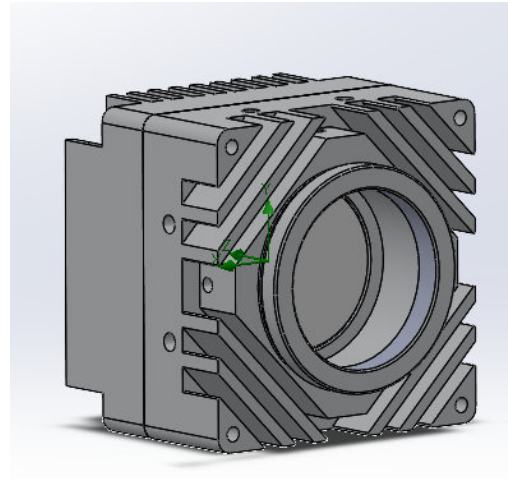
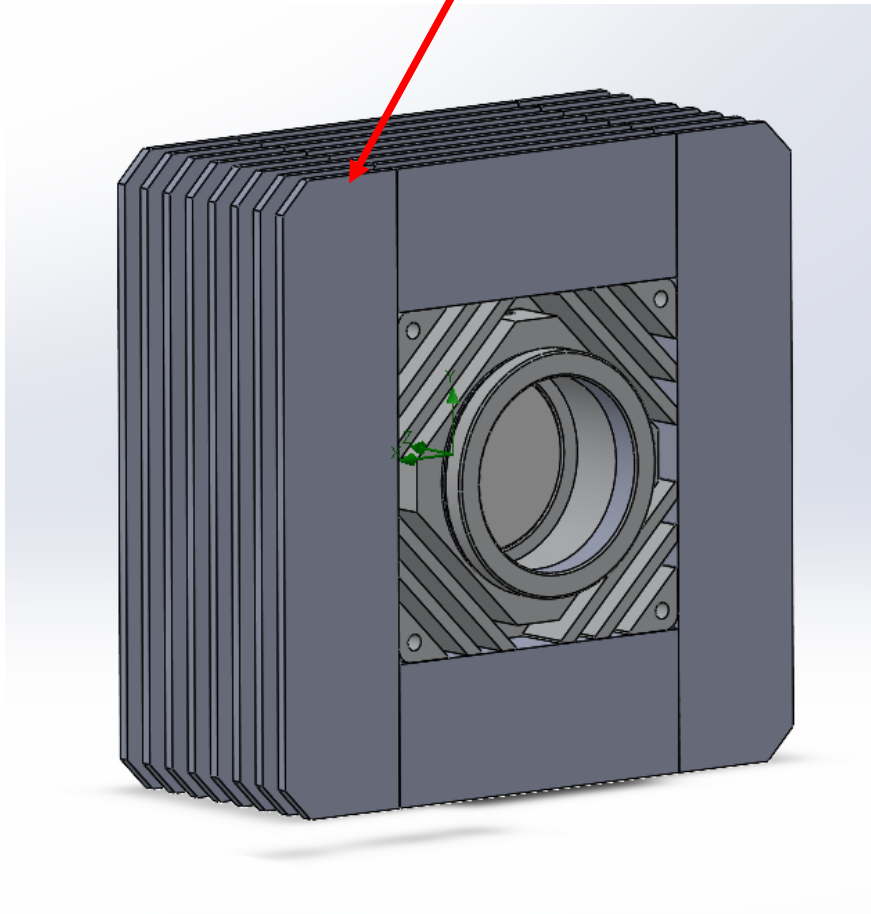


