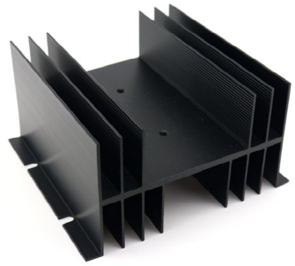
Heat Sinks — PCH Series

PCH-H-150



PCH-H-110

PCH-T-76

PCH-IF-110

PCH-IS-76-DIN

PCH-I-50

INTRODUCTION:

Solid State Relays (SSRs) generate heat while operating primarily from the semiconductor junction of the output switching device. This can be a triac, SCR or Mosfet. When utilizing an SSR it is important that the heat generated be managed via the use of the proper heat sink or alternative cooling method. Proper cooling will allow for maximum performance from the SSR. The use of the correct heat sink has a direct influence on the maximum load current that can be switched and the maximum ambient temperature the SSR can operate in. Proper installation of a heat sink is just as important for proper heat dissipation. This includes utilizing a thermal transfer pad or thermal conductive grease to fill the gap between the relay and heat sink and utilizing the proper torque while tightening the screws attaching the SSR to the heat sink.

- Recommended Screw Torque is 15 to 20 in lbs or 1.7 to 2.2 Nm.

For very high performance applications, air cooling may be required in addition to the heat sink. Failure to manage the dissipation of heat by the SSR during usage may lead to failure of the SSR in either a short or open output.

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Calculating SSR heat dissipation:

- **TJ-TA=P x RJA**
- **RJA=RJC+RCA**
- **P=I x V**

Where:
TJ is the junction temperature of the output semiconductor in °C, use 125°C for Triacs, SCRs & Mosfets,
TA stands for the ambient temperature in °C
P is the power generated by the internal semiconductor in Watts, where **I** is the maximum output current of the SSR and **V** is the Forward Voltage of the semi-conductor
RJA stands for thermal resistance in °C/W from junction to ambient ignoring the thermal resistance from the SSR metal base to heat sink
RJC stands for thermal resistance from junction to case – obtain from data sheet
RCA stands for the thermal resistance from case to ambient.

An example, PCS15-D-249A-20Z with a 10 Amp Load Current in free air:

RJC is 1.2 °C/W (from data sheet), RCA 8.5 °C/W (free air heat dissipation), TJ is 125°C, I is 10 Amp load current, V is 1.1V (Forward Voltage drop of triac at 10 Amps), in formula:

125 – TA = (10 x 1.1) x (1.2 + 8.5)   thus TA = 17.3°C or 63°F which is the maximum ambient temperature this relay will operate without a heat sink. Another way of looking at this, the maximum current the relay can handle at 25°C is 9.3 Amps

Add a PCH-H-110 Heat Sink with its 1.1°C/W (RCA) Thermal Resistance with the same 10 Amp Load:
125 – TA = (10 x 1.1) x (1.2 + 1.1)   thus TA = 99.7°C or 211°F which is the maximum ambient temperature this relay will operate with the PCH-H-110 heat sink. Also, the maximum current the relay can handle at 25°C is 39.5 Amps (Go with the 40A version of the relay)

