适用于压力传感器的 PGA305 信号调节器和发送器

1 特性

- 模拟特性：
  - 适用于电阻式电桥传感器的模拟前端
  - 传感器灵敏度可调节范围：1mV/V 至 135mV/V
  - 片上温度传感器
  - 可编程增益
  - 适用于信号通道的 24 位 Σ-Δ 模数转换器
  - 适用于温度通道的 24 位 Σ-Δ 模数转换器
  - 14 位输出 DAC
- 数字特性：
  - 整个温度范围内的 FSO 精度：< 0.1%
  - 系统响应时间：< 220µs
  - 三阶偏移、增益和非线性温度补偿
  - 诊断功能
  - 集成 EEPROM 用于存储器件操作、校准数据和用户数据
- 外设功能：
  - 可通过 I^2C 接口实现数据读取和器件配置
  - 单线制接口，可通过电源引脚进行通信，无需使用额外线路
  - 电流环路接口：4mA 至 20mA
  - 比例电压输出和绝对电压输出
  - 电源管理控制
  - 模拟低压检测
- 常规特性：
  - 工业温度范围：-40°C 至 150°C
  - 电源：
    - 片上电源管理，支持 3.3V 至 30V 较宽的电源电压范围
    - 集成反向保护电路

2 应用

- 压力传感发送器和变送器
- 液位计、流量计
- 电阻式现场变送器

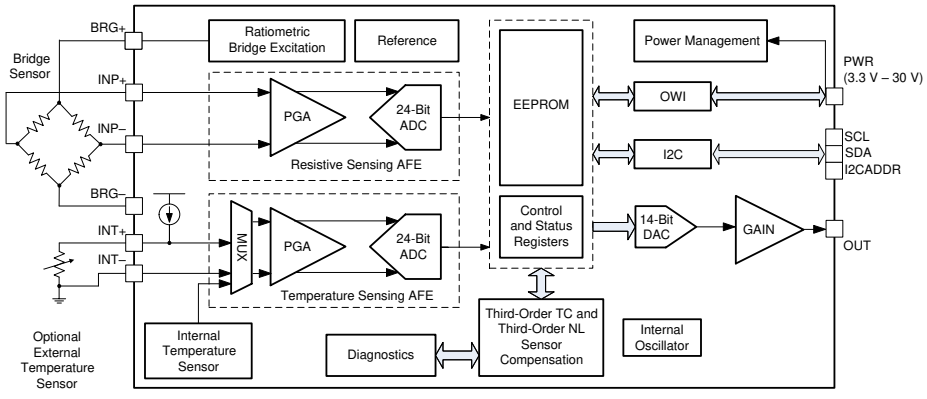
3 说明

PGA305 器件提供了一个适用于压阻式和应力计式压感元件的接口。该器件是一套完整的片上系统 (SoC) 解决方案，具有可编程模拟前端 (AFE)、ADC 和数字信号处理功能，可直接连接传感元件。此外，PGA305 器件还集成了稳压器和振荡器，最大程度地减少了外部组件数。PGA305 器件可以采用三阶温度和非线性补偿来实现高精度。该器件还可以使用集成 I^2C 接口或单线制串行接口 (OWI) 来实现外部通信并简化系统校准流程。集成 DAC 支持绝对电压、比例电压以及 4mA 至 20mA 的电流环路输出。

封装信息

器件型号	封装(1)	封装尺寸(2)
PGA305	RHH（VQFN，36）	6mm × 6mm

(1) 如需更多信息，请参阅 *机械、封装和可订购信息*。
(2) 封装尺寸（长 × 宽）为标称值，并包括引脚（如适用）。



PGA305 简化方框图

4 器件和文档支持

4.1 接收文档更新通知

要接收文档更新通知，请导航至 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。

4.2 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。

4.3 商标

TI E2E™ is a trademark of Texas Instruments.
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4.4 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。

4.5 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 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。

