

## USB72x6/USB7252 Silicon Errata and Data Sheet Clarification

This document describes known silicon errata for the following USB72x6/USB7252 devices:

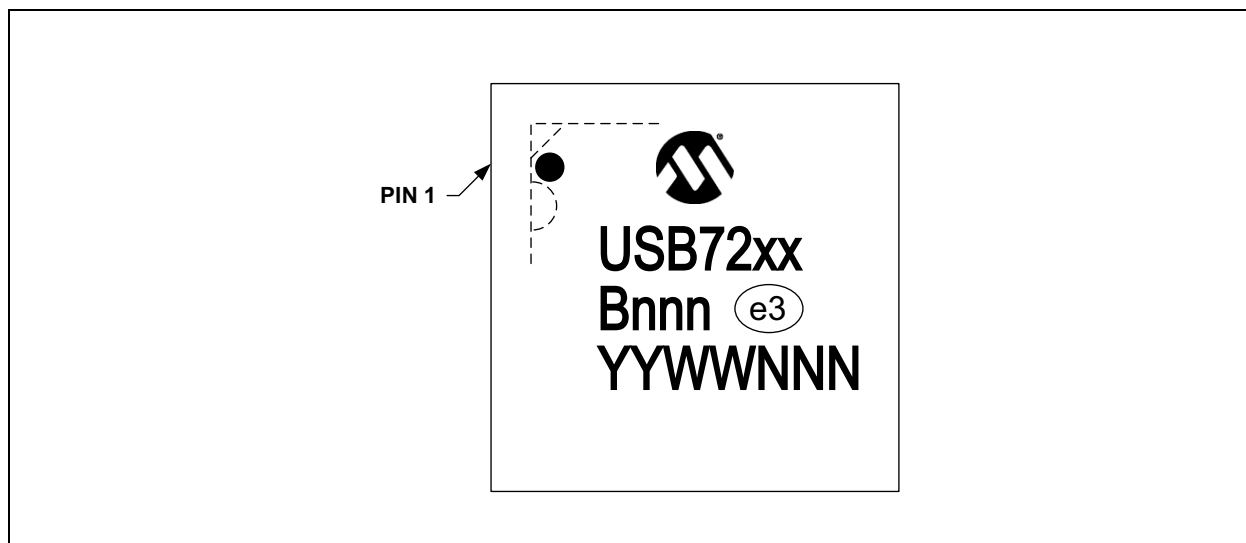
- USB7206
- USB7216
- USB7252

The silicon errata discussed in this document are for silicon with silicon revisions as listed in [Table 1](#). Parts affected by these errata are marked in [Figure 1](#).

**TABLE 1: AFFECTED SILICON REVISIONS**

Part Numbers	Silicon Revision
USB7206, USB7216, USB7252	B1

**FIGURE 1: TOP MARKING SILICON REVISION INDICATION**



**Note:** [Figure 1](#) details the top markings of an example part and highlights the location of the silicon revision. Other top marking values may differ (lot codes, location of manufacture, and so on).

A summary of USB72x6/USB7252 silicon errata is provided in [Table 2](#).

**TABLE 2: SILICON ISSUE SUMMARY**

Item Number	Silicon Issue Summary
1.	<a href="#">FlexConnect USB 3.0 operation requires special conditions</a>
2.	<a href="#">Type-C Bridging</a>
3.	<a href="#">Type-C VBUS discharge in Port Power On/Off test</a>
4.	<a href="#">I<sup>2</sup>C Bridge sends an extra byte under certain conditions</a>

# USB72x6/USB7252

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## Silicon Errata Issues

### Module 1: FlexConnect USB 3.0 operation requires special conditions

#### DESCRIPTION

FlexConnect: For USB 3.0 connections only, the following conditions exist:

- The Flexed port may not re-enumerate if disconnected and reconnected.
- After flexing and unflexing, the UFP may not re-enumerate.

These conditions are avoided if both of the following steps are taken:

1. Run the hub using SPI Flash memory.
2. Disable the host (PC) power management.

**Note:** USB 2.0 connections enumerate normally in all FlexConnect states.

#### END USER IMPLICATIONS

If FlexConnect operation is required for USB 3.0 connections, both of the following must be met:

- The hub must operate using SPI Flash memory.
- Host power management must be disabled.

#### Work around

None.

#### PLAN

This erratum will be corrected in a future revision of this silicon.

### Module 2: Type-C Bridging

#### DESCRIPTION

The internal Type-C Bridge device is not implemented for USB7216 and USB7252 devices with only basic Type-C ports.

#### END USER IMPLICATIONS

There is no end user impact as long as USB 3 Hub Command Verifier (HUB3CV) Ver. 2.1.12.1 or later is used; with this version, a missing Type-C Bridge device will not result in a compliance test failure.

#### Work around

None.

#### PLAN

This erratum will be corrected in a future revision of this silicon.

## Module 3: Type-C VBUS discharge in Port Power On/Off test

### DESCRIPTION

One requirement for USB-IF compliance certification of a system with an exposed Type-C port is the *Port Power On/Off* test. This test is part of the HUBCV suite of *Command Verification* tests for USB 2 devices. As part of this test, the hub must discharge VBUS, and then energize VBUS in response to CLEAR\_FEATURE and SET\_FEATURE commands from the test host.

Frequently, these ports will be implemented with electrolytic VBUS load capacitors, which retain a small residual charge that is released slowly compared to the timing of the discharge. In such cases, as energy is released from the capacitor the voltage can drift upward slightly after the discharge, which can cross the VBUS\_DET threshold for detecting VBUS high. In the sequence of the Port Power On/Off test, this can inhibit subsequent turning on of VBUS in response to commands from the test host and the test fails.

