

LM61460 3V 至 36V、6A、低噪声同步降压转换器

1 特性

- 可在所有负载下进行高效电源转换
 - 同步整流
 - 8 μ A 待机电流, $V_{IN}=13.5V$, $V_{OUT}=3.3V$, 无负载
 - 通过自动模式可在轻载时实现频率折返, 从而提高效率
 - 低 MOSFET 导通电阻
 - $R_{DS_ON_HS} = 41m\Omega$ (典型值)
 - $R_{DS_ON_LS} = 21m\Omega$ (典型值)
 - 可选外部偏置输入
- 低 EMI
 - 可调节 SW 节点上升时间
 - 200kHz - 2.2MHz 可调节或可同步频率范围
 - 轻负载下同步时, 可通过 FPWM 提供恒定频率
 - 4mm x 3.5mm 低 EMI VQFN-HR 封装 (带可润湿侧面) 和引脚排列
- 宽转换范围
 - 输入电压: 3V 至 36V
 - 输出电压可在 1V 至 V_{IN}
 - 直流负载电流: 0A 至 6A
 - $t_{ON_MIN} = 50ns$ (典型值)
 - $t_{OFF_MIN} = 70ns$ (典型值)
- 具有滤波器和延迟释放的电源正常输出
- 内置补偿、软启动、电流限制、断续保护、热关断和 UVLO

2 应用

- 交流逆变器和伺服驱动控制模块
- 超声成像扫描仪/探头
- 测试和测量仪表
- 通用宽输入电压降压 应用

3 说明

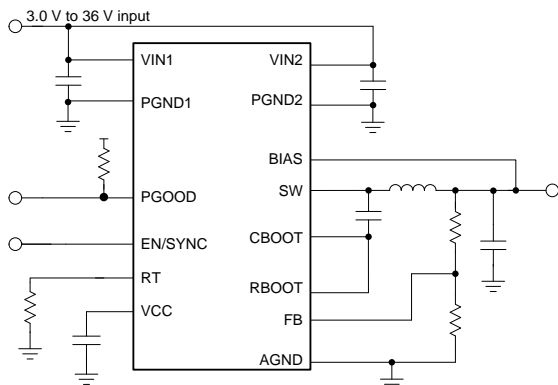
LM61460 是一款通用同步降压转换器, 可提供可调节输出电压和 0 至 6A 的直流负载电流, 电源电压范围为 3.0V 至 36V。LM61460 旨在实现高效率和高性能。自动模式可在轻负载条件下实现频率折返, 空载电流消耗仅为 8 μ A (典型值), 轻负载运行时效率高。外加极低的 MOSFET 导通电阻和可选外部偏置输入, 使其可在整个负载范围内实现卓越的效率。它还通过可调节 SW 节点上升时间和 VQFN-HR 封装实现最小 EMI, 具有低振铃和优化的布局友好型引脚排列。开关频率可在 200kHz 至 2.2MHz 范围内设置或同步, 以避免噪声敏感频段, 并可在低工作频率下提高效率或在高频率下缩小解决方案尺寸。该器件还提供开漏电源正常输出和全面保护功能。电气特性额定结温范围为 -40°C 至 +150°C。

器件信息⁽¹⁾

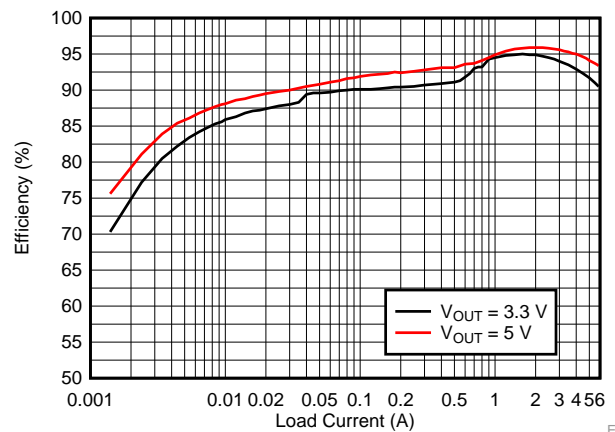
器件型号	封装	封装尺寸 (标称值)
LM61460	VQFN-HR (14)	4.00mm x 3.50mm

(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。

简化原理图



效率 ($V_{IN}=13.5V$ $F_{SW}=400kHz$)



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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
2019 年 5 月	*	初始发行版

5 器件和文档支持

5.1 接收文档更新通知

要接收文档更新通知，请导航至 TI.com.cn 上的器件产品文件夹。单击右上角的 [通知我](#) 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。

5.2 社区资源

The following links connect to TI community resources. Linked contents are provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

TI E2E™ Online Community *TI's Engineer-to-Engineer (E2E) Community*. Created to foster collaboration among engineers. At e2e.ti.com, you can ask questions, share knowledge, explore ideas and help solve problems with fellow engineers.

