TAS6584-Q1 - 具有电流感测和实时负载诊断功能的 45V、10A 数字输入 4 通道汽车 D 类音频放大器

1 特性

- 符合面向汽车应用的 AEC-Q100 标准
  - 温度等级 1：–40°C 至 +125°C，T_A
- 常规运行
  - 4.5V 至 45V 电源电压，50V 负载突降
  - 支持 1.8V 和 3.3V I/O
  - I^2C 控制，具有 8 个地址选项
  - 14.4V 时的空闲功率损耗低于 2W，最大 VBAT+PVDD 关断损耗低于 8 uA
- 集成 DSP 处理
  - H 类电源电压控制
  - 热监控和折返
  - 削波探测、PVDD 监控和折返
- 通过 I^2S/TDM 按通道进行输出电流感测
  - 无需外部电路
- 实时负载诊断
  - 播放音频时监控输出条件
  - 开路负载、短路负载、电源短路、接地短路检测
- 直流和交流备用负载诊断
- 音频输入
  - 2-4 通道 I^2S 或 4-16 通道 TDM 输入
  - 输入采样率：44.1 kHz、48 kHz、96 kHz、192 kHz
  - 辅助低延迟路径，在 48 kHz 时信号延迟减少 70% 以上
- 音频输出
  - 4 通道桥接式负载 (BTL)，可配置 2 通道并联 BTL (PBTL)
  - 384 kHz 至 2.1 MHz 可配置输出开关频率
  - 高达 10A 的通道输出电流
  - 400VA 峰值 BTL 输出功率
  - 118W（45V、8Ω、1% THD、BTL）
  - 215W（45V、4Ω、1% THD、BTL）
- 音频性能
  - THD+N 0.03%（8Ω、1W、1kHz）
  - 111 dB 的信噪比 (SNR)
  - 37 µV (14.4V)、80 µV (45V) 输出噪声
- 保护
  - 输出短路保护
  - 直流失调电压，欠压和过压
  - 可配置过热警告和单个通道关断
  - I^2C 温度和电源电压读数
- 可轻松满足 CISPR25-L5 EMC 规范要求
  - 高级展频

2 应用

- 汽车外部放大器
- 汽车音响主机

3 说明

TAS6584-Q1 是一款四通道、数字输入、高压、D 类音频放大器，支持高达 45V 的电源电压。结合高达 10A 的输出电流，该器件可在高阻抗和低阻抗负载下提供最大输出功率和高保真音频。该器件在 118W（45V、8Ω、1% THD、BTL）和 215W（45V、4Ω、1% THD、BTL）下提供四个通道。

TAS6584-Q1 集成了直流和交流负载诊断功能，可在启用输出级之前确定所连接负载的状态。在音频播放期间，可通过适用于每个通道的输出电流感测功能来监控状态，并通过 TDM 以最小的延迟将测量结果报告给主机处理器。该器件在播放音频时使用独立于主机和音频输入运行的实时负载诊断功能来监控输出负载状况。

为了优化系统效率，TAS6584-Q1 中集成的 DSP 支持 H 类包络跟踪控制，无需开发复杂的跟踪软件，而且无需外部微控制器即可实现本地升压控制。

TAS6584-Q1 器件为每个通道提供一个额外的低延迟信号路径，在 48kHz 下提供最高快 70% 的信号处理速度，从而支持时间敏感型有源噪声消除 (ANC) 和道路噪声消除 (RNC) 应用。

