

This application note shows how using different filtering techniques on the Ag5200 affects the output ripple.

All the tests are performed using an input voltage of 54V and load current of 2.5A.

Figure 1 below shows the basic output filter detailed in the Ag5200 datasheet.

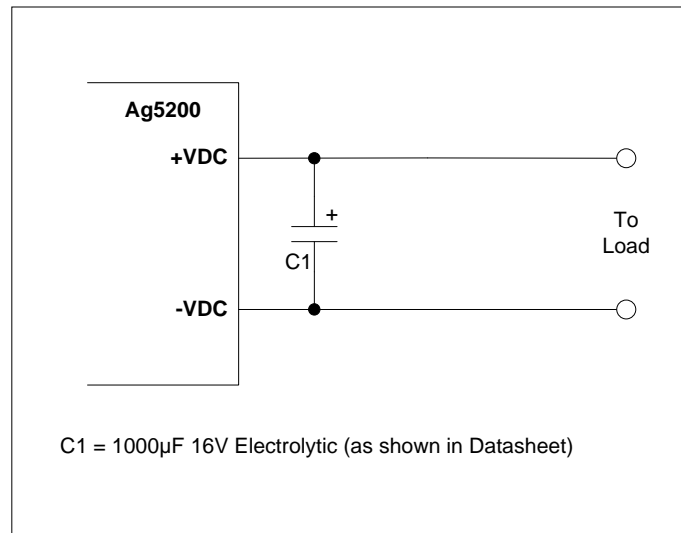


Figure 1: Basic output filter

Figure 2 shows the typical response that you will see from this basic output filter.

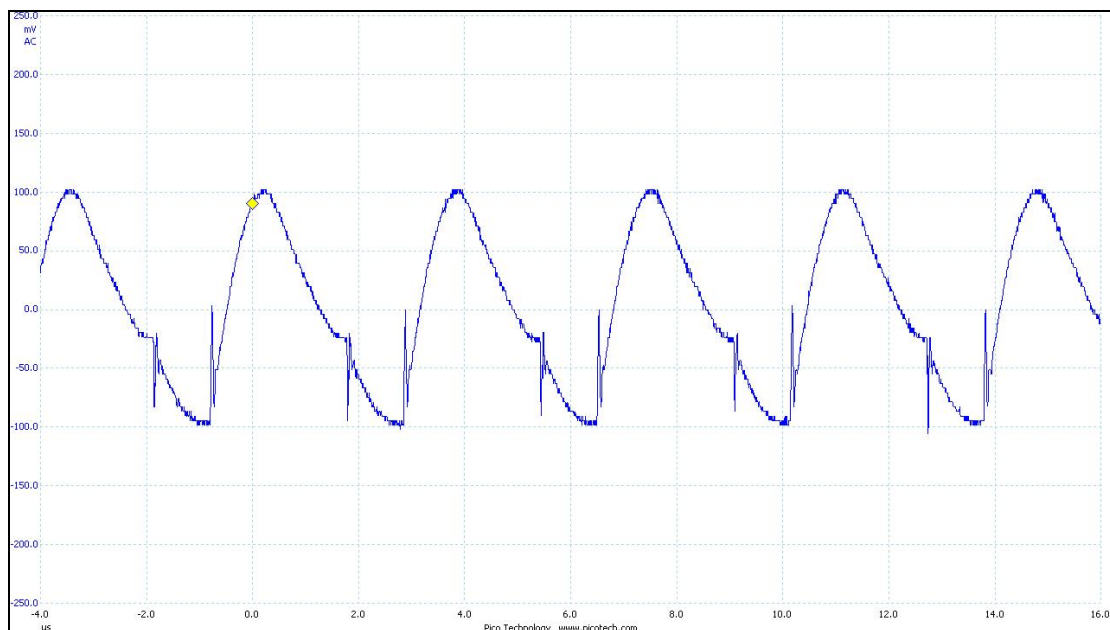


Figure 2: Output ripple with basic output filter

Figure 3 shows the addition of a simple PI filter.

