CLAIMS

1. Drive circuitry for a fuel injector actuator, said drive circuitry including a High Side Drive portion and a Low Side Drive portion, and including determination means to determine a short condition, said determination means adapted to perform a frequency analysis of a voltage(s) or a voltage signal at, or from, one or more points in the High Side Drive, and to determine if a faulty short conditions exists based on said analysis, wherein said voltage is the voltage of the High Side Drive Enable Signal.

2. Drive circuitry as claimed in claim 1 where said voltage is the voltage at the high side connection terminal for the fuel injector actuator.

3. Drive circuitry as claimed in claims 1 to 2 where said determination means is adapted to perform the frequency analysis of a voltage(s) by being adapted to compare the frequency of the voltage with a stored value, and output a signal indicative of a faulty short condition dependent on said comparison.

4. Drive circuitry as claimed in claim 3 said determination means is adapted to determine that a short condition exists if said voltage frequency is higher than said stored value, or higher than the stored value plus a tolerance threshold.

5. Drive circuitry as claimed in claim 4 wherein said stored value and/or tolerance threshold is variable and/or programmable.

6. Drive circuitry as claimed in claim 5 wherein said stored value and/or tolerance threshold is variable and/or programmable and set according to operating conditions of the injector or type of fuel injector and/or fuel injector actuator.

7. Drive circuitry as claimed in claims 4 to 6 where the stored frequency value is the operational switching frequency measured at an earlier time-point.

8. Drive circuitry as claimed adapted to stop the high side drive switching if a fault condition is determined.

9. A method of determining a short condition in drive circuitry for a fuel injector actuator, said drive circuitry including a High Side Drive portion and a Low Side Drive

Portion, comprising performing a frequency analysis of a voltage(s) or a voltage signal at, or from, one or more points in the High Side Drive; and, determining if a faulty short conditions exists based on said analysis, wherein said voltage is the voltage of the High Side Drive Enable Signal.

10. A method as claimed in claim 9 where said voltage is the voltage at the high side connection terminal for the fuel injector actuator.

11. A method as claimed in claims 9 to 11 comprising;
a) comparing the frequency of the voltage with a stored value, and determining a short condition dependent on said comparison.

12. A method as claimed in claim 11 where step a) comprises determining if said frequency is higher than said stored value, or higher than the stored value plus a tolerance threshold..

13. A method as claimed in claim 12 wherein said stored value and/or tolerance threshold is variable and/or programmable.

14. A method as claimed in claim 13 wherein said stored value and/or tolerance threshold is variable and/or programmable and set according to operating conditions of the injector or type of fuel injector and/or fuel injector actuator.

15. A method as claimed in claim 12 to 14 where the stored frequency value is the operational switching frequency measured at an earlier time-point.

16. A method as claimed in claim 15 including stopping the high side drive switching if a fault condition is determined.