

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
 - I²C 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 I²S/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 I²S 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
- I²C 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。

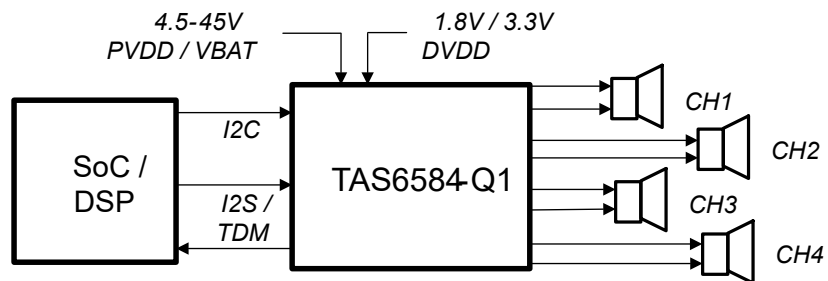
该器件采用带外露散热焊盘的 64 引脚 QFP 封装。

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。





简图

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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 <i>预告信息</i> 更改为 <i>量产数据</i>	1

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.

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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.

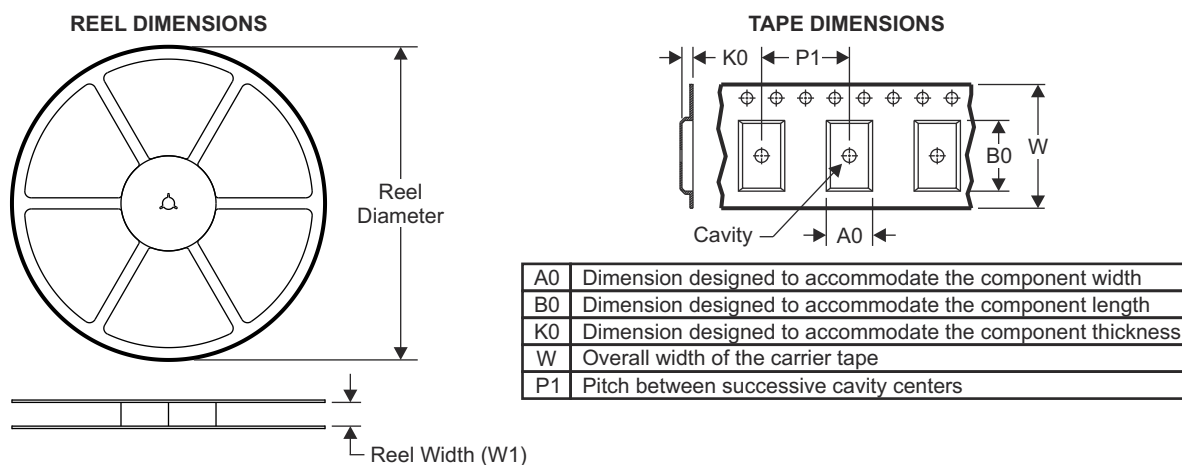
5.6 术语表

[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。

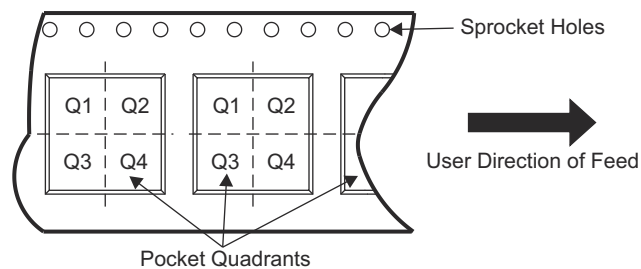
6 Mechanical, Packaging, and Orderable Information

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.

