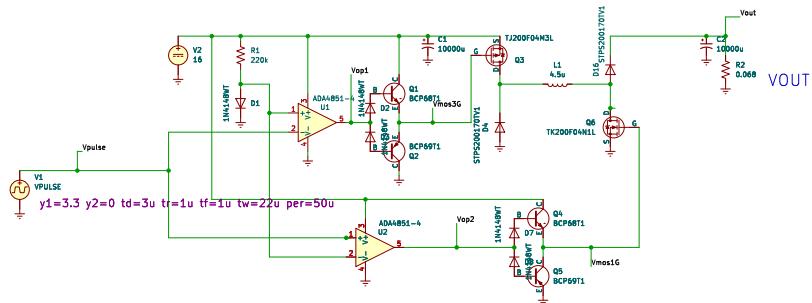
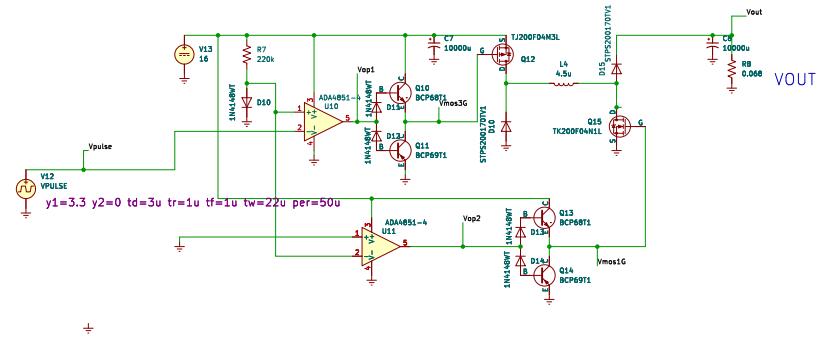


Inductor calculation the higher of:
 $V_{in_nom} = 13.8$ volts
 $V_{in_min} = 9$ volts
 $V_{in_max} = 18$ volts
 $I_{max} = 2000$ Amp
 $Freq = 20000$ hz
 $L > (V_{in_min} * (V_{out_nom} - V_{in_min})) / (I_{max} * 0.2 * freq * V_{out_nom})$
or $(V_{out_nom} * (V_{in_max} - V_{in_nom})) / (I_{max} * 0.2 * freq * V_{in_max})$
 $L > 4.025 \mu H$ or 3.913
Choosen $4.5 \mu H$
Duty cycles
 $D_{buck_min} = V_{out_mon} / V_{in_max} = 0.766$
 $D_{boost} \max = V_{in_min} / V_{out_nom} = 0.652$
Capacitor min
Vripple = 0.2
Cin have to be higher of
 $C_{in_buck} = I_{max} * 0.2 * (1 - D_{buck_min}) / (freq * V_{ripple})$ or
 $C_{in_boost} = I_{max} * 0.2 * (8 * freq * V_{ripple} * (1 - D_{boost_max}))$
 $C_{in_buck} = 8962 \mu F$
 $C_{in_boost} = 3591 \mu F$
Choosen $10000\mu F$
DV_removal = maximum voltage change for load remove
DV = 0.8V
 $C_{out} = I_{load}^2 * L / (2 * V_{out_nom} * DV)$
 $C_{out} = 8272 \mu F$
choosen $10000\mu F$

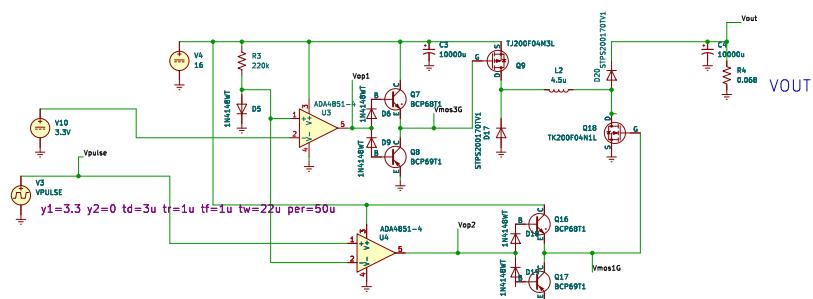
CONDITION ABS(VIN – VOUT) < 1 V (BUCK-BOOST CONVERTER)



CONDITION VIN – VOUT > 1 V (BUCK CONVERTER)



CONDITION VOUT – VIN > 1 V (BOOST CONVERTER)



CONDITIONS MUST BE PROGRAMMED
CIRCUIT IS SIMPLIFIED NEED TO BE ADDED POWER TO HANDLE MOSFET GATES