EVM User's Guide: TPSM8D7620EVM

TPSM8D7620 Dual Step-Down Converter Evaluation Module

Description

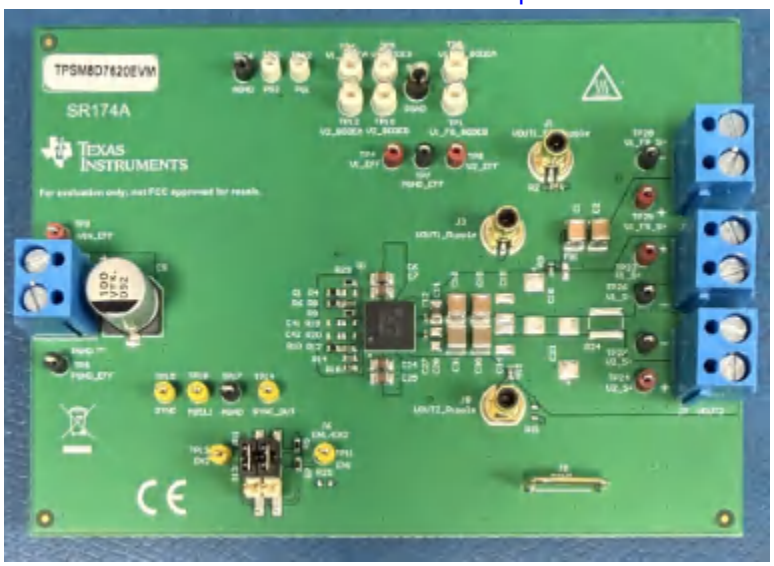
The TPSM8D7620 (SR174) evaluation module (EVM) facilitates the evaluation of the TPSM8D7620 (6A) and TPSM8D420 (4A) pin-to-pin compatible buck converters in small 6.4mm × 7mm overmolded ball grid array (BGA) package. The SR174 uses the 6A TPSM8D7620 to output two voltage rails: 1.2V and 2.5V for input voltage up to 17V. The SR174 EVM can be modified to support various multiphase and multioutput configurations.

Features

- Input voltage range: 4V to 17V
- Output voltage range: 0.6V to 11V
- Versatile multiphase (stacking up to two channels) and multi-output configuration
- Supports adjustable frequency from 400kHz to 2.2MHz or external clock
- Selectable internal or external compensation

Applications

- Test and measurement
- Aerospace and defense



TPSM8D7620EVM

1 Evaluation Module Overview

1.1 Introduction

The TPSM8D7620 uses fixed frequency peak current mode control to regulate the output voltage and operates between an adjustable 400kHz to 2.2MHz switching frequency.

This user's guide describes the characteristics and operation of the evaluation module TPSM8D7620EVM. This document provides instructions on how to use the evaluation module. Throughout this document, the terms of evaluation board, evaluation module, and EVM are synonymous with the TPSM8D7620EVM. This document also includes a schematic, reference printed circuit board (PCB) layout, and a complete bill of materials (BOM).

CAUTION

Hot surface! Contact can cause burns. Do not touch!

1.2 Kit Contents

Table 1-1 lists the contents of the EVM kit. Contact the Texas Instruments Product Information Center nearest you if any components are missing. TI highly recommends that users check the TI website to verify that the latest versions of the related software is being used.

Table 1-1. Kit Contents

Item	Quantity
TPSM8D7620EVM	1

1.3 Specification

Table 1-2 provides a summary of the TPSM8D7620EVM performance characteristics.

Table 1-2. Performance Specification

Tested at 25°C ambient temperature

TEST CONDITIONS		MIN	TYP	MAX	UNIT
Input voltage			12		V
Output voltage VOUT1	TPSM8D7620EVM, V_{IN} = 12V		2.5		V
Output voltage VOUT2	TPSM8D7620EVM, V_{IN} = 12V		1.2		V
Output current for each output	V_{IN} = 12V			6	A

1.4 Device Information

The TPSM8D7620 is a power-dense, dual-channel buck power module designed to provide efficient and reliable power conversion for a wide output voltage range from 0.6V to 11V. The module integrates MOSFETs, inductor, and select capacitors to reduce board space and layout complexity. The module can be configured into both 2-phase single output or 2 output rails. Under steady state conditions, the module operates in FCCM with a fixed-frequency that is resistor adjustable from 400kHz to 2.2MHz and synchronizable to an external clock. The TPSM8D7620 module employs current mode control with internal and external compensation. Sequencing requirements are easily met with the external soft start, active output discharge, adjustable EN, and power-good features. A full suite of protection features (overvoltage protection (OVP), undervoltage protection (UVP), input undervoltage lockout (UVLO), overtemperature (OT), overcurrent (OC)) are also included for robustness.

2 Hardware

2.1 Setup

This section describes how to properly connect, set up, and use the TPSM8D7620EVM.

