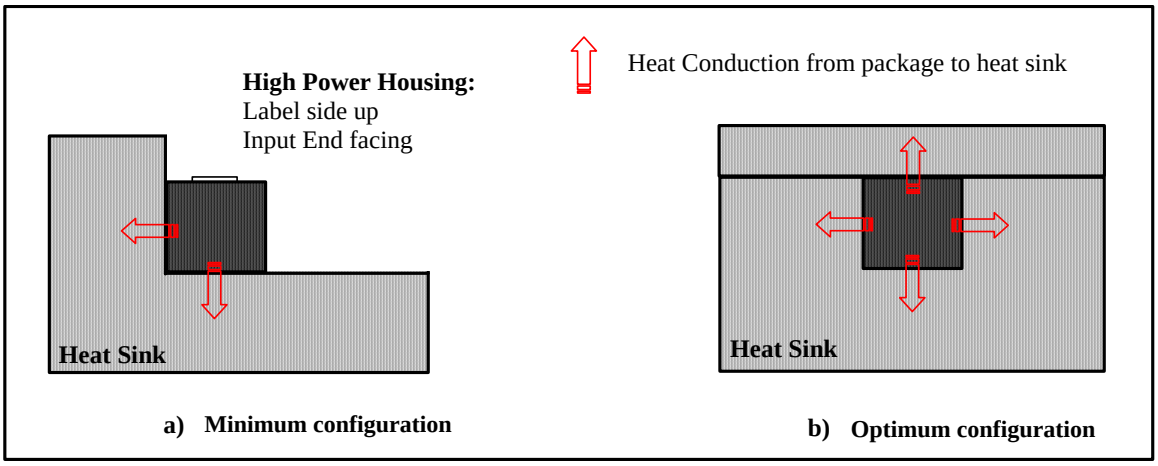
アプリケーションノート：
高入力パワータイプ励起光コンバイナーの使用方法(２)：除熱法

Power Handling Application Note for 2nd Generation Package

Preamble

The power handling capability of our combiners relies on its ability to conduct internal heat to its housing and thence to an external heat sink. As with all package designs, however, there are limitations to its capability. These are dependent on the total input power, the overall efficiency of the combiner, and the external heat sink temperature. The following sections show how to assess the power handling of our devices based on these parameters, using the recommended heat sink configurations described below.

Recommended Heat Sink Configurations



It is necessary that in both configurations there is good thermal contact between the sides of the housing and the heat sink to which it is in contact with, in order to aid heat transfer. Examples to achieve this may be the use of heat conducting thermal paste or tape. During combiner operation, it is inevitable, that over time the temperature of the heat sink may rise excessively if passive convection from the heat sink to its environment does not efficiently dump excess heat. Ways to combat this include fans and fins to aid convection, or water cooling. Certainly, a temperature probe on the heat sink during operation will show whether active heat sinking is necessary.

Power Handling Capability for input wavelengths 900 to 1100nm

Our estimate for the internal package temperature - $\mathbf{T_p}$ as a function of the total input power - $\mathbf{P_{in}}$, the combiner efficiency in % form - **eff**, and the heat sink temperature - $\mathbf{T_s}$, is given by:

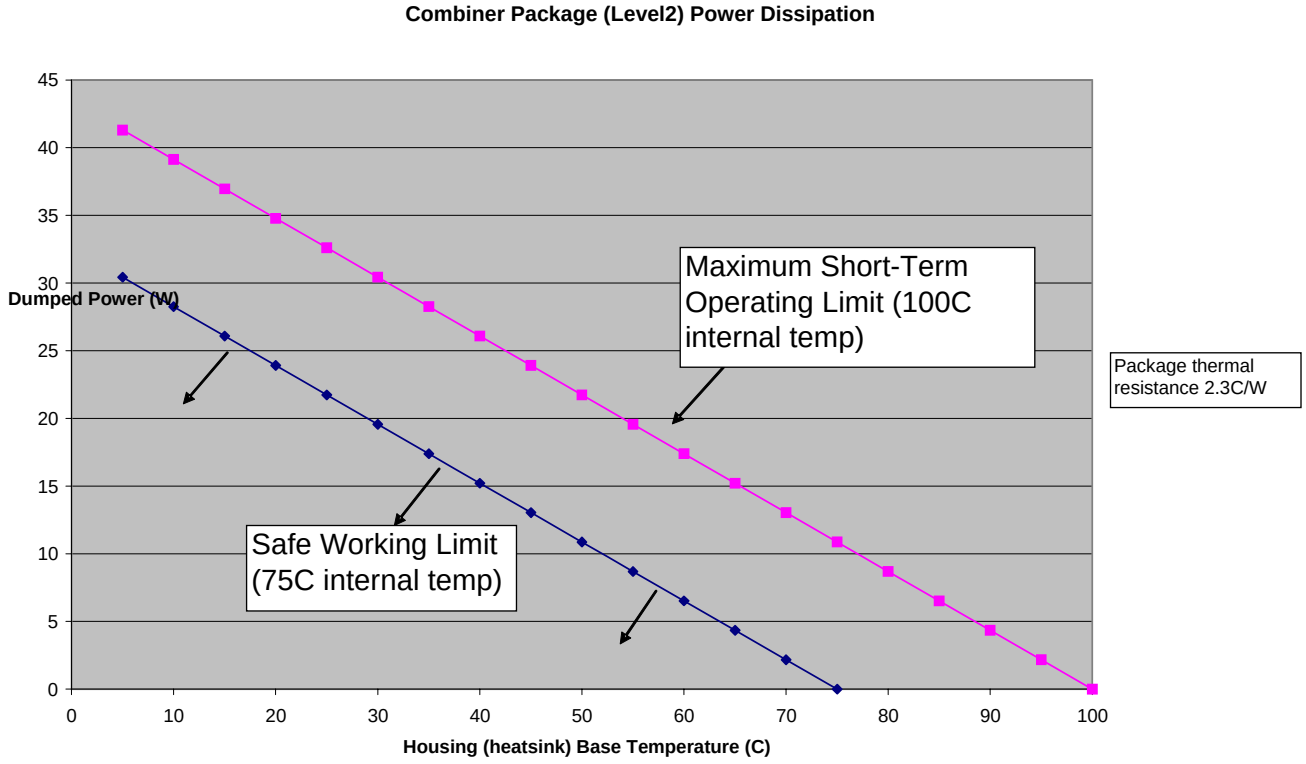
$$T_p = 2.273 \times P_{in} \times (1 - eff/100) + T_s \qquad (1)$$

where the temperature is in ^{0}C and the power is in Watts.

Our recommendation for the maximum allowable T_p is **75^{0}C**, especially for long term operation.

Note from (1) that the lower the heat sink temperature, the greater the allowed input power. Conversely however, should the heat sink temperature rise over time during combiner operation then T_p may exceed 75^{0}C. It may be judicious therefore, to initially monitor the heat sink temperature, especially if there is no active cooling in your system.

If your system uses wavelengths other than 900 – 1100nm, please contact sales for additional information.


Combiner Package (Level2) Power Dissipation
Dumped Power (W)
45
40
35
30
25
20
15
10
5
0
0
10
20
30
40
50
60
70
80
90
100
Housing (heatsink) Base Temperature (C)
Maximum Short-Term Operating Limit (100C internal temp)
Safe Working Limit (75C internal temp)
Package thermal resistance 2.3C/W