

Abstract

In pulsed power field applications a small amount of power is delivered in very short duration, generally in microseconds. To perform this task capacitors are used. They are charged in parallel through some charging resistor or constant current power supply and discharged in series with the help of very fast switches or vice versa. Capacitors used are of lower capacity and with very high voltages because energy stored in the capacitor is $1/2 \times C \times V^2$. So, the trend is to go up highest voltage possible with lower value of capacitance. The advantage is for the same energy rating volume of the capacitor will decrease for higher voltage.

Power supplies, generally used in laboratories, to charge this capacitor banks are using A.C. input source. They are operated on 230 V, 50 Hz and having bulky step up transformer and rectifier with bulky output filters. So, they can not be used for remote application.

Aim was to develop a compact, battery driven HVDC power supply for remote application. A flyback topology is used to generate AC in the range of 8 kV from 24 volt and then voltage multiplier to have very high voltages in the range of tens of kV. The output current for this power supply is in mAmp. Secondary of the transformer is specially insulated to hold high voltages. The project was started from a prototype design for 5k VDC supply. Circuit and results of the prototype are as shown. Then completed the design of the supply and developed the power supply for 32 kV then increased the output voltages to 60 kV by increasing the multiplier stages. The results are shown in the report.