

WRB_LT-3WR2 SERIES 3W, WIDE INPUT, ISOLATED & REGULATED SINGLE OUTPUT DC/DC CONVERTER



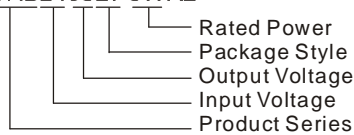
Patent Protection RoHS

FEATURES

- Ultra-small size, SMD package
- 2:1 wide input voltage range
- Operating temperature range: -40°C ~ +85°C
- 1.5KVDC isolation
- Short circuit protection (automatic recovery)
- High power density
- meet UL94-V0

PART NUMBER SYSTEM

WRB2405LT-3WR2



APPLICATION

The WRB_LT-3WR2 series are specially designed for applications where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

- 1) These products apply to where: Input voltage range ≤ 2:1;
- 2) 1.5KV input and output isolation;
- 3) Regulated and low ripple noise is required.

SELECTION GUIDE

Model Number	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			
*WRB0505LT-3WR2	5(4.5-9)	11	5	600	30	821	42	30	3300	73
*WRB0512LT-3WR2			12	250	13	800			1800	75
*WRB0515LT-3WR2			15	200	10	789			1000	76
*WRB1205LT-3WR2	12(9-18)	22	5	600	30	333	22		3300	75
*WRB1212LT-3WR2			12	250	13	312			1800	80
*WRB1215LT-3WR2			15	200	10	312			1000	80
WRB2405LT-3WR2	24(18-36)	40	5	600	30	162	12		3300	77
*WRB2412LT-3WR2			12	250	13	156			1800	80
*WRB2415LT-3WR2			15	200	10	156			1000	80
*WRB4805LT-3WR2	48(36-75)	80	5	600	30	81	8		3300	77
*WRB4812LT-3WR2			12	250	13	78			1800	80
WRB4815LT-3WR2			15	200	10	78			1000	80

Note:*Designing.

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

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1sec. max.)	5VDC input	-0.7	--	12	VDC
	12VDC input	-0.7	--	25	
	24VDC input	-0.7	--	50	
	48VDC input	-0.7	--	100	
Start-up Voltage	5VDC input	3.5	4	4.5	
	12VDC input	4.5	8	9	
	24VDC input	11	16	18	
	48VDC input	24	33	36	
Short Circuit Input Power		--	2500	3000	mW
Input Filter		π Filter			

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Output Power		0.15	--	3	W
Output Voltage Accuracy	5% to 100% load	--	±1	±3	%
No-load Output Voltage Accuracy	≤5V	--	±1.5	±5	
	>5V	--	±1.5	±3	
Line Regulation	Full load, Input voltage from low to high	--	±0.2	±0.4	
Load Regulation	5% to 100% load	--	±0.2	±0.75	
Transient Recovery Time	25% load step change	--	0.5	1	ms
Transient Response Deviation		--	±2	±5	%
Temperature Drift	100% load	--	±0.02	±0.03	%/°C
Ripple & Noise *	20MHz Bandwidth	--	25	45	mVp-p
Output Power Protection		120	--	--	%
Output Short Circuit Protection	Continuous, automatic recovery				

* Ripple and noise tested by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, 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/1V	--	1	--	nF
Switching Frequency	100% load, nominal input voltage	--	350	--	KHz
MTBF	MIL-HDBK-217F @25°C	1000	--	--	K hours
Case Material	Epoxy Resin (UL94-V0)				
Weight		--	5.2	--	g

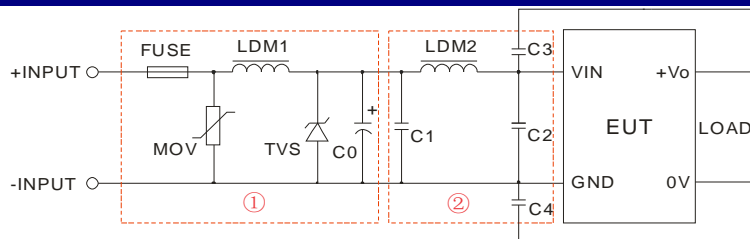
ENVIRONMENTAL SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%
Operating Temperature	Power derating (above 85°C)	-40	--	85	°C
Storage Temperature		-55	--	125	
Temp. rise at full load	Ta=25°C	--	25	--	
Soldering 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)			
EMS	ESD	IEC/EN61000-4-2	Contact ±4KV /Air ±8KV	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 Figure1-①)	
	Surge	IEC/EN61000-4-5	±2KV	perf. Criteria B (External Circuit Refer to Figure1-①)	
	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



