ESB Engineering Test Article

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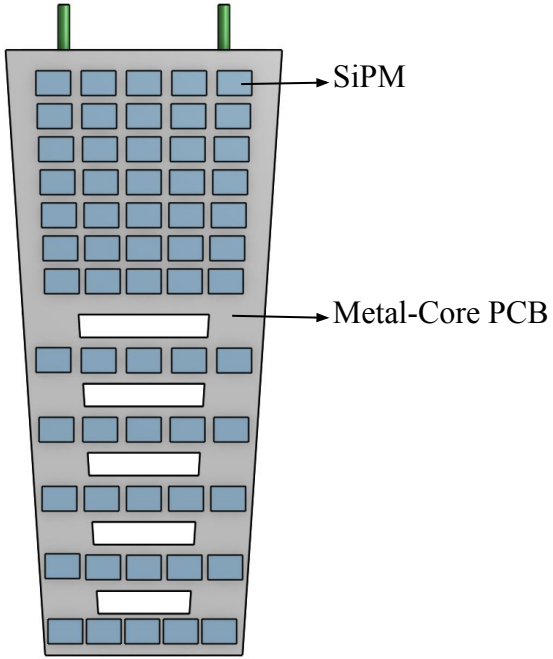
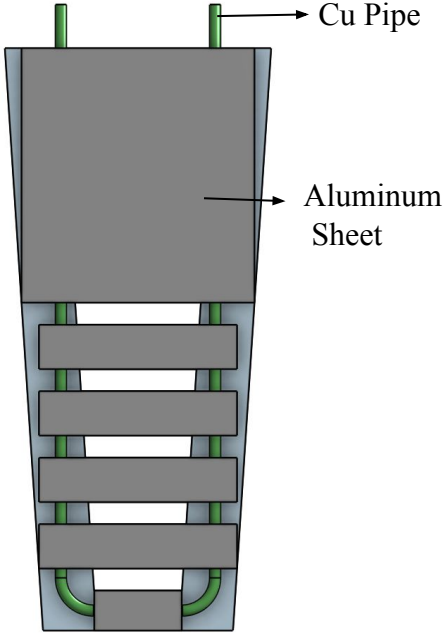
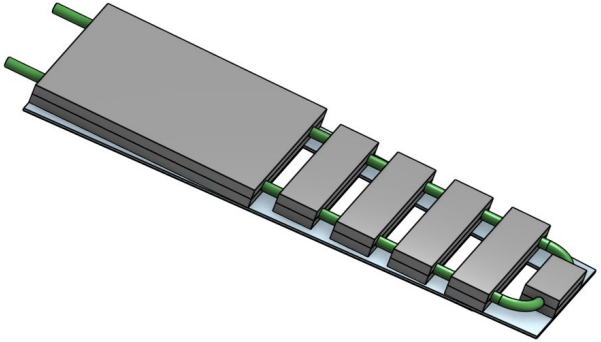
Engineering Test Article (Design #1)



