

## DESCRIPTION

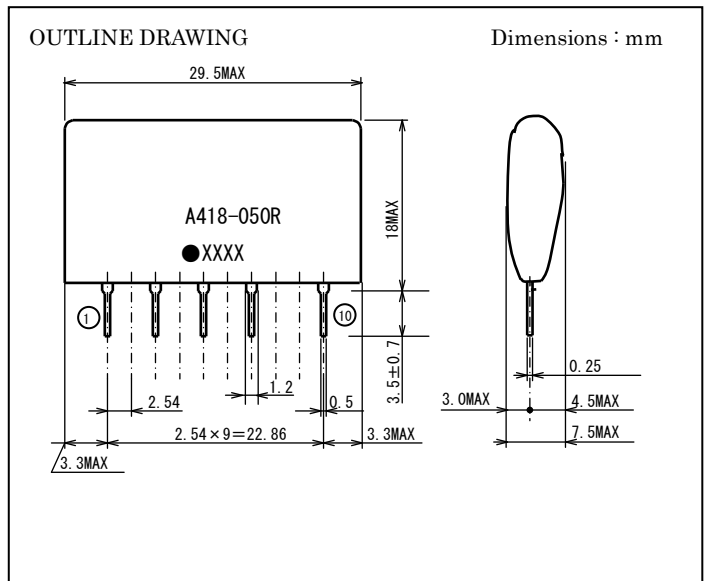
VLA418-050R is a non-isolated type DC-DC converter designed for direct input of rectified voltage from 100/200V AC. This hybrid IC provides +5V,100mA with fewer external components such as electrolytic capacitors and choke coils only

## FEATURES

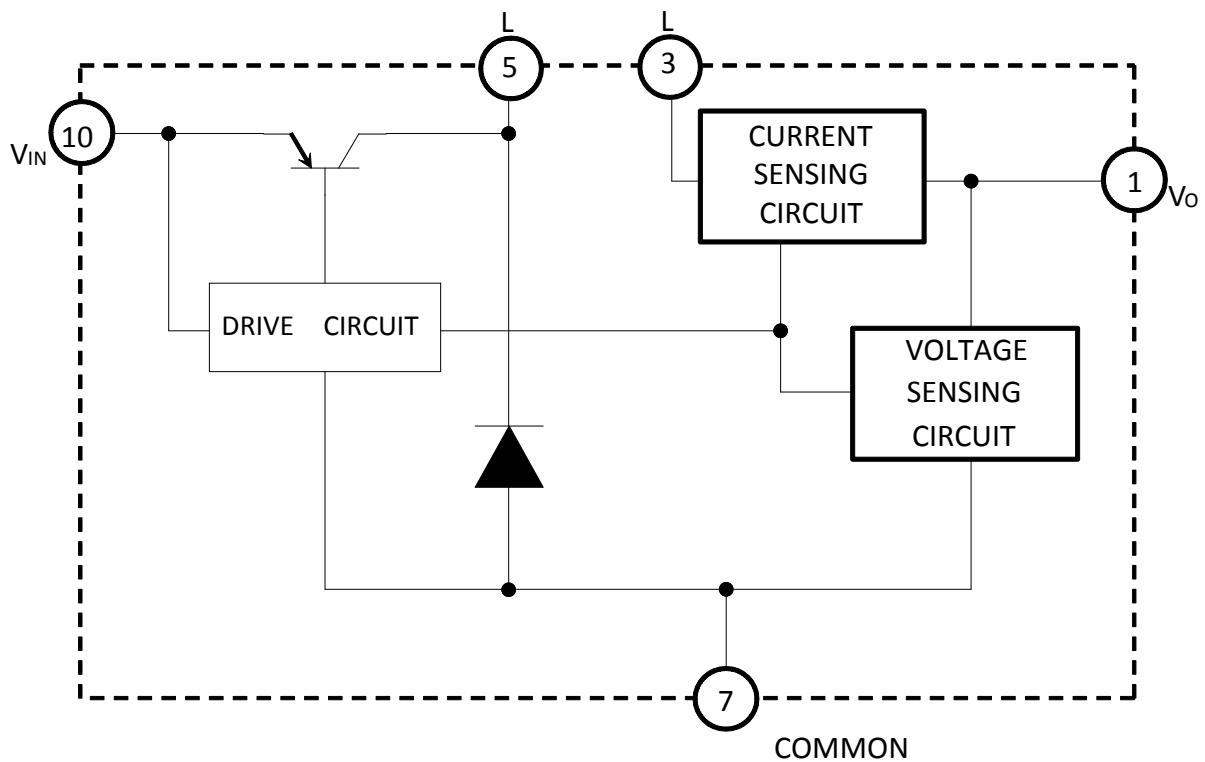
- Input voltage range ..... DC 113~410V
- Output ..... 5V $\pm$ 0.4V, 100mA

