

TPS53627适用于 VR13 CPU V_{CORE} 和 DDR 内存的两相 D-CAP+™ 降压控制器

1 特性

- 兼容 Intel®VR13 串行 VID (SVID)
- 单相或两相运行
- 支持压降和非压降应用
- 8 位 DAC，具有 10mV 的步长
- 4.5V 至 28V 转换电压范围
- 输出电压范围：0.5V 到 2.3V
- 轻重负载情况下效率均得到优化
- 8 级独立的过冲衰减 (OSR) 和下冲衰减 (USR)
- 无驱动器配置，有助于实现高效的高频开关
- 支持分立式、电源块、功率级™或 DrMOS MOSFET 实施
- 精确可调电压定位
- 300kHz 至 1MHz 的频率选择
- 已获专利 AutoBalance™相位均衡
- 适用于负载瞬态升压的可编程 ON-Pulse 扩展
- 可编程自动 DCM 和 CCM 运行
- 可选 8 级电流限制
- 小型 32 引脚 4mm × 4mm VQFN 封装 PowerPad™封装

2 应用范围

- 适用于 DDR 内存的 VDDQ
- SoC 处理器 V_{CORE} 电源

3 说明

TPS53627 器件是兼容 VR13 SVID 的无驱动器同步降压控制器。高级控制特性（例如具有重叠脉冲的 D-CAP+™架构）支持下冲衰减 (USR) 和过冲衰减 (OSR)，可提供快速瞬态响应、最低输出电容和高效率。该器件还支持在 CCM 和 DCM 运行情况下进行单相运行，从而提高轻负载情况下的效率。该器件集成了一整套 VR13 I/O 特性，包括 $\overline{\text{VR_READY}}$ (PGOOD)、 $\overline{\text{ALERT}}$ 和 $\overline{\text{VR_HOT}}$ 。SVID 接口地址允许在 00h 到 07h 的时间范围内进行编程。输出电压转换率的可调节控制可编程为高达 20mV/uS。

与 TI NexFET™功率级配合使用时，该总体解决方案可提供超高速度和低开关损耗。

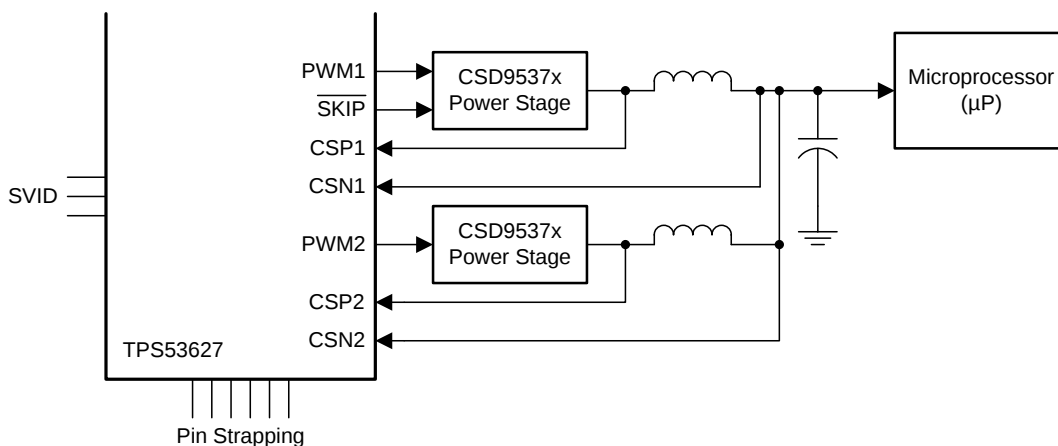
TPS53627 器件采用节省空间的热增强型 32 引脚 VQFN 封装，可在 -40°C 到 +105°C 温度下运行。

器件信息(1)

