

MORNSUN®

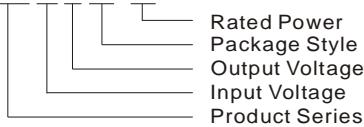
URA_ZP-6WR2 & URB_ZP-6WR2 Series 6W, ULTRA-WIDE INPUT, ISOLATED & REGULATED DUAL/SINGLE OUTPUT DIP PACKAGING, DC-DC CONVERTER



Patent Protection RoHS

PART NUMBER SYSTEM

URB4815ZP-6WR2



FEATURES

- | 4:1 wide input voltage range
- | Efficiency up to 88%
- | 1.5KVDC isolation
- | Short circuit protection
- | Output over voltage protection
- | Operation temperature range: -40°C ~ +85°C
- | Industry standard pinout
- | Low ripple & noise
- | Meet CISPR22/EN55022 CLASS A

APPLICATION

The URA_ZP-6WR2 & URB_ZP-6WR2 offer 6W of output, with ultra-wide input voltage of 9-36VDC, 18-75VDC and 1500VDC isolation voltage, output over-voltage protection and short-circuit protection. The products meet CISPR22/EN55022 CLASS A. All models are particularly suited to industrial control, electric power, instrumentation, tele-communications etc.

SELECTION GUIDE

Model	Input Voltage(VDC)		Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(Typ.)		Reflected Ripple Current (mA,Typ.)	Max. Capacitive Load ^② (μF)	Efficiency (% ,Typ.) @Max. Load
	Nominal (Range)	Max ^①		Max.	Min.	@Max. Load	@No load			
URA2405ZP-6WR2	24 (9-36)	40	±5	±600	±30	301	7	20	470	83
URA2412ZP-6WR2			±12	±250	±12	287			100	87
URA2415ZP-6WR2			±15	±200	±10	287			100	87
URB2403ZP-6WR2			3.3	1500	75	261			1800	79
URB2405ZP-6WR2			5	1200	60	301			1000	83
URB2412ZP-6WR2			12	500	25	287			100	87
URB2415ZP-6WR2			15	400	20	284			100	88
URA4805ZP-6WR2	48 (18-75)	80	±5	±600	±30	150	3	470	83	
URA4812ZP-6WR2			±12	±250	±12	143		100	87	
URA4815ZP-6WR2			±15	±200	±10	142		100	88	
URB4803ZP-6WR2			3.3	1500	75	129		1800	80	
URB4805ZP-6WR2			5	1200	60	149		1000	84	
URB4812ZP-6WR2			12	500	25	143		100	87	
URB4815ZP-6WR2			15	400	20	142		100	88	

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

②. The capacitive load for both outputs is the same.

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1sec. max.)	24V input	-0.7	--	50	VDC
	48V input	-0.7	--	100	
Start-up Voltage	24V input	--	--	9	
	48V input	--	--	18	
Input Filter		π Filter			

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy	5% to 100% load	--	±1	±2	%	
Output Voltage Balance	Dual output, balance load	--	±0.5	±1.5		
Line Regulation	Full load, Input voltage from low to high	--	±0.2	±0.5		
Load Regulation	5% to 100% load	--	±0.5	±1		
Cross Regulation	Dual output, main output 50% load, Supplement output from 10% to 100% load	--	--	±5		
Transient Recovery Time	25% load step change	--	300	500	μs	
Transient Response Deviation		--	±3	±5	%	
Temperature Drift	100% load	--	--	±0.03	%/°C	
Ripple*	20MHz bandwidth	--	10	25	mVp-p	
Noise*	20MHz bandwidth	3.3V, 5V output	--	30		80
		others	--	50		100
Output Over Voltage Protection	input voltage range	110	--	140	%Vo	
Output Short Circuit Protection		Continuous, automatic recovery				

Note:* Ripple and noise tested with "parallel cable" method. See detailed operation instructions at *DC-DC application notes*.

