

2A constant current isolated DC-DC converter with Ultra-wide Input and Regulated Single Output



Patent Protection **RoHS**

URB24C4LD-2A is isolated DC-DC converter with a ultra-wide 4:1 input voltage range and constant output current 2A. It features with 1500VDC input to output isolation, six-sided metal shielded package, input under-voltage protection, output over-voltage and short circuit protection. They are used in application of electric vehicle auxiliary charging power supply.

FEATURES

- Ultra-wide 4:1 input voltage range
- I/O isolation test voltage 1.5k VDC
- Output short-circuit protection (self-recovery)
- Operating ambient temperature range -40°C to +71°C
- MTBF \geq 1,000,000 hours
- Six-sided metal shielded package

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency(%) Min./Typ.
		Nominal (Range)	Max. ^①	Voltage(VDC)	Current (mA)	
--	URB24C4LD-2A	24 (9-36)	40	4.2	2000	69/71

Notes:

① Absolute maximum stress rating without damage (not recommended).

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	Nominal input voltage	--	5	12	mA
Reflected Ripple Current		--	40	--	
Surge Voltage (1sec. max.)		-0.7	--	50	VDC
Start-up Voltage		--	--	9	
Shut-down Voltage	Input voltage range, 10% load	7.5	--	--	
Start-up Time	Ta=25°C, Input voltage range & constant resistance load R \geq 2.3 Ω	--	10	--	ms
Input Filter		Pi filter			
Hot Plug		Unavailable			
Ctrl ^①	Module on	Ctrl pin open or pulled high (3.5-12VDC)			
	Module off	Ctrl pin pulled low to GND (0-1.2VDC)			
		--	5	10	mA

Note: ① The Ctrl pin voltage is referenced to input GND.

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy	Ta=25°C, Input voltage range	constant resistance load R2 \geq 2.3 Ω	--	\pm 3	\pm 5	%
Current Accuracy		constant resistance load R2 \leq 1.9 Ω	--	\pm 3	\pm 5	
Voltage Linear Regulation		constant resistance load R2 \geq 2.3 Ω	--	\pm 0.2	\pm 1	
Current Linear Regulation		constant resistance load R2 \leq 1.9 Ω	-	\pm 1	\pm 5	
Temperature Coefficient	Input voltage range & constant resistance load R2 \leq 1.9 Ω	--	--	\pm 0.03	%/°C	
Ripple & Noise ^①	Ta=25°C, 20MHz bandwidth, nominal input voltage, 5%-100% load	--	50	120	mVp-p	
Trim	nominal input voltage, output 5% load	--	\pm 10	--	%Vo	
Over-voltage Protection	Input voltage range, output 50% load	110	--	160		
Short-circuit Protection	Input voltage range	Continuous, self-recovery				

Note:

① The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.	1500	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC/60sec.	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	--	2000	--	pF
Operating Temperature	See Fig. 1	-40	--	+71	℃
Storage Temperature		-55	--	+125	
Storage Humidity	Non-condensing	5	--	95	%RH
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	℃
Vibration		10G,10-55Hz, 30 Min. along X, Y and Z			
Switching Frequency	PWM mode	--	300	--	KHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	K hours

Mechanical Specifications

Case Material	Aluminum alloy
Dimensions	50.80 x 25.40 x 11.80 mm
Weight	26.0g(Typ.)
Cooling Method	Free air convection

Typical Characteristic Curve

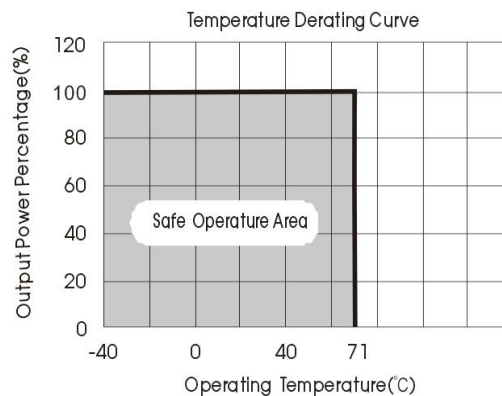


Fig. 1

Design Reference

1. Typical application

All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.

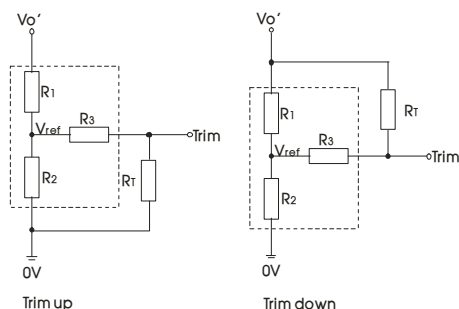
Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values C_{in} and C_{out} and/or by selecting capacitors with a low ESR (equivalent series resistance).



