

Input voltage	Output voltage	Output current	Output power	Efficiency	Size
9-36V	24V	6A	144W	92.7%	74*74*32mm

The RW-1433-12-36V-24V-144W is a Non-isolated DC-DC converter that uses a synchronous rectification technology, and features high efficiency and power density. It has the dimensions of 74*74*32mm (2.91 in. x 2.91 in. x 1.26 in) and provides the rated output voltage of 24V and the maximum output current of 6A.



Features

- Design meeting RoHS / CE
- High efficiency: 92.7% (@24Vin, 25°C)
- Import capacitors, high reliability
- 100% full stable current output
- Support -40 °C environment
- 100% full load burn-in test
- Short circuit, Over load, Low voltage protections
- Waterproof level IP68
- 3 months warranty
- Input transient absorption protection

Applications

- Industrial
- Alternative Energy
- Golf Cart
- Forklift
- Electromotor
- Telecommunications
- Boat & Yacht
- Medical
- LED Marketplaces and so on.

Model naming method
RW-1433-12-36V-24V-144W

RW-1433:SKUNAME
12:Input voltage
36V:Outputvoltage
144W: Output Power

Electrical Specifications

Conditions: TA=25°C(77°F), Airflow= 1 m/s (200LFM), Vin =12V, Vout =24V, unless otherwise specified

Parameter	Min.	Typ	Max.	Units	Remarks
Absolute maximum ratings					
Operating ambient temperature	-40	-	+55	°C	
Shell ambient temperature	-40	-	80	°C	
Storage temperature	-55	-	100	°C	
Operating humidity	5	-	95	%	Non-condensing
Atmospheric pressure	62	-	106	Kpa	
Altitude	-	-	4000	m	
Cooling way	-	-	-		Natural cooling

Input characteristics

Input voltage	9	12/24	36	V	-
Max. input voltage	-	-	36	V	Continuous
Undervoltage shutdown	7.8	8.0	8.2	V	Automatic recovery
Undervoltage recovery	8.5	8.6	8.7	V	Automatic recovery
Max. input current	-	-	22	A	Vin =8.1V; Iout =6A
No load current	-	55	58	mA	Vin =12V

Positive electrode cable	14	-	-	AWG	If the wire length is greater than 50cm, it is recommended to use a thicker wire diameter.
Negative electrode cable	14	-	-	AWG	
Enable PIN cable	22	-	-	AWG	If the product has this feature
Fuse	-	30	-	A	Input positive has built-in fuse

Output characteristics

Efficiency	-	92.7	-	%	Vin =12V; Iout =6A
Output voltage	23.9	24.0	24.3	V	Vin =12V; Iout =6A
Regulator accuracy	-	±1	-	%	
Voltage regulation	-	±1	-	%	
Load Regulation	-	±1	-	%	
Overvoltage protection	-	-	-	V	
Output current	0	-	6	A	
Overcurrent protection	9.7	9.9	10.2	A	Vin=12V
External capacitance		3000	4000	μF	
Output ripple and noise	-	170	230	mVp-p	Vin =9-40V; Iout=6A, Oscilloscope bandwidth: 20 MHz
Output voltage rise time	-	7.1	8.3	mS	
Boot delay time	-	17.1	20	mS	
Out voltage overshoot	-	1	2	%	Vin =12V, 50%-75% Load step
Over temperature protection	-	-		°C	
Short circuit protection	-	-	-		Long-term (4 hours) short circuit is not damaged, Hiccup mode
Positive electrode cable	16	-	-	AWG	If the wire length is greater than 50cm, it is recommended to use a thicker wire diameter.
Negative electrode cable	16	-	-	AWG	

Feature Description

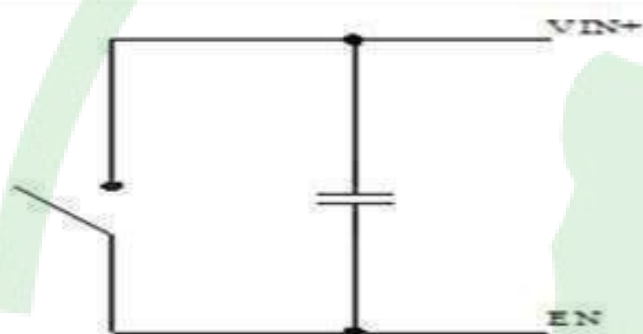
Remote On/Off (EN) (Optional)

Logic Enable	Low level (0-9Vdc)	High level (9-36Vdc)	Left open
Positive logic	Off	On	Off

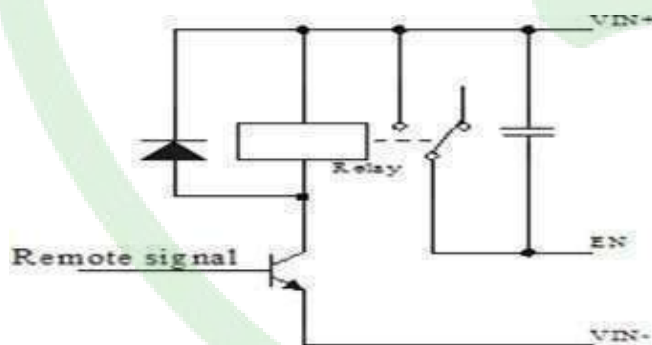
Input Undervoltage Protection

The converter will shutdown after the input voltage drops below the under-voltage protection threshold for shutdown. The converter will start to work again after the input voltage reaches the input under voltage protection threshold for startup. For the Hysteresis, see

Various circuits for driving the EN



Simple control



Transistor control

Output Overcurrent Protection

The converter equipped with current limiting circuitry can provide protection from an output overload or short circuit condition. If the output current exceeds the output overcurrent protection set point, the converter enters hiccup mode. When the fault condition is removed, the converter will automatically restart.

