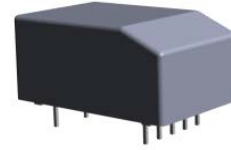


## Power Modules (Power Supplies with Ultra-low Standby Power Consumption)

### ■ 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 ( $V_{in}$ : 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.

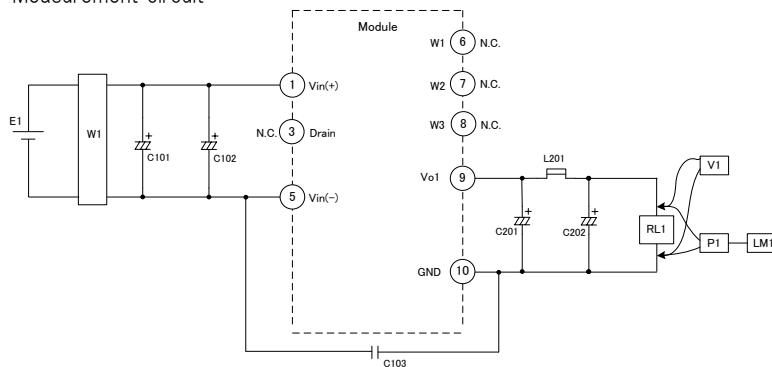
**Input-output condition**

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 Rated output current
Output voltage tolerance	±10%	Rated input voltage Output current 0~0.022A
	+5%/-6%	Rated input voltage 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 Output current 0⇔0.22A Slew rate 10uS
Upper limit of output overshoot during load step	16.5V or less	Rated input voltage 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 : 450BXC6.8M (RUBYCON)
- C102 : 450BXC6.8M (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**

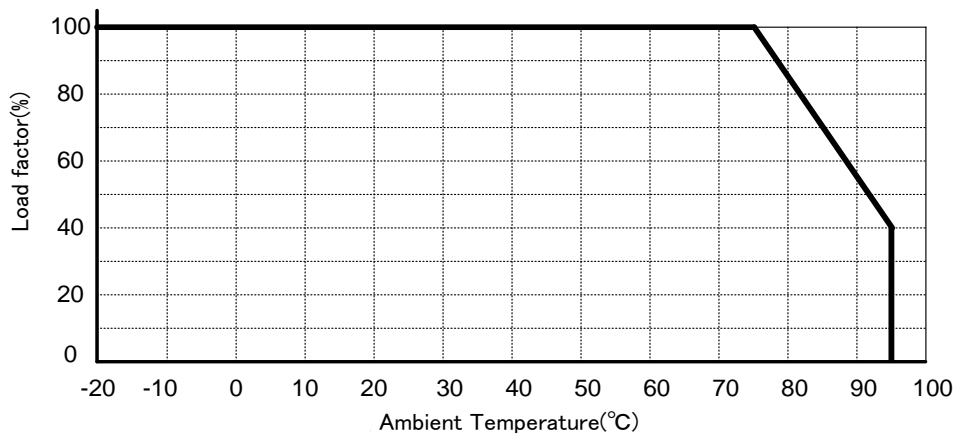
Item	Specification	Conditions·Note
Dielectric withstand voltage (Between Pri—Sec)	AC3.0kV 1min	Cutoff 2mA
Insulation resistance (Between Pri—Sec)	100MΩ or more	DC500V

