

User's Guide

LM2734 Step-Down Converter Evaluation Module User's Guide



Table of Contents

1 Introduction.....	2
2 Operating Conditions.....	3
3 PCB Layout.....	5
4 Additional Circuit Configuration Schematics.....	9
5 Revision History.....	10

Trademarks

All trademarks are the property of their respective owners.

1 Introduction

The LM2734 demo board is configured to convert 5-V input to 1.8-V output at 1-A load current using the LM2734X 1.6-MHz or the LM2734Y 550-kHz step down DC-DC regulator. The tiny low profile thin SOT23 package allows the demo board to be manufactured using less than 1 square inch of a 4-layer printed circuit board.

The circuit is configured with the boost diode connected to V_{IN} , and according to the data sheet, V_{IN} must not exceed the maximum operating limit of $5.5\text{ V} + V_{fD2}$ using this configuration. This makes sure that the voltage between the Boost and SW pins, $V_{BOOST} - V_{SW}$, does not exceed 5.5 V for proper operation. Please see the LM2734 data sheet for more information regarding this requirement.

A bill of materials in [Table 2-1](#) and [Table 2-2](#) describes the parts used on this demo board. A schematic and layout have also been included in [Figure 2-1](#) along with measured performance characteristics. The schematics at the end of this document show how to re-configure this demo board for various input and output conditions as discussed in the LM2734 data sheet. Short or leave open the indicated connection as indicated in the schematics. The above restrictions for the input voltage are valid only for the demo board as shipped with the demo board schematic below.