Wiring Instructions

The input and output of this product is terminals. The user should ensure that the input and output wires and terminals are connected reliably, and pay attention to the wire diameter to meet the requirements of the power supply current. If the cable to be used is long, it needs Considering the voltage drop of the wire, if the voltage drop is too large, the voltage output at the load end may not meet the load demand. In this case, consider using a thicker wire diameter or reducing the length of the wire. Generally, if long wiring is required. Long line should be used on the side where the current is relatively small. For example, this product is a stepdown product, so long lines should be used on the input side

DIAGRAM WIRING

INPUT+ TO BATTERY+

INPUT- TO BATTERY-

OUTPUT+ TO LOAD+

OUTPUT- TO LOAD-

Notes: Never reverse the input polarity, or it burns the converter.

REVISION HISTORY

rev.	description	date
1.0	initial release	April 2022
2.0	revision	Nov 2024

Safety and EMC features

Anti-electric Strength	Input to Output		V	Leakage current $\leq 3.5\text{mA}$, 1min, no breakdown, no arcing
	Input to Shell	≥ 500	V	
	Output to Shell	≥ 500	V	
Insulation resistance	Input to Output	≥ 50	$\text{M}\Omega$	Test voltage = 500V
	Input to Shell			
	Output to Shell			

Other characteristics

Weight	≤ 290	g	
Package	White box		
MTBF	$\geq 200,000$	H	$V_{in} = 24\text{V}; I_{out} = 6\text{A}$
Switching frequency	80 ± 10	KHz	

Characteristic Curves

Conditions: $T_A = 25^{\circ}\text{C}$ (77°F), $V_{in} = 12\text{ V}$, $V_{out} = 24\text{ V}$, unless otherwise specified

Figure 1, Efficiency

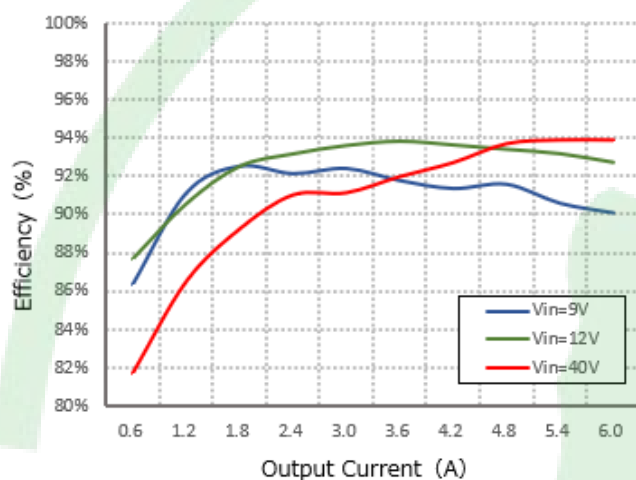


Figure 2, Power dissipation

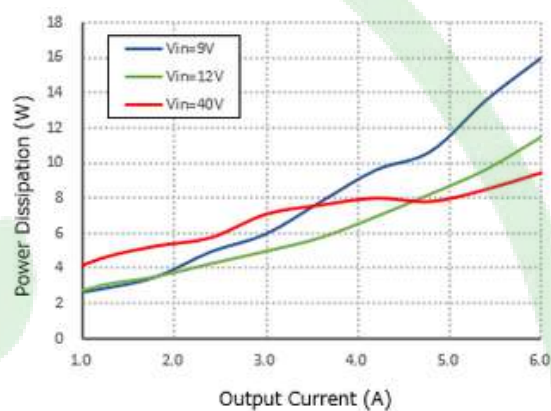
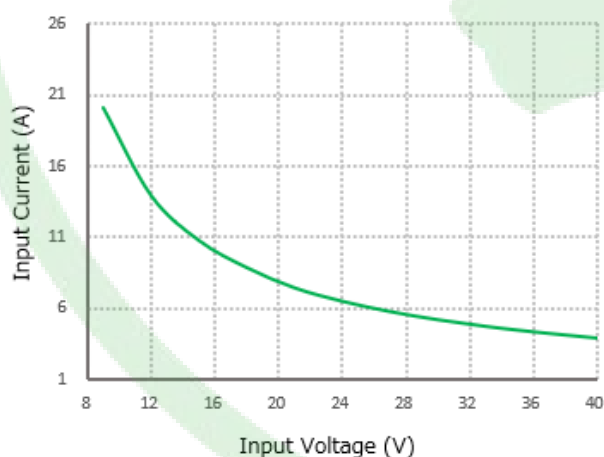