器件型号	封装	封装尺寸（标称值）
TPS53627	VQFN (32)	4.00mm x 4.00mm

(1) 要了解所有可用封装，请参阅文档末尾的可订购产品附录。

简化电路原理图



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4 修订历史记录

日期	修订版本	注释
2017 年 3 月	*	最初发布。

5 器件和文档支持

5.1 文档支持

5.1.1 相关文档

相关文档如下：

[TPS51604](#) 数据表

5.2 接收文档更新通知

如需接收文档更新通知，请访问 www.ti.com.cn 网站上的器件产品文件夹。点击右上角的提醒我 (Alert me) 注册后，即可每周定期收到已更改的产品信息。有关更改的详细信息，请查阅已修订文档中包含的修订历史记录。

5.3 社区资源

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Design Support *TI's Design Support* Quickly find helpful E2E forums along with design support tools and contact information for technical support.

5.4 商标

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5.5 静电放电警告



这些装置包含有限的内置 ESD 保护。存储或装卸时，应将导线一起截短或将装置放置于导电泡棉中，以防止 MOS 门极遭受静电损伤。

5.6 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

6 机械、封装和可订购信息

以下页中包括机械、封装和可订购信息。这些信息是针对指定器件可提供的最新数据。这些数据会在无通知且不对本文档进行修订的情况下发生改变。欲获得该数据表的浏览器版本，请查阅左侧的导航栏。

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
TPS53627RSMR	Active	Production	VQFN (RSM) 32	3000 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 105	TPS 53627
TPS53627RSMR.A	Active	Production	VQFN (RSM) 32	3000 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 105	TPS 53627
TPS53627RSMR.B	Active	Production	VQFN (RSM) 32	3000 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 105	TPS 53627
TPS53627RSMT	Active	Production	VQFN (RSM) 32	250 SMALL T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 105	TPS 53627
TPS53627RSMT.A	Active	Production	VQFN (RSM) 32	250 SMALL T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 105	TPS 53627
TPS53627RSMT.B	Active	Production	VQFN (RSM) 32	250 SMALL T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 105	TPS 53627

⁽¹⁾ **Status:** For more details on status, see our [product life cycle](#).

⁽²⁾ **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

⁽³⁾ **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

⁽⁴⁾ **Lead finish/Ball material:** Parts 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.

⁽⁵⁾ **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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GENERIC PACKAGE VIEW