2 Operating Conditions

- $V_{IN} = 5\text{ V}$
- $V_O = 1.8\text{ V}$
- $I_O = 1\text{ A}$

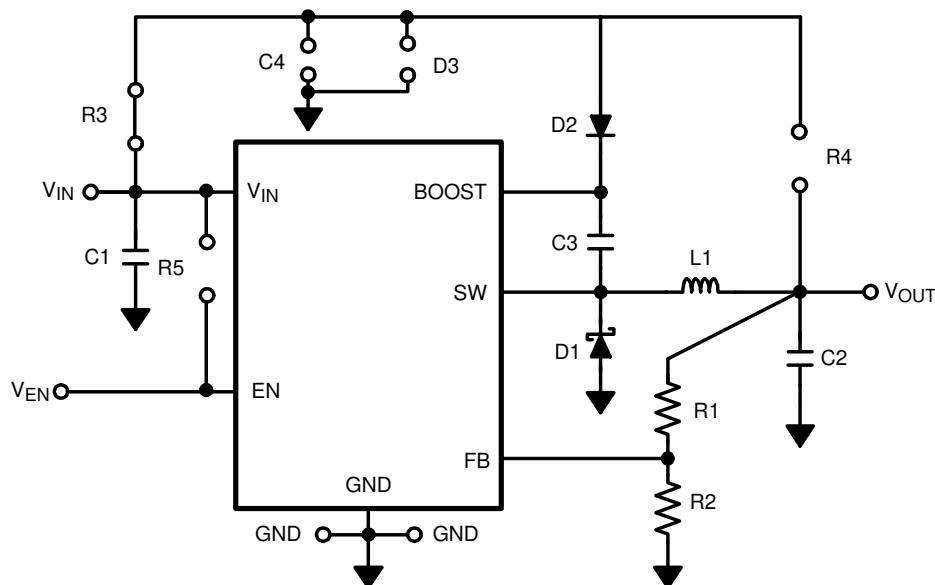


Figure 2-1. LM2734 Demo Board Schematic

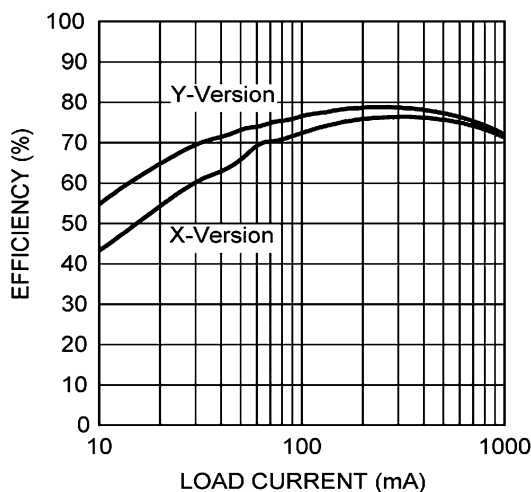


Figure 2-2. Efficiency vs Load Current

Table 2-1. Bill of Materials X-Version

Part ID	Part Value	Manufacturer	Part Number	Package Type
C1, Input Cap	4.7 μF , 10 V, X5R	Murata	GRM42-6X5R475K10	1206
C2, Output Cap	10 μF , 6.3 V, X5R	Murata	GRM42-6X5R106K6.3	1206
C3, Boost Cap	0.01 μF	Vishay	VJ0805Y103KXXA	0805
D2, Boost Diode	1 Vf at 50-mA Diode	Diodes, Inc.	1N4148W	SOD-123
R2	10 k Ω , 1%	Vishay	CRCW12061002F	1206
U1	1-A Buck Regulator	Texas Instruments	LM2734	Thin SOT23-6
D1, Catch Diode	0.34-Vf Schottky, 1 A, 20VR	International Rectifier	MBRA120	SMA
L1	2.7 μH , 1.8 A, 22 m Ω	TDK	SLF6028T-2R7M1R8	6028
R1	12.4 k Ω , 1%	Vishay	CRCW12061242F	1206

Table 2-1. Bill of Materials X-Version (continued)

Part ID	Part Value	Manufacturer	Part Number	Package Type
R3	0 Ω	Vishay	CRCW12060R00F	1206
D3, C4, R4, R5	Open			

Table 2-2. Bill of Materials Y-Version

Part ID	Part Value	Manufacturer	Part Number	Package Type
C1, Input Cap	10 μ F, 10 V, X5R	Murata	GRM42-6X5R106K10	1206
C2, Output Cap	10 μ F, 6.3 V, X5R	Murata	GRM42-6X5R106K6.3	1206
C3, Boost Cap	0.01 μ F	Vishay	VJ0805Y103KXXA	0805
D2, Boost Diode	1 Vf at 50-mA Diode	Diodes, Inc.	1N4148W	SOD-123
R2	10 k Ω , 1%	Vishay	CRCW12061002F	1206
U1	1-A Buck Regulator	Texas Instruments	LM2734	Thin SOT23-6
D1, Catch Diode	0.34-Vf Schottky, 1 A, 20VR	International Rectifier	MBRA120	SMA
L1	6.8 μ H, 1.5 A, 35 m Ω	TDK	SLF6028T-6R8M1R5	6028
R1	12.4 k Ω , 1%	Vishay	CRCW12061242F	1206
R3	0 Ω	Vishay	CRCW12060R00F	1206
D3, C4, R4, R5	Open			