Mechanics

Fins attached to case by screws during utilizing thermal grease



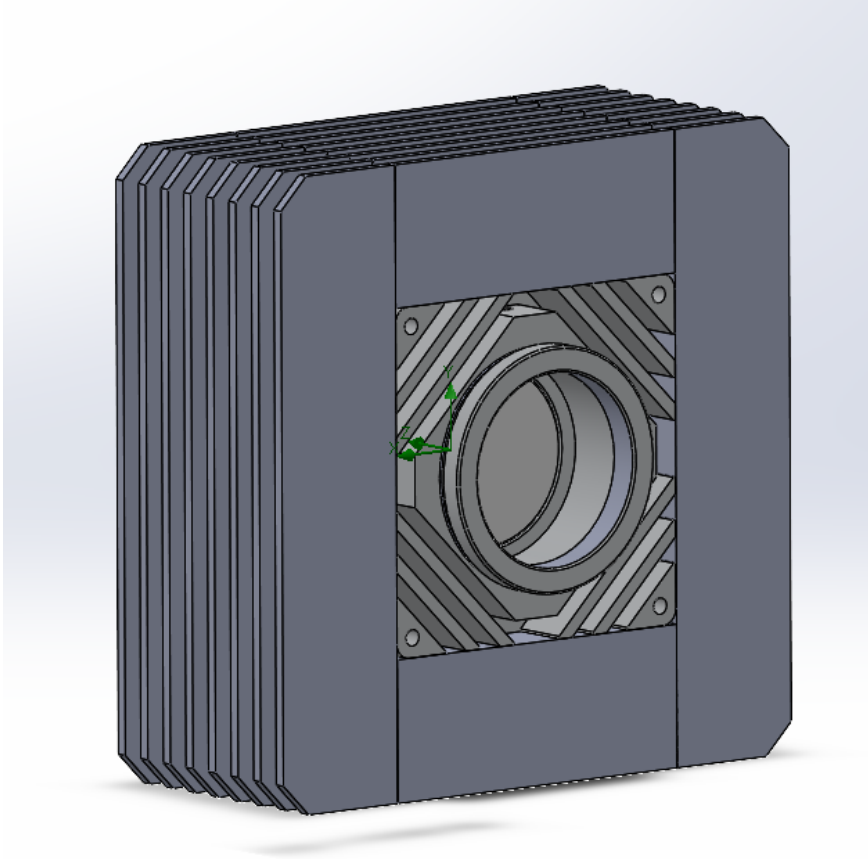
Air velocity direction

Two different models were analyzed:

1. Without fins
2. With fins attached to case by screws and thermal grease

For both cases were checked for still air as well as for the moving air (in y direction)

Boundary conditions



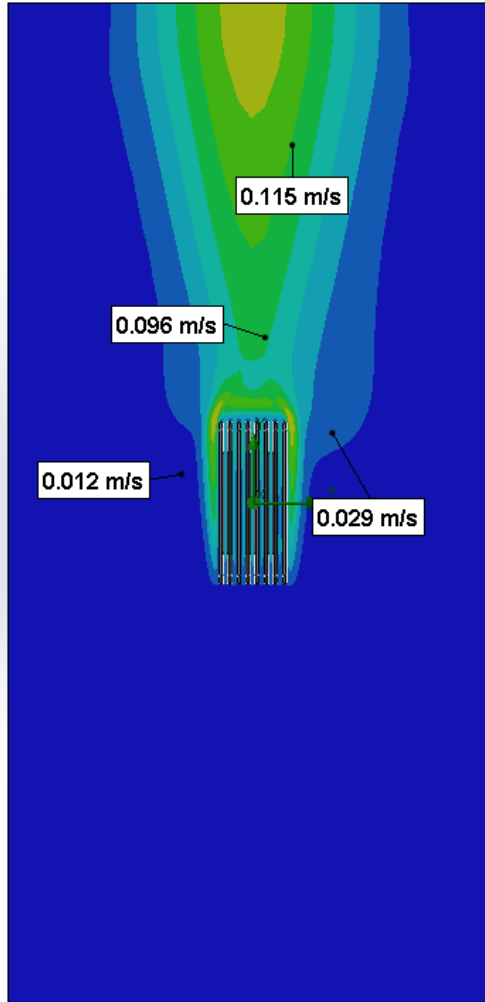
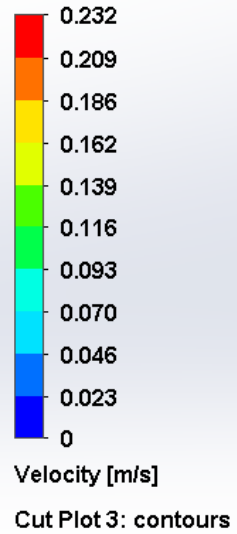
Heat transfer and evacuation is done by 3 ways:

- Heat transfer between solids by conduction.
- Heat transfer to air by natural/forced convection.
- Heat transfer by radiation. For heat radiation at low temperatures the emissivity/absorptivity coefficient is assumed to be 0.9.