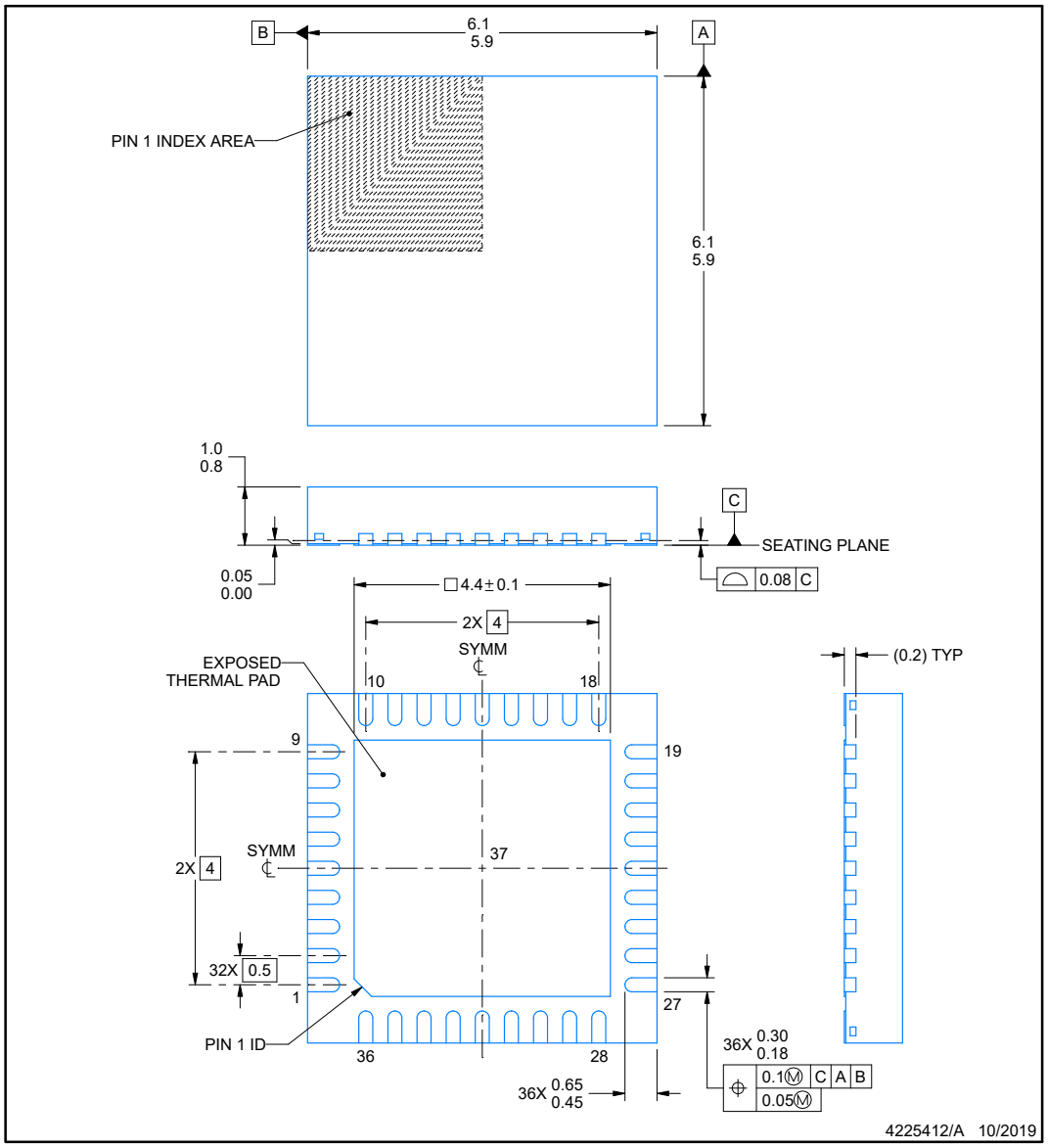
5.1 机械数据

RHH0036C

PACKAGE OUTLINE

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



