

Texas Instruments
Analog Reference Design Test Procedure

TIDA-00624 - Type-C DFP Adapter Test Procedure

Rev. 1

1.0 GENERAL

1.1 PURPOSE

- 1.1.1 To provide detailed instructions for testing Reference Design Modules

1.2 SCOPE

- 1.1.1 This document describes the steps required to perform a general functional tests for the TIDA-00624 - Type-C DFP Adapter.

1.3 REFERENCE DOCUMENTATION

- 1.3.1 Schematic TIDA-00624 - Type-C DFP Adapter.pdf
- 1.3.2 Assembly DWG TIDA-00624 - Type-C DFP Adapter_brd.pdf
- 1.3.3 Users Guide TIDA-00624 - Type-C DFP Adapter User's Guide.pdf

1.4 MATERIALS

- 1.4.1 Type C cable.
- 1.4.2 USB3 Type C device

1.5 DEFINITIONS

- 1.5.1 Reference Design –Evaluation Module / board
- 1.5.2 DFP – Downstream Facing Port
- 1.5.3 UFP – Upstream Facing Port
- 1.5.4 DRP – Dual Role Port
- 1.5.5 CC – Configuration Channel

2.0 SAFETY

- 2.1 Safety Glasses are to be worn.
- 2.2 ESD precautions must be followed while handling electronic assemblies while performing this test.
- 2.3 Precautions should be observed to avoid touching areas of the assembly that may get hot or present a shock hazard during testing.

3.0 QUALITY

- 3.1 Test data or reports shall be made available upon request by Texas Instruments.

4.0 APPAREL

- 4.1 Electrostatic smock
- 4.2 Electrostatic Gloves or finger cots
- 4.3 Ground ESD wrist strap.

5.0 EQUIPMENT

- 5.1 USB3 host PC or laptop.

- 5.2 TIDA-00624 - Type-C DFP Adapter.
- 5.3 HD3SS460 EVM.