Front View

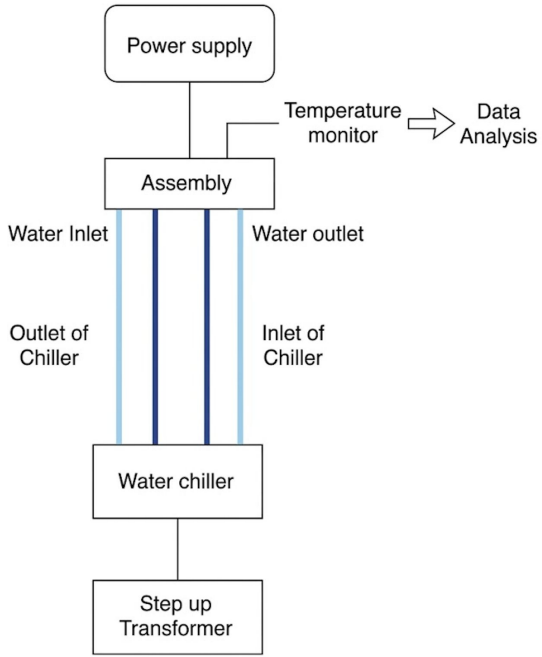


BackView

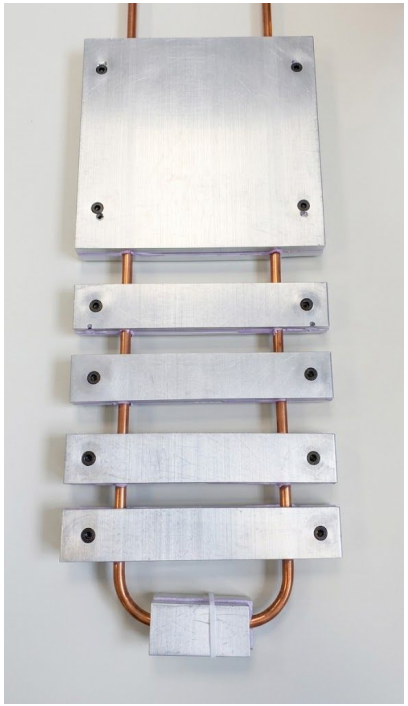


Isometric View

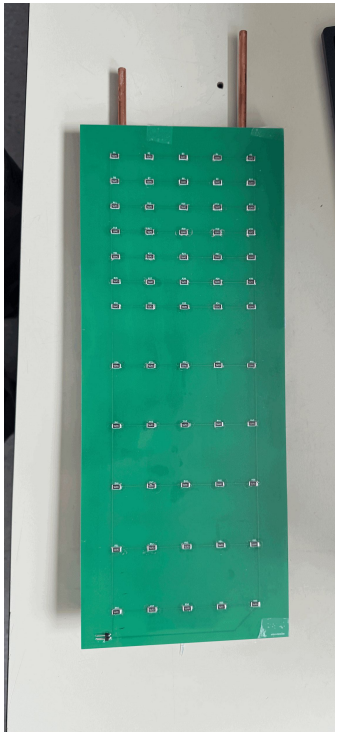
Testing Assembly #1



Assembly Layout

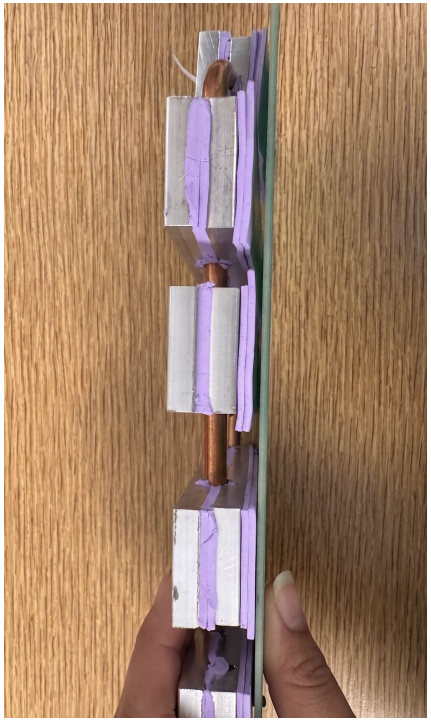


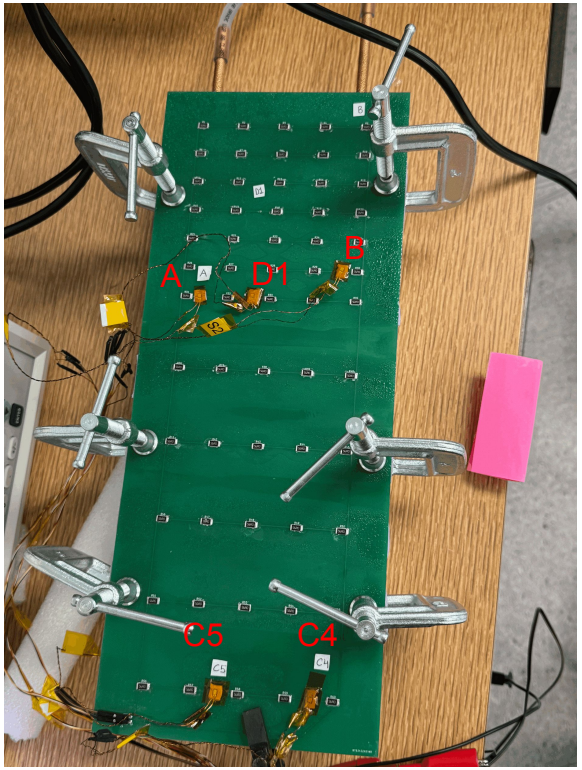
Cu pipe sandwiched between Cold Plates with Thermal Pads



