适用于压力传感器的 PGA300 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 16 位 Σ-Δ 模数转换器
  - 适用于温度通道的 16 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
  - 三阶温度和非线性补偿
  - 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：
  - 单线制接口，可通过电源引脚进行通信
  - 电流环路输出：4mA 至 20mA
  - 比例电压输出和绝对电压输出
- 电源：
  - 片上电源管理，支持 3.3V 至 30V 较宽的电源电压范围
  - 集成反向电压保护电路
- 工业温度范围：-40°C 至 +150°C

2 应用

- 压力变送器
- 温度变送器
- 流量变送器
- 液位发送器

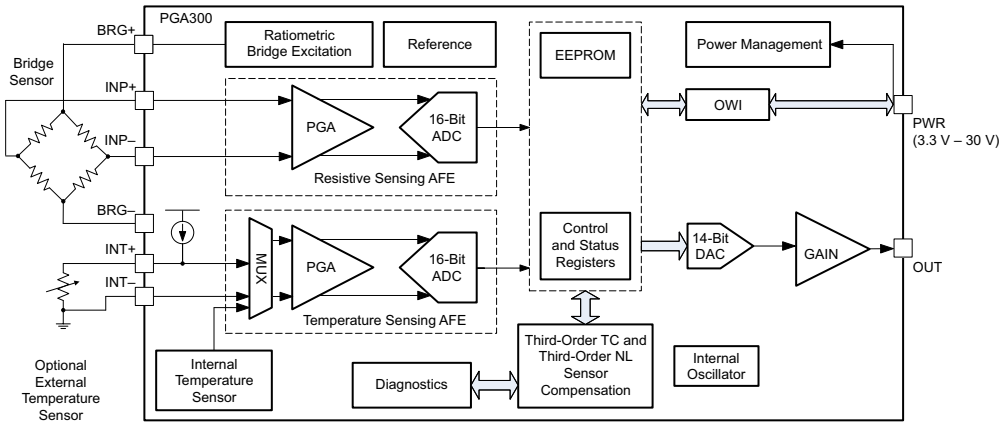
3 说明

PGA300 提供了一个适用于压阻式和应力计压感元件的接口。该器件具有可编程模拟前端 (AFE)、模数转换器 (ADC) 和数字信号处理功能。这是一套完整的片上系统 (SoC) 解决方案，可直接连接传感元件。此外，PGA300 还集成了稳压器和振荡器，更大程度地减少了外部元件数。该器件采用三阶温度和非线性补偿实现高精度。凭借单线制串行接口 (OWI)，可以通过电源引脚实现外部通信，从而简化系统校准过程。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)
PGA300	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）。



PGA300 简化方框图

4 器件和文档支持

4.1 文档支持

4.1.1 相关文档

请参阅以下相关文档：

- 德州仪器 (TI)，*PGA900 DAC 输出稳定性* 应用手册
- 德州仪器 (TI)，*将 PGA900 用作 4mA 至 20mA 电流环路变送器* 应用手册
- 德州仪器 (TI)，*了解 PGA900 DAC 增益放大器的开环增益* 应用手册
- 德州仪器 (TI)，*了解 PGA900 DAC 增益放大器的开环输出阻抗* 应用手册

4.2 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。

4.3 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。

4.4 商标

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4.5 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。

