Author: Petro Zeykan
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Introduction

The SLG55546 is a combination of current-limited USB port power switch with a USB 2.0 high-speed data line (D+/D-) switch and USB charging port identification circuit. The SLG55546 monitors D+ and D-, providing the correct hand-shaking protocol with compliant client devices.

Port Power Management (PPM) system based on SLG55546 is used when more than one USB charging port exists in the system. To prevent overload of the single internal 5V VBUS power source when multiple USB ports are simultaneously providing high charging current, PPM is a feature that allows high current charging in one port, and forces other USB ports to a lower current limit.

Port Power Management circuit design and analysis

Figure 1 is an example of two charging ports that could provide 2.5A max current in CDP/DCP mode and 0.5A in SDP mode. These limits are set by resistors on ILIM_L and ILIM_H pins. Each charging port uses a SLG55546V device. Only one of the two charging ports could provide 2.5A charging current at the same time. The functionality of this system is provided by using STATUS# pin to toggle the other port in SDP mode while CDP/DCP mode is in use. Initially both ports are in CDP/DCP mode. When the load current at one of the ports is above ILIM_LO+60mA for 200ms, STATUS# pin goes low and toggles the other port into SDP mode. STATUS# pin will go high again when the load current becomes ILIM LO+10mA. After that, both ports are ready to be used in CDP/DCP mode again.
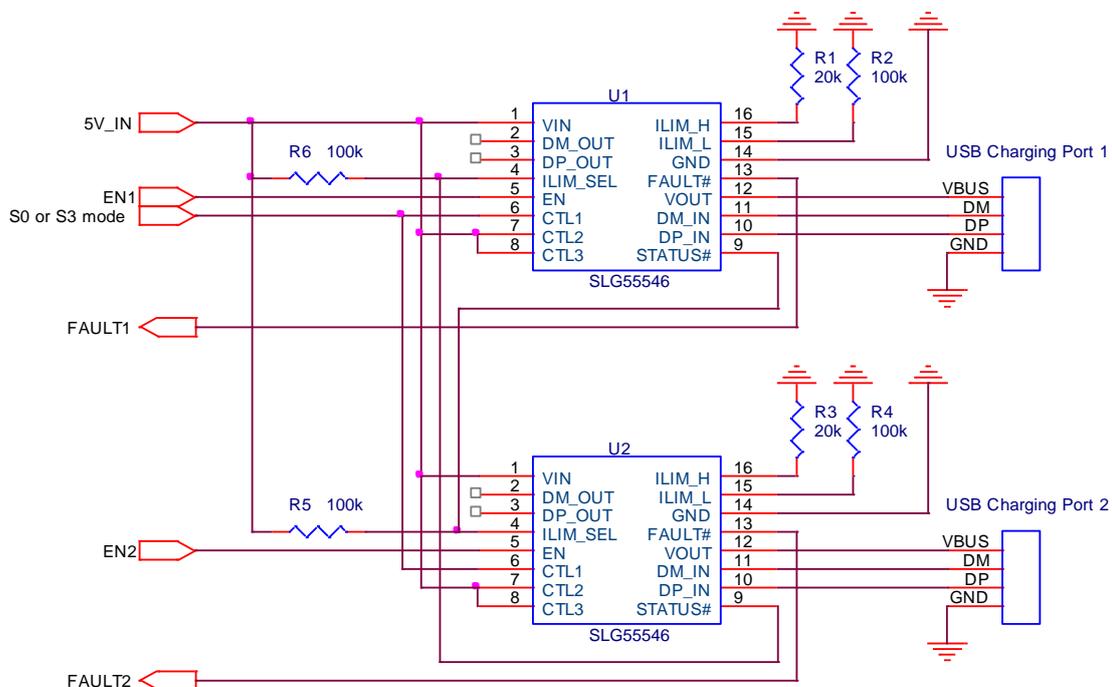

Figure 1. Implementing PPM with two independent charging ports

Conclusion

Using SLG55546 device is an easy, cost effective, and reliable way to create USB 2.0 high-speed data line switching and USB charging port identification at the same time. It features internal protection circuitry and low power consumption. The design in this application note could easily be used in USB ports/Hubs, Notebooks and Universal Wall Charging Adapters.