

CSD95420RCB 同期整流式降圧 NexFET™ スマート・パワー・ステージ

1 特長

- 50A のピーク連続電流
- 15A 時に 94% を超えるシステム効率
- 高周波数 (最高 1.75MHz) での動作
- ダイオード・エミュレーション機能
- 温度補償された双方向電流検出
- アナログ温度出力
- フォルト監視
- 3.3V および 5V の PWM 信号と互換
- トライステート PWM 入力
- ブートストラップ・スイッチ内蔵
- 貫通電流保護用に最適化されたデッドタイム
- QFN パッケージ
 - 高密度
 - 4mm × 5mm
 - 非常に低いインダクタンス
 - システム最適化された PCB 占有面積
 - 熱特性強化型ツォーリング
 - RoHS 準拠
 - 鉛フリーの端子メッキ処理
 - ハロゲン不使用

2 アプリケーション

- マルチフェーズの同期整流式降圧コンバータ
 - 高周波アプリケーション
 - 大電流、低デューティ・サイクルのアプリケーション
- POL DC/DC コンバータ
- メモリ・カードおよびグラフィック・カード
- デスクトップ PC およびサーバー向け VR13.x / VR14.x V-Core 同期整流式降圧コンバータ

3 概要

CSD95420RCB NexFET™ 電力段は、高電力、高密度の同期整流式降圧コンバータ向けに高度に最適化されています。この製品は、ドライバ・デバイスとパワー MOSFET を統合することにより、電力段スイッチングの完結した機能を実現します。この構成により、大電流、高効率、高速のスイッチング能力が、外形 4mm × 5mm の小型パッケージ内で実現されます。このデバイスは、正確な電流および温度検出機能を内蔵することで、システム設計の簡素化と精度の向上を両立しています。PCB 上の占有面積が最適化されているので、設計期間が短縮され、システム全体の設計が簡素化されます。

製品情報

デバイス ⁽¹⁾	中	数量	パッケージ	出荷形態
CSD95420RCBRCB	13 インチ・リール	2500	QFN 4.00mm × 5.00mm	テープ・アンド・リール

(1) 利用可能なすべてのパッケージについては、データシートの末尾にある注文情報を参照してください。

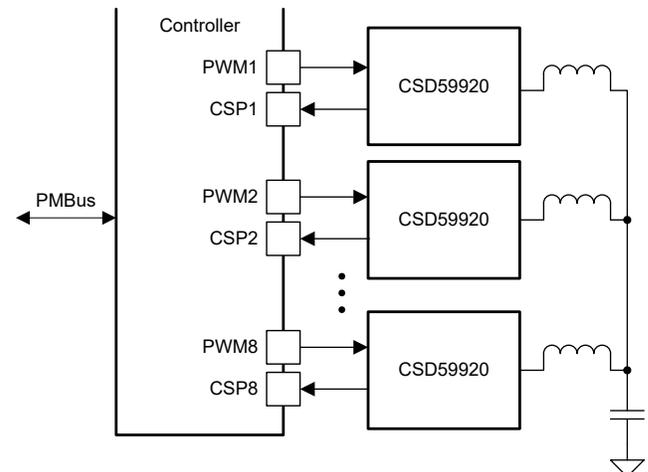


図 3-1. アプリケーション概略



Table of Contents

1 特長	1	5.6 用語集.....	3
2 アプリケーション	1	6 Mechanical, Packaging, and Orderable Information ...	3
3 概要	1	6.1 Package Option Addendum.....	4
4 Revision History	2	6.2 Mechanical Drawing.....	8
5 Device and Documentation Support	3	6.3 Recommended PCB Land Pattern.....	9
5.1 Documentation Support.....	3	6.4 Recommended Stencil Opening.....	10
5.2 ドキュメントの更新通知を受け取る方法.....	3	6.5 Alternate Industry Standard Compatible PCB Land Pattern.....	11
5.3 サポート・リソース.....	3	6.6 Alternate Industry Standard Compatible Stencil Opening.....	12
5.4 Trademarks.....	3		
5.5 静電気放電に関する注意事項.....	3		

4 Revision History

DATE	REVISION	NOTES
November 2020	*	Initial release.