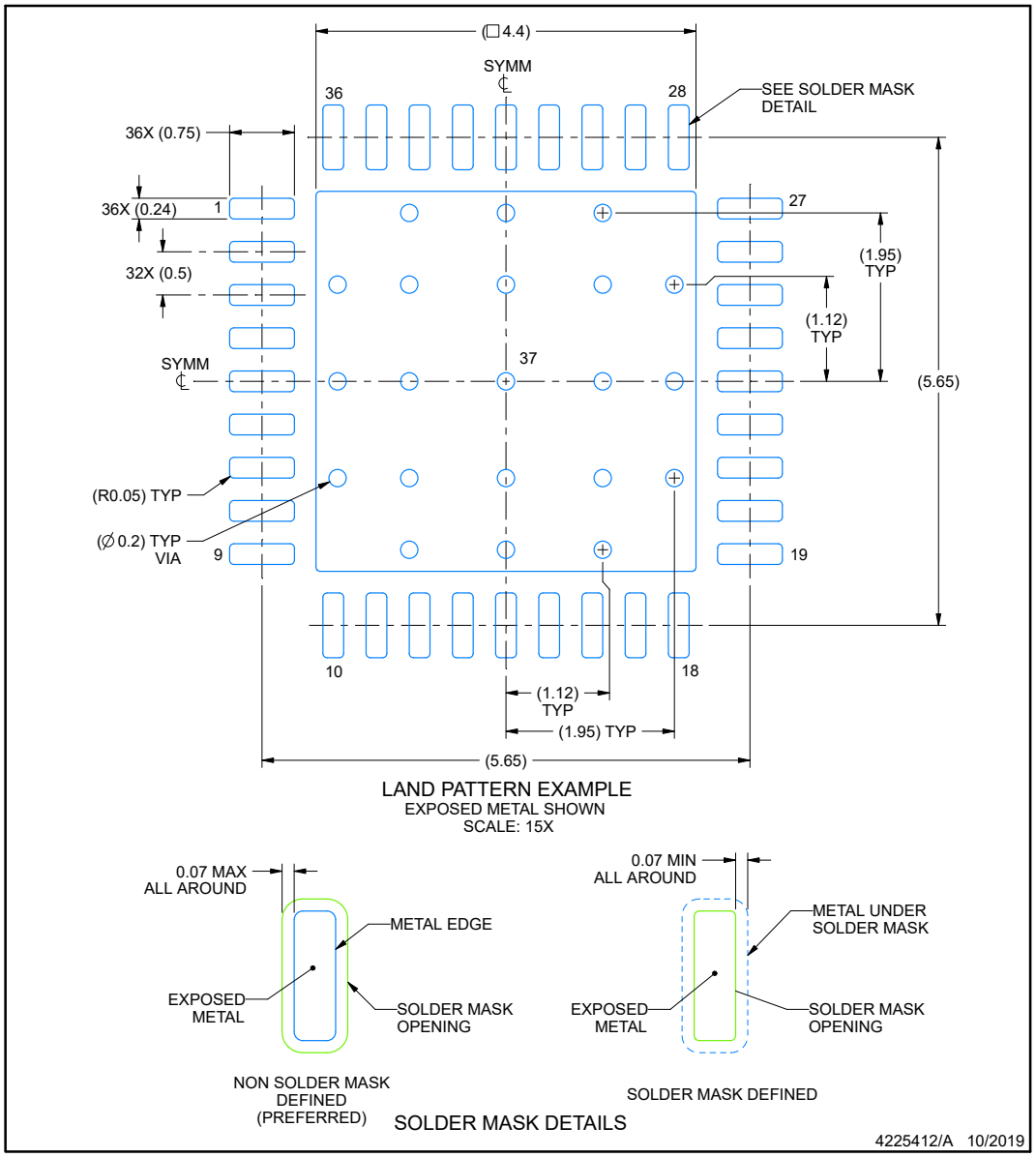
NOTES:

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.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

