



## Power handling of a Typical Power Divider

Power handling of a power divider is a very common and ambiguous question. There is no direct answer due to many variables into the device and also the way the user is powering and cooling the device.

Most of Sigatek's power dividers based on frequency of operation are specified to handle 30 watt of CW power when they are used as power dividers, operated in a 50 ohm system and all unused ports are terminated to a 50 ohm load with better than 1.20:1 VSWR. Theoretically when the power divider is used based on above conditions the internal isolation resistors which are very low power do not dissipate any power. When above conditions are not met which is usually the case the internal isolation resistors are in the circuit. As the matching conditions worsen the internal isolation resistors will begin dissipating more and more heat, up to the point where a failure will occur usually at temperatures greater than 60 degrees Celsius. Worst cases are when one of the output ports are opened or shorted where we have total reflection of the signals. In this case the reflected signals are 180 degree out of phase and all reflected power need to be dissipated in the isolation resistors. In conclusion a power divider can be used as a combiner with caution. If your application requires you to combine the signals make sure that the combining signals are coherent which means they have same phase and amplitude.

There are cases or rather applications that instead of CW signals we have **Pulse signals**. In these applications the most important variables are the duty cycle the period of the signal and the peak power. See link in Wikipedia for a visual demonstration:

[http://en.wikipedia.org/wiki/Duty\\_cycle](http://en.wikipedia.org/wiki/Duty_cycle)

For applications where high power needs to be combined a selection of a **power combiner** is very important. These power combiners can handle high power levels by design. Special designed boards with heavy copper lines and big high power resistors are utilized to withstand the high power levels in any condition. Also different cooling techniques can enhance the heat dissipation of these devices.

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