## APPLICATIONS

Controlled equipment etc



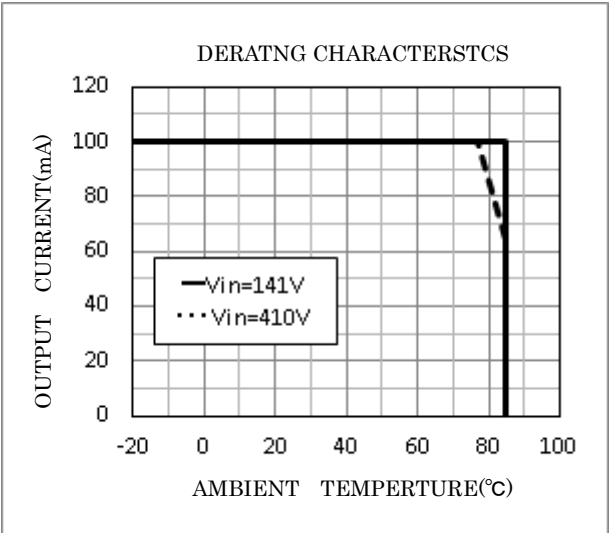
## BLOCK DIAGRAM



**MAXIMUM RATINGS** (unless otherwise noted,  $T_a = 25^\circ\text{C}$ )

| Symbol    | Parameter             | Conditions         | Ratings         | Units            |
|-----------|-----------------------|--------------------|-----------------|------------------|
| $V_{IN}$  | Input voltage         | —                  | 450             | V                |
| $I_L$     | Output current        | —                  | 100             | mA               |
| $T_{opr}$ | Operating temperature | No condensation *1 | $-20 \sim +85$  | $^\circ\text{C}$ |
| $T_{stg}$ | Storage temperature   | No condensation    | $-25 \sim +105$ | $^\circ\text{C}$ |

