

### 3 Things to Consider When Choosing a Hi-Rel Capacitor

Ceramic, Aluminum Electrolytic, Tantalum, Hybrid, Polymer...the list goes on. If you're designing a critical system in which high reliability is of the utmost importance, there are a wide variety of capacitor technologies to choose from. With all these options, its easy to spend hours researching and comparing how the these different capacitors stack up against one another. All capacitors options have their advantages and disadvantages so keep these 3 important factors in mind as you choose.

1. *SWaP Savings* – If size and weight are critical design constraints there are certain technologies that you'll want to be aware of. Aluminum electrolytic and wet tantalum capacitors are well proven designs, however for avionics, naval, and space applications where minimizing SWaP is key these options are significantly larger and heavier than other technologies.
2. *ESR* – For high current applications, such as Radar, laser, and bridge power, a capacitor with low ESR will make a huge impact on your system design. Capacitors with high ESR will experience a higher voltage droop and will therefore require higher capacitance values to overcome it. This may require you to connect 2-3 capacitors together to achieve the needed capacitance to offset the droop. In addition, the higher ESR will cause more heat to be generate which can require you to design in cooling systems and increase cost. Low ESR capacitors, such as hybrid technologies are available to minimize ESR.
3. *Shelf Life* – If you need to place individual capacitors or completed systems in storage for several years before potential use, the shelf life of every individual component is key. Some capacitor technologies have limited shelf lives as the electrolyte can slowly evaporate over time causing premature failure upon use. Certain hermetically sealed capacitors have unlimited shelf lives that alleviate this concern.

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