

# High Density DC-DC Modules

**POWER  
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PS50 Series  
25 to 50 Watt Wide Input  
DC-DC Converters  
Single Output



## Features

- 25W/50W Isolated Output
- Efficiency to 85%
- 300KHz Switching Frequency
- 2 : 1 Input Range
- Regulated Outputs
- Continuous Short Circuit Protection
- Five-Sided Metal Case



Only for Nominal Input Voltage 24 & 48 VDC

MODEL	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		%EFF
				NO LOAD	FULL LOAD	
PS50-12S25	9-18VDC	2.5 VDC	10 A	50 mA	2740 mA	76
PS50-12S33		3.3 VDC	10 A		3525 mA	78
PS50-12S05		5 VDC	10 A		5145 mA	81
PS50-12S12		12 VDC	4.16 A		4950 mA	84
PS50-12S15		15 VDC	3.33 A		4950 mA	84
PS50-12S24		24 VDC	2.08 A		4950 mA	84
PS50-24S25	18-36VDC	2.5 VDC	10 A	50 mA	1353 mA	77
PS50-24S33		3.3 VDC	10 A		1740 mA	79
PS50-24S05		5 VDC	10 A		2540 mA	82
PS50-24S12		12 VDC	4.16 A		2450 mA	85
PS50-24S15		15 VDC	3.33 A		2450 mA	85
PS50-24S24		24 VDC	2.08 A		2419 mA	86
PS50-48S25	36-75VDC	2.5 VDC	10 A	50 mA	676 mA	77
PS50-48S33		3.3 VDC	10 A		870 mA	79
PS50-48S05		5 VDC	10 A		1250 mA	83
PS50-48S12		12 VDC	4.16 A		1220 mA	85
PS50-48S15		15 VDC	3.33 A		1220 mA	85
PS50-48S24		24 VDC	2.08 A		1209 mA	86

NOTE: 1. Nominal Input Voltage 12, 24 & 48 VDC

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## Electrical Specification

### INPUT

Input Voltage Range	12V	9-18V
	24V	18-36V
	48V	36-75V
Undervoltage lockout	12Vin power up	8.8V
	power down	8V
	24Vin power up	17V
	power down	16V
	48Vin power up	34V
	power down	32.5V

Positive Logic Remote ON/OFF<sup>3,4</sup>

Input Filter Pi Type

### OUTPUT

Voltage Accuracy :	±1% max.	
Transient Response : 25% Step Load Change	<500µsec.	
External Trim Adj. Range	±10%	
Ripple & Noise, 20MHz BW,	2.5V & 3.3V & 5V	20mV RMS., max. 75mV pk-pk, max.
	12V & 15V	30mV RMS., max. 100mV pk-pk, max.
	24V	100mV RMS., max. 240mV pk-pk, max.

### ENVIRONMENTAL

Temperature Coefficient	±0.03%/°C
Short Circuit Protection	Continuous
Line Regulation <sup>1</sup>	±0.2% max.
Load Regulation <sup>2</sup>	±0.2% max.
Over Voltage Protection trip Range, % Vo nom.	115-140%
Current Limit	110% ~150% Nominal Output

### GENERAL

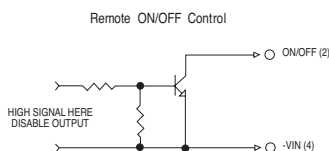
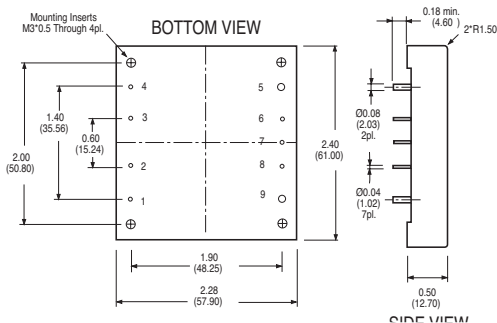
Efficiency	See Table	
Isolation Voltage	Input/Output	1500VDC min.
	Input/Case	1500VDC min.
	Output/Case	1500VDC min.
Isolation Resistance	10 <sup>7</sup> ohm min.	
Switching Frequency	12/24Vin	400KHz, Typ.
	48Vin	300KHz, Typ.
Operating case Temperature	-40°C to 100°C	
Storage Temperature	-55°C to +105°C	
Thermal Shutdown, Case Temp.	100°C Typ.	
Dimensions	2.28x2.40x0.50 inches (57.9x61.0x12.7 mm)	
Case Material	Aluminium	