2.1.1 Input and Output Connector Descriptions

Reference Designator	Description
J1-VOUT1_FB_Ripple	Positive connection (SMA) for VOUT1_FB ripple measurement on the optional secondary-stage output
J2-VOUT1_FB	Positive (+) and negative (-) connection for the optional secondary-stage output voltage VOUT1_FB (2.5V / 6A)
J3-VOUT1_Ripple	Positive connection (SMA) for VOUT1 ripple measurement
J4-VIN	Positive (+) and negative (-) connection for the input voltage VIN (5V to 17V)
J5-VOUT1	Positive (+) and negative (-) connection for output voltage VOUT1 (2.5V / 6A)
J6-EN1/EN2	Jumper for selection of EN1 and EN2 input voltage between external voltage (EN1_A/EN2_A) and the VIN-derived divider that enables EN startup at 4V VIN
J7-VOUT2	Positive (+) and negative (-) connection for output voltage VOUT2 (1.2V / 6A)
J8-VOUT2_Ripple	Positive connection (SMA) for VOUT2 ripple measurement
J9-PGND	Ground return jumper between the two PGND copper regions on the EVM
TP1 and TP2, TP5 and TP6, TP10 and TP12	Injection test points for Bode measurement. TP1 and TP2 - optional secondary-stage VOUT1_FB. TP5 and TP6 - VOUT1. TP10 and TP12 - VOUT2.
TP3-VIN_EFF	Test point to measure input voltage for efficiency measurement
TP4, TP8	Test points to measure output voltage for efficiency measurement. TP4 - VOUT1. TP8 - VOUT2.
TP7, TP19	Test points to measure ground voltage with respect to output for efficiency measurements (PGND_EFF / PGND)
TP9-PGND_EFF	Test point to measure ground voltage with respect to input voltage for efficiency measurement
TP11, TP13	Test points to measure EN pin voltage. TP11 - EN1. TP13 - EN2.
TP18-MSEL1	Test point to measure MSEL1 voltage (device-configuration pin-strap and analog junction-temperature output)
TP15-SYNC	Test point to inject SYNC external clock signal
TP14-SYNC_OUT	Test point to measure SYNC_OUT clock signal
TP16, TP17	Test points to measure analog ground (AGND) reference
TP21, TP22	Test points to measure power-good signals. TP21 - PG2. TP22 - PG1.
TP23, TP24, TP25	Remote-sense positive test points. TP23 - V1_S+ (VOUT1). TP24 - V2_S+ (VOUT2). TP25 - V1_FB_S+ (VOUT1_FB).
TP26, TP27, TP28	Remote-sense negative test points. TP26 - V1_S- (VOUT1). TP27 - V2_S- (VOUT2). TP28 - V1_FB_S- (VOUT1_FB).

2.1.2 Modification

The EVM is designed to support some modifications by the user. The external components like input caps, output caps, feedback resistors, and so forth can be changed according to the real application. Follow the datasheet guidelines for component design and selection.

The EVM can be configured in various multiphase and multi-output configurations. The default EVM is configured for two independent outputs. The following is a guide in terms of component connections to be made to configure the EVM in each of the possible configurations.

To configure a single output in 2-phase configuration:

1. Change R23 (MSEL strap) from 9.53kΩ to 41.2kΩ (selects 2+0, for more information on external compensation, see the *Device Configuration Pin (MSEL)* section of the TPSM8D7620 datasheet).
2. Populate R19 (10.5kΩ) and C41 (1200pF) to enable the external compensation network on COMP1. Leave R20/C42 DNP.
3. Populate 0Ω jumpers R24, R25, R26, R27, R28 in the "Optional Jumpers for parallel operation" block to tie VOUT1↔VOUT2, EN1↔EN2, COMP1↔COMP2, and SS1↔SS2.
4. Remove or float the FB2 divider (R10 and R12); PG2 pull-up R22 can be left unpopulated. Use J4/J5 (or J7) as the single combined output.

After these steps, VOUT1 and VOUT2 are merged into one 2-phase, 12A-capable output rail.

2.1.3 Input Capacitor

The ceramic input capacitors provide a low impedance source to the regulator in addition to supplying the ripple current and isolating switching noise from other circuits. A minimum of 10µF ceramic capacitance is required at each input and ground pin pair of the TPSM8D7620. Use two 10µF ceramic capacitance or more to improve EMI performance. The input capacitor must be rated for at least the maximum input voltage that the application requires. Having twice the maximum input voltage to reduce DC bias derating is preferable.

2.1.4 Output Capacitor

The output capacitor value and ESR determine the output voltage ripple and load transient performance. The load transient requirements typically limit the output capacitor rather than the output voltage ripple. For more detailed guidelines, see the *TPSM8D7620 3V to 17V, 4A, 6A, Dual Step-Down Power Module* datasheet.

3 Hardware Design Files

3.1 Schematic

Figure 3-1 shows the EVM schematic.

