

# CSD95411 Synchronous Buck NexFET™ Smart Power Stage

## 1 Features

- Peak continuous current: 65-A
- Peak efficiency ( $f_{SW} = 600$  kHz,  $L_{OUT} = 150$  nH): Over 94%
- High-frequency operation: up to 1.75 MHz
- Diode emulation function
- Temperature compensated bi-directional current sense
- Analog temperature output
- Fault monitoring
- 3.3-V and 5-V PWM signal compatible
- Tri-state PWM input
- Integrated bootstrap switch
- Optimized dead time for shoot-through protection
- High-density Industry Common QFN 5-mm × 6-mm Footprint
- Ultra-low-inductance package
- System optimized PCB footprint
- Thermally enhanced topside cooling
- RoHS compliant, lead-free terminal plating
- Halogen free

## 2 Applications

- Multiphase Synchronous Buck Converters
  - High-Frequency Applications
  - High-Current, Low-Duty Cycle Applications
- POL DC-DC Converters
- Memory and Graphic Cards
- Desktop and Server VR12.x / VR13.x / VR14.x V-Core Synchronous Buck Converters

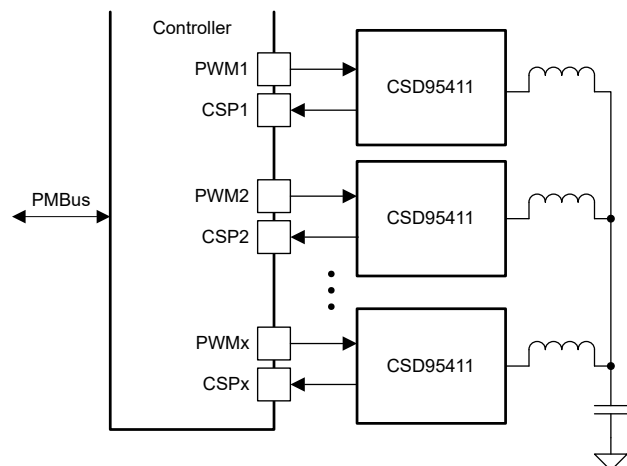
## 3 Description

The CSD95411 NexFET™ power stage is a highly optimized design for use with a high-power, high-density synchronous buck converter. This device integrates the driver IC and power MOSFETs to complete the power stage switching function. This combination produces high-current, high-efficiency, and high-speed switching capability in a small 5-mm × 6-mm outline package. The power stage also integrates the accurate current sensing and temperature sensing functionality to simplify system design and improve accuracy. The optimized PCB footprint helps reduce design time and simplify the completion of the overall system design.

### Device Information

| DEVICE       | MEDIA        | QTY  | PACKAGE <sup>(1)</sup>   | SHIP          |
|--------------|--------------|------|--------------------------|---------------|
| CSD95411RRB  | 13-Inch Reel | 2500 | QFN<br>5.00-mm × 6.00-mm | Tape and Reel |
| CSD95411RRBT | 7-Inch Reel  | 250  |                          |               |

(1) For all available packages, see the orderable addendum at the end of the data sheet.



**Simplified Application**



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## 4 Revision History

| DATE         | REVISION | NOTES            |
|--------------|----------|------------------|
| January 2023 | *        | Initial release. |

## 5 Device and Documentation Support

### 5.1 Device Support

#### 5.1.1 Third-Party Products Disclaimer

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### 5.2 Documentation Support

#### 5.3 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](https://www.ti.com). Click on *Notifications* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

### 5.4 Support Resources

TI E2E™ [support forums](#) are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

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### 5.5 Trademarks

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### 5.6 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.

### 5.7 Glossary

#### [TI Glossary](#)

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

## 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 part number        | Status<br>(1) | Material type<br>(2) | Package   Pins       | Package qty   Carrier | RoHS<br>(3) | Lead finish/<br>Ball material<br>(4) | MSL rating/<br>Peak reflow<br>(5) | Op temp (°C) | Part marking<br>(6) |
|------------------------------|---------------|----------------------|----------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| <a href="#">CSD95411RRB</a>  | Active        | Production           | VQFN-CLIP (RRB)   41 | 2500   LARGE T&R      | ROHS Exempt | NIPDAU                               | Level-2-260C-1 YEAR               | -40 to 125   | 95411RRB            |
| CSD95411RRB.B                | Active        | Production           | VQFN-CLIP (RRB)   41 | 2500   LARGE T&R      | ROHS Exempt | NIPDAU                               | Level-2-260C-1 YEAR               | -40 to 125   | 95411RRB            |
| <a href="#">CSD95411RRBT</a> | Active        | Production           | VQFN-CLIP (RRB)   41 | 250   LARGE T&R       | ROHS Exempt | NIPDAU                               | Level-2-260C-1 YEAR               | -40 to 125   | 95411RRB            |
| CSD95411RRBT.B               | Active        | Production           | VQFN-CLIP (RRB)   41 | 250   LARGE T&R       | ROHS Exempt | NIPDAU                               | Level-2-260C-1 YEAR               | -40 to 125   | 95411RRB            |

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

<sup>(2)</sup> **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.

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

<sup>(4)</sup> **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.

<sup>(5)</sup> **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.