5 Device and Documentation Support

5.1 Documentation Support

5.2 ドキュメントの更新通知を受け取る方法

ドキュメントの更新についての通知を受け取るには、[ti.com](https://www.ti.com) のデバイス製品フォルダを開いてください。「更新の通知を受け取る」をクリックして登録すると、変更されたすべての製品情報に関するダイジェストを毎週受け取れます。変更の詳細については、修正されたドキュメントに含まれている改訂履歴をご覧ください。

5.3 サポート・リソース

[TI E2E™ サポート・フォーラム](#) は、エンジニアが検証済みの回答と設計に関するヒントをエキスパートから迅速かつ直接得ることができる場所です。既存の回答を検索したり、独自の質問をしたりすることで、設計に必要な支援を迅速に得ることができます。

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5.5 静電気放電に関する注意事項



この IC は、ESD によって破損する可能性があります。テキサス・インスツルメンツは、IC を取り扱う際には常に適切な注意を払うことを推奨します。正しい取り扱いおよび設置手順に従わない場合、デバイスを破損するおそれがあります。

ESD による破損は、わずかな性能低下からデバイスの完全な故障まで多岐にわたります。精密な IC の場合、パラメータがわずかに変化するだけで公表されている仕様から外れる可能性があるため、破損が発生しやすくなっています。

5.6 用語集

[テキサス・インスツルメンツ用語集](#) この用語集には、用語や略語の一覧および定義が記載されています。

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.

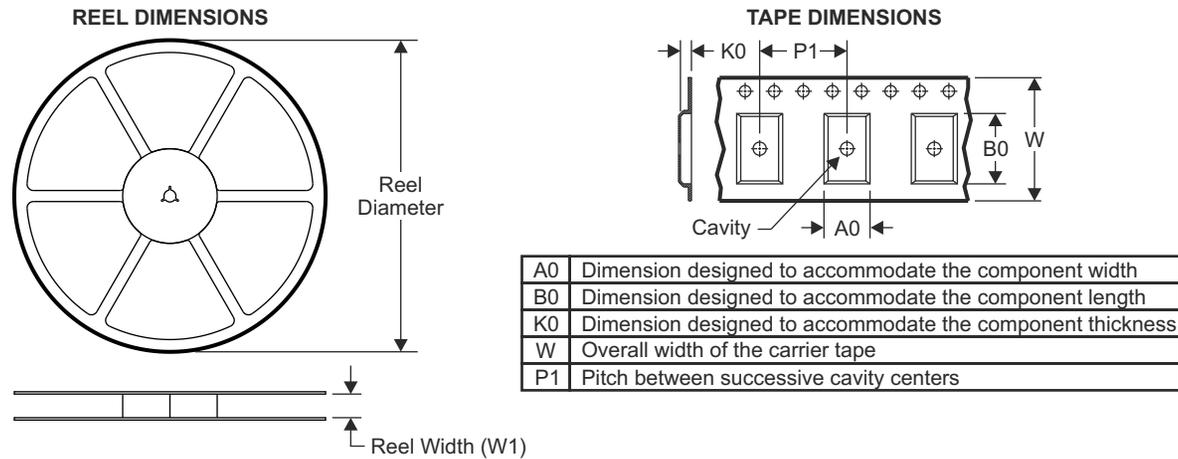
6.1 Package Option Addendum

6.1.1 Packaging Information

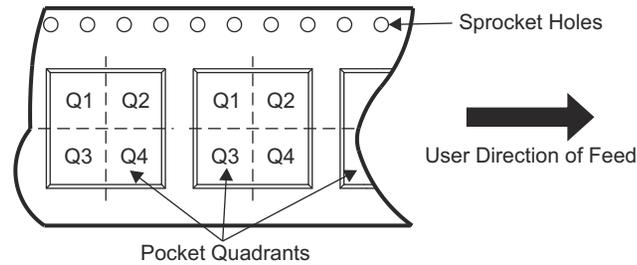
Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾	Op Temp (°C)	Device Marking ^{(4) (5)}
CSD95420RCBRCB	Active	QFN	RCB	27	2500	PB-Free (RoHS Exempt)	CU NIPDAU	Level-2-260CUNLIM	-55 to 150	59920RB