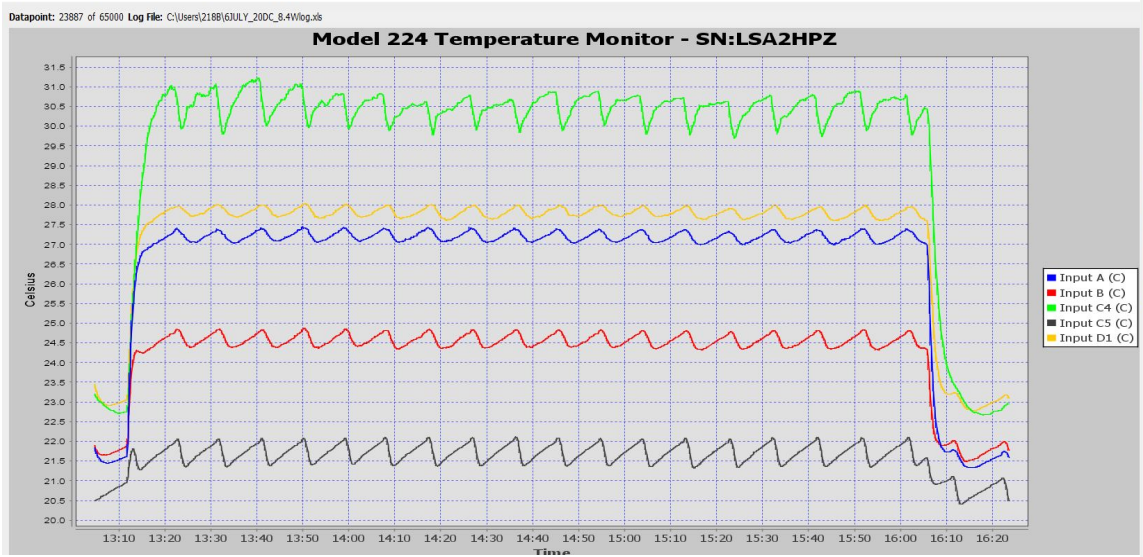
Assembly with the Dummy SiPM board

PCB Mounting

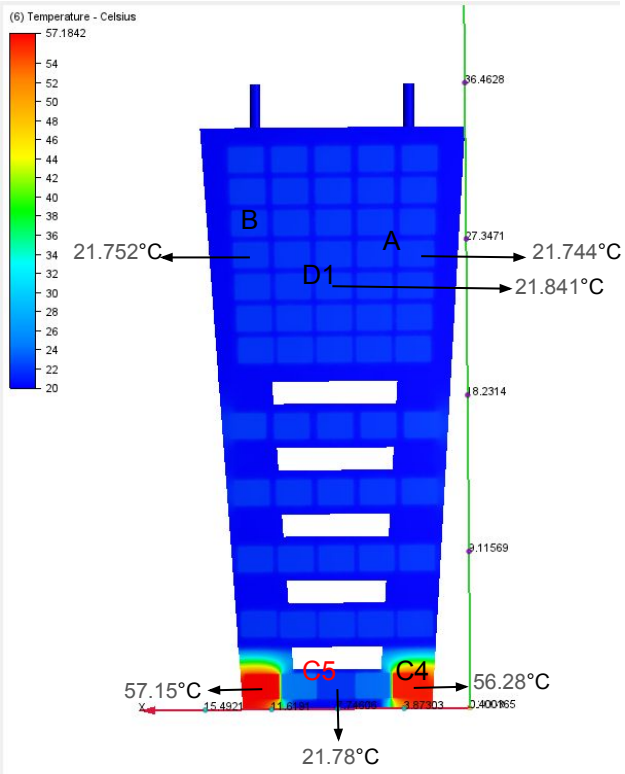




Results for T = 20°C and P = 8.4W

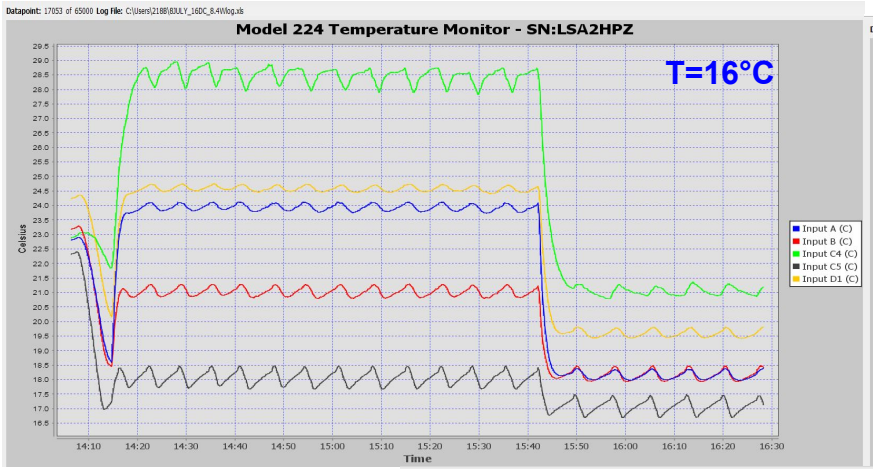