4.6 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

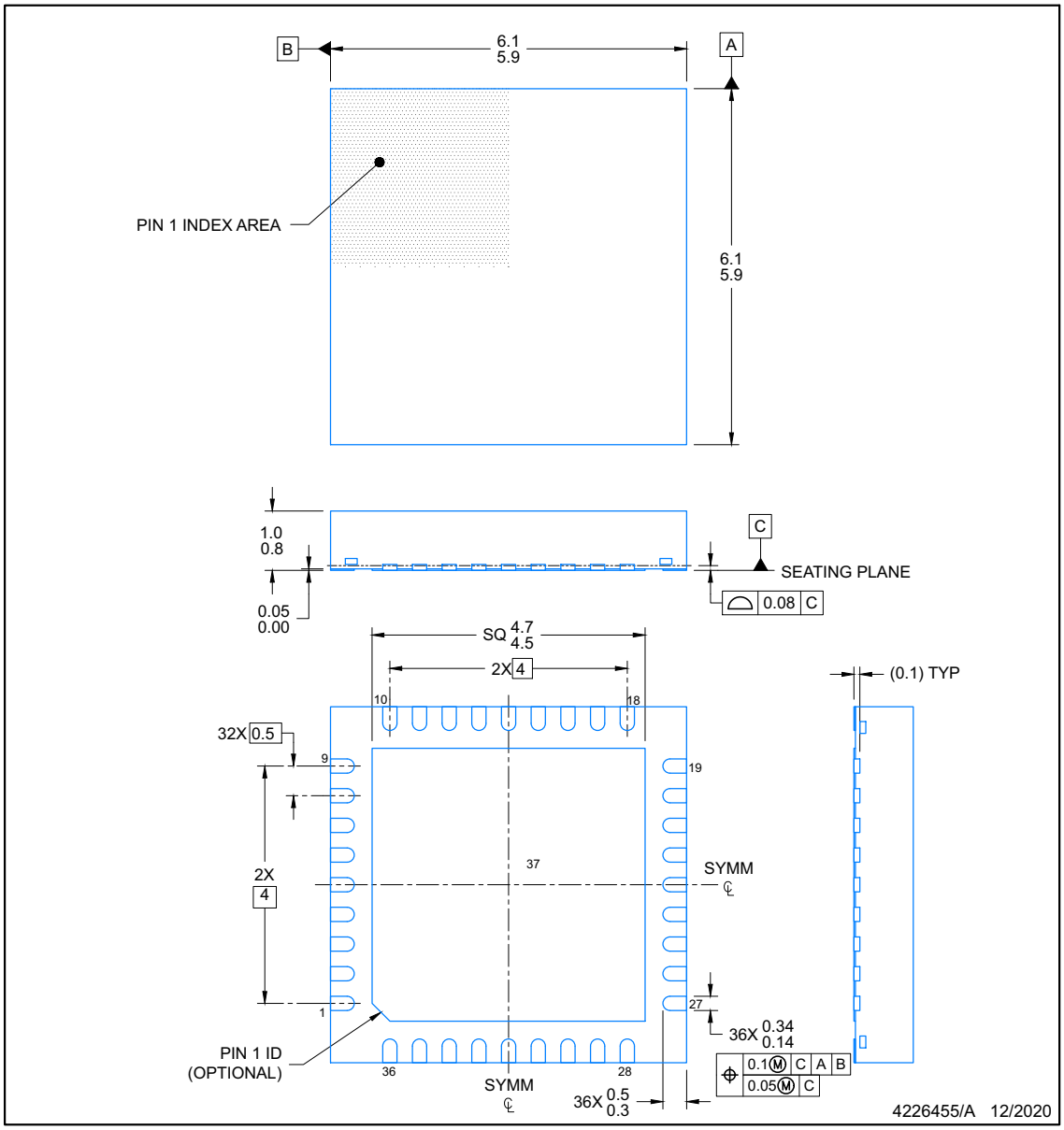
以下页面包含机械、封装和可订购信息。这些信息是指定器件可用的最新数据。数据如有变更，恕不另行通知，且不会对此文档进行修订。如需获取此数据表的浏览器版本，请查看左侧的导航面板。

