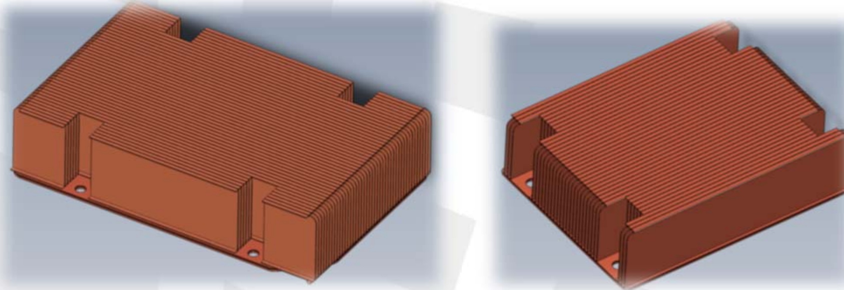

Thermal Solution Test for Eltex

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Purpose:

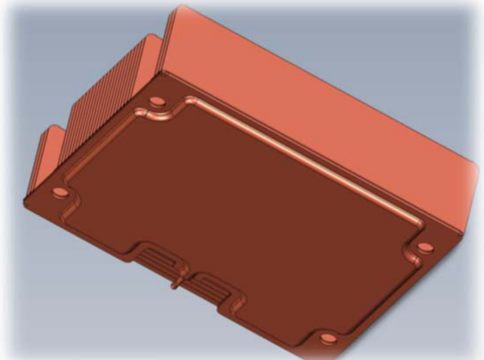
To keep Tcase lower than Tc max to ensure the best performance for Chip 1 and Chip 2.

Method:

To set up total power as TDP first to check if REGO solution could satisfy the demand under the worse situation due to no official TDP by chip maker at the moment.

Conditions:

1. **TDP** = 180W (**Chip 1**) + 230W (**Chip 2**)
2. **Chip size** = 28x28x3.83mm/ 62.6x62.6x5.14mm
3. **Ta** = 45°C (without chassis; Air flow : 5m/s)
4. **T_{c2} max** = 70.6°C (Chip 2);
   T_{c1} max for Chip 1 → is unknown yet.

