

Why Should You Care about Overcurrent Protection in Your System?



Everywhere we go, new electronic devices are popping up to make life easier or more efficient. As we come to rely on these devices, it becomes imperative that they just “work” – regardless of the operating environment. Whether it is the always-on smartphone, our ever-more-electronic vehicles, the self-checkout kiosks at our favorite restaurant or a large factory automation system that we do not directly interact with but have just come to accept as part of life – we just expect things to work.



Figure 1. Examples of the Many Electronic Devices That We Have Become Part of Our Everyday Life

One major way to prevent downtime in modern electronic systems is to detect, react to and fix potentially damaging conditions as rapidly as possible. However, two macro trends make this a larger challenge. The first is the desire for more performance, despite the fact that today’s electronics have processing power that’s orders of magnitude greater than their predecessors just since the early part of the millennium. The second is packing all of this additional performance into shrinking form factors.

System thermal management has become one of the most prevalent methods for implementing damage detection and prevention. Historically, designers monitored temperature to protect systems; as the temperature rose, a fan could turn on to reduce the ambient temperature. However, with the trend toward smaller form factors, in many cases there is just not room to implement a space-consuming solution like a fan.

The demand for greater performance can cause a significant rise in temperature in a short period of time. In most cases this temperature increase results in a power consumption increase. Rather than measuring a lagging indicator (temperature), many designers choose to measure a leading indicator, current (or power, which is the voltage multiplied by the current). Overcurrent protection enables designers to manage system thermal performance more efficiently and anticipate problems proactively vs. reacting to potential issues.

There are many reasons to monitor for overcurrent conditions:

- Long-term system reliability.
- System/user safety.
- System efficiency.
- Fault protection.

If you would like to learn more about the challenges of system thermal management and how Texas Instruments is enabling more accurate and precise overcurrent detection to help solve this challenge, please download my white paper, “[Overcurrent protection enables more efficient and reliable systems with longer lifecycles](#)” or check out the Texas Instruments portfolio of [current sense amplifiers](#).

Additional Resources:

- [TI Over-Current Detection Products Brochure](#)
- [Current Sense Amplifiers Brochure](#)
- [Getting Started with Current Sense Amplifiers Video Training Series](#)
- [Automotive Precision eFuse Reference Design](#)

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), 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 AND 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 skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on [ti.com](https://www.ti.com) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2023, Texas Instruments Incorporated