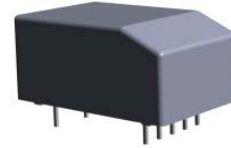


## Power Modules (Power Supplies with Ultra-low Standby Power Consumption)

### ■Features

- 1.Easy to design compact AC/DC due to small number of external components
- 2.Enables significant reduction in power consumption of no-load and light load
- 3.Corresponding world wide input and PFC output voltage (Vin:DC110V~420V)
- 4.Unique Tamura design insures significant reduction in 'buzz'  
under light-load conditions for lower noise level
- 5.Reinforced insulation



### ■Applications

- Industrial equipment
- Information processing equipment
- AV equipment
- Home electric appliances
- Other standby power supplies and compact power supplies

### ■Certified safety standards

UL60950-1, CSA C22.2 No.60950-1 (E132244)

Certified input voltage range

...DC110-340V

### ■Applicable safety standards

UL/CSA/IEC/EN60950-1  
UL/CSA/IEC/EN60065  
IEC/EN60335-1

Applicable input voltage range

...DC110-340V  
...DC110-340V  
...DC110-420V

### ■Application circuit

Method to select external parts for input rectification and smoothing as well as output smoothing is supported by the application note.

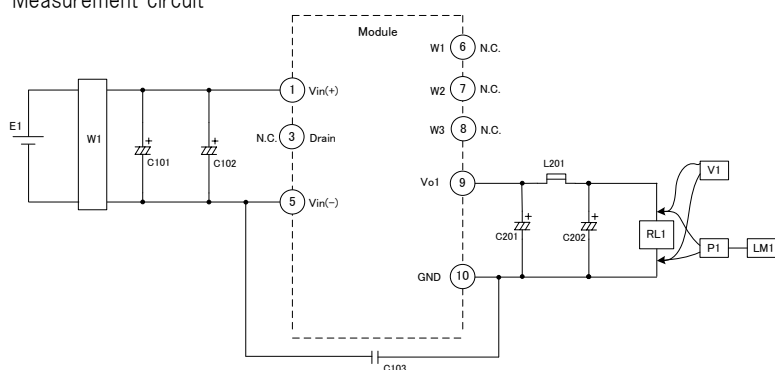
# Input-output condition

| Item                             | Specification  | Conditions・Note                          |
|----------------------------------|----------------|------------------------------------------|
| Input voltage range              | DC110~420V     | Average voltage                          |
| Maximum input voltage            | 420V or less   | Including peak value                     |
| Input ripple voltage lower limit | 85V or more    | Ripple voltage of the AC input rectified |
| Rated input voltage              | DC140V, DC340V |                                          |
| Rated output voltage             | 15V            |                                          |
| Rated load current               | 0.22A          |                                          |

# Electrical specification Ta=25°C

| Item                                              | Specification           | Conditions・Note                                                 |
|---------------------------------------------------|-------------------------|-----------------------------------------------------------------|
| Efficiency                                        | 74% or more (82% TYP)   | Rated input voltage<br>Rated output current                     |
| Output voltage tolerance                          | ±10%                    | Rated input voltage<br>Output current 0~0.022A                  |
|                                                   | +5%/-6%                 | Rated input voltage<br>Output current 0.022~0.22A               |
| No-load power                                     | 50mW or less (20mW TYP) | Rated input voltage                                             |
| Ripple                                            | 400mVp-p or less        | Rated input voltage                                             |
| Ripple noise                                      | 500mVp-p or less        | Rated output current                                            |
| Lower limit of output undershoot during load step | 13.0V or more           | Rated input voltage<br>Output current 0⇔0.22A<br>Slew rate 10uS |
| Upper limit of output overshoot during load step  | 16.5V or less           | Rated input voltage<br>Slew rate 10uS                           |

Measurement circuit



E1 : DC power supply  
W1 : Power meter WT210 (YOKOGAWA)  
RL1: Electronic load  
V1 : Voltmeter Class 0.5  
P1 : Differential probe DP-100(KG)  
LM1: Ripple noise meter RM-103(KG)