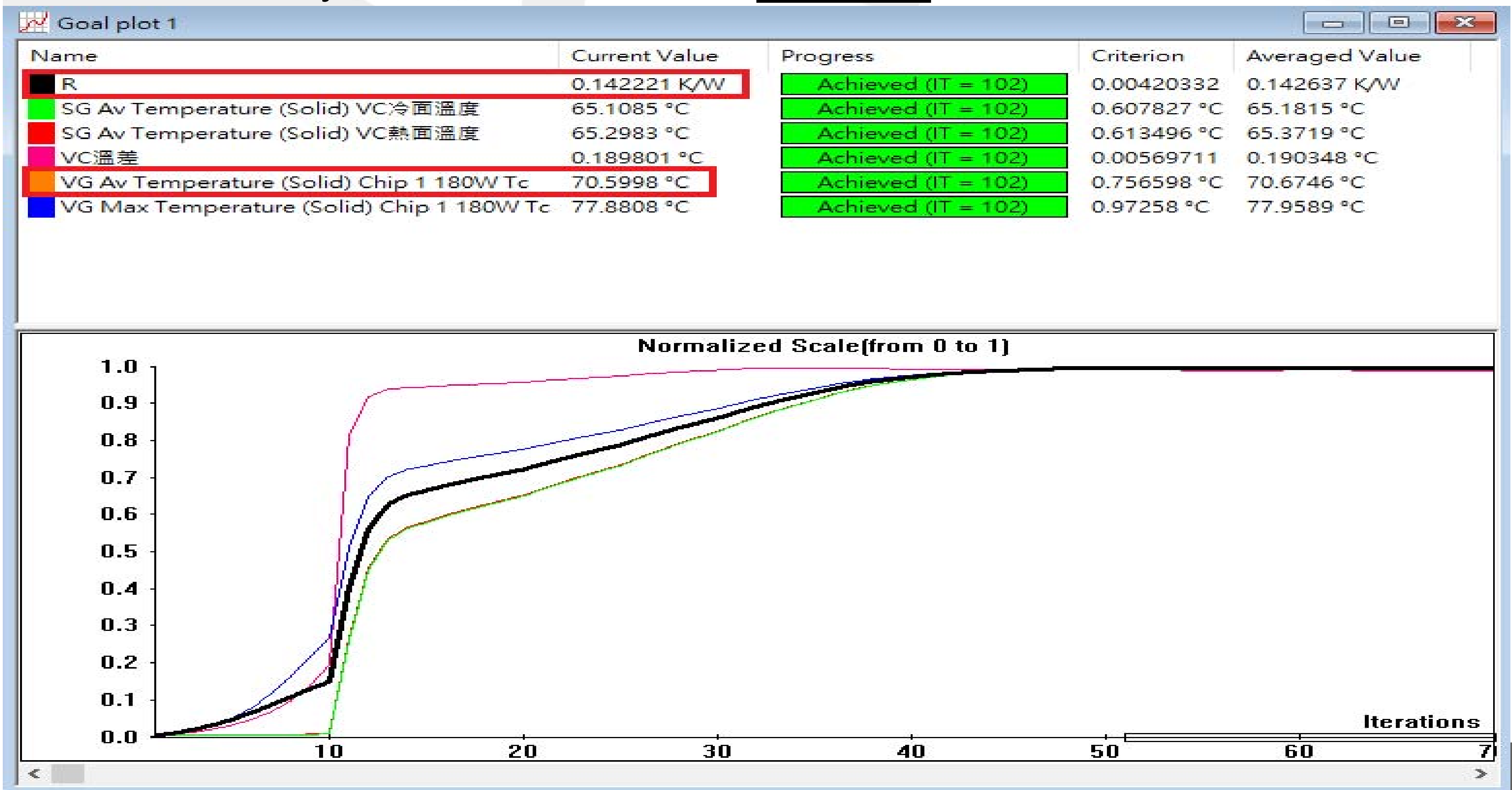


5. **HS 1** = Copper stacked fins + VC + thermal grease, **106x82x30mm**
   HS 2 = Copper stacked fins + VC + thermal grease, **140x90x33mm**
   ▲ Thermal grease: X23-7783-D
   ▲ VC: 3500 W/m*K

Analysis – Tcase of heat source (Chip 1)

1. The steady T_{c1} in average is **70.6°C** .

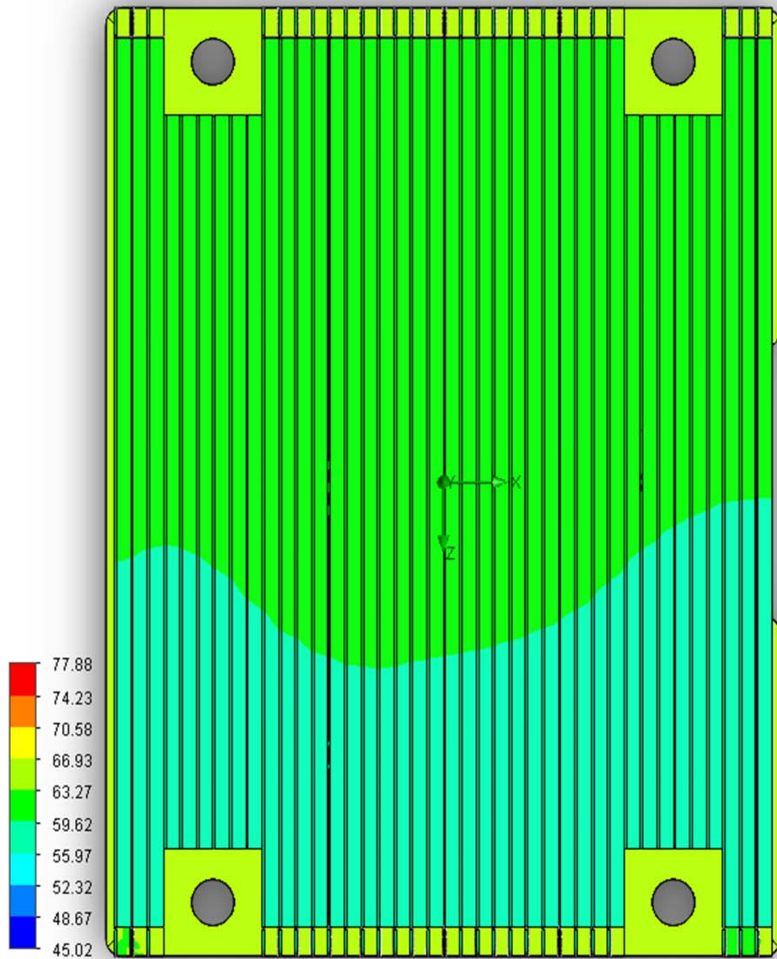
2. Relatively, thermal resistance is **0.14℃/W** .

