

UCC33420 超小型、1.5W、5.0V、3kV_{RMS} 隔离，工业 直流/直流模块

1 特性

- 最大输出功率为 1.5W
- 4.5V 至 5.5V 输入电压工作范围
- 5.0V、5.5V 稳定可选输出电压
 - 5.0V：300mA 可用负载电流
- 稳健可靠的隔离栅：
 - 隔离等级：3kV_{RMS}
 - 浪涌能力：6.5kV_{PK}
 - 工作电压：1188V_{PK}
 - 200V/nS 共模瞬态抗扰度
- 采用集成式变压器技术的高功率密度隔离式直流/直流模块
- 自适应展频调制 (SSM)
- 符合 CISPR32 B 级辐射标准
- 强磁场抗扰度
- 过载保护和短路保护
- 热关断
- 低浪涌电流软启动
- 具有故障报告机制的使能引脚
- 计划的安全相关认证：
 - 符合 DIN EN IEC 60747-17 (VDE 0884-17) 标准的基本隔离
 - 符合 UL 1577 标准且长达 1 分钟的 3kV_{RMS} 隔离
 - 符合 IEC 62368-1 和 IEC 60601-1 终端设备标准的 UL 认证
 - 根据 GB4943.1-2022 标准进行的 CQC 认证
- 工作温度范围：-40°C 至 125°C
- VSON-12 (4.00mm x 5.00mm) 封装

2 应用

- 工厂自动化 PLC 模块
- 电动汽车充电基础设施
- 适用于电压和电流传感器的隔离式电源
- 数字隔离器的隔离式辅助电源
- 适用于 RS-485、RS-422 和 CAN 的隔离式辅助电源

3 说明

UCC33420 是一款采用集成变压器技术且工业的直流/直流电源模块，可提供 1.5W 的隔离式输出功率。它可支持 4.5V 至 5.5V 的输入电压工作范围，并可通过 5.5V 的可选余量调节 5.0V 输出电压。

UCC33420 具有专有变压器架构，可实现 3kV_{RMS} 隔离额定值，同时支持低 EMI 和出色的负载调节。

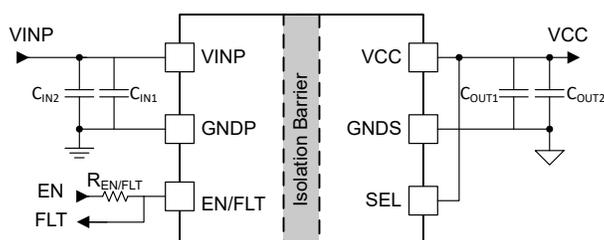
UCC33420 集成了保护特性以提高系统稳健性，例如具有故障报告机制的使能引脚、短路保护和热关断功能。

UCC33420 采用小型化、薄型解决方案 VSON (4.00mm x 5.00mm) 封装，高度为 1.00mm，爬电距离和间隙为 > 4.2mm

器件信息(1)

器件型号	封装	封装尺寸 (标称值)
UCC33420	VSON-FCRLF (12)	4.00mm x 5.00mm

(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。



简化版应用

内容

1 特性.....	1	4.4 支持资源.....	3
2 应用.....	1	4.5 商标.....	3
3 说明.....	1	4.6 静电放电警告.....	3
4 器件和文档支持.....	3	4.7 术语表.....	3
4.1 器件支持.....	3	5 修订历史记录.....	3
4.2 文档支持.....	3	6 机械和封装信息.....	4
4.3 接收文档更新通知.....	3		

ADVANCE INFORMATION

4 器件和文档支持

4.1 器件支持

4.2 文档支持

4.2.1 相关文档

请参阅如下相关文档：

- [隔离相关术语](#)

4.3 接收文档更新通知

要接收文档更新通知，请导航至 [ti.com](https://www.ti.com) 上的器件产品文件夹。点击 [通知](#) 进行注册，即可每周接收产品信息更改摘要。有关更改的详细信息，请查看任何已修订文档中包含的修订历史记录。

4.4 支持资源

[TI E2E™ 中文支持论坛](#) 是工程师的重要参考资料，可直接从专家处获得快速、经过验证的解答和设计帮助。搜索现有解答或提出自己的问题，获得所需的快速设计帮助。

链接的内容由各个贡献者“按原样”提供。这些内容并不构成 TI 技术规范，并且不一定反映 TI 的观点；请参阅 TI 的 [使用条款](#)。

4.5 商标

TI E2E™ is a trademark of Texas Instruments.

