

MORNSUN®

URA_LD-15W & URA_LD-20W SERIES 15/20W, 4:1 ULTRA WIDE INPUT ISOLATED & REGULATED DUAL OUTPUT DC-DC CONVERTER



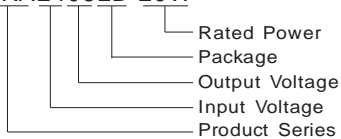
Patent Protection RoHS

FEATURES

- Efficiency up to 88%
- Ultra wide input range (4:1)
- High and low temperature characteristics
- Output short circuit protection
- 1500VDC isolation
- Operating temperature range: -40°C ~ +85°C
- Six-sided metal shield
- Industry standard pinout
- MTBF > 1,000,000 hours
- Industrial level specifications
- EMC application

PART NUMBER SYSTEM

URA2405LD-20W



APPLICATIONS

URA_LD-15W & URA_LD-20W series offer 15W & 20W of output, ultra wide input voltage: 9-36VDC, 18-75VDC, dual output, and features 1500VDC isolation, under voltage lockout, over current, over voltage and short circuit protection. All models are particularly suitable for industrial, telecommunication, electric power, test equipments applications.

SELECTION GUIDE

Model	Input Voltage (VDC)		Output Voltage (VDC)	Output Current (mA)		Input Current (mA) (typ.)		Reflected Ripple Current (mA, typ.)	Max. Capacitive Load [#] (μF)	Efficiency (% , typ.) @Max. Load
	Nominal (Range)	Max*		Max.	Min.	@Max. Load	@No Load			
URA2405LD-15W	24 (9-36)	40	±5	±1500	±150	719	7	30	4800	86
URA2412LD-15W			±12	±625	±62.5	700	17		800	87
URA2415LD-15W			±15	±500	±50	715	29		500	87
URA2405LD-20W			±5	±2000	±200	953	7		4800	84
URA2412LD-20W			±12	±833	±83.3	933	11		800	87
URA2415LD-20W			±15	±667	±66.7	932	29		500	87
URA4805LD-15W	48 (18-75)	80	±5	±1500	±150	364	6	200	4800	84
URA4812LD-15W			±12	±625	±62.5	350	11		800	87
URA4815LD-15W			±15	±500	±50	352	15		500	87
URA4805LD-20W			±5	±2000	±200	481	7		4800	85
URA4812LD-20W			±12	±833	±83.3	470	8		800	87
URA4815LD-20W			±15	±667	±66.7	480	8		500	88

Note: 1. *Input voltage can't exceed this value, or will cause the permanent damage.

2. # For each output.

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1000 ms)	24VDC Input Models	-0.7	--	50	VDC
	48VDC Input Models	-0.7	--	100	
Start-up Voltage	24VDC Input Models	--	8.7	9	
	48VDC Input Models	--	17.6	18	
Under Voltage Shutdown	24VDC Input Models	--	--	9	
	48VDC Input Models	--	--	18	
Start-up Time	Nominal input & constant resistance load	--	10	--	ms
Ctrl [*]	Models ON	3.5 - 12VDC or open circuit			
	Models OFF	0-1.2VDC			
	Input current (Models OFF)	--	--	1	mA

Short Circuit Input Power		--	--	3.5	W
Input Filter		Pi Filter			
Note: *The Ctrl pin voltage is referenced to GND.					

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Output Power	URA_LD-15W series	1.5	--	15	W
	URA_LD-20W series	2	--	20	
Voltage Accuracy	Refer to recommended circuit	--	±1	±3	%
Output Voltage Balance	Dual Output, Balanced Loads	--	±0.5	--	
Line Regulation	Full load, Input voltage from low to high	--	±0.2	±0.5	
Load Regulation	10% to 100% load	--	±0.5	±1	
Cross Regulation	Main output 50% Supplement output from 25% to 100% load	--	--	±5	
Transient Recovery Time	25%~ 50%~25% load or	--	200	500	µs
Transient Response Deviation	50%~75%~50% load step change	--	±3	±5	%
Temperature Drift	100% full load	--	±0.02	--	%/°C
Ripple*	20MHz Bandwidth	--	40	50	mVp-p
Noise*		--	75	100	
Trim		--	±10%	--	
Over Current Protection	Full input voltage	120	140	150	%
Over Voltage Protection	±5V output	--	±6.1	--	VDC
	±12V output	--	±15	--	
	±15V output	--	±18	--	
Short Circuit Protection		Hiccup, Continuous, automatic recovery			
Note: Dual output models unbalanced load: ±5%. *Test ripple and noise by "parallel cable" method. See detailed operation instructions at <i>DC-DC Application Notes</i> .					

