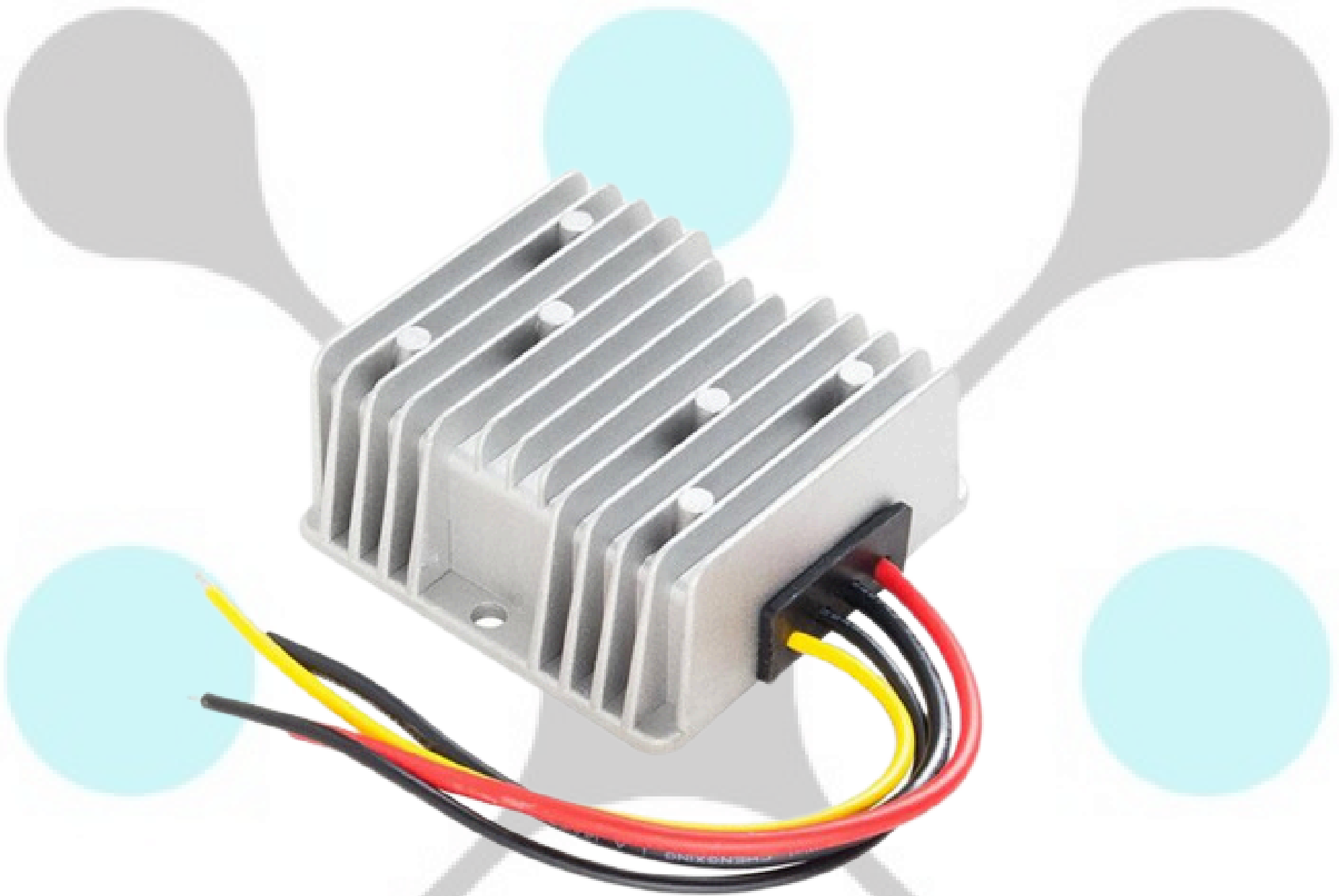


| Input Voltage | Output voltage | Output current | Output Power | Efficiency | Dimension   |
|---------------|----------------|----------------|--------------|------------|-------------|
| 10-20V        | 24V            | 20A            | 480W         | 96.6%      | 100*80*39mm |



The RW-941-12-24V-480W 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 100mm x 80mm x 39mm (3.94 in. x 3.15 in. x 1.54 in) and provides the rated output voltage of 24V and the maximum output current of 20A.