所有商标均为其各自所有者的财产。

4.6 静电放电警告



静电放电 (ESD) 会损坏这个集成电路。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。

4.7 术语表

[TI 术语表](#) 本术语表列出并解释了术语、首字母缩略词和定义。

5 修订历史记录

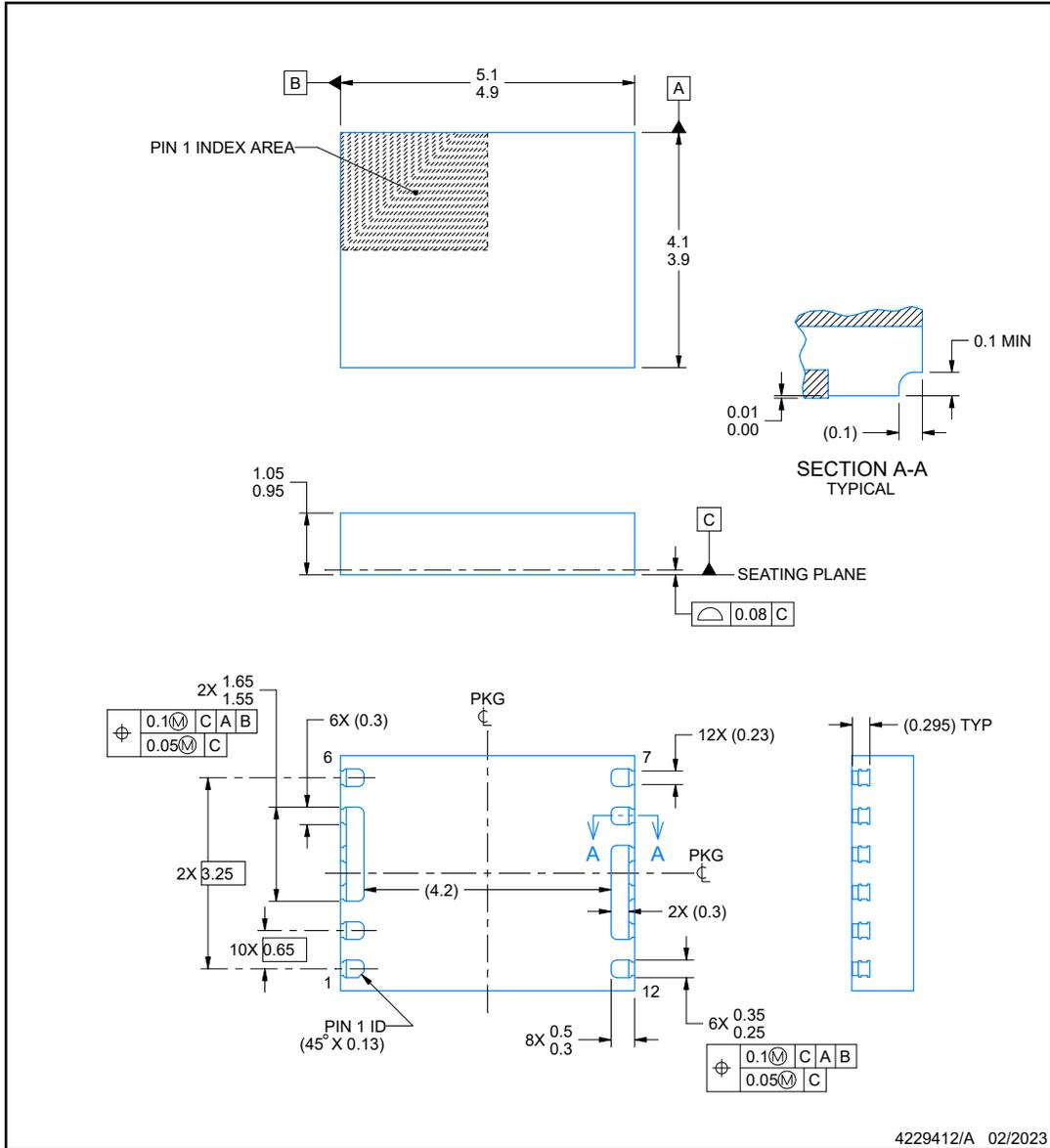
注：以前版本的页码可能与当前版本的页码不同

Changes from Revision * (January 2024) to Revision A (February 2024)	Page
• 更新了标题以包含“工业”。	1