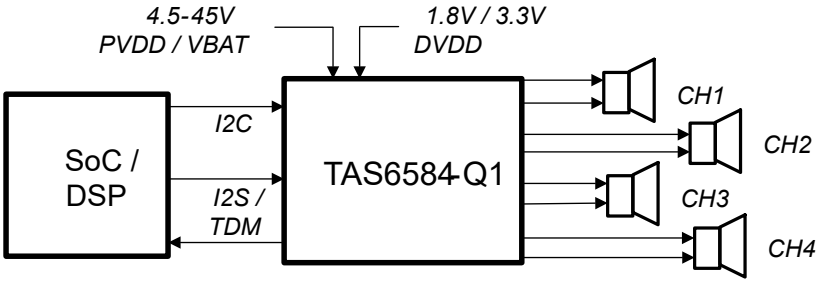
该器件采用带外露散热焊盘的 64 引脚 QFP 封装。

器件信息

器件型号	封装(1)	封装尺寸（标称值）
TAS6584-Q1	HTQFP (64)	14.00mm x 14.00mm

(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。

本文档旨在为方便起见，提供有关 TI 产品中文版本的信息，以确认产品的概要。有关适用的官方英文版本的最新信息，请访问 www.ti.com，其内容始终优先。TI 不保证翻译的准确性和有效性。在实际设计之前，请务必参考最新版本的英文版本。



简图

Copyright © 2022 Texas Instruments Incorporated

Table of Contents

1 特性 1
2 应用 1
3 说明 1
4 Revision History 3
5 Device and Documentation Support 4
5.1 Documentation Support 4
5.2 接收文档更新通知 4
5.3 支持资源 4
5.4 Trademarks 4
5.5 Electrostatic Discharge Caution 4
5.6 术语表 4
6 Mechanical, Packaging, and Orderable Information 4
6.1 Tape and Reel Information 5
6.2 Mechanical Data 6

4 Revision History

注：以前版本的页码可能与当前版本的页码不同

Changes from Revision * (January 2022) to Revision A (March 2022)	Page
• 将器件状态从*预告信息*更改为*量产数据*	1

Copyright © 2022 Texas Instruments Incorporated

5 Device and Documentation Support

TI offers an extensive line of development tools. Tools and software to evaluate the performance of the device, generate code, and develop solutions are listed below.

5.1 Documentation Support

5.1.1 Related Documentation

5.2 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 *订阅更新* 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。

5.3 支持资源

TI E2E™ 支持论坛是工程师的重要参考资料，可直接从专家获得快速、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可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》。

5.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.
所有商标均为其各自所有者的财产。

5.5 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

5.6 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。

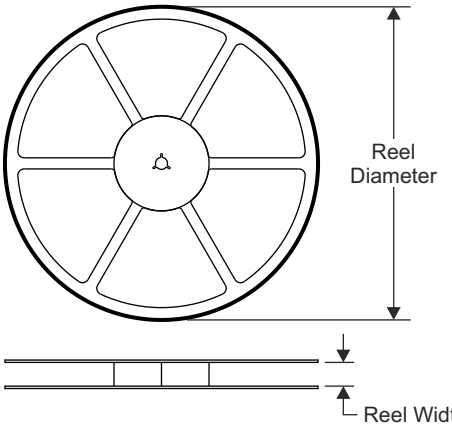
6 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

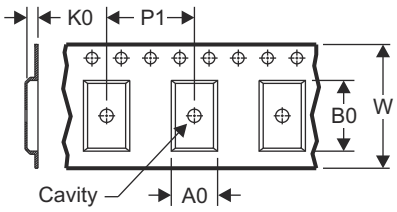
Copyright © 2022 Texas Instruments Incorporated