\*1) Please refer to de-rating characteristics

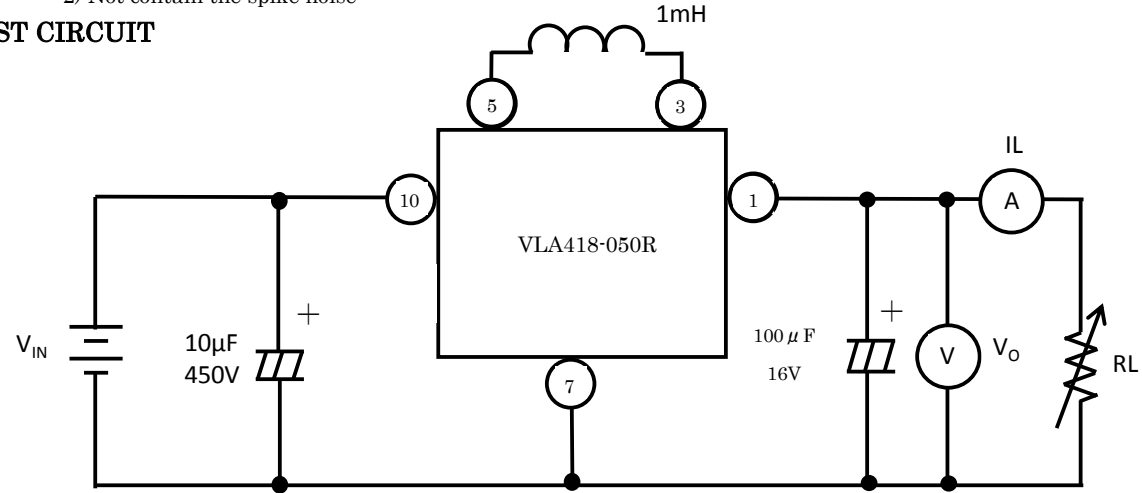


**ELECTRICAL CHARACTERISTICS** (unless otherwise noted,  $V_{IN}=280\text{V}$ ,  $T_a=25^\circ\text{C}$ )

| Symbol    | Parameter        | Test conditions                                    | Limit |     |     | Units             |
|-----------|------------------|----------------------------------------------------|-------|-----|-----|-------------------|
|           |                  |                                                    | Min   | Typ | Max |                   |
| $V_{IN}$  | Input voltage    | Recommended range                                  | 113   | -   | 410 | V                 |
| $V_o$     | Output current   | $I_L=0 \sim 100\text{mA}$                          | 4.6   | 5.0 | 5.4 | V                 |
| Reg-I     | Input regulation | $V_{IN}=113 \sim 410\text{V}$ , $I_L=100\text{mA}$ | -     | -   | 150 | mV                |
| Reg-L     | Load regulation  | $I_L=0 \sim 100\text{mA}$                          | -     | -   | 150 | mV                |
| $\eta$    | Efficiency       | $I_L=200\text{mA}$                                 | -     | 63  | -   | %                 |
| $V_{p-p}$ | Output ripple    | $I_L=100\text{mA}$ *2                              | -     | -   | 200 | mV <sub>p-p</sub> |

\*2) Not contain the spike noise

**TEST CIRCUIT**



(\*) Please use power inductors with good performance of DC superimposition.

(\*\*) Please use electrolytic capacitor of output side with high frequency and low impedance.

## A PRECAUTION FOR USE

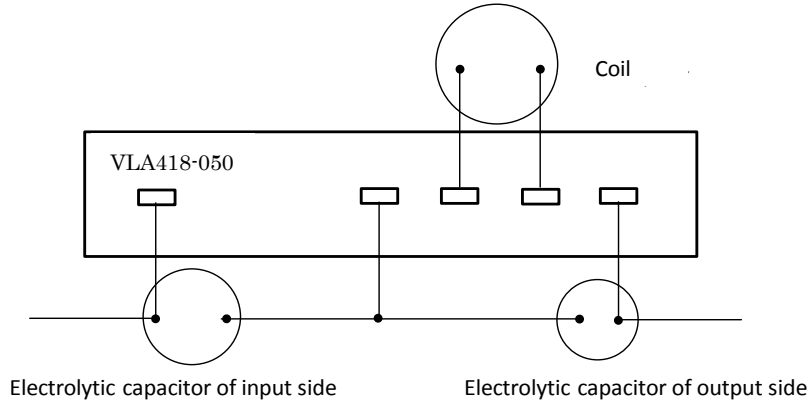
1. About overcurrent and load short.

This product is provided with overcurrent protection. But please use the fuse for safety using.