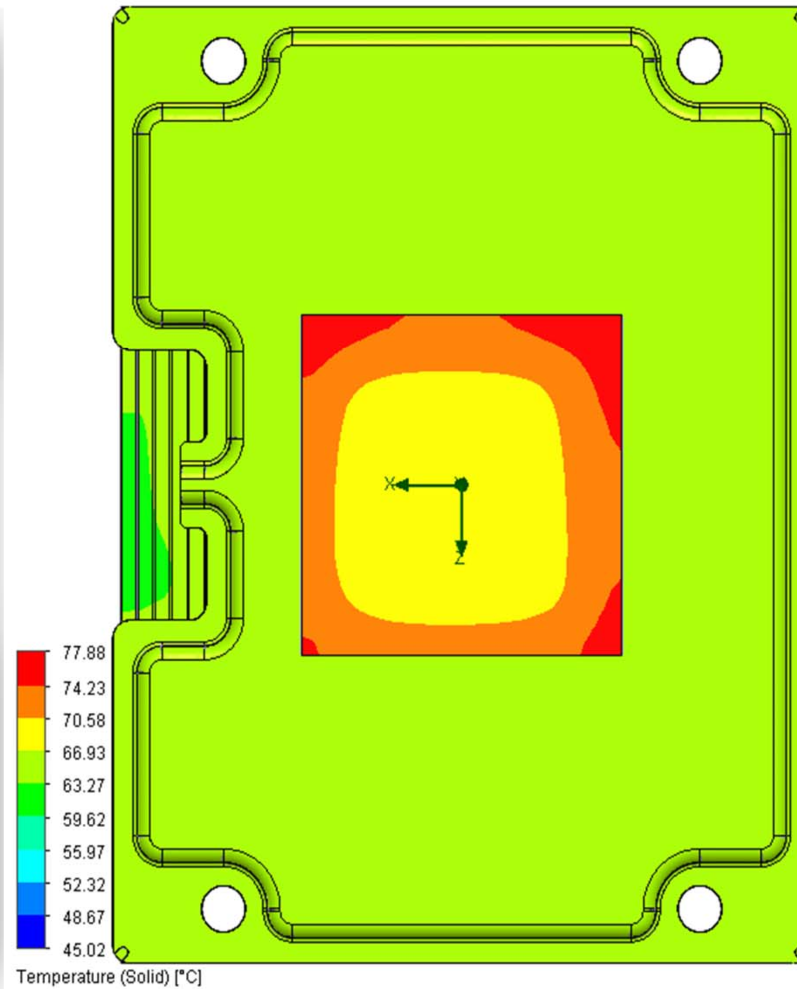


Goal plot 1

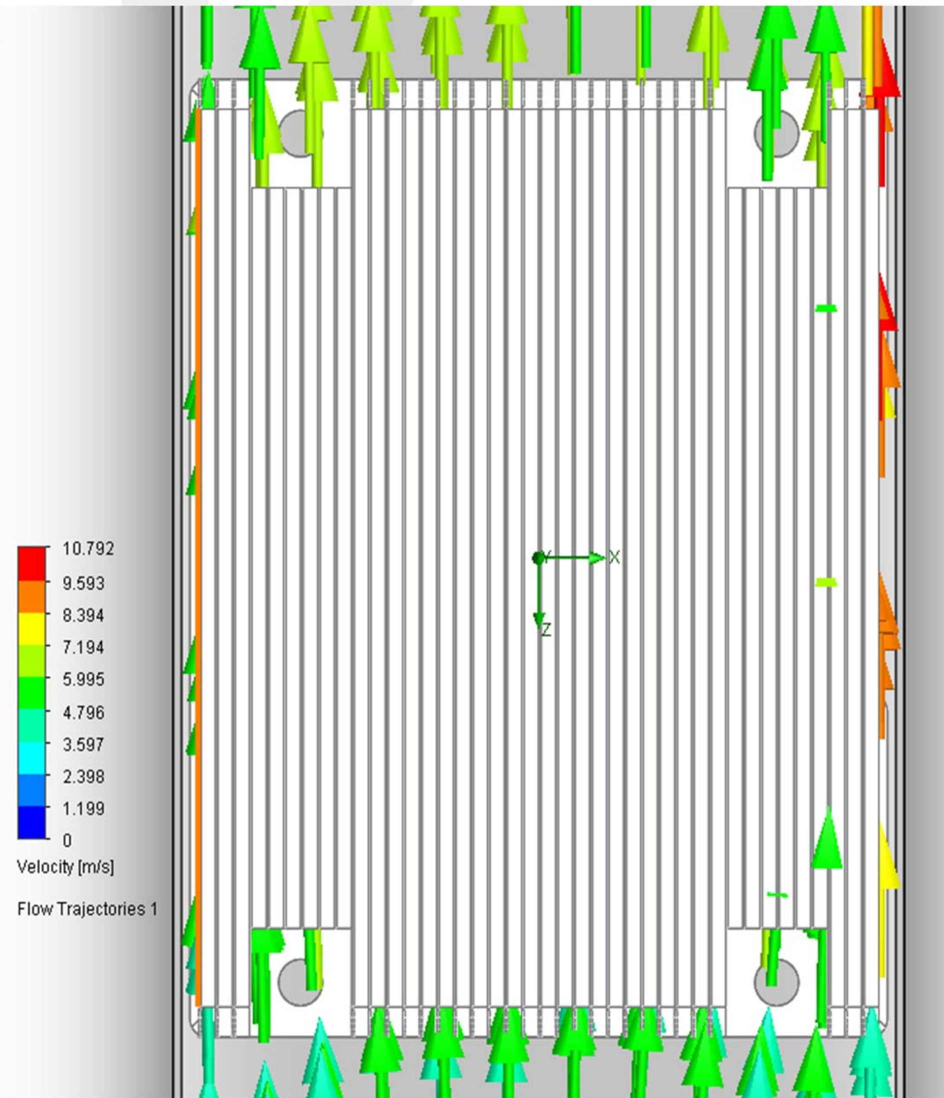
Name	Current Value	Progress	Criterion	Averaged Value
R	0.142221 K/W	Achieved (IT = 102)	0.00420332	0.142637 K/W
SG Av Temperature (Solid) VC冷面溫度	65.1085 °C	Achieved (IT = 102)	0.607827 °C	65.1815 °C
SG Av Temperature (Solid) VC熱面溫度	65.2983 °C	Achieved (IT = 102)	0.613496 °C	65.3719 °C
VC溫差	0.189801 °C	Achieved (IT = 102)	0.00569711	0.190348 °C
VG Av Temperature (Solid) Chip 1 180W Tc	70.5998 °C	Achieved (IT = 102)	0.756598 °C	70.6746 °C
VG Max Temperature (Solid) Chip 1 180W Tc	77.8808 °C	Achieved (IT = 102)	0.97258 °C	77.9589 °C

Analysis – Thermal Ranging (Chip 1)