6.1 Tape and Reel Information

REEL DIMENSIONS

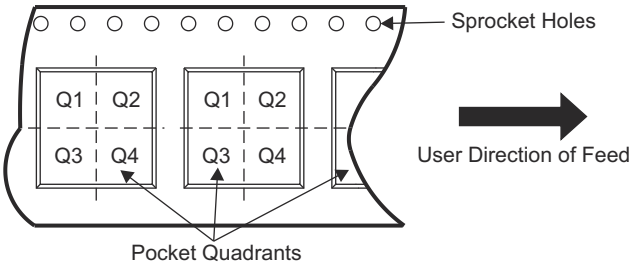


TAPE DIMENSIONS



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

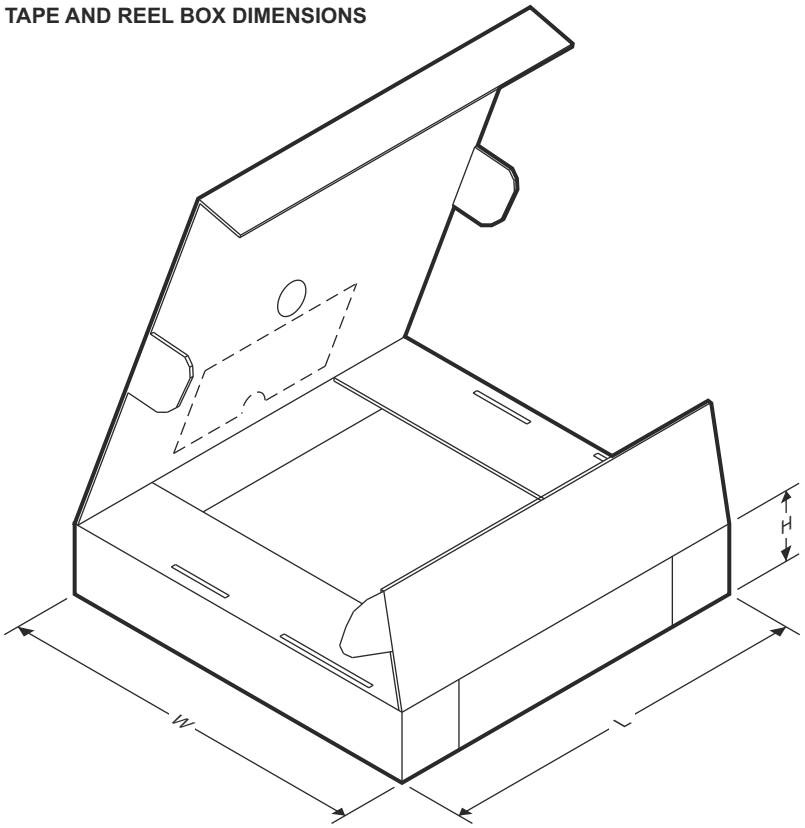
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



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
PTAS6584QDKQQ1	HTQFP	PHD	64	1000	330.0	24.4	17.0	17.0	1.5	20.0	24.0	Q2

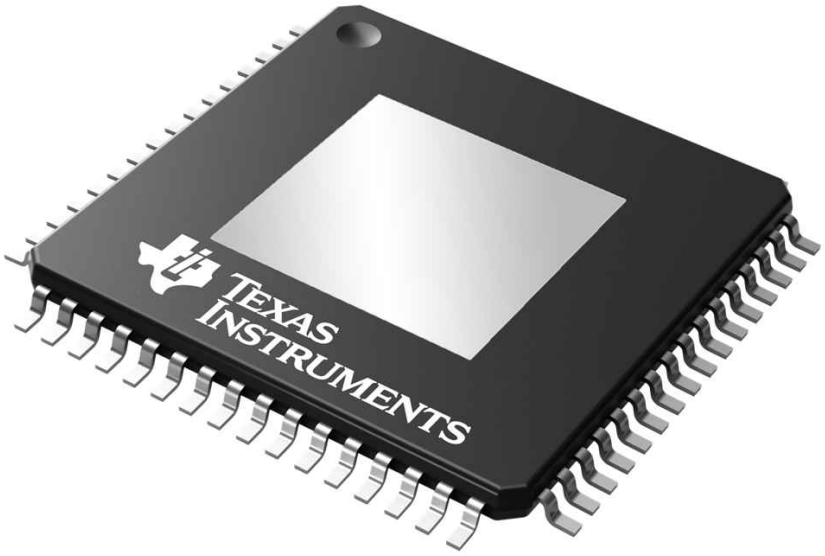
Copyright © 2022 Texas Instruments Incorporated

TAPE AND REEL BOX DIMENSIONS



Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
PTAS6584QPHDRQ1	HTQFP	PHD	64	1000	350.0	350.0	43.0