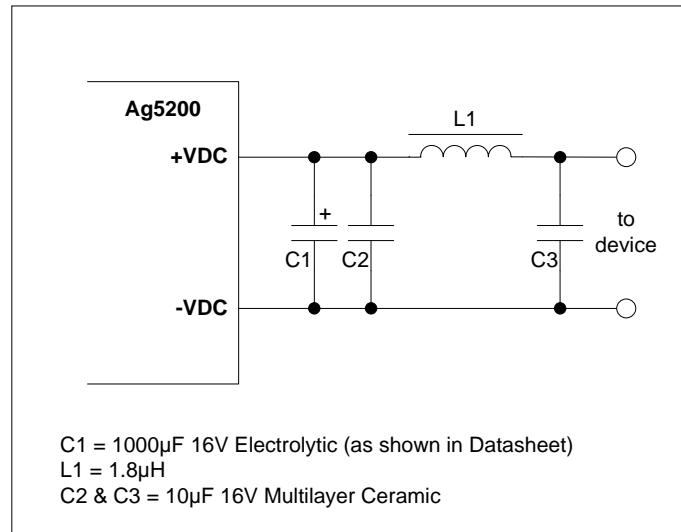


Figure 3: Addition of PI filter

Figure 4 shows the response from the additional PI filter shown in Figure 3.

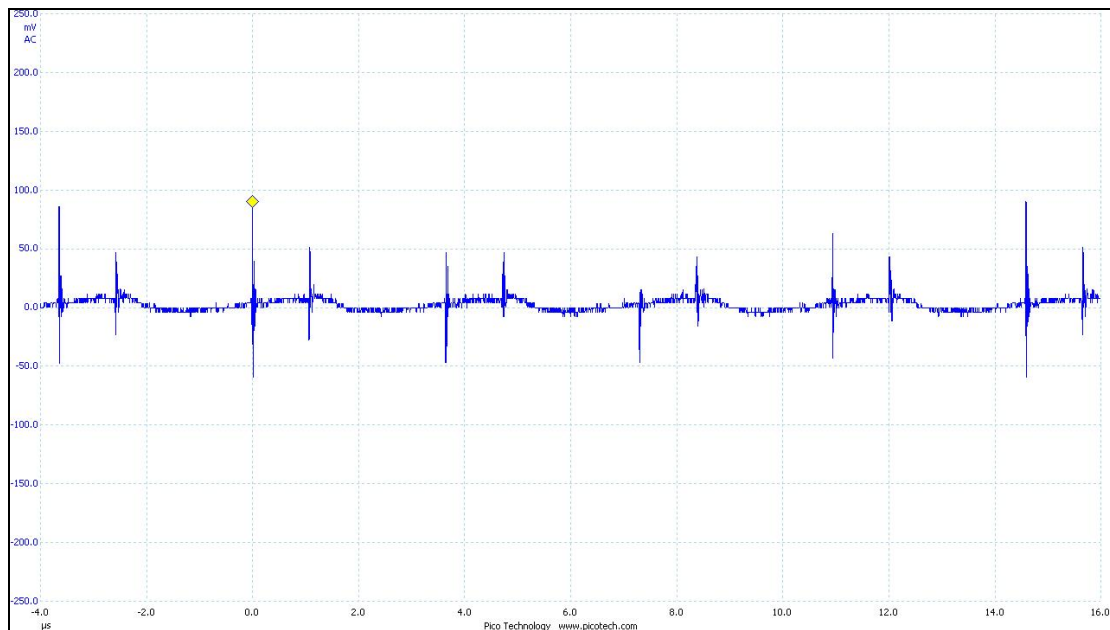


Figure 4: Output ripple with additional PI filter

Figure 5 shows the standard electrolytic output capacitor being replaced with a low ESR tantalum capacitor.