• 向封装说明中添加了 4.2mm 爬电距离和间隙。	1

6 机械和封装信息

下述页面包含机械、封装和订购信息。这些信息是指定器件可用的最新数据。数据如有变更，恕不另行通知，且不会对此文档进行修订。有关此数据表的浏览器版本，请查阅左侧的导航栏。

PACKAGE OUTLINE
RAQ0012B  **VSON-FCRLF - 1.05 mm max height**
 PLASTIC SMALL OUTLINE - NO LEAD



NOTES:

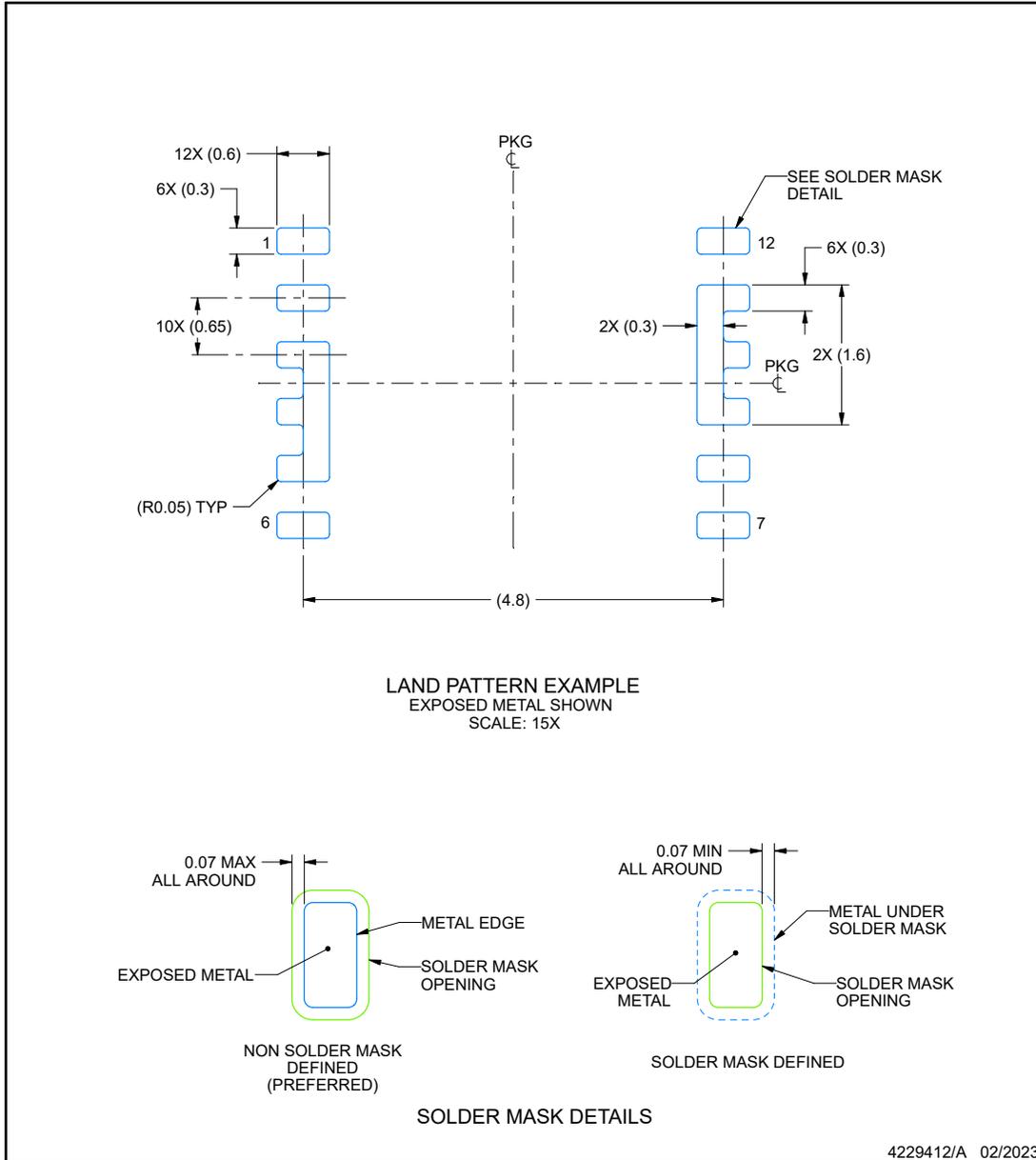
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

