Overview

High power DC systems, such as automobile and aircraft battery management systems, industrial factory equipment and photovoltaic units are susceptible to arc faults. Arcing occurs as battery terminals deteriorate, wires corrode or as insulation wears away and can cause fires that lead to severe damage to life and property. Consequently, system designers face the challenging problem of minimizing the chance of false arc-detection while ensuring that valid arcs are always detected.

TI's new RD-195 DC arc detect reference solution is the industry’s first reconfigurable solution, reliably detecting arcs and alerting systems to avert fires caused by arcing. Designers can program the RD-195 to optimize the balance between arc-detection accuracy and false detection prevention to meet any system’s needs. The RD-195 is accompanied by a software application tool to configure arc detection thresholds to ensure valid arcs are always detected, while minimizing nuisance tripping.

Key Features

- Detects series, parallel and ground arcs
- Programmable detection thresholds
- Self test capability
- Typical response time: <100 ms
- Industrial temperature range: –40°C to +85°C
- 1000 V tolerance with 3000 V insulation
- Application GUI for quick evaluation and tuning
- Compliant to industry standards:
  - UL1998 recognized and UL1699B certified
  - NEC690.11 compliant
How does the solution work?

The figures below show arcing and non-arcing current signatures from two different inverter types. The RD-195 can be used to detect the arcing characteristic, regardless of the inverter type, by setting different detection thresholds. This ensures that the solution always detects valid arcs and minimizes nuisance tripping.

### Device Description

<table>
<thead>
<tr>
<th>Device</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>SM73201MM</td>
<td>16-bit, 50 kSPS to 200 kSPS, differential input, micro-power ADC</td>
<td>Digitizes arc signature signal after the AFE gain and filtering stage; sends digital signal to the MCU</td>
</tr>
<tr>
<td>SM73308MG</td>
<td>Low-offset, low noise, RRO operational amplifier</td>
<td>Generates the reference voltage</td>
</tr>
<tr>
<td>SM73307MM</td>
<td>Dual channel, precision, 17 MHz, low noise, CMOS operational amplifier</td>
<td>For gain and filtering the arc signature signal</td>
</tr>
<tr>
<td>TMS320F28033</td>
<td>32-bit microcontroller, with C28x core and CLA</td>
<td>Microcontroller to perform DSP using proprietary algorithm</td>
</tr>
</tbody>
</table>

**Other materials in the EV kit**
- Schematic
- Board layout
- Bill of materials
- Firmware and firmware licensing agreement
- Application note
- Software tool/graphical user interface

For more information and to order EVMs, visit [ti.com/arcdetect](http://ti.com/arcdetect)

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