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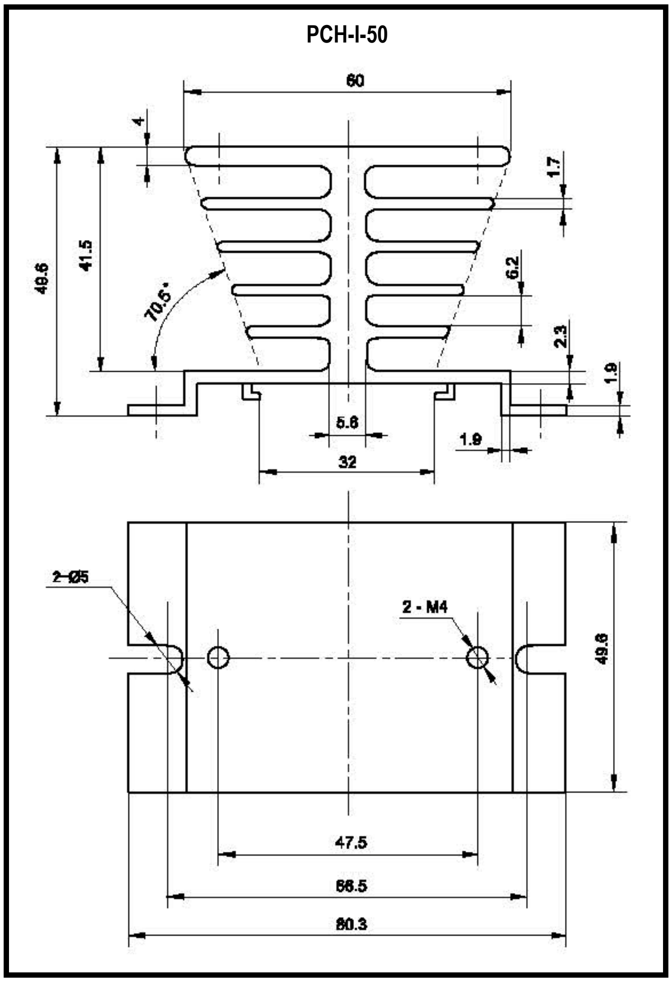
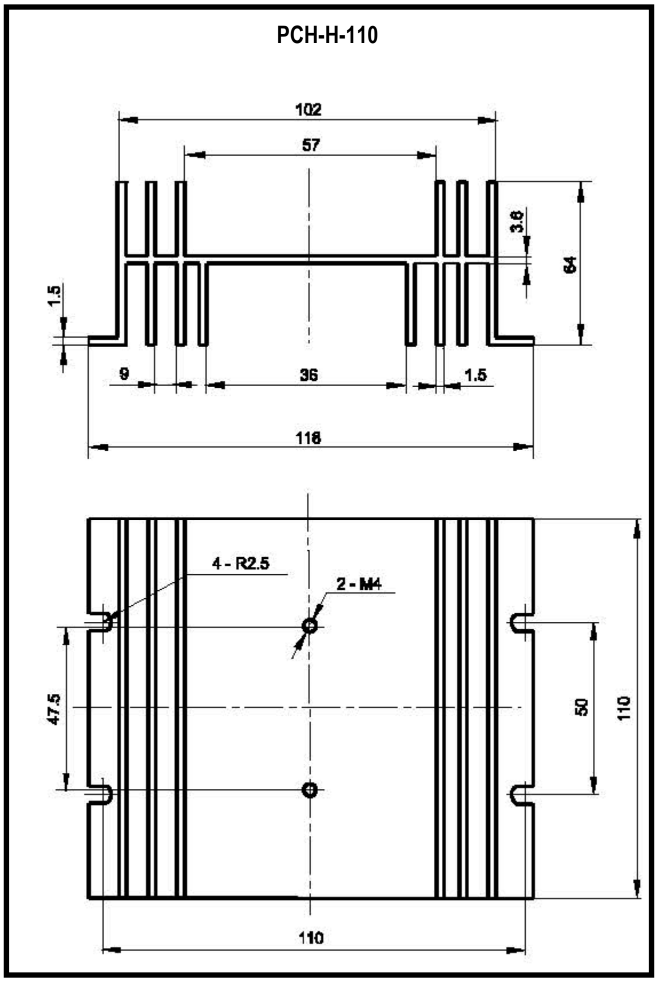
Part Number	Dimensions (mm)	Thermal Resistance	Matching SSR
PCH-I-50	50x50x50	2.4°C/W	**PCS15**: 10 A, 15 A **PCS33**: 30 VDC 50 A, 200 VDC 10 A
PCH-H-110	64x110x118	1.1°C/W	**PCS15**: 20 A, 25 A **PCS33**: 400 VDC 10 A, 150 VDC 50 A,100 VDC 20 A, 50 VDC 40 A, 30 VDC 100 A
PCH-T-76	57x76x132	1.0°C/W	**PCS15**: 20 A, 25 A **PCS33**: 400 VDC 10 A, 150 VDC 50 A,100 VDC 20 A, 50 VDC 40 A, 30 VDC 100 A
PCH-H-150	55x142x150	0.6°C/W	**PCS15**: 40 A **PCS33**: 50 VDC 80 A, 100 VDC 40 A, 200 VDC 40 A **PCS34**: 40 A, 50 A
PCH-IF-110 (Requires an additional 80mm cooling fan)*	80x100x110	———	**PCS28**: 40 A and Above **PCS34**: 60 A and Above

* Fan not included. Orion Fan OD8025-12HB is recommended.