Fig. 2

Vout (VDC)	Cout (μF)	Cin (μF)
4.2	220	100

2. Trim Function for Output Voltage Adjustment (open if unused)



Calculating Trim resistor values:

$$\begin{aligned} \text{up: } R_T &= \frac{\alpha R_2}{R_2 - \alpha} - R_3 & \alpha &= \frac{V_{ref}}{V_{O'} - V_{ref}} \cdot R_1 \\ \text{down: } R_T &= \frac{\alpha R_1}{R_1 - \alpha} - R_3 & \alpha &= \frac{V_{O'} - V_{ref}}{V_{ref}} \cdot R_2 \end{aligned}$$

R_T = Trim resistor,
 α = self-defined parameter, with no real meaning
 $V_{O'}$ = desired output voltage

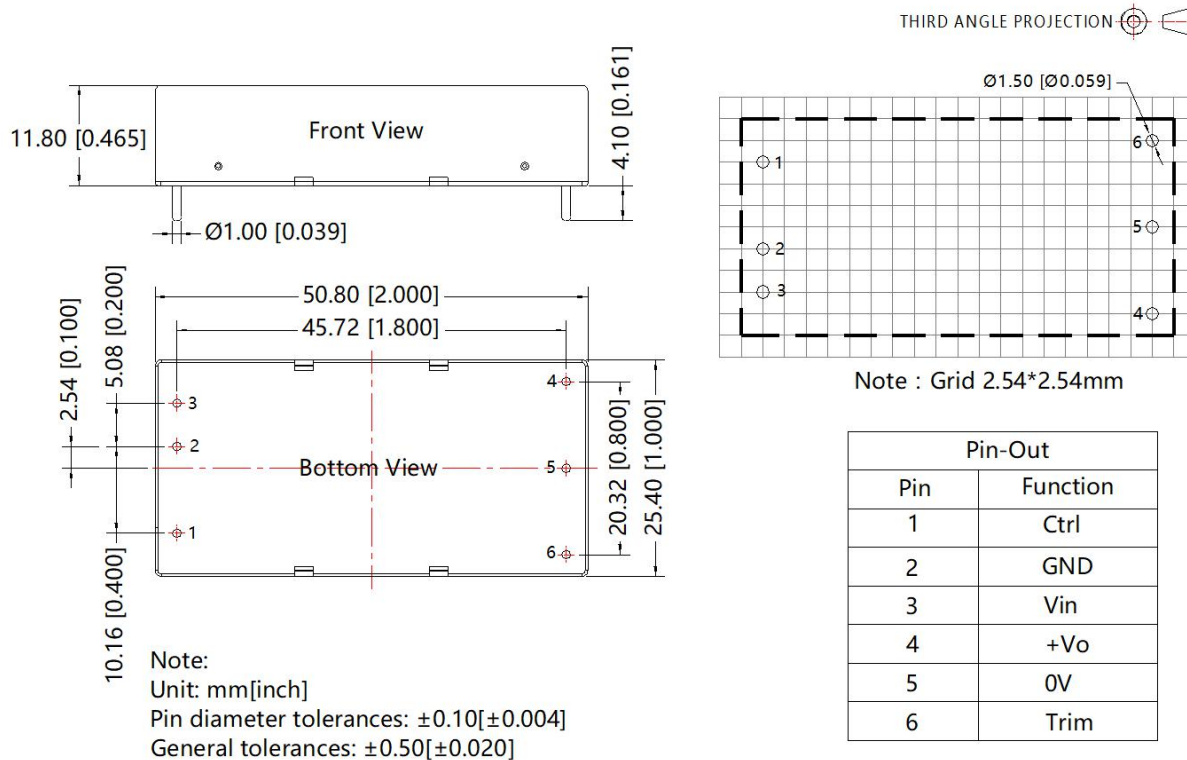
Trim resistor connections (dashed line shows internal resistor network)

Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
4.2	6.982	2.863	15	1.24

3. The products do not support parallel connection of their output

4. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout



Notes:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Horizontal Packaging Bag Number: 58200035;
- Unless otherwise specified parameters in this datasheet were measured under the conditions of $T_a=25^\circ\text{C}$, humidity<75%RH with nominal input voltage and constant resistance load $R=2.3\ \Omega$;
- We suggest to connect a capacitor with value of more than 680uf when testing in condition of 0%-5% I_o , to ensure the ripple & noise less than 5% V_o ;
- All index testing methods in this datasheet are based on our Company's corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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