

# 60W DC-DC Converter P60A-Series



PHI-CON

- Offer single, dual and triple output
- 50 to 60 W Output power
- 2:1 Wide input voltage range
- International safety standard approval
- Six-Sided continuous shield
- High efficiency up to 86%
- Short circuit protection



## Model selection guide

Typ	Input		Output 1		Output 2 (or Dual Output)		Efficiency typ.	Output Power
	nominal voltage	current no load	voltage	current	voltage	current		
	[V <sub>DC</sub> ]	[mA]	[V <sub>DC</sub> ]	[A]	[V <sub>DC</sub> ]	[A]	[%]	[W]
<b>Single output</b>								
P60A12S05P	9-18	20	5.0	12.0			79	60
P60A12S12P	9-18	20	12.0	5.0			82	60
P60A12S15P	9-18	20	15.0	4.0			82	60
P60A12S24P	9-18	20	24.0	2.5			84	60
P60A24S05P	18-36	15	5.0	12.0			80	60
P60A24S12P	18-36	15	12.0	5.0			84	60
P60A24S15P	18-36	15	15.0	4.0			84	60
P60A24S24P	18-36	15	24.0	2.5			85	60
P60A48S05P	36-72	10	5.0	12.0			83	60
P60A48S12P	36-72	10	12.0	5.0			85	60
P60A48S15P	36-72	10	15.0	4.0			85	60
P60A48S24P	36-72	10	24.0	2.5			86	60
<b>Dual output</b>								
P60A12D05P	9-18	20	5.0	5.0	5.0	5.0	78	50
P60A12D12P	9-18	20	12.0	2.5	12.0	2.5	80	60
P60A12D15P	9-18	20	15.0	2.0	15.0	2.0	80	60
P60A12D512P	9-18	20	5.0	5.0	12.0	2.5	79	55
P60A24D05P	18-36	15	5.0	5.0	5.0	5.0	80	50
P60A24D12P	18-36	15	12.0	2.5	12.0	2.5	82	60
P60A24D15P	18-36	15	15.0	2.0	15.0	2.0	82	60
P60A24D512P	18-36	15	5.0	12.0	12.0	2.5	80	60
P60A48D05P	36-72	10	5.0	5.0	5.0	5.0	80	50
P60A48D12P	36-72	10	12.0	2.5	12.0	2.5	84	60
P60A48D15P	36-72	10	15.0	2.0	15.0	2.0	84	60
P60A48D512P	36-72	10	5.0	12.0	12.0	2.5	81	60
<b>Triple output</b>								
P60A12T512P	9-18	20	5.0	5.0	± 12.0	± 1.25	78	55
P60A24T512P	18-36	15	5.0	5.0	± 12.0	± 1.25	79	55
P60A48T512P	36-72	10	5.0	5.0	± 12.0	± 1.25	80	55

Suffix "P" PCB mounting type, heat sink will be added on module.

Suffix "T" Chassis mounting type, (terminal block) heat sink or fan force cooling.

Indicate suffix when order!

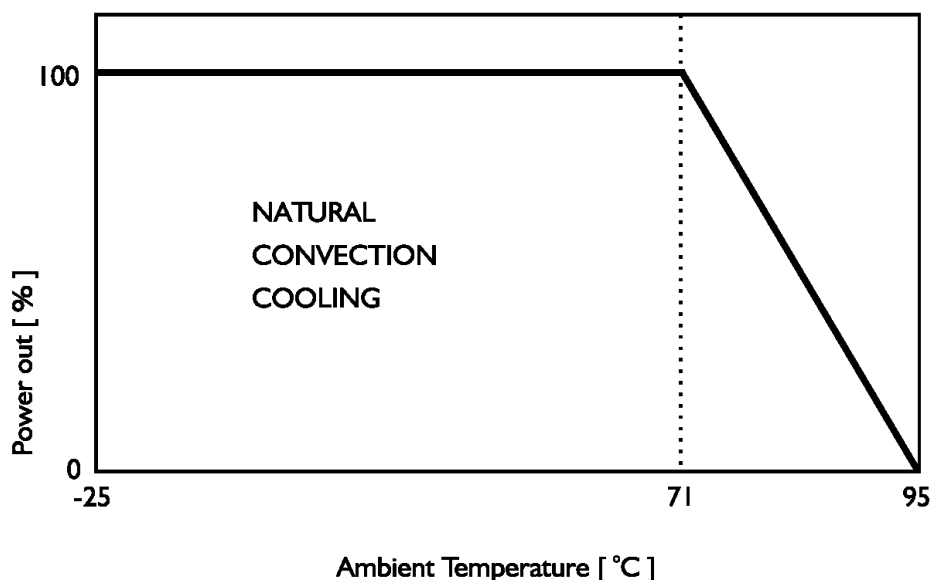
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## Specifications

