

DC Cigarette Lighter Adapter— Charger Protection

Application Overview

Problem/Solution

The connectors used to plug into automobile Cigarette Lighter Power Outlets often include a charger circuit for a mobile phone, an after market hands-free device, or other battery operated equipment. The whole assembly must operate over a wide range of temperatures and charging conditions that combine the harsh automotive environment with stringent electrical requirements. As a result, the chargers are often subjected to fault conditions that lead to short-circuits and blown fuses. There are three broad categories of these faults:

- Overcurrent faults - A fault in the mobile phone or other portable equipment, or its connection to the charger, draws too much current from the charger, potentially damaging the charger and circuitry.
- Charger circuit faults - A circuit fault in the charger may blow the fuse in the vehicle or damage the electrical harness.
- Reverse polarity faults - The automobile battery may be accidentally installed in reverse, resulting in circuit damage in the mobile phone or hands-free charger, or other portable equipment. The solution is to provide an overcurrent protection device at the charger input, potentially in combination with an overvoltage protection device, such as a Zener diode.

Protection Requirements

The protection requirement is determined by the load current of the end equipment and the fault susceptibility of power conversion circuits in the charger itself. Typically overcurrent protection such as a PolySwitch PPTC device is combined with overvoltage protection at the input to the charger (see Figure 1).



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Figure 1. Typical CLA Charger Circuit

