Application Report
SLVA779–July 2016

TPS2549-Q1 Production Silicon Change List

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ABSTRACT

TI discovered a bug with TPS2549-Q1 production silicon manufactured ***before*** March 1st, 2016. If you are using a TPS2549-Q1 device manufactured ***after*** March 1st, 2016, (directions follow on how to identify) please discard this change notice.

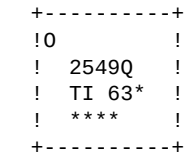
The bug is related to the CDP/SDP auto-switch function and is triggered only when the device is in CDP mode. While in CDP mode, the bug is triggered when the TPS2549-Q1 host port is connected to a compliant USB 2.0 device and high-speed data communication handshake is taking place.

The bug has no affect in systems where TPS2549-Q1 is configured in SDP/SDP1, DCP/DCP1, or Client mode (visit www.ti.com to download the latest version of the device data sheet). Note that this change notification only applies to TPS2549-Q1.

Important

TI has **fixed** the CDP/SDP auto-switch bug in all TPS2549-Q1 devices manufactured **after Feb 29th, 2016**.

The CDP/SDP auto-switch bug only affects TPS2549-Q1 parts that were manufactured **before** March 1st, 2016. Customers can easily verify if the part they are using is affected by this bug, by inspecting the top-side marking on the part.



Parts that have the bug fixed will have date code 63* or higher (that is, 64, 6A, 71, and so forth). In the highlighted alphanumeric character, the first character represents the year of manufacture, hence 6 is year 201**6** and a 7 would be year 201**7** and so on. The second character is a HEX for the month (1=January, 2=February, … , A=October, B=November, and so forth).

When in doubt, contact your local TI sales office. Contact your local TI sales office if you have a device with a date code prior to 63*, that is, 62* or earlier.

Silicon Bug Description: CDP/SDP Auto-Switch Function is Incorrectly Occurring in CDP Mode

Description: Refer to the device truth table (Table 1) and Section 8.3.6 in the TPS2549-Q1 data sheet (SLUSCE3), there is a CDP/SDP auto-switch function in CDP mode to support some popular phones that do not comply with the BC1.2 specification because they fail to establish a data communication in CDP mode. The CDP/SDP scheme performs the following:

1. The TPS2549-Q1 determines when a noncompliant phone has wrongly classified a CDP port as DCP port and has not made a data connection
2. The TPS2549-Q1 switches to SDP mode automatically after a VBUS discharge event so that the non-compliant phone can see a connection to SDP and make data connection
3. The TPS2549-Q1 switches back to CDP mode automatically without VBUS discharge so that the non-compliant phone is not interrupted while the port is ready in CDP mode, if a new device is attached.

The CDP/SDP auto-switch function in TPS2549-Q1 is meant to occur when a portable device never signals connection and enumerates. However, the silicon bug discovered makes the CDP/SDP auto-switch function incorrectly occur after a portable device has successfully established data communication as Table 1 shows.

Table 1. Truth Table

CTL1	CTL2	CTL3	CURRENT LIMIT SETTING	MODE	STATUS OUTPUT (ACTIVE-LOW)	FAULT OUTPUT (ACTIVE-LOW)	CS FOR CABLE COMPENSATION	NOTES
0	0	0	Lo	DCP1(1)	OFF	ON(2)	ON	DCP includes divider 3, 1.2-V mode, and BC1.2 mode
0	0	1	Hi	DCP(1)	ON	ON	ON	DCP includes divider 3, 1.2-V mode, and BC1.2 mode
0	1	X	Lo	SDP	OFF	ON	ON	Standard SDP port
1	0	X	NA	Client mode	OFF	OFF	OFF	No current limit, power switch disabled, data switch bypassed
1	1	0	Lo	SDP1(3)	OFF	ON(2)	ON	Standard SDP port
1	1	1	Hi	CDP(3)	ON	ON	ON	CDP-SDP auto switch mode

(1) No OUT discharge when changing between 000 and 001
(2) FAULT not asserted on overcurrent
(3) No OUT discharge when changing between 110 and 111

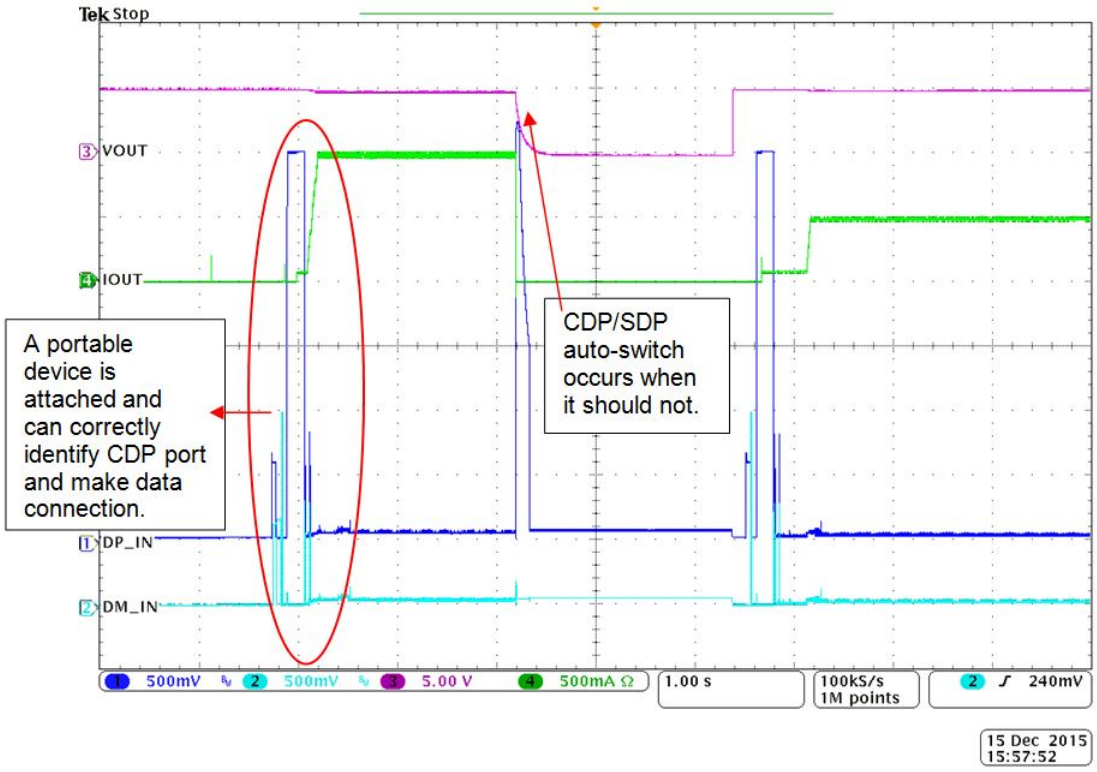


Figure 1. CDP/SDP Auto-Switch Occurs Incorrectly

Application Impact:

The CDP/SDP auto-switch bug will disable fast charging when the TPS2549-Q1 is configured in CDP mode. The bug prevents the portable device from fast charge as the TPS2549-Q1 switches to SDP mode and may also result in data communication loss due to VBUS discharge as shown in Figure 1.

Work Around:

Unfortunately there is no work around where fast charge and data communication are needed in same mode. Use DCP mode to fast charge the device if data communication is not needed, or SDP mode for data communication if fast charging is not needed.

Resolution:

TI has fixed the CDP/SDP auto-switch bug in silicon, see the first page of this change notification for details.

Impacted Device:

Device	Package	Top-Side Marking
TPS2549-Q1	QFN16	2549Q

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