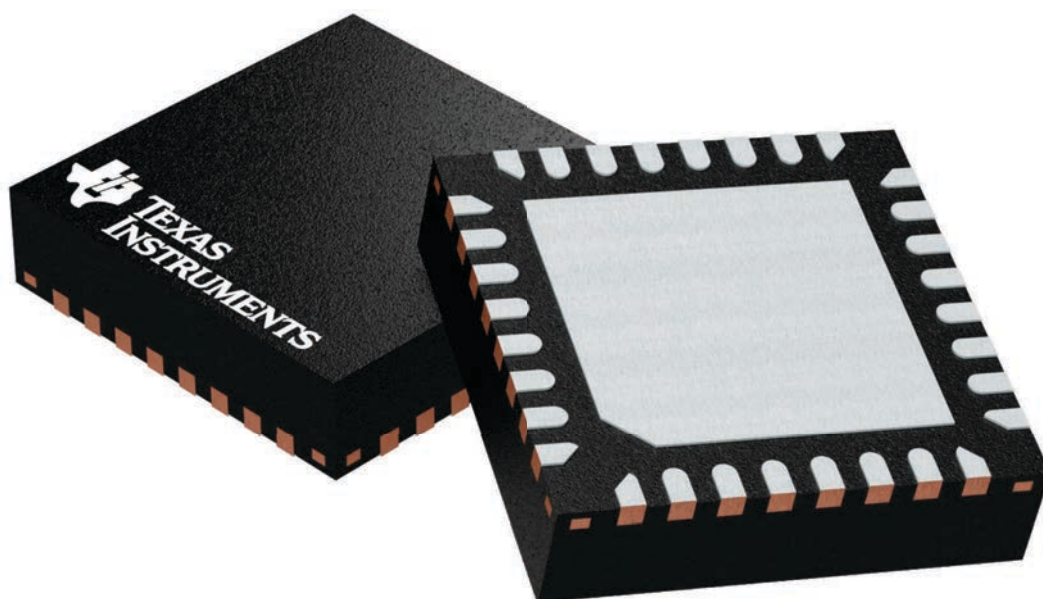
RSM 32

VQFN - 1 mm max height

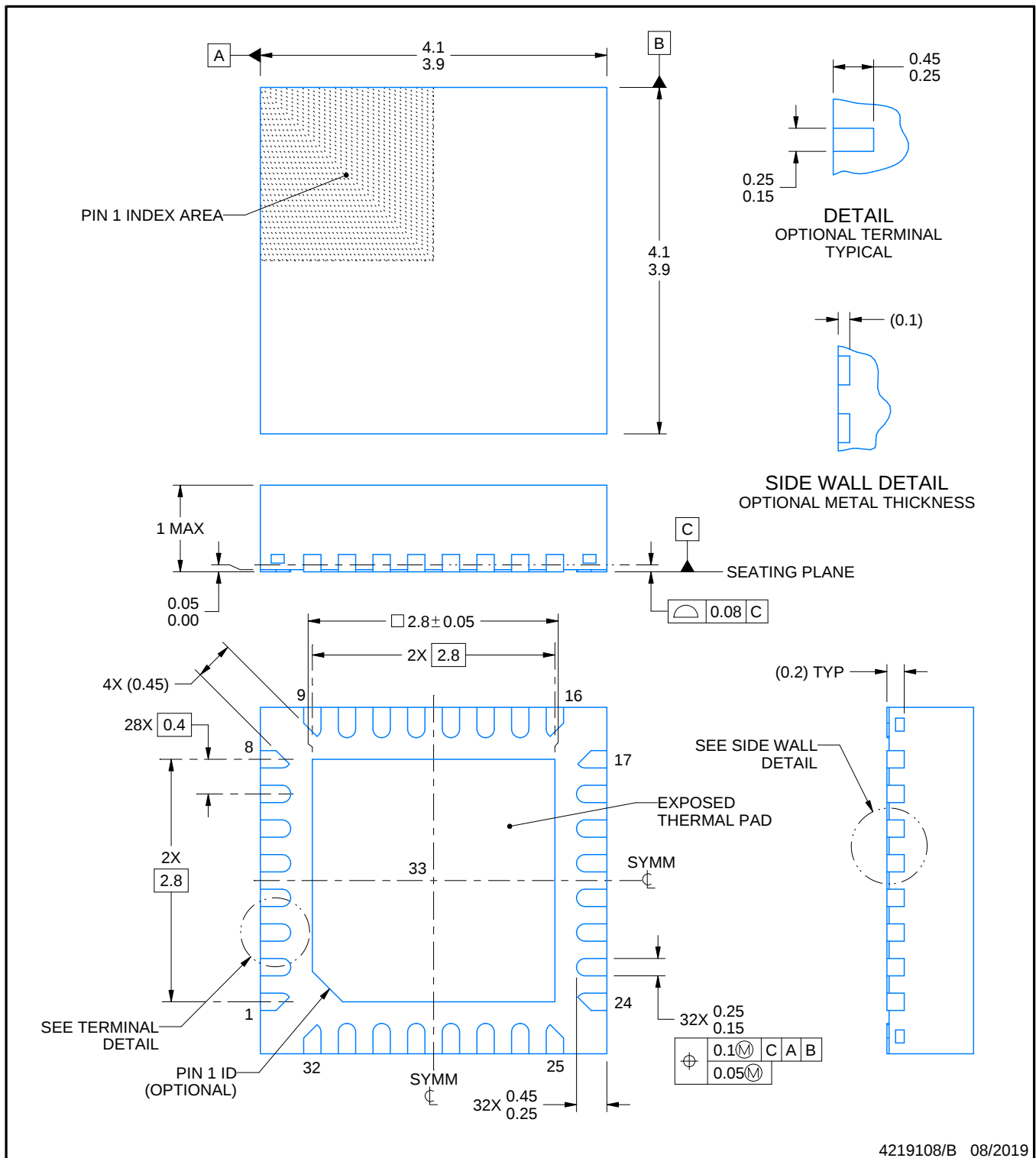
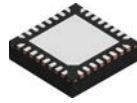
4 x 4, 0.4 mm pitch