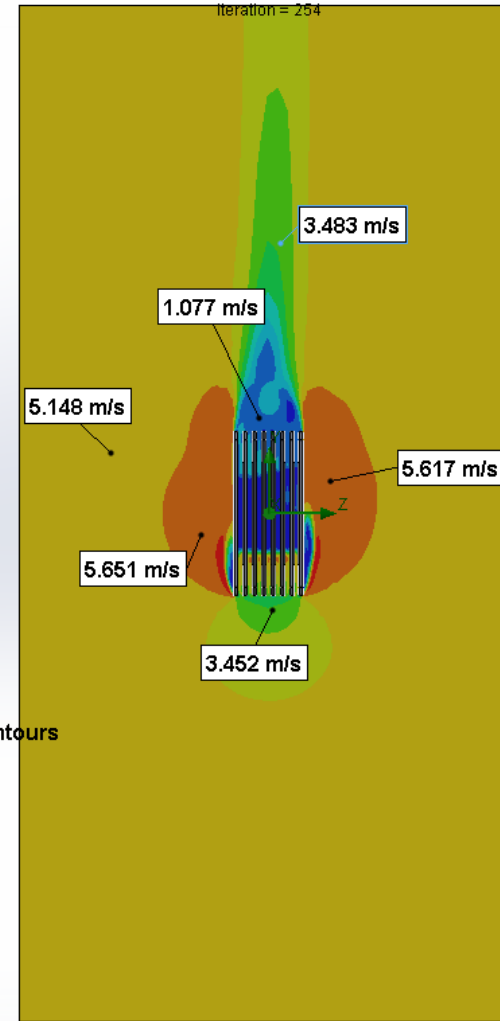
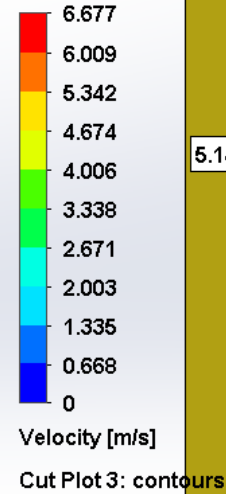
Ambient temperature

