Product Overview

Improving the Performance of Arc Fault Detection with High-Speed Comparators

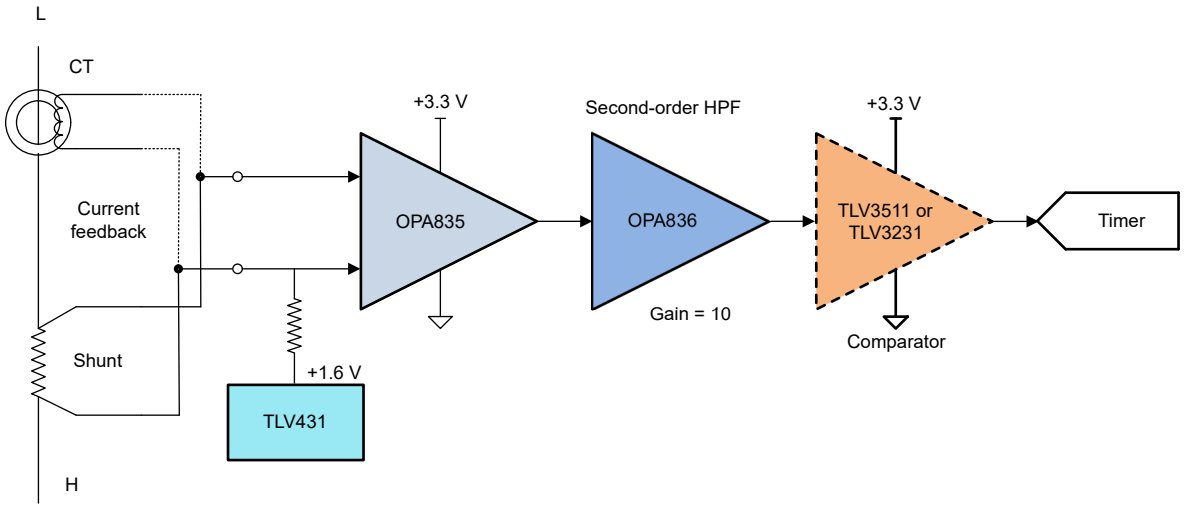

Figure 1. Concept Diagram for Arc Fault Detection Systems

Arc fault detection requires translation of analog fault signature, high-frequency noise into time domain as a series of pulse trains. Additional post-processing is used to verify the fault condition.

Design Challenges

- Wide-frequency spectrum, up to 10MHz
- Symmetrical timing on low-to-high and high-to-low signal edges
- Low input offset to maintain minimal timing error from amplifier output to comparator input
- Minimal power consumption

How High-Speed Comparators Benefit the Systems

- A comparator's fast response time enables the capturing of waveforms with spectrum up to 10MHz and beyond without loss of signal integrity.
- Symmetrical prop delay and rise-fall times of a push-pull output stage enables the arc fault signal to be digitized without distortion and with minimal timing error.
- Low power consumption is necessary due to the *always-on* nature of arc fault detectors and minimizes power drain on building power systems.
- Low input offset voltage maintains the integrity of an arc fault signature by triggering the comparator output at the precise threshold voltage, rendering an accurate digital waveform for post-processing.

Part Number	Propagation Delay	Toggle Frequency	Quiescent Current	Input Offset Voltage	Channel Count
TLV351x	6ns	180MHz	1.1mA	5mV	1/2
TLV323x	15ns	55MHz	200µA	4mV	1/2
LMV7219	7ns	N/A	600ps	6mV	1

If you have more questions please ask them on TI's E2E forum.

Trademarks

All trademarks are the property of their respective owners.

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 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