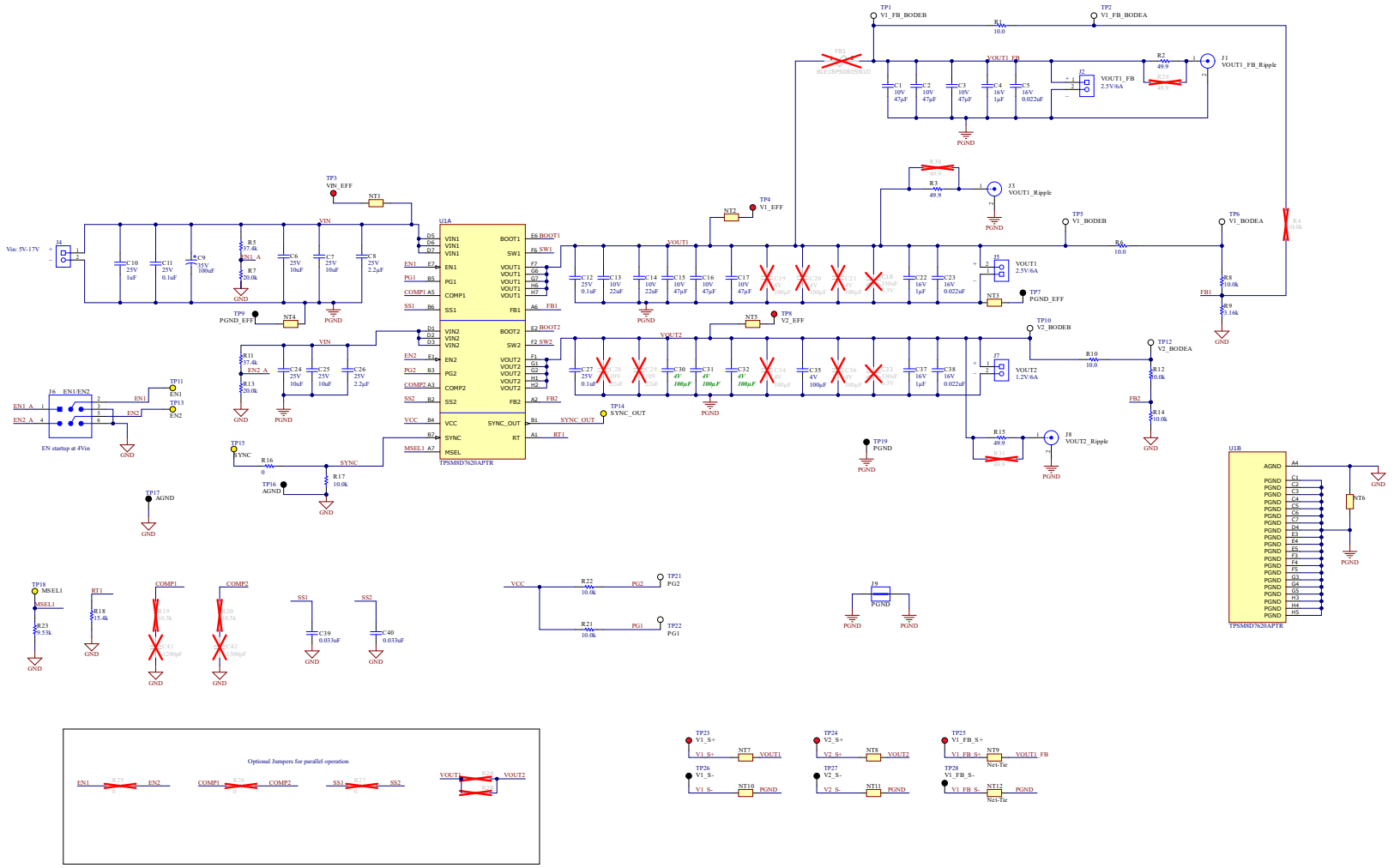


Figure 3-1. TPSM8D7620EVM Schematic

3.2 PCB Layout

The PCB of the TPSM8D7620EVM has six layers. Figure 3-2 and Figure 3-3 show the top side and bottom side of the PCB layout, respectively. Figure 3-4, Figure 3-5, Figure 3-6, and Figure 3-7 show the inner layer 1 and inner layer 2, inner layer 3, and inner layer 4, respectively.

