ITF TECHNICAL NOTE
MAXIMUM POWER RATING
HIGH POWER PACKAGE

The high power package in which many of our combiners are embedded is capable of dissipating up to 60watts if used under the proper operating condition. This technical note details the requirements regarding mounting, cooling and the related achievable maximum power ratings.

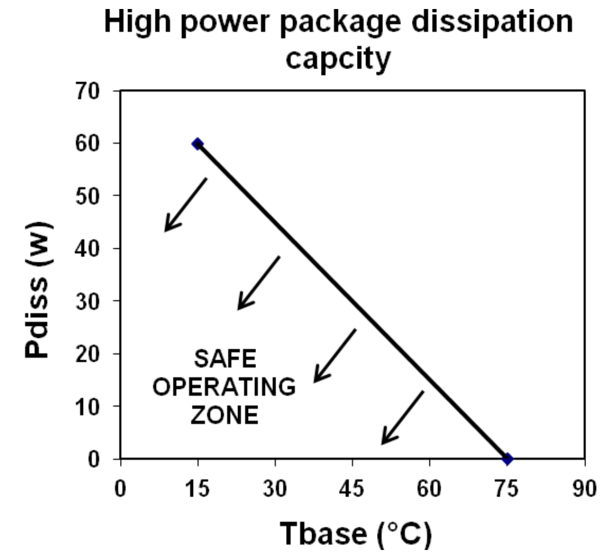
This device should not be operated unless properly attached to a heat sink. Failure to adequately cool the device could cause immediate and permanent damage. The heat sink should be made of copper, aluminum or another material with similar, or better, thermal conductivity. The surface finish should be 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 high power packages: 10-200141-00.

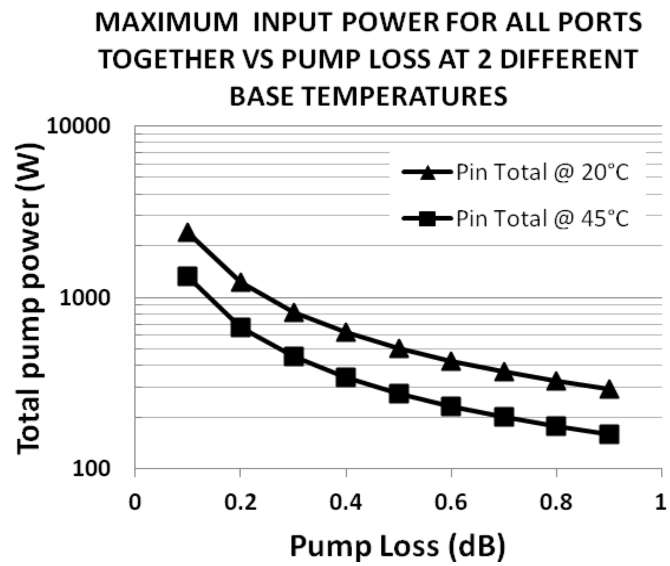
Use of a thermal interface material between the package and the heat sink is strongly recommended. Typically, it is desirable to achieve less than 0.2 °C/W between the package and the heat sink; this can be achieved if the thermal interface is rated at 2.5 x 10^{-5} °C⊙m^2/W (0.038 °C-in^2/W) or better. We recommend and supply Pyrolytic Graphite Sheet thermal interface material.

The package can be mounted with four NC#2-56 screws and ''D-shaped'' washers that we supply. The screws must be tightened to a torque of 20 in⊙oz (0.14 N⊙m). The package can be permanently distorted, damaged internally or the mounting flanges may break if the screws are over-tightened or tightened unevenly. The screw threads should be locked to prevent loosening over time.

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 1°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.

First release: October 10th 2007, revised: August 8th 2008, Febuary 25th 2011 & January 30th 2014





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

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)
TL: Transmission loss (%)
θ: thermal resistance set at 1°C/$W_{dissipated}$

400 Montpellier Blvd., Montreal, QC CANADA H4N 2G7 Tel : 514-748-4848 1-888-922-1044
www.3spgroup.com info@3spgroup.com