This issue does not impact normal operation of the port. Only the Port Power On/Off test is affected.

### END USER IMPLICATIONS

Type C ports that have a large electrolytic capacitor may require this workaround to pass the HUBCV Port Power On/Off test.

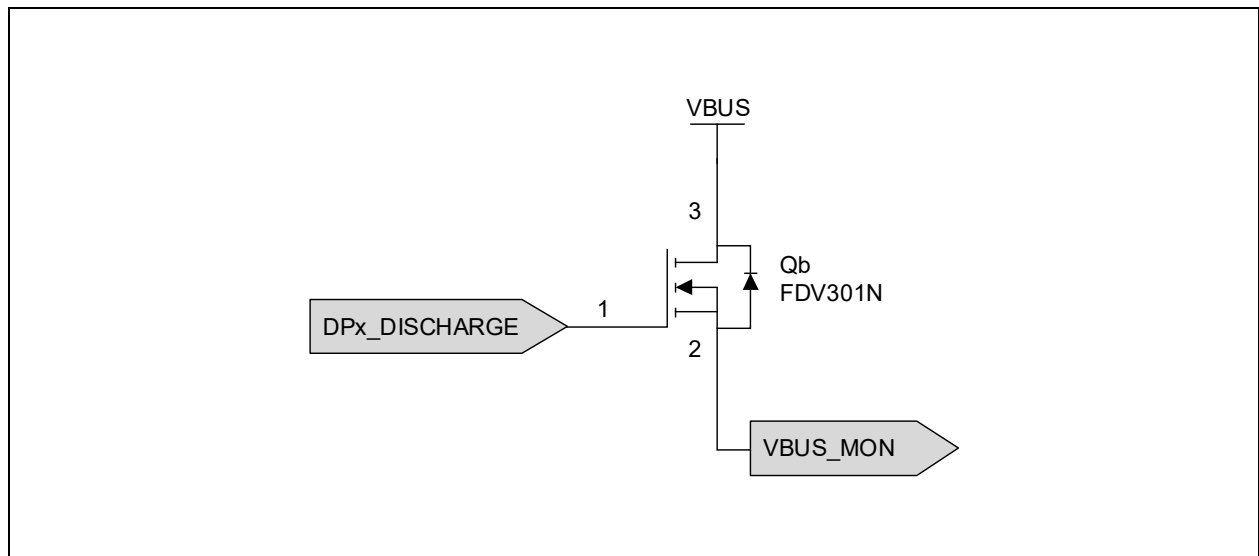
Applications that do not perform HUBCV testing are not affected.

#### Work around

In reference designs for USB7216 and USB7252 devices, an N-channel MOSFET with a  $V_{GS}$  less than 1.0V is connected between VBUS and VBUS\_MON, with gate control from the DISCHARGE signal. This additional component creates an additional current path as the discharge is monitored by VBUS\_MON, which biases VBUS\_MON higher. This results in discharge to a lower voltage than what is otherwise achieved, and compensates for any residual energy that the capacitor releases after the discharge. At times other than the discharge, the MOSFET is turned off and does not influence VBUS.

No components of the reference design need to be removed; only the MOSFET is added.

**FIGURE 2: TYPE-C DISCHARGE WORKAROUND FOR MODULE 3**



### PLAN

There is no plan to correct this erratum.

# USB72x6/USB7252

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## Module 4: I<sup>2</sup>C Bridge sends an extra byte under certain conditions

### DESCRIPTION

USB7252 is an I<sup>2</sup>C master that is connected to an I<sup>2</sup>C slave. In the case where a single byte is to be read, the I<sup>2</sup>C Bridge responds by reading two bytes. The first of these bytes has an ACK bit, and the second byte has a NACK bit. Only the first byte contains correct data, and the value of the second byte is unpredictable. Only the valid byte is returned to the application or the I<sup>2</sup>C Read Buffer.

This phenomenon is also seen in cases where the number of bytes to be read is equal to a multiple of 128 plus 1 (for example, 129 bytes, 257 bytes, and so on).

**Note:** This module applies to all USB7206, USB7216, and USB7252 devices Revision B1.

### END USER IMPLICATIONS

I<sup>2</sup>C slaves may not expect the second byte. The I<sup>2</sup>C slave software may interpret the incorrect byte as valid, and may malfunction.

#### Work around

The I<sup>2</sup>C master software should avoid reading a single byte. When only one byte is desired, the I<sup>2</sup>C master software should read two bytes and discard the second byte.

### PLAN

1. An OTP patch is available that corrects the error in the case of reading one byte. It does not correct the other cases (129 bytes, 257 bytes, and so on).
2. In Revision C0 of the part, the error will be corrected in the hardware.

## APPENDIX A: DOCUMENT REVISION HISTORY

Revision Level & Date	Section/Figure/Entry	Correction
DS80000847B (05-14-20)	Table 1	Added part number USB7252 in the list of affected silicon revisions.
	Type-C Bridging	Updated to show impact to USB7252.
	Type-C VBUS discharge in Port Power On/Off test	Added this section describing Type-C VBUS discharge in Port Power On/Off test.
	I <sup>2</sup> C Bridge sends an extra byte under certain conditions	Added this section describing the scenario where the I <sup>2</sup> C Bridge sends two bytes of data
DS80000847A (09-19-19)	Initial release	

# USB72x6/USB7252

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