6.1 Tape and Reel Information

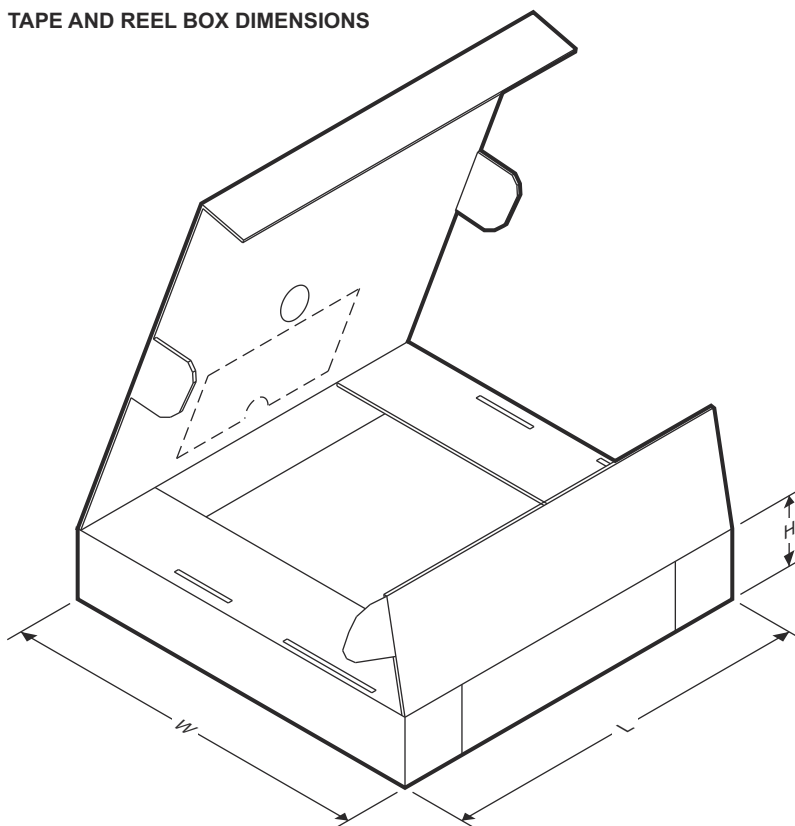


QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



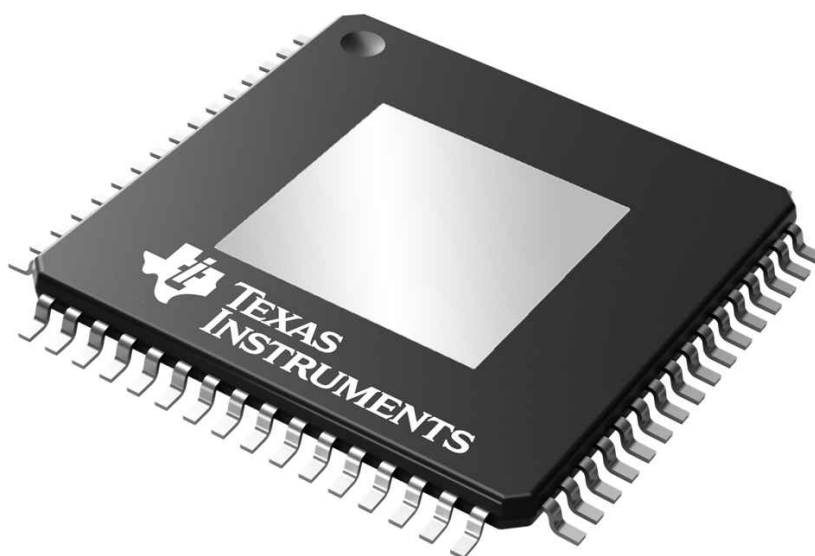
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
PTAS6584QDKQQ1	HTQFP	PHD	64	1000	330.0	24.4	17.0	17.0	1.5	20.0	24.0	Q2