C101 : 450BX06.8M (RUBYCON)  
C102 : 450BX06.8M (RUBYCON)  
C103 : CD65ZU2GA681M (TDK)  
C201 : 35ZLH220M (RUBYCON)  
C202 : 35ZLH47M (RUBYCON)  
L201 : PJ5H-2R2M (KORIN)

### ■ Protection

| Item                   | Specification | Conditions・Note |
|------------------------|---------------|-----------------|
| Overcurrent protection | 0.23A or more | Hiccup mode     |
| Overheat protection    |               |                 |

### ■ Insulation

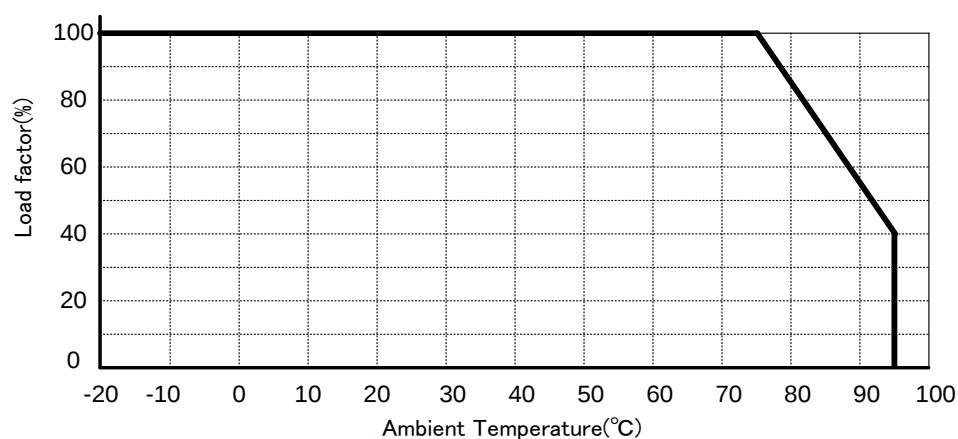
| Item                                              | Specification | Conditions・Note |
|---------------------------------------------------|---------------|-----------------|
| Dielectric withstand voltage<br>(Between Pri—Sec) | AC3.0kV 1min  | Cutoff 2mA      |
| Insulation resistance<br>(Between Pri—Sec)        | 100MΩ or more | DC500V          |