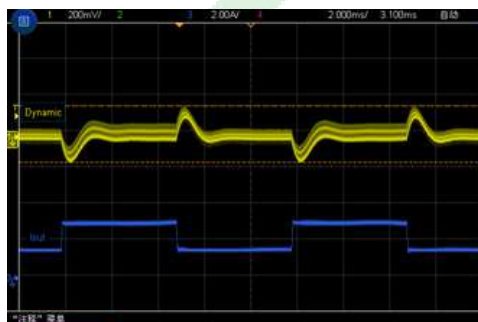
Figure 3, Input V-I, $I_{out}=6\text{A}$



Typical Waveforms

Conditions: $T_A = 25^\circ\text{C}$ (77°F), $V_{in} = 12\text{V}$, unless otherwise specified.

Figure 4, 25% - 50% load dynamic



frequency 104kHz
peak to peak 310mV
maximum level 173mV
maximum level 3.20A
One liter of time <930ps

Figure 5, 50% - 75% load dynamic



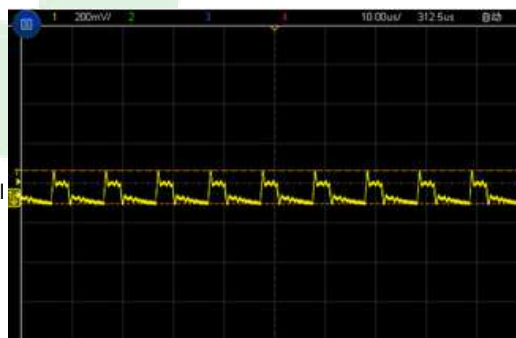
frequency 98kHz
peak to peak 350mV
maximum level 197mV
maximum level 4.81A
rise time <930ns

Figure 6, Output voltage established ($I_{out} = 6\text{A}$)



frequency boundless
peak to peak 25.3V
maximum level 25.1V
maximum level No signal
rise time 7.096ms

Figure 7, Output ripple & noise ($I_{out} = 6\text{A}$)



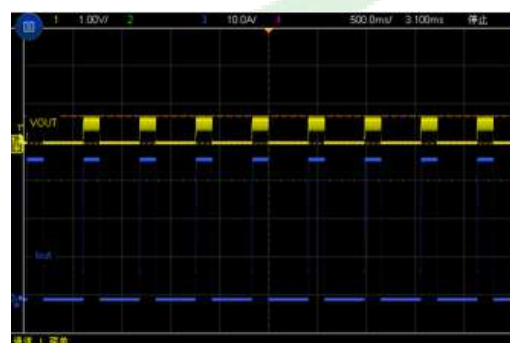
frequency 96.84kHz
peak to peak 170mV
maximum level 123mV
maximum level No signal
rise time 168ns

Figure 8, Boot delay time



X1(1): -10.800000000ms
X2(1): 6.345050000ms
 ΔX : 17.145050000ms
1/ ΔX : 58.326Hz
Y1(1): 2.5675V
Y2(1): 21.8650V
 ΔY : 19.2975V
 $\Delta Y/\Delta X$: 1.12554kV/s

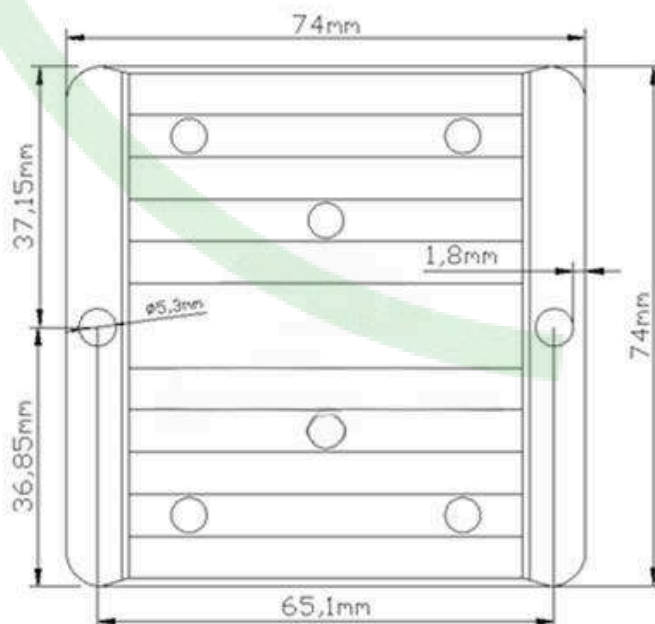
Figure 9, Short-circuit & Output voltage



frequency 1.7366Hz
peak to peak 720mV
maximum level 680mV
maximum level 36.9A
rise time 4.4ms

Thermal Consideration

Sufficient airflow should be provided to help ensure reliable operating of the RW-1433-12-36V-24V-144W. Therefore, thermal components are mounted on the top surface of the RW-1433-12-36V-24V-144W to dissipate heat to the surrounding environment by conduction, convection, and radiation. Proper airflow can be verified by measuring the temperature at the middle of the base plate.



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