6.2 Mechanical Data



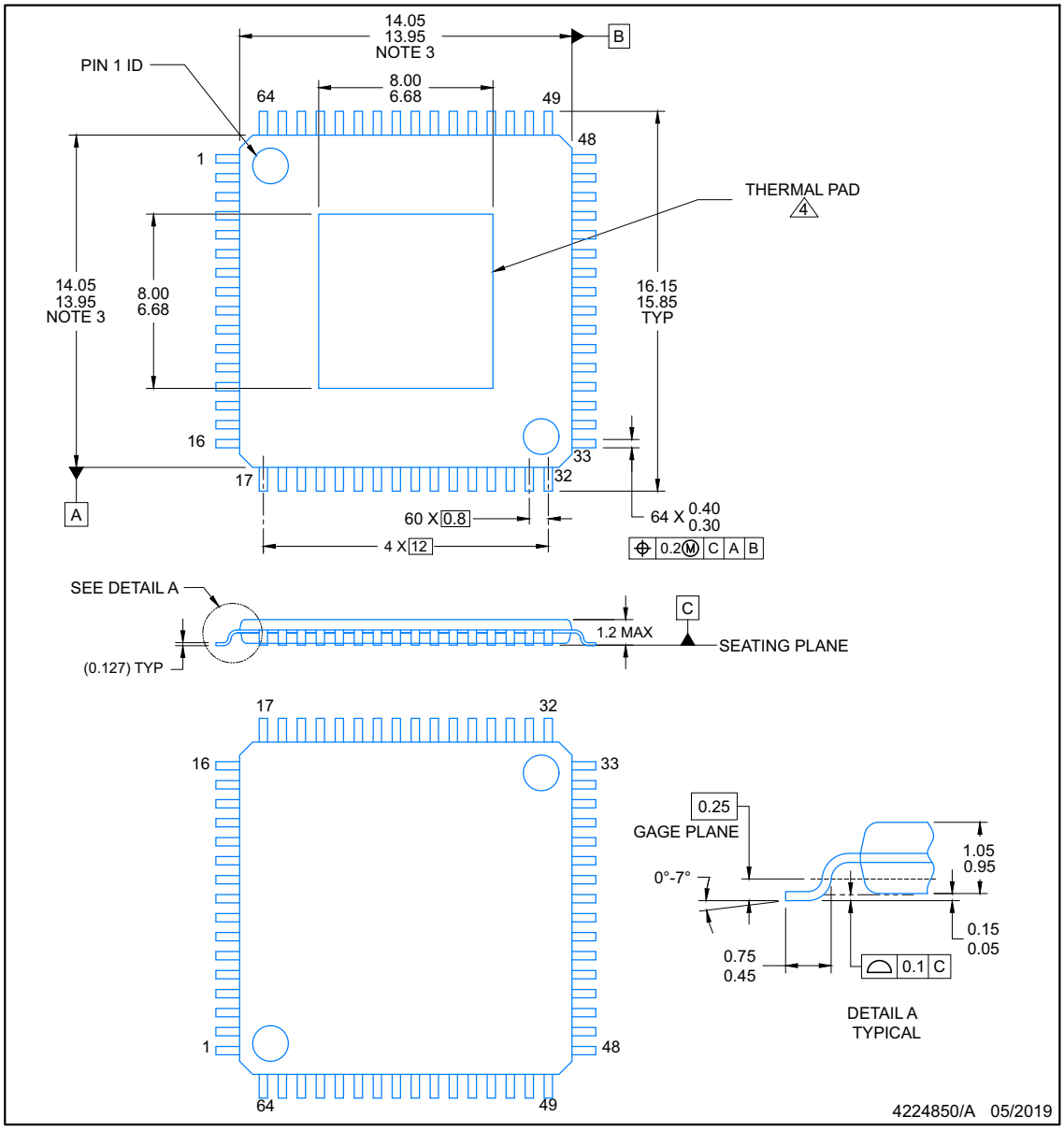
Copyright © 2022 Texas Instruments Incorporated

PACKAGE OUTLINE

PHD0064B

HTQFP - 1.2 mm max height

PLASTIC QUAD FLATPACK



NOTES:

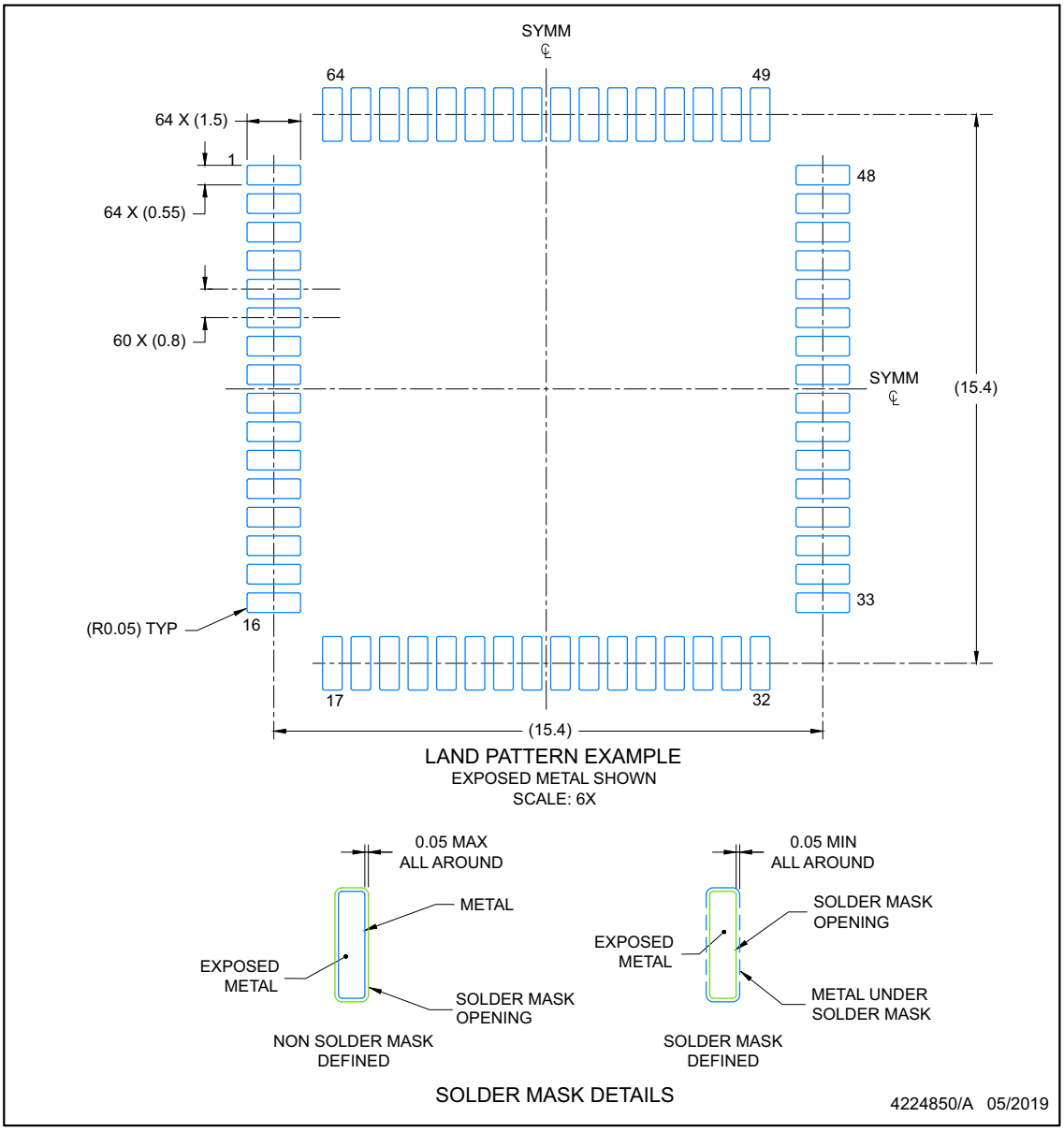
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 per side.
4. See technical brief. PowerPad Thermally Enhanced Package, Texas Instruments Literature No. SLMA002 (www.ti.com/lit/slma002) and SLMA004 (www.ti.com/lit/slma004) for information regarding recommended board layout.