### ■ Environmental conditions

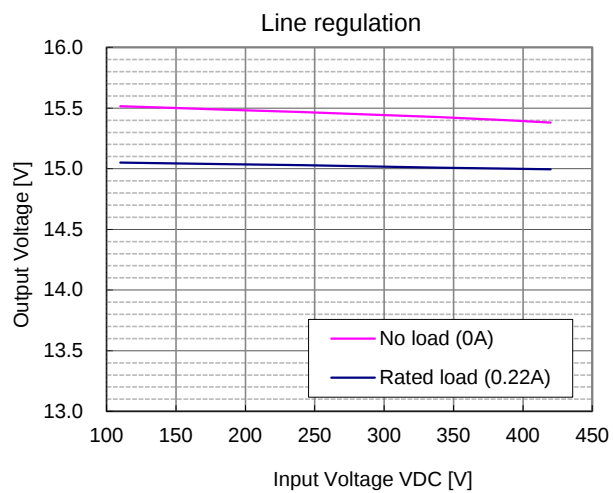
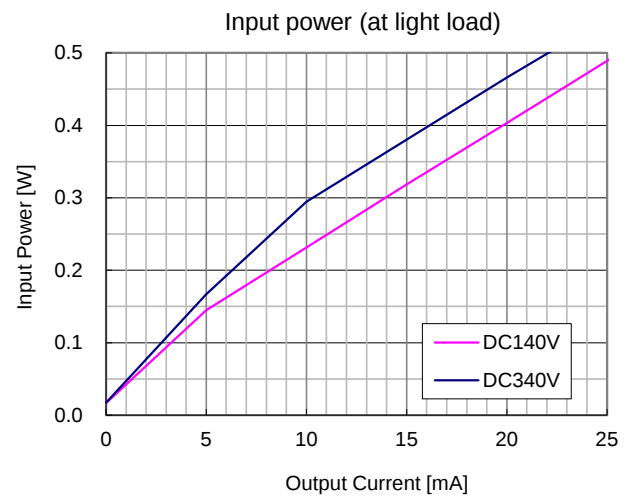
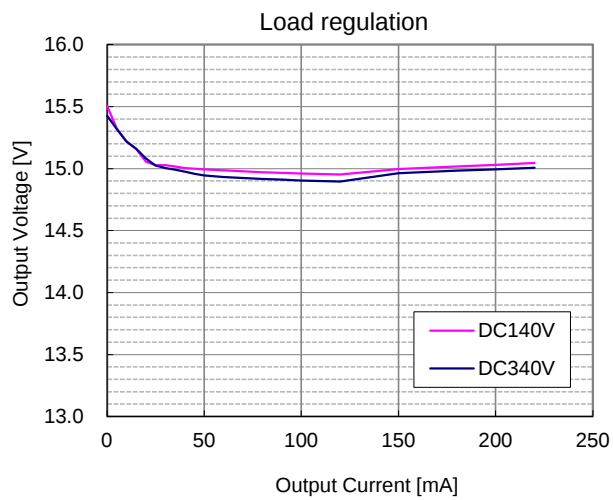
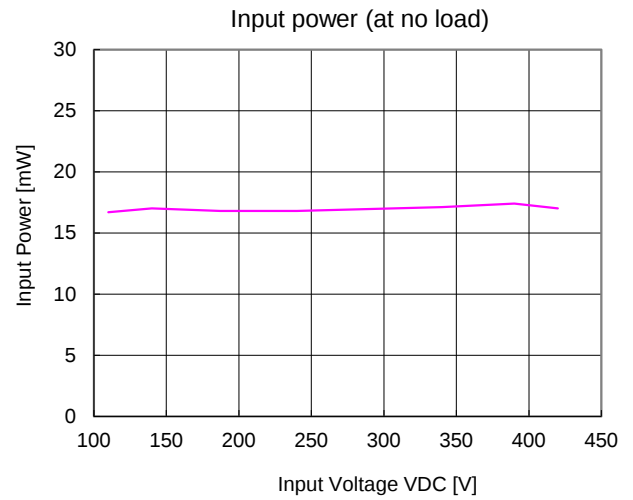
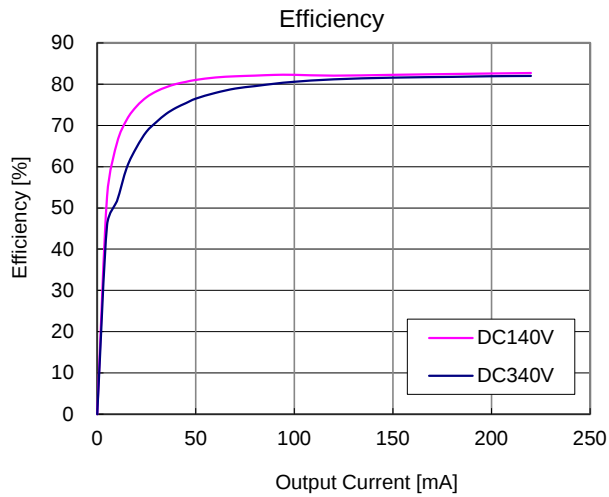
| Item                  | Specification                 | Conditions・Note                           |
|-----------------------|-------------------------------|-------------------------------------------|
| Operating temperature | -20°C~95°C                    | Refer to the ambient temperature derating |
| Operating humidity    | 20~95%RH<br>(No condensation) |                                           |
| Storage temperature   | -25°C~100°C                   |                                           |
| Storage humidity      | 5~95%RH<br>(No condensation)  |                                           |

