



PCIe400 Thermal Model

Jean-Marc NAPPA on behalf of the LAPP team



Simulation Passive (v9)

- Volume Air 254x100x36.4mm
- Tamb : 38 °C

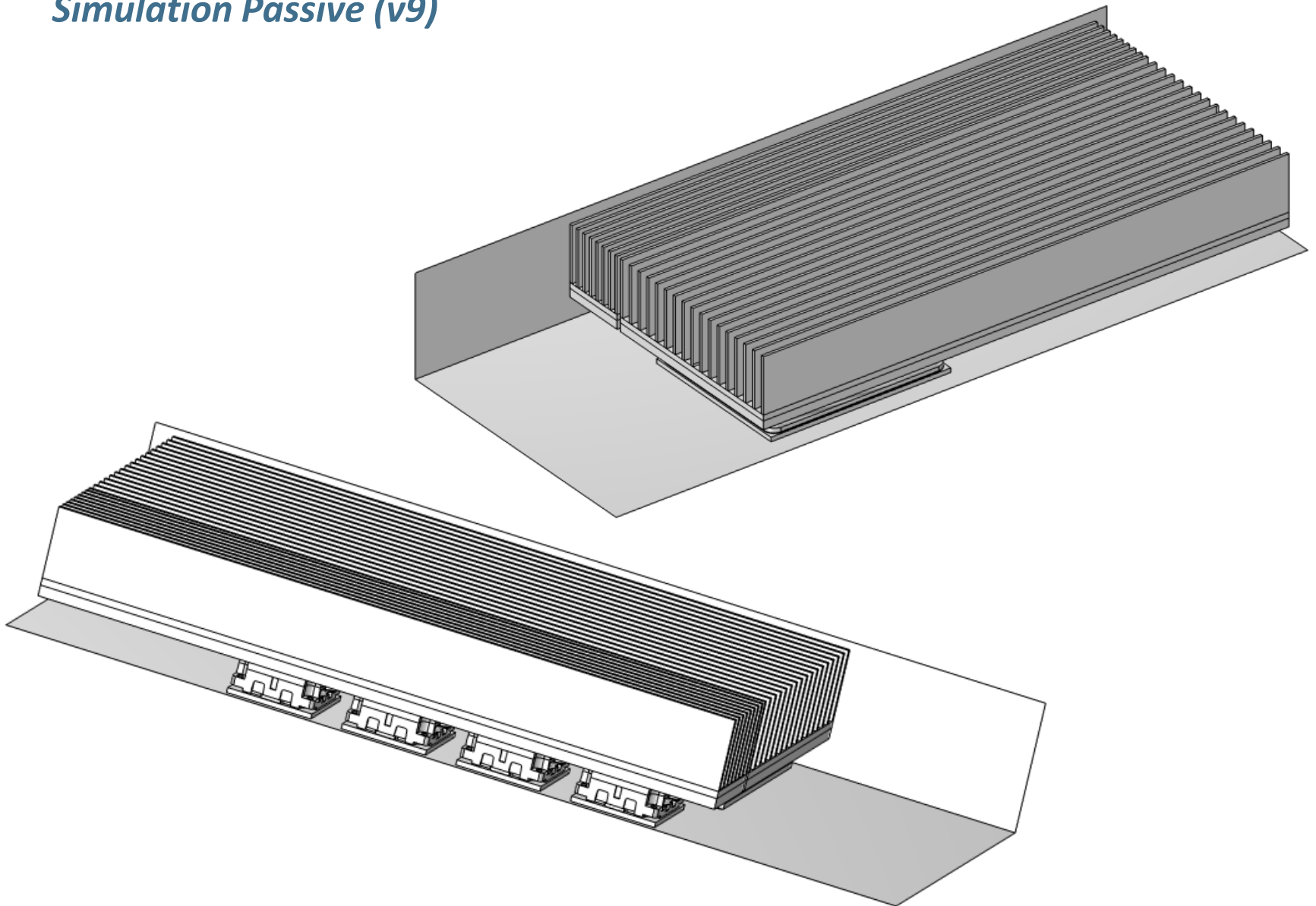
- FPGA Agilex

- Dimension 56x66x4.824mm
- Heat Sink 193x70x20mm with Fins 17x1mm (Aluminum)
- Vapor Chamber 193x70x3mm with Encoche 59.7x46.6x4.7mm (Copper)
- Heat source : 156 W

- OBT

- Heat Sink 193x23x18.5mm with Fins 8x1mm (Aluminum)
- Vapor Chamber 193x23x3mm (Copper)
- Heat rate LD : 3.89 W
- Heat rate TIA : 3.63 W

Simulation Passive (v9)



Simulation Passive (v9) – FPGA

U0 (m/s)	T Die (°C)	T IHS (°C)	T VC (°C)	T HeatSink (°C)
1.0000	91.491	87.453	86.554	85.705
2.0000	68.634	64.596	63.668	62.838
3.0000	60.956	56.917	55.966	55.156
5.0000	54.825	50.785	49.807	49.038
10.000	50.148	46.102	45.103	44.414

U0 (m/s)	Rθ J-C (°C/W)	Rθ C-V (°C/W)	Rθ V-S (°C/W)	Rθ S-A (°C/W)
1.0000	0.025964	0.0057648	0.0054463	0.30595
2.0000	0.025964	0.0059534	0.0053212	0.15930
3.0000	0.025968	0.0061021	0.0051908	0.11003
5.0000	0.025981	0.0062699	0.0049371	0.070788
10.000	0.026023	0.0064051	0.0044185	0.041135

Simulation Passive (v9) – OBT

U0 (m/s)	T1 Die (°C)	T1 Case (°C)	T2 Die (°C)	T2 Case (°C)	T3 Die (°C)	T3 Case (°C)	T4 Die (°C)	T4 Case (°C)
1.0000	81.202	71.829	81.035	71.660	81.041	71.665	80.982	71.606
2.0000	64.870	55.497	64.681	55.312	64.682	55.302	64.593	55.209
3.0000	59.490	50.125	59.279	49.927	59.279	49.907	59.170	49.794
5.0000	55.315	45.969	55.064	45.753	55.071	45.725	54.938	45.591
10.000	52.332	43.035	51.991	42.776	52.017	42.747	51.856	42.590

U0 (m/s)	T VC (°C)	T HeatSink (°C)
1.0000	70.644	70.263
2.0000	54.276	53.903
3.0000	48.886	48.518
5.0000	44.723	44.368
10.000	41.804	41.489

Simulation Passive (v9) – OBT

U0 (m/s)	Rθ J-C (°C/W)	Rθ C-V (°C/W)	Rθ V-S (°C/W)	Rθ S-A (°C/W)
1.0000	0.31168	0.017288	0.012656	1.0726
2.0000	0.31172	0.017354	0.012408	0.52868
3.0000	0.31136	0.017273	0.012232	0.34968
5.0000	0.31039	0.016950	0.011793	0.21171
10.000	0.30781	0.015931	0.010452	0.11601

FPGA Rθ J-A (°C/W) & OBT Rθ C-A (°C/W)

