

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 Dialog’s High Voltage GreenFET devices from inductive surges using simple TVS.

Transient Protection of High Voltage GreenFET Circuit Design

Illustrated in Figure 1, a TVS (transient voltage suppressor) is used to protect High Voltage GreenFET 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. High Voltage GreenFET Load Switches could easily stand off 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 High Voltage GreenFET 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 High Voltage GreenFET circuit would resume nominal operation once the inductive voltage transient no longer persists.

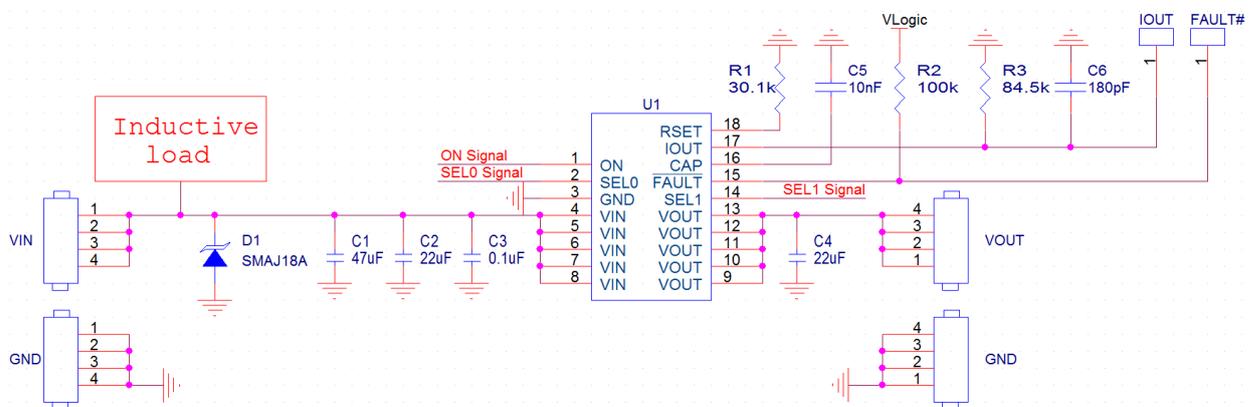


Figure 1. Transient Protection of High Voltage GreenFET using TVS

Conclusion

Using TVSs is an easy way to protect Dialog's High Voltage GreenFET devices from fast

inductive overvoltage spikes. TVSs are generally used in all electronic equipment that contain motors transients, solenoids or any inductive loads.

IMPORTANT NOTICE AND DISCLAIMER

RENESAS ELECTRONICS CORPORATION AND ITS SUBSIDIARIES (“RENESAS”) PROVIDES TECHNICAL SPECIFICATIONS AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OF THIRD-PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for developers who are designing with Renesas products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. Renesas grants you permission to use these resources only to develop an application that uses Renesas products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Renesas intellectual property or to any third-party intellectual property. Renesas disclaims responsibility for, and you will fully indemnify Renesas and its representatives against, any claims, damages, costs, losses, or liabilities arising from your use of these resources. Renesas' products are provided only subject to Renesas' Terms and Conditions of Sale or other applicable terms agreed to in writing. No use of any Renesas resources expands or otherwise alters any applicable warranties or warranty disclaimers for these products.

(Disclaimer Rev.1.01)

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

Trademarks

Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.

Contact Information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit www.renesas.com/contact-us/.