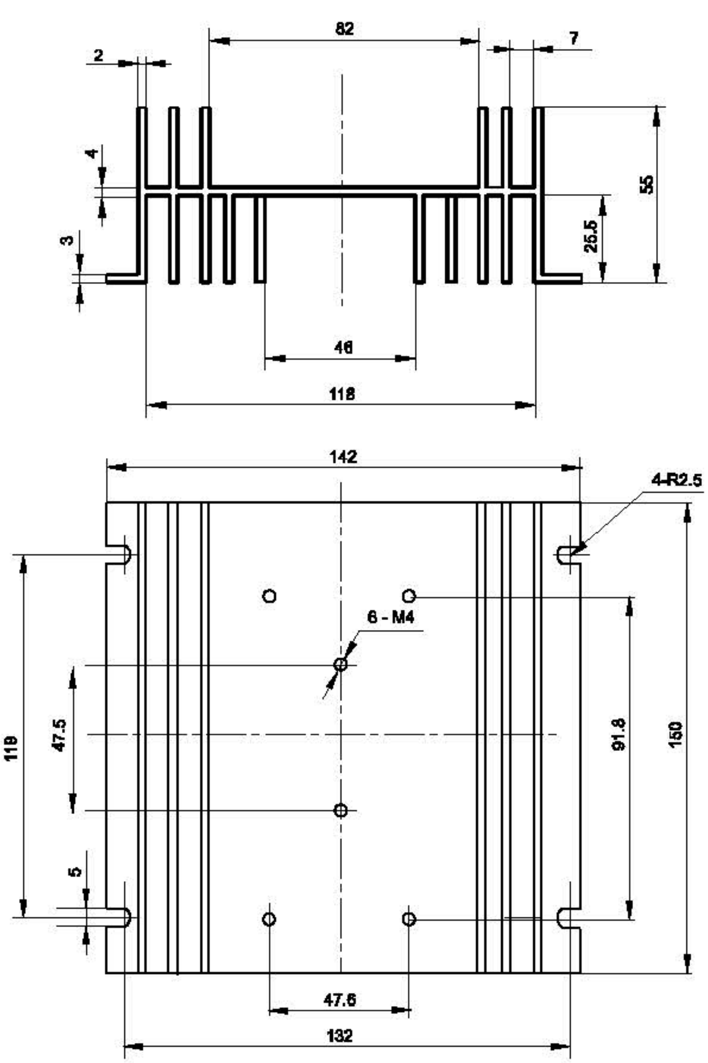
DIMENSIONS (mm)



