

# APPLICATION NOTE

SWITCHING MODE POWER SUPPLY

## P series

POWER PLAZA CO., LTD



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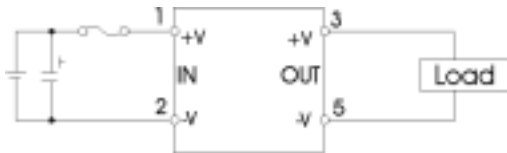
**Block Diagrams**

# P SERIES

Appucaton notes

## Basic Connection

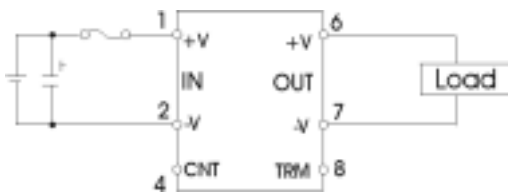
### PS1R5, PS3, PS6, PS10



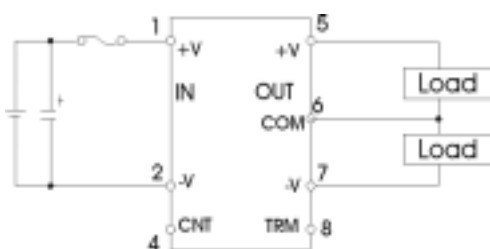
### PD1R5, PD3, PD6, PD10



### PS15, PS25



### PD15, PD25



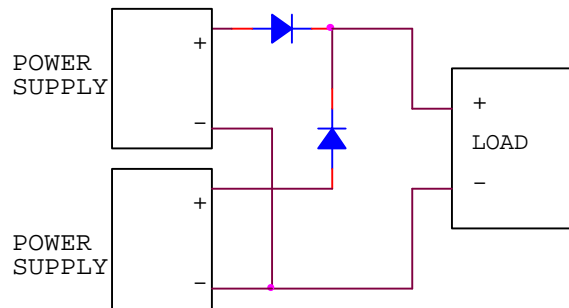
## Input Fuse

P Series input line should always be fused in order to ensure protection and safety.

Encapsulated power supplies, in general, do not have internal fuses and an external (Regular or Slow Blow Type) is should be used.

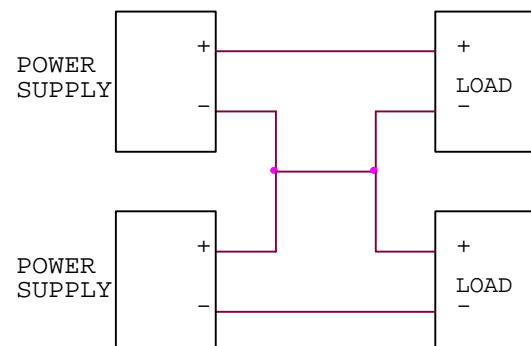
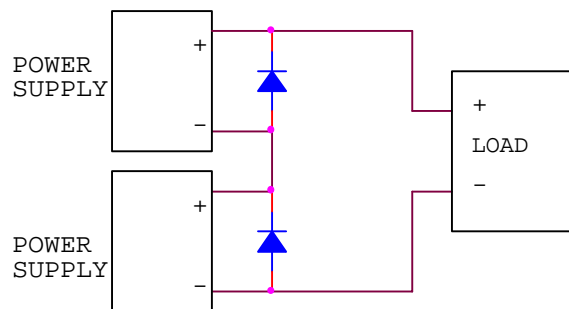
## Parallel Operation

This supply can be operated the following ways.



## Series Operation

This supply can be operated the following ways.



Choose a diode in accordance with voltage, power dissipation and heat radiation

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## P SERIES

Application notes

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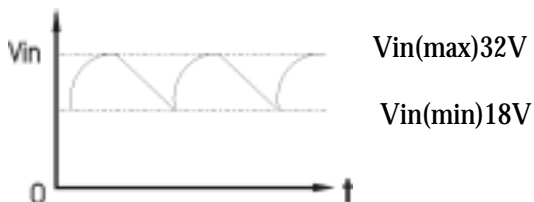
### Recommended Fuse Ratings

	5VDC	12VDC	24VDC	48VDC
P1R5	2A	1A	0.5A	0.5A
P3	3A	2A	1A	1A
P6	4A	3A	2A	1A
P10	6A	3A	2A	1A
P15	7A	5A	3A	1.5A
P25	12A	7A	4A	2A