### NOTE:

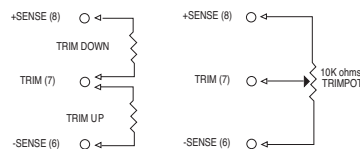
1. Measured From High Line to Low Line. 2. Measured From Full Load to Zero Load. 3. Logic Compatibility - Open Collector Ref. to -Input, Module ON - Open Circuit, Module OFF - < 0.8Vdc 4. Suffix "N" to the Model Number with Negative Logic Remote ON/OFF.

All Dimensions in Inches(mm)

Tolerances Inches .XX±.02 .XXX±.01 ±0.02  
Millimeters .X±.5 .XX±.25 ±0.5



### External Output Trim



### Pin Connection

Pin	Function
1	+Vin
2	ON/OFF
3	CASE
4	-Vin
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

All Specifications Typical At Nominal Line, Full Load and 25°C Unless Otherwise Noted.

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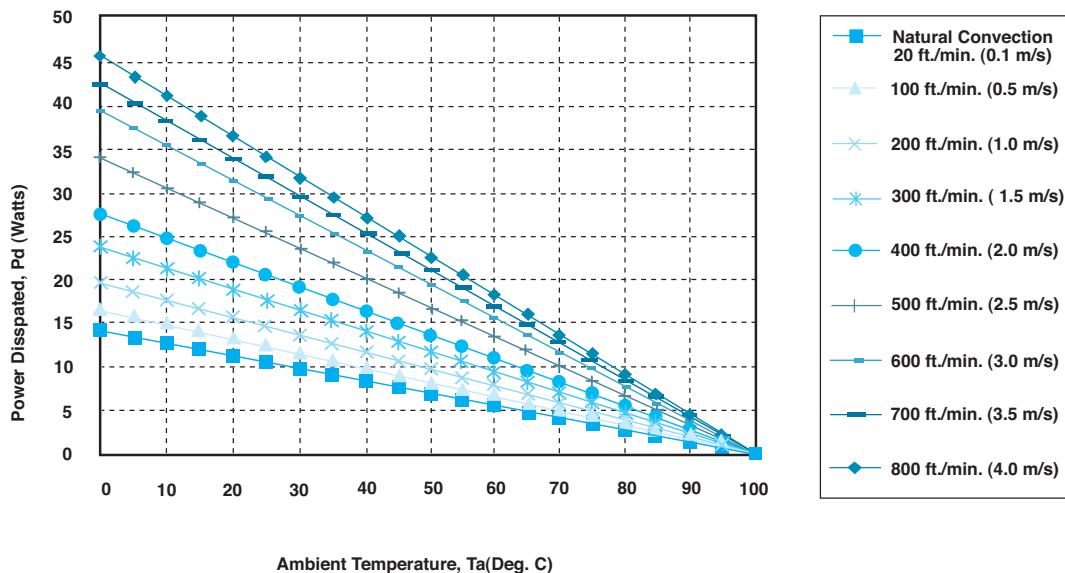
## Application Note

### Derating:

The operating case temperature range of the PS50 series is -40°C to +100°C. When operating the PS50 series, proper derating or cooling is needed.

The following curve is the derating curve of a PS50 without heat sink.

