

## 适用于 Intel® CPU 电源且带 SVID 接口的集成降压转换器

### 1 特性

- 可支持 Intel VR13.HC SVID POL 应用的单芯片
- 可支持 VCCANA (5.5A) 和 P1V8 (4A) 的两个输出
- 针对快速瞬态响应提供 D-CAP+™ 控制
- 宽输入电压范围 (4.5V 至 15V)
- 差动遥感
- 可编程内部环路补偿
- 每相逐周期电流限制
- 可编程开关频率范围为 800kHz 至 2MHz
- 用于电压、电流、功率、温度和故障条件遥测的 I<sup>2</sup>C 系统接口
- 过流、过压和过热保护
- 低静态电流
- 5mm × 5mm、35 引脚 QFN、PowerPAD 封装

### 2 应用

- 适用于 Intel 服务器平台的低电流 SVID 电源轨

### 3 说明

TPS53820 器件是一款 D-CAP+ 模式集成降压转换器，可适用于 Intel CPU 电源的低电流 SVID 电源轨。它最多可提供两路输出为低电流 SVID 电源轨（如 VCCANA (5.5A) 和 P1V8 (4A)）供电。该器件采用 D-CAP+ 模式控制，可提供快速的负载瞬态性能。内部补偿可简化使用并减少外部器件。

该器件还提供针对输入电压、输出电压、输出电流和温度报告的遥测功能。此外，还提供过压、过流和过热保护。

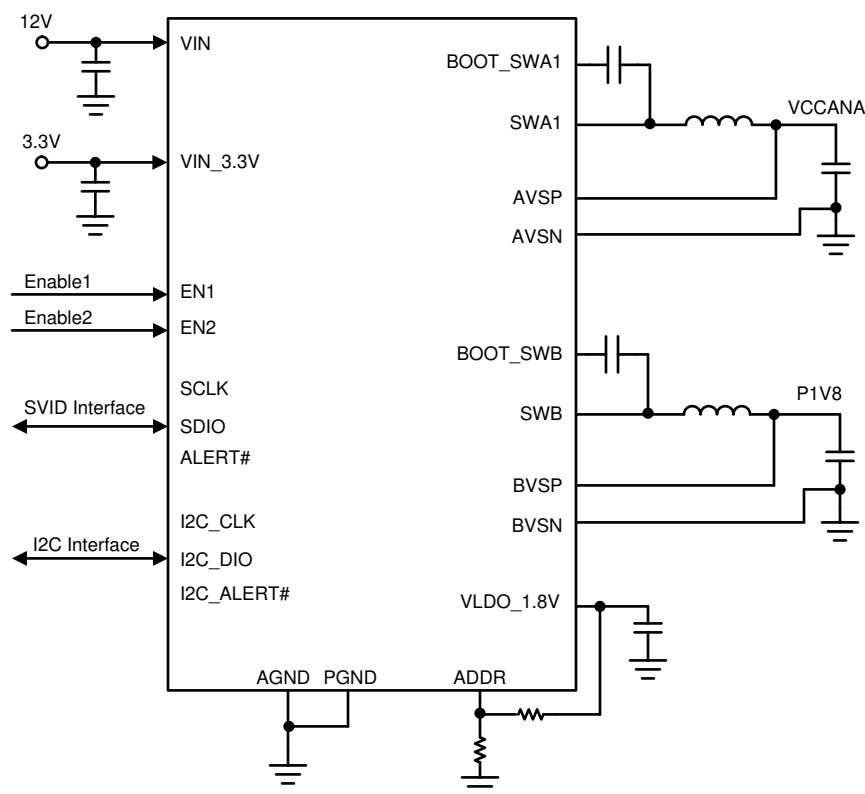
TPS53820 器件采用耐热增强型 35 引脚 QFN 封装，工作温度范围为 -40°C 至 125°C。

表 1. 器件信息<sup>(1)</sup>

器件型号	封装	封装尺寸 (标称值)
TPS53820	RWZ (35)	5mm × 5mm

(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。

图 1. 简化应用



## 4 修订历史记录

注：之前版本的页码可能与当前版本有所不同。

日期	修订版本	说明
2020 年 1 月	*	初始发行版。

## 5 器件和文档支持

### 5.1 商标

针对快速瞬态响应提供 D-CAP+ is a trademark of Texas Instruments.