### Unstable Input

Input voltage is comprised of both the DC voltage (average rectified voltage) and the peak to peak ripple voltage. Peak to peak ripple voltage should be minimized so that the input voltage is within the standard input voltage range as follows

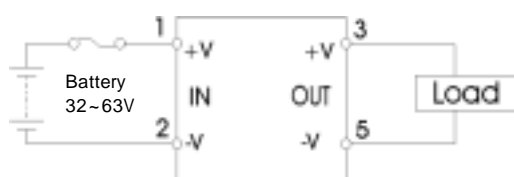
ex : PS10-24-5



### Battery Input

When using a battery as the input power supply, make sure that the maximum and minimum input voltage do not fall out of the standard input voltage range

ex: PS10-48-5



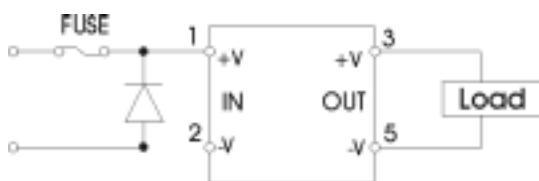


# P SERIES

Applicaton notes

## Input Reversal

Accidently reversing the input connections could damage the module. Thus. If the connections may be accidently reversed. Please use a protective diode and an input fuse as shown below



## Output Ripple & Noise Measurement Method

The standard measurement for output ripple and noise are based on normal probe with 20MHz bandwidth scope. Upon measurement of the ripple voltage, make sure that the oscilloscope probe leads are not too long.

## Over Current Protection

The P Series is equipped with an over current protection circuit. When the short or overload condition is removed, the output will automatically recover. This setting is fixed and cannot be varied externally. If the short or overload condition continues, the power module could be damaged due to the heat condition

## Over Voltage Protection

The P Series is equipped with an OVP(over voltage protection) circuit. When the OVP trigger, the output will be shut down. The input must be taken out(for at least five seconds), and than A52reinputted manually. Otherwise, the modyle will not output.

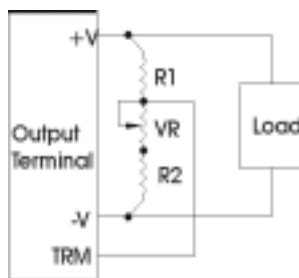
## Output Voltage Variation(Trm)

The output voltage of power module can be adjusted by connecting an external resistor between the TRIM pin and either the +Vo or -Vo pin using the external potentiometer the output voltage can be varied within  $\pm 5\%$  of the standard output voltage. If the output voltage is raised too far up, the OVP will trigger

### External part

Model	Output voltage	VR	R1	R2
PS15	5V	1K	1.0K	680
PS25	12V	1K	3.9K	680
	15V	1K	5.6K	750
PD15	$\pm 5V(10V)$	1K	3.3K	680
PD25	$\pm 12V(24V)$	5K	9.0K	820
	$\pm 15V(30V)$	5K	20K	910

External : Resistance tolerance  $\pm 5\%$   
Variable Resistor(VR) : Total resistance tolerance  $\pm 20\%$   
Remaining Resistance : Value less than 1%



# P SERIES

Applicaton notes

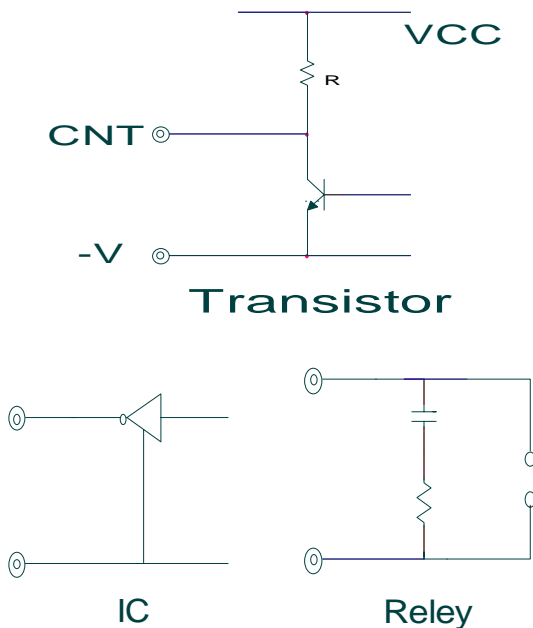
## On/Off Control(CNT)

The ground terminal of remote ON/OFF circuit is connected with -V input terminal.

