Introduction
The USB Type-C has become the standard for charging and data transferring in the electronic market due to its fast speed, high power delivery, compact and reversible connections. Because of high power and compact size, the USB-C is in risk to over-voltage / current surge caused by the unexpected short to \( V_{BUS} \) event. The voltage and current spikes can permanent damage the device and lead to subsequent system failure. Therefore, protection must be incorporated into the USB Type-C system. The DPO2039 is such a device which is designed to work with the USB-C system and protect it from any unexpected catastrophic failures.

Basic Circuit Configuration for DPO2039
1. VSYS is the power input pin. It requires a 1uF MLCC capacitor from this pin to GND pin to provide smooth and reliable voltage source to power the DPO2039

2. For ESD protection, connect a 0.1uF MLCC capacitor from this pin to ground.

3. Dead-battery charging option
   A. To enable dead-battery mode support, place a 5KΩ resistor from RPD1 to CC1 and RPD2 to CC2 pins respectively. The resistor should be 5% or better tolerance.
   B. If dead-battery mode support is not used, leave the RPD1 and RPD2 pins open.

Please refer to Figure 1 and Figure 2 below for dead-battery charging configurations.

DPO2039 Circuit Configuration with and without dead-battery charging

DPO2039 Circuit Configuration With and Without Dead-Battery Charging
A. Dead-battery charging enable

![Circuit Diagram](image_url)

Figure 1. Connect a 5KΩ Resistor from RPD1 to CC1C and RPD2 to CC2C to Enable Dead-Battery Charging Option
B. Dead-battery charging disable

Figure 2. Leave RPD1 and RPD2 Open When Dead-Battery Option is not Used
IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2018, Diodes Incorporated

www.diodes.com