Either populate R28 + R35 and remove R29 or populate R29 and remove R28 and R35.

Populate R28 + R35 and remove R29 or populate R29 and remove R28 and R35.

Either populate R28 + R35 and remove R29 or populate R29 and remove R28 and R35.

Either populate R28 + R35 and remove R29 or populate R29 and remove R28 and R35.

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Either populate R28 + R35 and remove R29 or populate R29 and remove R28 and R35.

Either populate R28 + R35 and remove R29 or populate R29 and remove R28 and R35.

Either populate R28 + R35 and remove R29 or populate R29 and remove R28 and R35.
Power stages

Filter frequency 1 kHz (3 dB), Ratio 2:1

Filter frequency 100 kHz (3 dB), Ratio 2:1

Current Sense

Supply

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Protection scheme:

D9 is the first line of defense against power supply surges. It clamps the voltage of a 500V out of 2 Ohms R92 surge to a maximum voltage of 25V. A negative surge is cut by the diode function in U86 and together with Q2 and a positive surge creates a high current in D9. The current through D9 is about 30A so the current will further increase to 32A into D94 until shutdown of Q1 is effective. Using the 3 kW type TVS at 25A the voltage at the output is limited to a maximum level of 42V. Using a 3kW type would be the reverse voltage up to 47.2V. The absolute maximum for the driver ICs is 48V for 400ms. For shorter time periods this can be higher. Therefore a 3 kW type would be sufficient.

Q9 has a double function. It detects U81 - U84 in parallel to the TPS31160 body diodes positive surge on the driver outputs are all guided into net 24V_local and thus into D94. These surges are calculated out of a 4 Ohm source at 2A. In case of a simultaneous surge on all outputs this current could reach 100A (5 x 500V/40 Ohms). Under this condition the voltage on D94 can reach levels of 54V for a 5kW type which make a 5kW redundant scheme: In this condition the voltage on D94 can reach levels of 54V for a 5kW type which makes a 5kW necessary. The negative discharge voltage of inductive discharges is clamped in D89 increasing the repeat rate of inductive discharges.

Negative surges are guided into D99. This reduces the maximum surge current generated by the TPS31160's themselves. Also the negative discharge voltage of inductive loads is clamped in D99 increasing the rewet rate of inductive discharges.
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