Introduction

Electrical transients in the form of voltage surges have existed in all electrical distribution systems. All electrical and electronic devices can be damaged by excessive voltage transients. The difference between them is the amount of energy they can absorb before damage occurs. Generally, surges occur in applications with inductive loads, such as motors, solenoids or relay coils when switched on and off. Inductive switching transients are silent killers of semiconductors as they often occur without advanced warning. In this application note, we represent a way to protect Silego's HFET1 devices from inductive surges using simple TVS.

Transient Protection of HFET1 Circuit Design

Illustrated in Figure 1, a TVS (transient voltage suppressor) is used to protect HFET1 from high positive inductive overvoltage spikes created by motor switching on and off or any inductive loads which are connected to the same VIN power rail. A TVS is a transient voltage suppressor designed to clamp quickly whenever a large voltage transient is higher than its trigger threshold. Silego's HFET1 IPS could easily standoff 30 V VIN, so to protect device from undesired voltage spikes higher than 30 V, it is necessary to use SMAJ18A TVS that has 29.2 V clamping voltage level. It is very important to take into account TVS's clamping voltage parameter that should be lower than max HFET1 VIN voltage. To choose a proper TVS, it is also necessary to consider a max current that the inductive stress could supply. Once this fault current level is known, a TVS with sufficient current-handling margin is selected. This way, one might be certain that the HFET1 circuit would resume nominal operation once the inductive voltage transient no longer persists.

Conclusion

Using TVSs is an easy way to protect Silego's HFET1 devices from fast inductive overvoltage spikes. TVSs are generally used in all electronic equipment that contain motors transients, solenoids or any inductive loads.
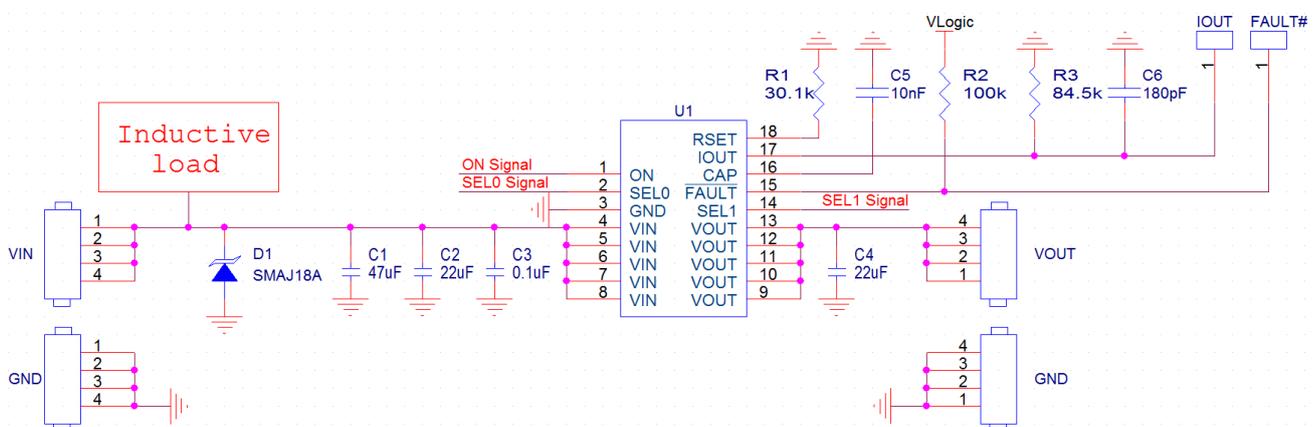

Figure 1. Transient Protection of HFET1 using TVS

About the Author

Name: Petro Zeykan

Background: Petro Zeykan received his Master's degree in "Cable Television and Information Systems" in 2008 from Lviv Polytechnic National University. Since 2010 he has worked as a Fiber Optic Engineer and, in 2011 began to work as an application engineer for power products at Silego Technology Inc. Currently he is a Sr. Application Engineering Manager for power products providing applications support, and designs automated systems for load switch characterization.

Contact: **appnotes@silego.com**

Document History

Document Title: Improving HFET1's VIN Transient Protection

Document Number: AN-1112

Revision	Orig. of Change	Submission Date	Description of Change
A	Petro Zeykan	06/21/2016	New application note

Worldwide Sales and Design Support

Silego Technology maintains a worldwide network of offices, solution centers, manufacturer's representatives, and distributors. To find the sales person closest to you, visit us at **Sales Representatives and Distributors.**

About Silego Technology

Silego Technology, Inc. is a fabless semiconductor company headquartered in Santa Clara, California, with operations in Taiwan, and additional design/technology centers in China, Korea and Ukraine.

Silego Technology Inc.
1515 Wyatt Drive
Santa Clara, CA 95054

Phone: 408-327-8800
Fax: 408-988-3800
Website: www.silego.com