Between CNT and -V input : Output voltage is ON at "LOW" level or short circuit (0~1.2V)

Between CNT and -V input : Output voltage is OFF at "High" level or open circuit(2.4~5.5V)

(Connection example)



When CNT terminal is "LOW" level, fan out current is 1mA typ. When Vcc is applied, use 5V ~ Vcc 24V. When remote ON/OFF function is not used, please short between CNT and -V input.

CNT level for INPUT -V	OUTPUT
L(Less than 1.2V) OR Short	ON
HL(More than 2.4V) OR Open	OFF

## Maximum Line Regulation

Maximum line regulation is maximum output voltage change when the input volt is slowly varied within the input voltage range. The measurement point for the input and output voltage are  $\pm V_{in}$ ,  $\pm V_{out}$  respectively.

## Maximum Load Regulation

Maximum load regulation is maximum output voltage value change when varying the load current slowly within the standard output current range. The measurement point for the input and output voltage are  $\pm V_{in}$ ,  $\pm V_{out}$  respectively

## Operation Temperature

The basetemperature range for P series is from -20 to 71

## Operation Humidity

Avoid the buildup of condensation on or in the power module

## Storage Temperature

Please note that sudden temperature changes can cause condensation buildup, and other harmful effects to each terminal solder

## Storage Humidity

High temperature and humidity can cause the terminal on the module to oxidize. The quality of the solder will become worse.

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# P SERIES

## Application notes

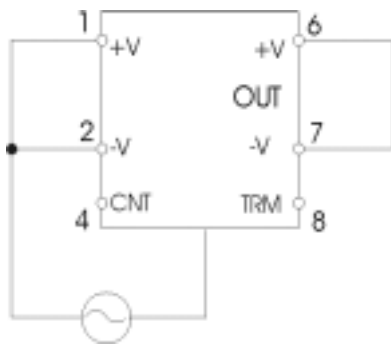
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### Withstand Voltage

The power module is designed to withstand 500V AC between the input to the case, input to output and output to case for 1 minute.

For the withstand voltage test, the applied voltage must be increased gradually from zero to the testing value, and then decreased gradually at shut down. Especially stay away from use of a timer. Where a pulse of several times the applied voltage can be generated

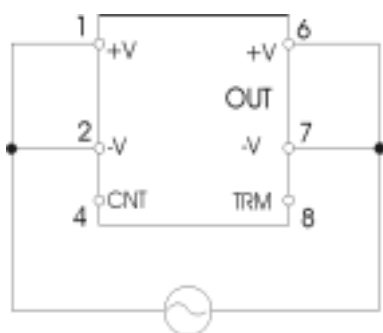
#### input-case



ex: PS15

500VAC, one minute, 5mA

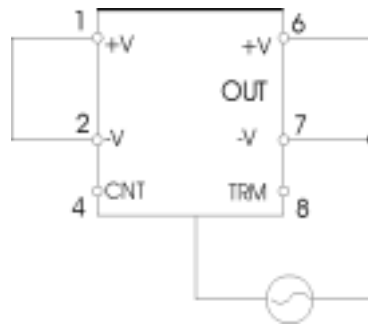
#### input-output



ex: PS15

500VAC, one minute

#### output-case



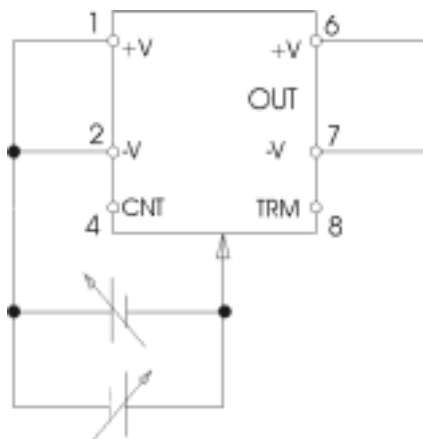
ex: PS15

500VAC, one minute

### Isolation Resistance

The isolation resistance is more than 100M at 500 VDC when tested with a DC isolation tester between the output and the case. Make sure that during testing, the isolation tester does not produce a high pulse when the applied voltage is varied. Ensure that the tester is fully discharged after the test.

