

TPS53632G D-CAP+™ Half-Bridge PWM Controller Optimized for GaN-based 48-V DC/DC Converter with I²C Interface

1 Features

- Valley Current Mode with Constant ON Time Control
- Lossless Current Sensing Scheme
- I²C Interface for VID Control and Telemetry
- Programmable I²C Addresses up to Eight Devices
- Switching Frequency up to 1 MHz
- Digital Current Monitor
- 7-Bit, DAC Output Range: 0.50-V to 1.52-V with 10-mV Step
- Accurate, Adjustable Voltage Positioning or Zero Slope Load-Line
- Selectable, 8-Level Current Limit
- Adjustable Output Slew Rate Control
- Default Boot Voltage: 1.00 V
- Small, 4-mm x 4-mm, 32-Pin, VQFN, PowerPAD Package

2 Applications

- 48-V Point-of-Load (POL) for Data Center and Telecommunication
- Wide Input Range Power Supplies for Industrial

3 Description

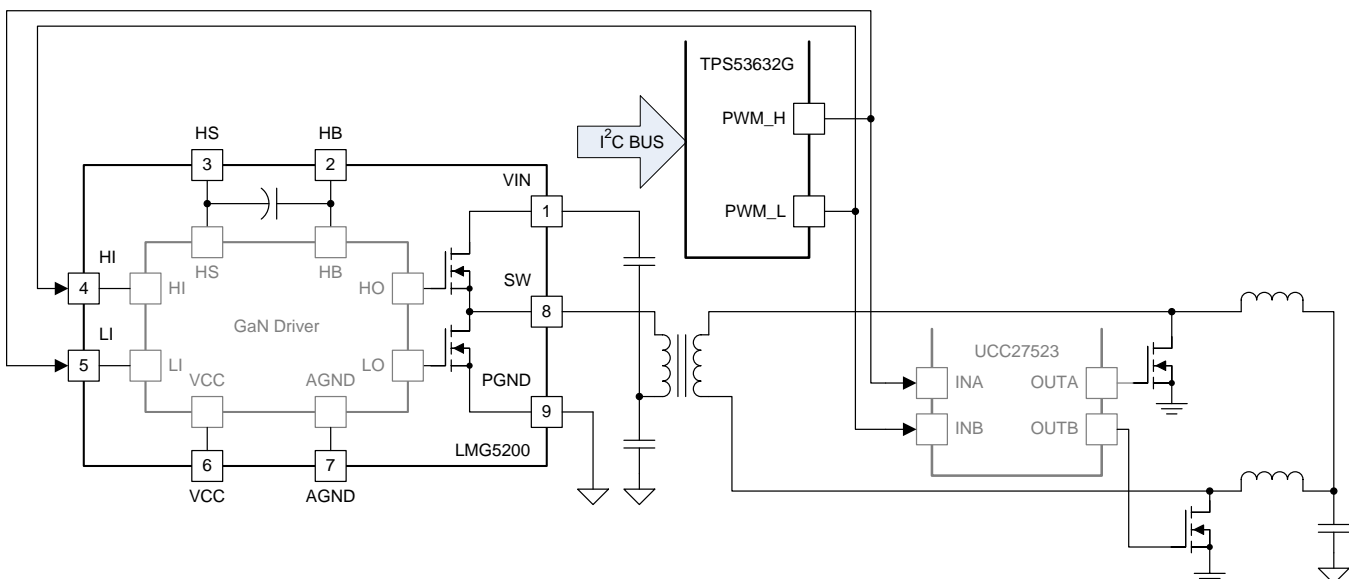
The TPS53632G device is a half-bridge PWM controller with D-CAP+™ architecture that provides fast transient response, lowest output capacitance and high efficiency in single stage conversion directly from 48-V bus. The TPS53632G device supports the standard I²C Rev 3.0 interface for dynamic control of the output voltage and current monitor telemetry. Paired with TI GaN power stages and drivers, the TPS53632G can switch up to 1 MHz to minimize magnetic component size and reduce overall board space. The LMG5200 GaN power stage is designed specifically for this controller to achieve high frequency and efficiency as high as 92% with 48-V to 1-V conversion.

Other features include adjustable control of output slew rate and voltage positioning. In addition, the TPS53632G device can be used along with other TI discrete power MOSFETs and drivers for silicon-based half bridge solutions. The TPS53632G device is packaged in a space saving, thermally enhanced, 32-pin VQFN package and is rated to operate at a range between –10°C and 105°C.

