TECHNICAL NOTE
MAXIMUM POWER RATING
MID-POWER PACKAGE

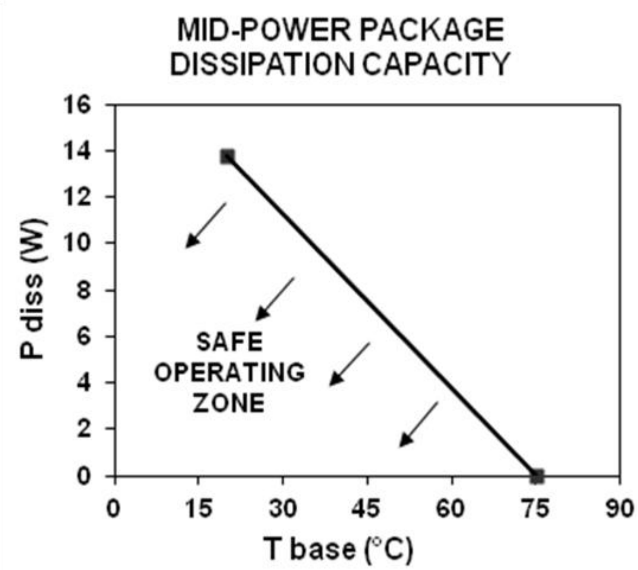
The MID-POWER package in which many of our combiners are embedded is capable of dissipating up to 14 watts if used under the proper operating condition. This technical note details the requirements regarding mounting, cooling and the related achievable maximum power ratings.

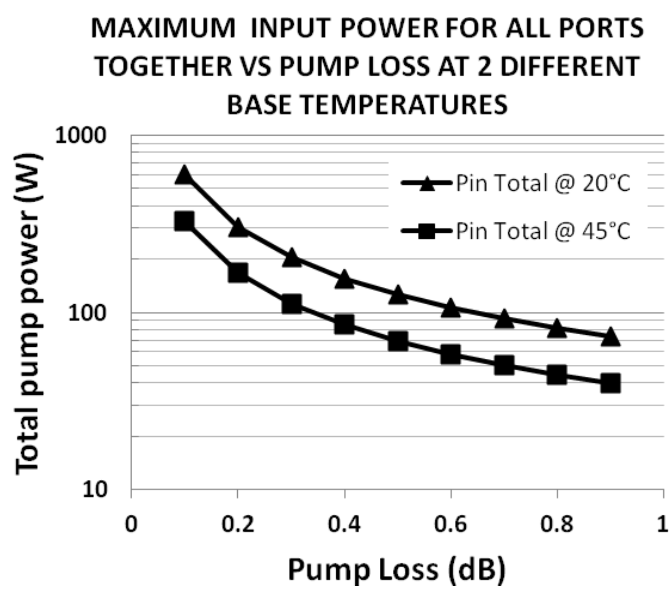
This device should not be operated unless properly attached to a heat sink. Failure to adequately cool the device could cause immediate and permanent damage. The heat sink should be made of copper, aluminum or another material with similar, or better, thermal conductivity. The surface finish should be 16µ-in (0.4µm) or better. The surface flatness under the package should be better than 0.001 in. (25µm) as indicated in the application note for mounting MID-POWER packages: 10-200228-00.

The package can be mounted with any bracket design has long as the applied force is between 70N to 140N and is applied on the extremities only. An example is shown on the application note for mounting MID-POWER packages: 10-200228-00. Do not apply force directly on the cylindrical part. If force is applied to the package cylindrical portion, the package can be permanently distorted and damaged internally. The cylindrical portion of the package is not meant to be in contact with the heat sink. Only the 2 extremities require good contact with the heat sink.

Use of a thermal interface material between the package and the heat sink is strongly recommended. We suggest pyrolitic graphite for heatsinking, pastes can be used, but not in conjunction with the graphite sheet. If paste is used, take extreme care that it does not come into contact with the fibers. Typically, it is desirable to achieve less than 0.2 °C/W between the package and the heat sink; this can be achieved if the thermal interface is rated at 2.5 x 10^{-5} °C•m^2/W (0.038 °C•in^2/W) or better.

The maximum power that the package can dissipate is a function of the temperature on the base of the package when in operation and the known thermal resistance of the package, which is 4°C/$W_{dissipated}$. The first chart shows the maximum power that can be dissipated for a given base temperature. The second is an example of the total maximum input power as a function of pump loss at 2 different base temperatures.





$$T_{max} = T_{base} + (P_{diss\ max} \bullet \theta)$$
$$P_{diss\ max} = (T_{max} - T_{base}) / \theta$$
$$P_{\ max} = P_{\ diss\ max} / IL$$

T_{max}: maximum internal temperature set at 75°C
T_{base}: temperature at the interface of the heatsink and the package when in operation (°C)
$P_{diss\ max}$: maximum dissipated power (W)
IL: insertion loss (linear scale)
θ: thermal resistance set at 4°C/$W_{dissipated}$

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