EXAMPLE BOARD LAYOUT

RAQ0012B

VSON-FCRLF - 1.05 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



NOTES: (continued)

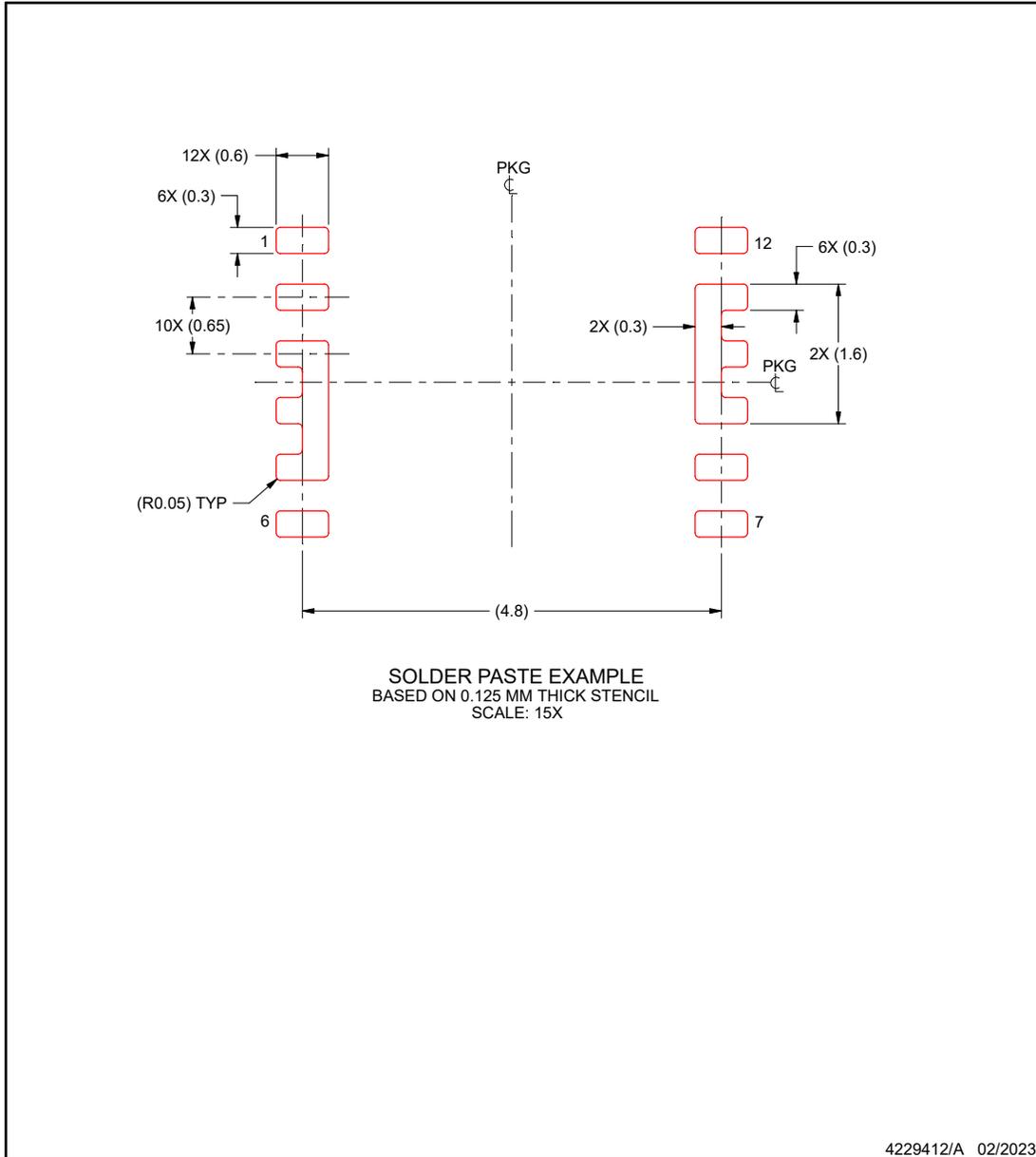
3. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/sluea271).
4. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.