Device Information

PART NUMBER	PACKAGE	BODY SIZE
TPS53632G	VQFN	4 mm x 4 mm

Simplified Schematic



4 Device and Documentation Support

4.1 Trademarks

D-CAP+ is a trademark of Texas Instruments.
All other trademarks are the property of their respective owners.

4.2 Electrostatic Discharge Caution



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

4.3 Glossary

[SLYZ022](#) — *TI Glossary*.

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

5 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/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
TPS53632GRSMR	PREVIEW	VQFN	RSM	32	3000	TBD	Call TI	Call TI	-10 to 105		
TPS53632GRSMT	PREVIEW	VQFN	RSM	32	250	TBD	Call TI	Call TI	-10 to 105		

(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) 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) 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.

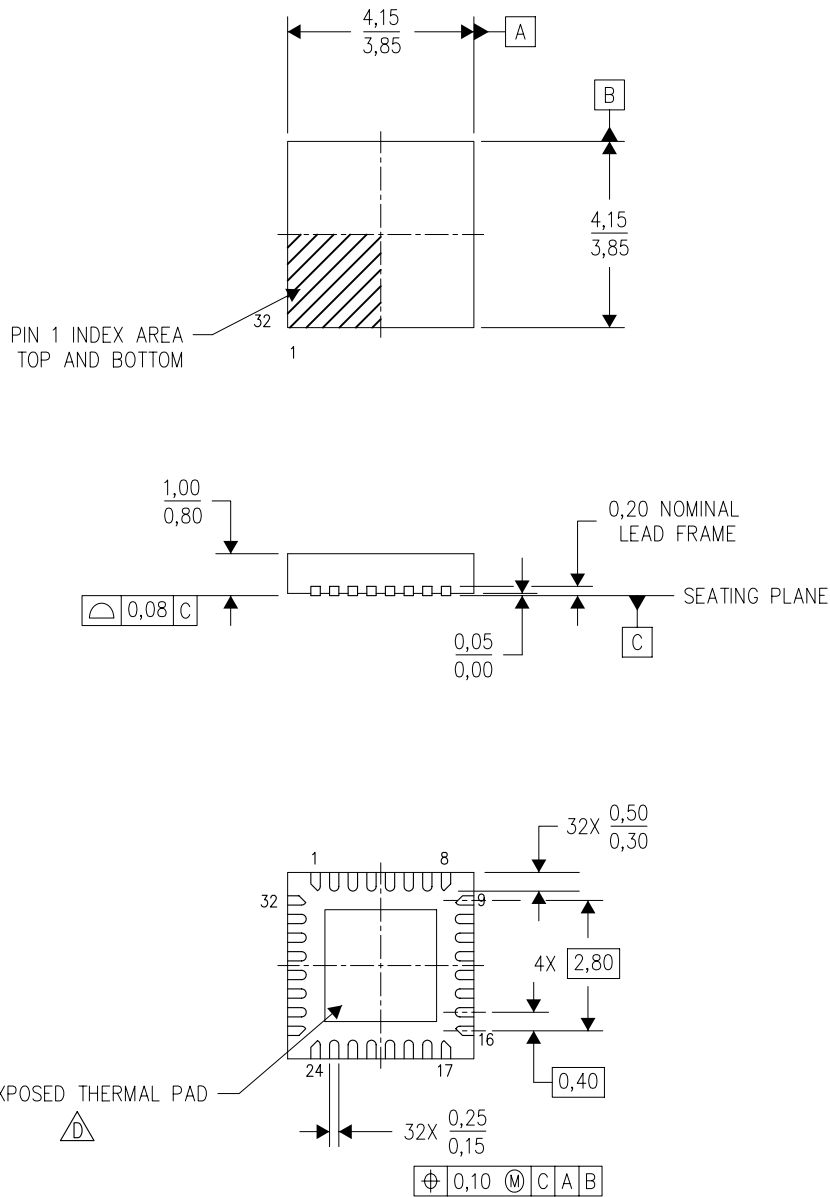
(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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RSM (S-PVQFN-N32)

PLASTIC QUAD FLATPACK NO-LEAD



4207560/B 03/10

- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
 - B. This drawing is subject to change without notice.
 - C. QFN (Quad Flatpack No-Lead) Package configuration.
 -  The package thermal pad must be soldered to the board for thermal and mechanical performance. See the Product Data Sheet for details regarding the exposed thermal pad dimensions.

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