EXAMPLE BOARD LAYOUT

RHH0036C — **VQFN - 1 mm max height**

PLASTIC QUAD FLATPACK - NO LEAD



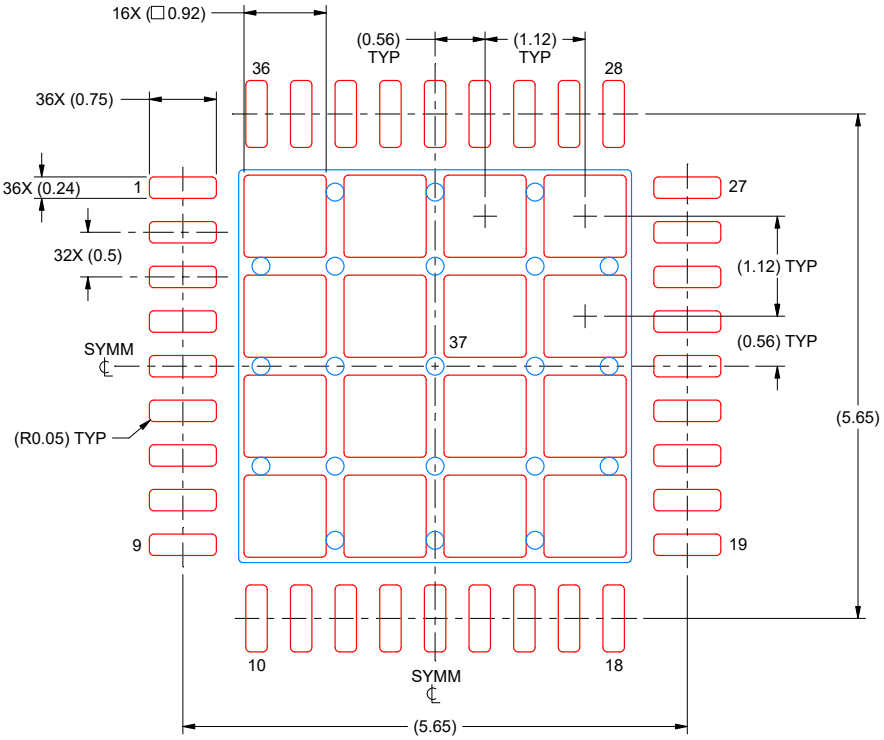
NOTES: (continued)

4. 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/slua271).
5. 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

RHH0036C — **VQFN - 1 mm max height**

PLASTIC QUAD FLATPACK - NO LEAD



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

EXPOSED PAD 37
70% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE

4225412/A 10/2019

NOTES: (continued)

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

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)
PGA305ARHHR	Active	Production	VQFN (RHH) | 36	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 150	PGA305A RHH
PGA305ARHHT	Active	Production	VQFN (RHH) | 36	250 | SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 150	PGA305A RHH

(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.