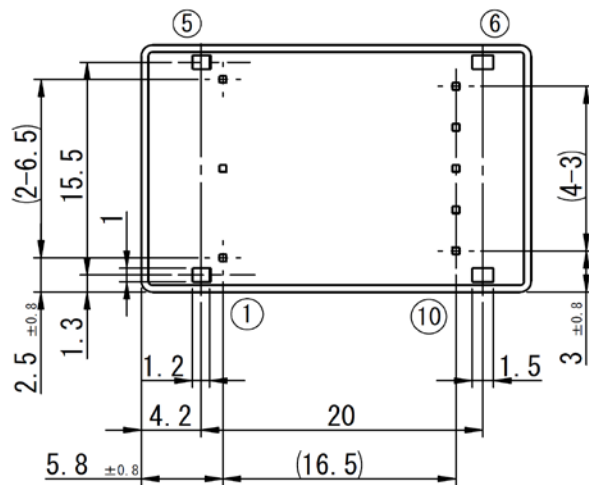
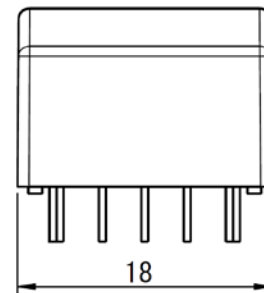
### ■ Ambient temperature derating curve

Reduce the load current according to the following temperature derating table.



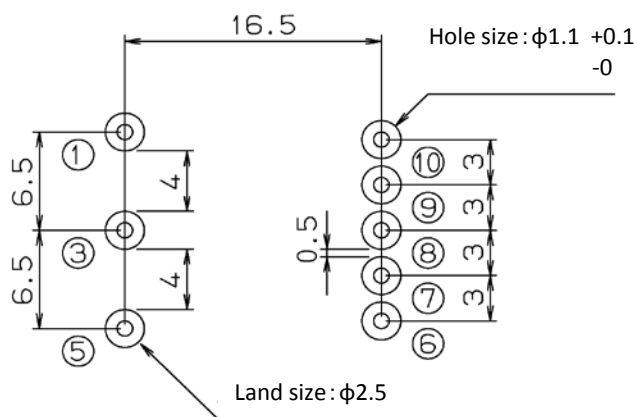
■ Typical characteristics Ta=25°C





Unit:mm

# Recommended hole diameter and land size



※ The round pulling out figure is a pin numbering.

