# AMSROL10-NZ

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Aimtec's AMSROL10-NZ series are non-isolated DC-DC converters with a 10A output current and wide input voltage range of 16-75VDC. They feature efficiency up to 97%, operating temperature of -40℃ ~ +85℃, input under-voltage, output short-circuit & over-current protection.

The AMSROL10-NZ meets CLASS A of CISPR32/EN55032 emissions standards by adding the recommended external components. These models are widely used in applications such as battery powered systems and robotic field with a large fluctuation in a battery voltage & motor interference.

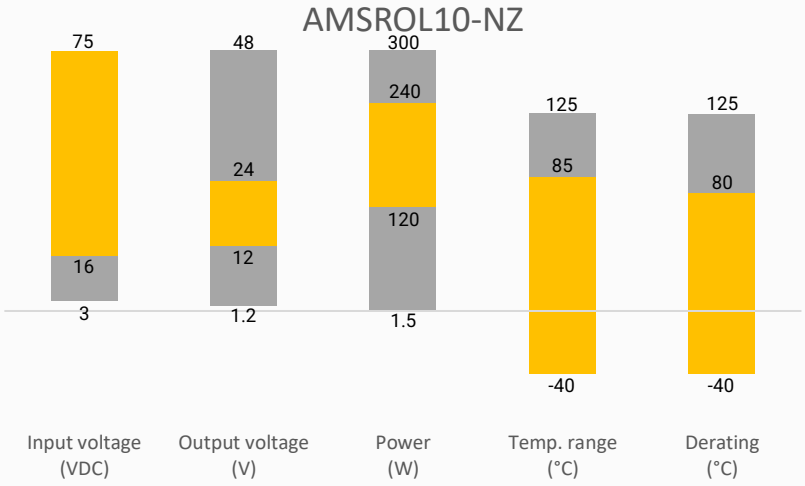
## Features

- Input Range: 16VDC – 75VDC
- Operating Temp: -40 °C to +85 °C
- Low ripple & noise, up to 220mV(p-p) max.
- Efficiency up to 97%
- Adjustable output voltage
- Input under-voltage, output short circuit, over current protection
- Regulated single output

RoHS

3yr Warranty

## Summary




## Training

Product Training Video (click to open)

Press Release

Coming Soon!

Application Notes

## Applications

Power Grid

Industrial

Telecom

Instrumentation

# Models & Specifications

| Single Output | | | | | | | |
|---|---|---|---|---|---|---|---|
| Model | Input Voltage (VDC) | Output Voltage (VDC) | Maximum Input Current (Nominal input voltage) (mA) | | Output Current Max (A) | Maximum Capacitive Load (µF) | Efficiency (%) Full Load Typ. |
| | | | No Load | Full Load | | | |
| AMSROL10-4812NZ | 48 (16 ~ 75) | 12 | 80 | 2718 | 10 | 5500 | 95 |
| AMSROL10-4824NZ | 48 (30 ~ 75) | 24 | 80 | 5320 | 10 | 3300 | 97 |

| Input Specification | | | | |
|---|---|---|---|---|
| Parameters | Conditions | Typical | Maximum | Units |
| Voltage range | See models table | | | VDC |
| Filter | Capacitance filter | | | |
| Absolute maximum rating | 1 sec. max | | 80 | VDC |
| Reflected ripple current | Nominal input voltage | 200 | | mA pk-pk |
| Start-up voltage | Nominal 12V output model | | 16 | VDC |
| | Nominal 24V output model | | 30 | VDC |
| Under voltage protection | Nominal 12V output model | 14 | | VDC |
| | Nominal 24V output model | 27 | | VDC |
| Adjustable input starting/under voltage (Refer to design reference) | Nominal 12V output model, | ≥16 | 75 | VDC |
| | Nominal 24V output model | ≥30 | 75 | VDC |
| Ctrl * | Module ON | Ctrl pin open or pulled high (1.5~12VDC) | | |
| | Module OFF | Ctrl pin pulled low to GND (0~0.8VDC) | | |
| | Input current when OFF | 2 | 10 | mA |
| * The Ctrl pin voltage is referenced to input GND. | | | | |