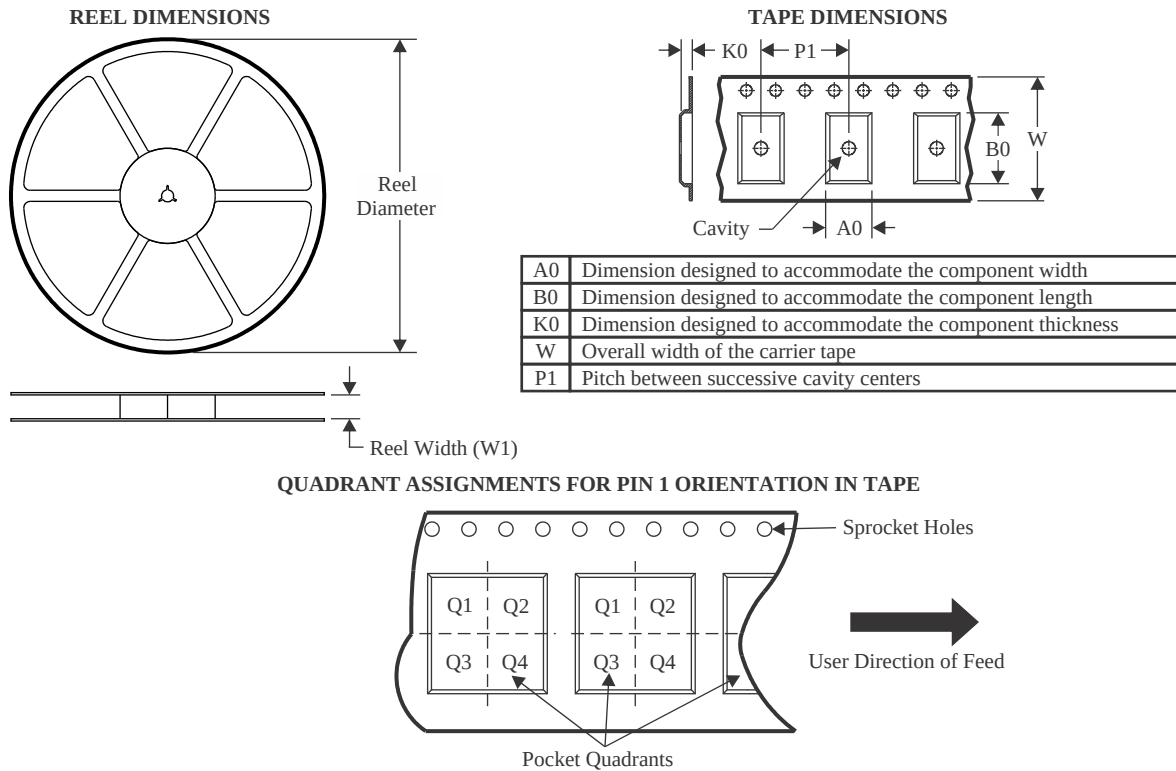
<sup>(6)</sup> **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

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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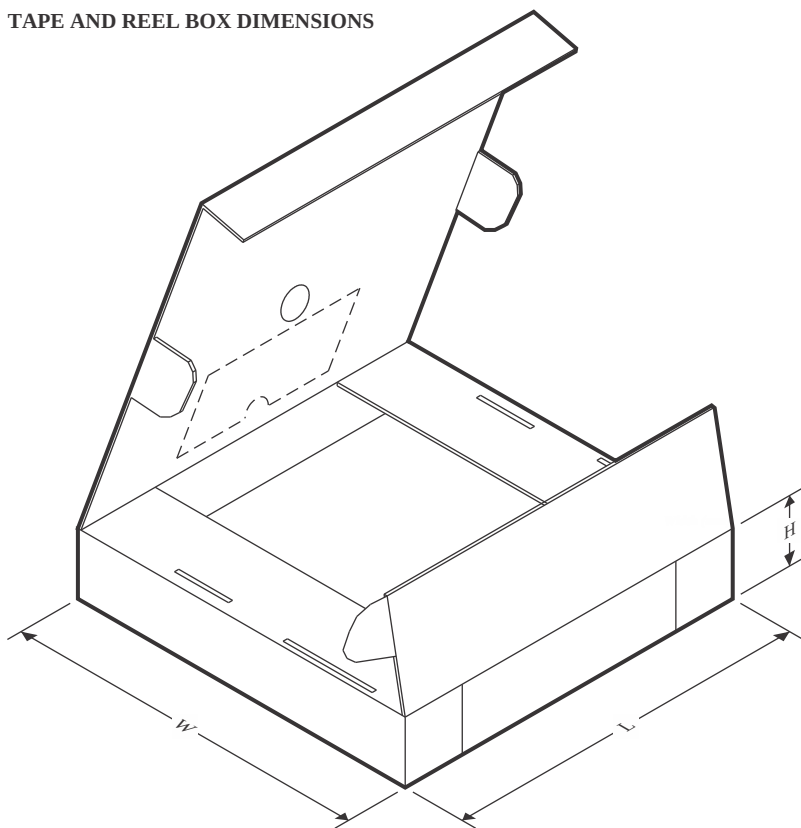
## TAPE AND REEL INFORMATION



\*All dimensions are nominal

| 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 |
|--------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| CSD95411RRB  | VQFN-CLIP    | RRB             | 41   | 2500 | 330.0              | 12.4               | 5.3     | 6.3     | 1.2     | 8.0     | 12.0   | Q1            |
| CSD95411RRBT | VQFN-CLIP    | RRB             | 41   | 250  | 180.0              | 12.4               | 5.3     | 6.3     | 1.2     | 8.0     | 12.0   | Q1            |

## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

| Device       | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|--------------|--------------|-----------------|------|------|-------------|------------|-------------|
| CSD95411RRB  | VQFN-CLIP    | RRB             | 41   | 2500 | 367.0       | 367.0      | 38.0        |
| CSD95411RRBT | VQFN-CLIP    | RRB             | 41   | 250  | 213.0       | 191.0      | 35.0        |

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