Gooch & Housego
ENABLING PHOTONIC TECHNOLOGIES

HEAT SINKING OF TFB COMBINERS IN HIGH POWER APPLICATIONS

900 – 1100 nm

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.

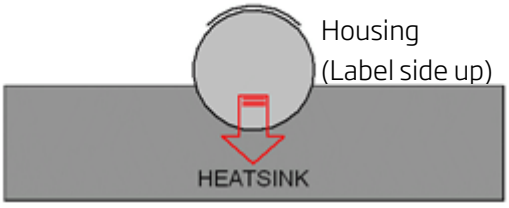
An estimate for the internal package temperature – T_p in °C for each combiner type is given by the formulae below where:

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

For the following examples, use the corresponding formula provided.

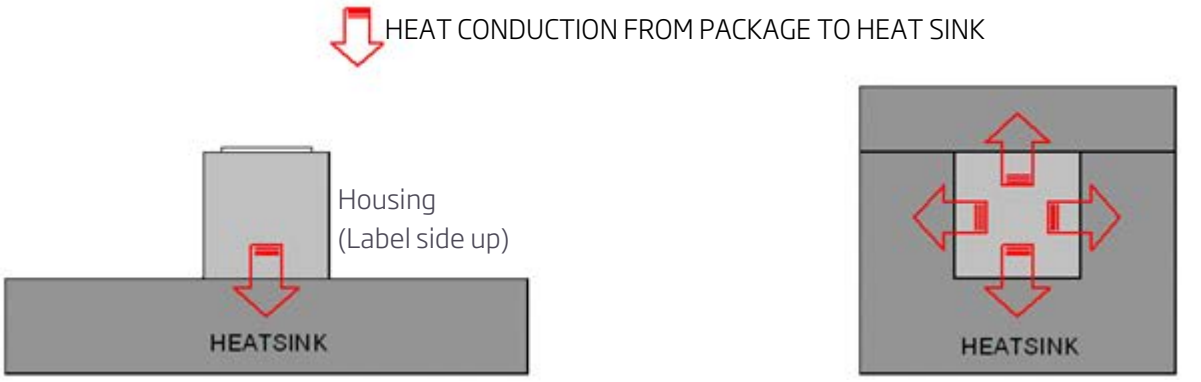
Ø3 mm Regular Housing (Housing code 3)

HEAT CONDUCTION FROM PACKAGE TO HEAT SINK



$$T_p = 9 \times P_{in} \times (1 - eff/100) + T_s$$

5 mm² High Power Housing Level 1 (Housing Code 7)

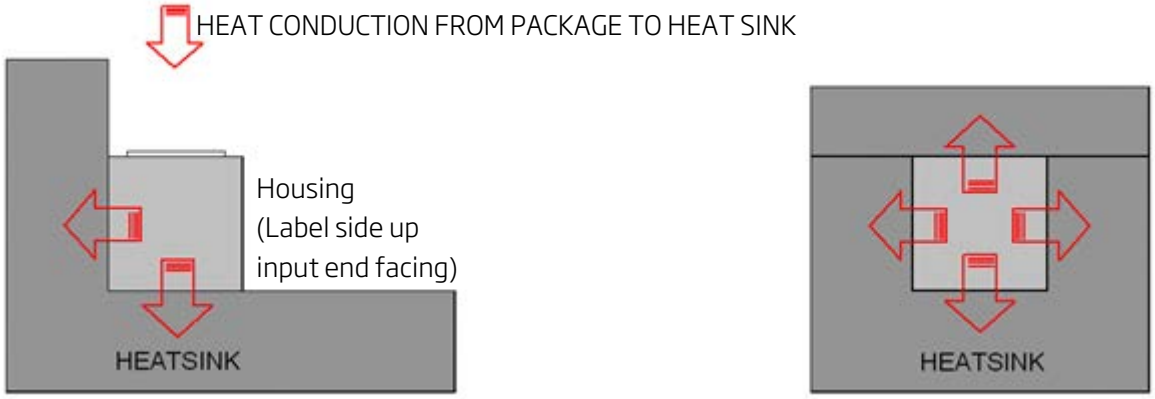


MINIMUM CONFIGURATION

OPTIMUM CONFIGURATION

$$T_p = 6.0 \times P_{in} \times (1 - eff/100) + T_s$$

Level 2 (Housing Code 8)



MINIMUM CONFIGURATION

OPTIMUM CONFIGURATION

$$T_p = 2.3 \times P_{in} \times (1 - eff/100) + T_s$$

The recommendation for the maximum allowable Internal Package Temperature T_p is 75°C, especially for long term operation. 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.