| Output Specification | | | | |
|---|---|---|---|---|
| Parameters | Conditions | Typical | Maximum | Units |
| Voltage accuracy | 0 ~ 100% load | ±1 | ±3 | % |
| Line regulation | Full load, LL - HL | ±0.1 | ±0.5 | % |
| Load regulation | 5 ~ 100% load | ±0.3 | ±2 | % |
| Over current protection | | 130 | 190 | % Iout |
| Short circuit protection | Continuous, Auto recovery | | | |
| Temperature coefficient | Full load | | ±0.03 | %/ °C |
| Ripple & Noise* | 20MHz bandwidth | 150 | 220 | mV pk-pk |
| Trim | | | ±10 | % Vout |
| Transient recovery time | 25% load step change | 200 | 500 | µS |
| Transient response deviation | 25% load step change | ±4 | ±5 | % |
| Sense | Refer to remote sense application for details | | 105 | % Vout |

| General Specifications | | | | |
|---|---|---|---|---|
| **Parameters** | **Conditions** | **Typical** | **Maximum** | **Units** |
| **Switching frequency** | Nominal 12V output model | 200 | | KHz |
| | Nominal 24V output model | 250 | | KHz |
| **Operating temperature** | See derating graph | -40 to +85 | | °C |
| **Storage temperature** | | -55 to +125 | | °C |
| **Soldering temperature** | Wave soldering, maximum duration 10 sec | | 260 | °C |
| **Cooling** | Nature convection or forced convection | | | |
| **Humidity** | Non-condensing | | 95 | % RH |
| **Vibration** | 10-150Hz, 5G, 0.75mm, 90min, along X, Y and Z | | | |
| **Weight** | | 33 | | g |
| **Dimensions (L x W x H)** | 2.33 x 1.48 x 0.51 inches (59.20 x 37.60 x 13.00mm) | | | |
| **MTBF** | > 1 000 000 hrs (MIL-HDBK -217F, t=+25°C) | | | |

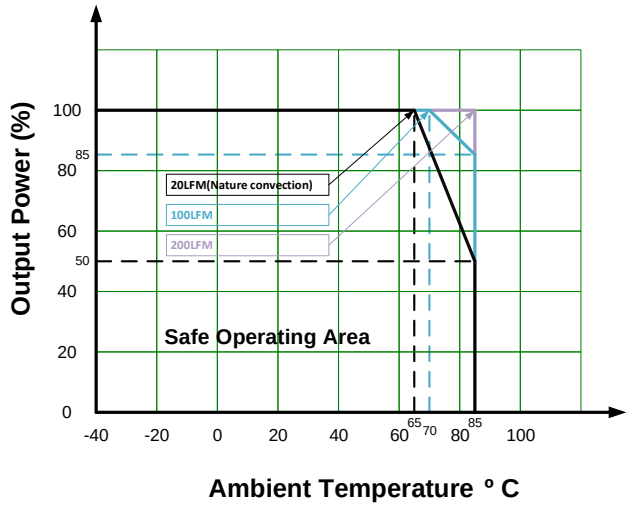
| Safety Specifications | | |
|---|---|---|
| **Parameters** | | |
| **Standards** | EMC - Conducted and radiated emission | CISPR32/EN55032, CLASS A with recommended circuit |
| | Electrostatic Discharge Immunity | IEC 61000-4-2 Contact ± 6KV, Criteria B |
| | RF, Electromagnetic Field Immunity | IEC 61000-4-3 10V/m, Criteria A |
| | Electrical Fast Transient/Burst Immunity | IEC 61000-4-4 ± 2KV, Criteria A with recommended circuit |
| | Surge Immunity | IEC 61000-4-5 ± 2KV, Criteria B with recommended circuit |
| | RF, Conducted Disturbance Immunity | IEC 61000-4-6 10Vr.m.s, Criteria A |