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	--	1000	--	pF
Switching Frequency	5% to 100% load	--	300	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K hours
Case Material		Aluminum Alloy			
Weight		--	14	--	g

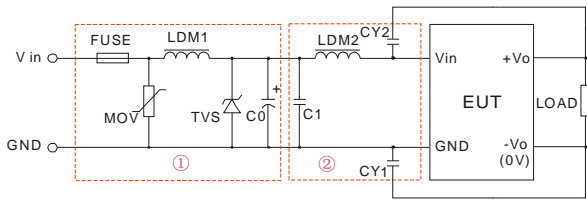
ENVIRONMENTAL SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	5	--	95	%
Operating Temperature	Power derating (above 71°C)	-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 A(Without External Circuit)/ CLASS B (External Circuit Refer to Figure 1-② or Figure 3)			
	RE	CISPR22/EN55022 CLASS A(Without External Circuit)/ CLASS B (External Circuit Refer to Figure 1-② or Figure 3)			
EMS	ESD	IEC/EN61000-4-2	Contact ±4KV	perf. Criteria B	
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A	
	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria B (External Circuit Refer to Figure 1-①)	
			±4KV	perf. Criteria B (External Circuit Refer to Figure 3)	
	Surge	IEC/EN61000-4-5	±2KV	perf. Criteria B (External Circuit Refer to Figure 1-① or Figure 3)	
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A	
	Voltage dips, short and interruptions immunity	IEC/EN61000-4-29	0%-70%	perf. Criteria B	

EMC RECOMMENDED CIRCUIT

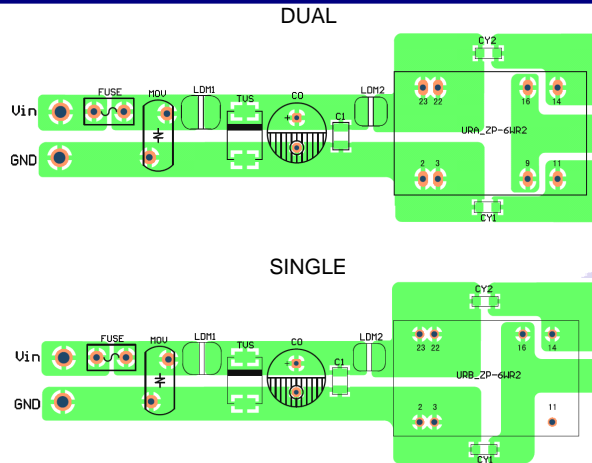


(Figure 1)

Note: In Figure 1, part ① is EMS Recommended external circuit, part ② is EMI recommended external circuit. Choose according to requirements.

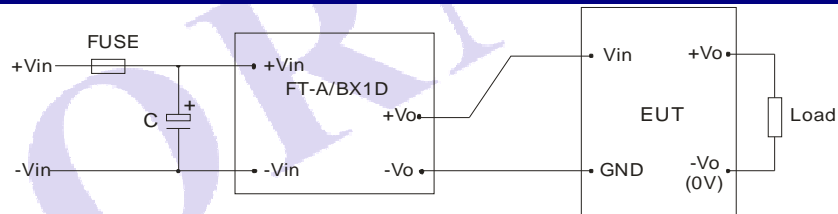
Parameters	Vin: 24V	Vin: 48V
FUSE	Choose according to practical input current	
MOV	10D560K	10D101K
LDM1	56 μ H	
TVS	SMCJ48A	SMCJ90A
C0	120 μ F/50V	120 μ F/100V
C1	1 μ F/50V	1 μ F/100V
LDM2	4.7 μ H	
CY1	1nF/2000V	
CY2	1nF/2000V	

EMC RECOMMENDED CIRCUIT PCB LAYOUT



(Figure 2)