## Features

- Design meeting RoHS / CE
- High efficiency: 96.6% (@12Vin, 25°C)
- Non-isolated between input and output
- 100% full stable current output test
- Support -40 °C environment
- 100% full load burn-in test
- 3 month warranty
- Over load, Low voltage protections
- Waterproof level IP68

## Applications

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

## Model naming method

**RW-941-12-24V-480W**

RW-941 : SKU NAME  
12: Input voltage range  
24V: Output voltage  
480W: POWER

### Datasheet

| Parameter                       | Min | Typ  | Max  | Units | Remakrs  |
|---------------------------------|-----|------|------|-------|--|
| <b>Absolute maximum ratings</b> |     |      |      |       |  |
| Operating ambient temperature   | -40 | -    | +50  | °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  |
| <b>Input characteristics</b>    |     |      |      |       |  |
| Input voltage                   | 10  | 12   | 20   | V     |  |
| Max. input voltage              | -   | -    | 23   | V     | Continuous   |
| Undervoltage shutdown           | 9.3 | 9.6  | 9.8  | V     | Automatic recovery   |
| Undervoltage recovery           | 10  | 10.3 | 11   | V     | Automatic recovery   |
| Max. input current              | -   | -    | 51   | A     | Vin =10V; Iout =20A  |
| No load current                 | -   | 46   | 100  | mA    | Vin =12V   |
| 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   |  |

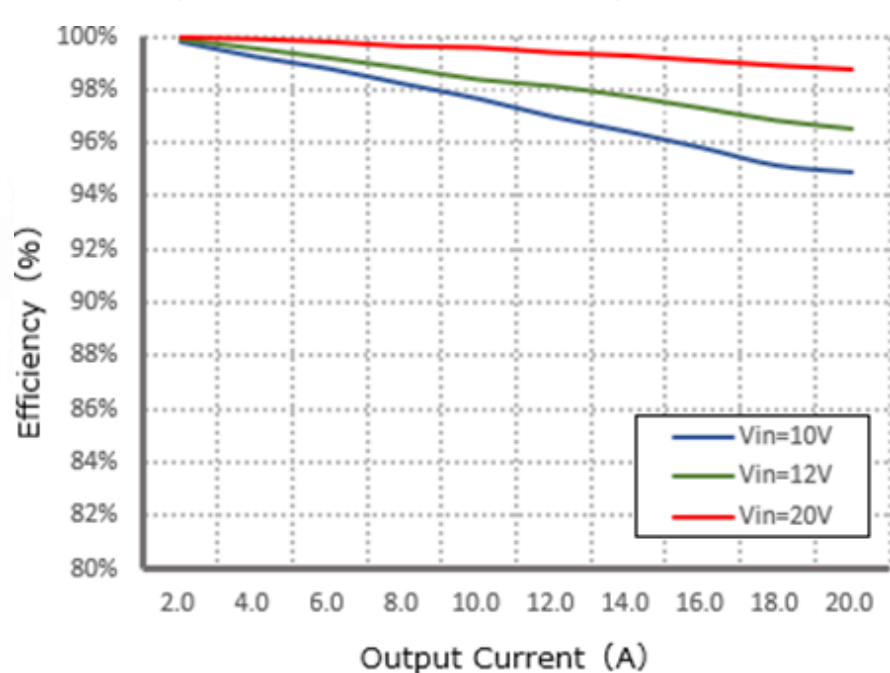
|                               |      |      |      |       |   |
|-------------------------------|------|------|------|-------|---|
| Enable PIN cable              | -    | NA   | -    | AWG   | If the unit with this function                        |
| Fuse                          | -    | -    | -    | A     | Input positive has built-in fuse                      |
| <b>Output characteristics</b> |      |      |      |       |   |
| Efficiency                    | -    | 96.6 | -    | %     | Vin =12V; Iout =20A                                   |
| Output voltage                | 23.6 | 24.0 | 24.4 | V     | Vin =12V; Iout =20A                                   |
| Regulator accuracy            | -    | ±3   | -    | %     |   |
| Voltage regulation            | -    | ±2   | -    | %     |   |
| Load Regulation               | -    | ±2   | -    | %     |   |
| Overvoltage protection        | -    | NA   | -    | V     |   |
| Output current                | 0    | -    | 20   | A     | Vin =10-20V   |
| Overcurrent protection        | 21   | 28   | 35   | A     | Vin=12V   |
| External capacitance          | -    | NA   | -    | μF    | Don't need  |
| Output ripple and noise       | -    | 248  | 400  | mVp-p | Vin =10-20V; Iout=20A, Oscilloscope bandwidth: 20 MHz |
| Output voltage risetime       | -    | 50.4 | 100  | mS    |   |
| Boot delay time               | -    | 32   | 100  | mS    |   |
| Out voltage overshoot         | -    | -    | 5    | %     |   |
| Over temperatur protection    | -    | -    | 96   | °C    | Shell   |