6.0 EQUIPMENT SETUP

6.1 What does this Reference design look like?

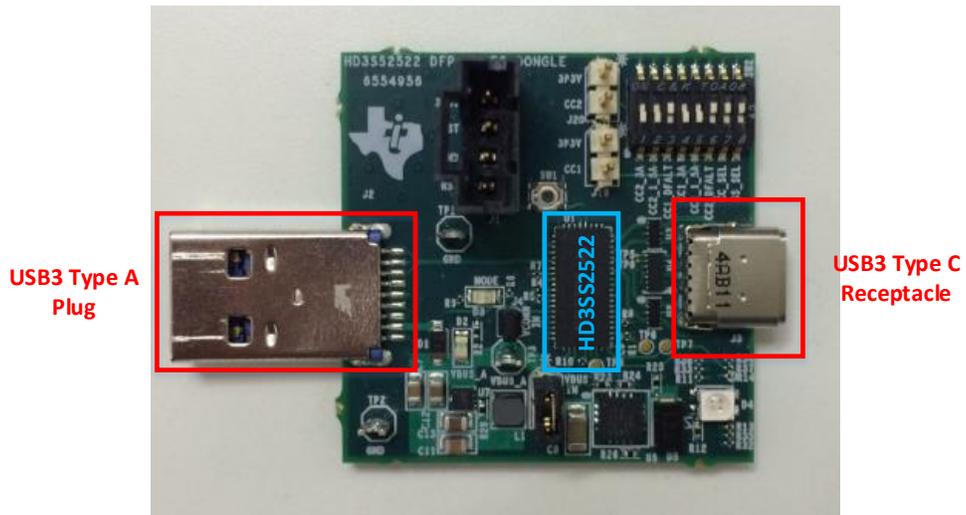


Figure 1 TIDA-00624 - Type-C DFP Adapter

6.2 Hardware Description

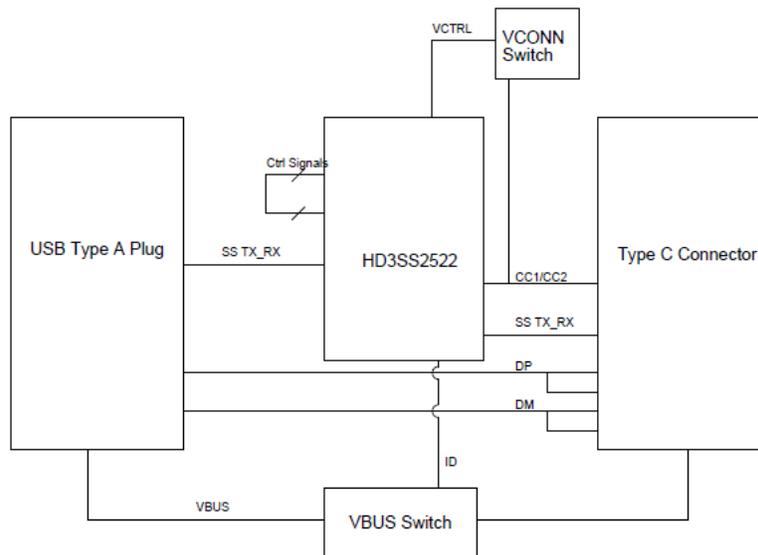


Figure 2 TIDA-00624 - Type-C DFP Adapter Block Diagram

6.2.1 Power

The TIDA-00624 - Type-C DFP Adapter is powered directly 5V VBUS from the USB Type A Plug. Jumper J18 must be populated.

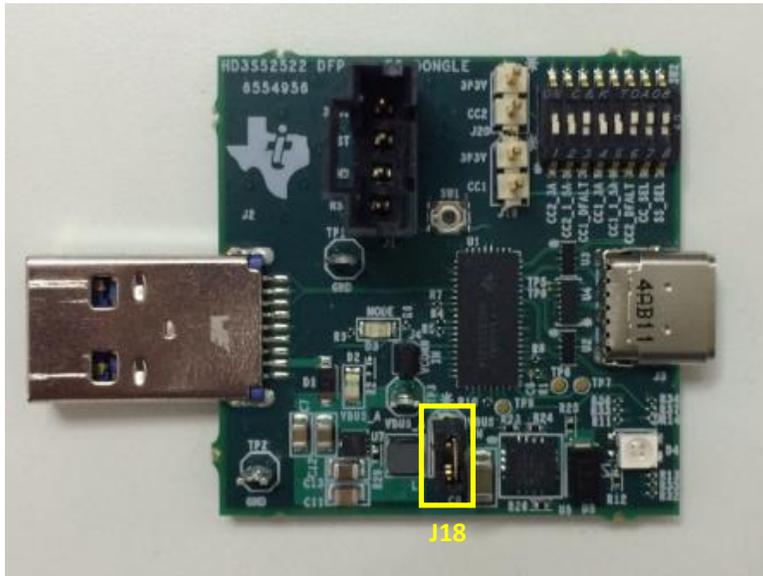


Figure 3 Jumper J18

6.2.2 Type C Receptacle

The Reference Design provides a single Type C receptacle. The cable connection is flippable.

6.2.3 Reset

A reset switch, SW1, is also provided for manual reset after the device has been powered on.

6.2.4 DIP Switches

The Reference Design provides eight DIP switches for configuring the TIDA-00624 - Type-C DFP Adapter current mode and the pull-up resistor values.

Using the DIP switch, the TIDA-00624 - Type-C DFP Adapter can be configured to support default, mid or high current mode: 500mA/900mA, 1.5A or 3A respectively. The IMODE must be configured to match the CC resistor setting for the corresponding current configuration. Below shows the DIP switch setting for each mode of operation. After changing either of the IMODE1/2 switches, the Reference Design must be reset using SW1 or by unplugging the Type A connector to remove VBUS.

Label	SW Pin	SW Position		
		500/900mA	1.5A	3.0A
CC2_3A	SW2.1	OFF	OFF	ON
CC2_1_5A	SW2.2	OFF	ON	OFF
CC2_DEFAULT	SW2.3	ON	OFF	OFF
CC1_3A	SW2.4	OFF	OFF	ON

CC1_1_5A	SW2.5	OFF	ON	OFF
CC1_DEFAULT	SW2.6	ON	OFF	OFF
IMODE1*	SW2.7	OFF	OFF	ON
IMODE2*	SW2.8	OFF	ON	ON

*Silk Screen label on these signals are incorrect. CC_SEL should be IMODE1, SS_SEL should be IMODE2.