GENERIC PACKAGE VIEW

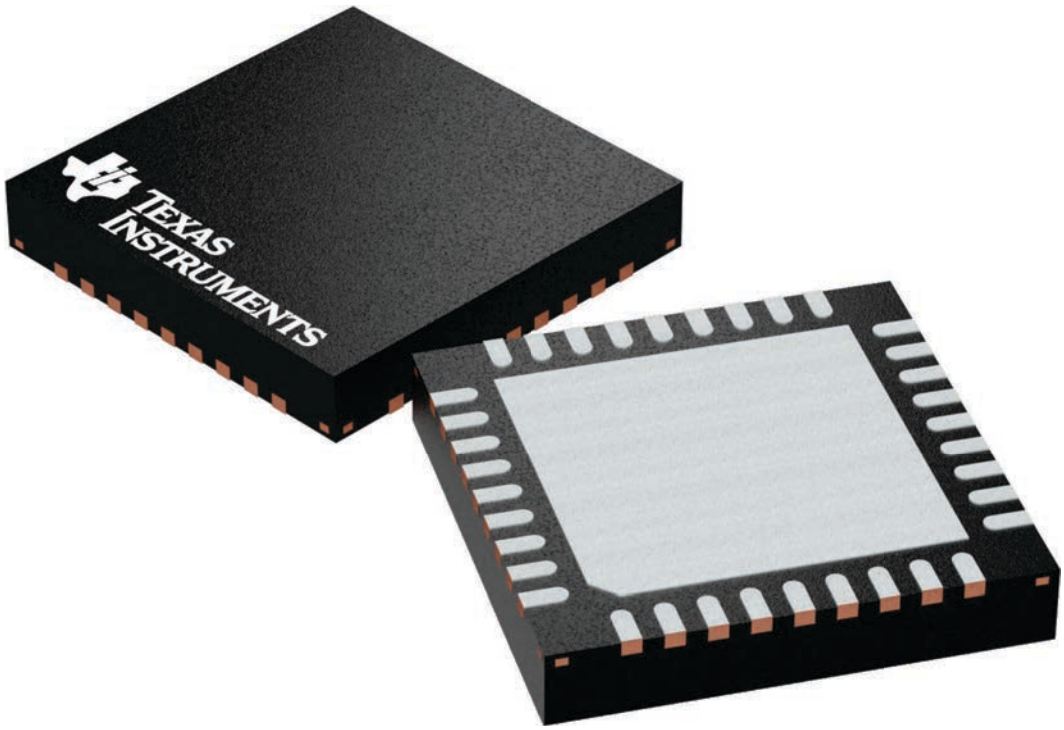
RHH 36

VQFN - 1 mm max height

6 x 6, 0.5 mm pitch

PLASTIC QUAD FLATPACK - NO LEAD

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



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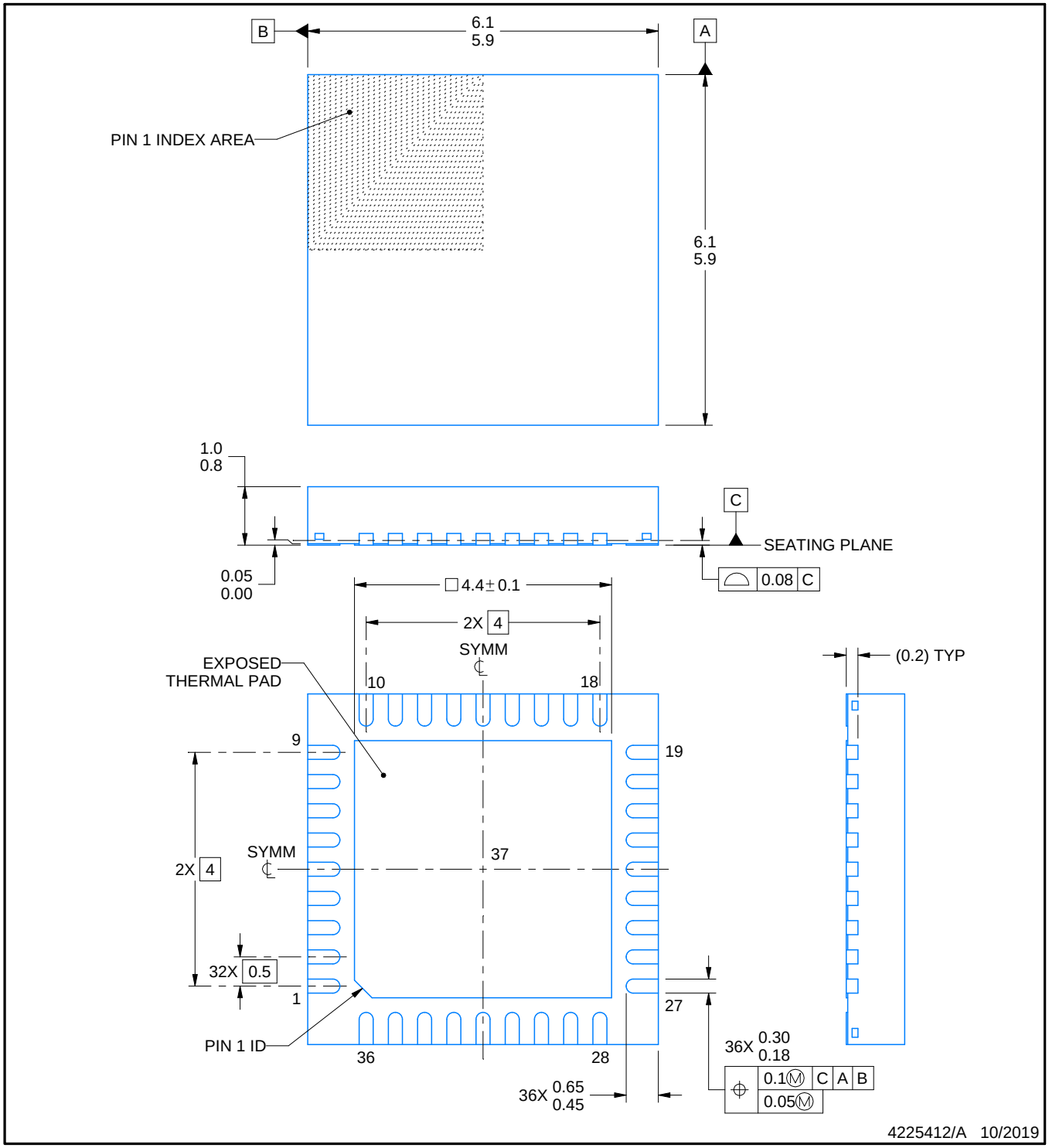
RHH0036C

