

Keywords: sequencer, power MOSFET, mosfet

APPLICATION NOTE 5490

Level Shifting to Control Power MOSFETs

Oct 25, 2012

Abstract: Some power architectures require the power supply sequencer (or system manager) to control downstream power MOSFETs to allow power to flow into branch circuits. This application note explains how system power sequencing and level shifting can be accomplished using a low-voltage system manager.

Some power architectures require that the power-supply sequencer (or system manager) control downstream power MOSFETs to allow power to flow into branch circuits. If the incoming power-supply voltage is at least 5V higher than the power-supply output voltage, a power MOSFET can be placed on the output of the power supply with the addition of some level-shifting circuitry. In this case, a low-voltage system manager like the [MAX34440/MAX34441](#) series can be used to enable and disable the power MOSFET.

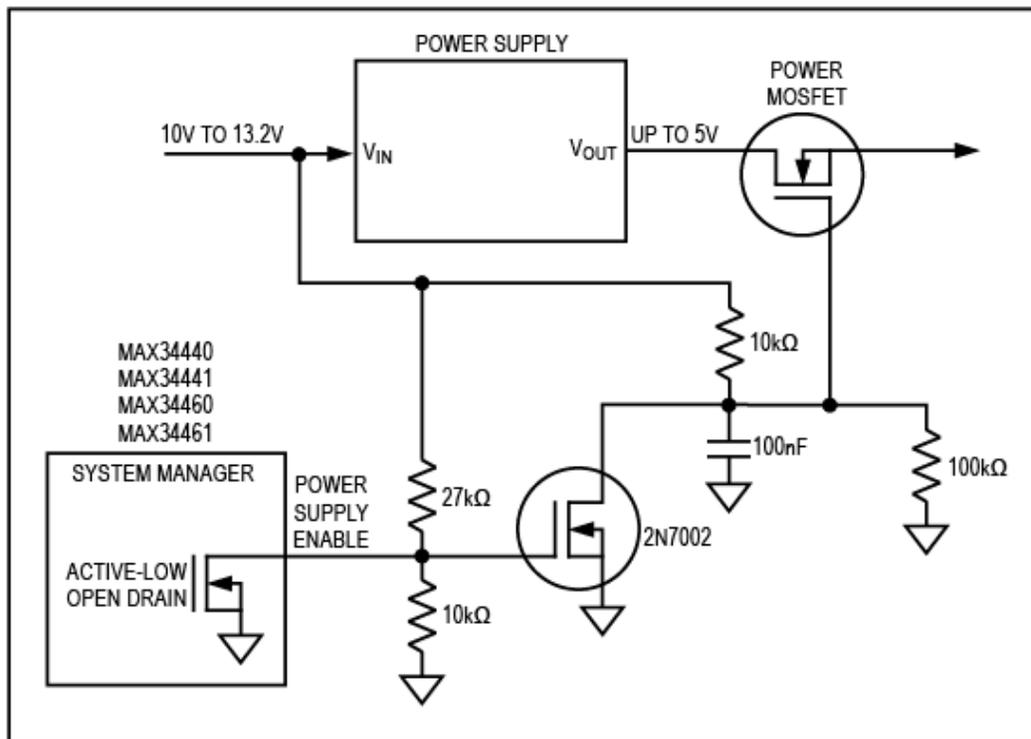


Figure 1. Level-shifting circuitry.

In the application shown, the system manager is configured with active-low, open-drain outputs. Even if the system manager is not powered up when power is applied to the power supply, the power MOSFET will not be enabled (since the 2N7002 will be enabled). This in turn disables the power MOSFET.

Most power supplies contain an undervoltage lockout (UVLO), which prevents them from providing power until the input voltage is above a minimum level. The minimum UVLO level needs to be high enough to ensure that the 2N7002 is enabled before the power supply starts delivering power.

When the system manager needs to enable the power MOSFET, the open-drain output is pulled low. This disables the 2N7002, allowing the power MOSFET to turn on. The resistor and capacitor tied to the gate of the power MOSFET can be adjusted to slow the turn-on time of the power MOSFET.

As soon as the system manager releases the open-drain output and allows it to go high impedance, the resistor-divider tied from the power-supply input will immediately enable the 2N7002. This immediately shuts off the power MOSFET.

Related Parts

MAX34440	PMBus 6-Channel Power-Supply Manager	Free Samples
MAX34441	PMBus 5-Channel Power-Supply Manager and Intelligent Fan Controller	Free Samples
MAX34460	PMBus 12-Channel Voltage Monitor and Sequencer	Free Samples
MAX34461	PMBus 16-Channel Voltage Monitor and Sequencer	Free Samples

More Information

For Technical Support: <http://www.maximintegrated.com/support>

For Samples: <http://www.maximintegrated.com/samples>

Other Questions and Comments: <http://www.maximintegrated.com/contact>

Application Note 5490: <http://www.maximintegrated.com/an5490>

APPLICATION NOTE 5490, AN5490, AN 5490, APP5490, Appnote5490, Appnote 5490

Copyright © by Maxim Integrated

Additional Legal Notices: <http://www.maximintegrated.com/legal>