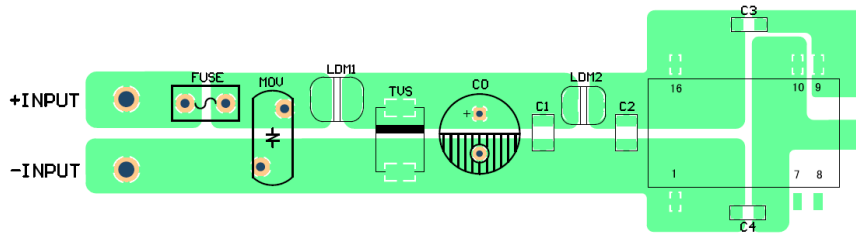
(Figure1)

Recommended external circuit parameters:

Model	Vin:5V (Designing)	Vin:12V (Designing)	Vin:24V	Vin:48V
FUSE	Choose according to practical input current			
MOV			10D560	10D101
LDM1			56μH	56μH
TVS			SMCJ48A	SMCJ90A
C0			120μF/50V	120μF/100V
LDM2			12μH	12μH
C1			475K/50V	475K/100V
C2			475K/50V	475K/100V
C3			--	--
C4			--	--

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

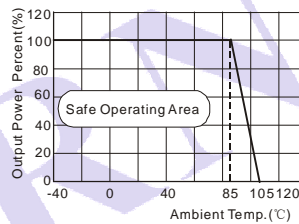
EMC RECOMMENDED CIRCUIT PCB LAYOUT



(Figure 2)

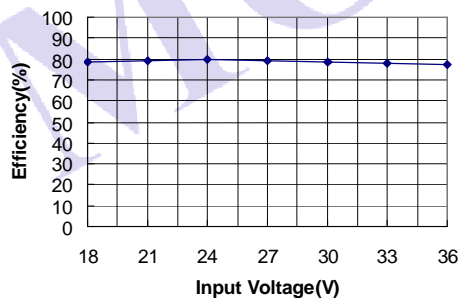
PRODUCT TYPICAL CURVE

Temperature Derating Graph



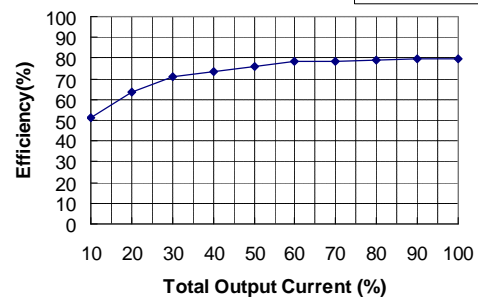
Efficiency VS Input Voltage curve

(Full Load) — WRB2405LT-3WR2



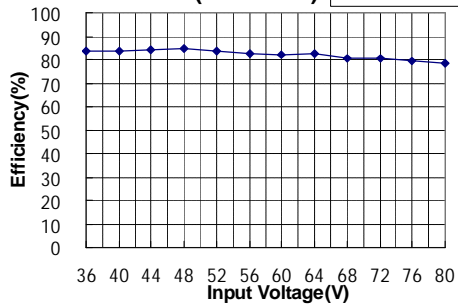
Efficiency VS Output Load curve

(Vin=Vin-nominal) — WRB2405LT-3WR2



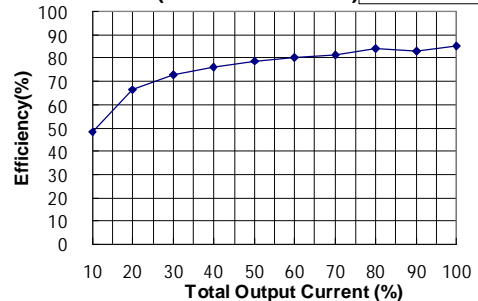
Efficiency VS Input Voltage curve

(Full Load) — WRB4815LT-3WR2



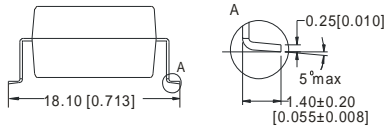
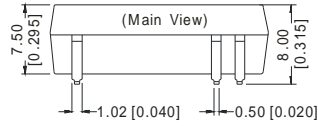
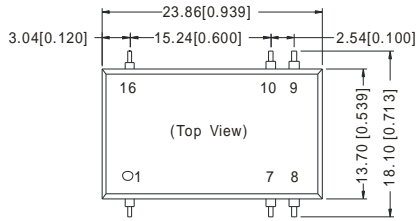
Efficiency VS Output Load curve

