# cPCI-3970

## Power Dissipation Guidelines

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# Thermal Requirements for the cPCI-3970

This section provides information on the thermal requirements of the cPCI-3970 Series. Cooling of the board and its components is provided by the thermal module (passive heatsink) and is dependent on sufficient airflow from the chassis. The amount of thermal energy that can by dissipated from the board is dependent on the ambient air temperature and the airflow rate of the chassis. To provide the user with guidelines for the upper limits of operating conditions for the cPCI-3970, the following sections give information on the maximum ambient air temperature as a function of airflow rate for a given level of power consumption.

**Thermal Performance Characteristic Curves**

The following thermal performance characteristic curves (TPCC) characterize the thermal solution performance designed for the CPU module. Users can determine the minimum airflow rate (CFM) required versus maximum operating temperature and given CPU loading, to keep the CPU working without performance downgrade. One graph is provided for each CPU supported by the cPCI-3970. The curves on each graph indicate the upper limits of operating conditions under which the CPU will not be affected by its thermal management and protection systems at a given percentage of the CPU's thermal design power (TDP).

The CPU's thermal management and protection systems begin to take effect when the CPU temperature exceeds the maximum junction temperature ($T_{j,Max}$=100℃). When the ambient air temperature and airflow rate are in the ranges below the TDP curves on the graphs, the CPU temperature will remain below $T_{j,Max}$ and the CPU will be able to operate at full performance (i.e. not limited by thermal management).

The power dissipation graphs show two curves:

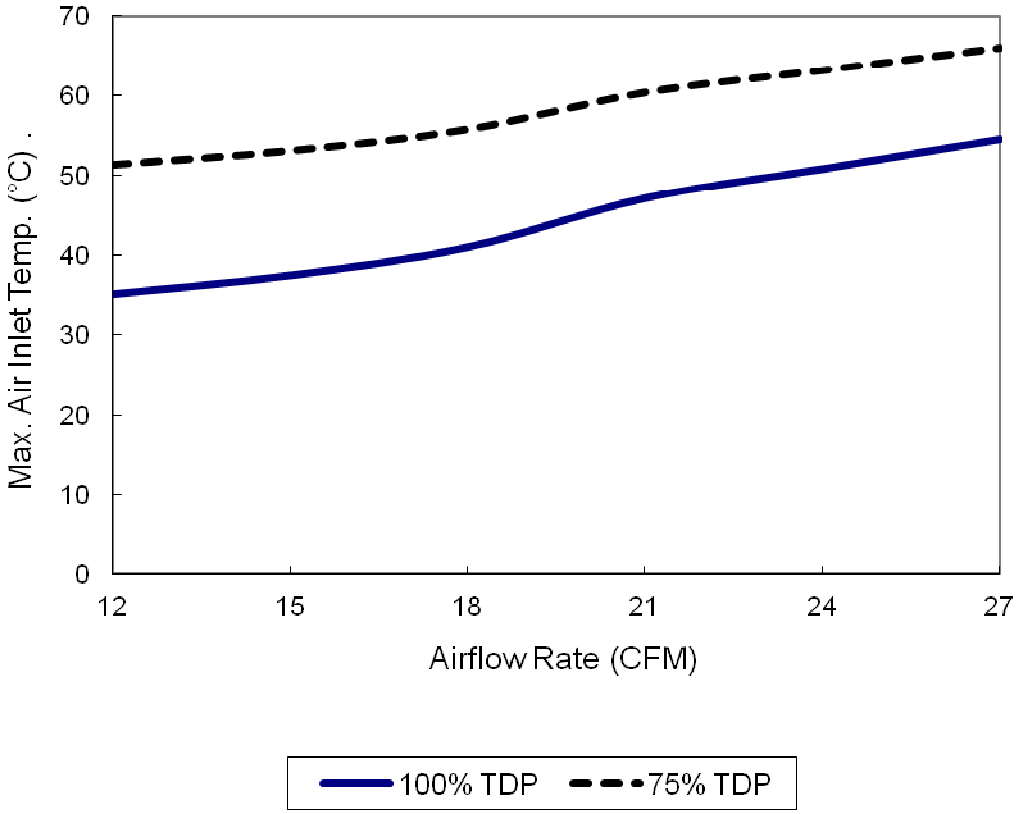
- 100% TDP, maximum load stress
- 75% TDP, typical load scenarios

The detailed specifications for each processor can be found in cPCI-3970 user manual Section 3.1 "Processor" on page 21.