## Derating

### 12V output model

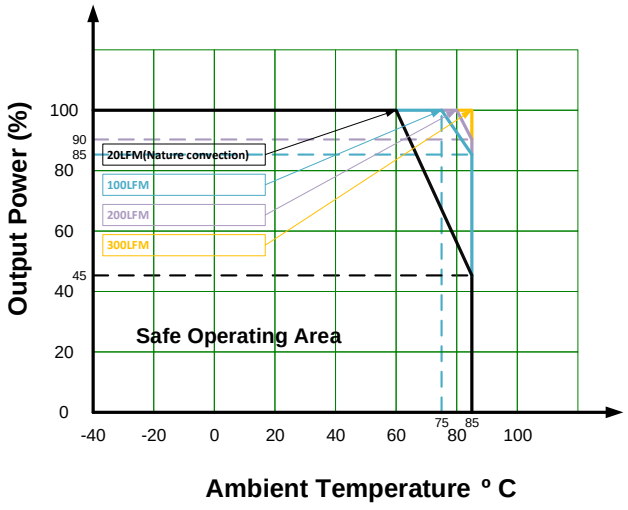
**16V ≤ Vin ≤ 48V**

**Nature convection or forced convection**



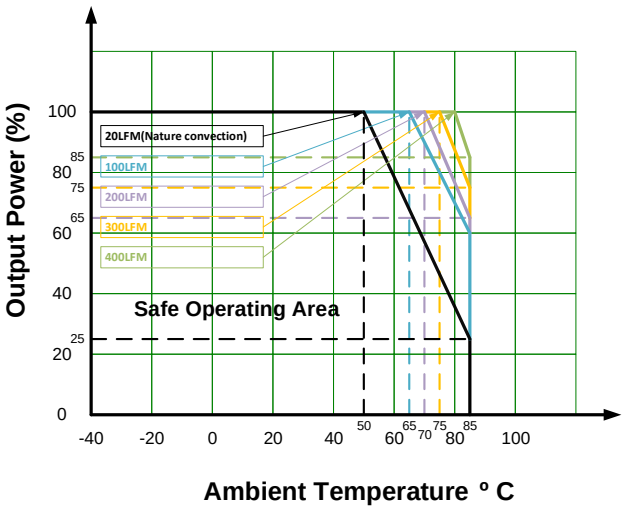

**48V ≤ Vin ≤ 55V**

**Nature convection or forced convection**



### 55V ≤ Vin ≤ 75V

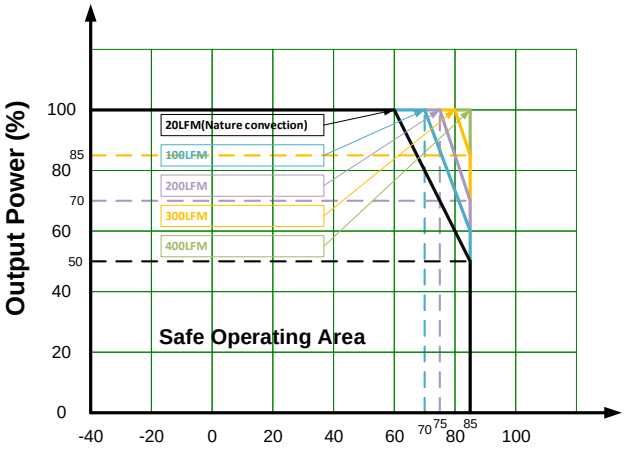
Nature convection or forced convection




## 24V output model

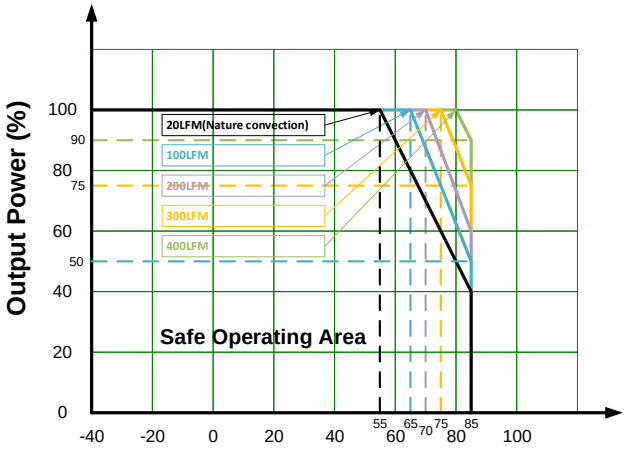
### 30V ≤ Vin ≤ 48V

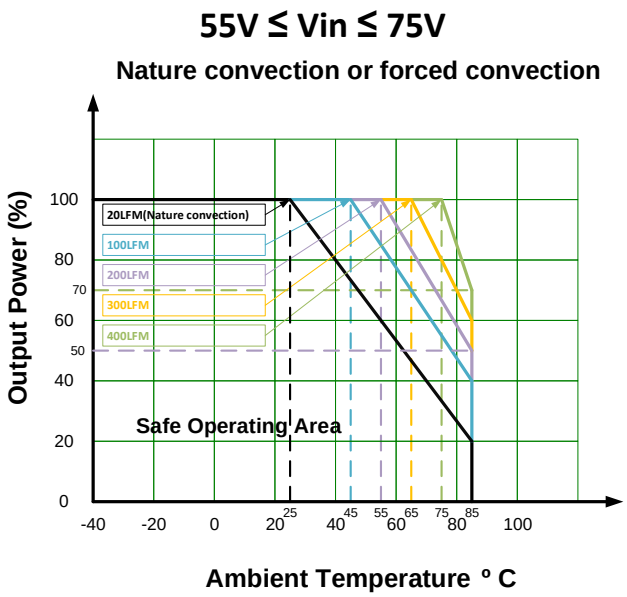
Nature convection or forced convection