PLASTIC QUAD FLATPACK - NO LEAD

This image is a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.



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NOTES:

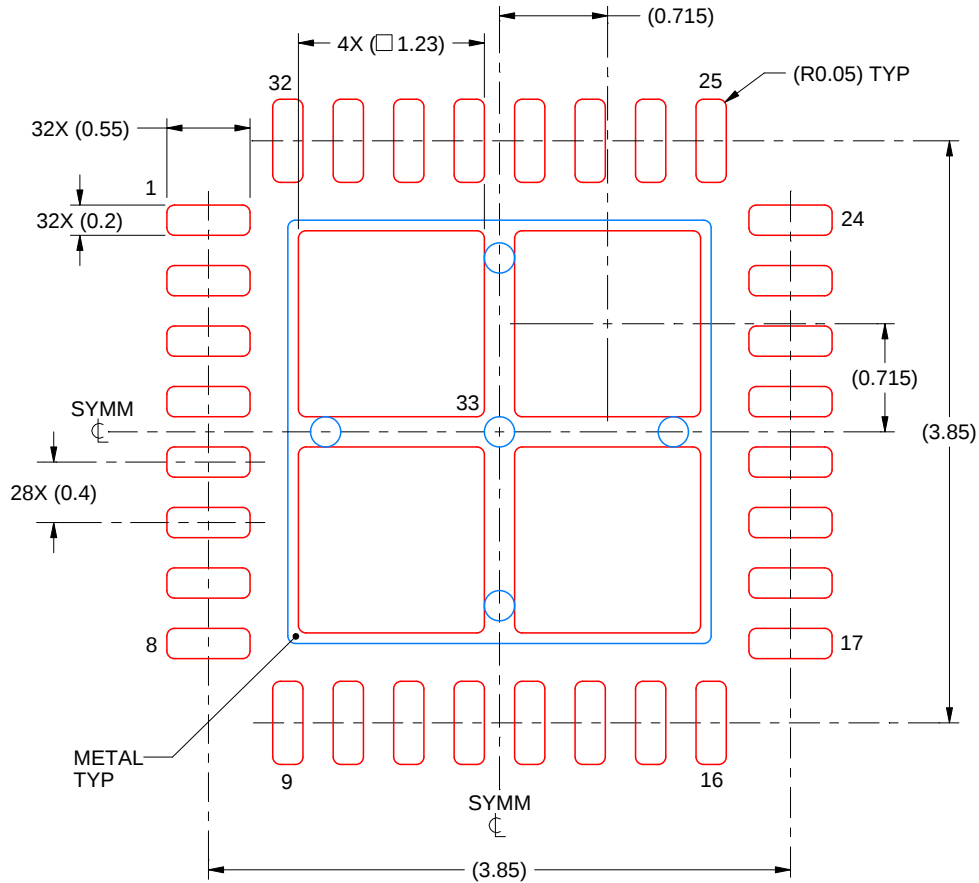
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

EXAMPLE STENCIL DESIGN

RSM0032B

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



SOLDER PASTE EXAMPLE
BASED ON 0.1 mm THICK STENCIL

EXPOSED PAD 33:
77% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE
SCALE:20X

4219108/B 08/2019

NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

重要通知和免责声明

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