

Application Note

Fagor Electrónica Semiconductores

Duty Cycle Derating

Transient Voltage Suppressors are specifically conceived to limit over voltages and dissipate high transient power with very short response times (1 pico second).

These devices start to conduct current when the terminal voltage exceeds a threshold and take increasing current until the pulse is held down to a maximum clamping voltage.

All the energy absorbed in the semiconductor junction of these devices is converted to heat.

By convention the maximum energy rating of these devices is specified as a power for a 1mS pulse (figure 1).

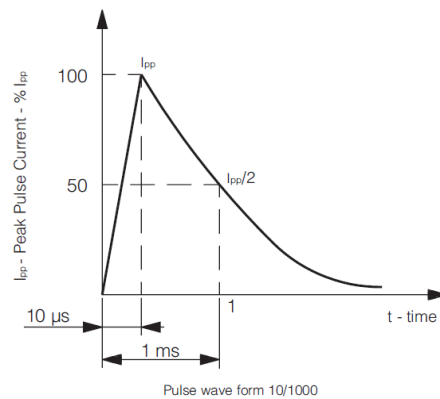


Figure 1 –Non repetitive Exponential Pulse Waveform

The Peak Pulse Power Width Rating Curve for the TPSMBA-series is given in figure 2. This curve is defined under non-repetitive pulse waveforms and at temperature of the leads of 25°C.

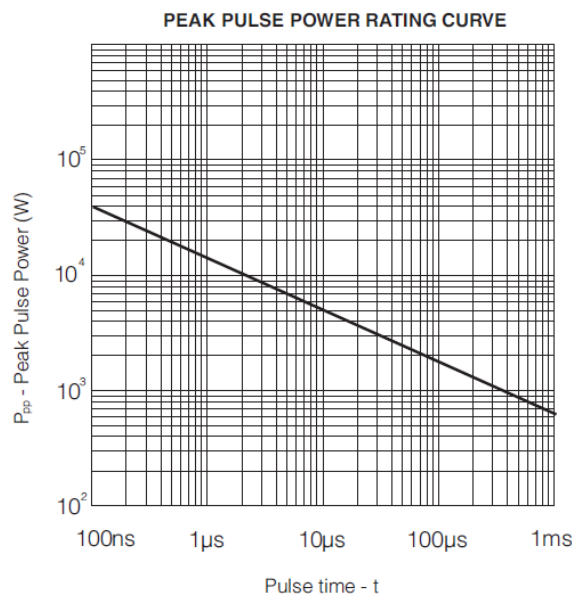


Figure 2 –TPSMBA-Series Pulse Width Rating Curve

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The Peak Pulse Power specification is affected with temperature. This effect is represented with the Peak Pulse Power Derating Curve, as it can be seen in figure 3.

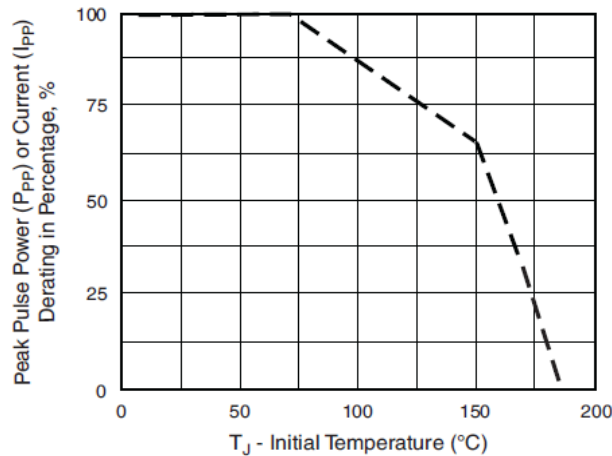


Figure 3 –TPSMBA-Series Peak Pulse Power Derating Curve

All the graphs showed previously in this note are defined under non repetitive pulse waveforms.

For the case of real Applications, applied pulses use to be mainly repetitive and different from specified in the datasheet, then the duty cycle of the pulse is an important parameter to take into account.

The Peak Power will be affected by this type of pulses and depending of the duty cycle, this Peak Power will be derated following the Duty Cycle Derating curve as represented in figure 4.

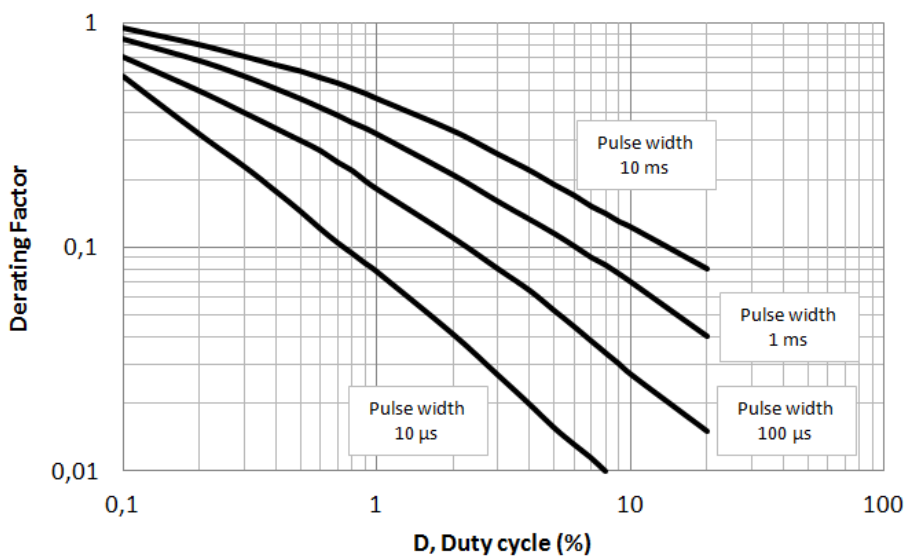


Figure 4 –Typical Derating Factor for Duty Cycle