Copyright © 2022 Texas Instruments Incorporated

EXAMPLE BOARD LAYOUT

PHD0064B — **HTQFP - 1.2 mm max height**

PLASTIC QUAD FLATPACK



NOTES: (continued)

5. Publication IPC-7351 may have alternate designs.
6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.
7. Vias are optional depending on application, refer to device data sheet. It is recommended that vias under paste be filled, plugged or tented.

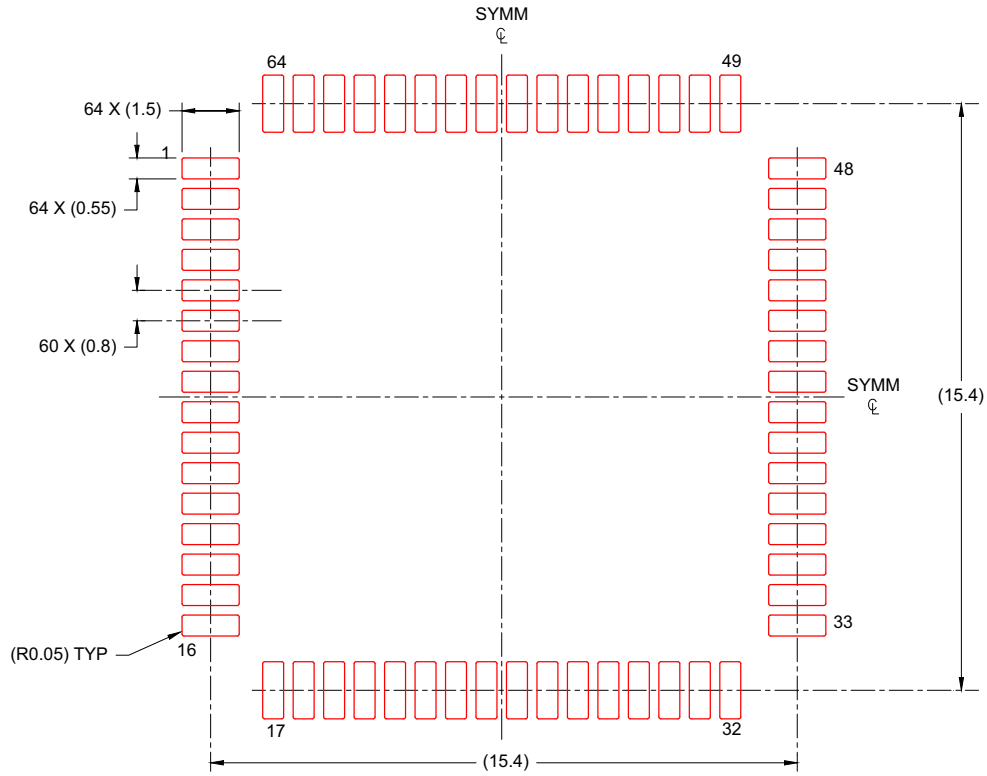
Copyright © 2022 Texas Instruments Incorporated

EXAMPLE STENCIL DESIGN

PHD0064B

HTQFP - 1.2 mm max height

PLASTIC QUAD FLATPACK



SOLDER PASTE EXAMPLE
SCALE: 6X

4224850/A 05/2019

NOTES: (continued)

7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
8. Board assembly site may have different recommendations for stencil design.

Copyright © 2022 Texas Instruments Incorporated

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)
TAS6584QPHDRQ1	Active	Production	HTQFP (PHD) | 64	1000 | LARGE T&R	Yes	NIPDAU	Level-3-260C-168 HR	-40 to 125	TAS6584
TAS6584QPHDRQ1.A	Active	Production	HTQFP (PHD) | 64	1000 | LARGE T&R	Yes	NIPDAU	Level-3-260C-168 HR	-40 to 125	TAS6584

(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.