Design Support *TI's Design Support* Quickly find helpful E2E forums along with design support tools and contact information for technical support.

5.3 商标

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5.4 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。

5.5 Glossary


[SLYZ022](#) — *TI Glossary*.

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

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。

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
LM61460AANRJRR	ACTIVE	VQFN-HR	RJR	14	3000	RoHS & Green	SN	Level-2-260C-1 YEAR	-40 to 150	61460 AAN	

(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) **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 <=100ppm 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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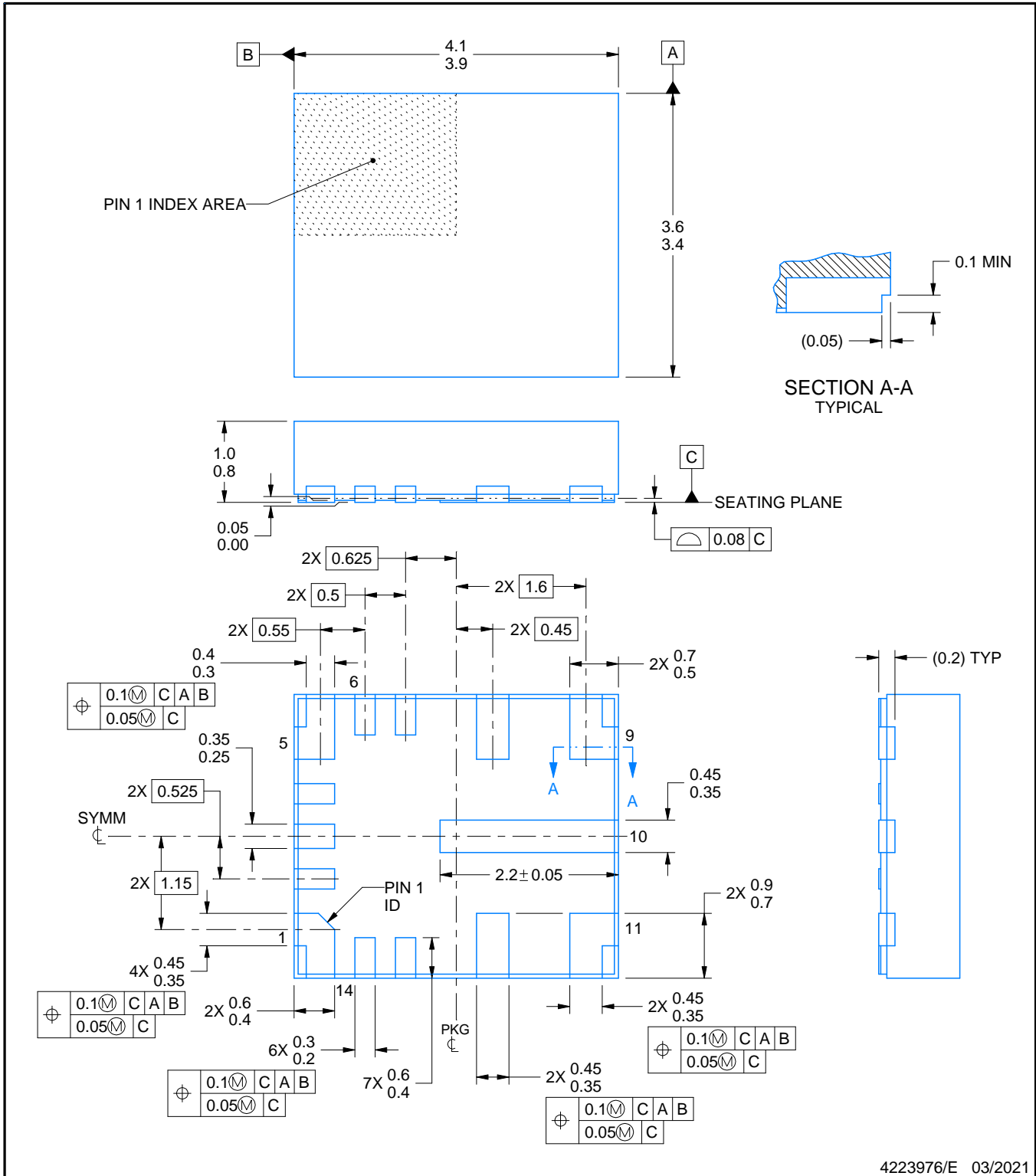
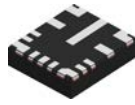
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF LM61460 :

- Automotive : [LM61460-Q1](#)

NOTE: Qualified Version Definitions:

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



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NOTES:

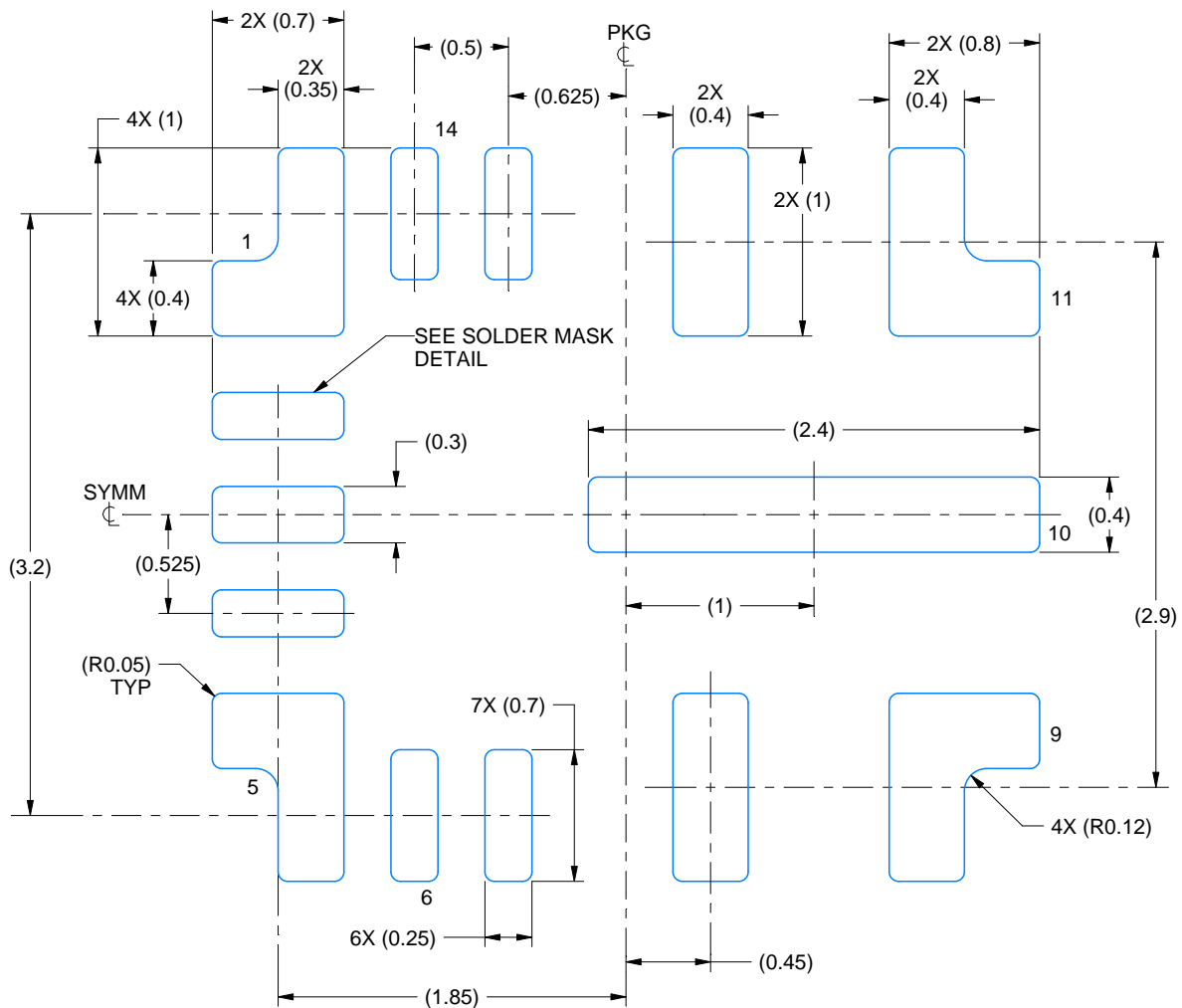
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

EXAMPLE BOARD LAYOUT

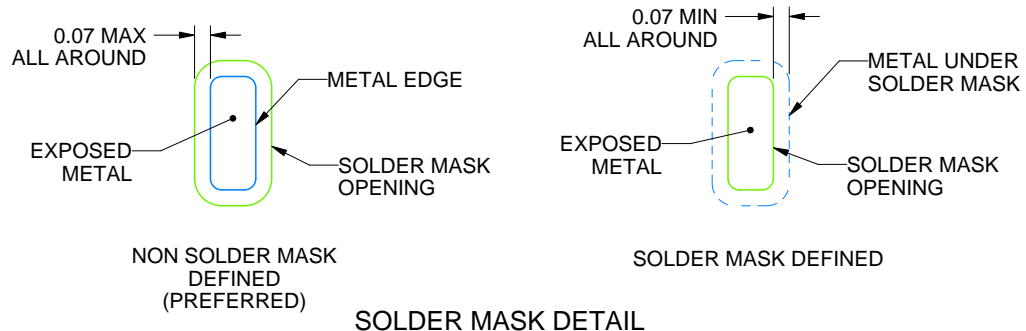
RJR0014A

VQFN-HR - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 25X



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NOTES: (continued)