### 48V ≤ Vin ≤ 55V

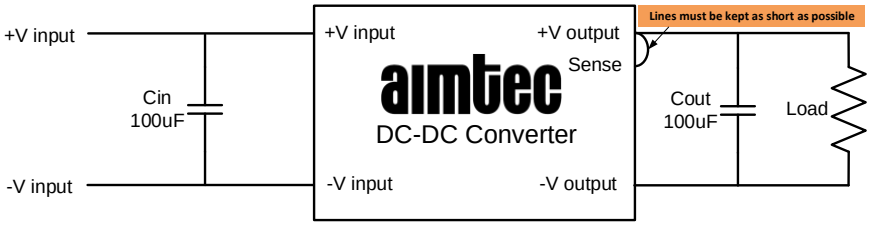
Nature convection or forced convection





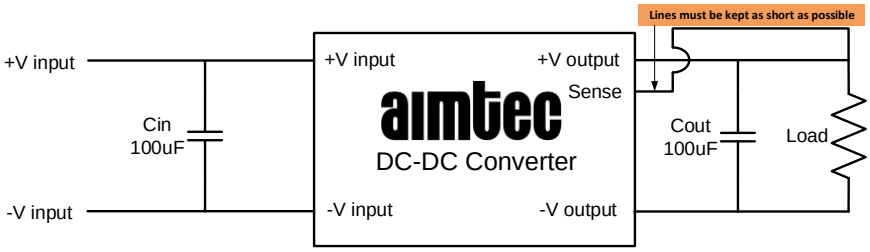

## Remote Sense Application

### Remote sense connection if not used



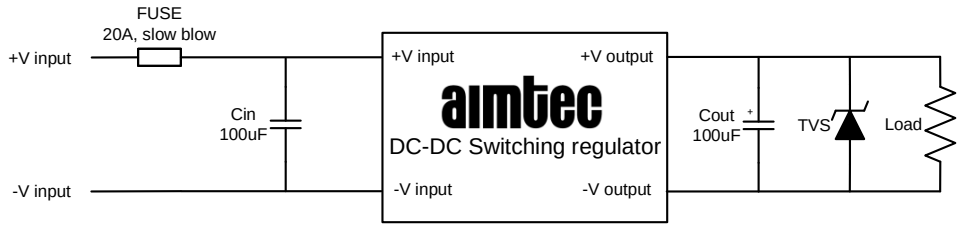

Notes：
1. Sense must be connected to + Vo at the DC-DC switching regulator if it is not used for remote regulation.
2. To avoid picking up noise, interference and/or cause unstable operation of the regulator, the connection between Sense and +Vo must be as short as possible.