EXAMPLE STENCIL DESIGN

RAQ0012B

VSON-FCRLF - 1.05 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



NOTES: (continued)

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

ADVANCE INFORMATION

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)
UCC33420RAQR	Active	Production	VSON-FCRLF (RAQ) 12	3000 LARGE T&R	Yes	NIPDAU	Level-3-260C-168 HR	-40 to 125	U33420
UCC33420RAQR.A	Active	Production	VSON-FCRLF (RAQ) 12	3000 LARGE T&R	Yes	NIPDAU	Level-3-260C-168 HR	-40 to 125	U33420

(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.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF UCC33420 :

- Automotive : [UCC33420-Q1](#)

NOTE: Qualified Version Definitions:

- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects

GENERIC PACKAGE VIEW

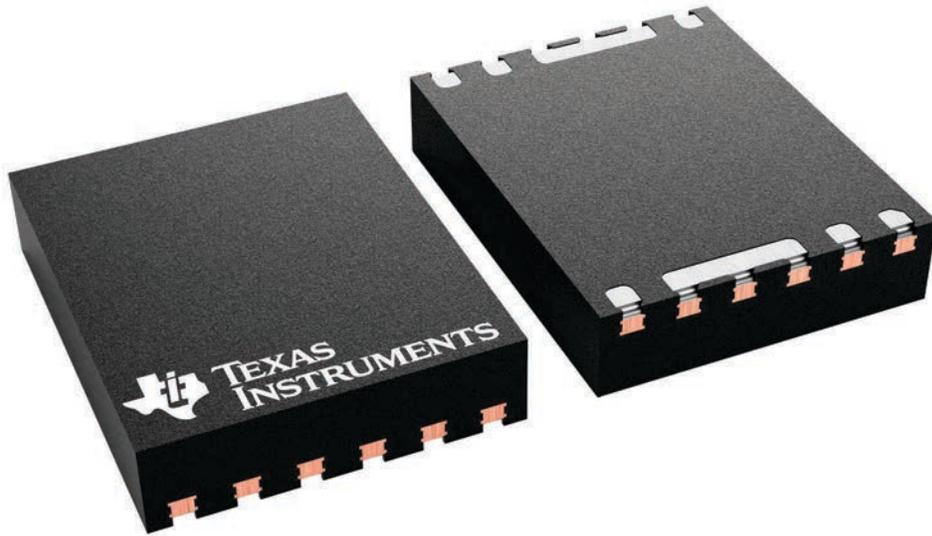
RAQ 12

VSON-FCRLF - 1.05 mm max height

5 x 4, 0.65 mm pitch

PLASTIC SMALL OUTLINE - NO LEAD

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



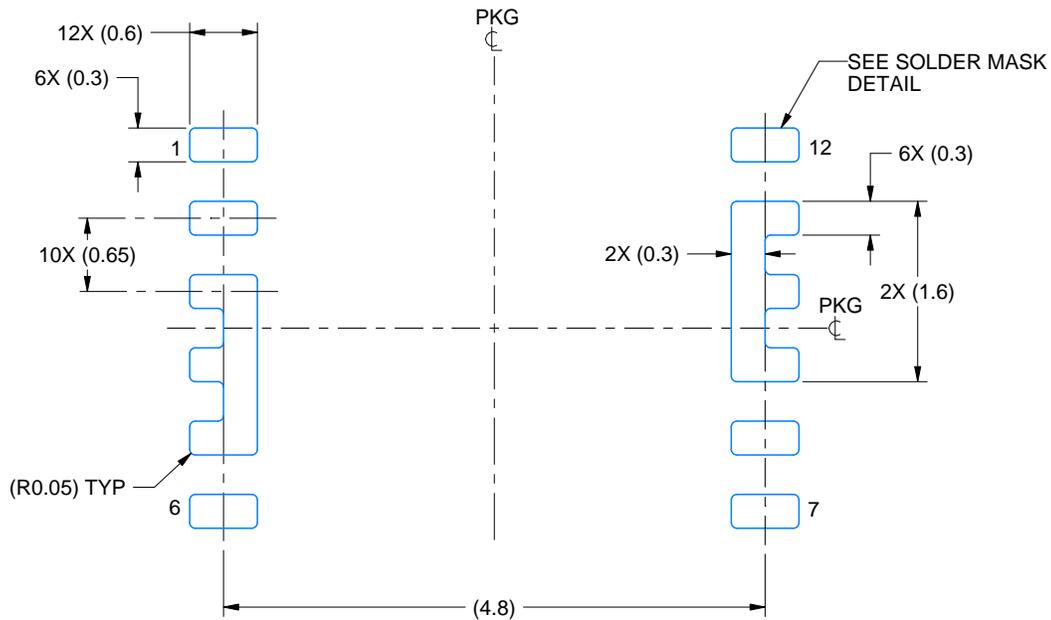
4229417/A

EXAMPLE BOARD LAYOUT

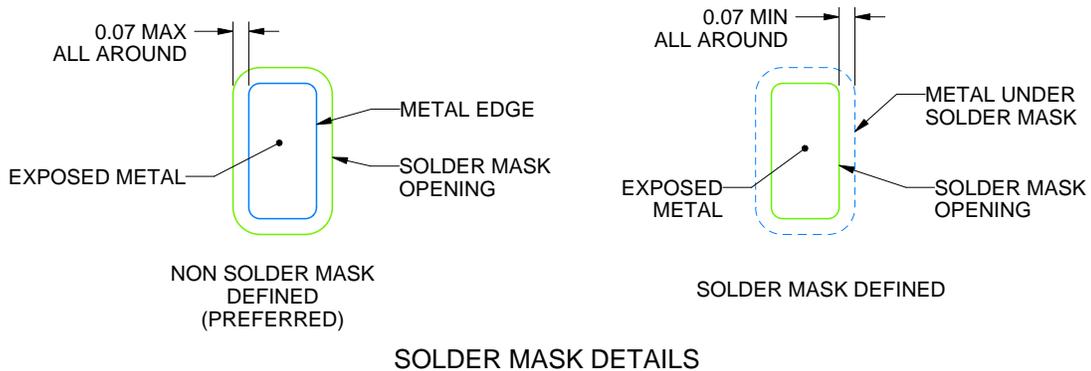
RAQ0012C

VSON-FCRLF - 1.05 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 15X



SOLDER MASK DETAILS

4230399/A 01/2024

NOTES: (continued)

