Typical Characteristics

- Wide input range (4:1), Output: 60W
- Conversion efficiency: 93%(Typ.)
- Isolation voltage: 1600Vdc
- Ultra-low standby power consumption: 0.036W(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



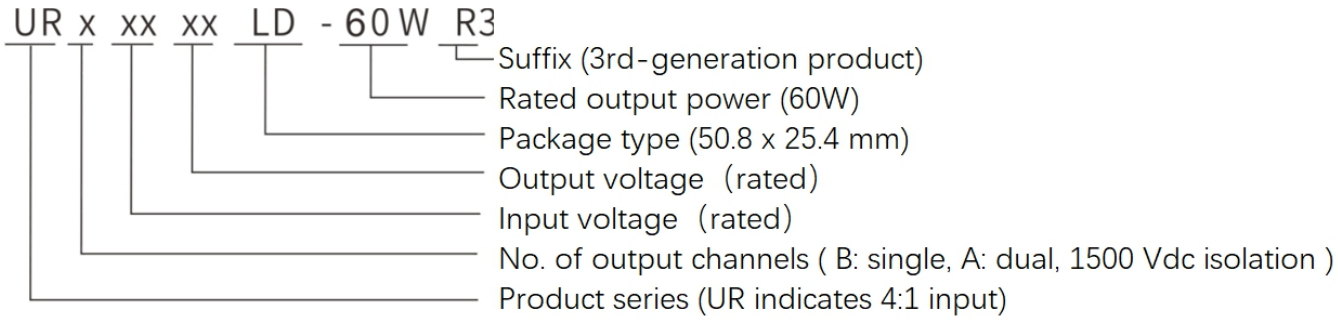


60W，ultra-wide input voltage range, isolated regulated single- or dual-output, DIP package, DC-DC power module

RoHS

URB_LD-60WR3 and URA_LD-60WR3 series offer an output power of 60W, a 4:1 wide input voltage range, and efficiency up to 93%. a standard isolation voltage of 1600 VDC, an operating temperature range of -40°C to +105°C, and features such as 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



Product selection table

Certification	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.	% (Typ.)
	URB2405LD-60WR3	24（9~36）	40	5	12000/0	30/50	20000	91
	URB2412LD-60WR3			12	5000/0	50/80	5000	92
	URB2415LD-60WR3			15	4000/0	50/80	3500	93
	URB2424LD-60WR3			24	2500/0	50/80	2000	93
	URB2428LD-60WR3			28	2140/0	100/200	2000	94

	URB4805LD-60WR3	48（18-75）	80	5	12000/0	30/50	20000	92
	URB4812LD-60WR3			12	5000/0	50/80	5000	93
	URB4815LD-60WR3			15	4000/0	50/80	3500	93
	URB4824LD-60WR3			24	2500/0	50/80	2000	93
	URB4828LD-60WR3			28	2143/0	100/200	1500	94

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 nominal 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	-	2717/25	2778/50	mA
	48VDC rated input series, rated input voltage	-	1359/25	1389/30	
Reflected ripple current	Rated input voltage	-	-	60	mA
Impulse voltage （1 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	12.0	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）			