6.2.5 LED Indicators

VBUS LED – When illuminated, indicates the TIDA-00624 - Type-C DFP Adapter is receiving 5V VBUS power from the Type A plug.

Mode LED – When illuminated, indicates a valid Type C connection.

Status LED – When Green, indicates VBUS to the Type C connection is enabled.

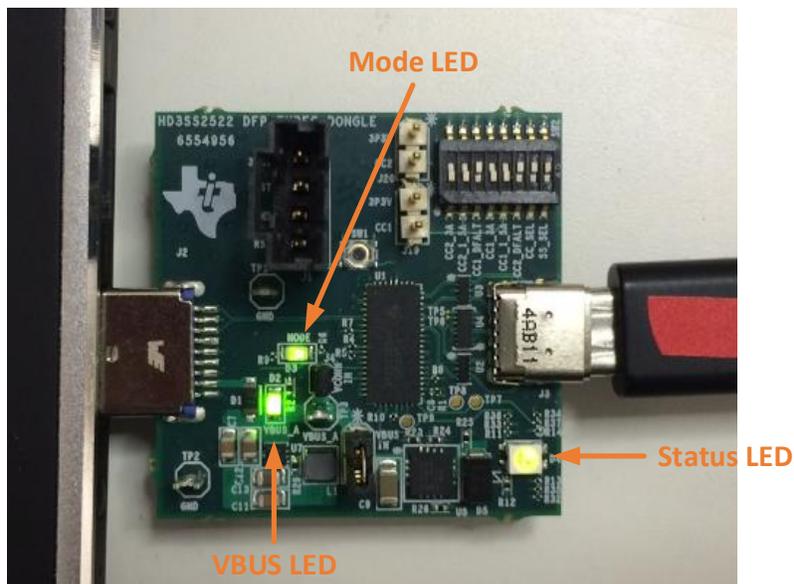


Figure 4 LED Indicators

7.0 PROCEDURE

The test setup consists of a USB3 host PC or laptop connected to the TIDA-00624 - Type-C DFP Adapter which is connected to a USB3 Type C device using a Type C cable. Since no Type C devices exist today, a modified HD3SS460 board with a USB3.0 thumb drive can be substituted.