5.1 机械数据

PACKAGE OUTLINE

RHH0036G **VQFN - 1 mm max height**

PLASTIC QUAD FLATPACK-NO LEAD



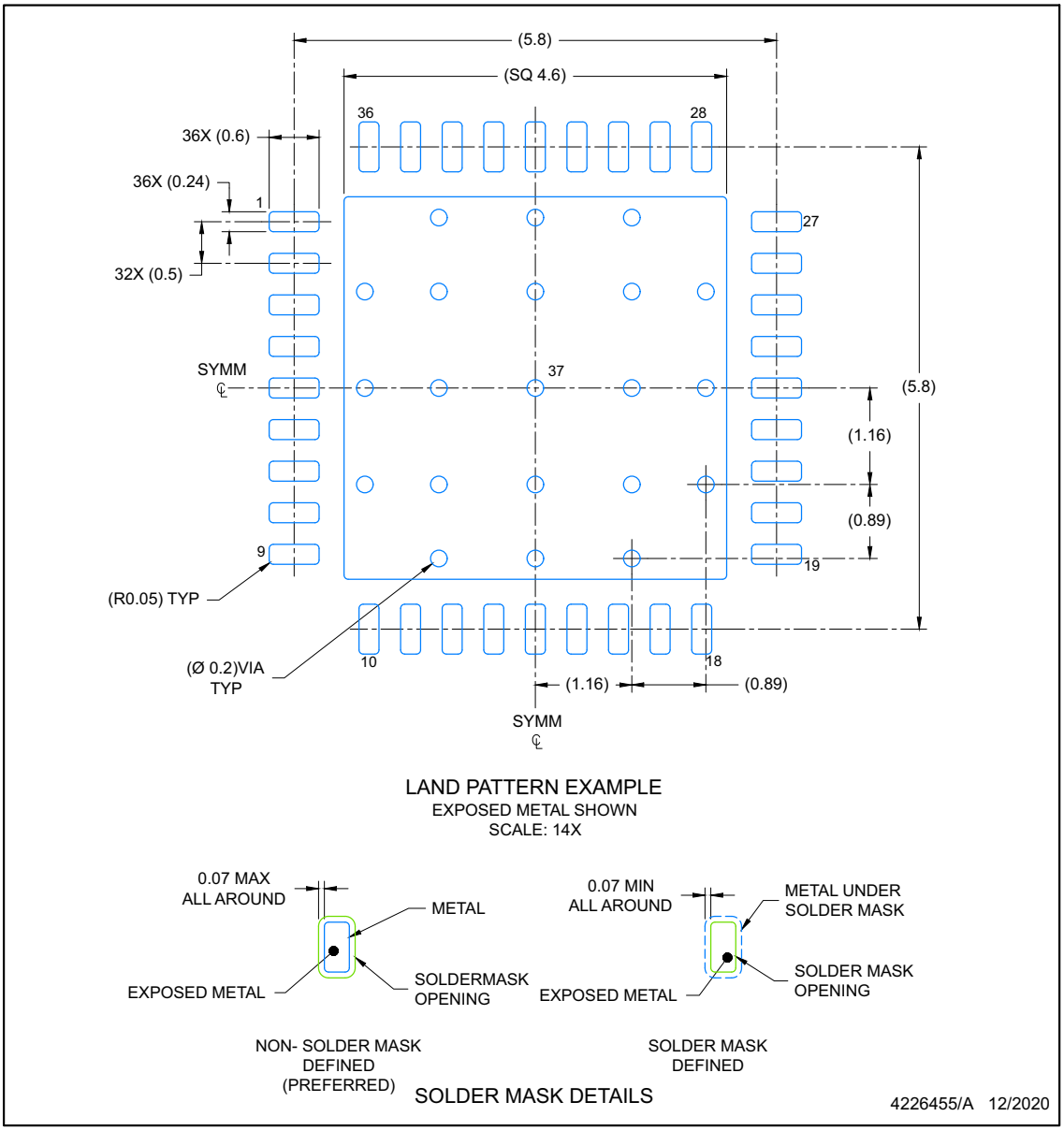
NOTES:

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 optimal thermal and mechanical performance.

EXAMPLE BOARD LAYOUT

RHH0036G — **VQFN - 1 mm max height**

PLASTIC QUAD FLATPACK-NO LEAD



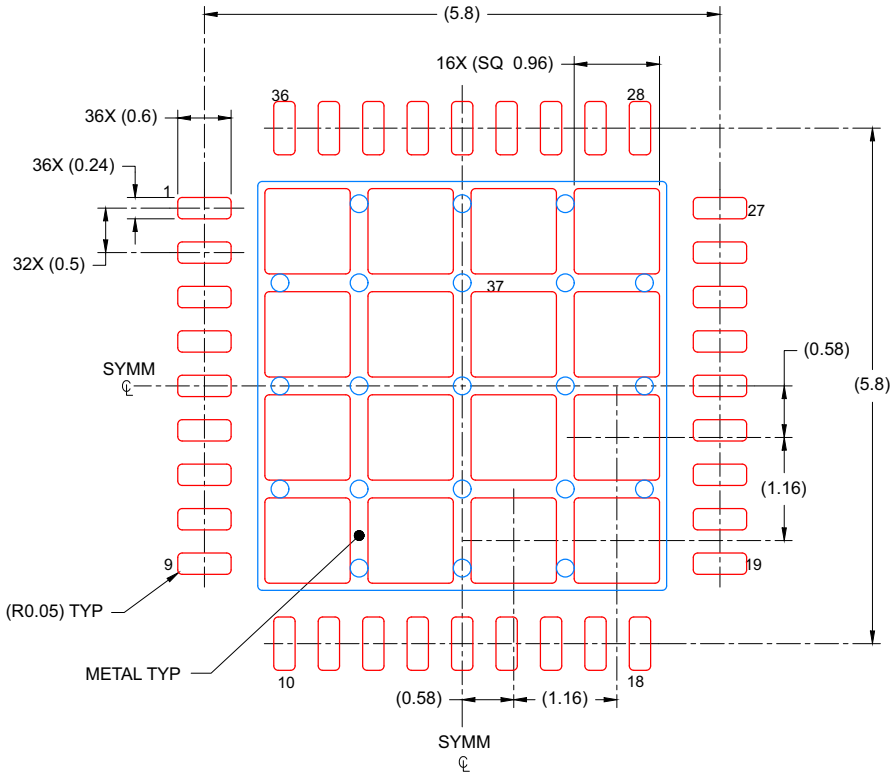
NOTES: (continued)

