A power supply circuit includes a line voltage forming circuit and a supply voltage forming circuit. The line voltage forming circuit forms a voltage that is proportional to a line voltage provided by a telecommunication line, and the supply voltage forming circuit forms a second voltage from the first voltage. A sensing circuit senses the telecommunication line and provides a sensor signal that is representative of the power provided by the telecommunication line. The line voltage forming circuit is controlled by the sensor signal such that the slope of a load line characteristic of the line voltage forming circuit is modified when the sensor signal is above a predetermined threshold signal. The load line characteristic defines an increase of the line voltage with an increase of the line current provided by the telecommunication line.