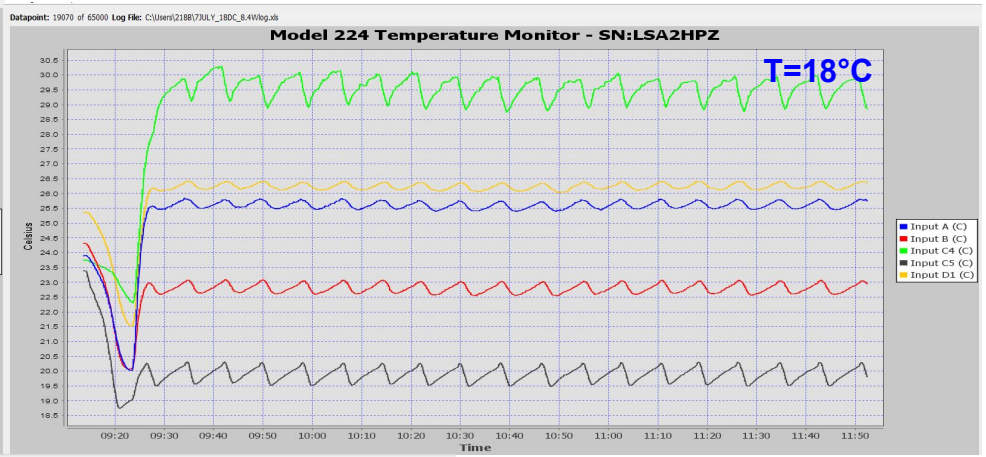
Test Results

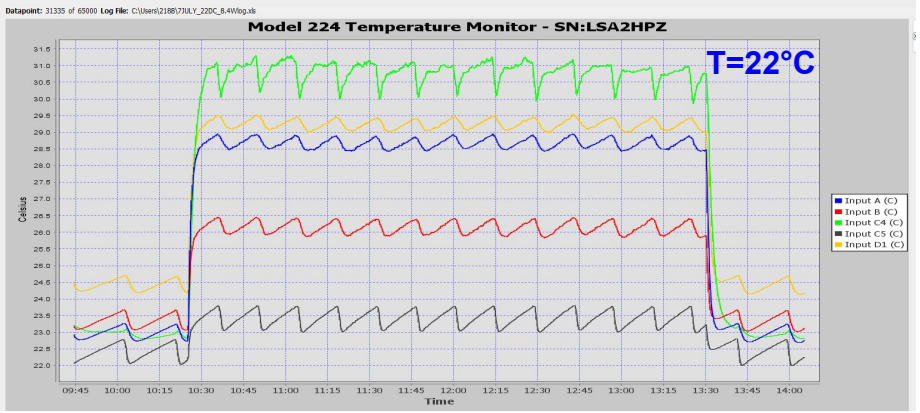


Simulation Results

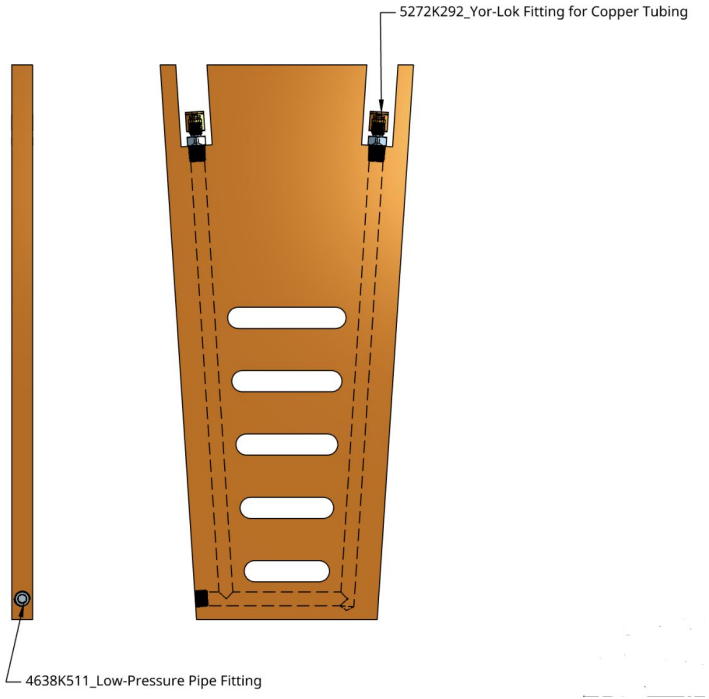
Results at 16°C, 18°C, 22°C, at power = 8.4W