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**Intel® Core™ i7-2655LE (with single-slot height heatsink)**

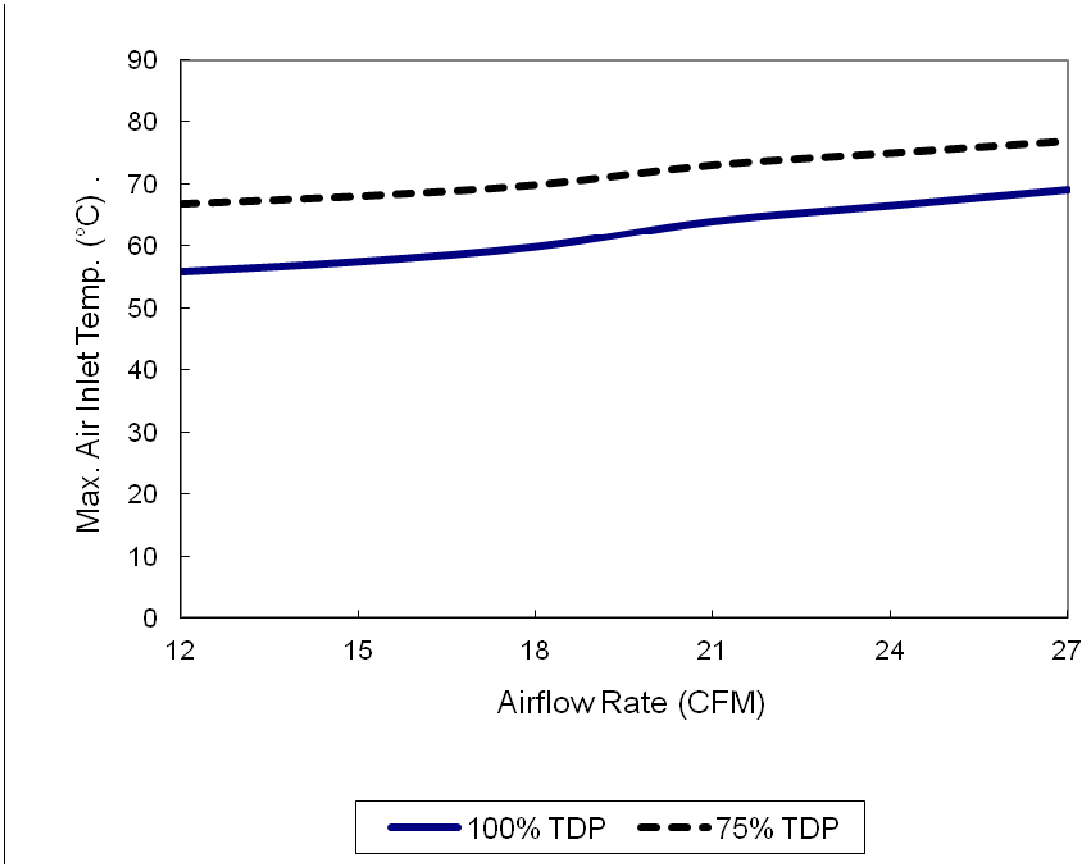



For cPCI-3970 models equipped with the Intel® Core™ i7-2655LE processor, the maximum operating temperature without CPU throttling can be as high as 66℃ with 27 CFM at 75% TDP, or as low as 35℃ with 12 CFM, 100% TDP.



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**Intel® Core™ i7-2610UE (with single-slot height heatsink)**