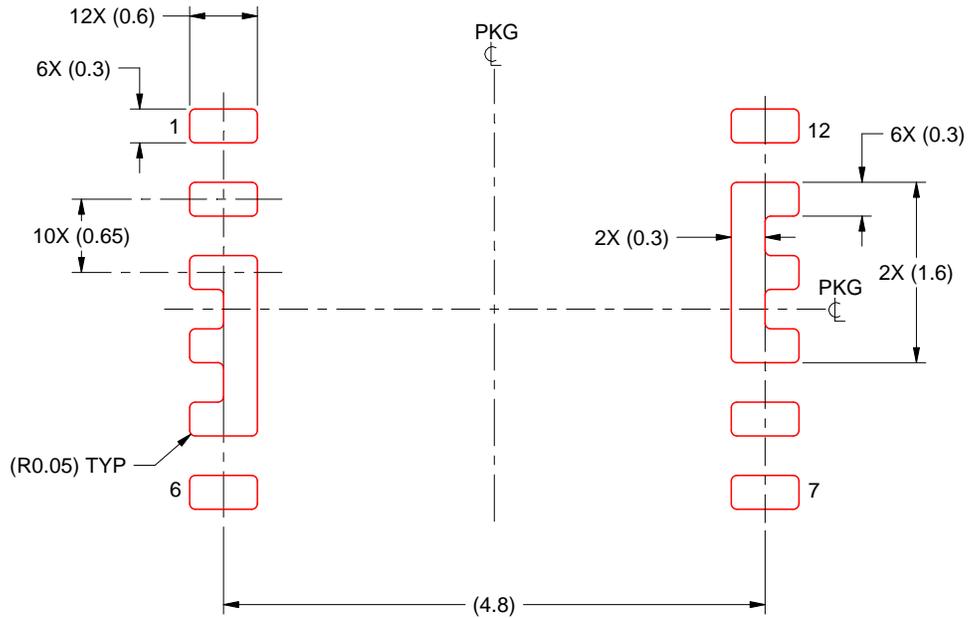
3. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/sluea271).
4. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.

EXAMPLE STENCIL DESIGN

RAQ0012C

VSON-FCRLF - 1.05 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



SOLDER PASTE EXAMPLE
BASED ON 0.125 MM THICK STENCIL
SCALE: 15X

4230399/A 01/2024

NOTES: (continued)

5. 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

TI“按原样”提供技术和可靠性数据（包括数据表）、设计资源（包括参考设计）、应用或其他设计建议、网络工具、安全信息和其他资源，不保证没有瑕疵且不做任何明示或暗示的担保，包括但不限于对适销性、与某特定用途的适用性或不侵犯任何第三方知识产权的暗示担保。

这些资源可供使用 TI 产品进行设计的熟练开发人员使用。您将自行承担以下全部责任：(1) 针对您的应用选择合适的 TI 产品，(2) 设计、验证并测试您的应用，(3) 确保您的应用满足相应标准以及任何其他安全、安保法规或其他要求。

这些资源如有变更，恕不另行通知。TI 授权您仅可将这些资源用于研发本资源所述的 TI 产品的相关应用。严禁以其他方式对这些资源进行复制或展示。您无权使用任何其他 TI 知识产权或任何第三方知识产权。对于因您对这些资源的使用而对 TI 及其代表造成的任何索赔、损害、成本、损失和债务，您将全额赔偿，TI 对此概不负责。

TI 提供的产品受 [TI 销售条款](#)、[TI 通用质量指南](#) 或 [ti.com](#) 上其他适用条款或 TI 产品随附的其他适用条款的约束。TI 提供这些资源并不会扩展或以其他方式更改 TI 针对 TI 产品发布的适用的担保或担保免责声明。除非德州仪器 (TI) 明确将某产品指定为定制产品或客户特定产品，否则其产品均为按确定价格收入目录的标准通用器件。

TI 反对并拒绝您可能提出的任何其他或不同的条款。

版权所有 © 2026，德州仪器 (TI) 公司

最后更新日期：2025 年 10 月