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

Output characteristics

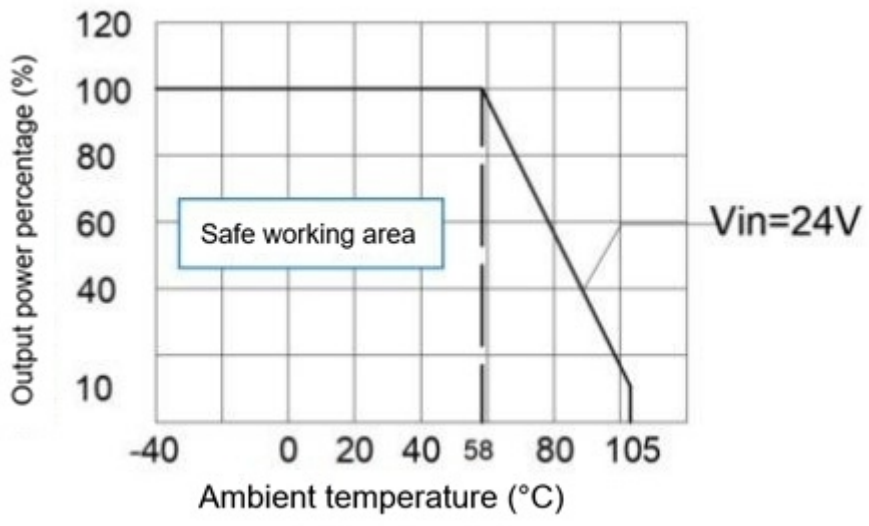
Items	Working and test conditions		+Vo1		
			Min.	Typ.	Max.
Output load	Load percentage		-	-	100%
Output voltage accuracy	5%-100% load		-	±1.0%	±3.0%
Line Regulation	Input voltage range		-	±0.2%	±0.5%
Load Regulation	5% to 100% rated load, balanced load		-	±0.5%	±1%
Ripple & Noise	Pure resistive load, 20 MHz bandwidth, peak-to-peak value		-	100mVp-p	200mVp-p
Startup delay			-	1ms	-
Output voltage adjustment	Input voltage range		-	Non-adjustable	-
Dynamic response to a step disturbance	25% of the rated load step	5V output	-	±3.0%	±10.0%
		Other output		±3.0%	±5.0%
Dynamic response recovery time	25% of the rated load step		-	250μs	500μs
Output overvoltage protection	Full voltage range input		110% Vo	-	180%Vo
Output overcurrent protection	Full voltage range input		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.	1600	--	--	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		-55	--	+125	
Maximum operating case temperature		--	--	+100	
Storage humidity	No condensation	5	--	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			Kh

Temperature Characteristic Curve



Reference for Design

1、 Recommended Test Circuit

Recommended capacitors: C1: 100–470 μF; C2, C3: 220–680μF. 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.

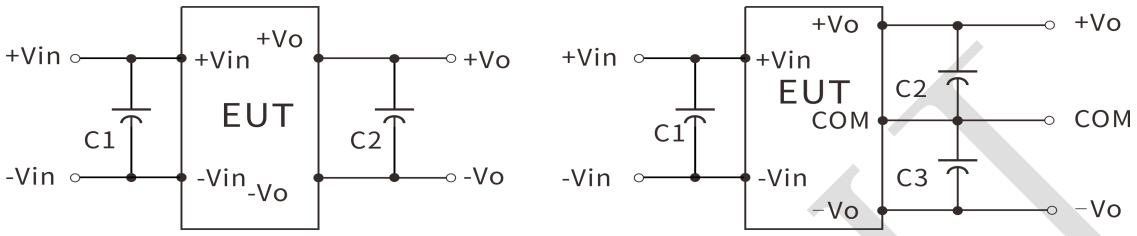
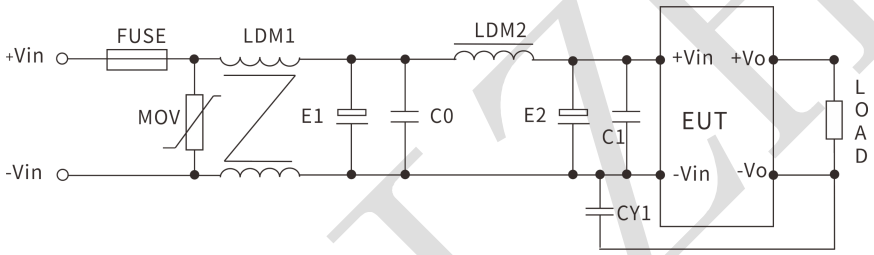