### Remote sense connection used for compensation



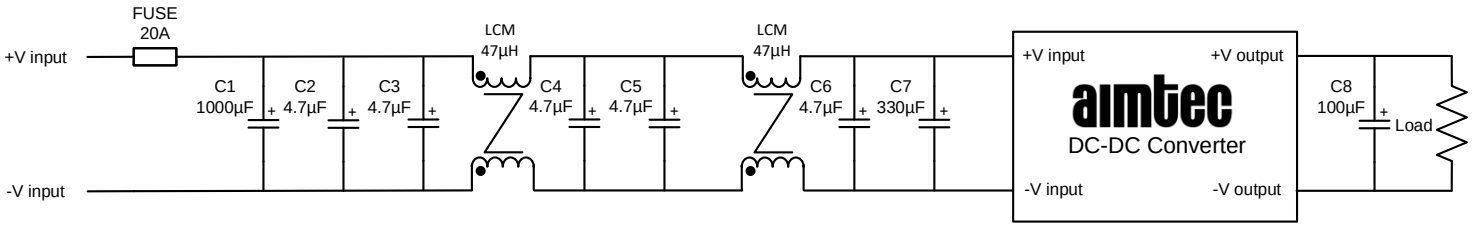

Notes：
1. Using long remote sense wire may cause unstable output, please contact technical support if long sense wires must be used.
2. Please ensure adequate cross section for PCB-trace and/or cables connecting the power supply module to the load to keep the voltage drop below 0.3V and make sure the power supply's output voltage remains within the specified range.
3. Large wire impedance may cause oscillation of the output voltage and/or increased ripple. Consult technical support or factory for further advice of sense operation.

## Typical Application Circuit

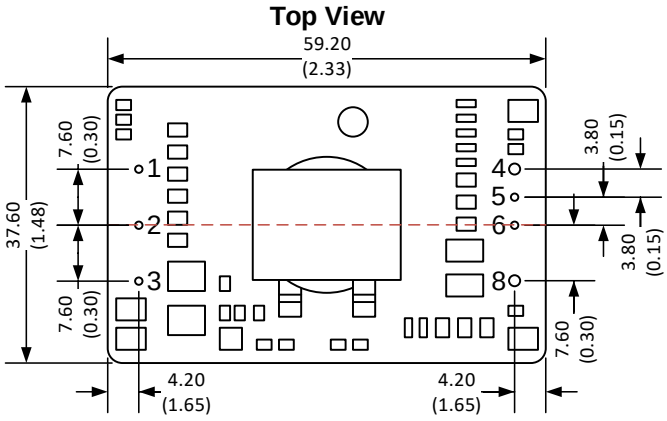


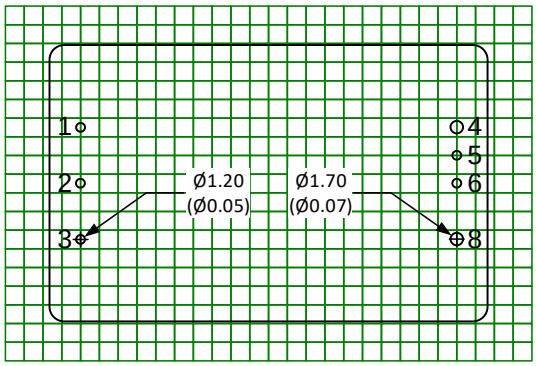

**TVS : SMDJ14A (12V output model) / SMDJ28A (24V output model).**

## EMC Recommended Circuit



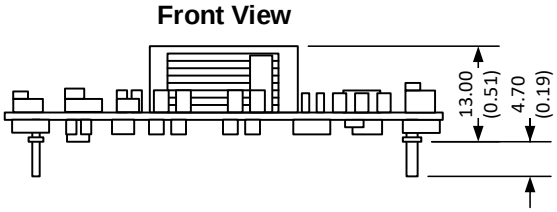

## Dimensions




Note : Grid 2.54*2.54 mm

| Pin Out Specifications | |
|---|---|
| Pin | Single |
| 1 | +V Input |
| 2 | Ctrl |
| 3 | -V Input |
| 4 | +V Output |
| 5 | Sense |
| 6 | Trim |
| 8 | -V Output |

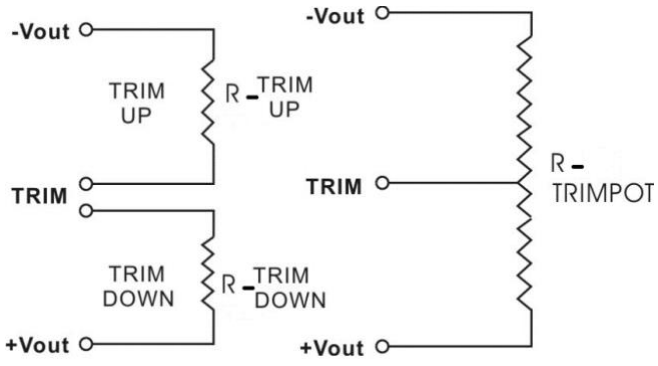



Notes:
All dimensions are typical in millimeters (inches).
Pin 1,2,3,5,6 diameter : 1.0 (0.04)
Pin 4,8 diameter : 1.5 (0.06)
Pin diameter tolerance : ±0.1 (±0.004)
Stand-off tolerance ±0.50 (±0.02)

# Trimming

Output voltage can be externally trimmed by utilizing the methods as shown below

**Fixed Resistor** **Variable Potentiometer**




Leave open if not used.

