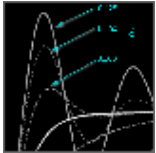


RC SNUBBER CALCULATOR SPREADSHEET

Paulo Administrator [electronicsanddiy](#) 25 May 2016



An Excel-based calculator eases the design of RC snubbers in power switching applications.

RC Snubber Calculator Spreadsheet

In power switching applications, a designer often has to contend with spurious oscillations. These are the result of parasitic capacitance and inductance on the board and behave like the step response of an RLC circuit. These transients can induced undesired noise in neighboring circuits and create over voltage spikes that can compromise long term component reliability.

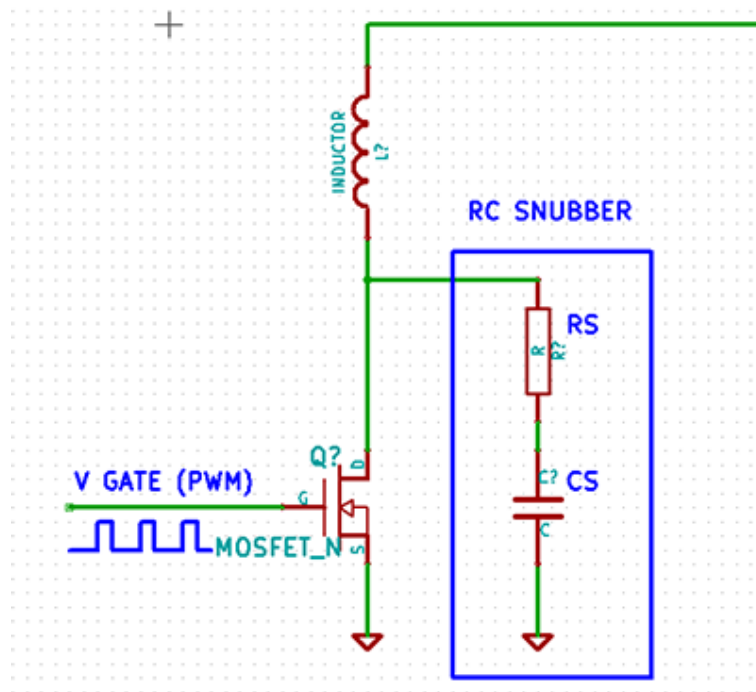


Figure 1 - Typical RC Snubber Circuit

The most common way to mitigate the effects of these transients is by using an RC snubber circuit. There are many excellent sources on the web discussing this topic so I won't repeat the discussion here (see references at the end for more information). Instead, I'm offering an Excel-based calculator that simplifies the components selection should you be faced with this task.

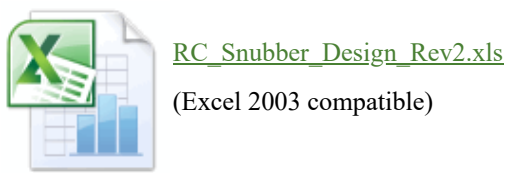
The Spreadsheet

The spreadsheet can be download through the link below:



[RC_Snubber_Design_Rev2.xlsx](#)

And here's an Excel 2003 compatible version as some users can't open the latest excel formats.



The spreadsheet is quite simple to use (See Figure 2).

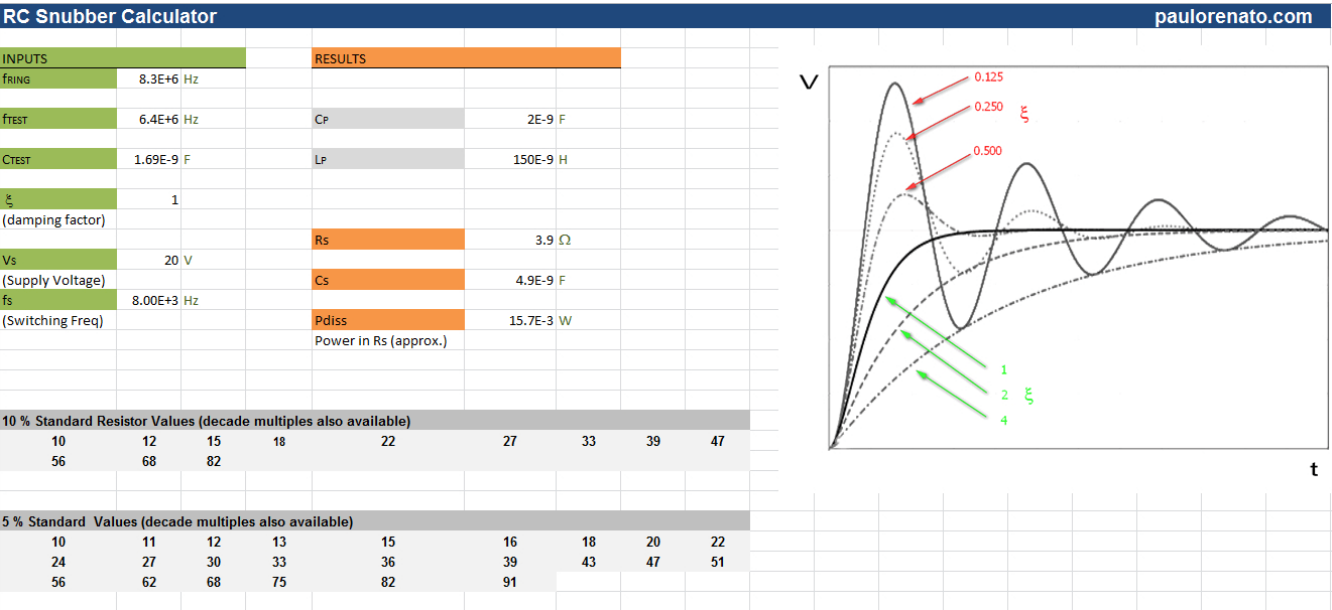


Figure 2 - The Spreadsheet Calculator 'Interface'

On the left side, colored in green, is the "inputs" section. In order to precisely "tune" the RC snubber, you should measure the frequency of the oscillations (without having the snubber) using an oscilloscope and enter it under f_{RING} .

The next step is to add a known value test film capacitor in parallel with the MOSFET (C_{TEST}) and measure the new oscillating frequency as a result. Finally, you must select the damping factor for the desired response depending on how much overshoot you can tolerate. There's a graph in this document illustrating the normalized effect of the damping factor on the response.

The "results" section of the spreadsheet (colored orange) automatically calculates the recommended R and C values. The estimated parasitic capacitance C_P and inductance L_P are also displayed for reference. Power dissipated in the R_s resistor is also estimated using the maximum supply voltage (V_s) and the maximum switching frequency (f_s) so you can select a resistor with the appropriate power handling capability.

A table with standard E-series values is included for convenience.

Enjoy!

References

[AN11160 Designing RC snubbers - NXP](#)
[Resistor-Capacitor \(RC\) Snubber Design for Power Switches - Fairchild Semiconductor](#)