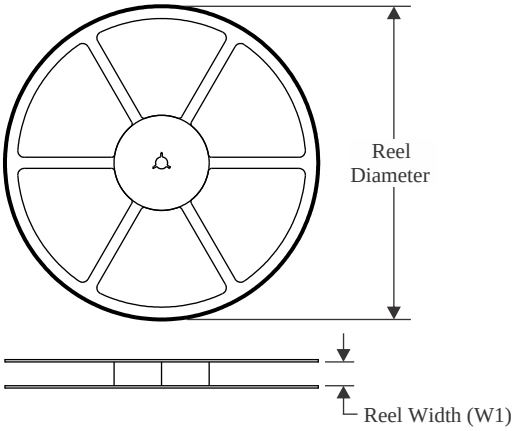
Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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.

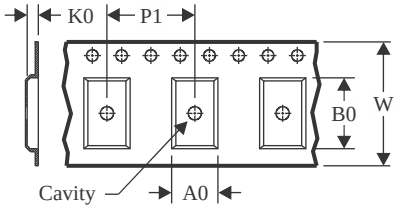
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

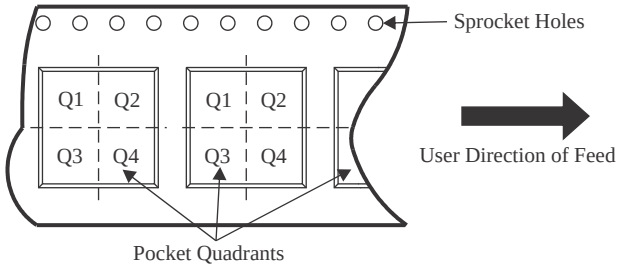


TAPE DIMENSIONS



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

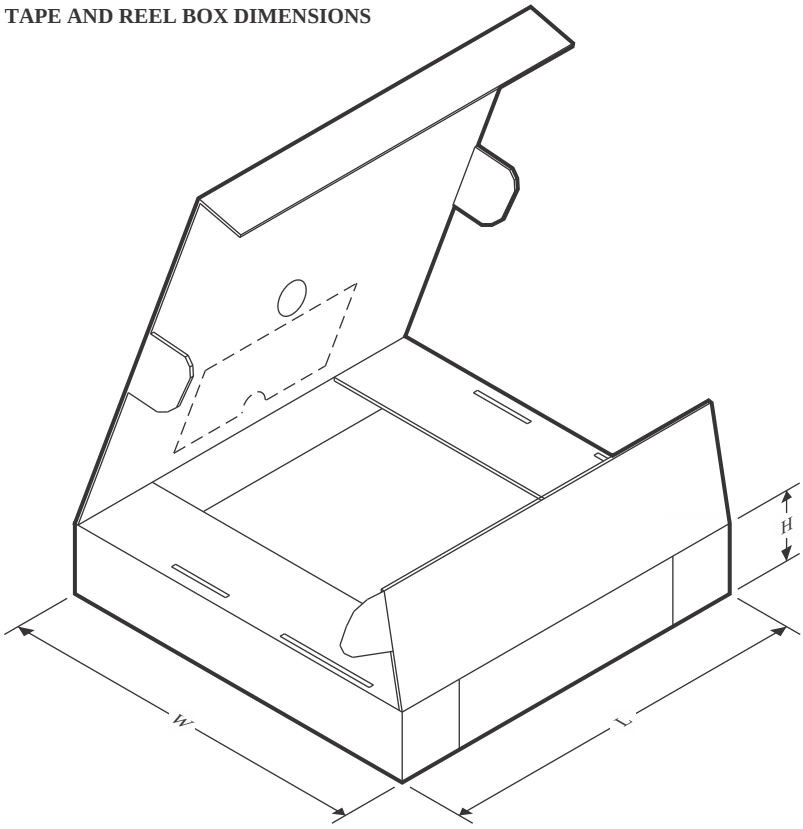
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
TAS6584QPHDRQ1	HTQFP	PHD	64	1000	330.0	24.4	17.0	17.0	1.5	20.0	24.0	Q2
TAS6584QPHDRQ1	HTQFP	PHD	64	1000	330.0	24.4	17.0	17.0	1.5	20.0	24.0	Q2

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TAS6584QPHDRQ1	HTQFP	PHD	64	1000	367.0	367.0	55.0
TAS6584QPHDRQ1	HTQFP	PHD	64	1000	350.0	350.0	43.0

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出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