**Environmental conditions**

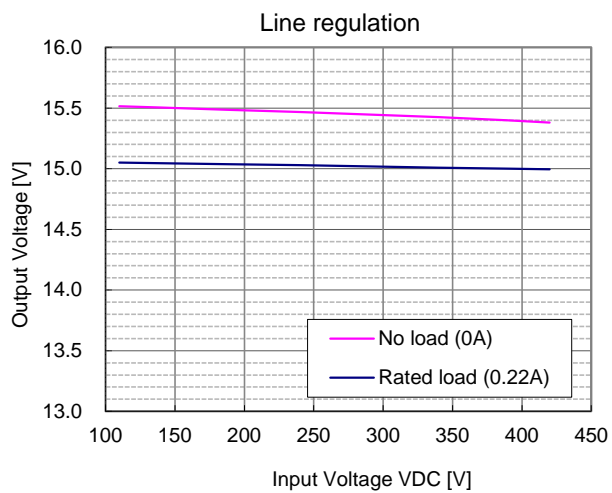
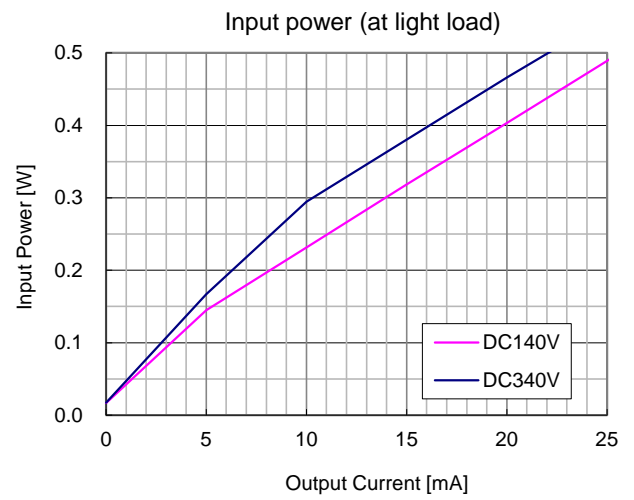
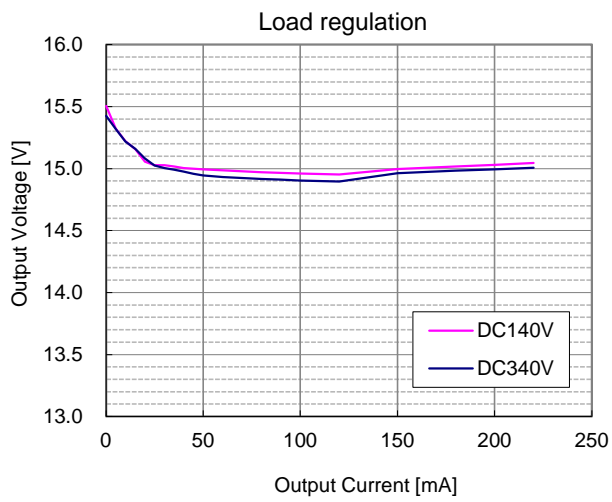
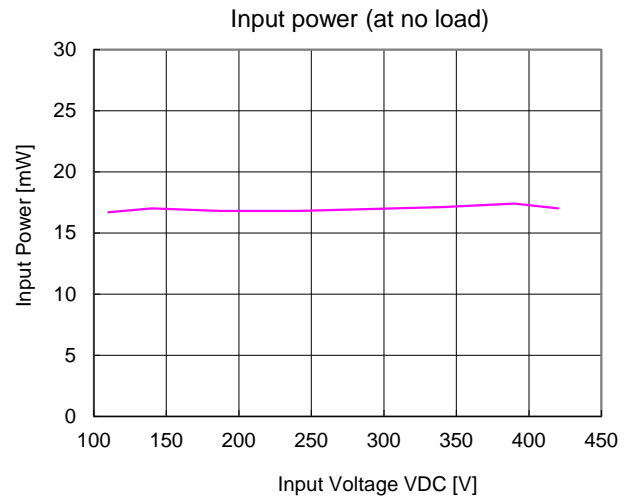
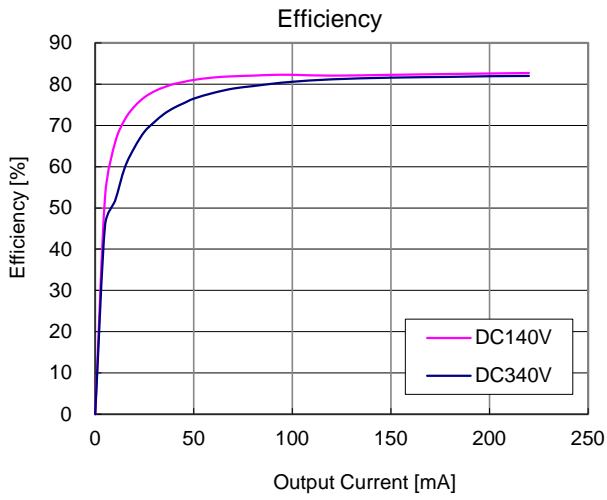
Item	Specification	Conditions·Note
Operating temperature	-20°C~95°C	Refer to the ambient temperature derating
Operating humidity	20~95%RH (No condensation)	
Storage temperature	-25°C~100°C	
Storage humidity	5~95%RH (No condensation)	