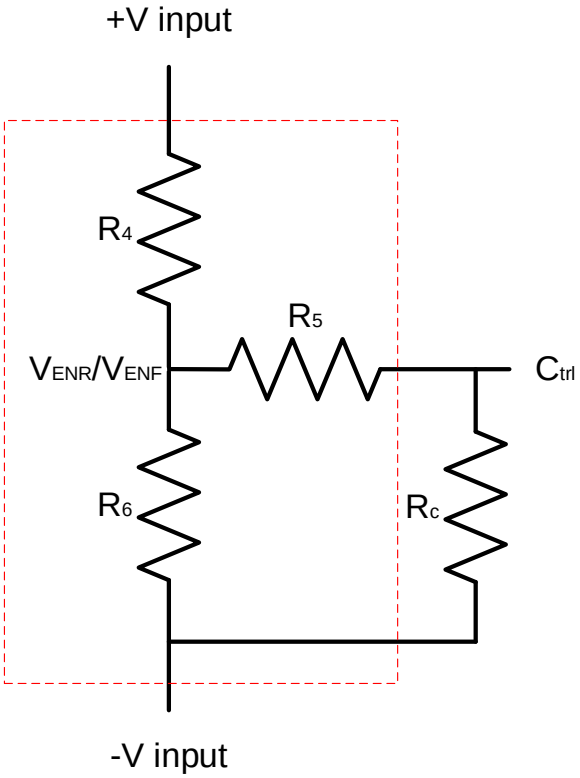
## AMSROL10-4812NZ

| Trim down % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Vout (VDC) | 11.880 | 11.760 | 11.640 | 11.520 | 11.400 | 11.280 | 11.160 | 11.040 | 10.920 | 10.800 |
| Rt down (KΩ) | 22228.051 | 12632.653 | 8742.977 | 6636.153 | 5314.955 | 4409.004 | 3749.121 | 3247.040 | 2852.201 | 2533.562 |
| Trim up % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Vout (VDC) | 12.120 | 12.240 | 12.360 | 12.480 | 12.600 | 12.720 | 12.840 | 12.960 | 13.080 | 13.200 |
| Rt up (KΩ) | 3336.021 | 1224.275 | 714.417 | 484.966 | 354.489 | 270.308 | 211.497 | 168.087 | 134.731 | 108.297 |

## AMSROL10-4824NZ

| Trim down % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Vout (VDC) | 23.760 | 23.520 | 23.280 | 23.040 | 22.800 | 22.560 | 22.320 | 22.080 | 21.840 | 21.600 |
| Rt down (KΩ) | 31665.034 | 15574.887 | 10232.492 | 7565.213 | 5966.097 | 4900.540 | 4139.683 | 3569.180 | 3125.538 | 2770.676 |
| Trim up % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Vout (VDC) | 24.240 | 24.480 | 24.720 | 24.960 | 25.200 | 25.440 | 25.680 | 25.920 | 26.160 | 26.400 |
| Rt up (KΩ) | 1002.593 | 457.394 | 274.952 | 183.598 | 128.743 | 92.155 | 66.011 | 46.399 | 31.143 | 18.936 |

# Adjustable input Starting/Under Voltage and Resistor calculation




Adjustable input Starting/Under Voltage resistor connection
(dashed line shows internal resistor network)

Calculation resistor of Adjustable input Starting (Under-voltage) Voltage:

$$R_c = \frac{bR_5}{R_5 - b} - R_6 \qquad b = \frac{V_{EN}}{V_{in} - V_{EN}} \times R_4$$

Rc : resistor of Adjustable input Starting (Under-voltage) Voltage
B : self-defined parameter
When $V_{EN}=V_{ENR}$, $V_{in}$ is actual starting voltage required for input
When $V_{EN}=V_{ENF}$, $V_{in}$ is actual under-voltage required for input

| Vout(VDC) | R4(KΩ) | R5(KΩ) | R6(KΩ) | VENR(V) | VENF(V) |
|---|---|---|---|---|---|
| 12 | 100 | 8.93 | 0.1 | 1.22 | 1.09 |
| 24 | 100 | 4.32 | 0.1 | 1.22 | 1.09 |