

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 $\times$ 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

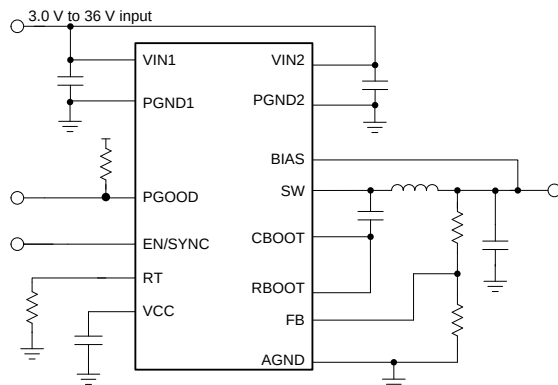
LM61460 是一款通用同步降压转换器, 可提供可调节输出电压和 0 至 6A 的直流负载电流, 电源电压范围为 3.0V 至 36V。LM61460 旨在实现高效率和高性能。自动模式可在轻负载条件下实现频率折返, 空载电流消耗仅为 8 μ A (典型值), 轻负载运行时效率高。外加极低的 MOSFET 导通电阻和可选外部偏置输入, 使其可在整个负载范围内实现卓越的效率。它还通过可调节 SW 节点上升时间和 VQFN-HR 封装实现最小 EMI, 具有低振铃和优化的布局友好型引脚排列。开关频率可在 200kHz 至 2.2MHz 范围内设置或同步, 以避免噪声敏感频段, 并可在低工作频率下提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 $-40^{\circ}C$ 至 $+150^{\circ}C$ 。

器件信息⁽¹⁾

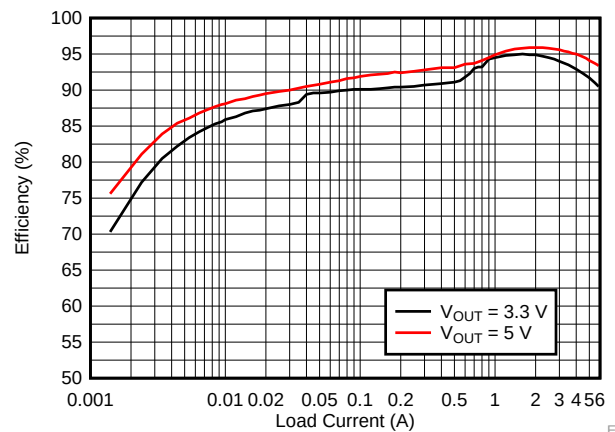
器件型号	封装	封装尺寸 (标称值)
LM61460	VQFN-HR (14)	4.00mm $\times$ 3.50mm

(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

E2E is a trademark of Texas Instruments.
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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 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)
LM61460AANRJRR	Active	Production	VQFN-HR (RJR) 14	3000 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 150	61460 AAN
LM61460AANRJRR.A	Active	Production	VQFN-HR (RJR) 14	3000 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 150	61460 AAN

⁽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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OTHER QUALIFIED VERSIONS OF LM61460 :

- Automotive : [LM61460-Q1](#)

NOTE: Qualified Version Definitions:

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



VQFN-HR - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



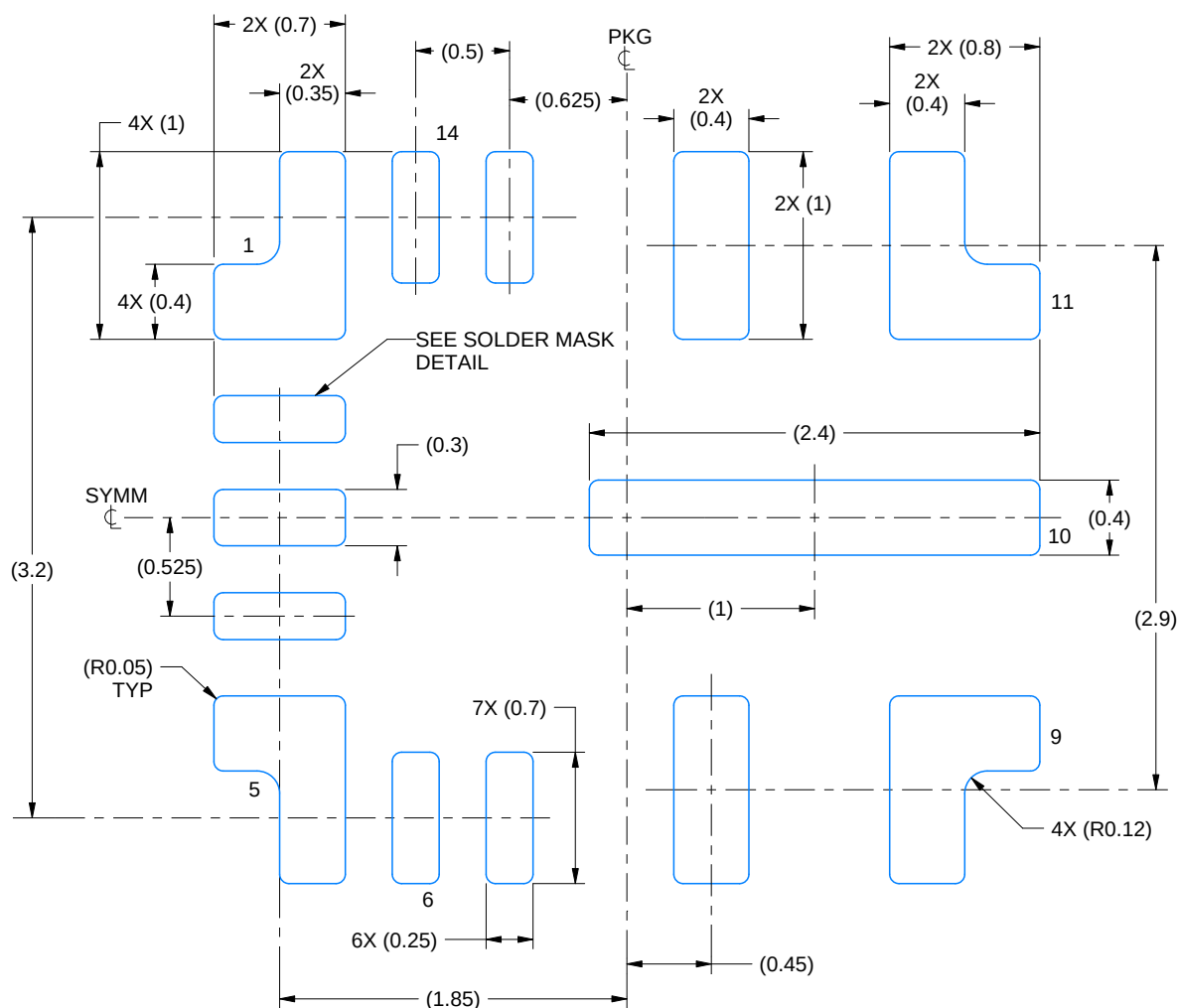
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.

2. This drawing is subject to change without notice.

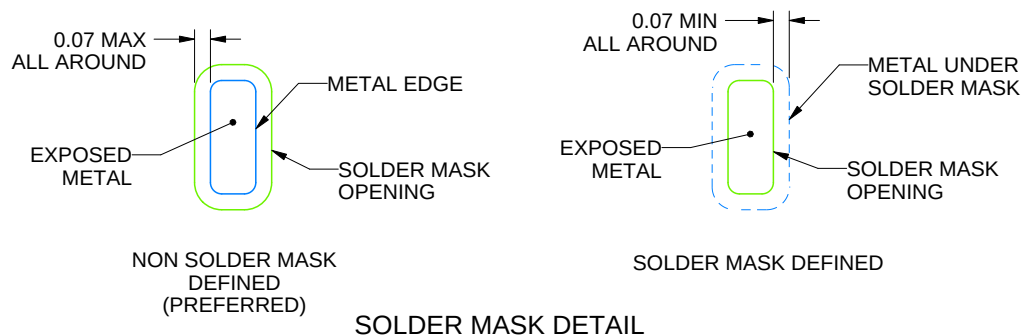
RJR0014A

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)