(Vin=Vin-nominal) — WRB4815LT-3WR2



OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING

MECHANICAL DIMENSIONS

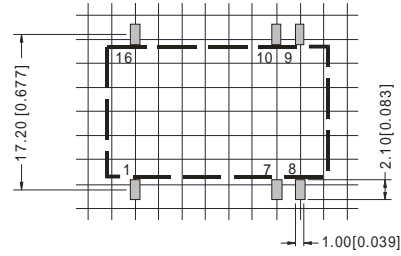


FOOTPRINT DETAILS	
Pin	FUNCTION
1	GND
7	NC
8	NC
9	+Vo
10	0V
16	Vin

NC: No connection

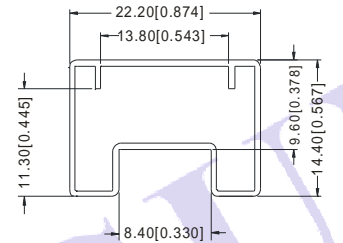
Note:
Unit:mm[inch]
Pin section tolerances:±0.10mm[±0.004inch]
General tolerances:±0.25mm[±0.010inch]

RECOMMENDED FOOTPRINT(TOP VIEW)



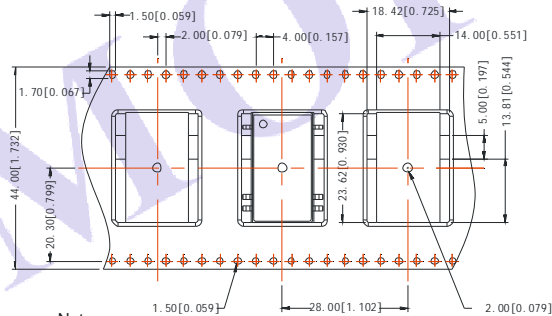
Note: grid 2.54*2.54mm.

TUBE OUTLINE DIMENSIONS

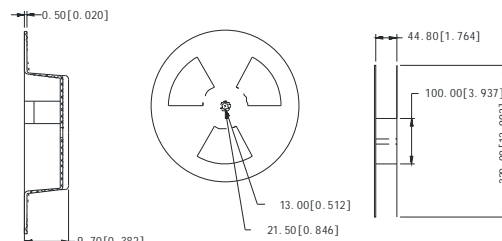


Note:
Unit :mm[inch]
General tolerances: ±0.50mm[±0.020inch]
L=530mm[20.866inch] pcs/tube: 21
L=220mm[8.661inch] pcs/tube: 8
Short tube inner package dimensions: L*W*H= 255*170*80mm
Short tube outer package dimensions(with six inner package boxes): L*W*H= 375*280*270mm
Long tube inner package dimensions: L*W*H= 580*200*100mm
Long tube outer package dimensions(with two inner package boxes): L*W*H= 600*215*220mm
Long tube outer package dimensions(with three inner package boxes): L*W*H= 600*215*325mm

TAPING REEL DIMENSIONS



Note:
Unit:mm [inch]
General Tolerances:±0.50mm [±0.020inch]

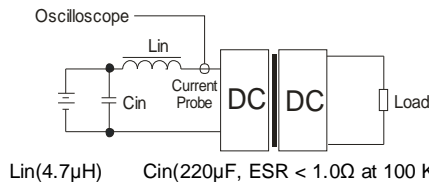


Per reel of packing quantity:200PCS
Innerpackage cartondimensions:L*W*H=365*350*105mm
Tube quantity:400pcs
Outerpackagecartondimensions: L*W*H=390*360*245mm
Tube quantity:800pcs

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 is not less than 5% of the full load,otherwise ripple maybe increase dramatically. 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 WRB_LT-3WR2 series have been tested according to the following recommended testing circuit before leaving factory. This series should be tested under load (See Figure 3).

If you want to further decrease the input/output ripple, you can increase capacitance properly or choose capacitors with low ESR. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance must less than the Max. Capacitive Load.

General: Cin: 5V&12V 100 μ F
24V&48V 10 μ F~47 μ F
Cout: 10 μ F/100mA

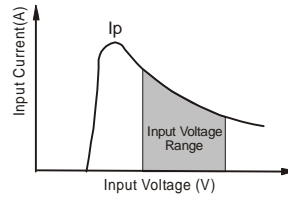


(Figure 3)

3) Input Current

When it is used in unregulated power supply, be sure that the fluctuating range of the power supply and the rippled voltage do not exceed the module standard. Input current of power supply should afford the flash startup current of this kind of DC/DC module (Figure 4).

General: Vin=5V Ip =1200mA
Vin=12V Ip =600mA
Vin=24V Ip =300mA
Vin=48V Ip =150mA



(Figure 4)

4) Cannot use in parallel and hot swap

Note:

1. Min. load shouldn't be less than 5%, otherwise ripple maybe increase dramatically. 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 Ta=25°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, 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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