|                                |                 |            |                     |   |   |
|--------------------------------|-----------------|------------|---------------------|---|---|
| Short circuit protection       | -               | NO         | -                   |   |   |
| 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   |   |
| <b>Safety and EMC features</b> |                 |            |                     |   |   |
| Anti-electric Strength         | Input to Output | -          | V                   | Leakage current $\leq$ 3.5mA, 1min, no breakdown, no arcing |   |
|                                | Input to Shell  | $\geq 500$ | V                   |   |   |
|                                | Output to Shell | $\geq 500$ | V                   |   |   |
| Insulation resistance          | Input to Output | $\geq 50$  | M $\Omega$          | Test voltage = 500V   |   |
|                                | Input to Shell  |            |                     |   |   |
|                                | Output to Shell |            |                     |   |   |
| <b>Other characteristics</b>   |                 |            |                     |   |   |
| Weight                         | $\leq 560$      | g          |                     |   |   |
| Package                        | white box       |            |                     |   |   |
| MTBF                           | $\geq 200,000$  | H          | Vin= 12V; Iout= 20A |   |   |
| Switching frequency            | 50 $\pm$ 10     | KHz        |                     |   |   |

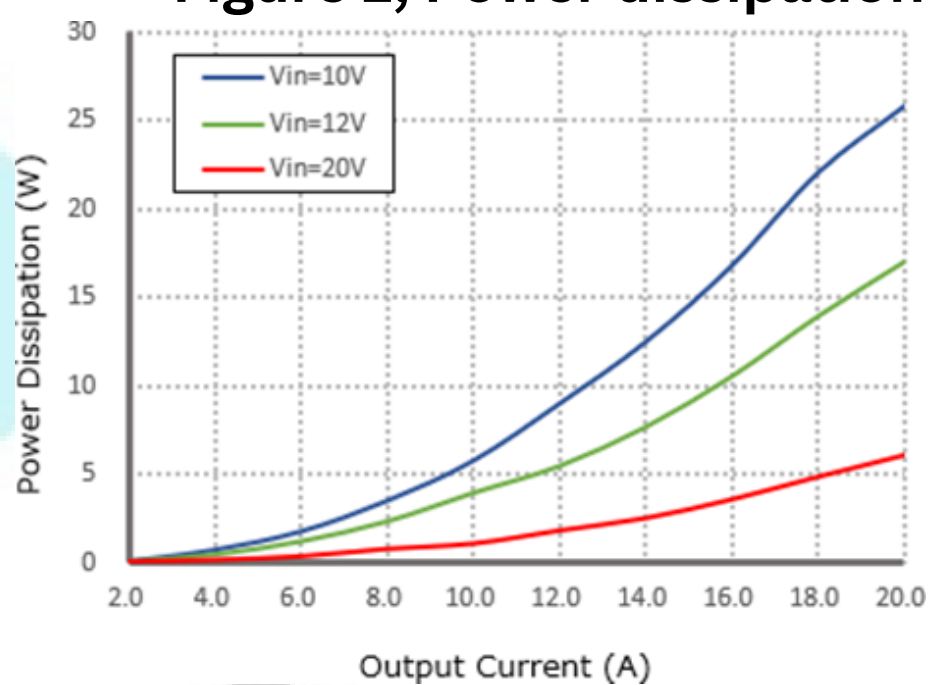
### Characteristic Curves

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

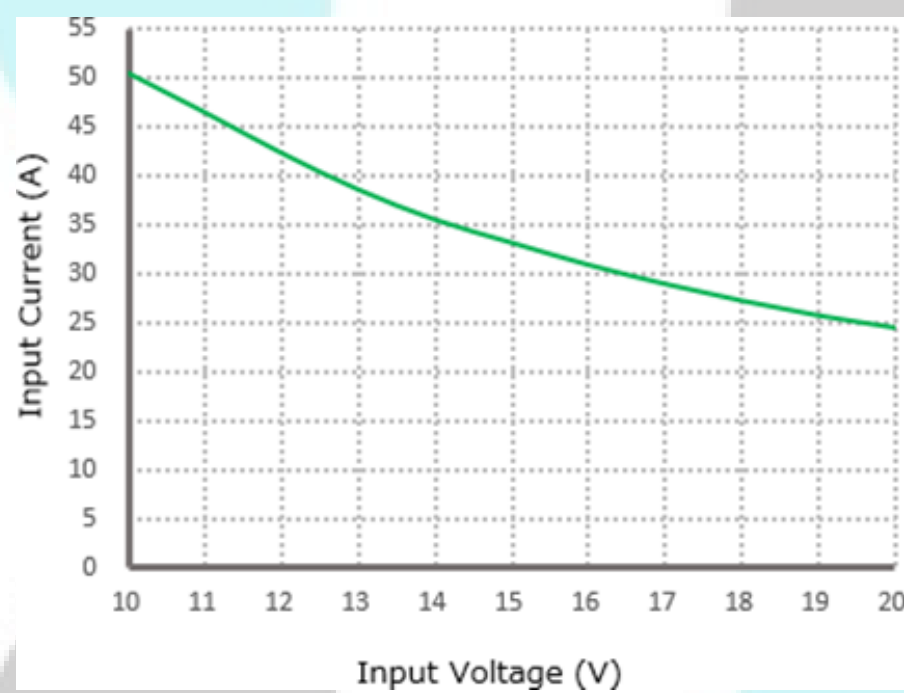
**Figure 1, Efficiency**



**Figure 2, Power dissipation**



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



### Typical Waveforms

Conditions: TA = 25°C (77°F), Vin = 24V, unless otherwise specified.