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Tested for 1 minute and leakage current less than 1 mA	1500	--	--	VDC
Isolation Resistance	Test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input/Output, 100KHz/0.1V	--	2000	--	pF
Switching Frequency	Full load, nominal input	--	400	--	KHz
MTBF	MIL-HDBK-217F @ 25°C	1000	--	--	K hours
Case Material		Aluminum Alloy			
Weight	Without heatsink	--	28	--	g
	With heatsink	--	36	--	

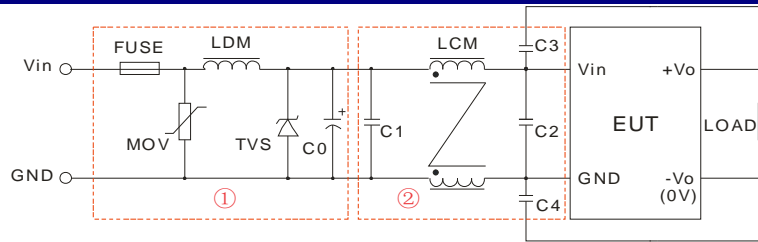
ENVIRONMENTAL SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	5	--	95	%
Operating Temperature	See Temperature Derating Curve	-40	--	85	°C
Storage Temperature		-55	--	125	
The Max. Case Temperature	Operating Temperature curve range	--	--	105	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS B (External Circuit Refer to Figure1-②)			
	RE	CISPR22/EN55022 CLASS B (External Circuit Refer to Figure1-②)			
EMS	ESD	IEC/EN61000-4-2 Contact ±4KV perf. Criteria B			
	EFT	IEC/EN61000-4-4 ±2KV perf. Criteria B (External Circuit Refer to Figure1-①)			
	Surge	IEC/EN61000-4-5 ±2KV perf. Criteria B (External Circuit Refer to Figure1-①)			

EMC RECOMMENDED CIRCUIT



(Figure1)

URA_LD-15W recommended external circuit parameters:

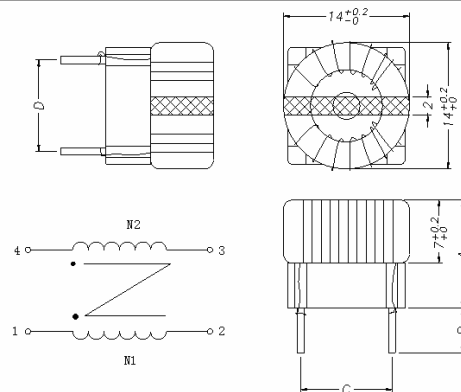
Model		URA24_LD-15W	URA48_LD-15W
EMS	FUSE	Choose according to load	
	MOV	S10K35	S10K60
	LDM	56μH	56μH
	TVS	SMCJ48A	SMCJ90A
	C0	120μF/50V	120μF/100V
EMI	C1	4.7μF/50V	1μF/100V
	LCM	1250μH	1250μH
	C2	4.7μF/50V	1μF/100V
	C3	1000pF/2KV	1000pF/2KV
	C4	1000pF/2KV	1000pF/2KV

URA_LD-20W recommended external circuit parameters:

Model		URA24_LD-20W	URA48_LD-20W
EMS	FUSE	Choose according to load	
	MOV	S10K35	S10K60
	LDM	56μH	56μH
	TVS	SMCJ48A	SMCJ90A
	C0	120μF/50V	120μF/100V
EMI	C1	4.7μF/50V	4.7μF/100V
	C2	--	4.7μF/100V

