G-ENERGY

Non-Isolated DC/DC Converter Specification

RW-1464-12V-48V-960W

Input voltage	Output voltage	Output current	Output power	Efficiency	Size
10-20V	48V	20A	960W	96.8%	140*120*42.5mm

The RW-1464-12V-48V-960W 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 140*120*42.5mm (5.51 in. x 4.72 in. x 1.67 in) and provides the rated output voltage of 48V and the maximum output current of 20A

Features

- Designmeeting RoHS / CE
- Highefficiency:96%(@48Vin, 25℃)
- Non-isolated between input and output
- 100% full stable current output
- Support -30 ℃ environment
- 100% full load burn-in test
- 3 month warranty
- OT, OL, LV protections
- Waterproof level IP67

Applications

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

Model naming method

RW-1464-12V-48V-960W

RW-1464: SKU NAMEEE
12V: Input Voltage
48V: Output Voltage
960W: Output Power

Electrical Specifications

Conditions:TA=25°C(77°F),Airflow= 1 m/s (200LFM), Vin =12V, Vout =48V, unless otherwise specified

Parameter	Min.	Typ	Max.	Units	Remarks
Absolute maximum ratings					
Operating ambient temperature	-30	-	+50	°C	
Shell ambient temperature	-30	-	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	10	12	20	V	-
Max. input voltage	-	-	23	V	Continuous
Undervoltage shutdown	9.3	9.5	9.8	V	Automatic recovery
Undervoltage recovery	10.2	10.6	11.0	V	Automatic recovery
Max. input current	-	-	102	A	Vin =10V; Iout =20A
No load current	-	120	200	mA	Vin = 12V

Positive electrode cable	4	-	-	AWG	If the wire length is greater than 50cm, it is recommended to use a thicker wire diameter.
Negative electrode cable	4	-	-	AWG	
Enable PIN cable	-	NA	-	AWG	If the product has this feature
Fuse	-	120	-	A	Input positive has built-in fuse

Output characteristics

Efficiency	-	96.8	-	%	Vin =12V; Iout =20A
Output voltage	47.6	48	48.1	V	Vin =12V; Iout =20A
Regulator accuracy	-	±2	-	%	
Voltage regulation	-	±1	-	%	
Load Regulation	-	±1	-	%	
Overvoltage protection	-	NA	-	V	
Output current	0	-	20	A	Vin =10-20V
Overcurrent protection	32	33	34	A	Vin=12V
External capacitance	-	NA	-	μF	Don't need
Output ripple and noise	-	452	700	mVp-p	Vin =10-20V; Iout=20A, Oscilloscope bandwidth: 20 MHz
Output voltage rise time	-	101	300	mS	
Boot delay time	-	106	300	mS	
Out voltage overshoot	-	-	3	%	Vin =12V, 50%-75% Load step
Over temperature protection	-	105		°C	Shell temperature
Short circuit protection	-	NO	-		Long-term (4 hours) short circuit is not damaged, Hiccup mode
Positive electrode cable	10	-	-	AWG	If the wire length is greater than 50cm, it is recommended to use a thicker wire diameter.
Negative electrode cable	10	-	-	AWG	

Feature Description

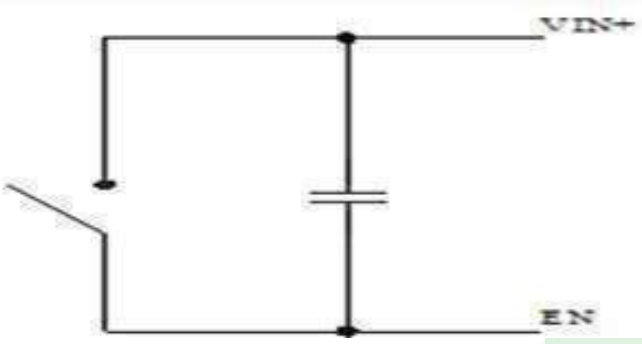
Remote On/Off (EN) (Optional)

Logic Enable	Low level (0 - 10Vdc)	High level (10-20Vdc)	Left open
Positive logic	Off	On	Off

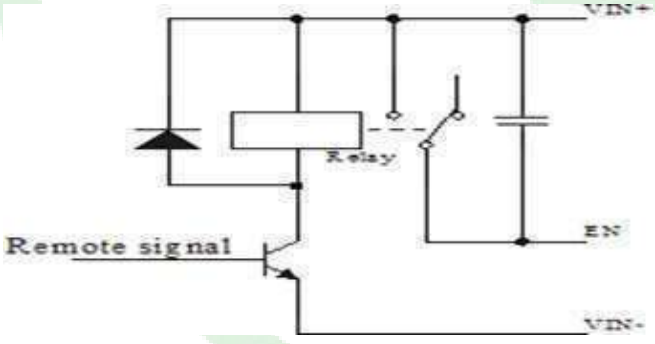
Input Undervoltage Protection

Theconverter will shutdownaftertheinput 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 step-down product, so long lines should be used on the input side.