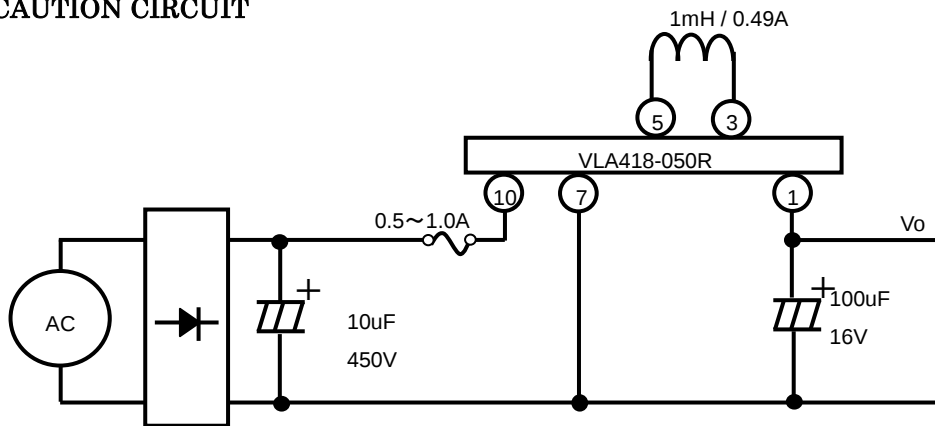
2. About design of parts

Please place electrolytic capacitor of input and output side close to product.

And please place coil opposite side to electrolytic capacitor as below diagram.



## A PRECAUTION CIRCUIT

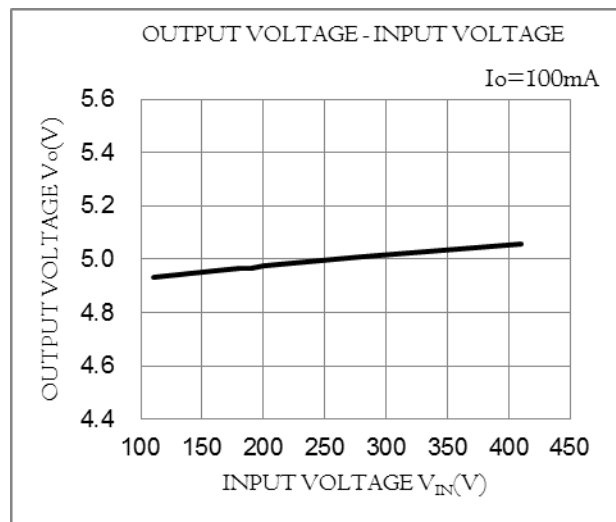
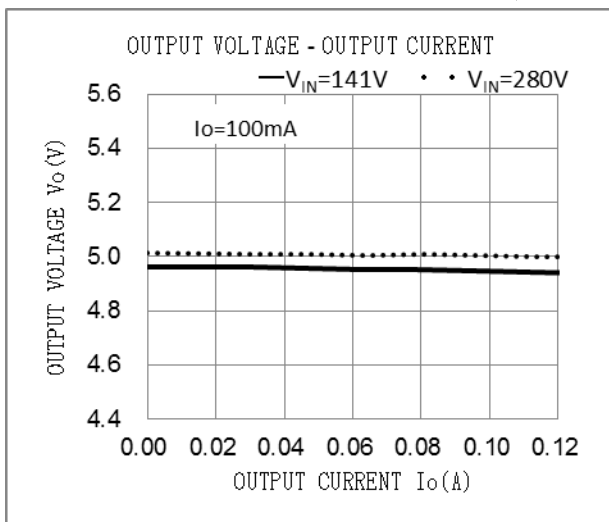