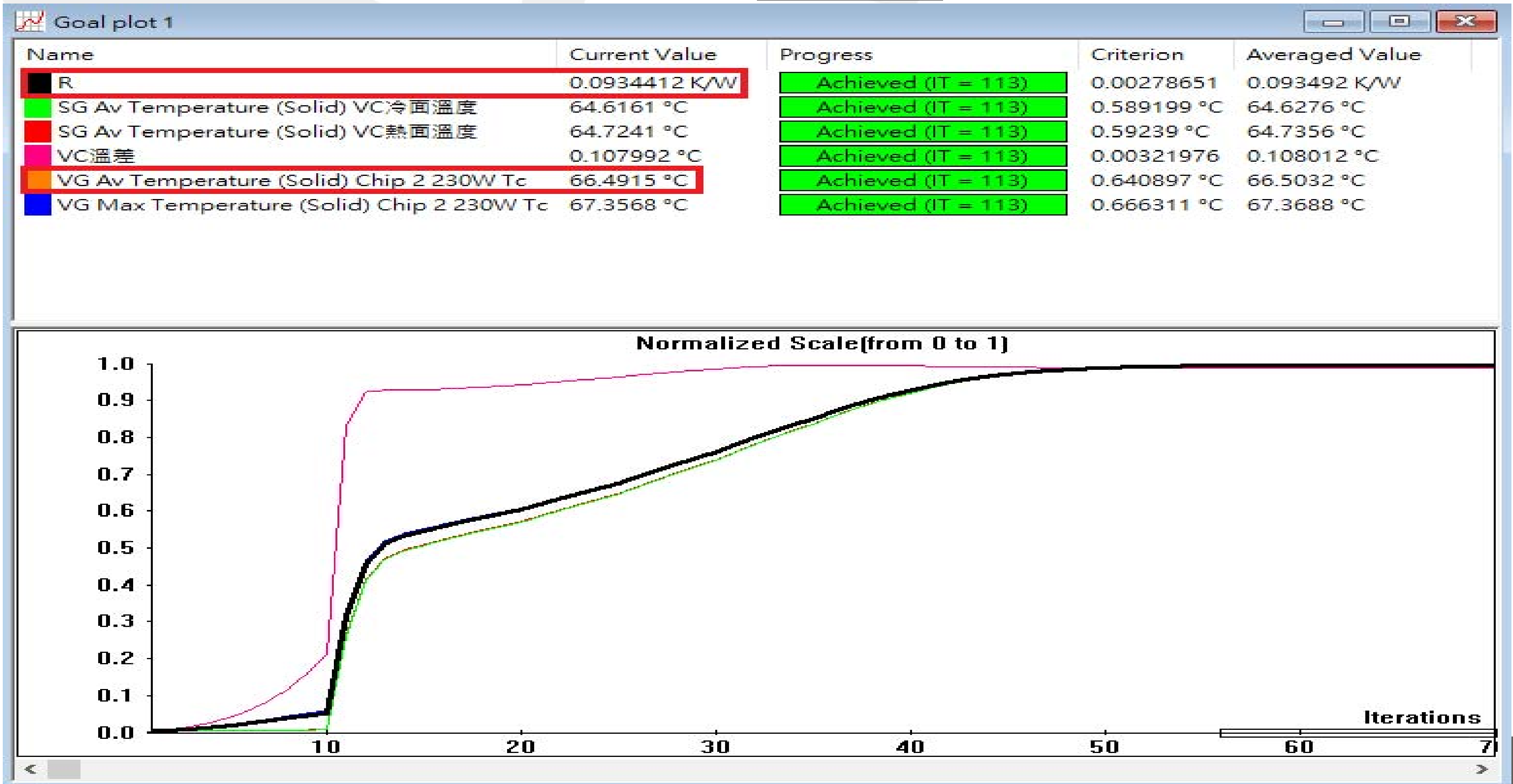
Analysis – Air Flow (Chip 1)