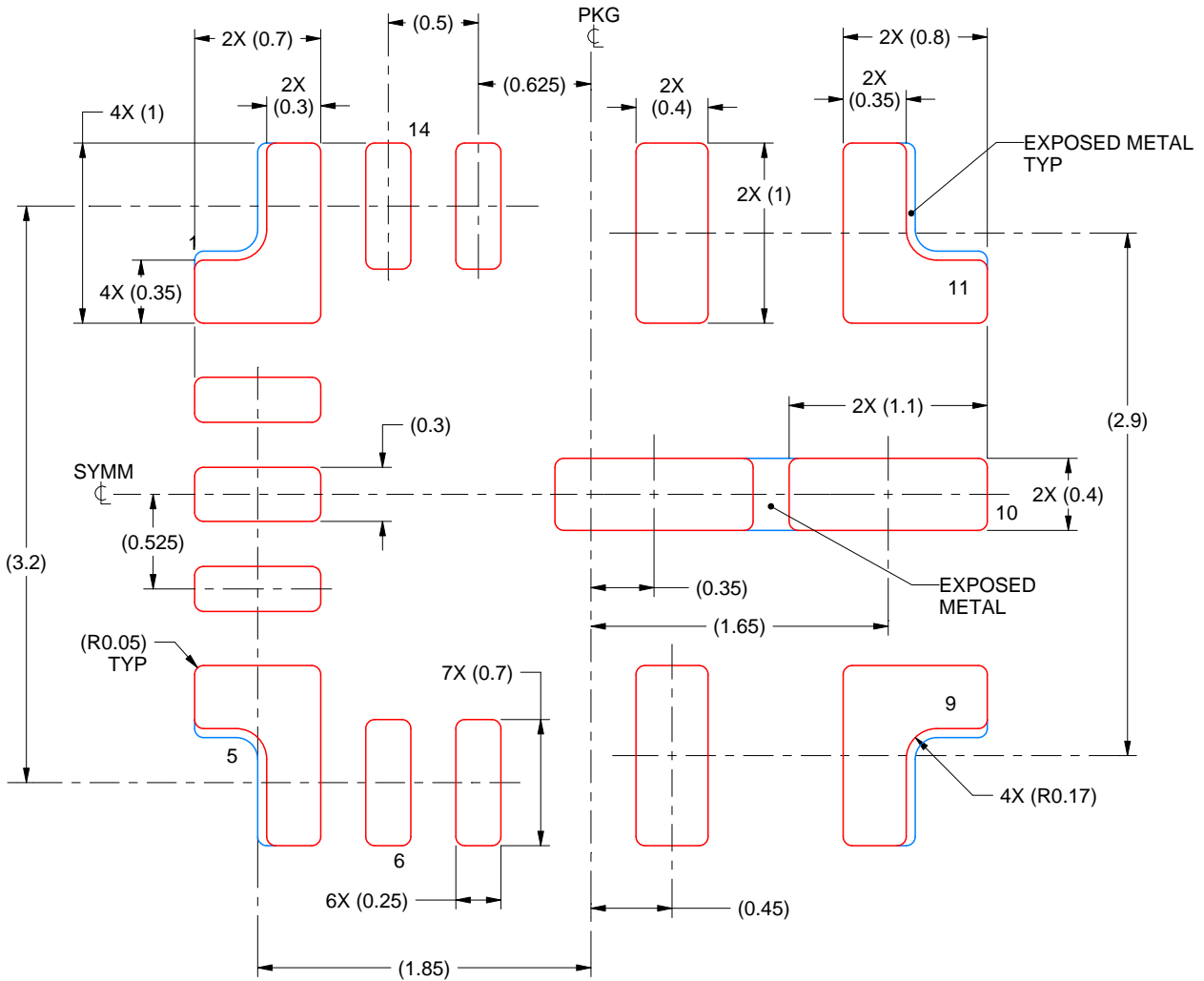
3. This package is designed to be soldered to thermal pads on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).

EXAMPLE STENCIL DESIGN

RJR0014A

VQFN-HR - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



SOLDER PASTE EXAMPLE
 BASED ON 0.1 mm THICK STENCIL
 PADS 1, 5, 9 & 11:
 90% PRINTED SOLDER COVERAGE BY AREA
 SCALE: 25X

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NOTES: (continued)

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

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