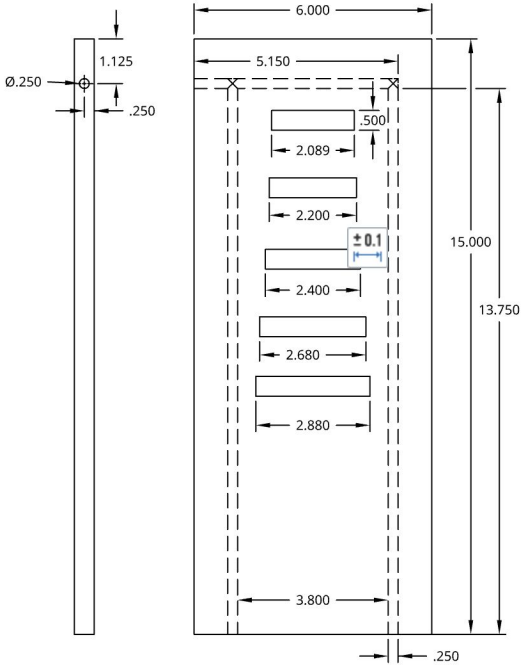




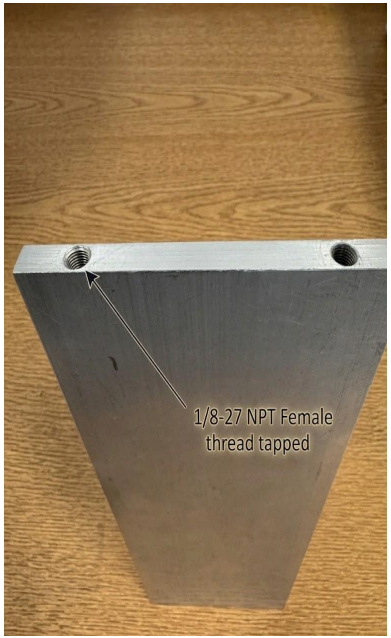


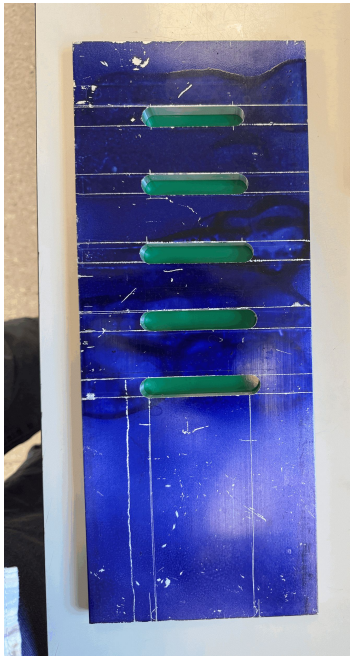
Engineering Test Article (Design #2)