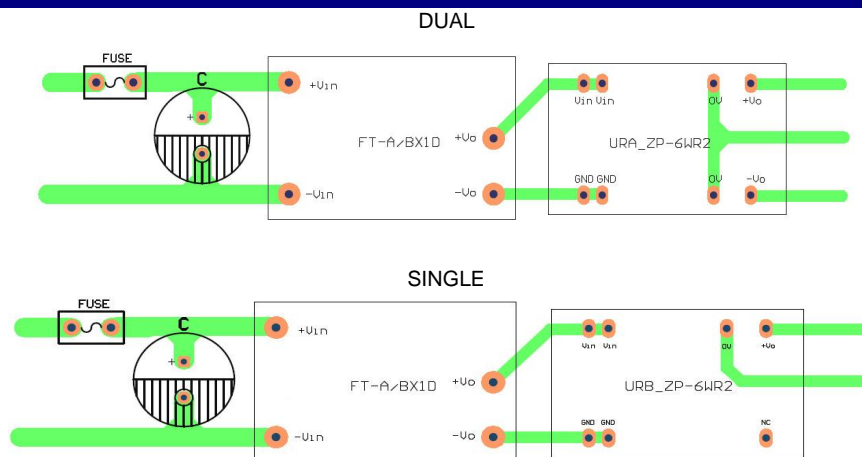
EMC MODULE RECOMMENDED CIRCUIT



Nominal Voltage < 48V, C ≥ 330 μ F/50V
 Nominal Voltage = 48V, C ≥ 330 μ F/100V
 FT-A/BX1D is MORNSUN's EFT suppressor

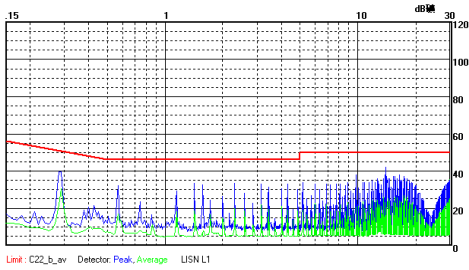
(Figure 3)

EMC MODULE RECOMMENDED CIRCUIT PCB LAYOUT

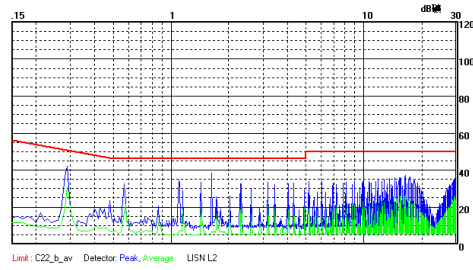


(Figure 4)

EMI TEST WAVEFORM (NOMINAL AND FULL LOAD)



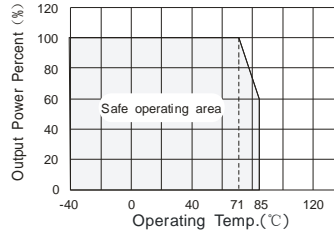
URB4815ZP-6WR2 With External Circuit Power+ (Class B)



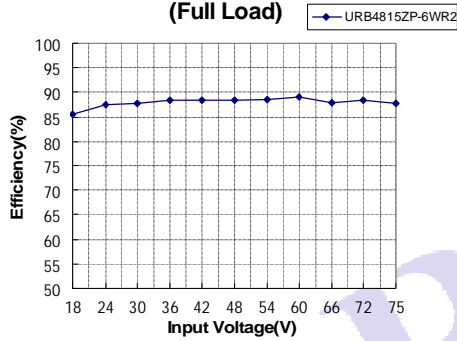
URB4815ZP-6WR2 With External Circuit Power- (Class B)