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

RHH0036G — **VQFN - 1 mm max height**

PLASTIC QUAD FLATPACK-NO LEAD



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD
70% PRINTED COVERAGE BY AREA
SCALE: 14X

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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 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
PGA300ARHHR	ACTIVE	VQFN	RHH	36	2500	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 150	PGA300A RHH	Samples
PGA300ARHHT	ACTIVE	VQFN	RHH	36	250	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 150	PGA300A RHH	Samples

(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 <=1000ppm 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.

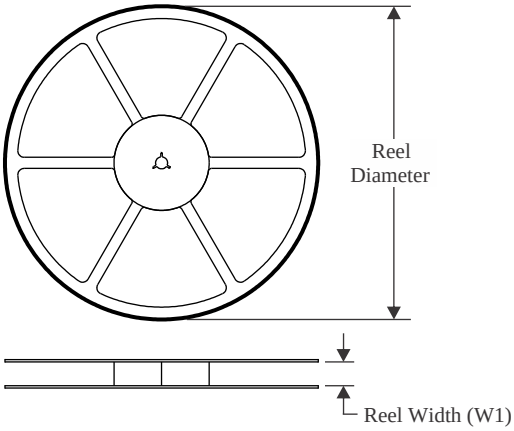
(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(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.

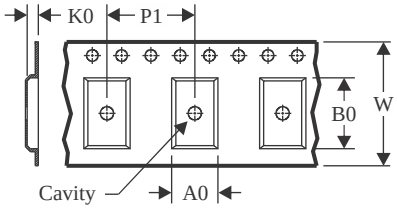
(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