All other trademarks are the property of their respective owners.

### 5.2 静电放电警告



ESD 可能会损坏该集成电路。德州仪器 (TI) 建议通过适当的预防措施处理所有集成电路。如果不遵守正确的处理措施和安装程序，可能会损坏集成电路。

ESD 的损坏小至导致微小的性能降级，大至整个器件故障。精密的集成电路可能更容易受到损坏，这是因为非常细微的参数更改都可能会导致器件与其发布的规格不相符。

## 6 机械、封装和可订购信息

以下页面包含机械、封装和可订购信息。这些信息是指定器件的最新可用数据。数据如有变更，恕不另行通知，且不会对此文档进行修订。如需获取此数据表的浏览器版本，请查阅左侧的导航栏。

## 6.1 Package Option Addendum

### 6.1.1 Packaging Information

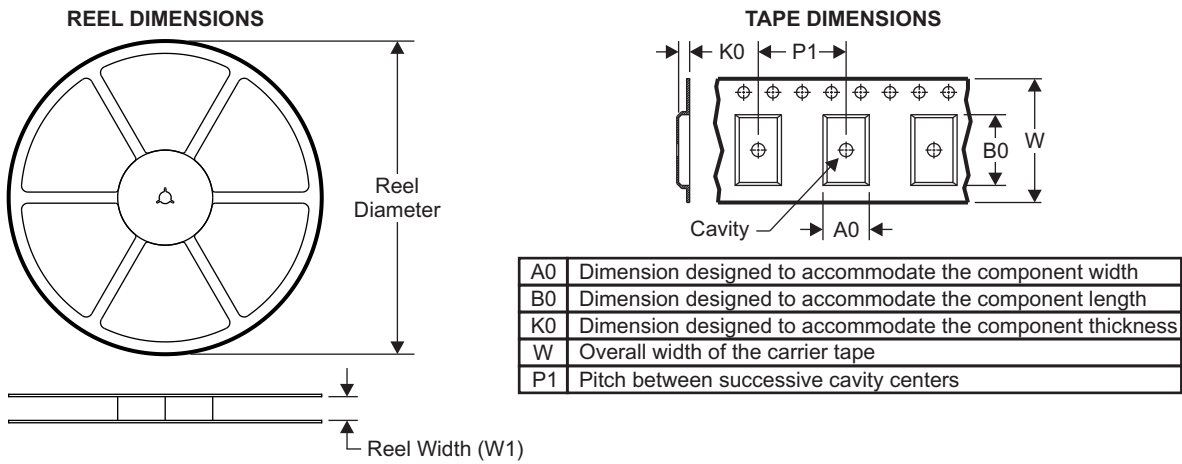
Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish <sup>(3)</sup>	MSL Peak Temp <sup>(4)</sup>	Op Temp (°C)	Device Marking <sup>(5)(6)</sup>
TPS53820RWZR	ACTIVE	VQFN-HR	RWZ	35	3000	Green (RoHS & no Sb/Br)	NiPdAu	Level-2-260C-1 YEAR	-40 to 125	TPS53820
TPS53820RWZT	ACTIVE	VQFN-HR	RWZ	35	250	Green (RoHS & no Sb/Br)	NiPdAu	Level-2-260C-1 YEAR	-40 to 125	TPS53820

- (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.  
**PRE\_PROD** Unannounced device, not in production, not available for mass market, nor on the web, samples not available.  
**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) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.  
**TBD:** The Pb-Free/Green conversion plan has not been defined.  
**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.  
**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.  
**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)
- (3) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.
- (4) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.
- (5) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device
- (6) 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.