#### input-case



ex: PS15

500VDC, more than 100M

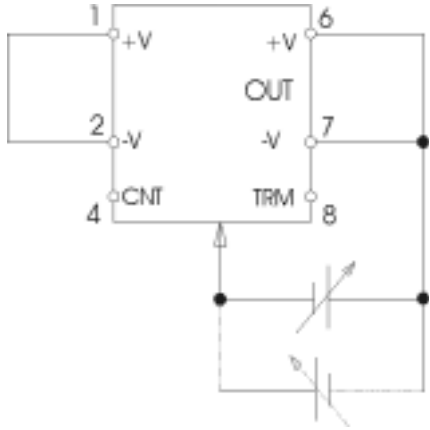
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# P SERIES

## Applicaton notes

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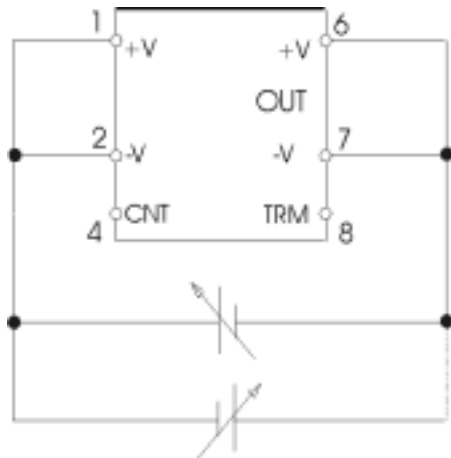
output-case



ex: PS15

500VDC, more than 100M

output-case

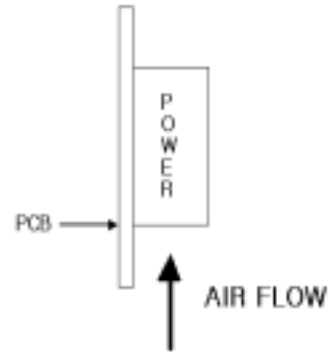


ex: PS15

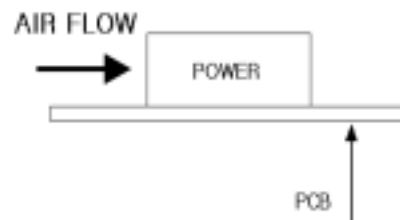
500VDC, more than 100M

## Cooling

Please adjust air flow to prevent the temperature to rises during using this product.



VERTICAL MOUNTING



HORIZONTAL MOUNTING

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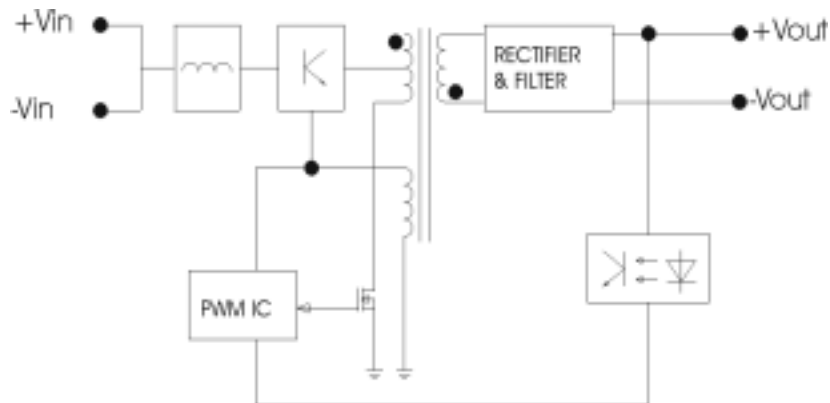
## P SERIES

### Applicaton notes

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#### Block Diagrams

##### PS1R5, PS3, PS6, PS10

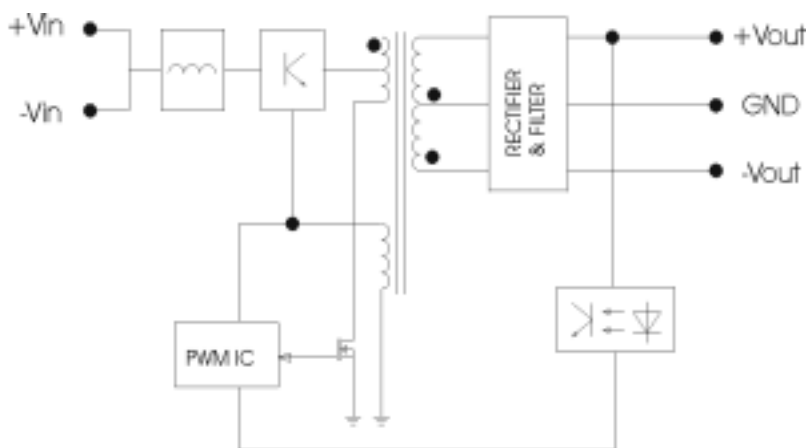


PS1R5, PS3, PS6, PS10

Circuit topology : flyback

Switching Frequency : 300 Khz(fixed)