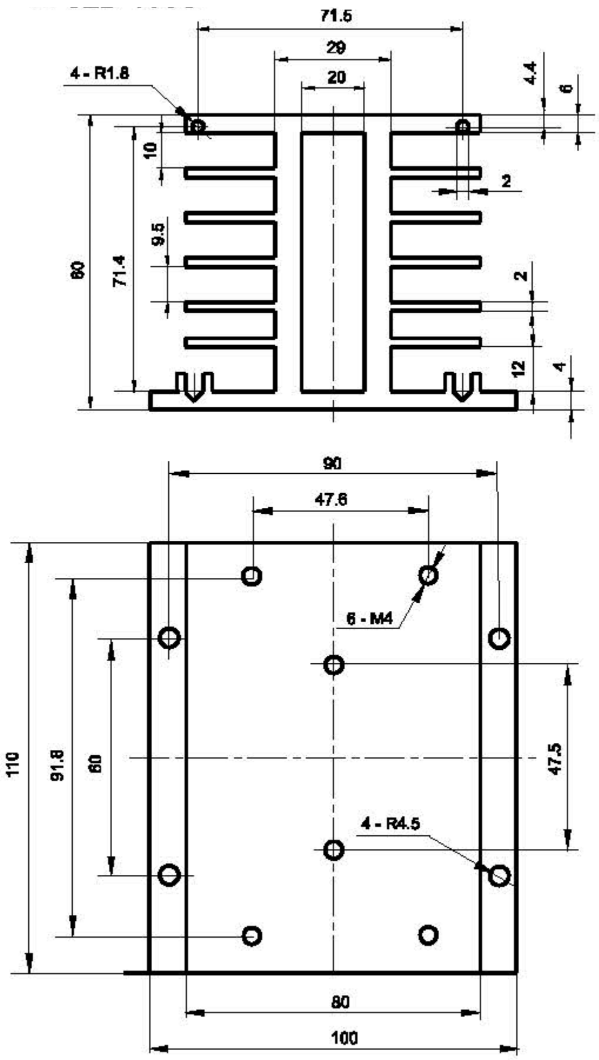


DIMENSIONS CONTINUED (mm)

PCH-H-150

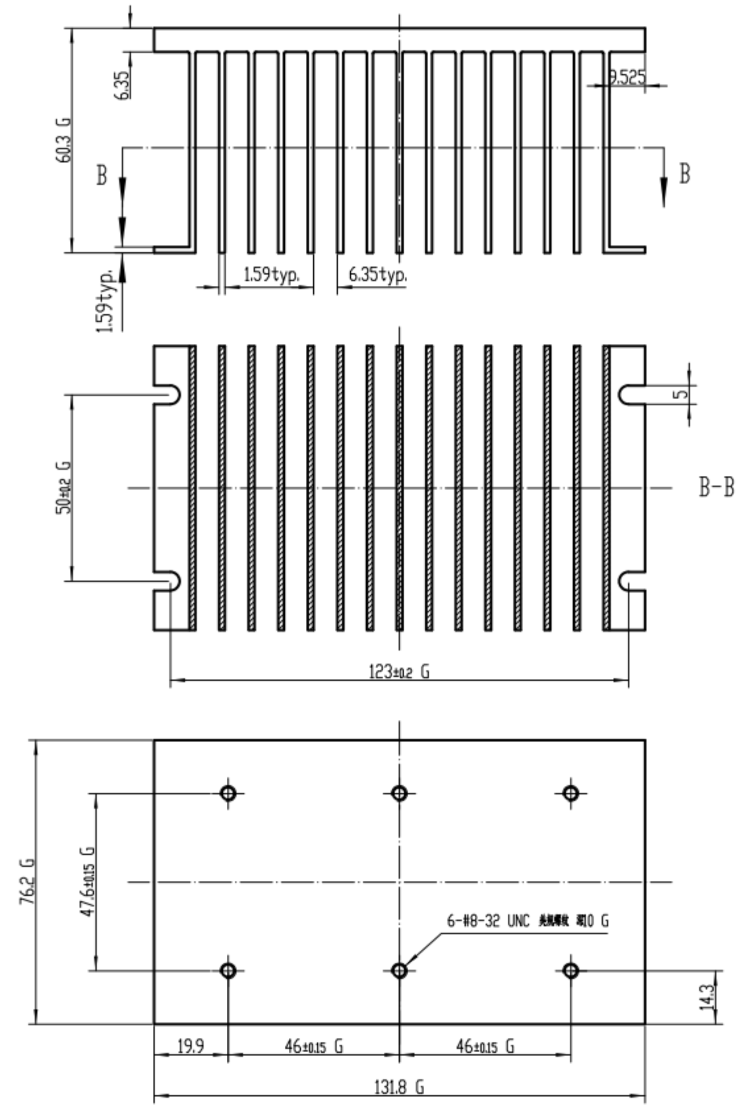


PCH-IF-110



DIMENSIONS CONTINUED (mm)

PCH-T-76



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