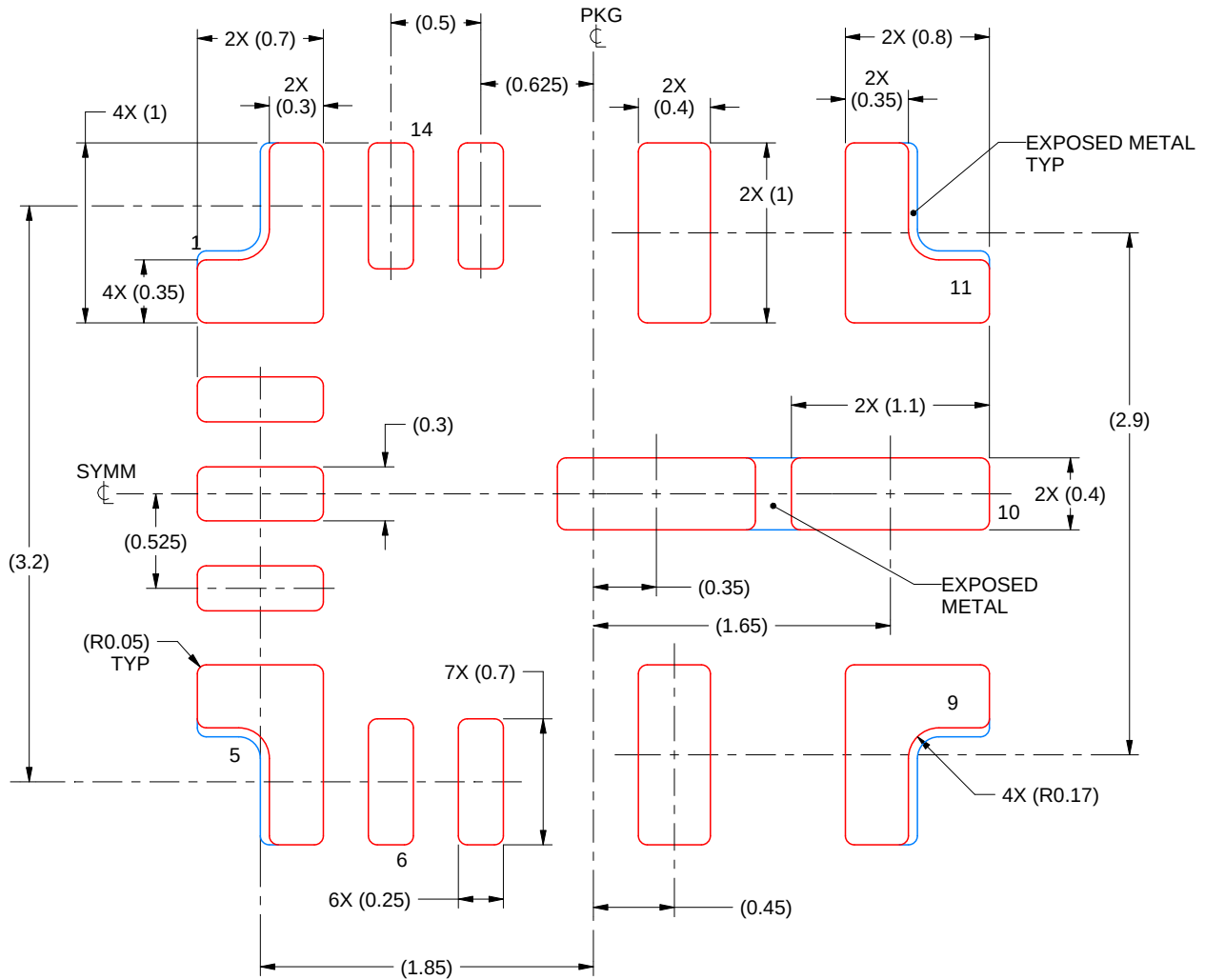
3. This package is designed to be soldered to thermal pads on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).

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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