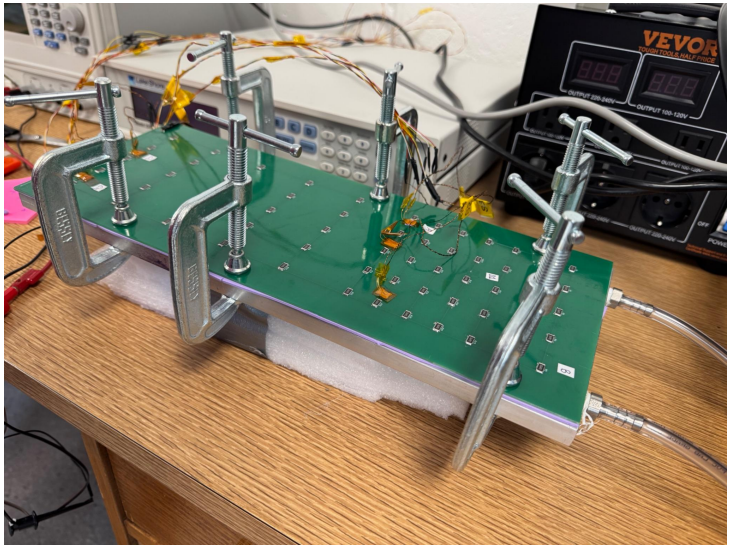




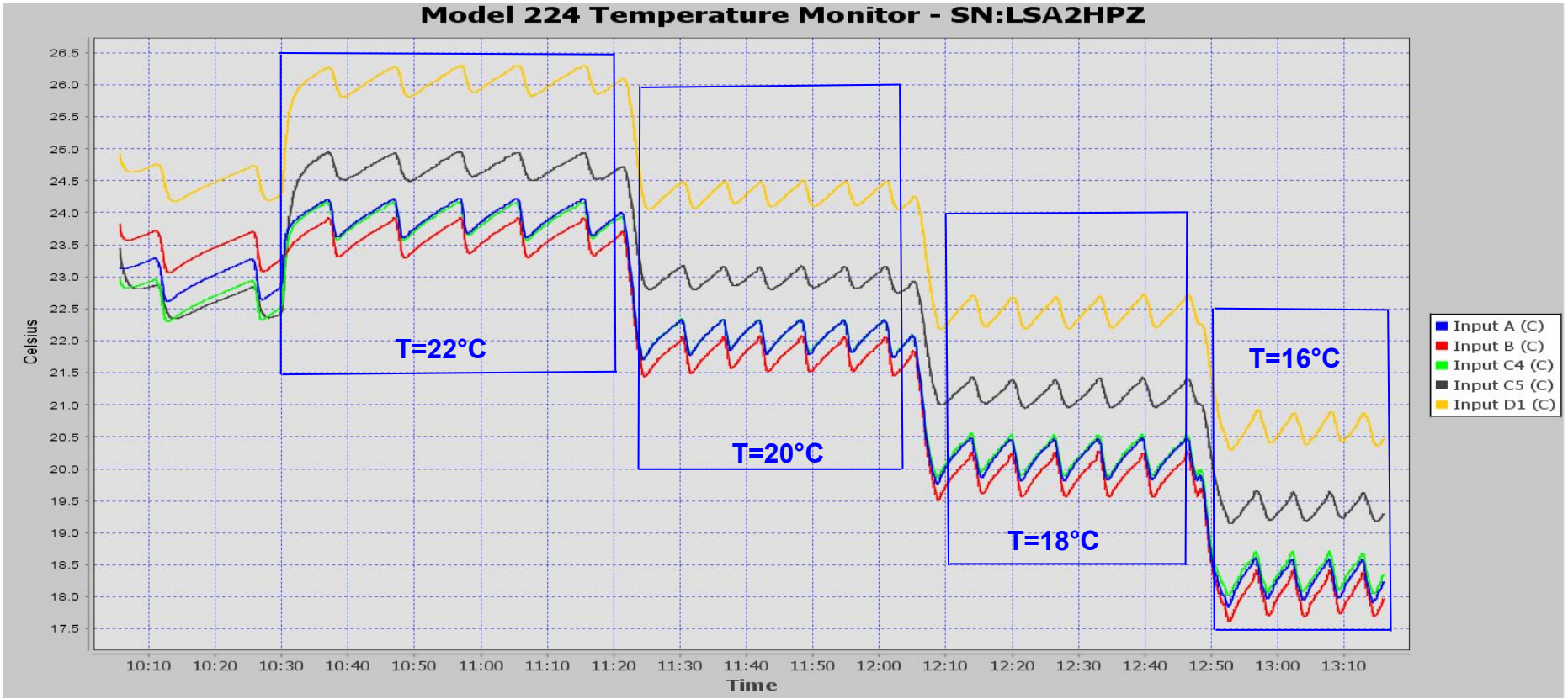
Testing Assembly #2







Results


Model 224 Temperature Monitor - SN:LSA2HPZ
Celsius
Time
T=22°C
T=20°C
T=18°C
T=16°C
Input A (C)
Input B (C)
Input C4 (C)
Input C5 (C)
Input D1 (C)

Summary and next steps

Sensor Placement	Lab Results for Article 1	Lab Results for Article 2
A	27.25	22
B	24.65	21.25
D1	27.75	24.25
C4	30.5	22
C5	21.7	23

- Article 1: Due to non-planar geometry it showed poor thermal conduction resulted in higher SiPM temperatures.
- Article 2: Improved heat transfer provided more effective cooling of the SiPM board.
- Limitation: Direct water flow through the aluminum sheet may cause corrosion.
- Next Steps: Evaluate a press-fit Cu pipe/Al cooling design and investigate Peltier cooling for active heat removal.