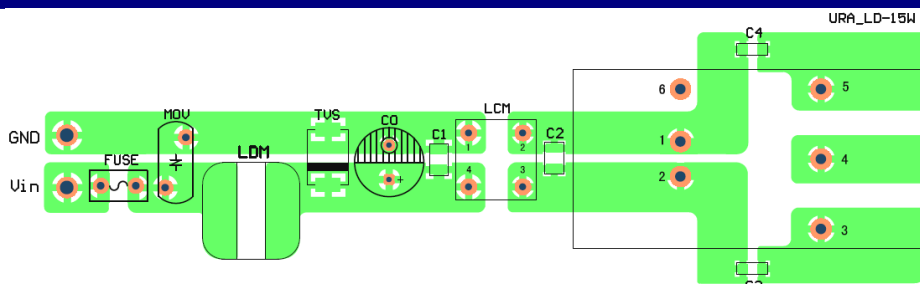
This common choke LCM has been defined as follow
(Can be assembled by hand):

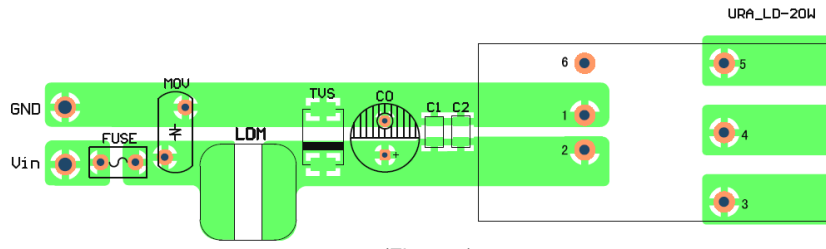
- ⌋ Core:P5T,14*8*7,Base(Optical)
L:1250μH ±25%,DCR:250mΩ(max.)
- ⌋ Wire: diameter 0.4mm
 - ∅ A Height:11.2mm(max.)
 - ∅ B Terminal Length: 4.0mm(max.)
 - ∅ C Terminal Pitch: 7.5mm(max.)
 - ∅ D Terminal Pitch: 7.5mm(max.)
- ⌋ Test condition: 100KHz/100mV
- ⌋ Recommended through hole: ∅0.9mm
- ⌋ All dimensions in millimeters



Note: 1. In Figure 1, part① is EMS recommended external circuit, part② is EMI recommended external circuit. Choose according to requirements.
2. If there is no recommended parameters, the model no require the external component.

