Monitoring Five Different Voltage Rails Using the TPS3103 and TPS3306

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ABSTRACT

As portable power designs get more complex, the number of power supply rails are increasing. Finding a simple supervisor circuit to monitor all the voltage rails can be complicated due to the number of different rail voltages and desired SVS trip voltages. To provide a solution for the more complex designs, the TPS3103 and TPS3306 can be used to monitor up to five different voltage rails. This design also features a watchdog timer that can be easily disabled.

The circuit shown in Figure 1 can be used to monitor 1.2-V, 1.5-V, 1.8-V, 2.5-V, and 3.3-V rails. The design is implemented with the TPS3103e12 and the TPS3306-15D. The open drain /PFO and /RESET outputs featured in these supervisors enable these outputs to be connected together in a wired-OR configuration.

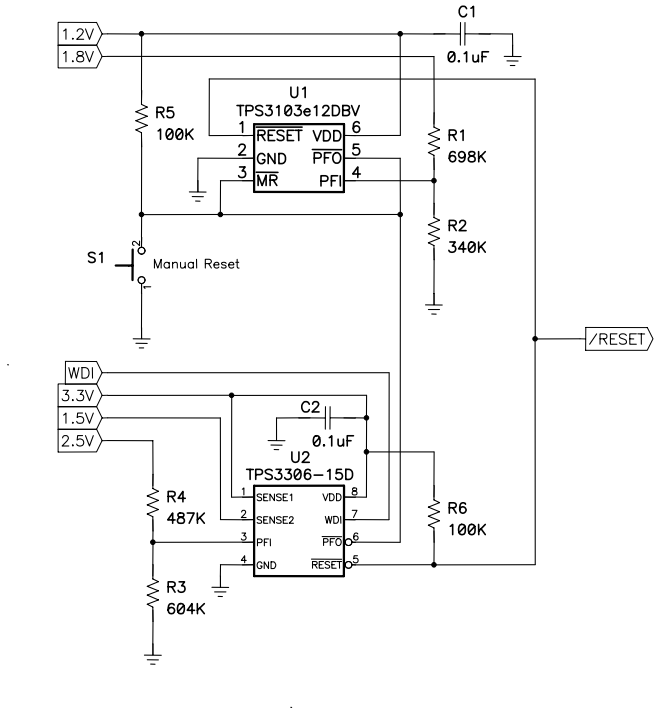

Figure 1. SVS Solution to Monitor Five Different Voltage Rails

By connecting the two /PFO outputs together to the /MR pin of the TPS3103e12, it is possible to monitor two additional voltage rails. The reset delay time for these rails is set by the TPS3103e12 and is typically 130 ms. The delay time for the 3.3-V and 1.5-V rails is set by the TPS3306-15D and is typically 200 ms. If the watchdog function of the TPS3306 is not desired, leaving the WDI pin open disables the watchdog timer. The open-drain /RESET output can be pulled up to 3.3 V without causing problems for the TPS3103, which has a supply voltage of only 1.2 V.

Table 1 shows the rails that can be monitored by changing the voltage version of the TPS3103 and TPS3306. The voltages monitored on rails 2 and 5 are adjustable by an external resistor divider network. The trip voltage at the PFI pin for the adjustable rails is typically 0.551 V for the TPS3103 and 1.25 V for the TPS3306.

Table 1. All Possible Rail Voltages for Different Voltage Devices

TPS3103		TPS3306		
Rail 1	**Rail 2**	**Rail 3**	**Rail 4**	**Rail 5**
1.2, 1.5, 2.0, 3.3	Adjustable	3.3, 5.0	1.5, 1.8, 2.0, 2.5, 3.3	Adjustable

Because the reset delay time for the TPS3103 is typically 130 ms, no deglitching circuitry is needed for the manual reset switch shown in Figure 1.

Since the supply current for the TPS3103 is less than the TPS3306 supply current, the propagation delay from power fault to reset output is longer for the TPS3103. For most applications, some propagation delay is desired to provide additional noise immunity. See the TPS3103 and TPS3306 data sheets (SLVS363 and SLVS290) for addition information about the propagation delays for /MR, VDD, and SENSE to /RESET output.

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