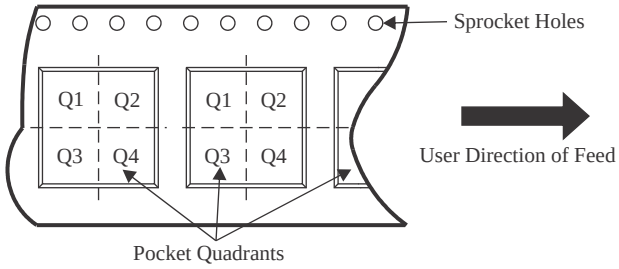


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

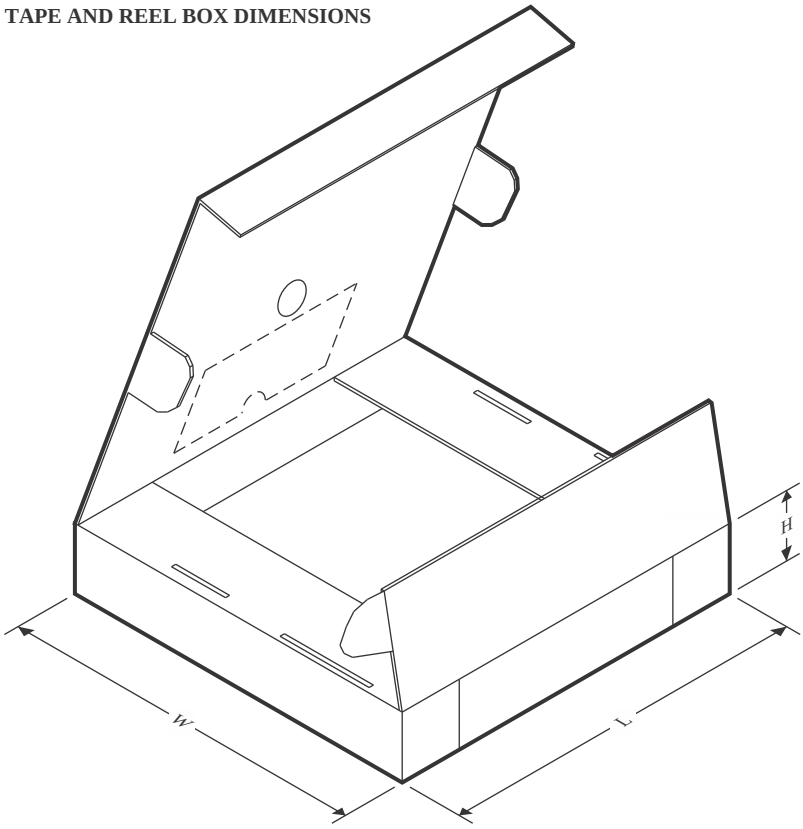
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

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
PGA300ARHHR	VQFN	RHH	36	2500	330.0	16.4	6.3	6.3	1.1	12.0	16.0	Q2
PGA300ARHHT	VQFN	RHH	36	250	180.0	16.4	6.3	6.3	1.1	12.0	16.0	Q2

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
PGA300ARHHR	VQFN	RHH	36	2500	367.0	367.0	38.0
PGA300ARHHT	VQFN	RHH	36	250	210.0	185.0	35.0

GENERIC PACKAGE VIEW

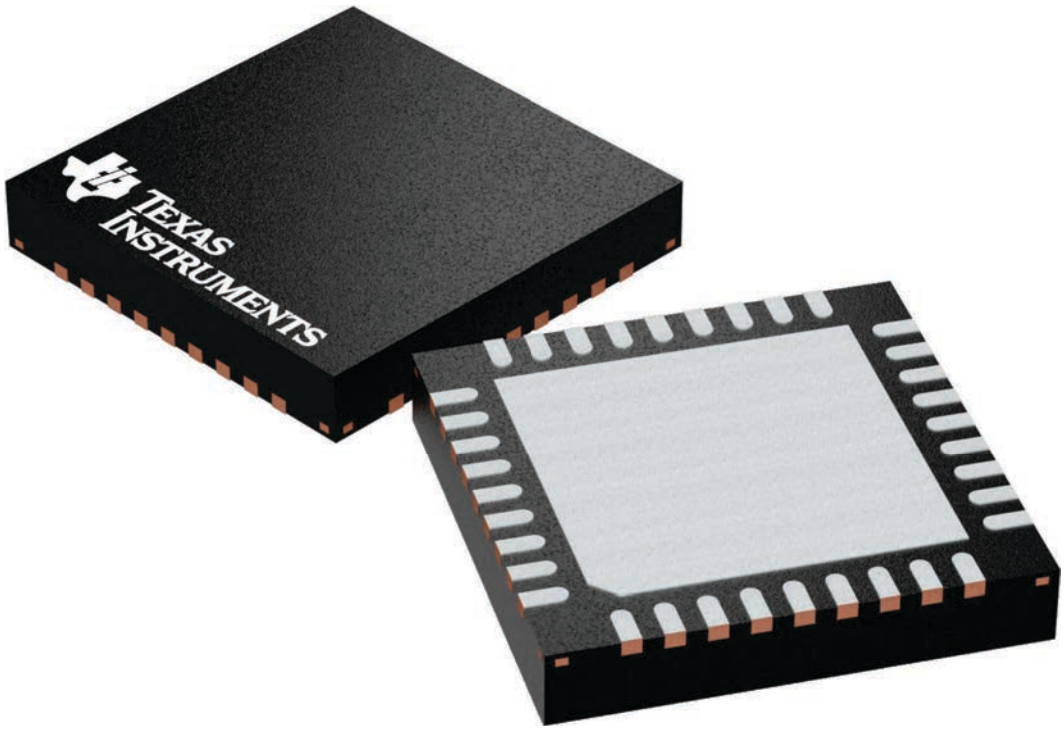
RHH 36

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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