



FUSE TIME VS. CURRENT FOR THE CT43X CONTACT CURRENT SENSORS

By Allegro MicroSystems

INTRODUCTION

The CT43x is a family of high-bandwidth and low-noise contact current sensors which offers high accuracy current measurement in wide variety of enterprise and industrial applications. The contact current sensor, as its name indicates, is placed in series with the consumer elements. Therefore, the current that is being measured must pass through the sensor. Like any other current conducting element, contact sensors dissipate heat which depends on the quantity of the passing current. Hence, the maximum current that contact sensors can measure is limited (65 A for the CT43x). However, due to its low resistance (0.5 mΩ), the CT43x dissipates a very low amount of heat in normal operation.

This application note illustrates the CT43x's behavior when the current surges above the rated nominal values due to short circuit or transient current spikes. This will show the time duration that the CT43x tolerates high currents, before permanently damaging the lead-frame (fused) due to excessive heat from the current spike.

TEST CONDITIONS

The CT43x (in a SOICW-16 package) was installed on Allegro MicroSystems' CTD43x evaluation board and tested at room temperature (25°C).

The step sizes of the high current values were 100 A, 200 A, and 300 A. The test includes generating current at the specified values and monitoring the CT43x to determine the fuse time (open circuit).

It should be noted that the properties of the printed circuit board (PCB) and the designed circuit play a significant role in the heat dissipation and hence tolerance to high current levels. Therefore, any similar experiments on different boards

may yield different results from those that are presented in this application note. For instance, a thicker and wider current-passing metal layer in the PCB and using more thermal vias may increase the fuse time.

RESULTS

Figure 1 illustrates the fuse time for 100 A, 200 A and 300 A. The fuse times were measured on the CTD43x evaluation board with 4 oz. copper traces and thermal vias.

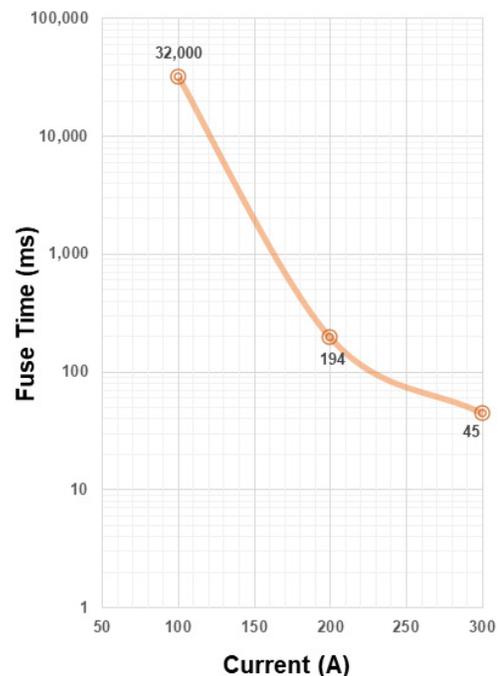


Figure 1: CT43x Fuse Time vs. Current

Revision History

Number	Date	Description	Responsibility
1	December 11, 2023	Document rebrand and minor editorial changes	Tyler Hendrigan

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