*The tantalum capacitors used in the following examples is a KEMET - T495X227K016ATE100.*

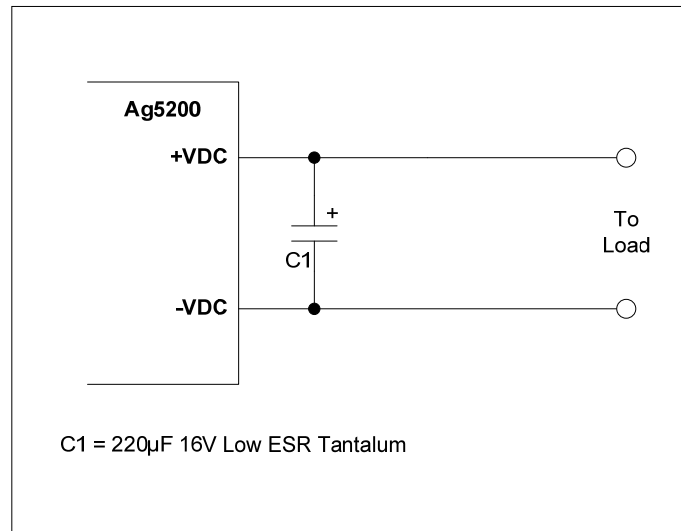


Figure 5: Low ESR Tantalum

Figure 6 shows the response that you will see from the low ESR tantalum capacitor shown in Figure 5. The amplitude of the ripple may be comparable to that of the 1000µF standard electrolytic capacitor shown in Figure 1. But remember that the 220µF tantalum capacitor will not handle large step load changes as well the 1000µF standard electrolytic will.

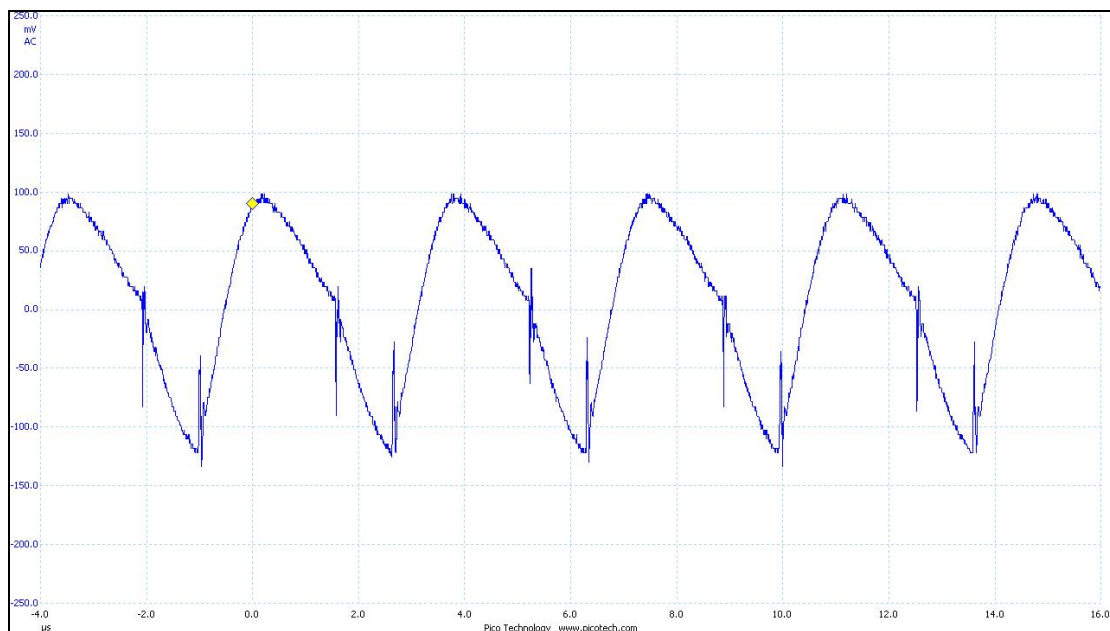


Figure 6: Output ripple with 220µF low ESR tantalum capacitor

Figure 7 shows the standard electrolytic capacitor being replaced with two low ESR tantalum capacitors.