Figure 1

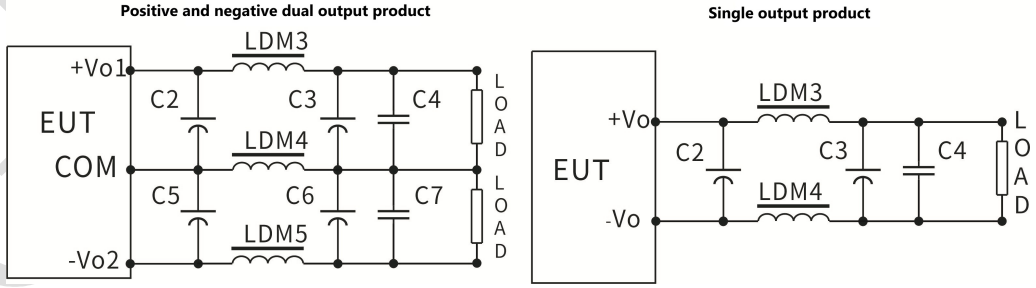
2、EMC Solutions—Recommended Circuits



Recommended parameters：

Component code	24V Input	48V Input
FMSE fuse	Connect the appropriate fuse based on customer requirement	
MOV varistor	14D560K	14D101K
LDM1 common-mode inductor	10 mH	15 mH
E1、E2 electrolytic capacitor	470μF/50V	220μF/100V
C0、D1 ceramic capacitor	1μF/50V	1μF/100V
LDM2 common-mode inductor	10 μH	15 μH
CY1 safety Y2 capacitors	2.2nF/3000VDC	

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.

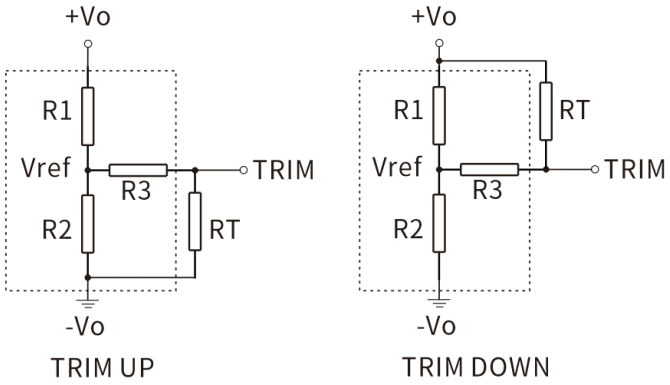
2. When applying a capacitive load, ensure that the minimum load is at least 3%; otherwise, it will cause abnormal module output.

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

Recommended parameters：

Part code	5V output	9V/12V output	15V output	24V/28V output
LDM3 inductor	1μH	2.2 μH	2.2 μH	4.7 μH
LDM4 inductor	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	680μF	470μF	470μF	220μF
C5、C6 electrolytic capacitor	680μF	470μF	470μF	220μF
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：

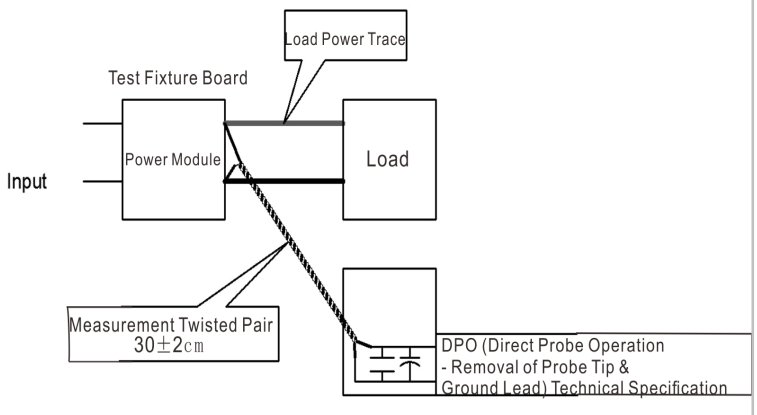
Vout(V)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
5	2.4	2.344	13.622	2.5
6	10	6.982	13.622	2.5
12	8.2	2.153	17.346	2.5
15	12	2.388	21.016	2.5
24	10	1.158	10.714	2.5

5. Ripple & Noise Testing: (Twisted-pair Method, 20 MHz Bandwidth)

Test Method:

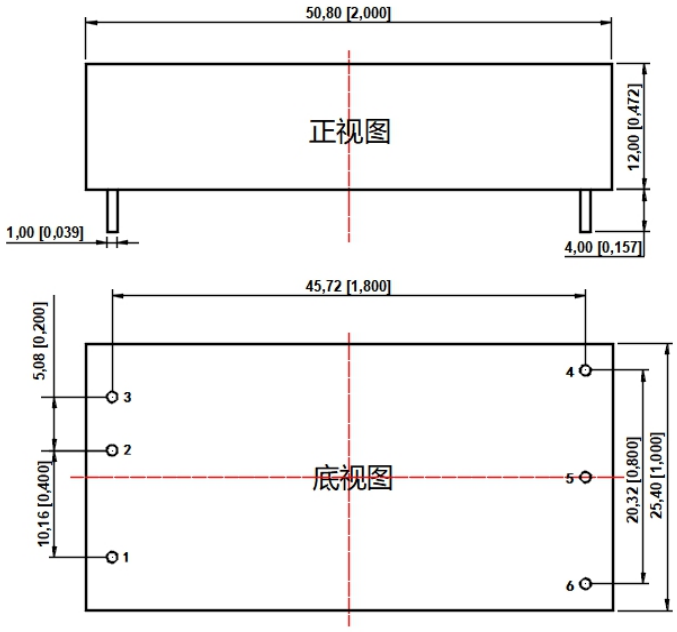
1. For ripple and noise testing, use a Category 12 twisted-pair cable. Set the oscilloscope bandwidth to 20 MHz and use a 100 MHz bandwidth probe. Connect a 0.1μF polypropylene capacitor and a 47μF high-frequency, low-impedance electrolytic capacitor in parallel at the probe tip. Set the oscilloscope to “Sample” mode.

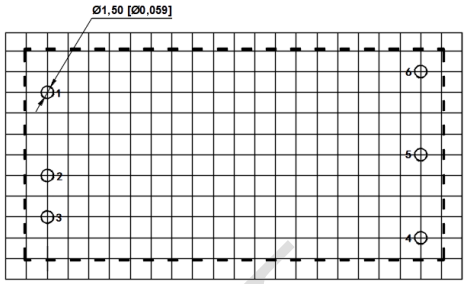
2. Schematic diagram for output ripple and noise testing:



Connect the power supply input to the input power source. Connect the power supply output to the electronic load via the fixture board. For testing, use a 30 cm ± 2 cm sampling lead to take a direct sample from the power supply output port. Select insulated wires with appropriate gauge based on the magnitude of the output current.

Package Dimensions and Pin Function Diagram



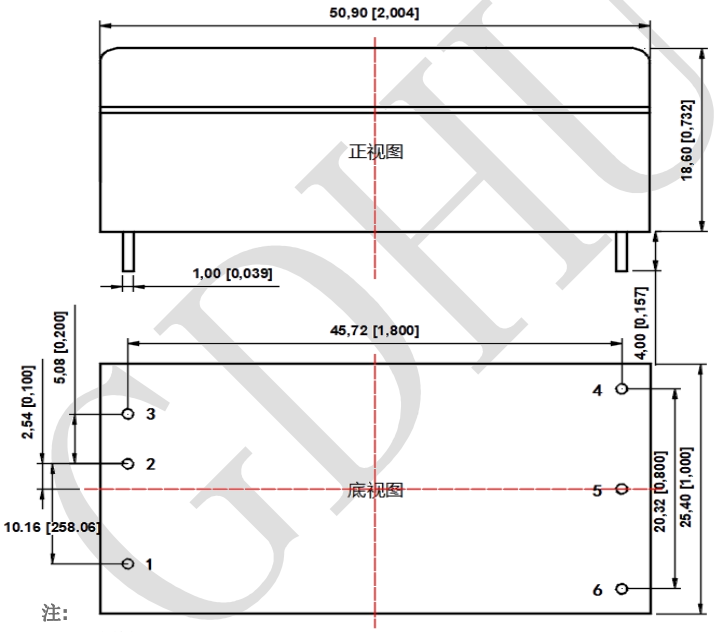


栅格距离尺寸为 2.54 x 2.54 mm

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-60WHR3(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]

Contact

GDHUIZHI®
广东汇智电子技术有限公司
Guangdong Huizhi Electronic Technology Co.,Ltd
地址：广东省肇庆市端州区 11 区肇庆大道北侧厂房、办公楼(二期)3 楼
Add.: 3rd floor, factory and office building (phase II) on the north side of Zhaoqing Avenue, District 11, Duanzhou District, Zhaoqing City, Guangdong Province, China
Homepage：www.huizhi-elec.com/www.chinaebizal.com
Tel：+86 -758 - 2566585
E-mail：sales@huizhi-elec.com

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