambient temperature of 25° C.

Input characteristics

Items	Working conditions		Min.	Typ.	Max.	Unit
Input Current (Full Load/No Load)	24VDC rated input series, rated input voltage	5V	-	1938/60	1984/100	mA
		Other output	-	1893/12	1938/25	
	48VDC rated input series, rated input voltage		-	926/12	968/25	
Reflected ripple current	Rated input voltage		-	-	40	mA
Impulse voltage （I sec. max）	24VDC rated input series		-0.7	-	50	VDC
	48VDC rated input series		-0.7	-	100	
Startup voltage	24VDC rated input series		-	-	9	
	48VDC rated input series		-	-	18	
Input undervoltage protection	24VDC rated input series		5.5	6.5		
	48VDC rated input series		12	15.5	-	
Startup time	Rated input voltage and constant-resistance load		-	10	150	mS
Input filter type			PI type			
Hot swap	-		Not supported			

Remote control (Ctrl)*	Module on	Ctrl floating or connected to a TTL high level (3.5-12VDC)			
	Module off	Connect Ctrl to GND or a low level (0-1.2VDC)			
	Input current during turn-off	-	5	10	mA

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

Output characteristics

Items	Working and test conditions		+Vo1			-Vo2		
			Min.	Typ.	Max.	Min.	Typ.	Max.
Output load	Load percentage		0%	-	100%	0%	-	100%
Output voltage accuracy	5%-100% load		-	±1.0%	±2.0%	-	±2.0%	±3.0%
Line Regulation	Input voltage range		-	±0.2%	±0.5%	-	±1.5%	±2%
Load Regulation	5% to 100% rated load, balanced load		-	±0.5%	±1%	-	±4.0%	±5.0%
Ripple & Noise	Pure resistive load, 20 MHz bandwidth, peak-to-peak value, 5%-100% load		-	100mVp-p	200mVp-p	-	100mVp-p	200mVp-p
	20MHz bandwidth, 0%-5% load	5VDC output	-	-	5%Vo	-	-	5%Vo
		Other output			3%Vo			3%Vo
Startup delay			-	1ms	-	-	1ms	-
Output voltage adjustment	Input voltage range		-	10.0%	-	-	10.0%	-
Dynamic response to a step disturbance	25% of the rated load step		-	5.0%	8.0%	-	5.0%	8.0%
Dynamic response recovery time			-	250μs	500μs	-	300μs	500μs
Output overvoltage protection	Full voltage range input		110% Vo	-	160%Vo			
Output overcurrent protection	Full voltage range input		110% Io	140% Io	-	110% Io	140% Io	-
Output short-circuit protection	Full voltage range input		Sustainable, self-recovering					

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

General characteristics

Items	Working conditions	Min.	Typ.	Max.	Unit
Insulation voltage	Input-output, test duration: 1 minute, leakage current less than 1 mA.	1500	--	--	VDC
Insulation resistance	Input-output, insulation voltage 500 VDC.	1000	--	--	MΩ
Isolation capacitor	Input-Output, 100 kHz/0.1 V	--	2000	--	pF
Working temperature	Use the reference temperature derating curve	-40	--	+105	℃
Storage temperature		-50	--	+125	
Maximum operating case temperature		-55	--	+100	
Storage humidity	No condensation	--	--	95	%RH
Pin soldering temperature resistance	The solder joint is 1.5 mm from the housing; 10 seconds	--	--	+300	℃
Switching frequency	PWM mode	--	300	--	KHz
Vibration		10-55Hz, 10G, 30 Min. along X, Y and Z			
Housing material		Aluminum alloy housing			
Minimum mean time between failures	MIL-HDBK-217F@25℃	1000	--	--	Hrs