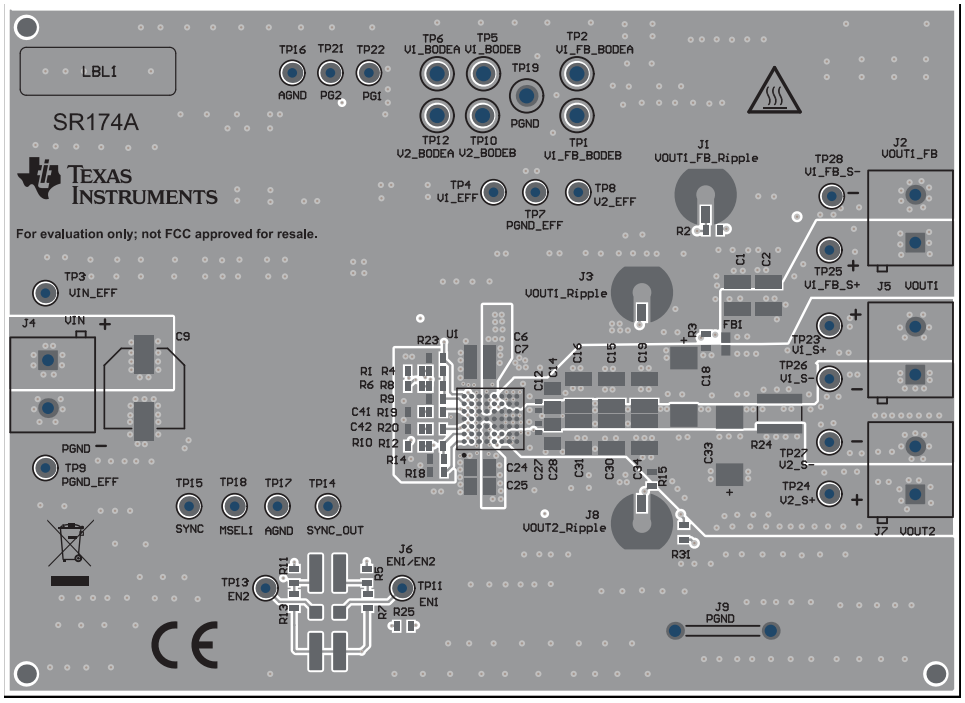


Figure 3-2. Top-Side Composite View

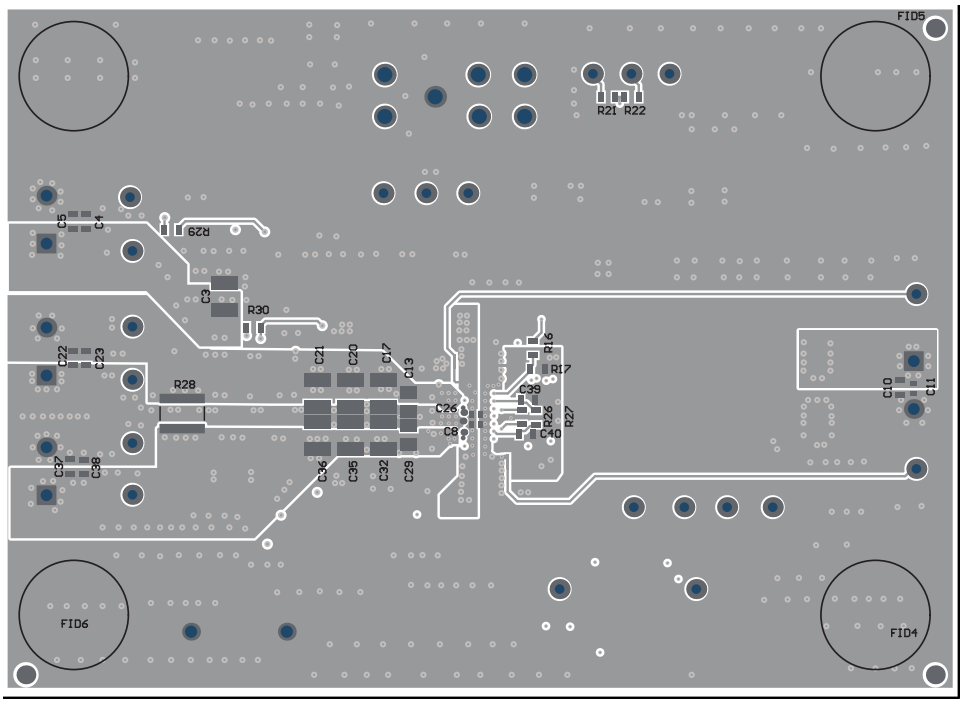


Figure 3-3. Bottom-Side Composite View

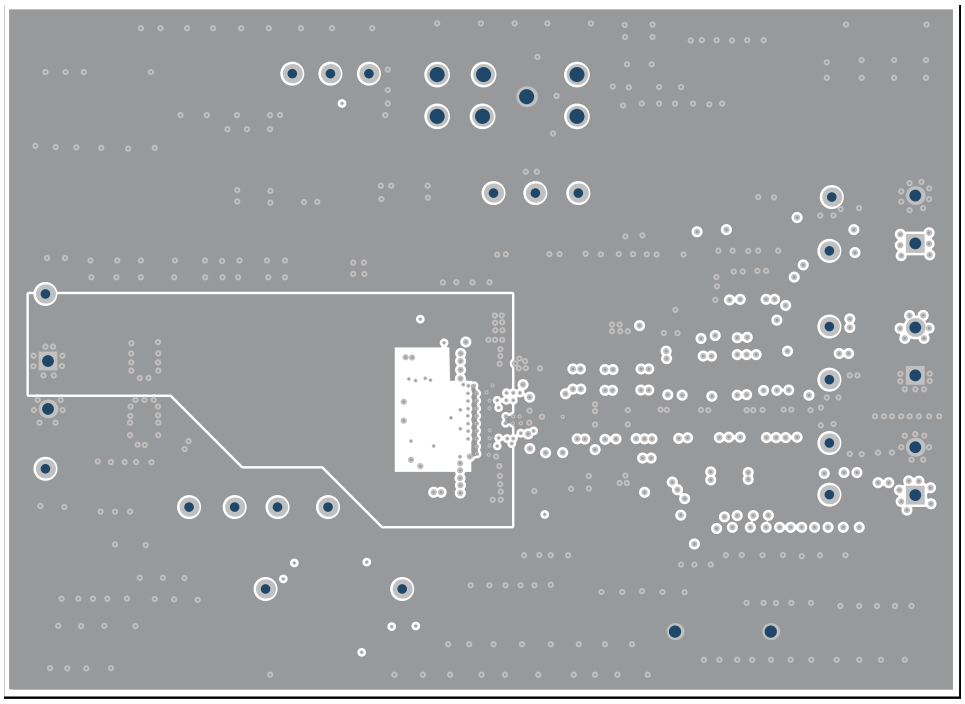


Figure 3-4. Inner Layer 1 Layout

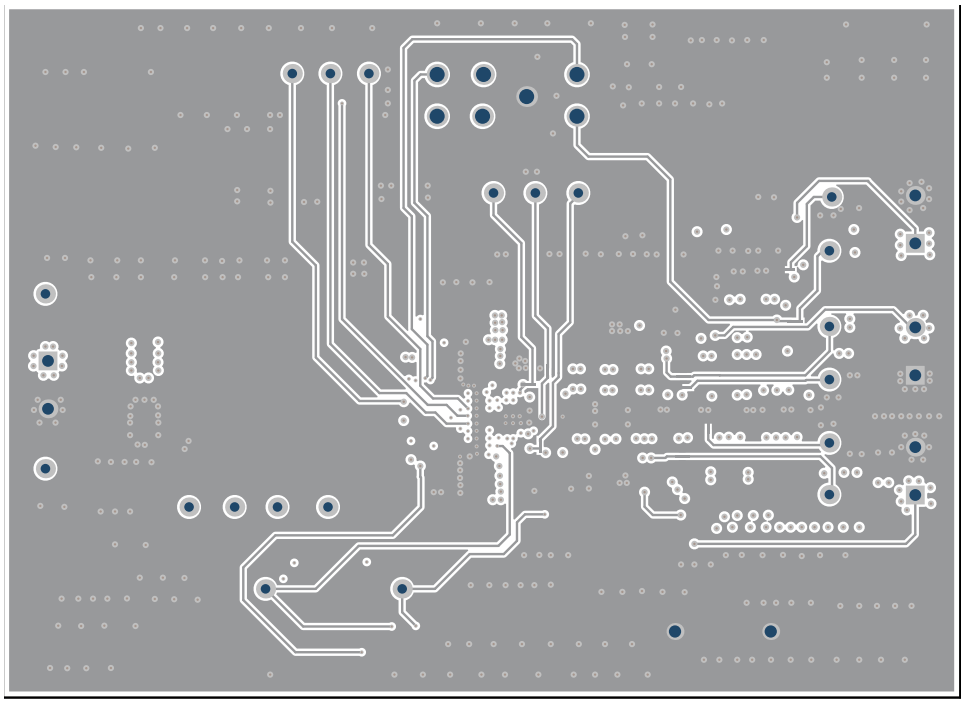


Figure 3-5. Inner Layer 2 Layout

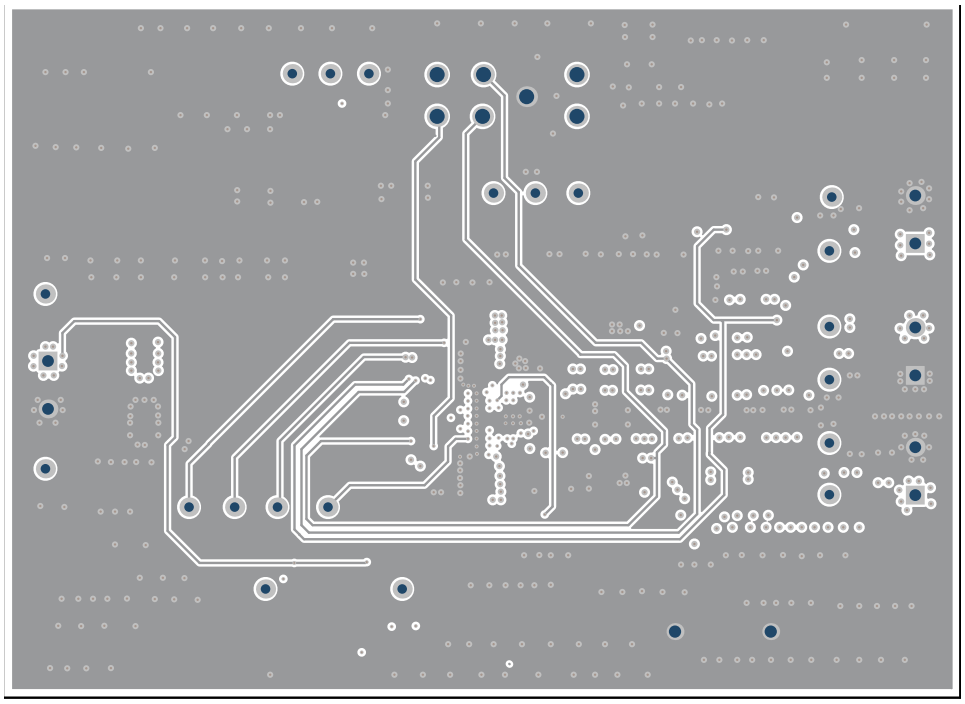


Figure 3-6. Inner Layer 3 Layout

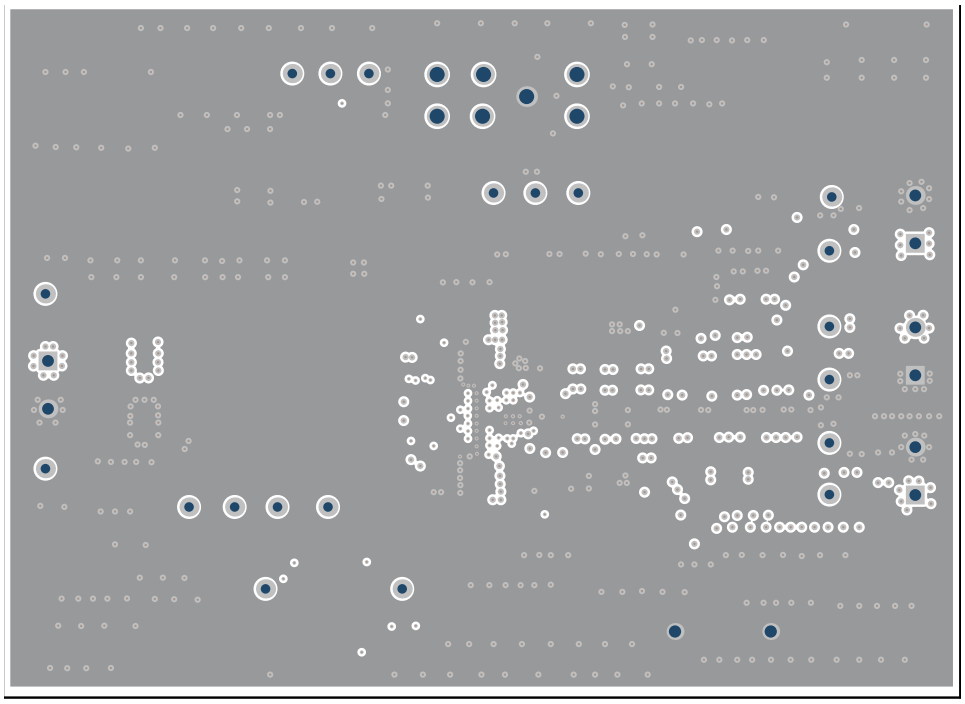


Figure 3-7. Inner Layer 4 Layout

3.3 Bill of Materials

Table 3-1 displays the EVM bill of materials.

Table 3-1. TPSM8D7620EVM Bill of Materials

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
C1, C2, C3, C15, C16, C17	6	47uF	CAP, CERM, 47 µF, 10V, ±20%, X7R, 1210	1210	LMK325B7476MM-PR	Taiyo Yuden®
C4, C22, C37	3	1uF	CAP, CERM, 1 µF, 16V, ±10%, X7R, AEC-Q200 Grade 1, 0603	0603	CL10B105KO8VPNC	Samsung Electro-Mechanics
