

TLV62568PEVM-860, TLV62568APEVM-860 and TLV62569PEVM-860, TLV62569APEVM-860 Evaluation Modules

This user's guide describes the characteristics, operation, and use of TI's TLV62568P, TLV62568AP, TLV62569P and TLV62569AP evaluation modules (EVM). These EVMs are designed to help the user easily evaluate and test the operation and functionality of the TLV62568P, TLV62568AP (both 1-A) and TLV62569P, TLV62569AP (both 2-A) buck converters. The EVMs convert a 2.5-V to 5.5-V input voltage to a regulated 1.8-V output voltage that delivers up to 2 A. This user's guide includes setup instructions for the hardware, a printed-circuit board (PCB) layout, a schematic diagram, a bill of materials (BOM), and test results of the EVM. Throughout this document, TLV6256xEVM-860 is used as an abbreviation representing the TLV62568PEVM-860 (001), TLV62569PEVM-860 (002), TLV62568APEVM-860 (003) and TLV62569APEVM-860 (004) EVMs.

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1 Introduction

The TLV62568PDRL, TLV62568APDRL, TLV62569PDRL and TLV62569APDRL are synchronous step-down converters in 1.6-mm × 1.6-mm, 5-pin SOT-563 package. The TLV62568PEVM-860 (PWR860-001) uses the TLV62568PDRL integrated circuit (IC). The TLV62569PEVM-860 (PWR860-002) uses the TLV62569PDRL IC. The TLV62568APEVM-860 (PWR860-003) uses the TLV62568APDRL integrated circuit (IC). The TLV62569APEVM-860 (PWR860-004) uses the TLV62569APDRL integrated circuit (IC).

1.1 Performance Specification

[Table 1](#) provides a summary of the TLV6256xEVM-860 performance specifications.

Table 1. Performance Specification Summary

Specification		Test Conditions	MIN	TYP	MAX	Unit
Input voltage			2.5		5.5	V
Output voltage setpoint				1.8		V
Output current	TLV62568PEVM-860		0		1	A
	TLV62569PEVM-860		0		2	A
	TLV62568APEVM-860		0		1	A
	TLV62569APEVM-860		0		2	A

1.2 Modifications

The PCB for this EVM is designed to accommodate the adjustable voltage version of this IC. On the EVM, additional input and output capacitors can be added. Finally, a feedforward capacitor can be added.

1.2.1 Input and Output Capacitors

C4 is provided for an additional input capacitor. This capacitor is not required for proper operation but can be used to reduce the input voltage ripple.

C6, C7, and C8 are provided for additional output capacitors. These capacitors are not required for proper operation but can be used to reduce the output voltage ripple and to improve the load transient response. The output capacitance must remain within the recommended range in the TPS62568P ([SLVSD89](#)) and TPS62569P ([SLVSDG1](#)) data sheet for proper operation.

1.2.2 Feedforward Capacitor

C5 is provided for the installation of an optional feedforward capacitor. This capacitor is not required for proper operation but can be used to improve the load transient performance.

2 Setup

This section describes how to properly use the TLV6256xEVM-860.

2.1 Connector Descriptions

J1, Pin 1 and 2 – VIN	Positive input voltage connection from the input supply for the EVM
J1, Pin 3 and 4 – S+/S–	Input voltage sense connections, measure the input voltage at this point
J1, Pin 5 and 6 – GND	Input return connection from the input supply for the EVM
J2, Pin 1 and 2 – VOUT	Positive output voltage connection
J2, Pin 3 and 4 – S+/S–	Output voltage sense connections, measure the output voltage at this point
J2, Pin 5 and 6 – GND	Output return connection
J3 – PG/GND	The PG output appears on pin 1 of this header with a convenient ground on pin 2.
JP1 – EN	EN pin jumper. Place the supplied jumper across ON and EN to turn on the IC. Place the jumper across OFF and EN to turn off the IC.
JP2 – PG Pullup Voltage	PG pin pullup voltage jumper. Place the supplied jumper on JP2 to connect the PG pin pullup resistor to the output voltage. Alternatively, the jumper can be removed and a different voltage can be supplied on pin 1 to pull up the PG pin to a different level. This externally applied voltage must remain below 5.5 V.

2.2 Hardware Setup

To operate the EVM, set jumpers JP1 to the desired positions per [Section 2.1](#). Connect the input supply to J1, and connect the load to J2.

3 TLV6256xEVM-860 Test Results

The TLV6256xEVM-860 was used to take the data in the TLV62568P, TLV62569P, TLV62568AP and TLV62569AP data sheet. See the device data sheet for the performance of this EVM.

