The Intel E97378-001 CPU cooler I have has an average thermal resistance of [1] with the fan at maximum speed. Using a K6 Sil-Pad (with a thermal resistance of ), at an ambient temperature of and a maximum junction temperature of , the maximum power a single MOSFET can dissipate ranges from to , and to at maximum junction temperature of .

Since the power capabilities of a single MOSFET are so low without an expensive cooling solution, the next best choice is to use multiple MOSFETs. When using multiple parallel MOSFETs, especially in linear mode, it is better to keep them at the same temperature to limit the possibility of thermal runaway or other failures due to differences between them. Currently the best way I see of doing that is using a copper busbar for the drain connections of the MOSFETs. This allows the usage of thermal grease, which offers the lowest thermal resistance between the case and heatsink (, depending on the source). The busbar would then be mounted to an actively cooled heatsink with an electrically isolating thermal interface, most likely Sil-Pad. Although this increases the total thermal resistance between junction and heatsink, and thus ambient, it allows heat to escape the junction faster, which generally is the limiting factor, more so in pulse operation.

To sum up, use the CPU cooler pressure mounting the MOSFET between it and the PCB using a mounting bracket/backplate. Probably use the IXTK102N65X2, because it has a lowest among DC SOA rated MOSFETs ( versus on most others), resulting in difference in maximum power using the Intel cooler, and increases with lower total thermal resistance. Furthermore, it has a DC SOA throughout its range of , while the next best is out of . And it only costs . The only real downside is the current limit at low voltages – , .

When calculating maximum power at high currents, power dissipated in the sense resistor, PCB traces and wires should be accounted for; with 50A load on single MOSFET, the sense resistor will dissipate 5W, bypass MOSFETs will dissipate 4.5W, 10AWG wires will dissipate ~5W/m, in total adding about 15W per MOSFET.

* Simulate bypass driver on all 6 MOSFETs
* Figure out input protection
* Redesign the whole physical layout
* Find parts