Unit:mm

Component side

# Terminal function and connection

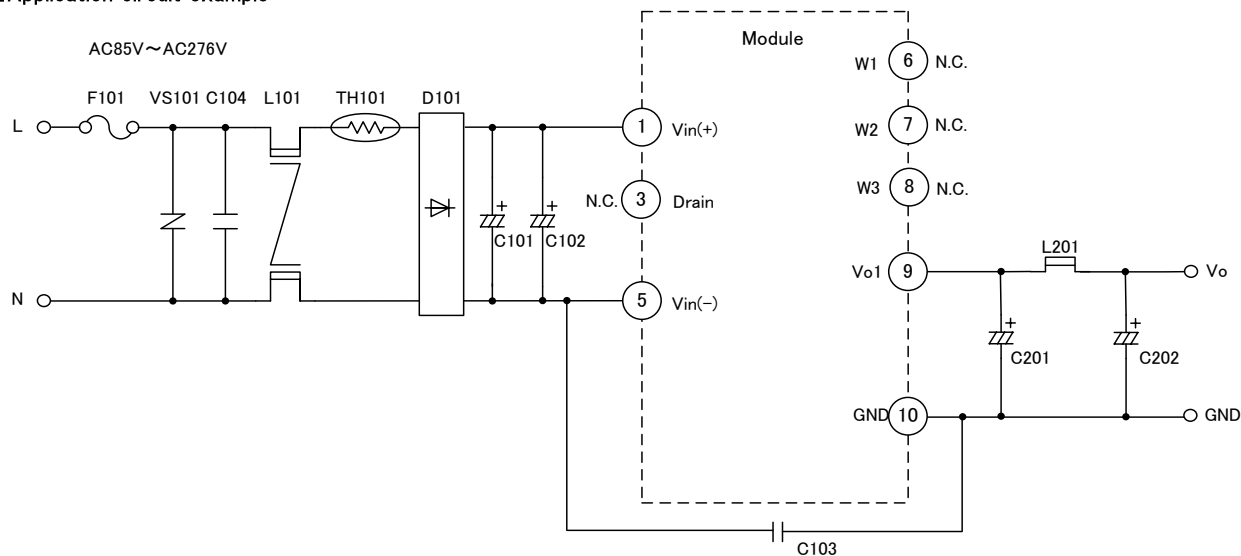
Primaries

| Pin No. | Name   | Explanation of terminals      |
|---------|--------|-------------------------------|
| 1       | Vin(+) | DC voltage input terminal (+) |
| 2       |        | No terminal                   |
| 3       | Drain  | Terminal for noise adjustment |
| 4       |        | No terminal                   |
| 5       | Vin(-) | DC voltage input terminal (-) |

Secondaries

| Pin No. | Name | Explanation of terminals                                       |
|---------|------|----------------------------------------------------------------|
| 6       | W1   | N.C.                                                           |
| 7       | W2   | N.C.                                                           |
| 8       | W3   | Secondary wired bundle pin ※Don't connect with other circuits. |
| 9       | Vo1  | Output terminal (+)                                            |
| 10      | GND  | Output terminal (-)                                            |

# Application circuit example



| Symbol | Description | Part No.      | Manufacturer  |
|--------|-------------|---------------|---------------|
| D101   | Diode       | S1NBC80       | SHINDENGEN    |
| TH101  | Thermistor  | NTPA7220L     | MURATA        |
| VS101  | Varistor    | TVR10471      | THINKING      |
|        |             |               |               |
| L101   | Inductor    | LU-8S-V-103   | KORIN         |
| L201   | Inductor    | PJ5H-2R2M     | KORIN         |
|        |             |               |               |
| C101   | Capacitor   | 400AX10M      | RUBYCON       |
| C102   | Capacitor   | 400AX10M      | RUBYCON       |
| C103   | Capacitor   | CD65ZU2GA681M | TDK           |
| C104   | Capacitor   | LE104-MX      | OKAYA         |
| C201   | Capacitor   | 35ZLH220M     | RUBYCON       |
| C202   | Capacitor   | 35ZLH47M      | RUBYCON       |
|        |             |               |               |
| F101   | Fuse        | FIH 250V 2.5A | NIPPON-SEISEN |

※Mount the fuse on the input Live side to ensure safety without fail.

Recommended parts:FIH 250V 1.6A~2.5A/NIPPON-SEISEN

※Depend on the applying safety standard, please add the discharge resistance in paralell with C104.

**■ Usage cautions**

- Always mount fuse on the Live side of input for ensuring safety because the fuse is not built-in the product.  
Please select the fuse considering conditions such as steady current, inrush current, and ambient temperature at your own responsibility.  
※Recommended parts: FIH 250V 1.6A~2.5A / NIPPON-SEISEN  
When using a fuse having large rated current or high capacity input electrolytic condenser, by combining another converter and input line and input electrolytic condenser, fuse may not blow off in the case of abnormality.  
Do not combine high voltage line and fuse.

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  - Use that involves exposure to direct sunlight, outdoor exposure, or dusty conditions.
  - Use in locations where corrosive gases such as salt air, C12, H2S, NH3, SO2, or NO2, are present.
  - Use in environments with strong static electricity or electromagnetic radiation.
  - Use that involves placing inflammable material next to the product.
  - Use of this product either sealed with a resin filling or coated with resin.
  - Use of water or a water soluble detergent for flux cleaning.
  - Use in locations where condensation is liable to occur.
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