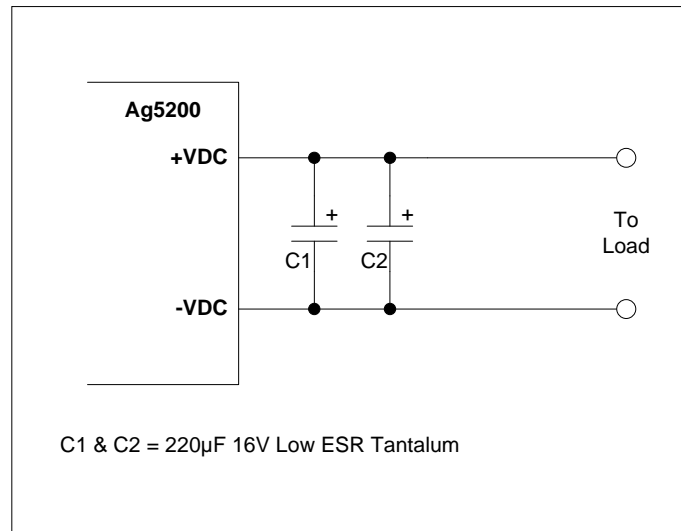


Figure 7: Output filter using two 220µF low ESR tantalum capacitors

Figure 8 shows the response that you will see from using two low ESR tantalum capacitors, as shown in Figure 7. The amplitude of the ripple is now a lot less than that of the 1000µF standard electrolytic capacitor shown in Figure 1. But even with two 220µF tantalum capacitors, these will not handle large step load changes as well the 1000µF standard electrolytic.

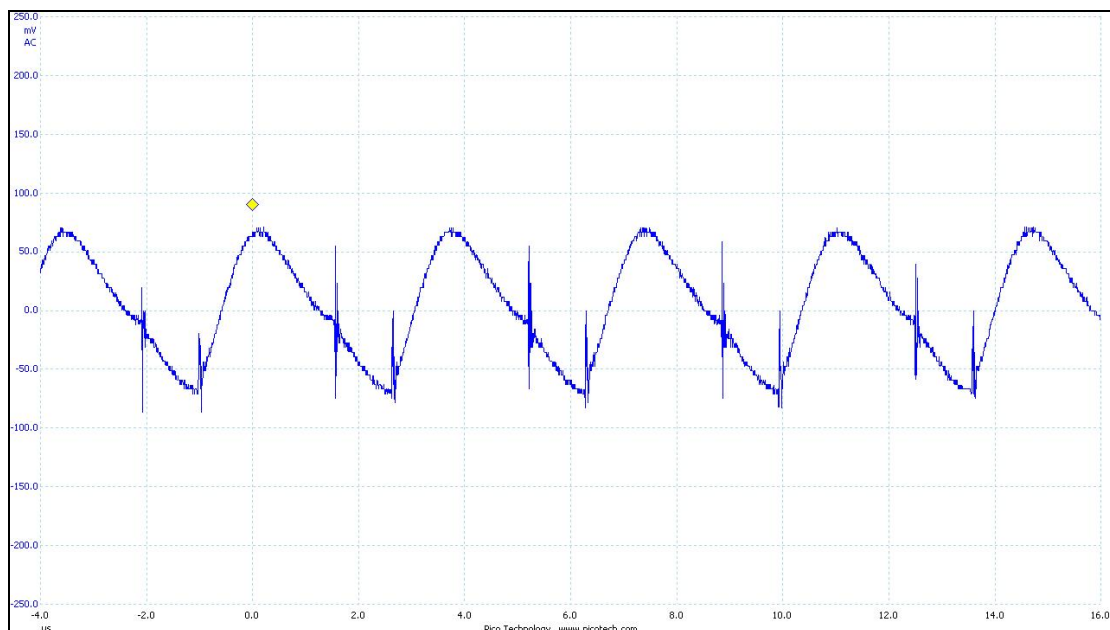


Figure 8: Output ripple with two 220µF low ESR Tantalum

Figure 9 shows the addition of a simple PI filter to the 220 $\mu$ F low ESR tantalum capacitor.

