

APPLICATION NOTE

SWITCHING MODE POWER SUPPLY

P series

POWER PLAZA CO., LTD



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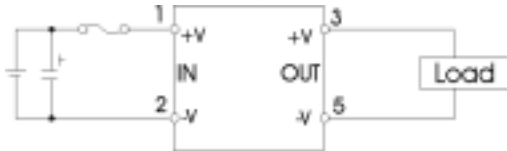
Block Diagrams

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Application notes

Basic Connection

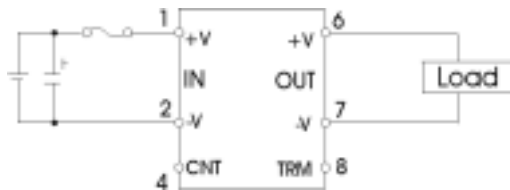
PS1R5, PS3, PS6, PS10



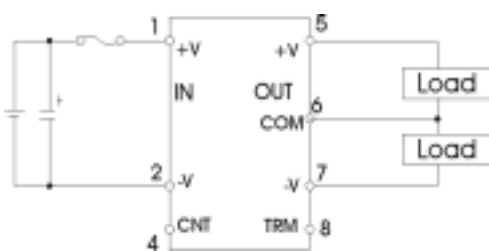
PD1R5, PD3, PD6, PD10



PS15, PS25



PD15, PD25



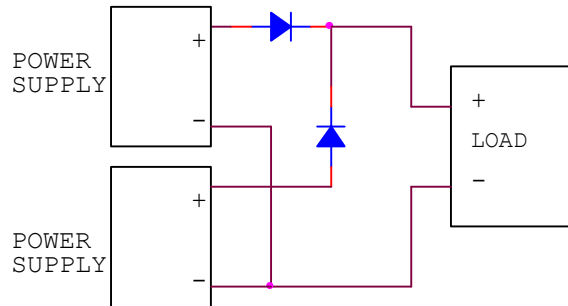
Input Fuse

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.

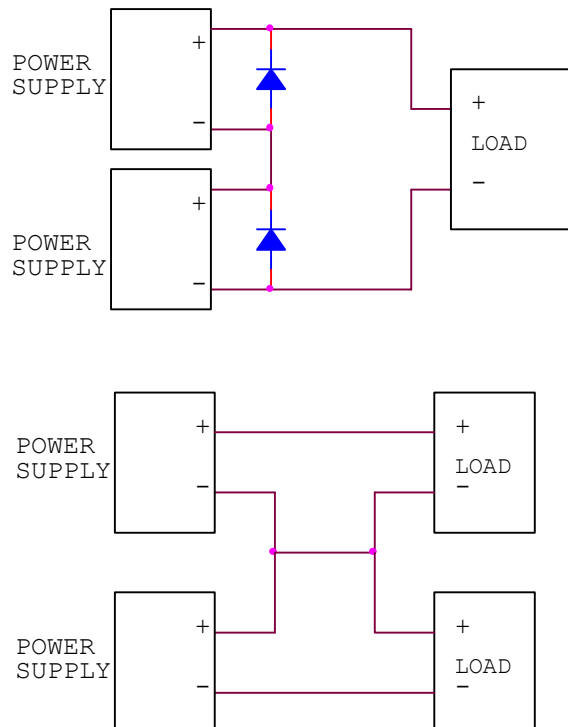
Parallel Operation

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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Application notes

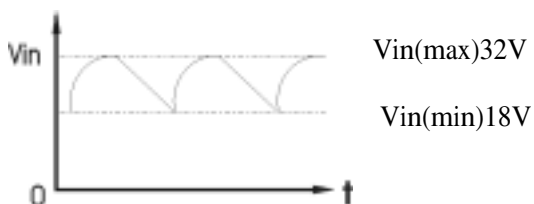
Recommended Fuse Ratings

	5VDC	12VDC	24VDC	48VDC
PIR5	2A	1 A	0.5A	0.5A
P3	3A	2A	1A	1.A
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

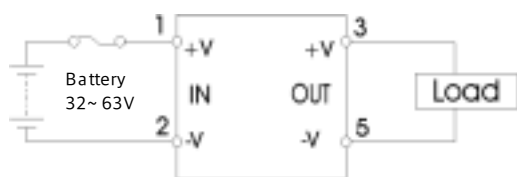
ex : PS10-24-5



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



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Application notes

Input Reversal

Accidentally reversing the input connections could damage the module. Thus. If the connections may be accidentally 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 then A52reinputted manually. Otherwise, the module will not output.

