講演番号	071

文献番号	20225071

Development of thermal comparator by VHDL-AMS and modeling of thermal protection function of boost conver

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KEY WORDS: **Electrothermal, Thermal network, Thermal Protecter , MBD, VHDL-AMS, Modeling [E1]**

Due to the requirement to consider safety in MDB, it became necessary to include protective operation in the operation model of the in-vehicle converter. For this reason, we have developed a boost converter model that includes thermal protection operation with VHDL-AMS. In this model, we have developed a thermal comparator model as a heat detection function, and we have verified the thermal protection operation of the boost converter using a thermal network for the heat dissipation path.

Fig.1 shows that the thermal protection operation is stopped and the temperature of the power switch exceeds 430K, but it can be seen that it is 390K in terms of the protection circuit monitoring.On the other hand, Fig. 2 shows that the temperature rise is restricted by the operation of the thermal protection circuit.

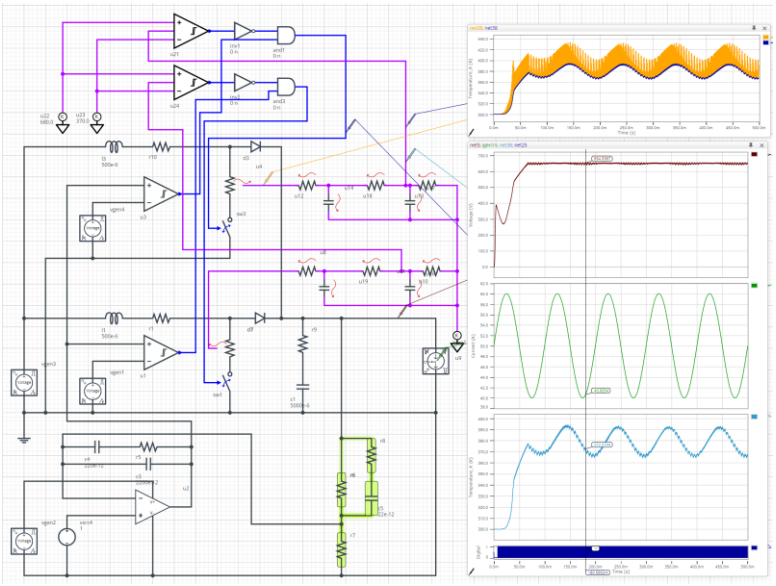

Fig.1 Thermal Protect not working

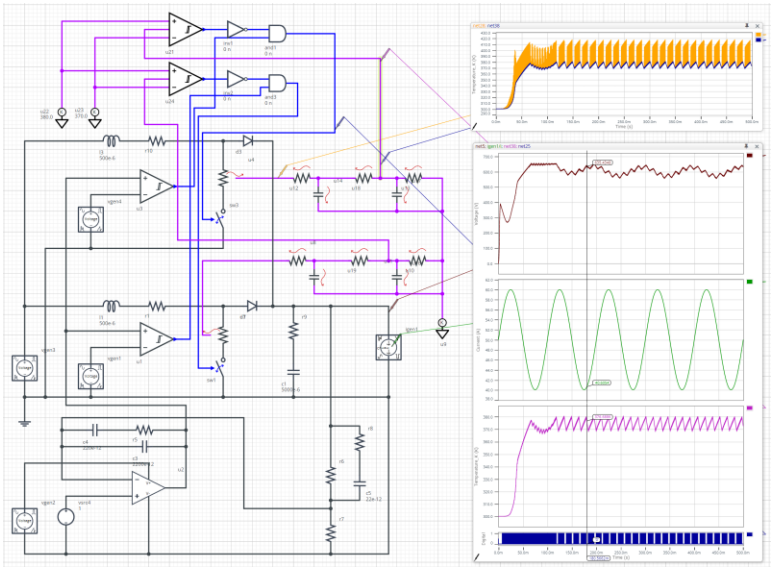

Fig.2 Thermal Protect working