Figure 4, 25% - 50%load dynamic

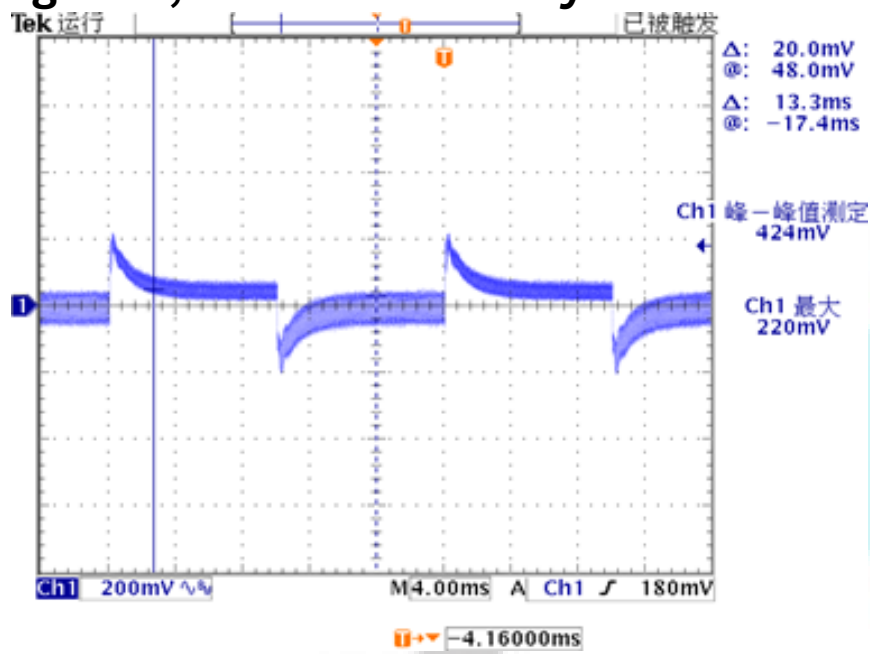


Figure 5, 50% - 75%load dynamic

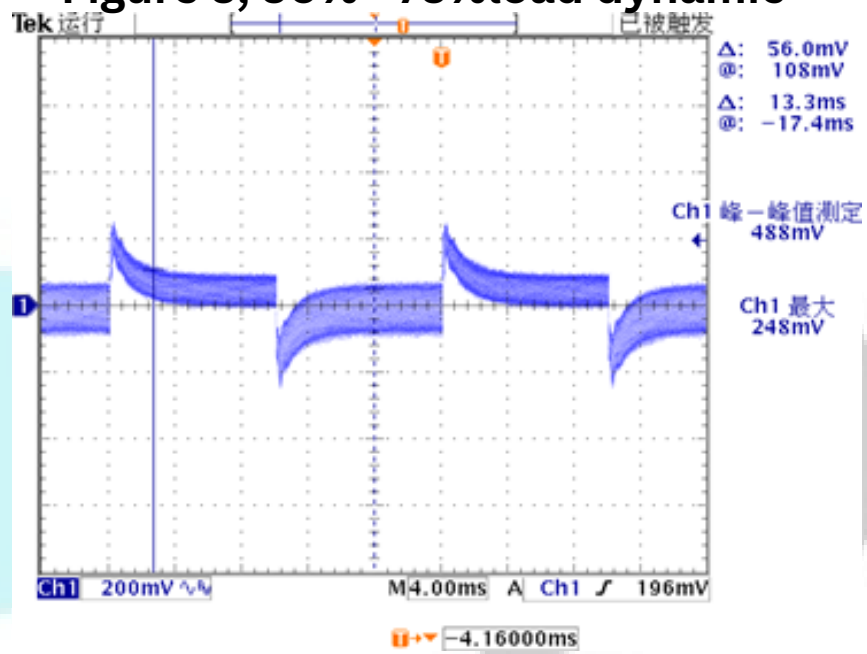