**Power Dissipated vs Ambient Temperature and Air Flow**



Forced Convection Power Derating without Heat Sink

Where:

The power dissipation (Pd):

$$Pd = Pi - Po = Po (1-n) / n$$

The thermal resistance are listed below:

### Chart of Thermal Resistance vs Air Flow:

AIR FLOW RATE	TYPICAL Rca
Natural Convection 20ft./min. (0.1m/s)	7.12 °C/W
100 ft./min. (0.5m/s)	6.21 °C/W
200 ft./min. (1.0m/s)	5.17 °C/W
300 ft./min. (1.5m/s)	4.29 °C/W
400 ft./min. (2.0m/s)	3.64 °C/W
500 ft./min. (2.5m/s)	2.96 °C/W
600 ft./min. (3.0m/s)	2.53 °C/W
700 ft./min. (3.5m/s)	2.37 °C/W
800 ft./min. (4.0m/s)	2.19 °C/W

The temperature rise ( $\Delta T$ ):

$$\Delta T = Pd * Rca$$

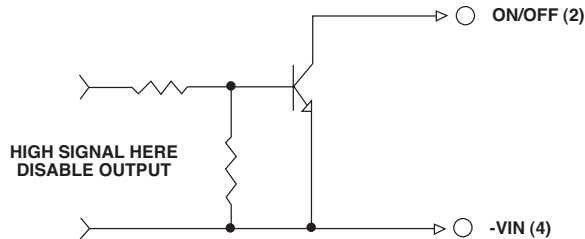
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## Remote ON/OFF Control

The PS50 series allows the user to switch the module on and off electronically with remote on/off feature. The PS50 series are available with "positive logic" or "negative logic" (option).

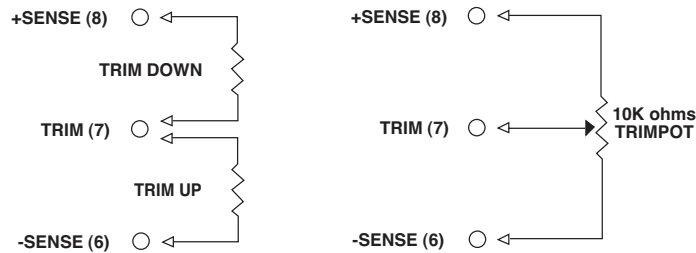


Logic Table

Logic State (Pin 2)	Negative Logic	Positive Logic
Logic Low - Switch Closed	Module on	Module off
Logic High - Switch Open	Module off	Module on

## External Output Trimming

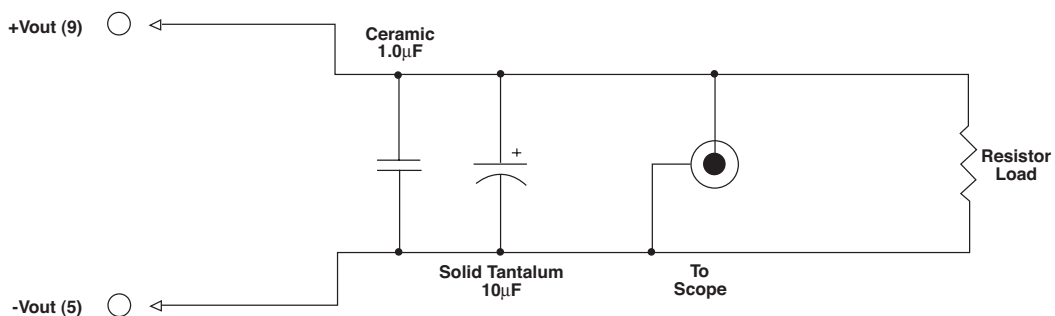
Output may optionally be externally trimmed ( $\pm 10\%$ ) with a fixed resistor or an external trimpot as shown.



External Output

## Output Noise

The output noise is measured with  $10\mu\text{F}$  tantalum capacitor and  $1.0\mu\text{F}$  ceramic capacitor across output.



Output Noise Test Circuit schematic

All Specifications Typical At Nominal Line, Full Load and 25°C Unless Otherwise Noted.