4 Board Layout

This section provides the TLV6256xEVM-860 board layout and illustrations. The Gerbers are available on the EVM product pages: [TLV62568PEVM-860](#), [TLV62568APEVM-860](#), [TLV62569PEVM-860](#) and [TLV62569APEVM-860](#).

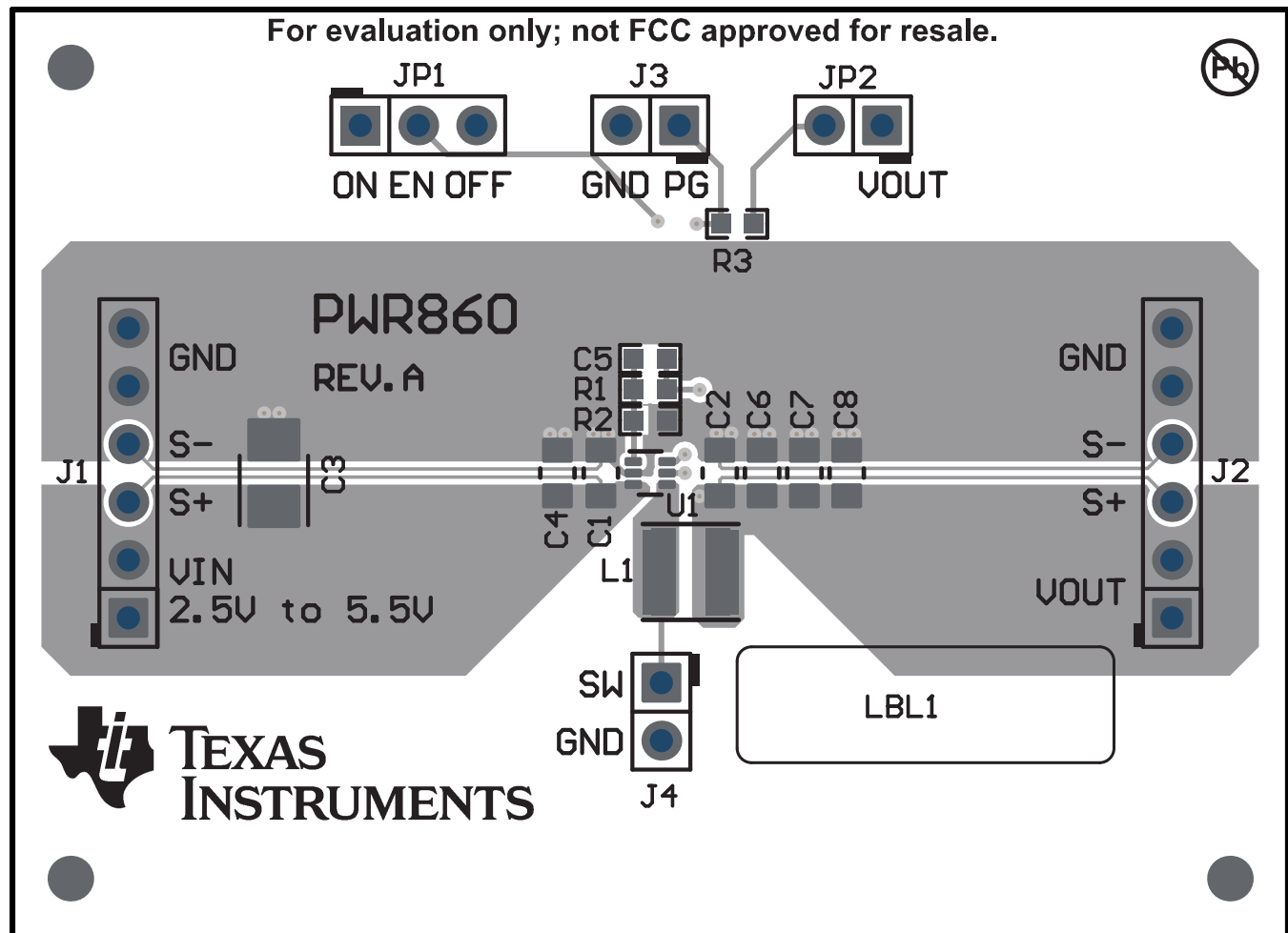