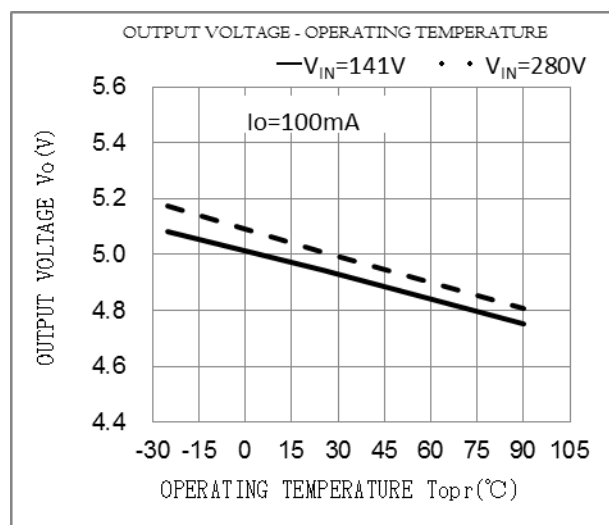
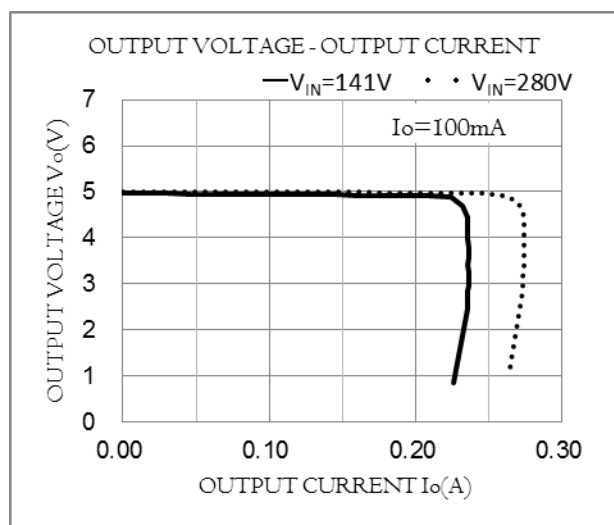
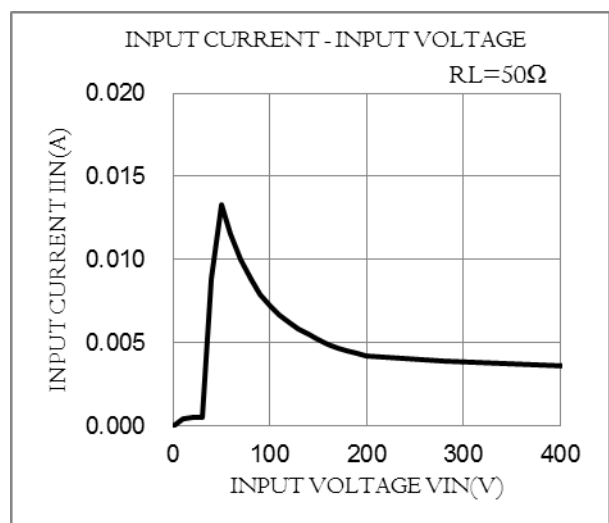
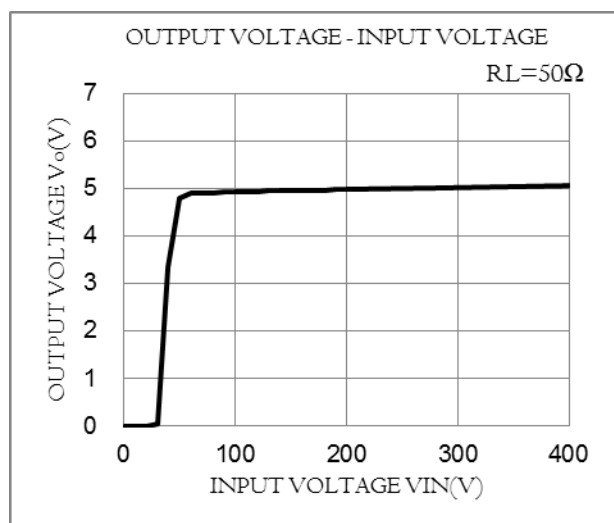
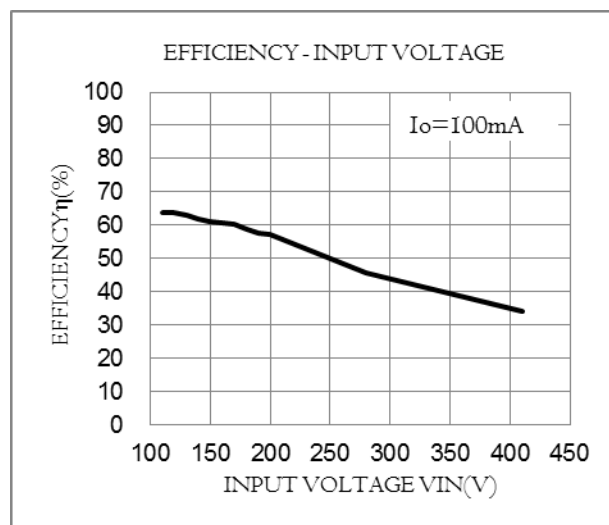
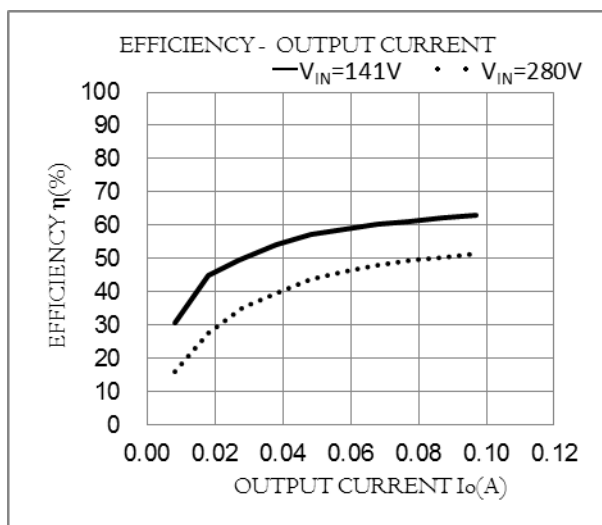
Electrolytic capacitor of output side: PW series (Nichicon)