##### PD1R5, PD3, PD6, PD10



PD1R5, PD3, PD6, PD10

Circuit topology : flyback

Switching Frequency : 300 Khz(fixed)

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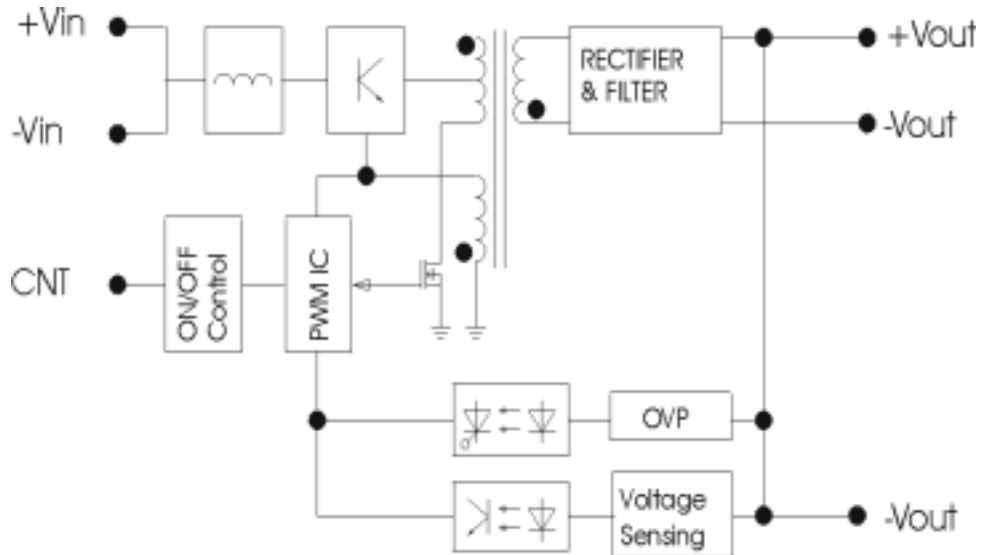
# PT SERIES

## Applicaton notes

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### Block Diagrams

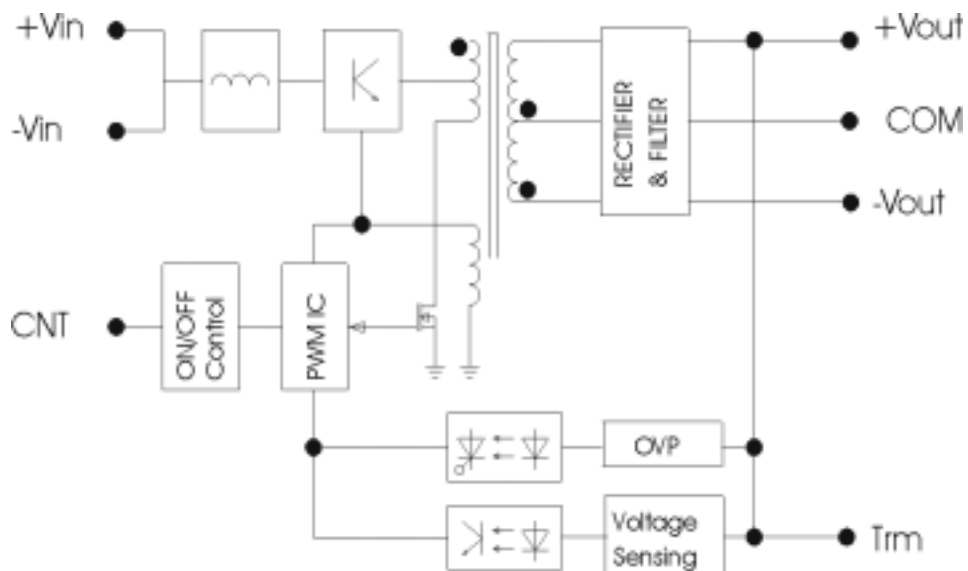
#### PS15



Circuit topology : flyback

Switching Frequency : 300Khz(fixed)