Overtemperature Protection

A temperature sensor on the converter senses the average temperature of the module. It protects the converter from being damaged at high temperatures. When the temperature exceeds the over temperature protection threshold, the output will shut down. It will allow the converter to turn on again when the temperature of the sensed location falls by the value of Over temperature Protection Hysteresis

Safety and EMC features

Anti-electric Strength	Input to Output		V	Leakage current ≤ 3.5mA, 1min, no breakdown, no arcing
	Input to Shell	≥500	V	
	Output to Shell	≥500	V	
Insulation resistance	Input to Output	≥10	MΩ	Test voltage = 500V
	Input to Shell			
	Output to Shell			

Other characteristics

Weight	≤ 1.2	g	
Package	White box		
MTBF	≥200,000	H	Vin= 12V; Iout= 20A
Switching frequency	80±10	KHz	

Characteristic Curves

Conditions:TA=25°C(77°F),Vin = 12V, Vout = 48V, unless otherwise specified

Figure 1, Efficiency

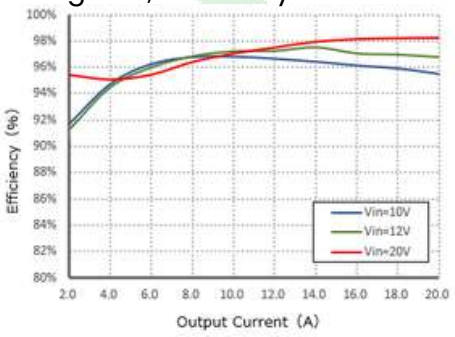


Figure 2, Power dissipation

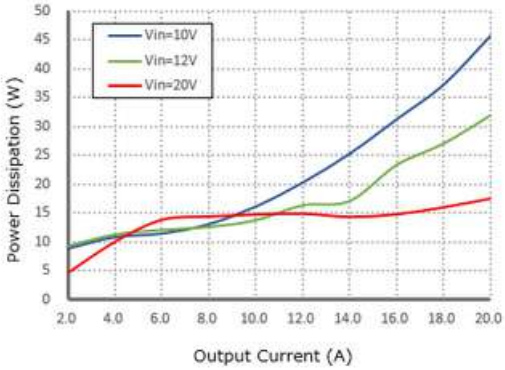
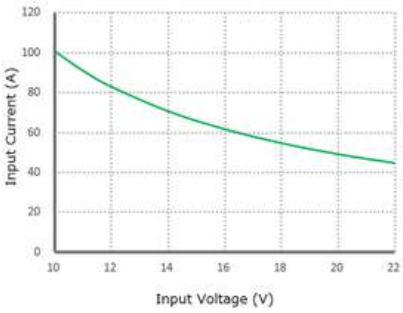


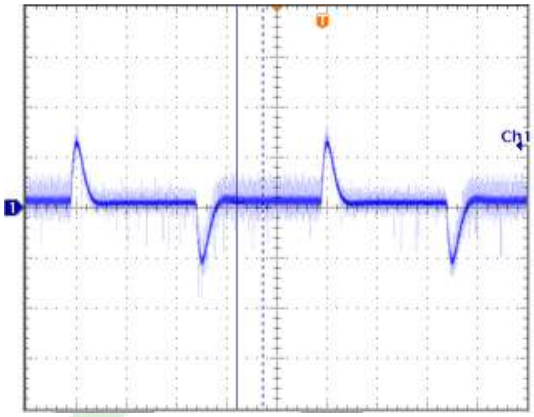
Figure 3, Input V-I, Iout=20A



Typical Waveforms

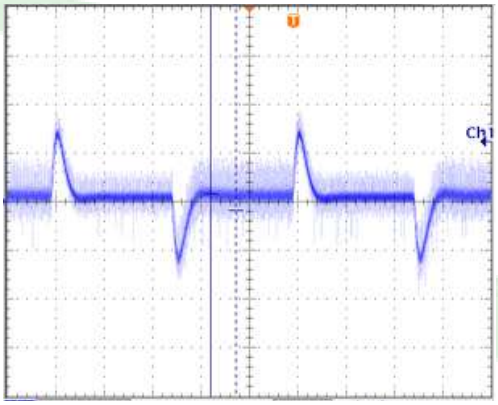
Conditions: TA = 25°C (77°F), Vin = 12V, unless otherwise specified.