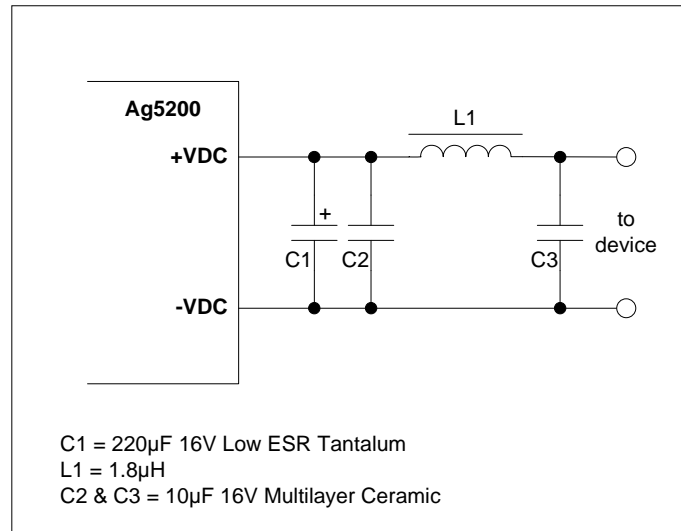


Figure 9: PI filter and low ESR tantalum

Figure 10 shows the response that you will see from the filter shown in Figure 9. The amplitude of the ripple may be comparable to that of the 1000 $\mu$ F with a PI filter. But once again, you have to remember that the 220 $\mu$ F tantalum capacitor will not handle large step load changes as well the 1000 $\mu$ F standard electrolytic.

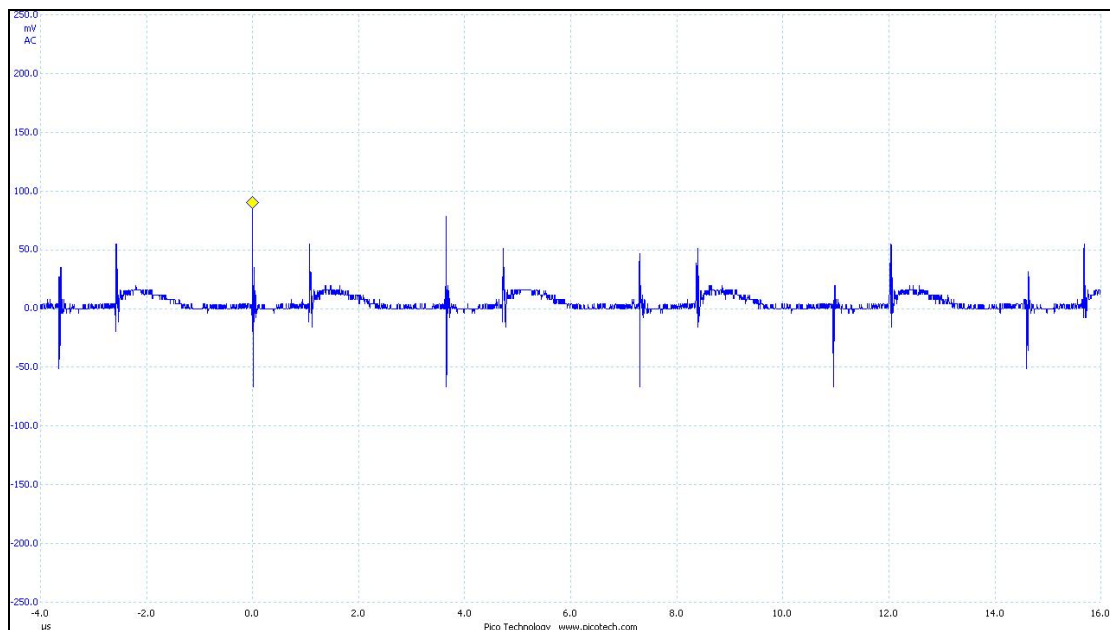


Figure 10: Output ripple with 220 $\mu$ F Tantalum and PI filter