Input	
Voltage range	9-18 V <sub>DC</sub> 18-36 V <sub>DC</sub> 36-72 V <sub>DC</sub>
Filter	Pi-type
Input reversed protection	Shunt diode built in, external fuse recommended !
Output	
Output Power	60 W max.
Voltage accuracy (full load and nominal V <sub>in</sub> )	±1%
Voltage adjustability	±10%
Ripple and noise (at 20 MHz BW)	± 1% of V <sub>out</sub>
Short circuit	Continuous
Line voltage regulation (I <sub>out</sub> nom, V <sub>in</sub> min... V <sub>in</sub> max)	±1%
Load voltage regulation (I <sub>out</sub> min... I <sub>out</sub> nom)	Single output model: ± 2% Dual output model: ±2% Triple output model: ±5%
Transient recovery time @ 25% load, step changed	500 μs
Temperature coefficient	± 0.02% / °C, max
Minimum load	Single: and Dual: 0% +5V of triple output 0% ±12V of triple output 20%

General	
Efficiency	See table
Switching frequency	80 kHz, typ.
Environmental	
Operating temperature ambient	-25°C to +95°C (with derating, see diagram)
Operating temperature case	+95 °C, max.
Storage temperature range	-25 °C to +100 °C
Cooling	Free air convection
MTBF according to MIL-HDBK-217F, GF40	122,500 hrs
Physical	
Dimensions "P" model	3.5 x 5.5 x 1.4 inches 88.9 x 139.7 x 35.6 mm
Dimensions "T" model	3.5 x 5.5 x 1.29 inches 88.9 x 139.7 x 32.9 mm
Weight	"P" Model 690 g "T" Model 570 g
Case material	metal
Isolation	
Rated voltage	1500 V <sub>DC</sub> , min
Resistance	10 <sup>9</sup> Ω, min.
Remote control	
Remote control on	Open or > + 5.5 V <sub>DC</sub>
Remote control off	Short or 0V ... < + 1.8 V <sub>DC</sub> referenced to - Input, pin 2
Shutdown idle current	10mA