- (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) 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 on 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



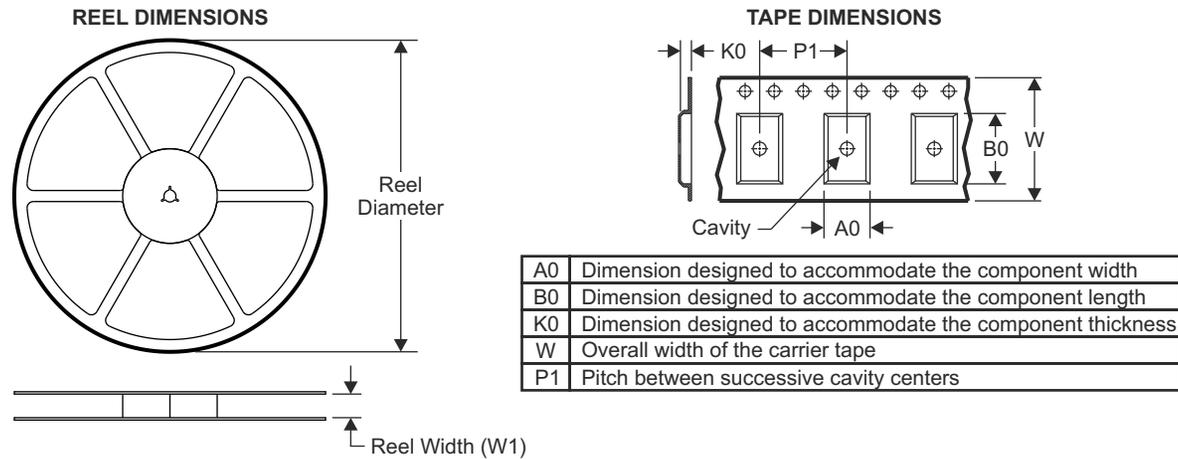
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
CSD95420RCB	VQFN-CLIP	RCB	27	2500	330	12.4	4.30	5.30	1.30	8.00	12.00	Q1
CSD95420RCBT	VQFN-CLIP	RCB	27	250	330	12.4	4.30	5.30	1.30	8.00	12.00	Q1

6.1.1 Packaging Information

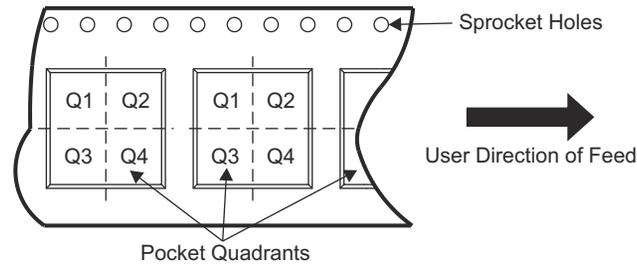
Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾	Op Temp (°C)	Device Marking ^{(4) (5)}
CSD95420RCBRCB	Active	QFN	RCB	27	2500	PB-Free (RoHS Exempt)	CU NIPDAU	Level-2-260CUNLIM	-55 to 150	59920RB

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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.
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- (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
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6.1.2 Tape and Reel Information

