

High Density DC-DC Modules

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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^{3,4}

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 ¹ | ±0.2% max. |
| Load Regulation ² | ±0.2% max. |
| Over Voltage Protection trip Range, % Vo nom. | 115-140% |
| Current Limit | 110% ~150% Nominal Output |

GENERAL

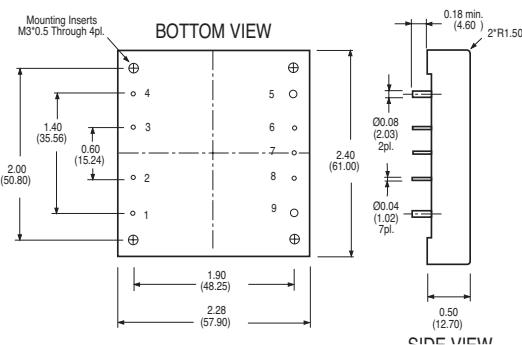
| | |
|------------------------------|--|
| Efficiency | See Table |
| Isolation Voltage | Input/Output 1500VDC min. |
| | Input/Case 1500VDC min. |
| | Output/Case 1500VDC min. |
| Isolation Resistance | 10 ⁷ ohm min. |
| Switching Frequency | 12/24Vin 400KHz, Typ. |
| | 48Vin 300KHz, Typ. |
| Operating 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:

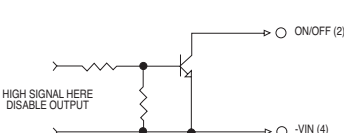
1. Measured From High Line to Low Line. 2. Measured From Full Load to Zero Load. 3. Logic Compatibility - Open Collector Ref. to -Input, Module ON - Open Circuit, Module OFF - < 0.8Vdc 4. Suffix "N" to the Model Number with Negative Logic Remote ON/OFF.

All Dimensions In Inches(mm)

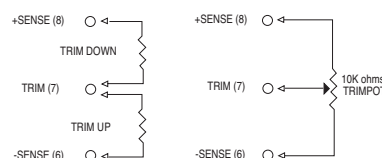
Tolerances Inches XX±.02 .XXX±.01 Pin .±0.02
Millimeters .X±.5 .XX±.25 ±0.5



Remote ON/OFF Control



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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High Density DC-DC Modules

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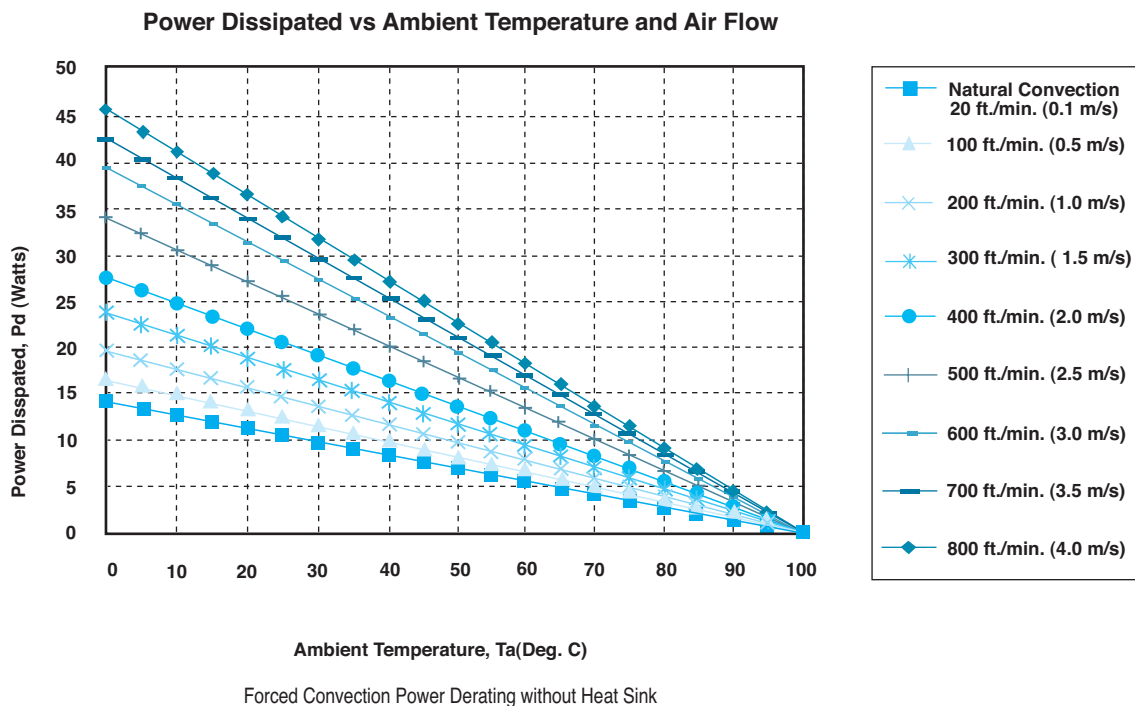
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Application Note