**Ambient temperature derating curve**

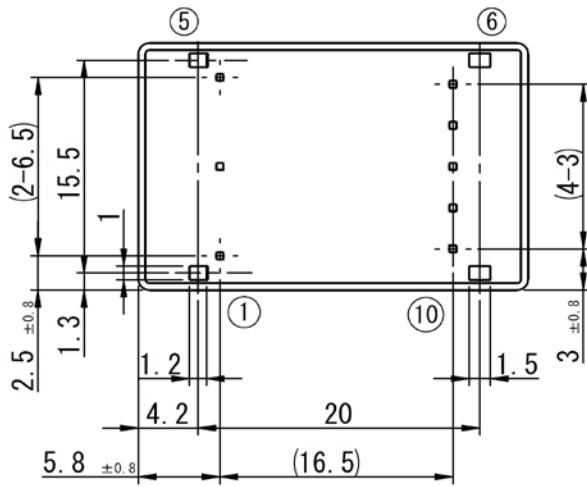
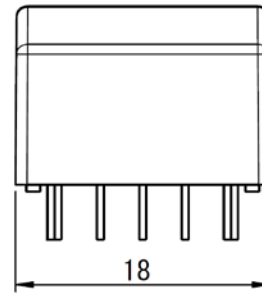
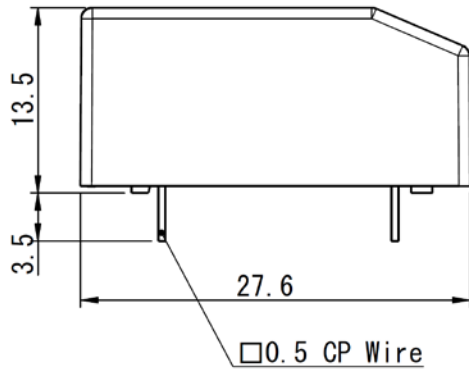
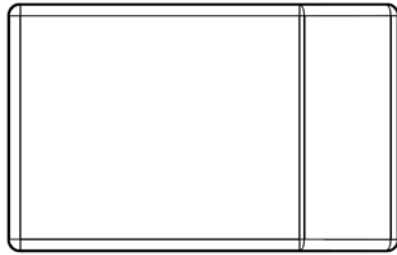
Reduce the load current according to the following temperature derating table.



■ Typical characteristics Ta=25°C

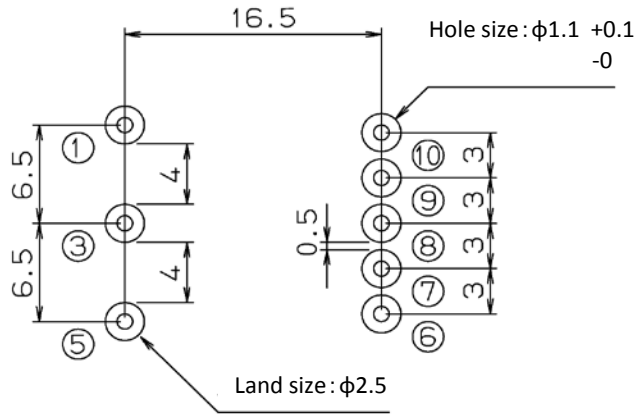


■ Outline dimensional drawing



Note : 1. The dimensional tolerance without directions is  $\pm 0.5\text{mm}$ .

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**

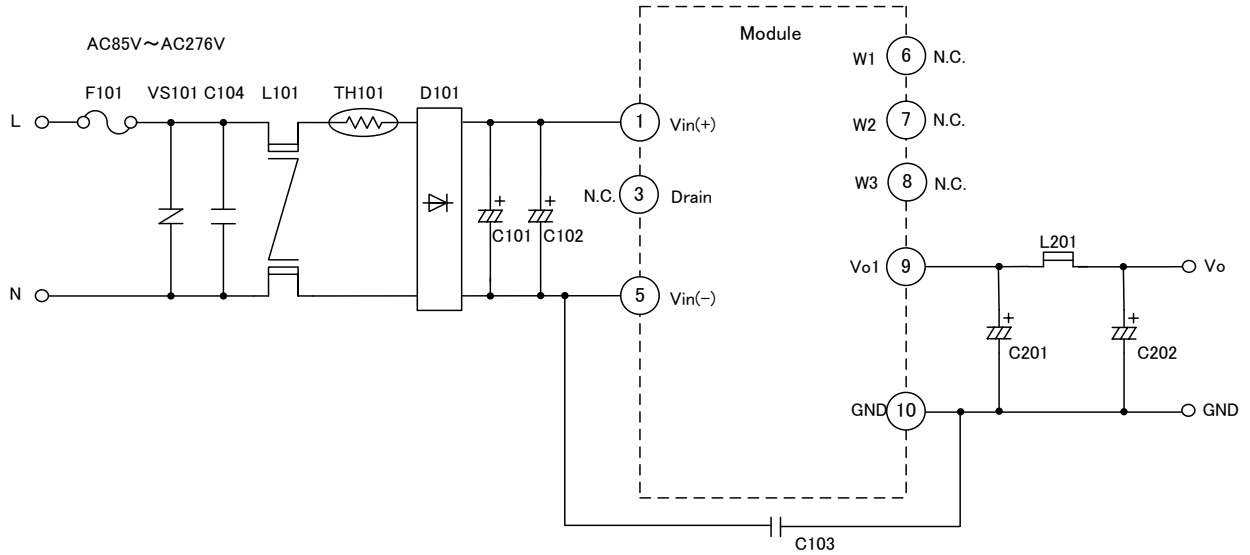
Primaries

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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