Temperature Characteristic Curve

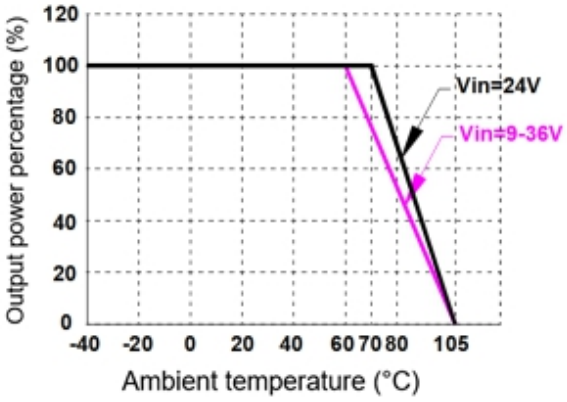


Figure 1 Temperature Derating Curve（24V）

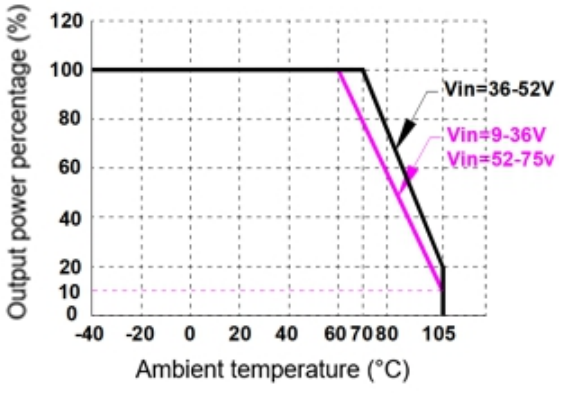


Figure 1 Temperature Derating Curve（48V）

Reference for Design

1、 Recommended Test Circuit

Recommended capacitors: C1: 47－100μF; C2, C3: 10－22μF. All DC/DC converters in this series are tested using the test circuit shown in Figure 1 before shipment.

If further reduction of input and output ripple is required, the external input and output capacitors C1, C2, and C3 can be increased in value or capacitors with low equivalent series impedance (ESL) can be selected; however, the capacitance must not exceed the product's maximum capacitive load.

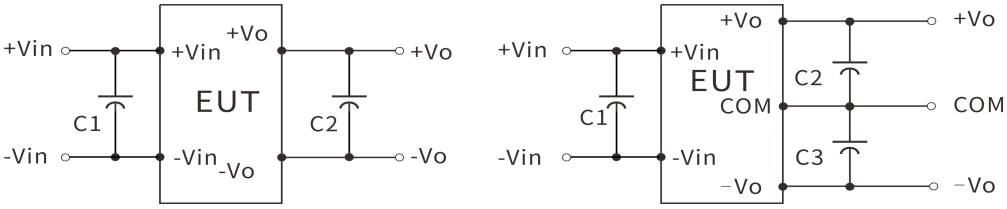
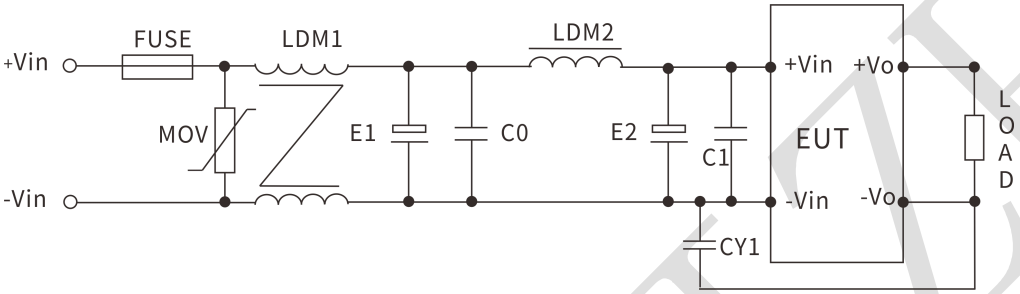


Figure 3

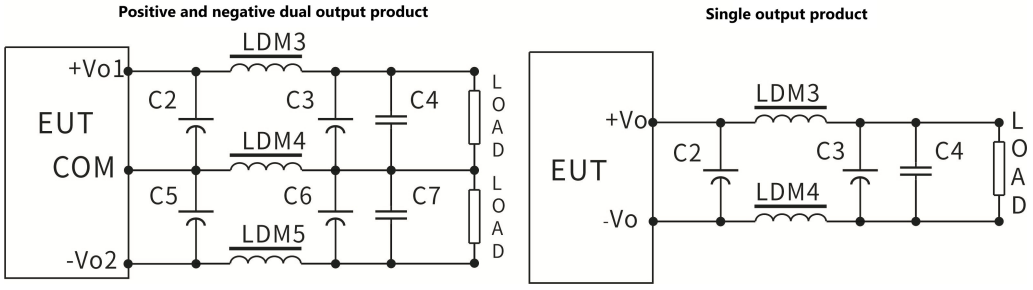
2、EMC Solutions—Recommended Circuits



Recommended parameters:

Component code	24V Input	48V Input	110V Input
FMSE fuse	Connect the appropriate fuse based on customer requirements		
MOV varistor	14D560K	14D101K	14D201K
LDM1 common-mode inductor	10 mH	15 mH	30 mH
E1、E2 electrolytic capacitor	100μF/50V	100μF/100V	63μF/200V
C0、D1 ceramic capacitor	1μF/50V	1μF/100V	0.47μF/250V
LDM2 common-mode inductor	10 μH	15 μH	68 μH
CY1 safety Y2 capacitors	1nF/250Vac		

3、Recommended Peripheral Circuit for Output Filtering



For general ripple and noise requirements, it is recommended to use only C2 and C5 in the peripheral circuit; for strict ripple and noise requirements, it is recommended to use the circuit shown in the figure above.

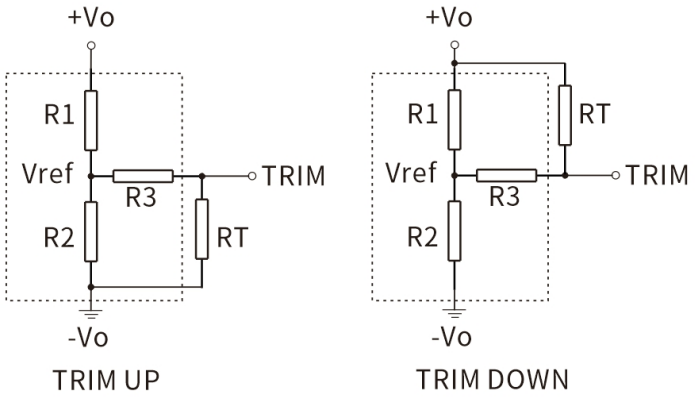
Note: 1. Use high-frequency, low-impedance electrolytic capacitors for C2, C3, C5, and C6. The total capacitance must not exceed the maximum capacitive load specified in the manual; otherwise, the module will fail to start normally.

2. When applying a capacitive load, ensure that the minimum load is at least 3%; otherwise, it will cause abnormal module output.

3. The LDM5 is intended for use only in dual-output products.

Part code	3.3V Output	±5V or 5V Output	±/9V/12V or 9V/12V Output	±15V or 15V Output	±24V or 24V Output
LDM3 inductor	0.47μH	1μH	2.2 μH	2.2 μH	4.7 μH
LDM4 inductor	0.47μH	1μH	2.2 μH	2.2 μH	4.7 μH
LDM5 inductor	-	1μH	2.2 μH	2.2 μH	4.7 μH
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、The use of Trim and the calculation of Trim resistors



Trim Formula for Calculating Resistance:

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

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

RT stands for TRIM resistor

® is a custom parameter with no practical significance.

Trim's application circuit (the dotted box indicates the interior of the product)

Reference Descriptions:

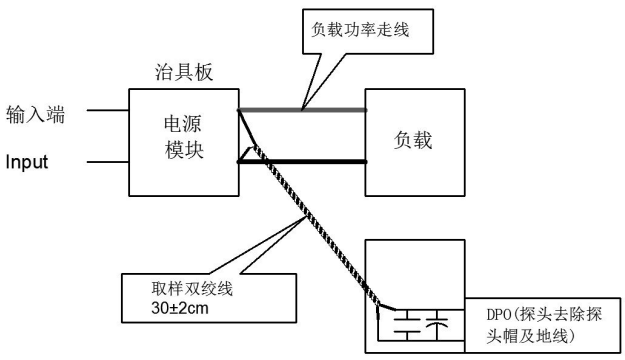
Vout(V)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
5	2.4	2.344	13.622	2.5
12	8.2	2.153	17.346	2.5
15	12	2.388	21.016	2.5
24	10	1.158	10.714	2.5

5、Ripple & Noise Test(Twisted Pair Method, 20MHz Bandwidth)

Test Method:

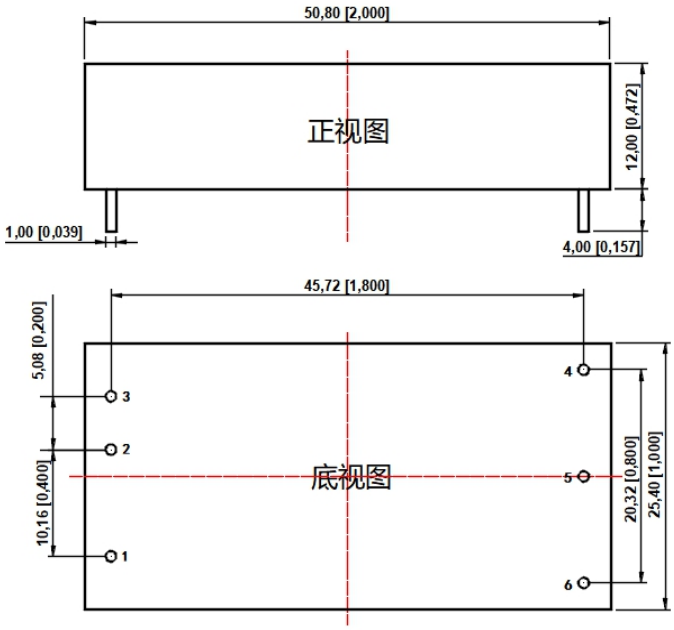
1. Ripple noise is measured using #12 twisted pair wires, with the oscilloscope bandwidth set to 20MHz, using a 100M bandwidth probe, and a 0.1uF polypropylene capacitor and a 47uF high-frequency low-impedance electrolytic capacitor connected in parallel at the probe end. The oscilloscope sampling uses the Sample mode.

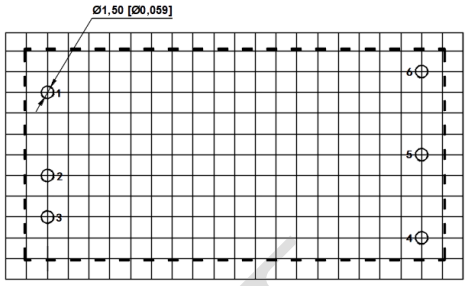
2. Ripple noise output test schematic:



Connect the power input to the input power supply, and connect the power output to the electronic load through the fixture board. For the test, use a 30cm ± 2cm sampling wire directly from the power output port. The power line should be selected with insulated wires of appropriate wire gauge based on the output current.

Package Dimensions and Pin Function Diagram



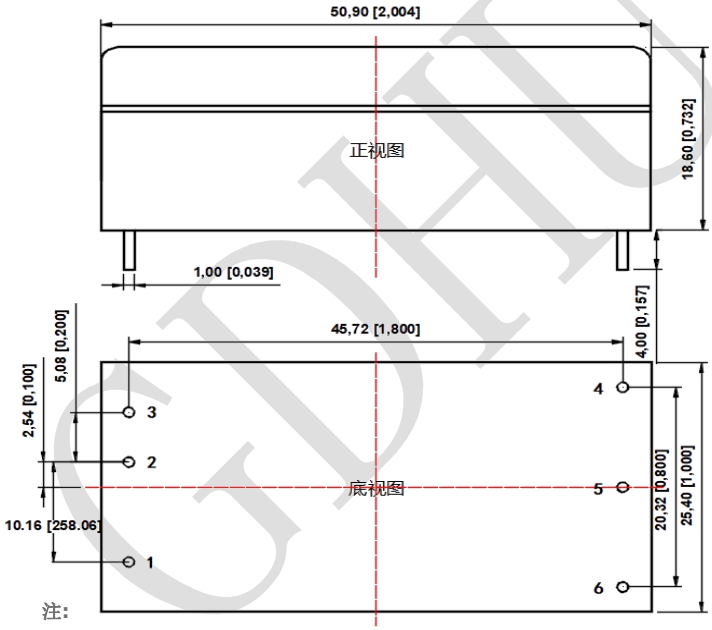


栅格距离尺寸为 2.54 x 2.54 mm

注:
尺寸单位：mm[inch]
端子直径公差：±0.10[±0.004]
未标注之公差：±0.50[±0.020]

Pin Assignment		
Pin	Function（Single）	Function（Dual）
1	Ctrl	Ctrl
2	-Vin	-Vin
3	+Vin	+Vin
4	+Vo	+Vo
5	-Vo	COM
6	Trim	-Vo

URBxxxxLD-40WHR3 (with heat sink) Dimension Drawing



注:
尺寸单位：mm[inch]
端子直径公差：±0.10[±0.004]
未标注之公差：±0.50[±0.020]

Package Description

Package code	L x W x H	
LD	50.8 X25.4X11.8mm	2.000X 1.000 X0.465 inch

Contact

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