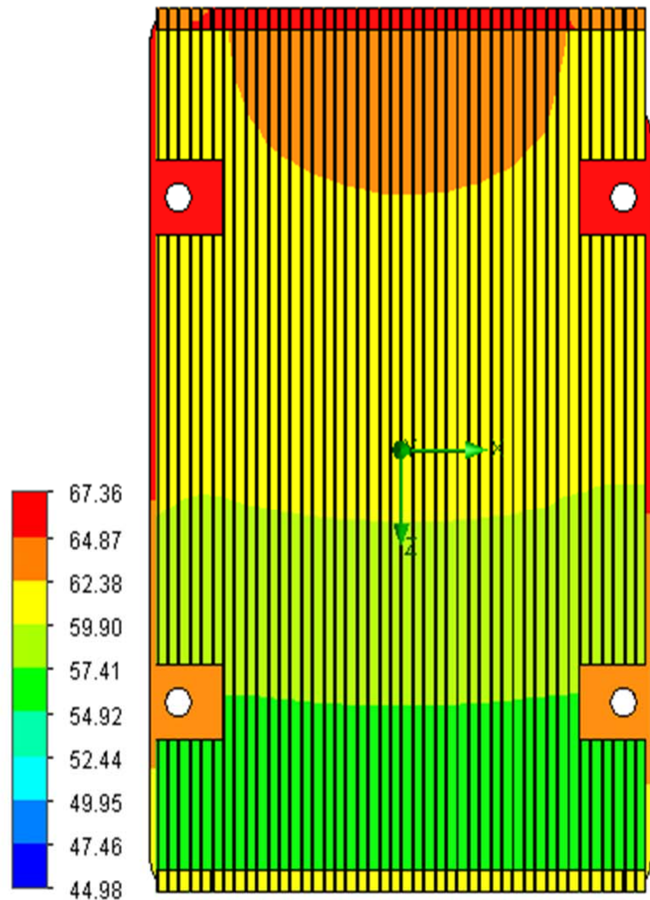
Analysis – Tcase of heat source (Chip 2)

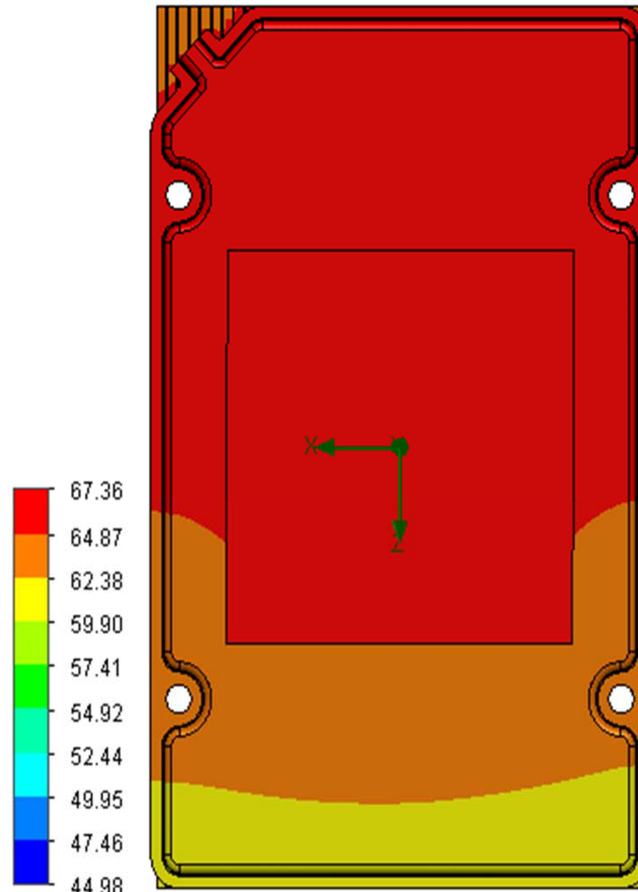
1. The steady T_{C2} in average is **66.49°C**, < T_{Cmax} 70.6°C.