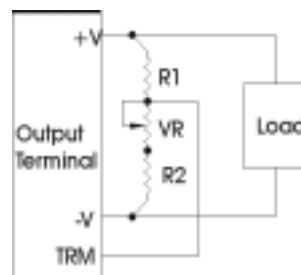
Output Voltage Variation(Trm)

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 Ω
PS25	12V	1K	3.9K	680 Ω
	15V	1K	5.6K	750 Ω
PD15	$\pm 5V(10V)$	1K	3.3K	680 Ω
PD25	$\pm 12V(24V)$	5K	9.0K	820 Ω
	$\pm 15V(30V)$	5K	20K	910 Ω

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



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Applicaton notes

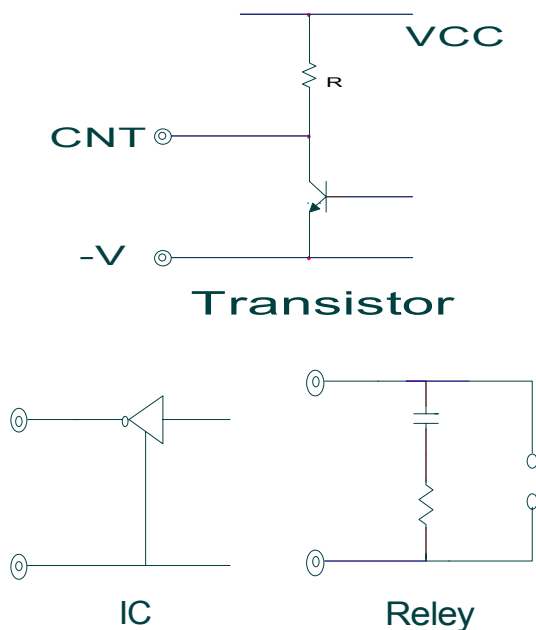
On/Off Control(CNT)

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 $5V \leq V_{cc} \leq 24V$. 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 stadnard 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°C to 71°C

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 affects 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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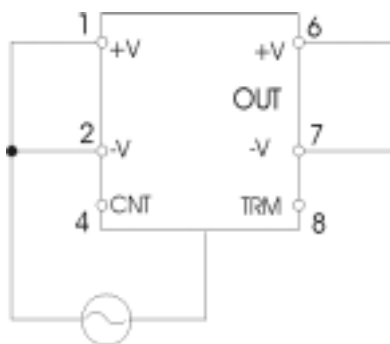
Applicaton notes

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

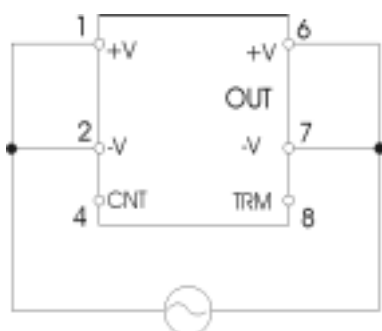
input-case



ex: PS15

500VAC, one minute, 5mA

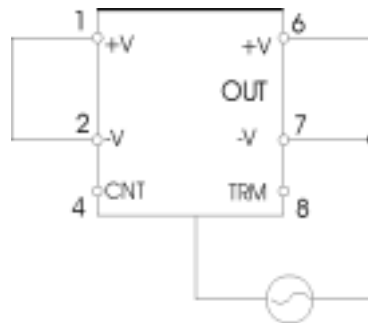
input-output



ex: PS15

500VAC, one minute

output-case



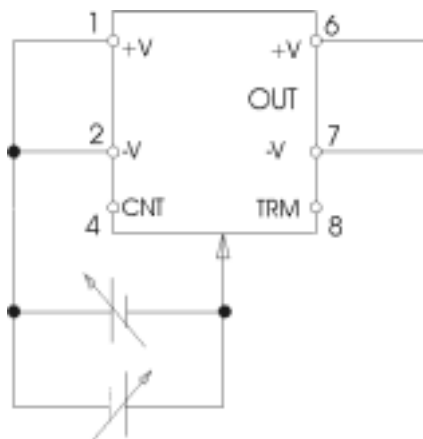
ex: PS15

500VAC, one minute

Isolation Resistance

The isolation resistance is more than 100M Ω 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