C5, C23, C38	3	0.022uF	CAP, CERM, 0.022uF, 16V, ±10%, X7R, 0603	0603	GRM188R71C223KA01D	muRata™ muRata
C6, C7, C24, C25	4	10uF	CAP, CERM, 10uF, 25V, ±10%, X7S, 0805	0805	GRM21BC71E106KE11L	muRata
C8, C26	2	2.2uF	CAP, CERM, 2.2 µF, 25V, ±20%, X5R, 0402	0402	GRM155R61E225ME15D	muRata
C9	1	100uF	CAP, AL, 100uF, 35V, ±20%, 0.16Ω, AEC-Q200 Grade 2, SMD	SMT Radial F	EEE-FK1V101P	Panasonic
C10	1	1uF	CAP, CERM, 1uF, 25V, ±10%, X7R, 0603	0603	C1608X7R1E105K080AB	TDK
C11, C12, C27	3	0.1uF	CAP, CERM, 0.1uF, 25V, ±10%, X7R, 0402	0402	GRM155R71E104KE14D	muRata
C13, C14	2	22uF	CAP, CERM, 22uF, 10V, ±20%, X7S, 0805	0805	C2012X7S1A226M125AC	TDK
C30, C31, C32, C35	4	100uF	CAP, CERM, 100 µF, 4V, ±20%, X7S, 1210	1210	GRM32EC70G107ME15L	muRata
C39, C40	2	0.033uF	CAP, CERM, 0.033uF, 16V, ±10%, X7R, 0603	0603	GRM188R71C333KA01D	muRata
H1, H2, H3, H4	4		Bumpon, Hemisphere, 0.44X 0.20, Clear	Transparent Bumpon	SJ-5303 (CLEAR)	3M®