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.



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 (ΔT):

$$\Delta T = Pd * Rca$$

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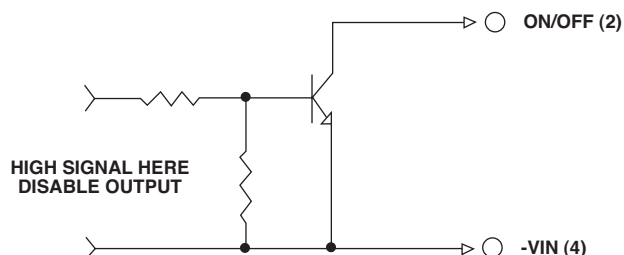
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Remote ON/OFF Control

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).

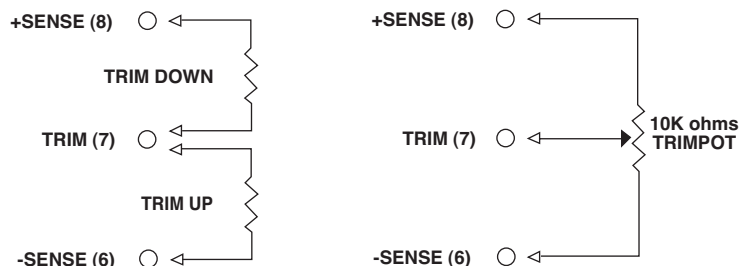
Logic Table



| 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

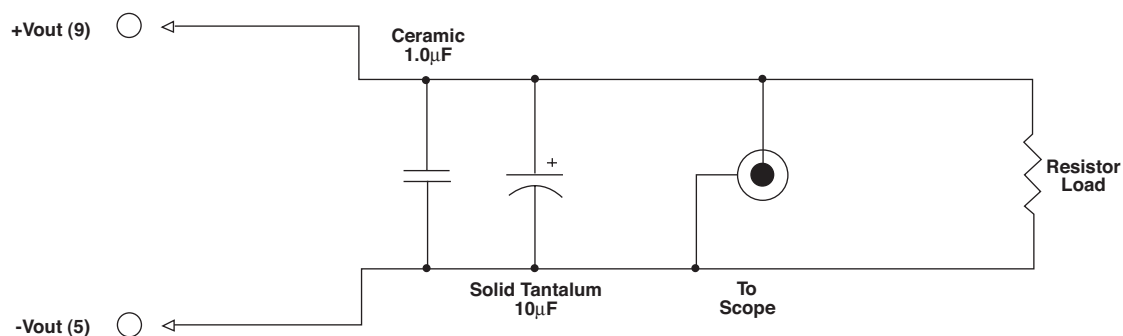
Output may optionally be externally trimmed ($\pm 10\%$) with a fixed resistor or an external trimpot as shown.



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.