#### PD15



Circuit topology : flyback

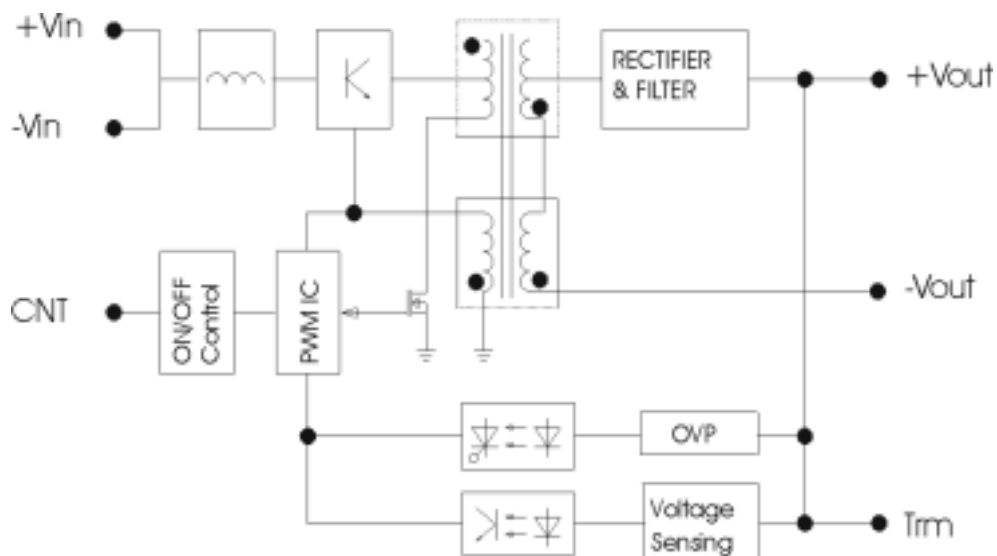
Switching Frequency : 300Khz(fixed)

# P SERIES

## Applicaton notes

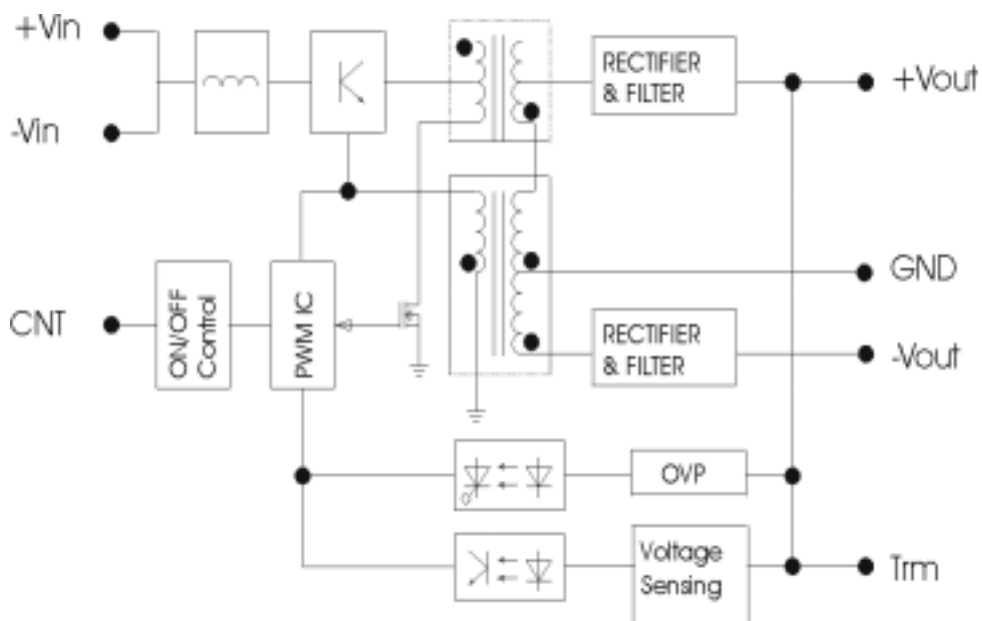
### Block Diagrams

#### PS25



Circuit topology : flyback , forward  
Switching Frequency : 300Khz(fixed)

#### PD25



Circuit topology : flyback  
Switching Frequency : 300Khz(fixed)