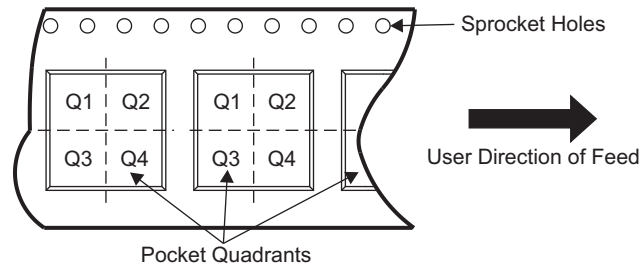
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### 6.1.2 Tape and Reel Information

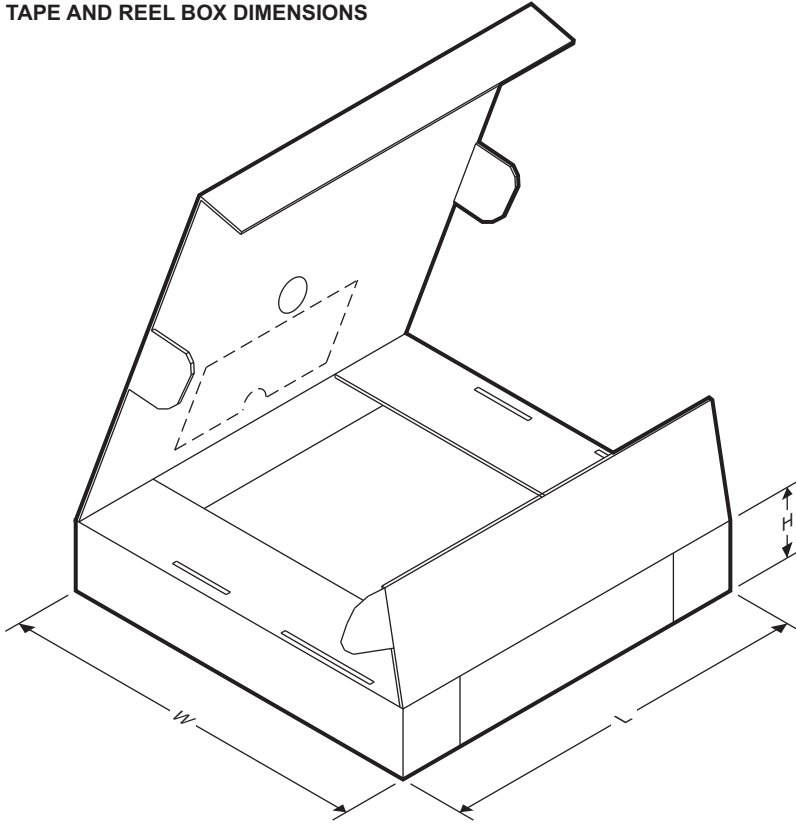


#### QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE





Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TPS53820RWZR	VQFN-HR	RWZ	35	3000	330.0	12.4	5.3	5.3	1.1	8.0	12.0	Q2
TPS53820RWZT	VQFN-HR	RWZ	35	250	180.0	12.4	5.3	5.3	1.1	8.0	12.0	Q2

TAPE AND REEL BOX DIMENSIONS



Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TPS53820RWZR	VQFN-HR	RWZ	35	3000	367.0	367.0	35.0
TPS53820RWZT	VQFN-HR	RWZ	35	250	210.0	185.0	35.0

**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
TPS53820RWZR	ACTIVE	VQFN-HR	RWZ	35	3000	RoHS & Green	Call TI   NIPDAU	Level-2-260C-1 YEAR	-40 to 125	TPS 53820	
TPS53820RWZT	ACTIVE	VQFN-HR	RWZ	35	250	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	TPS 53820	

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

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**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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