PACKAGE OUTLINE

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



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EXAMPLE BOARD LAYOUT

RHH0036C

VQFN - 1 mm max height

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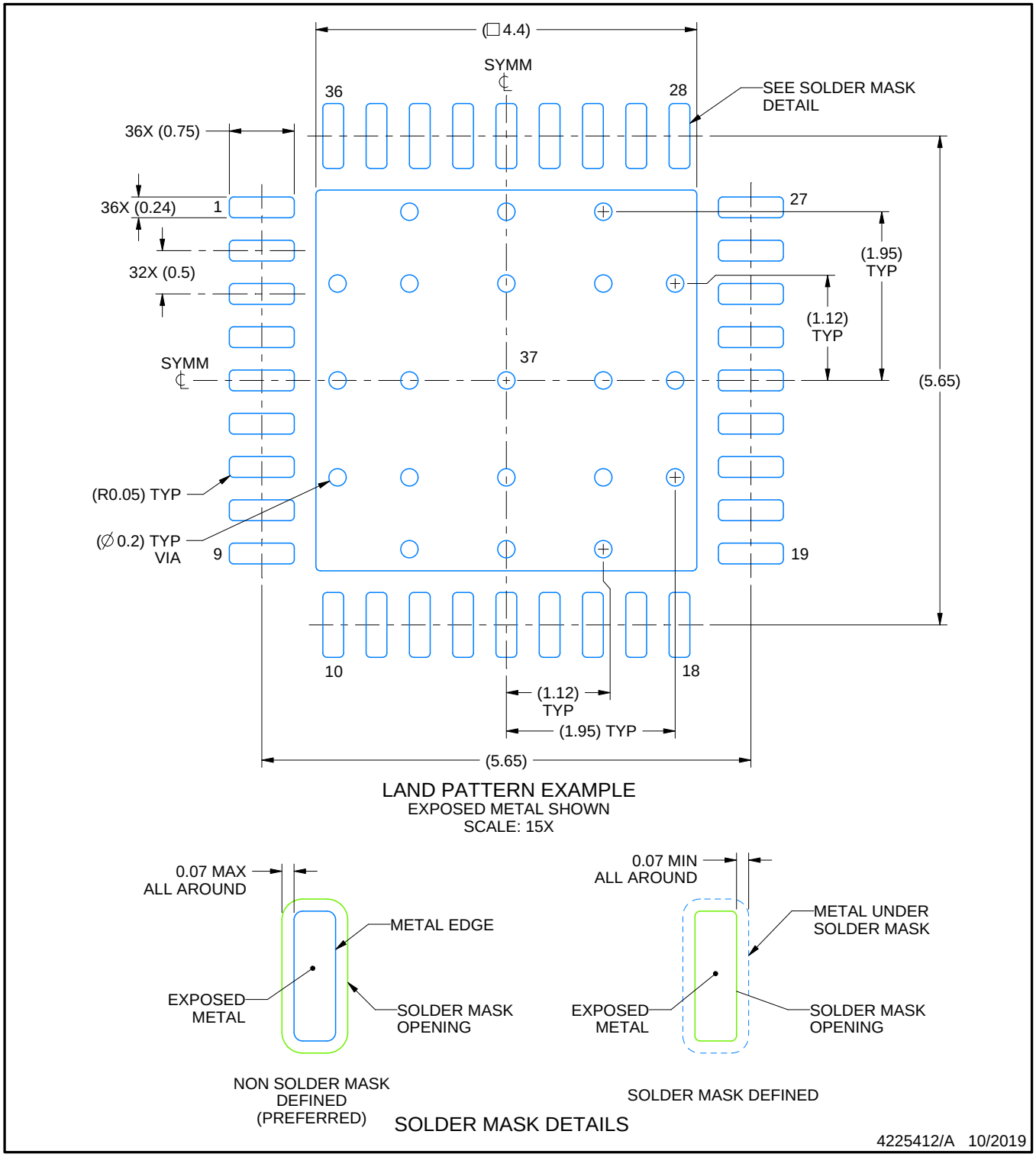