J1, J3, J8	3		Connector, Receptacle, 50Ω, TH	SMB Connector	SMBR004D00	JAE Electronics
J2, J4, J5, J7	4		Terminal Block, 5.08mm, 2x1, Brass, TH	2x1 5.08mm Terminal Block	ED120/2DS	On-Shore Technology
J6	1		Header, 2.54mm, 2x3, Gold with Tin tail, SMT	Header, 2.54mm, 2x3, SMT	TSM-102-01L-TV	Samtec®
J9	1		1mm Uninsulated Shorting Plug, 10.16mm spacing, TH	Shorting Plug, 10.16mm spacing, TH	D3082-05	Harwin®
LBL1	1		Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	PCB Label 0.650x 0.200 inch	THT-14-423-10	Brady®
R1, R6, R10	3	10	RES, 10.0, 1%, 0.25W, AEC-Q200 Grade 0, 0603	0603	CRCW060310R0FKEAHP	Vishay®-Dale
R2, R3, R15	3	49.9	RES, 49.9, 1%, 0.1W, 0603	0603	RC0603FR-0749R9L	Yageo®
R5, R11	2	37.4k	RES, 37.4k, 1%, 0.1W, AEC-Q200 Grade 0, 0603	0603	CRCW060337K4FKEA	Vishay-Dale

Table 3-1. TPSM8D7620EVM Bill of Materials (continued)

