

适用于 DDR5 On-DIMM 电源的 TPS53830A 集成式数字降压转换器

1 特性

- 单器件设计，支持 DDR5 应用
- 3 个输出，可支持 VDD (1.1V)、VDDQ (1.1V) 和 VPP (1.8V)，并具有可选的第 4 个输出 (VDD2)
- 对于 3 个输出，VDD (SWA 双相) 为 12A、VDDQ(SWC) 为 6A，VPP(SWD) 为 5A，具有 3 路输出
- 对于 4 个输出，VDD1(SWA) 为 6A、VDD2(SWB) 为 6A、VDDQ(SWC) 为 6A，VPP(SWD) 为 5A
- 差分遥测：VDD、VDDQ 和 VPP
- D-CAP+™ 控制，可实现快速瞬态响应
- 宽输入电压：4.5 V 至 15 V
- 可编程内部环路补偿
- 每相逐周期电流限制
- 可编程频率：500 kHz 至 1.375 MHz
- 支持用于电压、电流、功率、温度和故障状况遥测的 I²C 和 I3C 总线接口
- 过流、过压和过热保护
- 持久寄存器 (黑盒) 功能
- 低静态电流
- 5mm × 5mm、35 引脚、QFN PowerPad™ 封装

2 应用

- 用于服务器的 DDR5 On-DIMM 电源

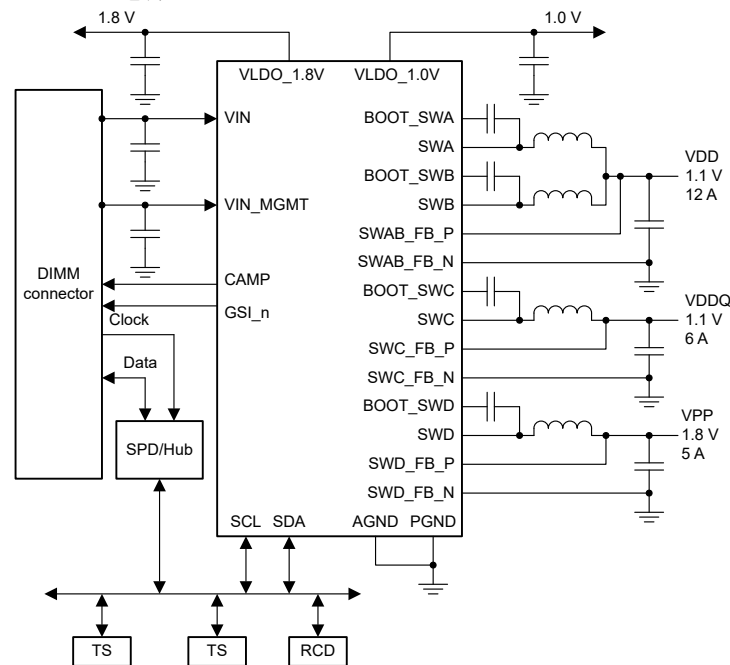


图 3-1. 简化版应用

3 说明

TPS53830A 是适用于 DDR5 DIMM 自载电源的 D-CAP+™ 模式集成式降压转换器，该转换器具有可配置电流能力，可为 DIMM 模块上的 DRAM 芯片提供 VDD、VDDQ 和 VPP 电压。高电流轨可以配置为两相或 2 个输出，从而提供高达 12A (或 6A + 6A) 的电流，并采用 D-CAP+™ 模式控制。该转换器还采用内部补偿以方便使用并减少外部元件。

该转换器提供全套遥测功能，包括输入电压、输出电压和输出电流。此外，还提供过压、欠压、过流限制和过热保护。

TPS53830A 采用耐热增强型 35 引脚 QFN 封装，工作温度范围为 -40°C 至 +105°C。

器件信息

器件型号	封装 ⁽¹⁾	封装尺寸 (标称值)
TPS53830A	RWZ	5.00mm x 5.00mm

- (1) 如需了解所有可用封装，请参阅数据表末尾的可订购产品附录。



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4 Revision History

注：以前版本的页码可能与当前版本的页码不同

DATE	REVISION	NOTES
October 2022	*	Initial release

5 Device and Documentation Support

5.1 接收文档更新通知

要接收文档更新通知，请导航至 [ti.com](https://www.ti.com) 上的器件产品文件夹。点击 [订阅更新](#) 进行注册，即可每周接收产品信息更改摘要。有关更改的详细信息，请查看任何已修订文档中包含的修订历史记录。

5.2 支持资源

[TI E2E™ 支持论坛](#) 是工程师的重要参考资料，可直接从专家获得快速、经过验证的解答和设计帮助。搜索现有解答或提出自己的问题可获得所需的快速设计帮助。

链接的内容由各个贡献者“按原样”提供。这些内容并不构成 TI 技术规范，并且不一定反映 TI 的观点；请参阅 TI 的《[使用条款](#)》。

5.3 Trademarks

D-CAP+™, PowerPad™, and TI E2E™ are trademarks of Texas Instruments.
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5.4 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

5.5 术语表

[TI 术语表](#)

本术语表列出并解释了术语、首字母缩略词和定义。

6 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
TPS53830ARWZR	ACTIVE	VQFN-HR	RWZ	35	3000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 105	TPS 53830A	Samples

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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