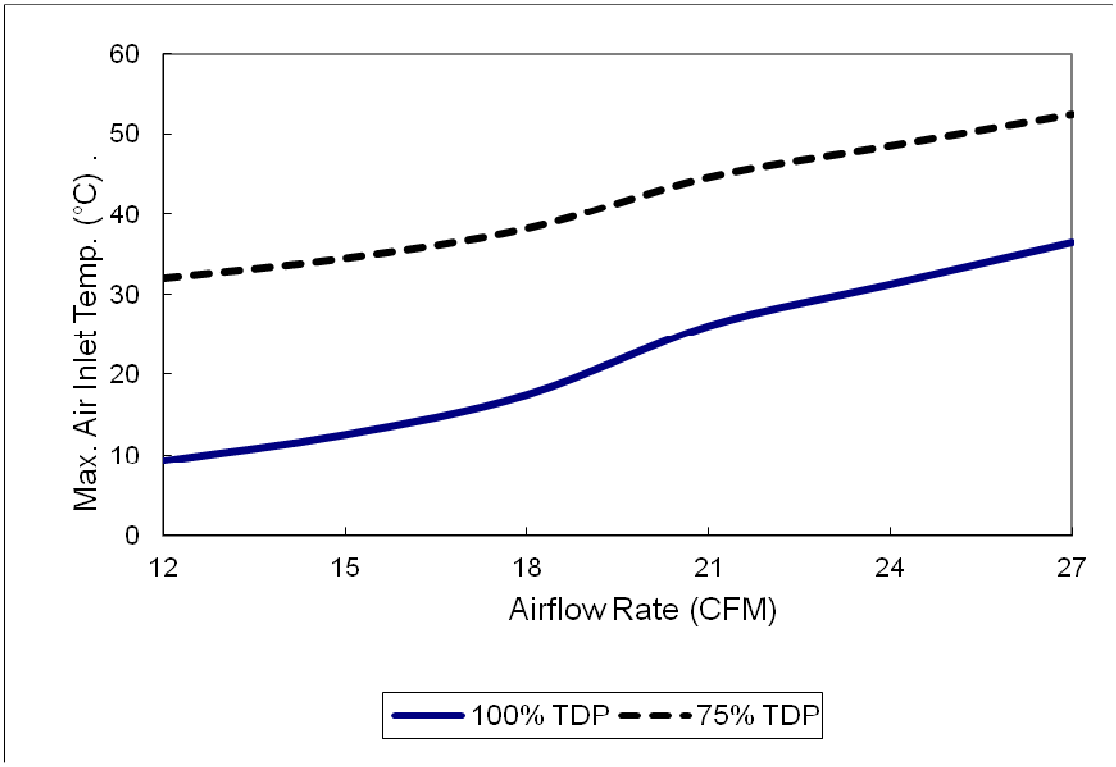



For cPCI-3970 models equipped with the Intel® Core™ i7-2610UE processor, the maximum operating temperature without CPU throttling can be as high as 77℃ with 27 CFM at 75% TDP, or as low as 56℃ with 12 CFM at 100% TDP.



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**Intel® Core™ i5-2515E (with single-slot height heatsink)**