NOTES: (continued)

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RHH0036C

VQFN - 1 mm max height

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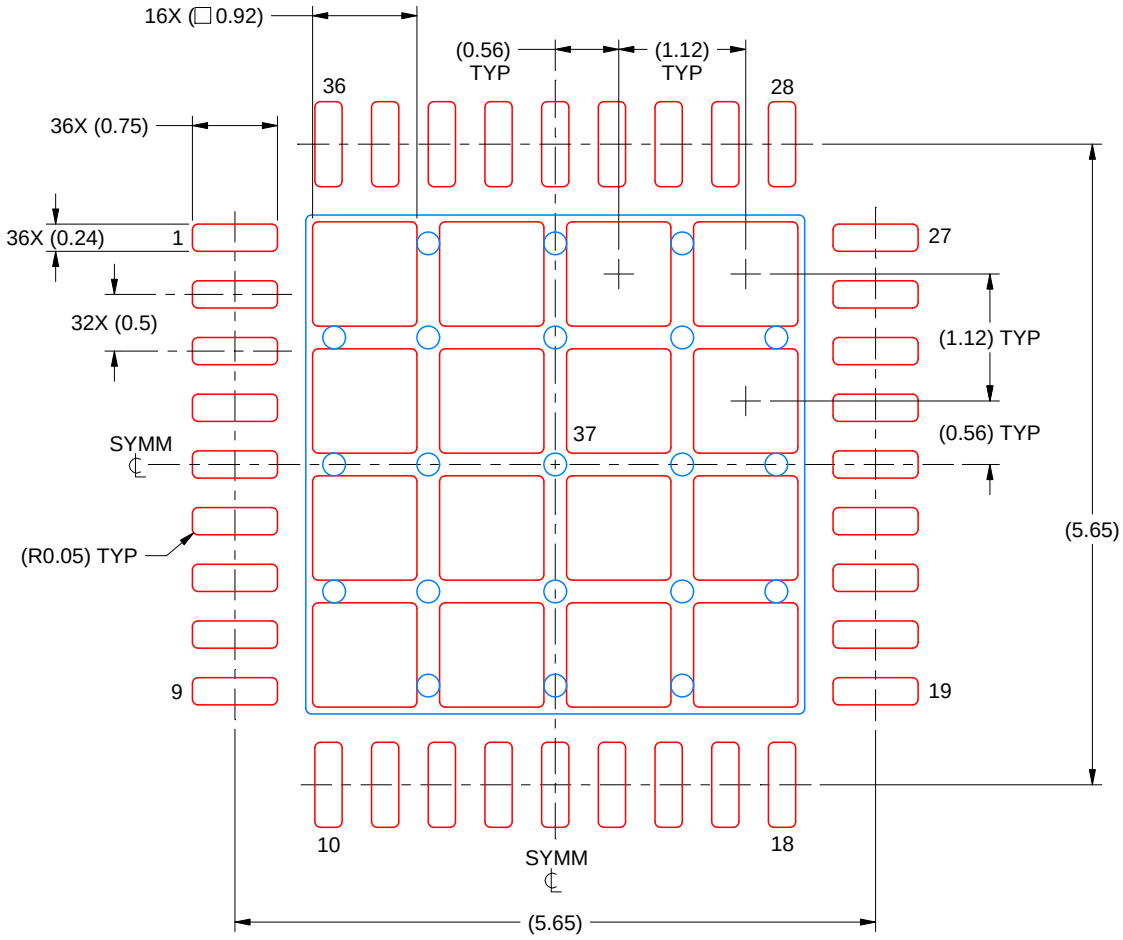

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BASED ON 0.125 MM THICK STENCIL
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70% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE

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