3 PCB Layout

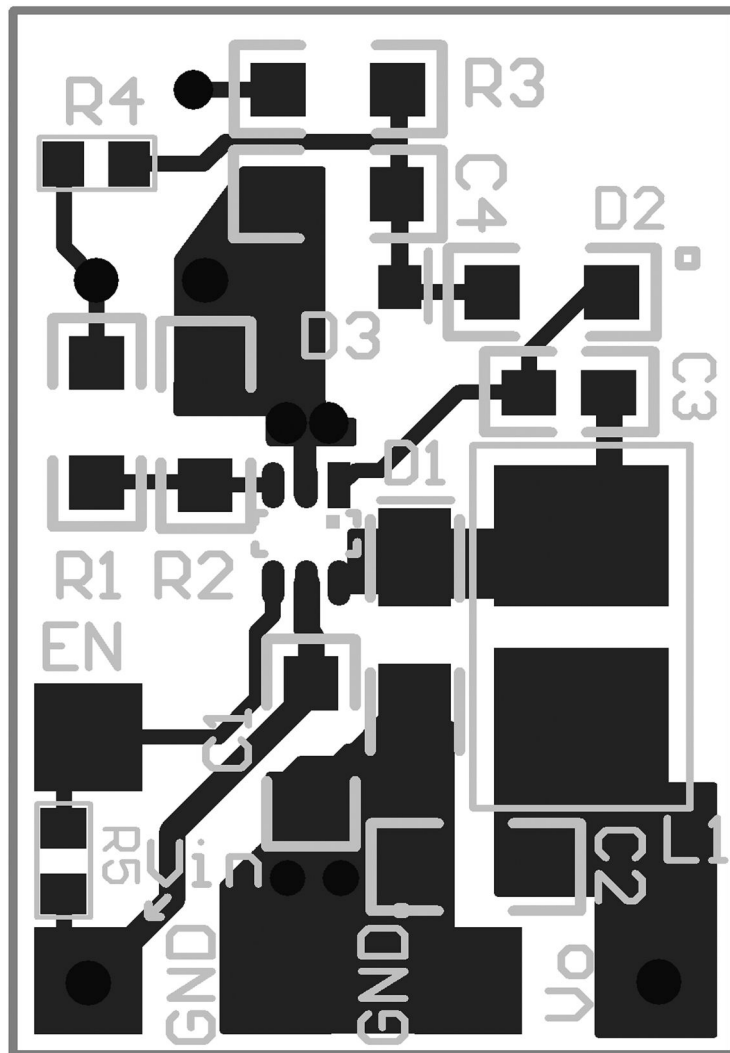


Figure 3-1. Top Layer

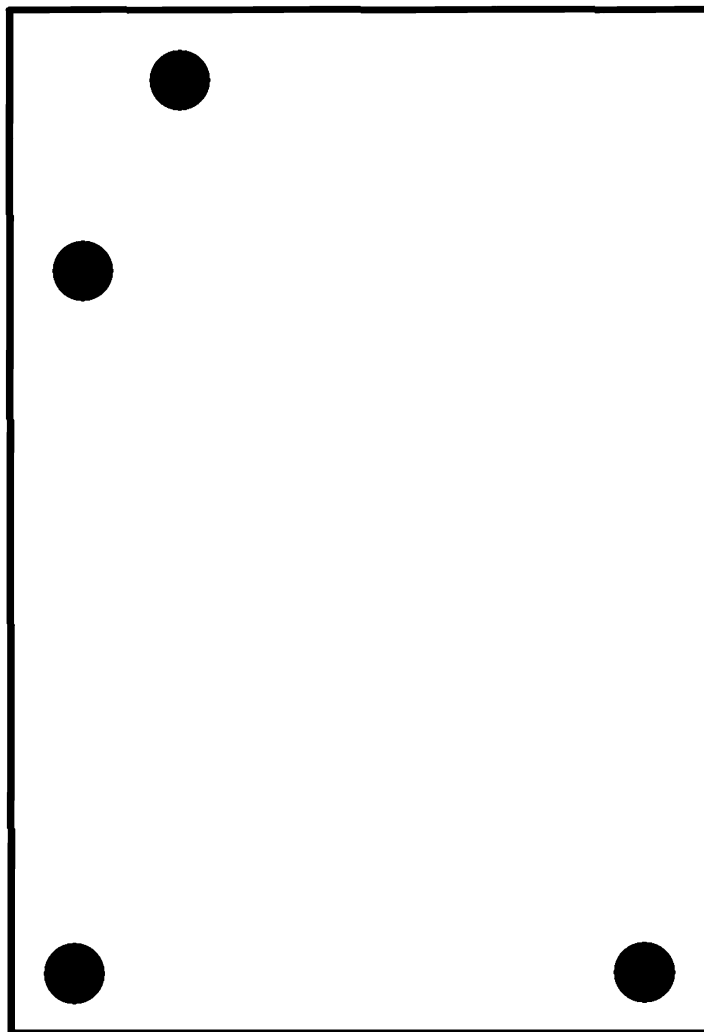


Figure 3-2. Internal Plane 1 (GND)