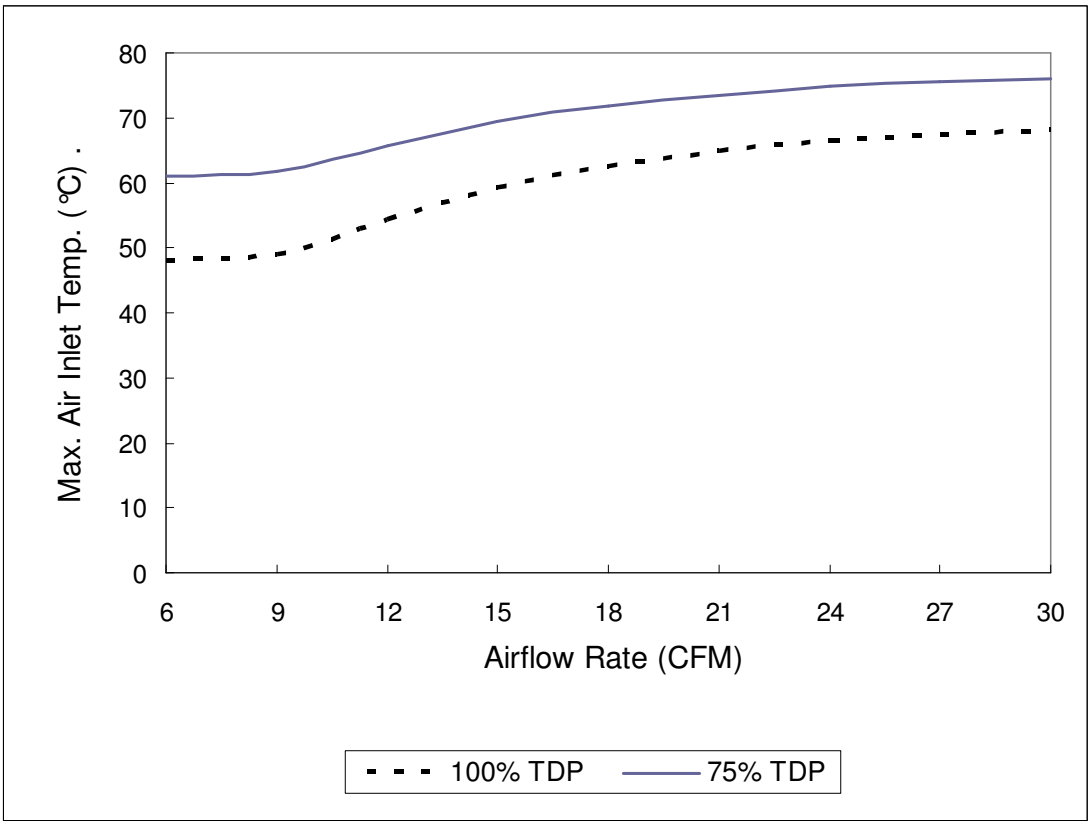



For cPCI-3970 models equipped with the Intel® Core™ i5-2515E processor, the maximum operating temperature without CPU throttling can be as high as 52℃ with 27 CFM at 75% TDP, or down to 26℃ with 21 CFM at 100% TDP. An air conditioned environment is required if the airflow rate is lower than 21 CFM.



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**Intel® Core™ i5-2515E (with dual-slot height heatsink)**

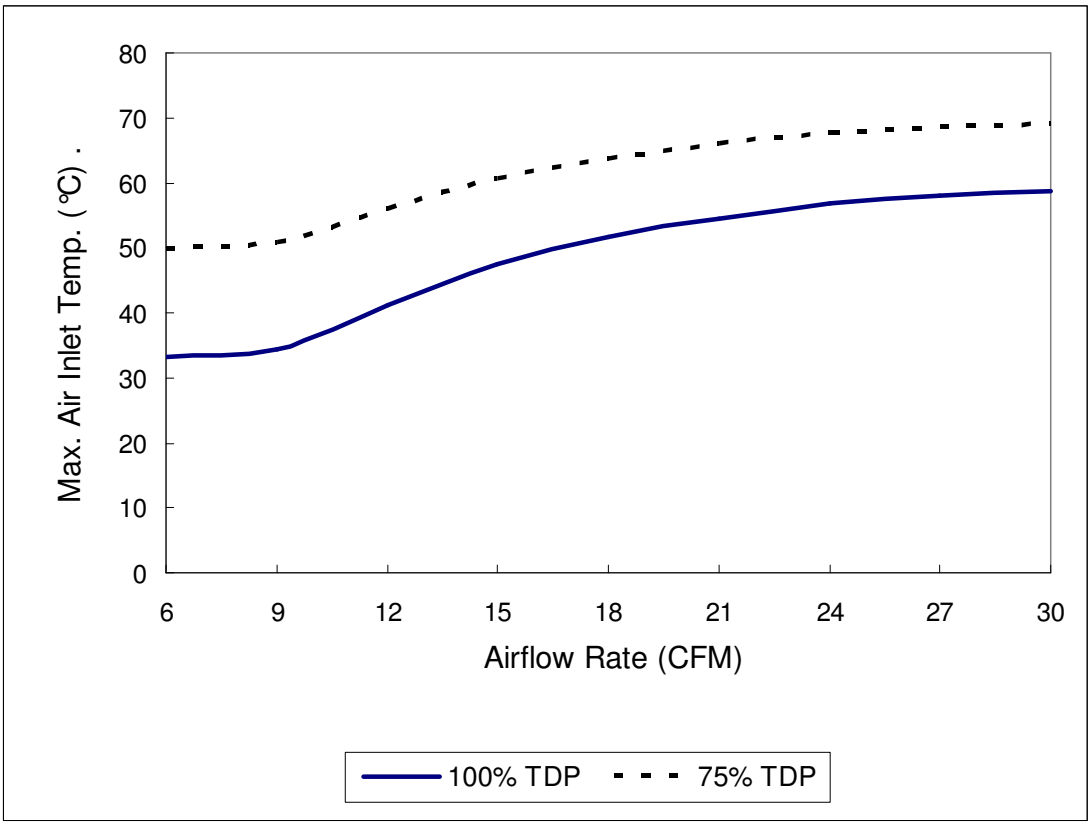



For cPCI-3970 models equipped with the Intel® Core™ i5-2515E processor, the maximum operating temperature without CPU throttling can be as high as 75℃ with 21 CFM at 75% TDP, or as low as to 65℃ with 21 CFM at 100% TDP.



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**Intel® Core™ i7-2715QE (with dual-slot height heatsink equipped)**




For cPCI-3970 models equipped with the Intel® Core™ i7-2715E processor, the maximum operating temperature without CPU throttling can be as high as 66℃ with 27 CFM at 75% TDP, or as low as 57℃ with 24 CFM at 100% TDP when equipped with dual-slot height heatsink.

For other processors or environmental conditions not listed here, please contact your ADLINK representative for more information.



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