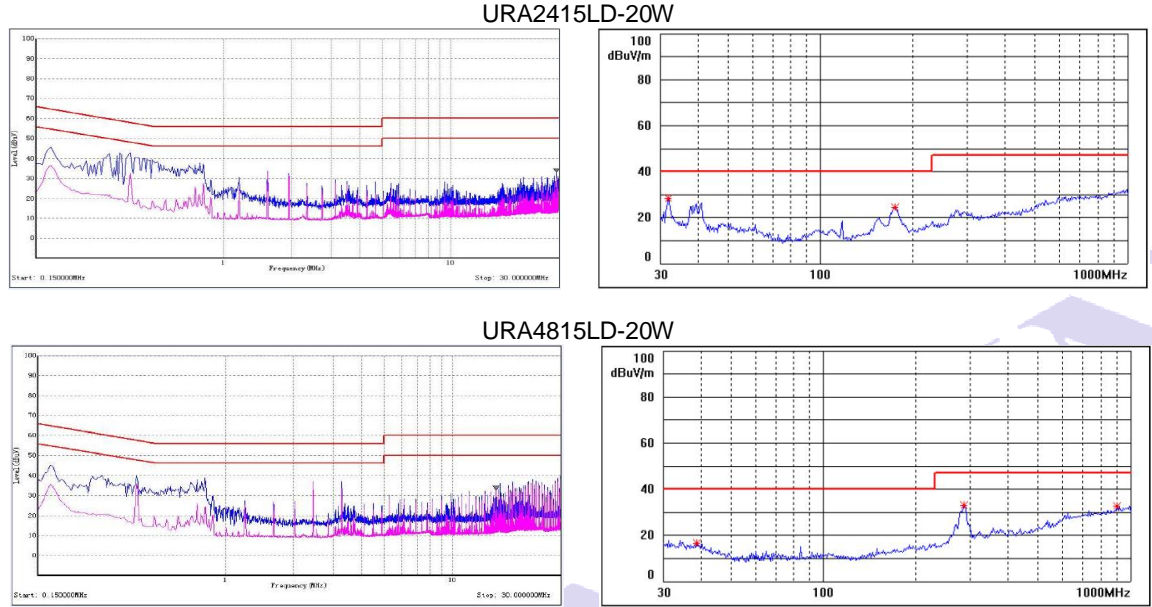
EMC RECOMMENDED CIRCUIT PCB LAYOUT



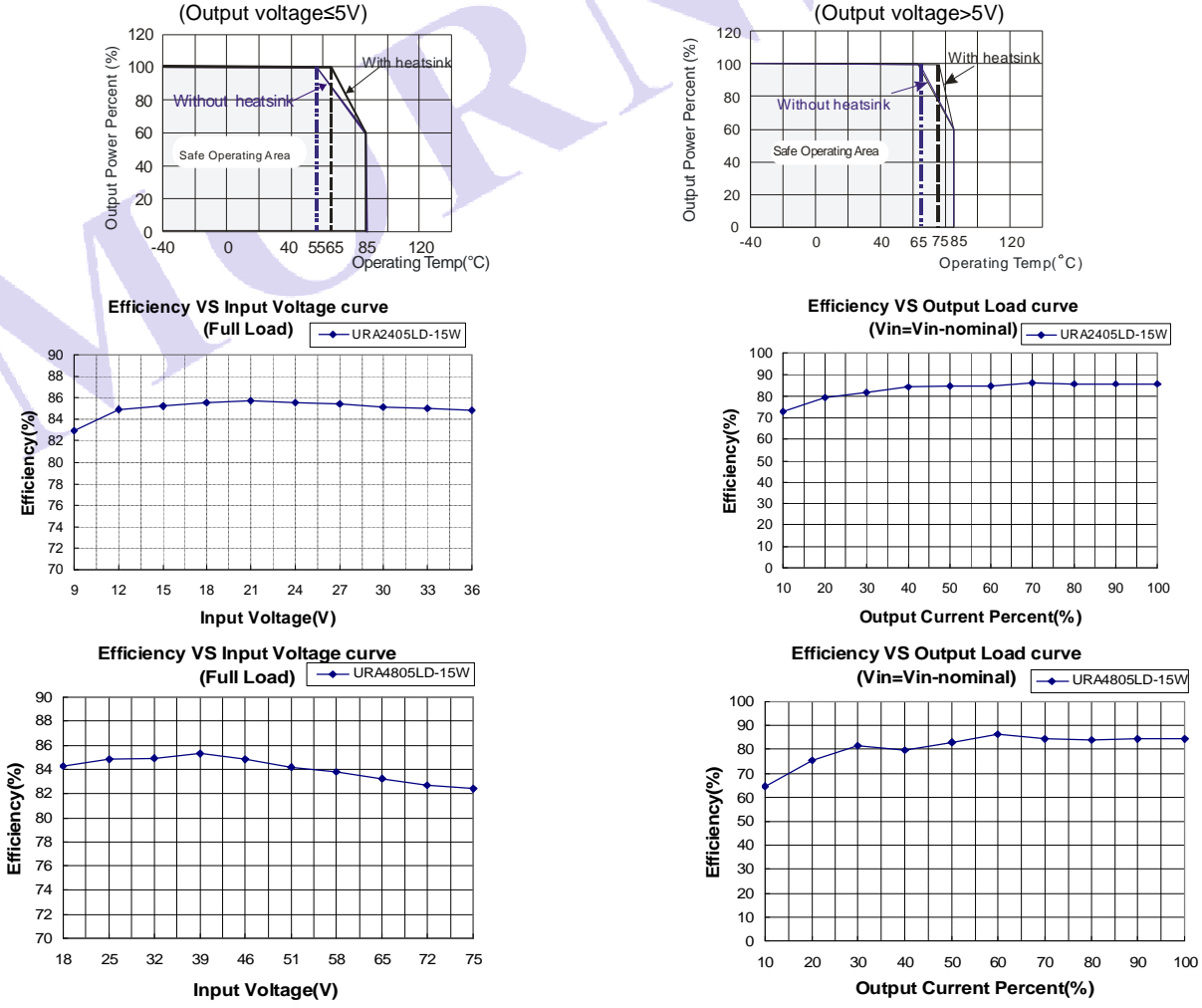


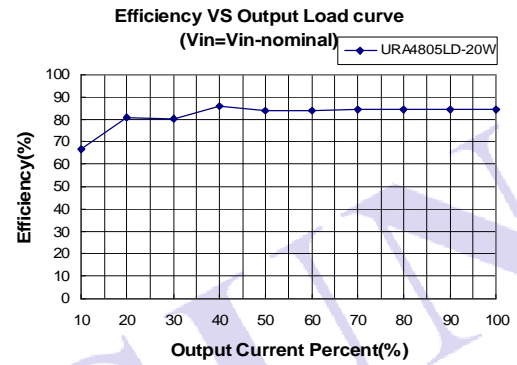
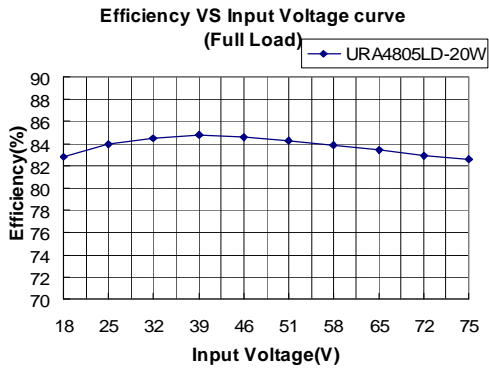
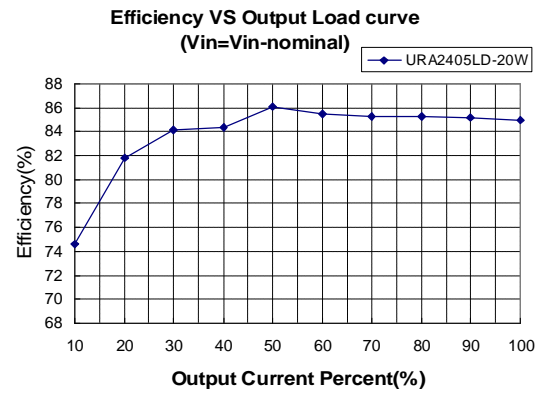
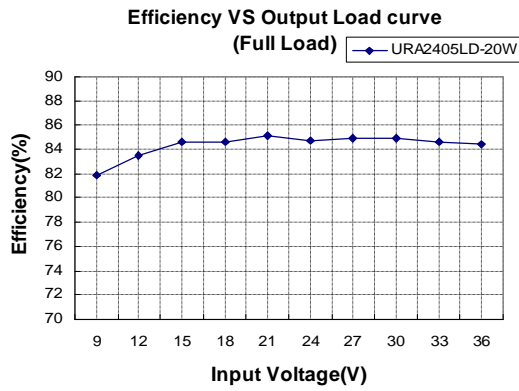
(Figure 2)

EMI TEST WAVEFORM (CLASS B APPLY CIRCUIT)



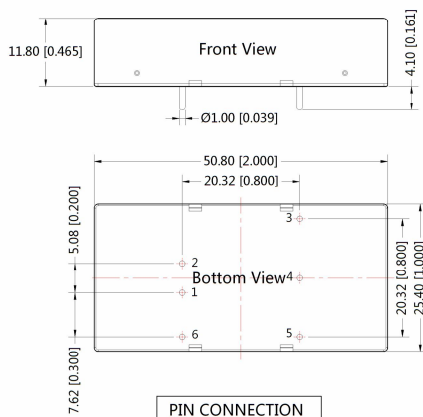
PRODUCT TYPICAL CURVE





OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING

MECHANICAL DIMENSIONS

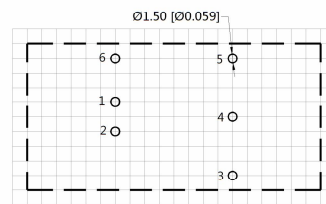


PIN CONNECTION	
Pin	Dual
1	GND
2	Vin
3	+Vo
4	0V
5	-Vo
6	Ctrl

Note:
 Unit :mm[inch]
 Pin diameter tolerances :±0.10[±0.004]
 Pin height tolerances :±0.50[±0.020]
 General tolerances:±0.30[±0.012]