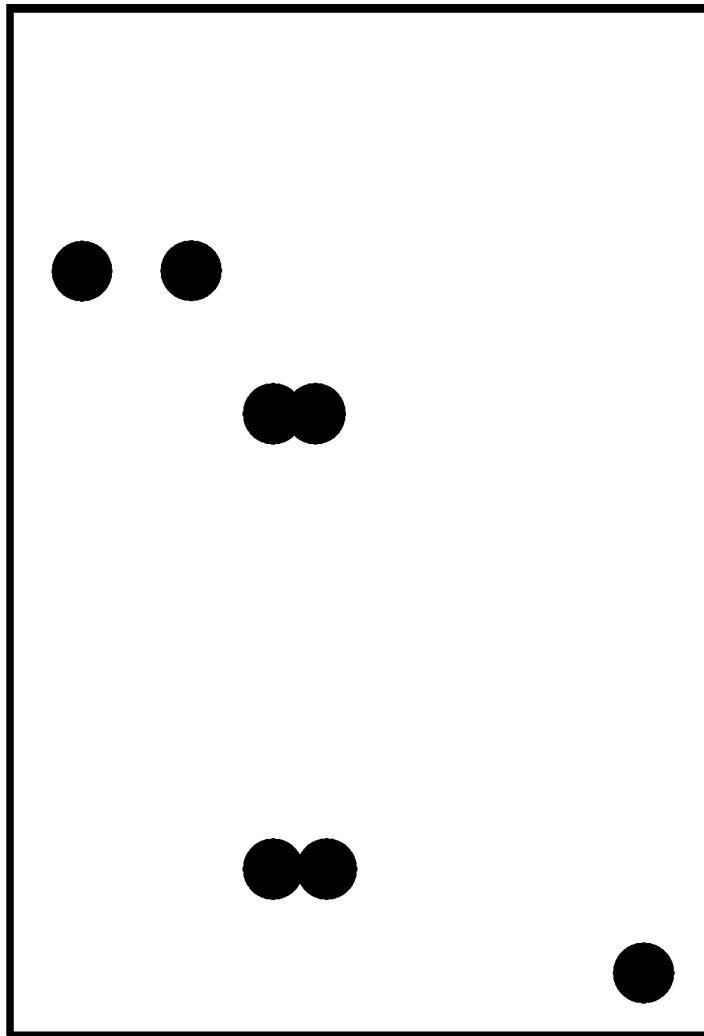


Figure 3-3. Internal Plane 2 (V_{IN})