Figure 6, Output voltage established (Iout = 20A)

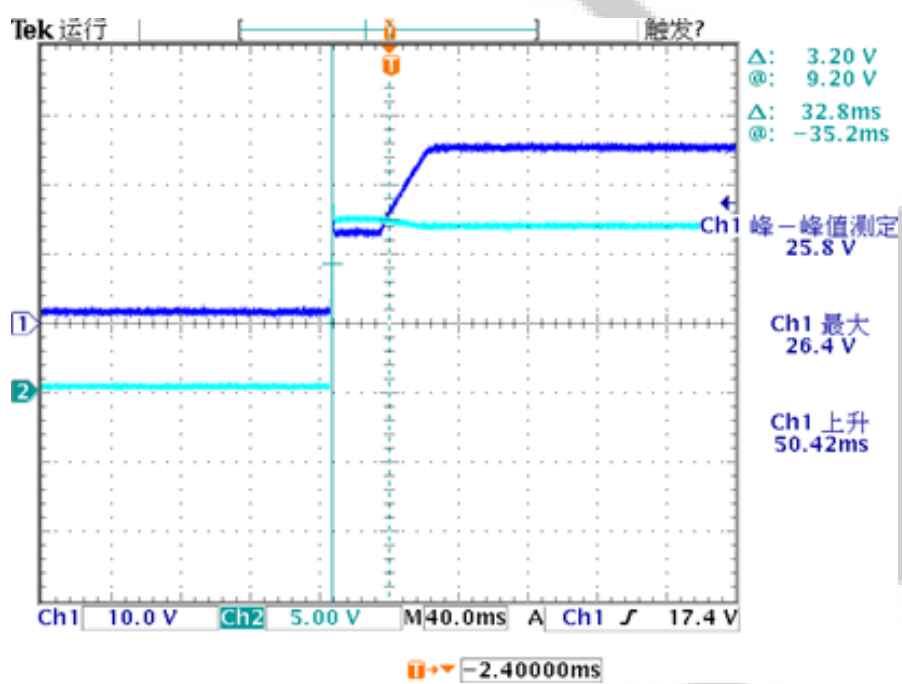
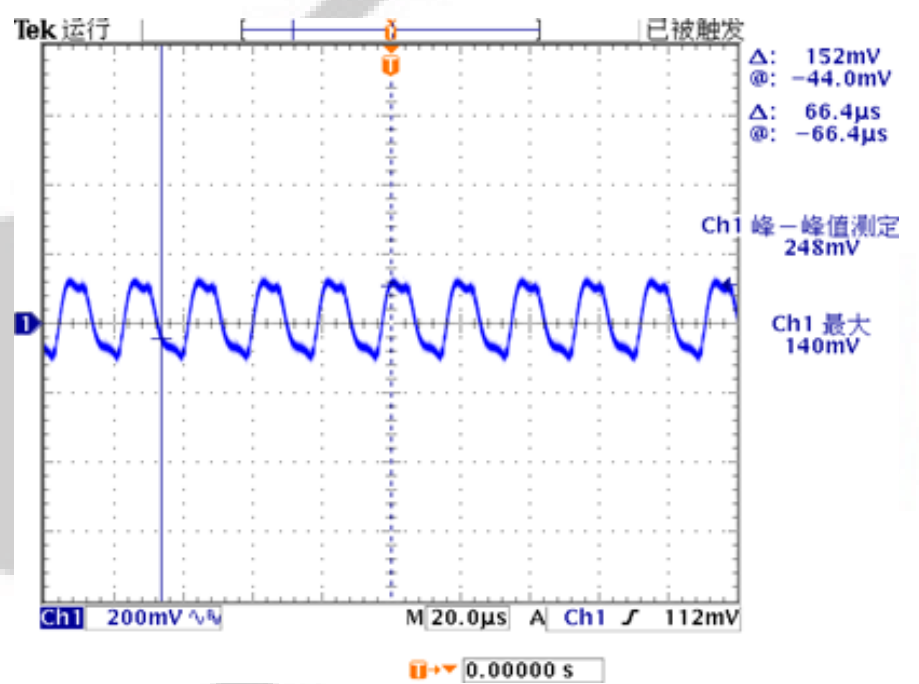


