Heat Sinking of TFB Combiners in High Power Applications 900-1100 nm

APPLICATION NOTE

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

**Note:** For systems using wavelengths other than 900–1100 nm please contact the sales office for additional information.

Good thermal contact between the device housing and the heat sink is essential in order to aid heat transfer. Examples to achieve this include the use of heat conducting thermal paste or tape. During device 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. A temperature probe on the heat sink near the device output end will show whether active heat sinking is necessary.

An estimate for the internal package temperature – \( T_p \) in °C for each combiner type is given by the formulae below where:

- \( P_{in} \) = Total input power in Watts
- \( \text{Eff} \) = The device efficiency in % form
- \( T_s \) = The heat sink temperature in °C

For the following examples, use the corresponding formula provided.

**Ø3 mm Regular Housing (Housing code 3)**

\[
T_p = 9 \times P_{in} \times (1 - \text{eff}/100) + T_s
\]
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5 mm² High Power Housing Level 1 (Housing Code 7)

The recommendation for long term operation is that Internal Package Temperature, \( T_p \), should not exceed 75°C. If it is likely to rise above this value please consult the G&H sales office.

G&H’s TFB series power combiners have been proven by successfully completing a rigorous qualification program and will provide long reliable service when used within the stated guidelines. Operation outside of these guidelines may invalidate G&H’s responsibility as the supplier.

For further information

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PEC 0134 Issue 5.1
August 2019
As part of our policy of continuous product improvement, we reserve the right to change specifications at any time.