## Derating

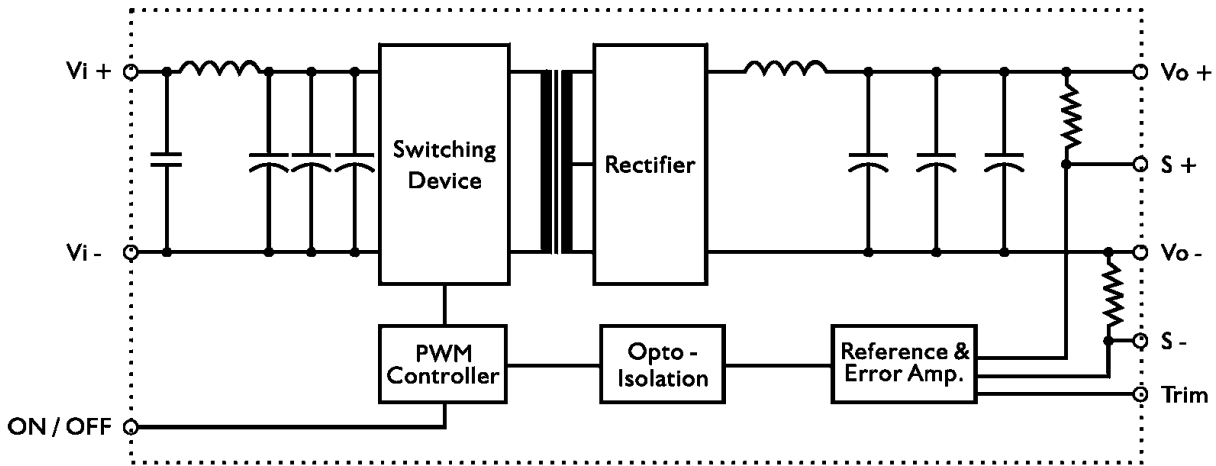


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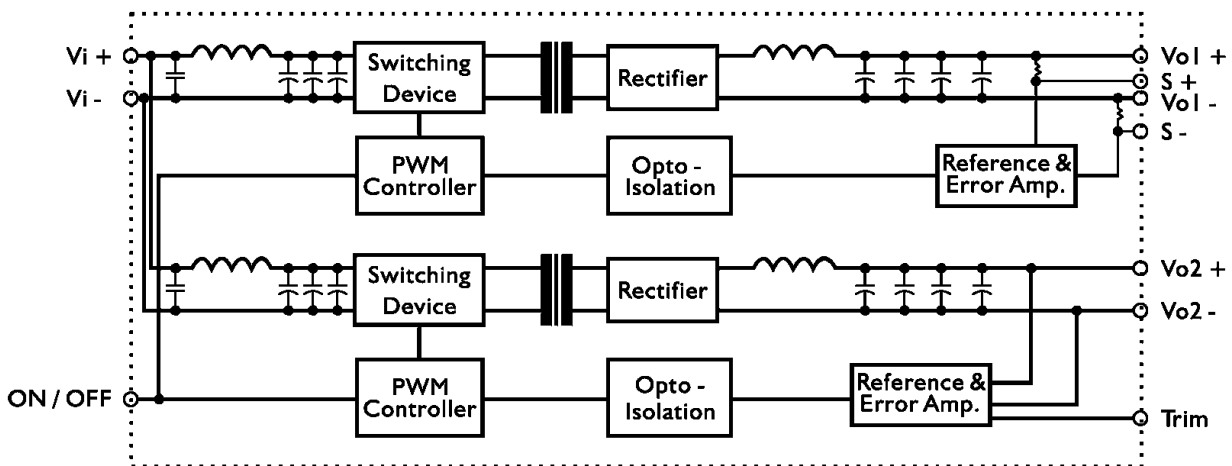


## Internal circuit schematic

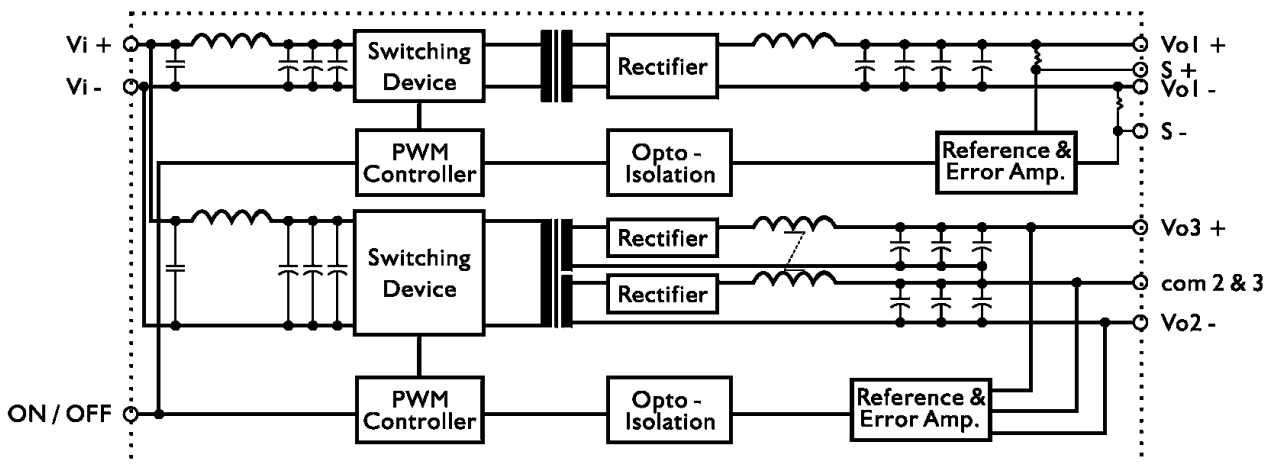
Block diagram for P60A series with single output