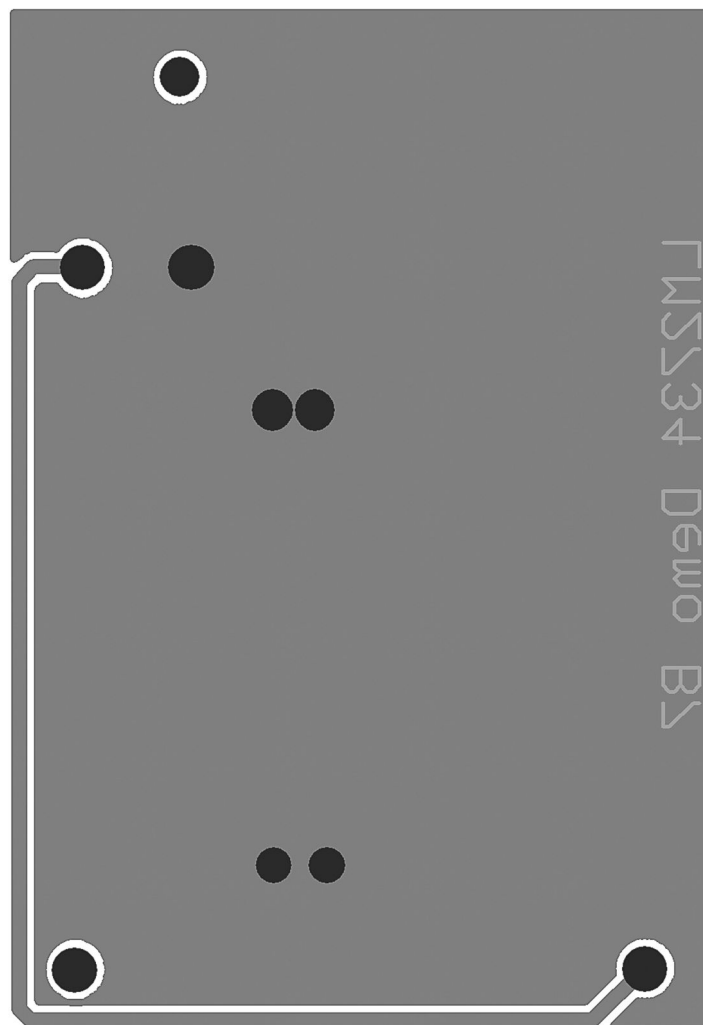


Figure 3-4. Bottom Layer

4 Additional Circuit Configuration Schematics

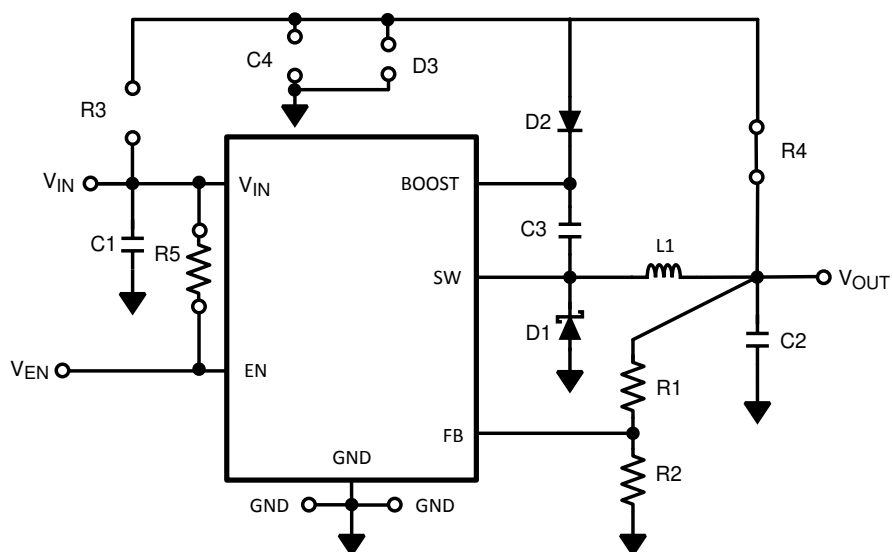


Figure 4-1. V_{BOOST} Derived from V_{OUT}

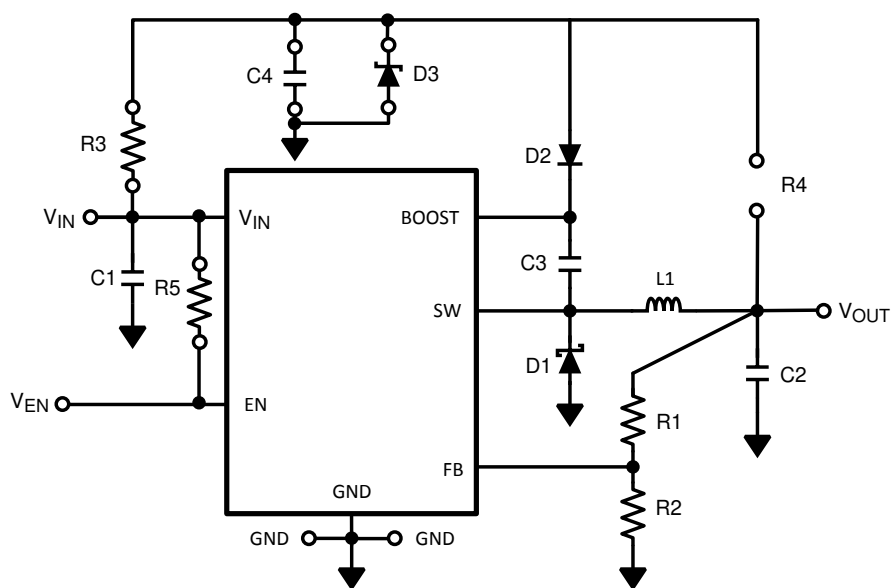


Figure 4-2. V_{BOOST} Derived from V_{SHUNT}

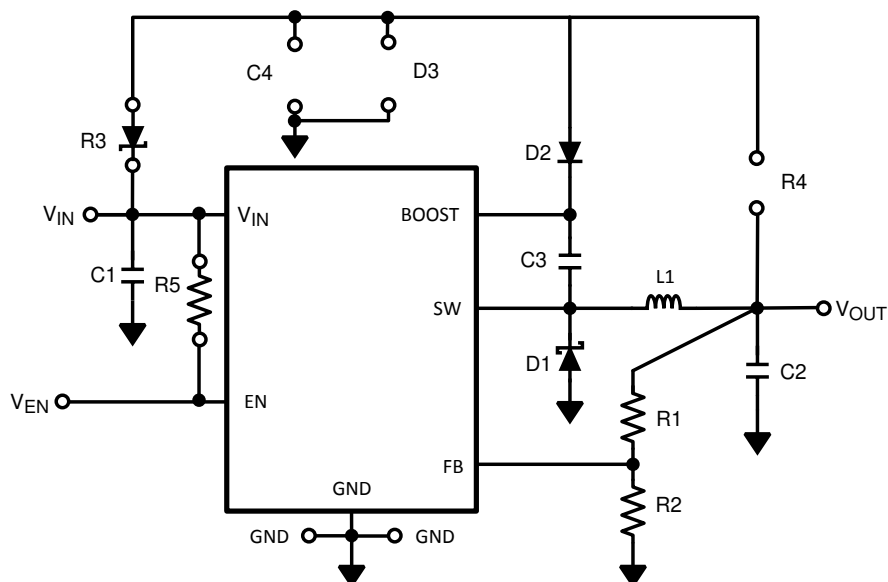


Figure 4-3. V_{BOOST} Derived from Series Zener Diode (V_{IN})

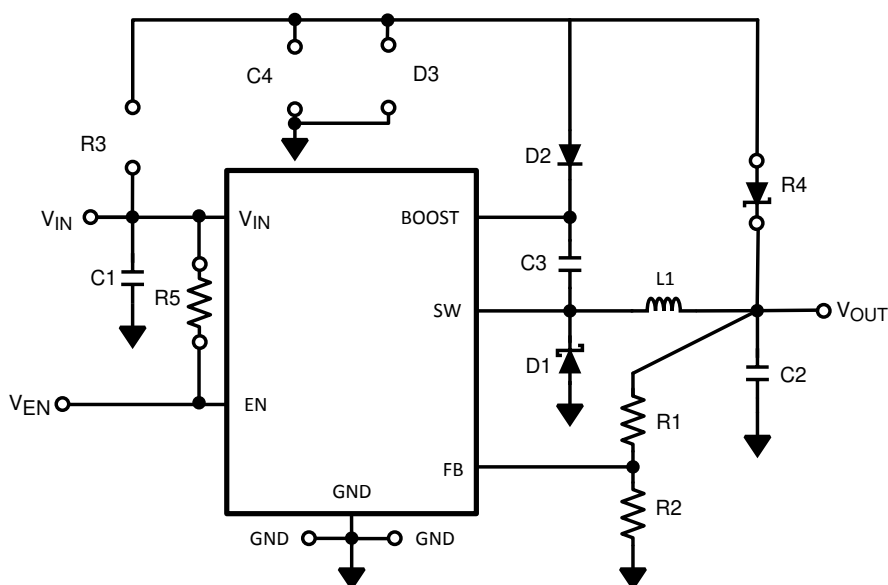


Figure 4-4. V_{BOOST} Derived from Series Zener Diode (V_{OUT})

5 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision A (April 2013) to Revision B (December 2021)	Page
• Updated the numbering format for tables, figures, and cross-references throughout the document.	2
• Updated the user's guide title.....	2
• Edited user's guide for clarity	2

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 © 2022, Texas Instruments Incorporated