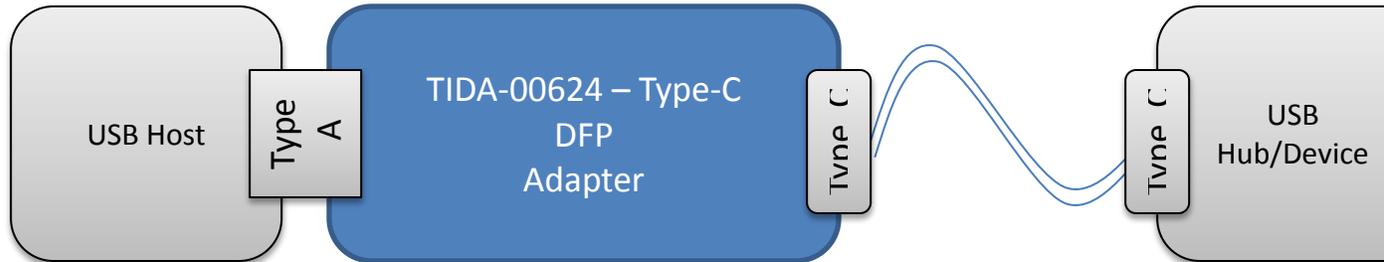


Figure 5 Test Setup Block Diagram

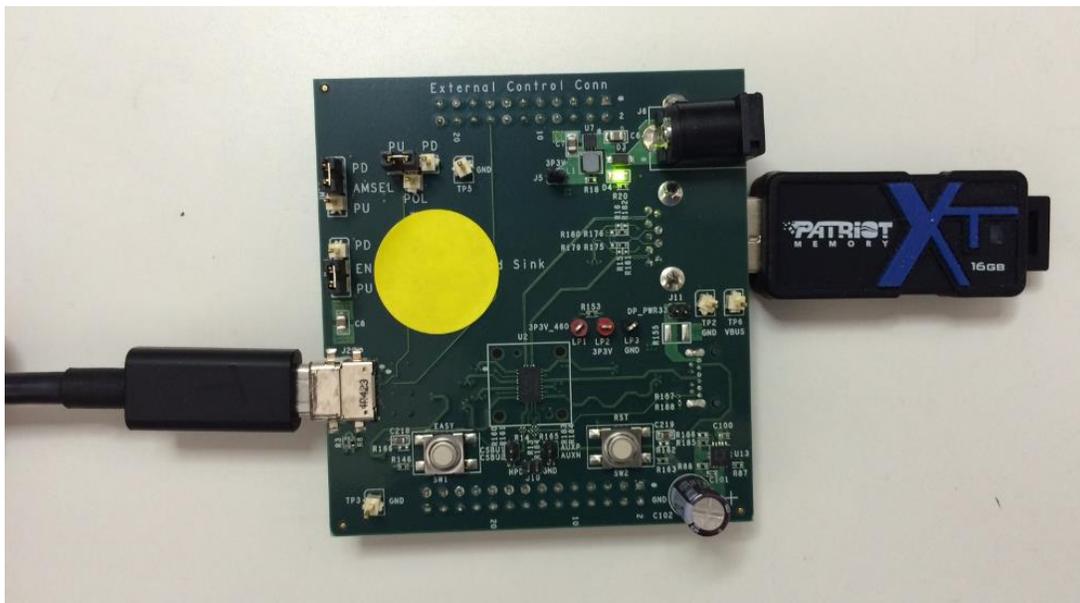


Figure 6 Modified HD3SS460 EVB with USB3.0 Thumbdrive

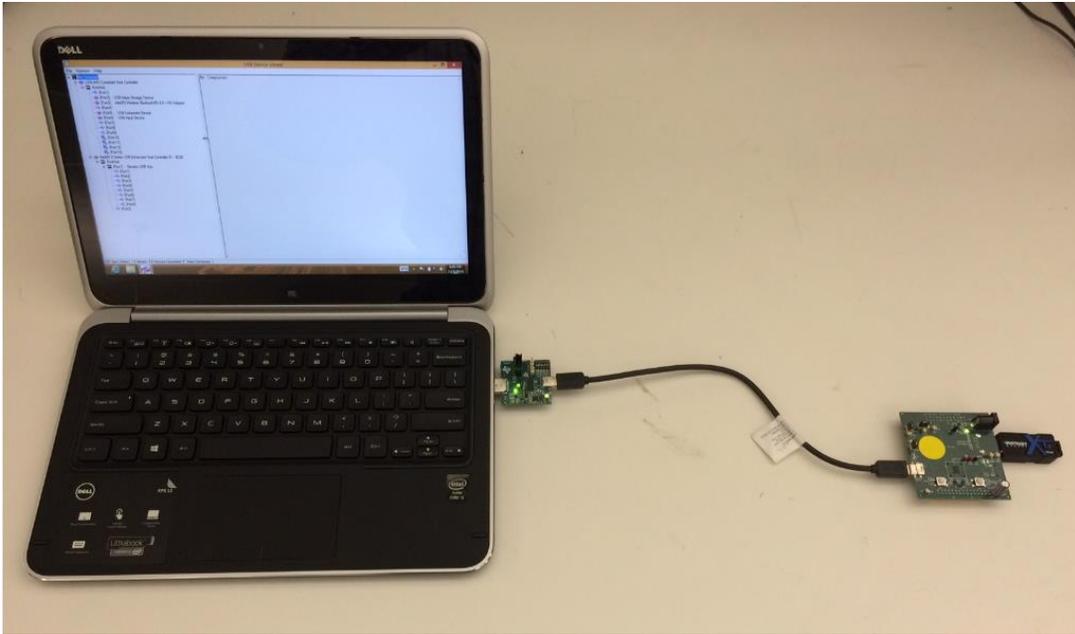


Figure 7 Example Test Setup

Launch USBVIEW application on the PC and locate the USB xHCI Compliant Host Controller.