$$T_{\text{amb}} = 20^{\circ}\text{C}$$

Results – Air Velocity

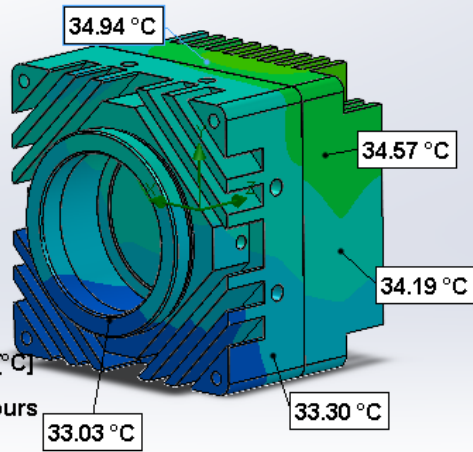
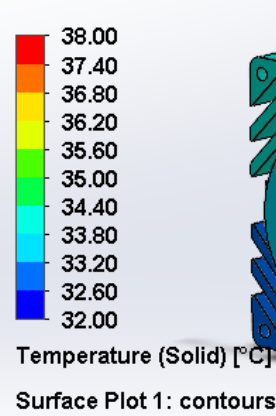
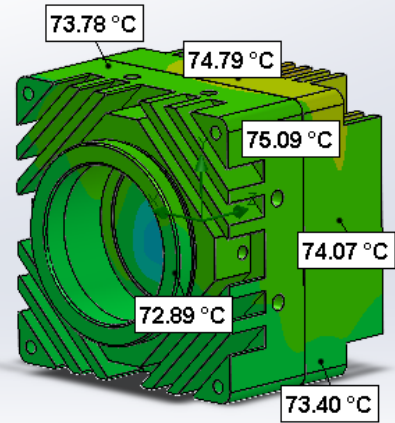
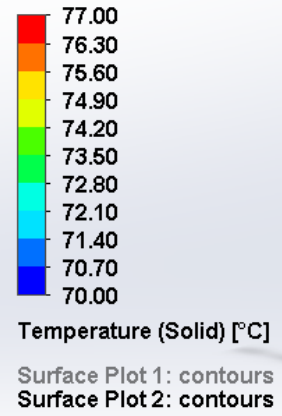
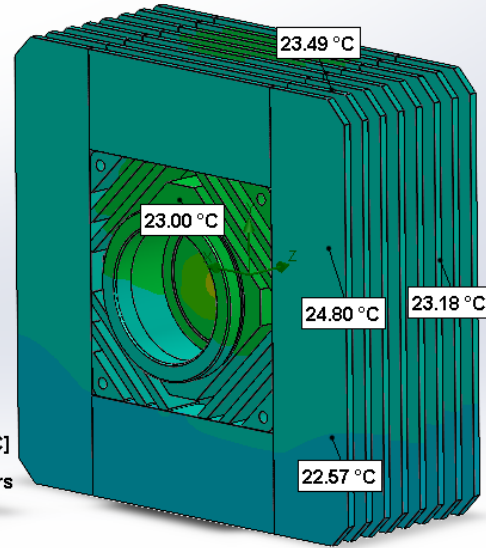
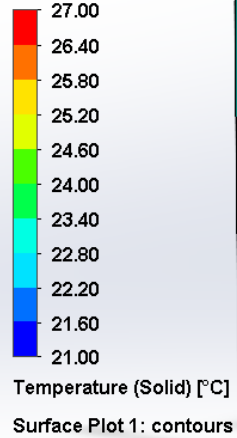
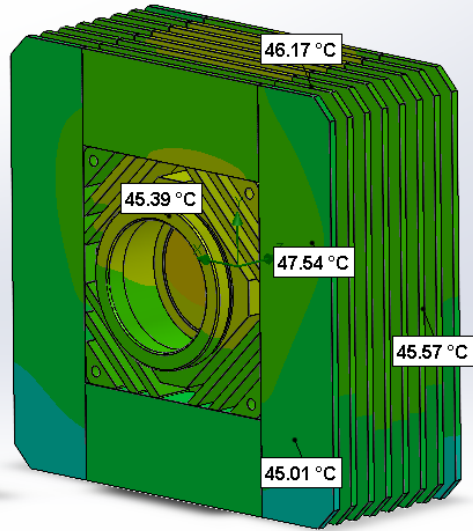
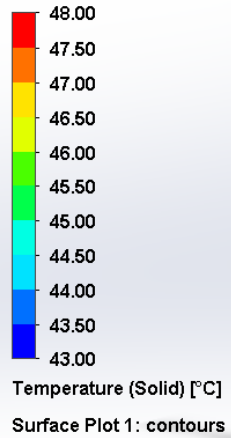