Block diagram for P60A series with double output



Block diagram for P60A series with triple output



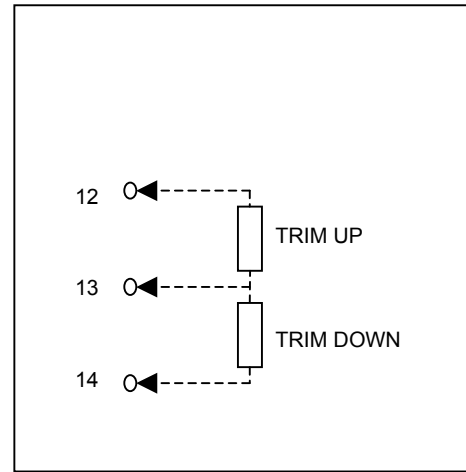
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## Pin connections

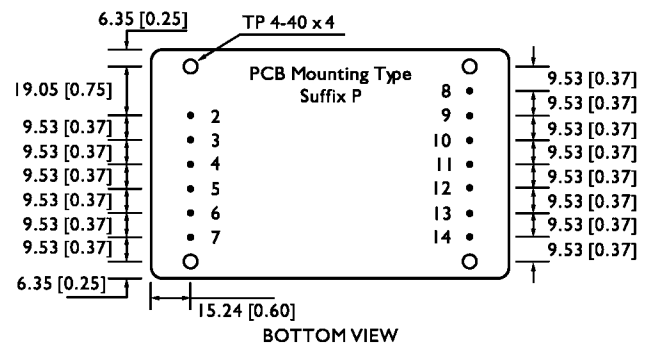
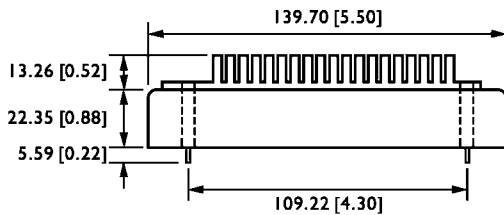
Pin	Single	Dual	Triple
1	Omitted	Omitted	Omitted
2	- Input	- Input	- Input
3	- Input	- Input	- Input
4	+ Input	+ Input	+ Input
5	+ Input	+ Input	+ Input
6	Remote CTRL	Remote CTRL	Remote CTRL
7	NC	NC	NC
8	- Output	- Sense / Trim up	- Sense / Trim up
9	- Output	- Output	- Output
10	+ Output	+ Output	+ Output
11	+ Output	+ Sense/ trim down	+ Sense/ trim down
12	- Sense / Trim up	- Output 2	- Output 2
13	TRIM	TRIM	Common -Vo 2 & +Vo 3
14	+ Sense/ trim down	+ Output 2	+ Output 3

## Trimming

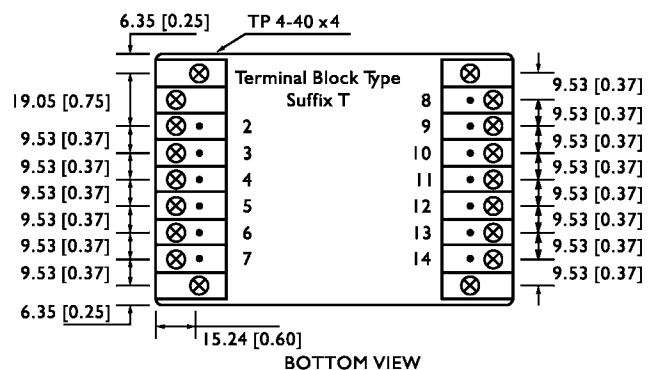
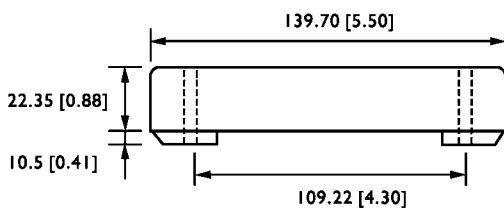


## Dimensions

### CASE : HH- P- 60



### CASE : HH- T



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