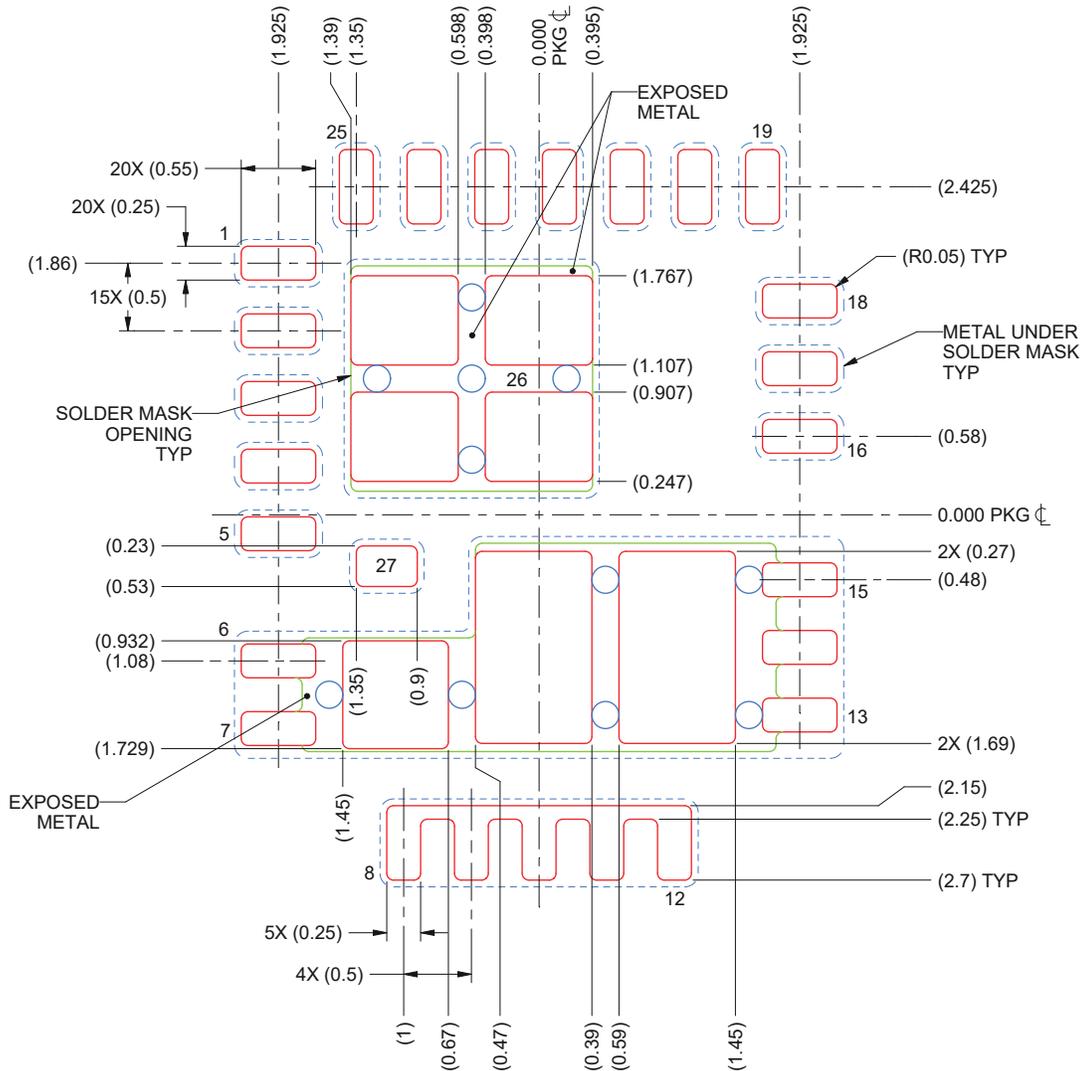


QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



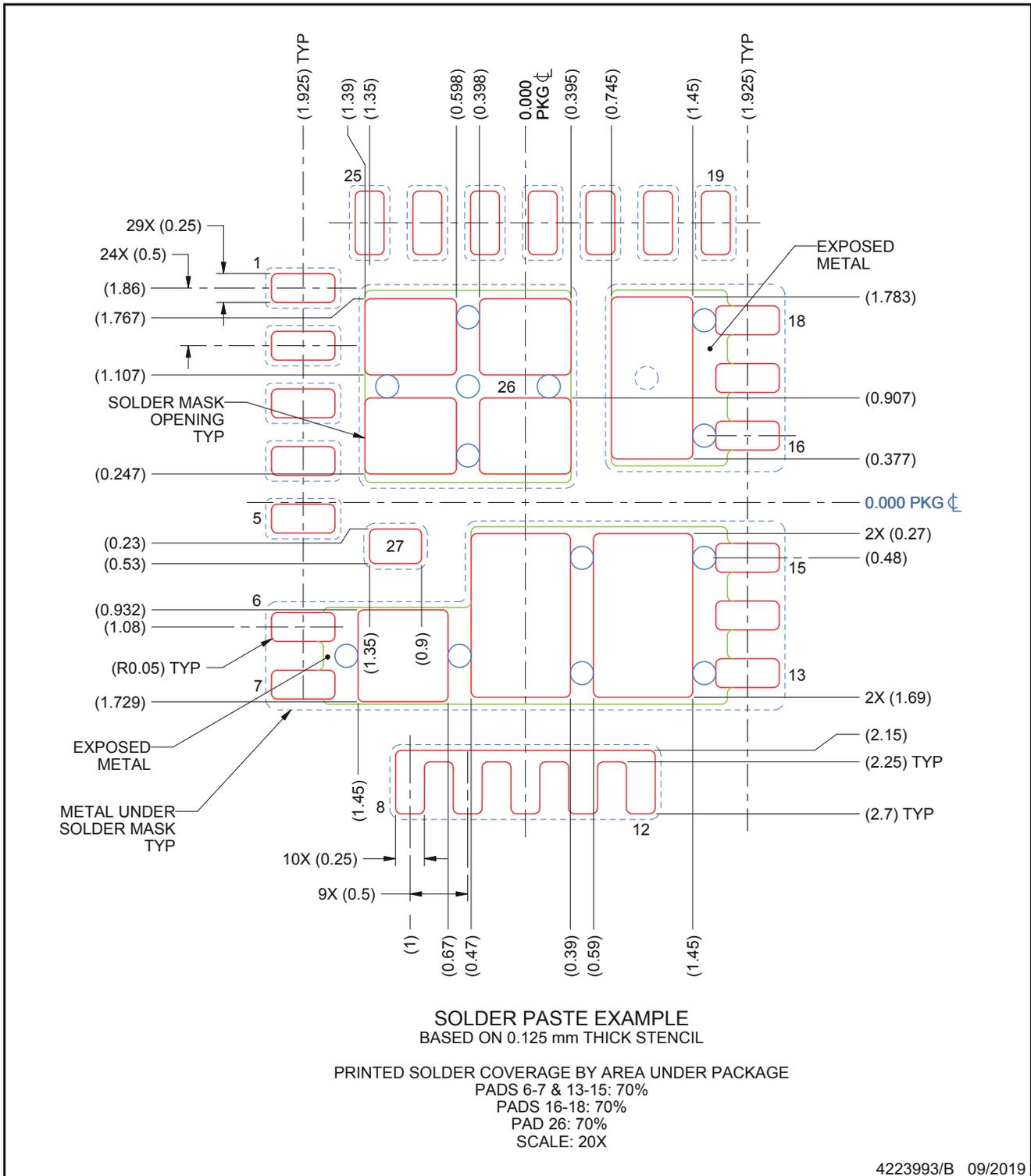
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
CSD95420RCB	VQFN-CLIP	RCB	27	2500	330	12.4	4.30	5.30	1.30	8.00	12.00	Q1
CSD95420RCBT	VQFN-CLIP	RCB	27	250	330	12.4	4.30	5.30	1.30	8.00	12.00	Q1

6.4 Recommended Stencil Opening



- All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
- This drawing is subject to change without notice.
- Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

6.6 Alternate Industry Standard Compatible Stencil Opening



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)
CSD95420RCB	Active	Production	VQFN-CLIP (RCB) 27	2500 LARGE T&R	ROHS Exempt	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	95420RB
CSD95420RCB.A	Active	Production	VQFN-CLIP (RCB) 27	2500 LARGE T&R	ROHS Exempt	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	95420RB
CSD95420RCBT	Active	Production	VQFN-CLIP (RCB) 27	250 SMALL T&R	ROHS Exempt	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	95420RB
CSD95420RCBT.A	Active	Production	VQFN-CLIP (RCB) 27	250 SMALL T&R	ROHS Exempt	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	95420RB

(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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最終更新日 : 2025 年 10 月