2. Relatively, thermal resistance is **0.09℃/W** .

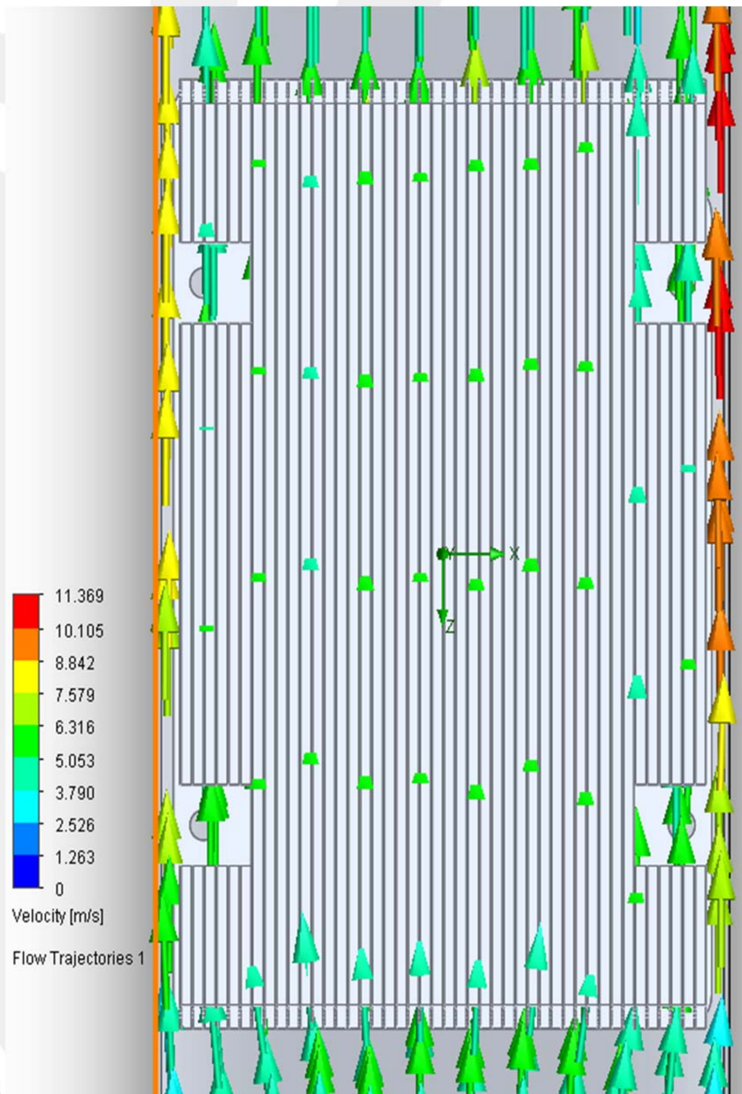


Analysis – Thermal Ranging (Chip 2)





Analysis – Air Flow (Chip 2)



Conclusion

Despite of having insufficient accurate information, such as TDP and complete 3D drawing for Eltex's device & chassis, we still make the simulation under the worse situation (setting up the total power as TDP, 180W+230W) to see if our solution could still satisfy the expectation. As per the result, for bigger heat source (chip 2, 230W), the Tcase (Tc_1) we've got (**66.49°C**) is within Tc_{max} (70.6°C), so it could easily avoid reaching Tj to keep the chip performance as expected by Eltex.

Certainly, there will be some difference after adding these two solutions into the complete 3D drawing (the full chassis, enclosure) and also the actual airflow by the fan in position, **but** our solutions could still have great chance to resolve the heat issues because of the buffer we've made (**actual TDP shall be lower than 180W+230W**).

For Chip 1, please assist to check and advise the actual Tc_{max} you'll need to have. Then, we could understand if the HS1 could also reach your target as well.

Shall you still have question or other request, don't hesitate to keep us informed. We'll try to help you out.

Thank you.
REGO Thermal Design Team

THANK YOU!

OUR TEAM IS COMMITTED TO PROVIDE QUICK RESPONSE AND PRO-ACTIVELY ASSIST OUR CUSTOMERS

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