

Application of DMZ1520E in MCU Power Supply and Protection Solution

The working voltage of most common MCUs currently ranges from 2.7V to 5.5V. In applications with high input voltage supply, the power supply for the MCU mostly uses a depletion MOSFET+LDO scheme. As shown in Figure 1, the circuit uses the DMZ1520E with a voltage withstand value of 150V to provide the MCU with precise power supply voltage through an LDO. At the same time, to further simplify the circuit and save costs, the DMZ1520E can also be directly used to power the MCU, as shown in the circuit in Figure 2. Under operating current conditions of 1mA to 5mA, the output voltage (VDD) of the DMZ1520E is about 3.5V. The circuit diagram is shown below:

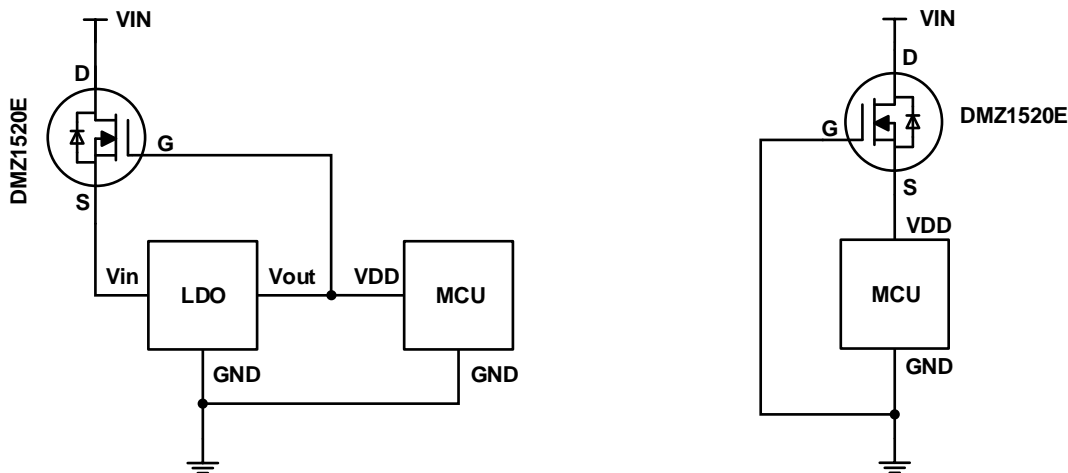


Figure 1. Common MCU power supply solution **Figure 2. Solution to power the MCU using DMZ1520E**

As shown in Figure 2, only one DMZ1520E can provide stable power supply for the MCU with a working voltage of 2.7V to 5.5V, while also providing transient surge protection for the MCU.

The features of the circuit in Figure 2 are as follows:

- The maximum operating voltage of DMZ1520E is 150V, which can directly operate under high input voltage conditions.
- DMZ1520E can provide stable power supply for the MCU and transient surge protection.
- DMZ1520E has high reliability and good stability, the circuit structure is simple, which can keep the cost down.

Typically, the operating current of the MCU is about 1mA to 5mA. Therefore, using typical DMZ1520E samples under this condition, the relationship between VDD and current is measured as shown in Figure 3. In addition, the VDD is related to the threshold voltage parameter $V_{GS(OFF)}$ of DMZ1520E. The relationship between the $V_{GS(OFF)}$ parameter of typical DMZ1520E samples and the junction temperature is shown in Figure 4.

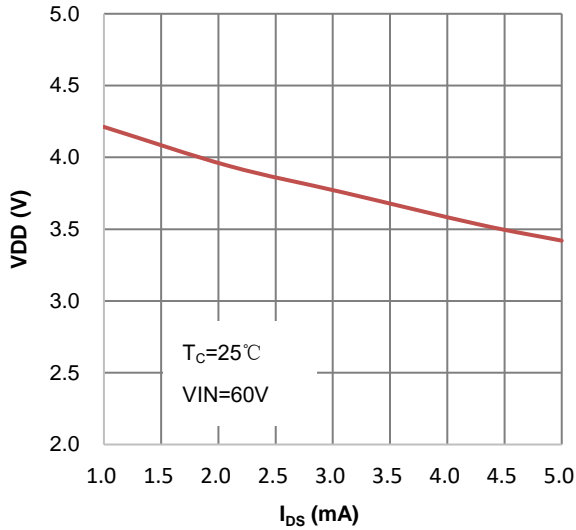


Figure 3. The relationship between VDD and I_{DS}

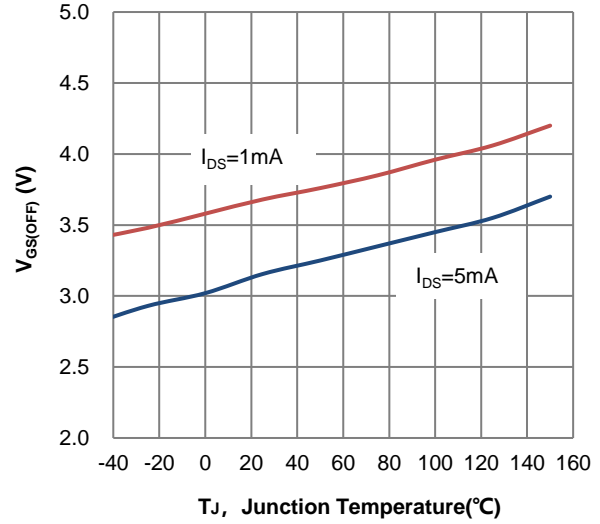


Figure 4. The relationship between V_{GS(OFF)} and T_J