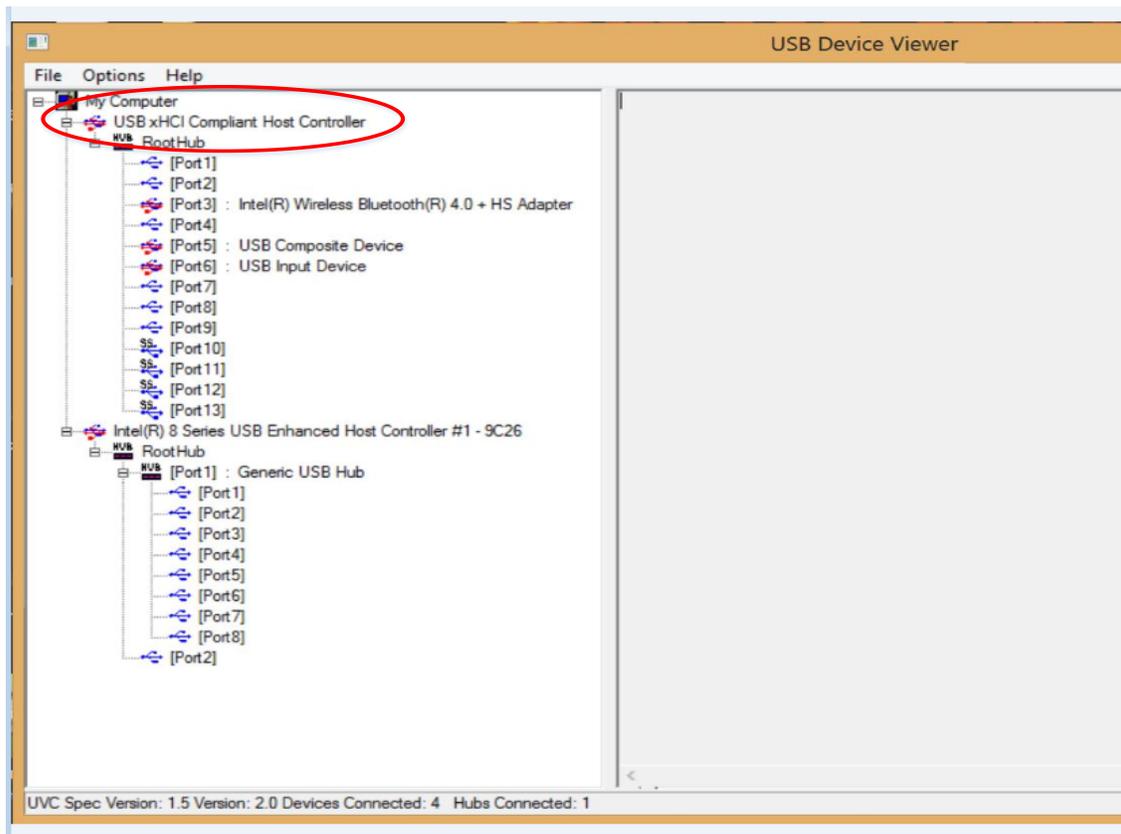


Figure 8 USBVIEW - Locating xHCI controller

Follow the sequence below to test the TIDA-00624 - Type-C DFP Adapter.

1. Check that J18 jumper is populated.
2. Set the TIDA-00624 - Type-C DFP Adapter DIP switches for 500/900mA configuration.
3. Plug the TIDA-00624 - Type-C DFP Adapter into a USB3 port on the PC and verify the VBUS LED is illuminated.
4. Connect the Type C cable to the the TIDA-00624 - Type-C DFP Adapter and the Type C device.
5. Verify the Mode and Status LED are illuminated.
6. Locate the new USB mass storage device which has appeared in USBVIEW, click on it, and verify the connection speed is "Super".