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
R7, R13	2	20.0k	RES, 20.0k, 1%, 0.1W, AEC-Q200 Grade 0, 0603	0603	CRCW060320K0FKEA	Vishay-Dale
R8, R12, R14, R17, R21, R22	6	10.0k	RES, 10.0k, 1%, 0.1W, AEC-Q200 Grade 0, 0603	0603	CRCW060310K0FKEA	Vishay-Dale
R9	1	3.16k	RES, 3.16k, 1%, 0.1W, AEC-Q200 Grade 0, 0603	0603	CRCW06033K16FKEA	Vishay-Dale
R16	1	0	RES, 0, 5%, 0.1W, AEC-Q200 Grade 0, 0603	0603	CRCW06030000Z0EA	Vishay-Dale
R18	1	15.4k	RES, 15.4k, 1%, 0.1W, AEC-Q200 Grade 0, 0603	0603	CRCW060315K4FKEA	Vishay-Dale
R23	1	9.53k	RES, 9.53k, 1%, 0.1W, AEC-Q200 Grade 0, 0603	0603	CRCW06039K53FKEA	Vishay-Dale
SH-J1, SH-J2	2	1x2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
TP1, TP2, TP5, TP6, TP10, TP12	6		Test Point, Multipurpose, White, TH	White Multipurpose Testpoint	5012	Keystone Electronics®
TP3, TP4, TP8, TP23, TP24, TP25	6		Test Point, Miniature, Red, TH	Red Miniature Testpoint	5000	Keystone Electronics
TP7, TP9, TP16, TP17, TP26, TP27, TP28	7		Test Point, Miniature, Black, TH	Black Miniature Testpoint	5001	Keystone Electronics
TP11, TP13, TP14, TP15, TP18	5		Test Point, Miniature, Yellow, TH	Yellow Miniature Testpoint	5004	Keystone Electronics
TP19	1		Test Point, Multipurpose, Black, TH	Black Multipurpose Testpoint	5011	Keystone Electronics
TP21, TP22	2		Test Point, Miniature, White, TH	White Miniature Testpoint	5002	Keystone Electronics
U1	1		4V to 17V, 6A, Dual Step-Down Power Module	FCBGA56	TPSM8D7620APTR	Texas Instruments

4 Additional Information

4.1 Trademarks

muRata™ is a trademark of Murata Manufacturing Co., Ltd..
Taiyo Yuden® is a registered trademark of Taiyo Yuden Co., Ltd..
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5 Revision History

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

DATE	REVISION	NOTES
May 2026	*	Initial Release

STANDARD TERMS FOR EVALUATION MODULES

1. *Delivery:* TI delivers TI evaluation boards, kits, or modules, including any accompanying demonstration software, components, and/or documentation which may be provided together or separately (collectively, an “EVM” or “EVMs”) to the User (“User”) in accordance with the terms set forth herein. User's acceptance of the EVM is expressly subject to the following terms.

   1.1 EVMs are intended solely for product or software developers for use in a research and development setting to facilitate feasibility evaluation, experimentation, or scientific analysis of TI semiconductors products. EVMs have no direct function and are not finished products. EVMs shall not be directly or indirectly assembled as a part or subassembly in any finished product. For clarification, any software or software tools provided with the EVM (“Software”) shall not be subject to the terms and conditions set forth herein but rather shall be subject to the applicable terms that accompany such Software

   1.2 EVMs are not intended for consumer or household use. EVMs may not be sold, sublicensed, leased, rented, loaned, assigned, or otherwise distributed for commercial purposes by Users, in whole or in part, or used in any finished product or production system.

2 *Limited Warranty and Related Remedies/Disclaimers*:

   2.1 These terms do not apply to Software. The warranty, if any, for Software is covered in the applicable Software License Agreement.

   2.2 TI warrants that the TI EVM will conform to TI's published specifications for ninety (90) days after the date TI delivers such EVM to User. Notwithstanding the foregoing, TI shall not be liable for a nonconforming EVM if (a) the nonconformity was caused by neglect, misuse or mistreatment by an entity other than TI, including improper installation or testing, or for any EVMs that have been altered or modified in any way by an entity other than TI, (b) the nonconformity resulted from User's design, specifications or instructions for such EVMs or improper system design, or (c) User has not paid on time. Testing and other quality control techniques are used to the extent TI deems necessary. TI does not test all parameters of each EVM. User's claims against TI under this Section 2 are void if User fails to notify TI of any apparent defects in the EVMs within ten (10) business days after delivery, or of any hidden defects with ten (10) business days after the defect has been detected.

   2.3 TI's sole liability shall be at its option to repair or replace EVMs that fail to conform to the warranty set forth above, or credit User's account for such EVM. TI's liability under this warranty shall be limited to EVMs that are returned during the warranty period to the address designated by TI and that are determined by TI not to conform to such warranty. If TI elects to repair or replace such EVM, TI shall have a reasonable time to repair such EVM or provide replacements. Repaired EVMs shall be warranted for the remainder of the original warranty period. Replaced EVMs shall be warranted for a new full ninety (90) day warranty period.

WARNING

Evaluation Kits 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 shall operate the Evaluation Kit within TI’s recommended guidelines and any applicable legal or environmental requirements as well as reasonable and customary safeguards. Failure to set up and/or operate the Evaluation Kit within TI’s recommended guidelines may result in personal injury or death or property damage. Proper set up entails following TI’s instructions for electrical ratings of interface circuits such as input, output and electrical loads.

NOTE:

EXPOSURE TO ELECTROSTATIC DISCHARGE (ESD) MAY CAUSE DEGREDATION OR FAILURE OF THE EVALUATION KIT; TI RECOMMENDS STORAGE OF THE EVALUATION KIT IN A PROTECTIVE ESD BAG.

3 *Regulatory Notices:*

3.1 *United States*

3.1.1 *Notice applicable to EVMs not FCC-Approved:*

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.

3.1.2 *For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:*

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.