Power inductors: C10- FR1-GA (MITSUMI ELECTRIC CO., LTD.)

Please use the type of deciding hastily fuse.(0.5A~1A)

## TYPICAL CHARACTERISTIC CURVES (Ta=25°C)





FOR SAFETY USING

Great detail and careful attention are given to the production activity of Hics, such as the development, the quality of production, and in its reliability. However the reliability of Hics depends not only on their own factors but also in their condition of usage. When handling Hics, please note the following cautions.

| CAUTIONS         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Packing          | The materials used in packing Hics can only withstand normal external conditions. When exposed to outside shocks, rain and certain environmental contaminators, the packing materials will deteriorates. Please take care in handling.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Carrying         | <ol style="list-style-type: none"> <li>1) Don't stack boxes too high. Avoid placing heavy materials on boxes.</li> <li>2) Boxes must be positioned correctly during transportation to avoid breakage.</li> <li>3) Don't throw or drop boxes.</li> <li>4) Keep boxes dry. Avoid rain or snow.</li> <li>5) Minimal vibration and shock during transportation is desirable.</li> </ol>                                                                                                                                                                                                                                                                       |
| Storage          | <p>When storing Hics, please observe the following notices or possible deterioration of their electrical characteristics, risk of solder ability, and external damage may occur.</p> <ol style="list-style-type: none"> <li>1) Devices must be stored where fluctuation of temperature and humidity is minimal, and must not be exposed to direct sunlight. Store at the normal temperature of 5 to 30 degrees Celsius with humidity at 40 to 60%.</li> <li>2) Avoid locations where corrosive gasses are generated or where much dust accumulates.</li> <li>3) Storage cases must be static proof.</li> <li>4) Avoid putting weight on boxes.</li> </ol> |
| Extended storage | When extended storage is necessary, Hics must be kept non-processed. When using Hics which have been stored for more than one year or under severe conditions, be sure to check that the exterior is free from flaw and other damages.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Maximum ratings  | To prevent any electrical damages, use Hics within the maximum ratings. The temperature, current, voltage, etc. must not exceed these conditions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Polarity         | To protect Hics from destruction and deterioration due to wrong insertion, make sure of polarity in inserting leads into the board holes, conforming to the external view for the terminal arrangement.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Keep safety first in your circuit designs!**

ISAHAYA Electronics Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (1) placement of substitutive, auxiliary circuits, (2) use of non-flammable material or (3) prevention against any malfunction or mishap.

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