Figure 7, Output ripple & noise (Iout = 20A)



### Feature Description

#### Remote On/Off (EN) (Optional)

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

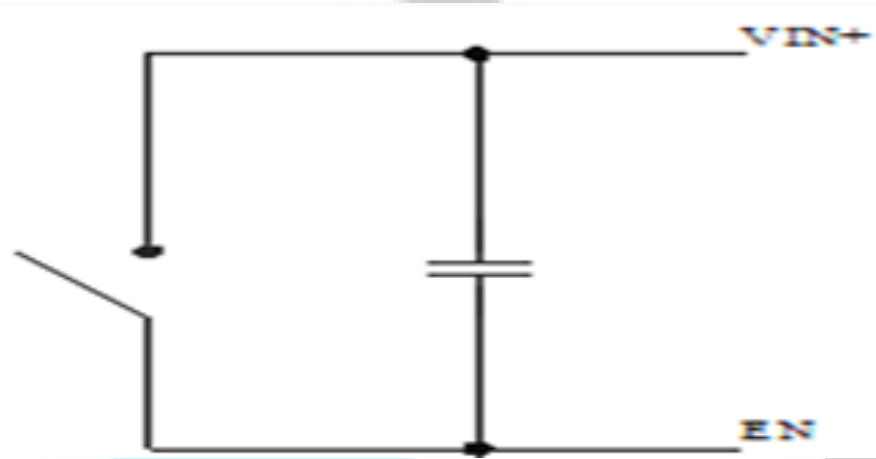
#### Input Undervoltage Protection

The converter will shut down 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 the Protection characteristics.

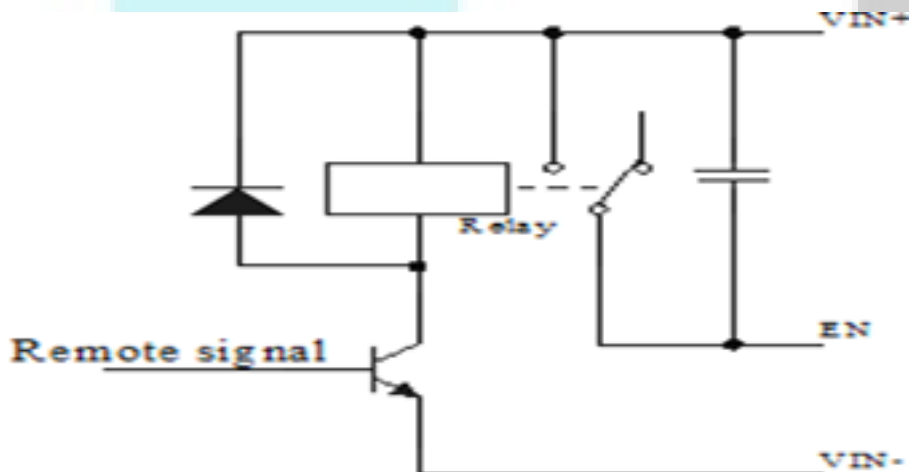
#### Various circuits for driving the EN

#### 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



Simple control



Transistor control

#### 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



### Thermal Consideration

Sufficient airflow should be provided to help ensure reliable operating of the RW-936-9-40-24V-144W. Therefore, thermal components are mounted on the top surface of the RW-936-9-40-24V-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.