Concerning EVMs Including Detachable Antennas:

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

3.3 *Japan*

3.3.1 *Notice for EVMs delivered in Japan:* Please see http://www.tij.co.jp/lsds/ti_ja/general/eStore/notice_01.page 日本国内に輸入される評価用キット、ボードについては、次のところをご覧ください。

https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-delivered-in-japan.html

3.3.2 *Notice for Users of EVMs Considered "Radio Frequency Products" in Japan:* EVMs entering Japan may not be certified by TI as conforming to Technical Regulations of Radio Law of Japan.

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.

【無線電波を送信する製品の開発キットをお使いになる際の注意事項】 開発キットの中には技術基準適合証明を受けていないものがあります。 技術適合証明を受けていないもののご使用に際しては、電波法遵守のため、以下のいずれかの措置を取っていただく必要がありますのでご注意ください。

1. 電波法施行規則第6条第1項第1号に基づく平成18年3月28日総務省告示第173号で定められた電波暗室等の試験設備でご使用いただく。
2. 実験局の免許を取得後ご使用いただく。
3. 技術基準適合証明を取得後ご使用いただく。

なお、本製品は、上記の「ご使用にあたっての注意」を譲渡先、移転先に通知しない限り、譲渡、移転できないものとします。

上記を遵守頂けない場合は、電波法の罰則が適用される可能性があることをご留意ください。 日本テキサス・インスツルメンツ株式会社

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西新宿三井ビル

3.3.3 *Notice for EVMs for Power Line Communication:* Please see http://www.tij.co.jp/lsds/ti_ja/general/eStore/notice_02.page

電力線搬送波通信についての開発キットをお使いになる際の注意事項については、次のところをご覧ください。https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-for-power-line-communication.html

3.4 *European Union*

3.4.1 *For EVMs subject to EU Directive 2014/30/EU (Electromagnetic Compatibility Directive)*:

This is a class A product intended for use in environments other than domestic environments that are connected to a low-voltage power-supply network that supplies buildings used for domestic purposes. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

4 *EVM Use Restrictions and Warnings:*

4.1 EVMS ARE NOT FOR USE IN FUNCTIONAL SAFETY AND/OR SAFETY CRITICAL EVALUATIONS, INCLUDING BUT NOT LIMITED TO EVALUATIONS OF LIFE SUPPORT APPLICATIONS.

4.2 User must read and apply the user guide and other available documentation provided by TI regarding the EVM prior to handling or using the EVM, including without limitation any warning or restriction notices. The notices contain important safety information related to, for example, temperatures and voltages.

4.3 *Safety-Related Warnings and Restrictions:*

4.3.1 User shall operate the EVM within TI's recommended specifications and environmental considerations stated in the user guide, other available documentation provided by TI, and any other applicable requirements and employ reasonable and customary safeguards. Exceeding the specified performance ratings and specifications (including but not limited to input and output voltage, current, power, and environmental ranges) for the EVM may cause personal injury or death, or property damage. If there are questions concerning performance ratings and specifications, User should contact a TI field representative prior to connecting interface electronics including input power and intended loads. Any loads applied outside of the specified output range may also result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. Please consult the EVM user guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative. During normal operation, even with the inputs and outputs kept within the specified allowable ranges, some circuit components may have elevated case temperatures. These components include but are not limited to linear regulators, switching transistors, pass transistors, current sense resistors, and heat sinks, which can be identified using the information in the associated documentation. When working with the EVM, please be aware that the EVM may become very warm.

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.

4.4 User assumes all responsibility and liability to determine whether the EVM is subject to any applicable international, federal, state, or local laws and regulations related to User's handling and use of the EVM and, if applicable, User assumes all responsibility and liability for compliance in all respects with such laws and regulations. User assumes all responsibility and liability for proper disposal and recycling of the EVM consistent with all applicable international, federal, state, and local requirements.

5. *Accuracy of Information:* To the extent TI provides information on the availability and function of EVMs, TI attempts to be as accurate as possible. However, TI does not warrant the accuracy of EVM descriptions, EVM availability or other information on its websites as accurate, complete, reliable, current, or error-free.

6. *Disclaimers:*

6.1 EXCEPT AS SET FORTH ABOVE, EVMS AND ANY MATERIALS PROVIDED WITH THE EVM (INCLUDING, BUT NOT LIMITED TO, REFERENCE DESIGNS AND THE DESIGN OF THE EVM ITSELF) ARE PROVIDED "AS IS" AND "WITH ALL FAULTS." TI DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, REGARDING SUCH ITEMS, INCLUDING BUT NOT LIMITED TO ANY EPIDEMIC FAILURE WARRANTY OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF ANY THIRD PARTY PATENTS, COPYRIGHTS, TRADE SECRETS OR OTHER INTELLECTUAL PROPERTY RIGHTS.

6.2 EXCEPT FOR THE LIMITED RIGHT TO USE THE EVM SET FORTH HEREIN, NOTHING IN THESE TERMS SHALL BE CONSTRUED AS GRANTING OR CONFERRING ANY RIGHTS BY LICENSE, PATENT, OR ANY OTHER INDUSTRIAL OR INTELLECTUAL PROPERTY RIGHT OF TI, ITS SUPPLIERS/LICENSORS OR ANY OTHER THIRD PARTY, TO USE THE EVM IN ANY FINISHED END-USER OR READY-TO-USE FINAL PRODUCT, OR FOR ANY INVENTION, DISCOVERY OR IMPROVEMENT, REGARDLESS OF WHEN MADE, CONCEIVED OR ACQUIRED.

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Last updated 10/2025