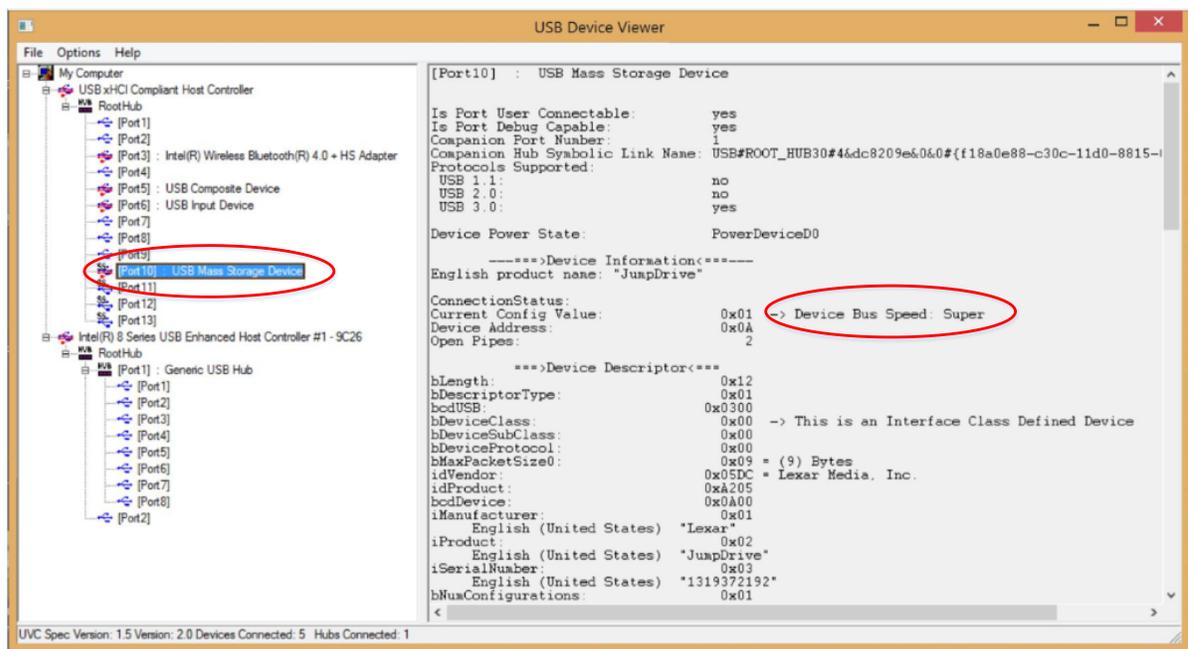


Figure 9 USBVIEW - Verifying Device Speed

1. Unplug the Type-C cable on the TIDA-00624 - Type-C DFP Adapter end, flip it over, and plug it back in.
2. Repeat Steps 5 and 6 to verify the Type C connection is still working properly.
3. Unplug the Type C cable from the TIDA-00624 - Type-C DFP Adapter.
4. Set the TIDA-00624 - Type-C DFP Adapter DIP switches for 1.5A configuration.
5. Press SW1 to reset the TIDA-00624 - Type-C DFP Adapter and load the new IMODE settings. (You may also unplug and re-plug the USB Type A connection instead of using SW1 reset)
6. Repeat steps 4-9.
7. Set the TIDA-00624 - Type-C DFP Adapter DIP switches for 3.0A configuration.

8. Press SW1 to reset the TIDA-00624 - Type-C DFP Adapter and load the new IMODE settings. (You may also unplug and re-plug the USB Type A connection instead of using SW1 reset)
9. Repeat steps 4-9.

8.0 EQUIPMENT SHUTDOWN

8.1 Specify power down sequence as needed if applicable.

9.0 MATERIAL DISPOSITION & TRANSFER

9.1 CONFORMING MATERIAL

Units that have passed this test procedure shall be packaged into anti-static ESD approved bags, labeled with two labels according to the table below, and shipped per the P.O.

Label 1 Assembly Number+Dash Number if Applicable	Label 2 IC Number
TIDA-00624 - Type-C DFP Adapter	HD3SS2522RHU

9.2 NON-CONFORMING MATERIAL

If yield loss is 2% or less, scrap non-conforming units and adjust P.O. to reflect total amount shipped. If yield loss approaches or exceeds 5%, contact Reference Design coordinator for assistance.

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2021, Texas Instruments Incorporated