Still Air



5m/s Air velocity

Results –Case temperatures

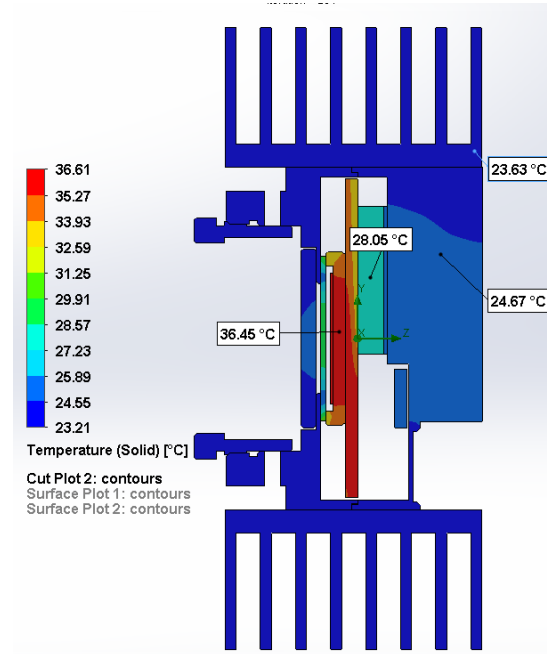
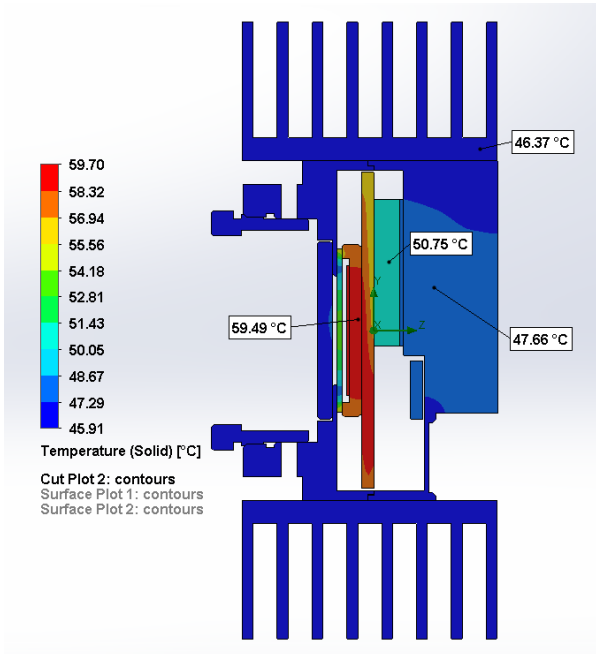


- For all tests the case temperature variation is just a few degrees.
- Fins and Air velocity significantly reduces case temperature

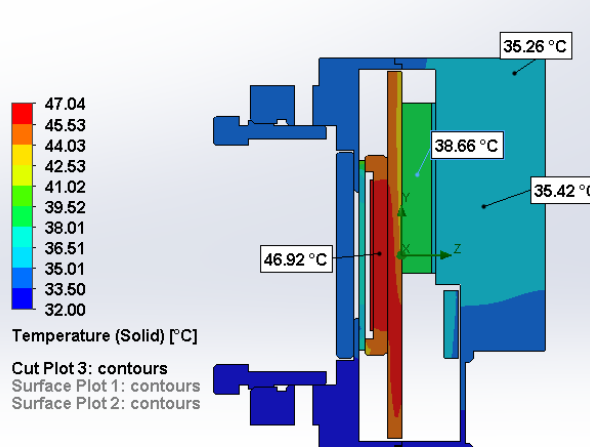
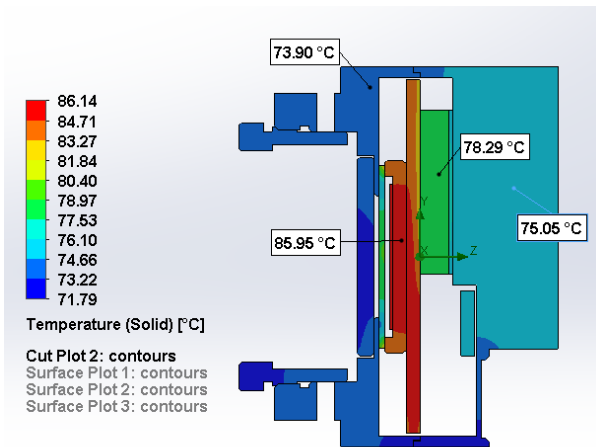
Still Air

5m/s Air velocity

Results –Sensor back Temperatures



Fins



No Fins

Still Air

5m/s Air velocity

Temperatures Summary

	FPGA Temp [°C]	Sensor Temp [°C]
No Fins, No air flow	78	85
No Fins, 5m/s air flow	39	46
Extra Fins, No air flow	50	59
Extra Fins, 5m/s air flow	28	36

*Ambient 20C

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