Figure 1. Top Layer

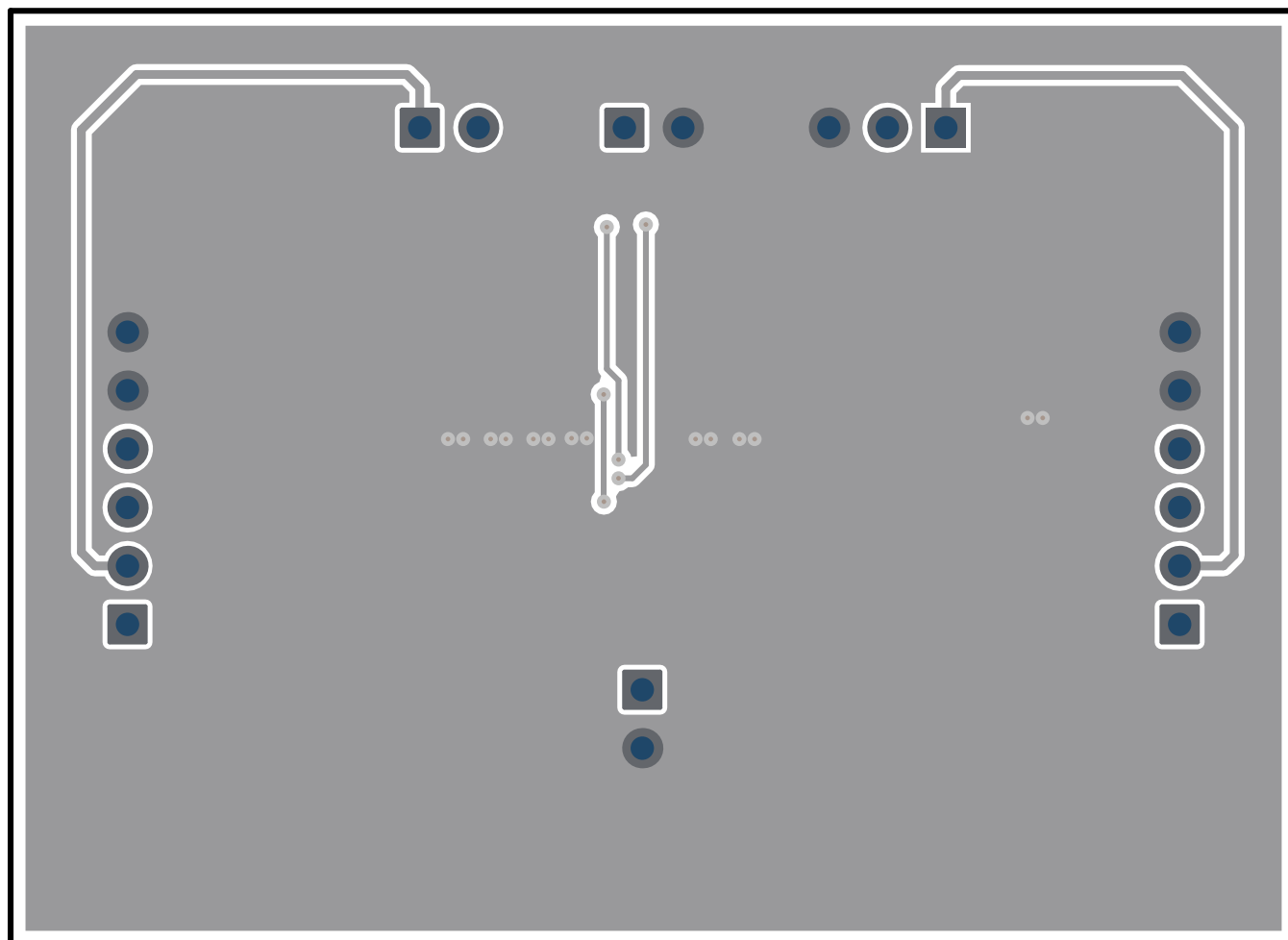


Figure 2. Bottom Layer

5 Schematic and Bill of Materials

This section provides the TLV6256xEVM-860 schematic and bill of materials.

5.1 Schematic

Figure 3 illustrates the EVM schematic.