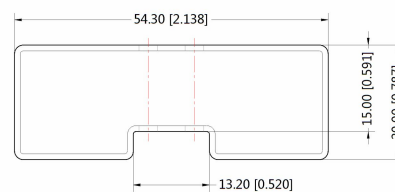
THIRD ANGLE PROJECTION

RECOMMENDED FOOTPRINT DETAILS



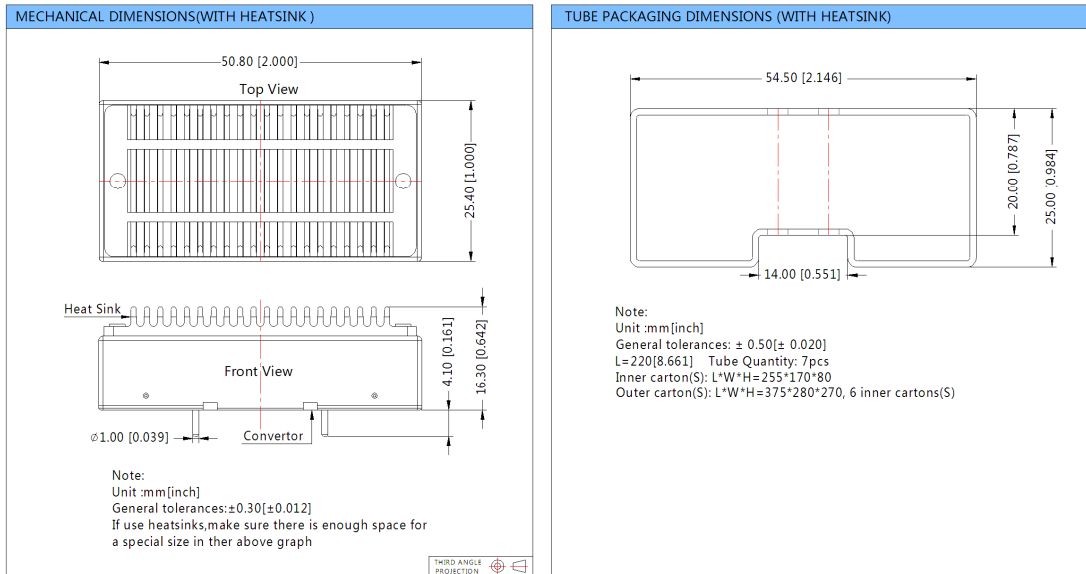
Note : Grid 2.54*2.54mm

TUBE PACKAGING DIMENSIONS (WITHOUT HEATSINK)



Note:
 Unit :mm[inch]
 General tolerances :±0.5[±0.020]
 L=230[9.055] Tube Quantity:7 pcs
 Inner carton(S): L*W*H=255*170*80
 Outer carton(S): L*W*H=375*280*270, 6 inner cartons(S)

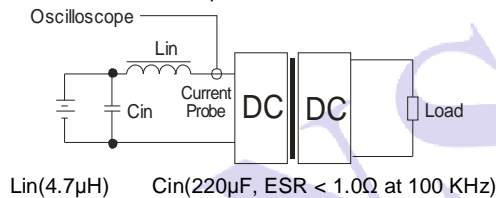
HEATSINK ASSEMBLY & PACKAGE DIAGRAM



TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor L_{in} and Capacitor C_{in} to simulate source impedance.



DESIGN CONSIDERATIONS

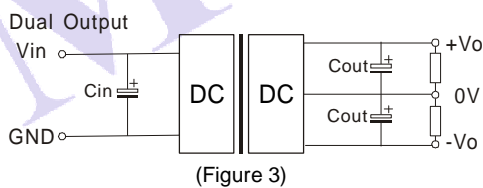
1) Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load **could not be less than 10% of the full load**. If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load, or use our company's products with a lower rated output power.

2) Recommended circuit

All the URA_LD-15W&URA_LD-20W Series have been tested according to the following recommended testing circuit before leaving factory. This series should be tested under load. Never be tested under no load (see Figure 3).

If you want to further decrease the output ripple, you can increase capacitance properly or choose capacitors with low ESR. However, the capacitance can't exceed the maximum capacitor load in the list (Table 1).



EXTERNAL CAPACITOR TABLE (TABLE 1)

Capacitance Vout(VDC)	Cout [#] (μF)	Cin(μF)
±5	220	100
±12	100	
±15	100	

Note: [#] For each output.

3) Cannot use in parallel and hot swap

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed.
2. Max. Capacitive Load tested at input voltage range and full load.
3. All specifications measured at $T_a=25^{\circ}\text{C}$, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on our corporate standards.
5. All characteristics are for listed model only, non-standard models may perform differently, please contact our technical person for more detail.
6. Contact us for your specific requirement.
7. Specifications subject to change without prior notice.

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