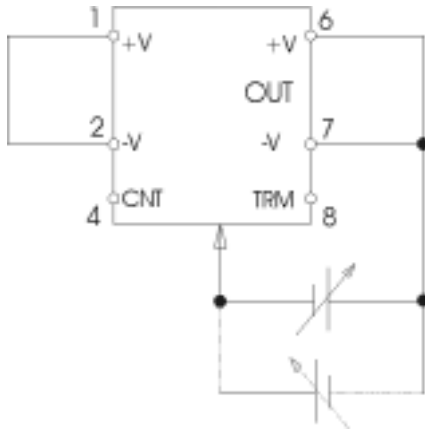
ex: PS15

500VDC, more than 100M Ω

P SERIES

Applicaton notes

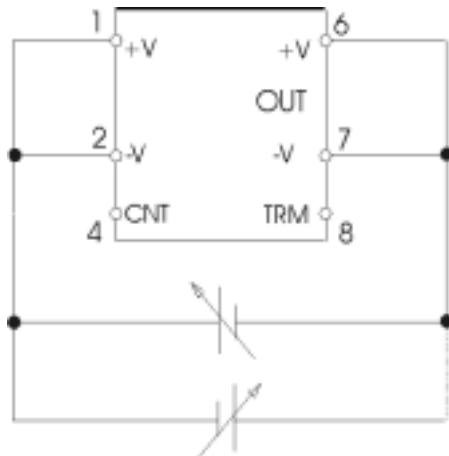
output-case



ex: PS15

500VDC, more than 100M Ω

output-case

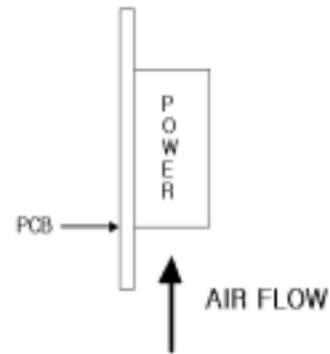


ex: PS15

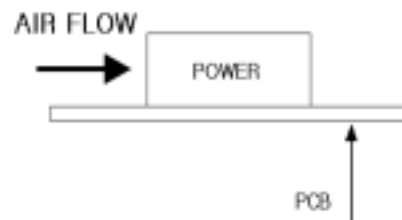
500VDC, more than 100M Ω

Cooling

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



VERTICAL MOUNTING



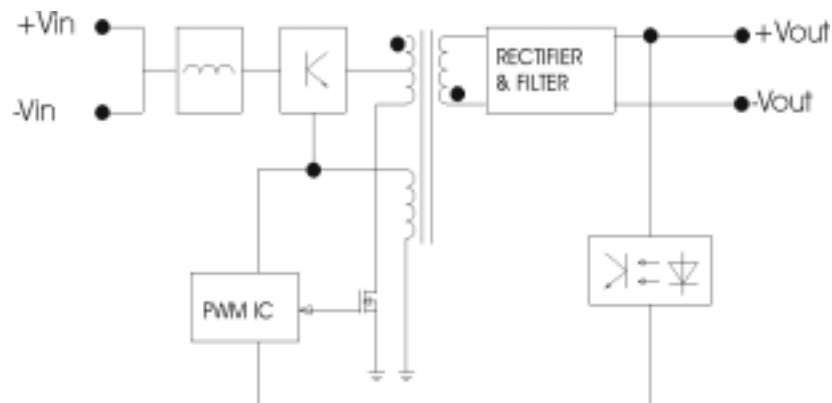
HORIZONTAL MOUNTING

P SERIES

Applicaton notes

Block Diagrams

PS1R5, PS3, PS6, PS10

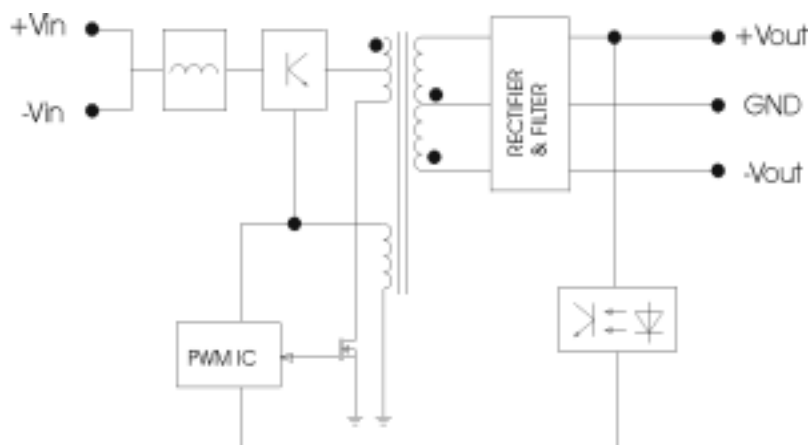


PS1R5, PS3, PS6, PS10

Circuit topology : flyback

Switching Frequency : 300 Khz(fixed)