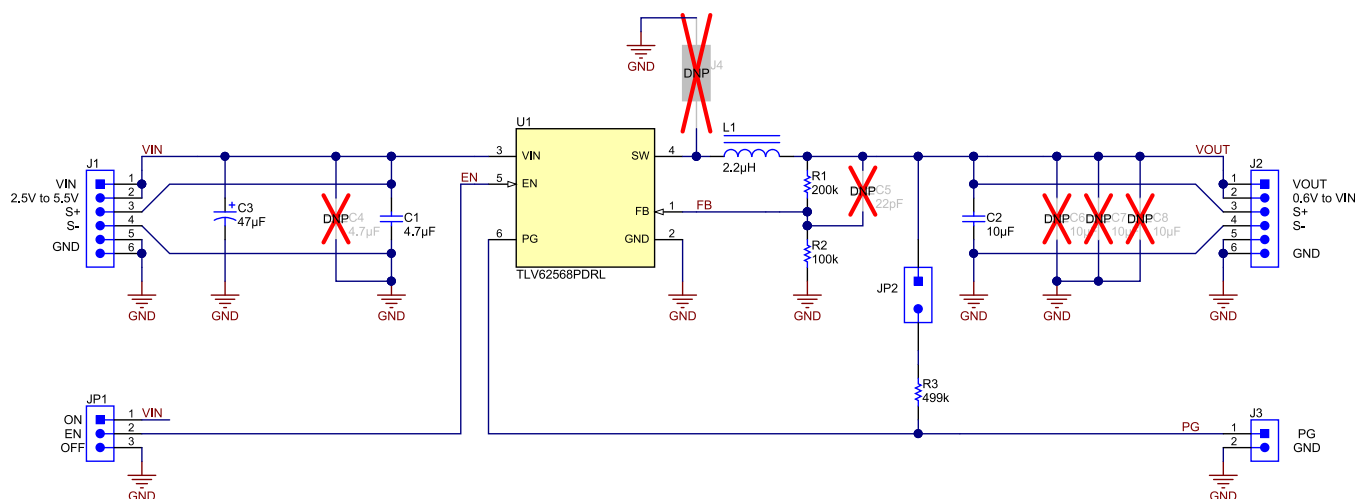


Figure 3. TLV6256xEVM-860 Schematic

5.2 Bill of Materials

Table 2 lists the BOM for this EVM.

Table 2. TLV6256xEVM-860 Bill of Materials

Quantity				Ref Des	Value	Description	Size	Part Number	MFR
TLV62568PEVM-860	TLV62569PEVM-860	TLV62568APEVM-860	TLV62569APEVM-860						
1	1	1	1	C1	4.7uF	Capacitor, Ceramic, 10V, X7R, ±10%	0805	GRM21BR71A475KA73L	Murata
1	1	1	1	C2	10uF	Capacitor, Ceramic, 10V, X7R, ±10%	0805	GRM21BR71A106KE51L	Murata
1	1	1	1	C3	47uF	Capacitor, Tantalum, 6.3V, ±20%	3528-21	T520B476M006ATE025	Kemet
1	0	0	0	L1	2.2uH	Inductor, Shielded, 2.8 A, 0.045 ohm	4x4mm	SDER041H-2R2MS	Cyntec
0	1	0	0	L1	2.2uH	Inductor, Shielded, 5.5 A, 0.04 ohm	4x4mm	XAL4020-222MEB	Coilcraft
0	0	1	0	L1	1uH	Inductor, Shielded, 3.3 A, 0.04 ohm	2.5x1.2x2mm	DFE252012F-1R0M=P2	Murata
0	0	0	1	L1	1uH	Inductor, Shielded, 8.75 A, 0.01 ohm	4x2.1x4mm	XAL4020-102MEB	Coilcraft
1	1	1	1	R1	200k	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	1	1	1	R2	100k	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	1	1	1	R3	499k	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	0	0	0	U1	TLV62568P	IC, 5.5V 1A Step-Down Converter	1.6x1.6mm	TLV62568PDRL	TI
0	1	0	0	U1	TLV62569P	IC, 5.5V 2A Step-Down Converter	1.6x1.6mm	TLV62569PDRL	TI
0	0	1	0	U1	TLV62568AP	IC, 5.5V 1A Step-Down Converter with fixed PWM operation	1.6x1.6mm	TLV62568APDRL	TI
0	0	0	1	U1	TLV62569AP	IC, 5.5V 2A Step-Down Converter with fixed PWM operation	1.6x1.6mm	TLV62569APDRL	TI

Revision History

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

Changes from Original (April 2017) to A Revision	Page
Added TLV62568APEVM-860 (TLV62568AP) and TLV62569APEVM-860 (TLV62569AP) support to the entire document.	1

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FCC NOTICE: This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

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CAUTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

3.2 Canada

3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247

Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

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http://www.tij.co.jp/llds/ti_ja/general/eStore/notice_01.page

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If User uses EVMs in Japan, not certified to Technical Regulations of Radio Law of Japan, User is required to follow the instructions set forth by Radio Law of Japan, which includes, but is not limited to, the instructions below with respect to EVMs (which for the avoidance of doubt are stated strictly for convenience and should be verified by User):

1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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4.3.2 EVMs are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems. User assumes all responsibility and liability for proper and safe handling and use of the EVM by User or its employees, affiliates, contractors or designees. User assumes all responsibility and liability to ensure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard. User assumes all responsibility and liability for any improper or unsafe handling or use of the EVM by User or its employees, affiliates, contractors or designees.

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
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