Figure 4, 25% - 50% load dynamic



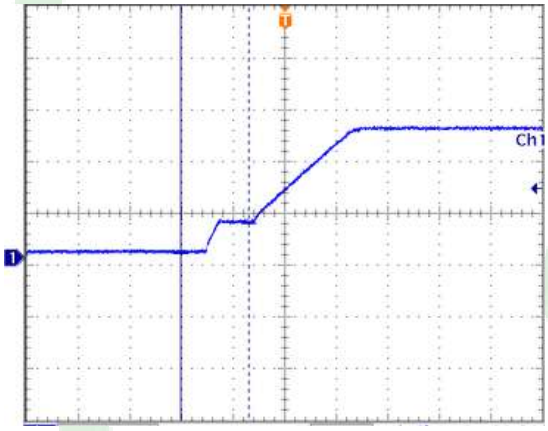
A: 20.0mV
@: 20.0mV
A: 2.08ms
@:-6.96ms
Peak-to-peak measurement 600mV
Ch1 Maximum 320mV Ch1 Rising low signal amplitude 1.281 * mu * s

Figure 5, 50% - 75% load dynamic



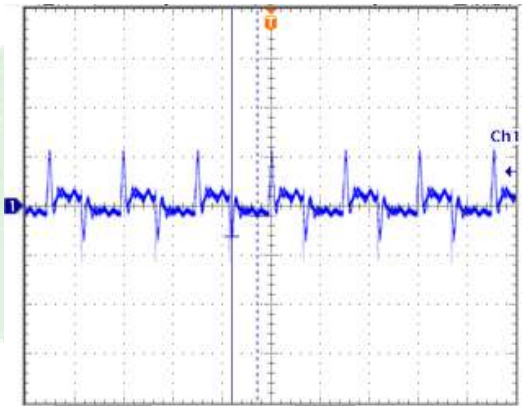
A: 68.0 mV
@: 32.0mV
A: 2.08ms
@:-6.96ms
Peak-to peak measuremen t 808mV
Ch1Maximu m 380mV
Ch1 Rising

Figure 6, Output voltage established (Iout = 20A)



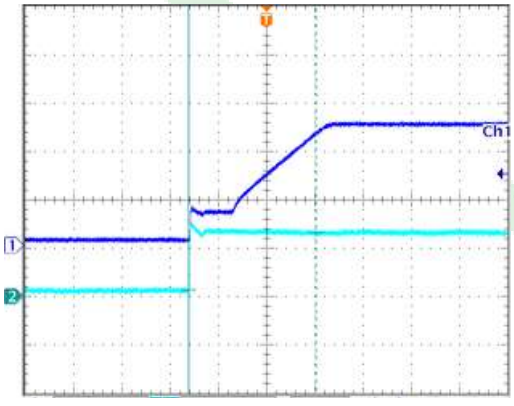
Δ: 11.6 V
@: 1.60 V
A: 52.8ms
@:-82.0ms
Peak-to peak measurement 50.0 V Ch1 Maximum 51.2 V Ch1 Rise 101.1ms

Figure 7, Output ripple & noise (Iout = 20A)



A: 84.0mV
@:-124mV
Δ: 2.08mu*s
@: - 3.2mu*s
Peak-to-peak measurement 452mV Ch1 Maximum 232mV Ch1 Rise 7.764ns Low signal amplitude

Figure 8, Boot delay time (Iout = 20A)



Δ: 11.8 V
@: 1.40 V
Δ: 106ms
@:-64.8ms
Peak-to-peak measurem ent 50.8 V Ch1 Maximum 51.6 V Ch1 Rise 99.87ms

Thermal Consideration

Sufficient airflow should be provided to help ensure reliable operating of the RW-1464-12V-48V-960W Therefore, thermal components are mounted on the top surface of the RW-1464-12V-48V-960W 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.