PD1R5, PD3, PD6, PD10



PD1R5, PD3, PD6, PD10

Circuit topology : flyback

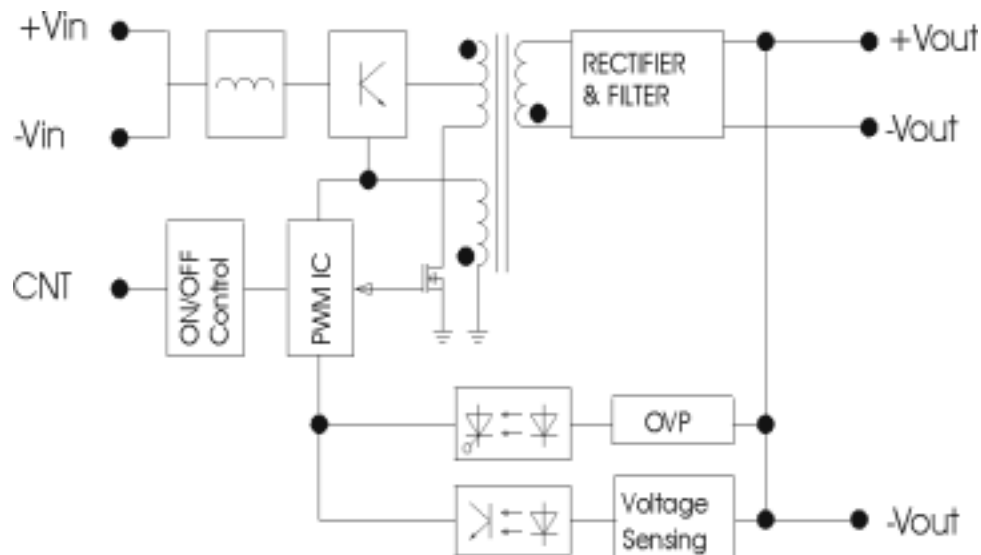
Switching Frequency : 300 Khz(fixed)

PT SERIES

Applicaton notes

Block Diagrams

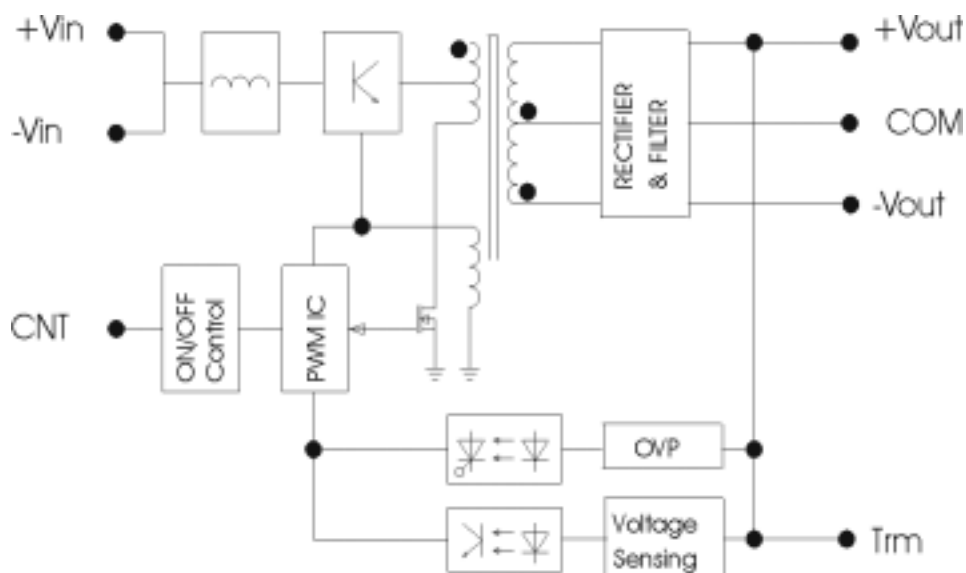
PS15



Circuit topology : flyback

Switching Frequency : 300Khz(fixed)

PD15

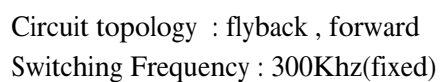


Circuit topology : flyback

Switching Frequency : 300Khz(fixed)

Applicaton notes

PS25



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