PRODUCT TYPICAL CURVE

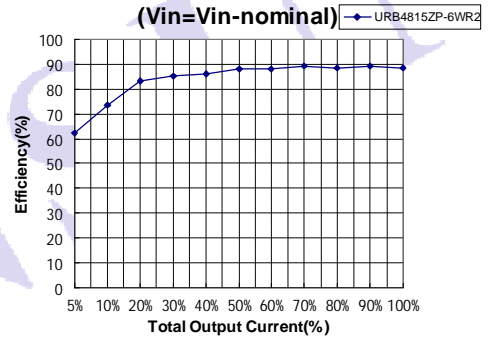
Temperature Derating Curve



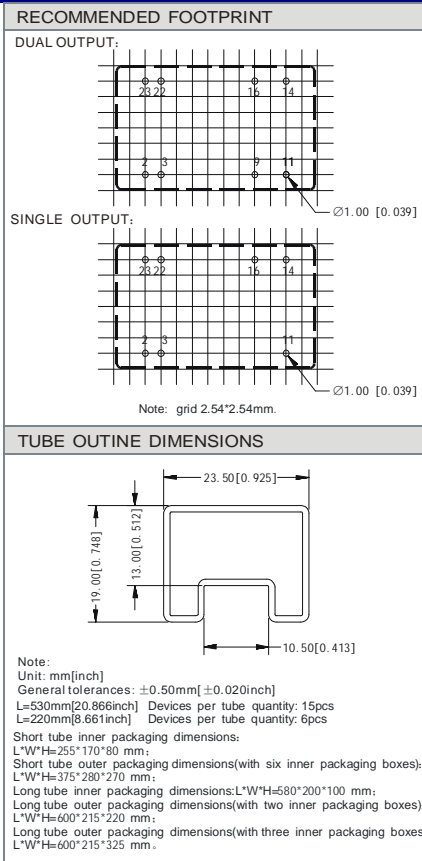
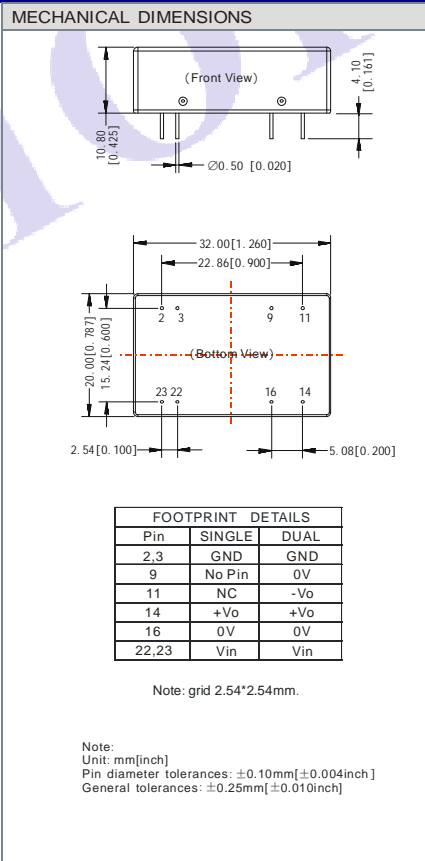
Efficiency VS Input Voltage curve (Full Load)



Efficiency VS Output Load curve (Vin=Vin-nominal)



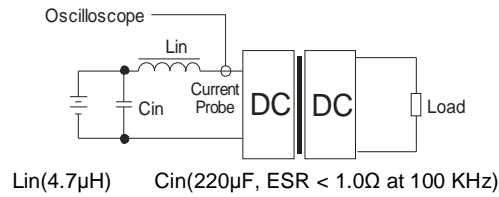
OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING



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.



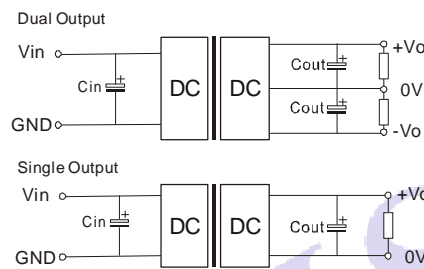
DESIGN CONSIDERATIONS

1) Recommended circuit

All the URA_ZP-6WR2 & URB_ZP-6WR2 Series have been tested according to the following recommended testing circuit before leaving factory (see Figure 5).

If you want to further decrease the output ripple, you can increase a capacitance properly or choose capacitors with low ESR, but the greatest capacitance of its filter capacitor must less than the Max. Capacitive Load.

Cin: 12V 100μF
24V&48V 10μF~47μF
Cout: 10μF



2) Cannot use in parallel and hot swap

Note:

1. Min. load shouldn't be less than 5%, otherwise ripple maybe increased dramatically, If the product operate under min. load, it may not be guaranteed to meet all specification listed. Operation under minimum load will not damage the converter.
2. Recommended Dual output models unbalanced load: $\leq \pm 5\%$, If the product operate $> \pm 5\%$, it may not be guaranteed to meet all specification Listed, please contact our technical person for more detail.
3. Max. Capacitive Load is tested at nominal input voltage and full load.
4. All specifications measured at $T_a=25^\circ\text{C}$, humidity $<75\%$, nominal input voltage and rated output load unless otherwise specified.
5. In this datasheet, all the test methods of indications are based on our corporate standards.
6. All characteristics are for listed model, non-standard models may perform differently, please contact our technical person for more detail.
7. Contact us for your specific requirement.
8. Specifications of this product are subject to changes without prior notice.

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