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

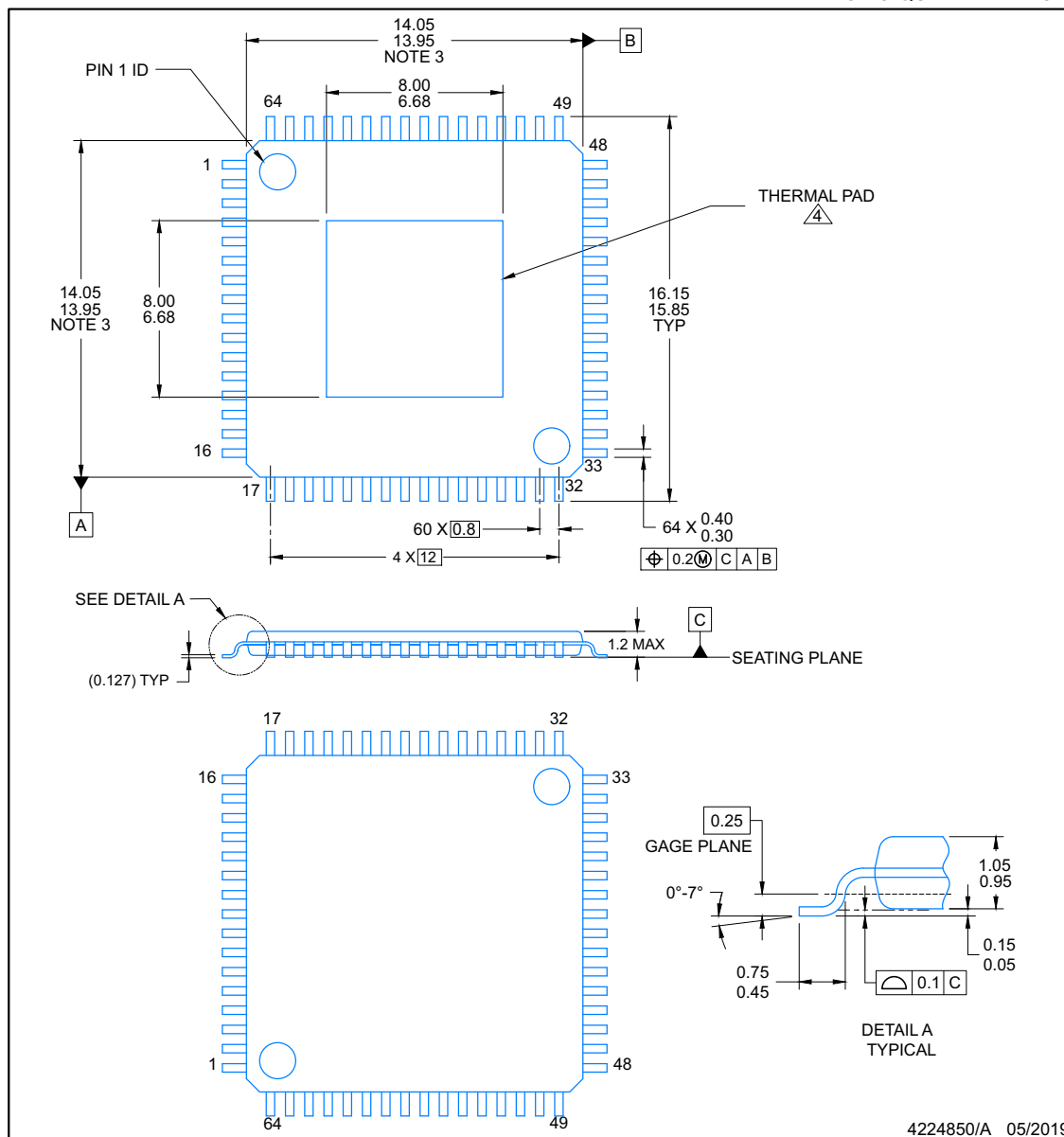
6.2 Mechanical Data



PHD0064B

PACKAGE OUTLINE HTQFP - 1.2 mm max height

PLASTIC QUAD FLATPACK

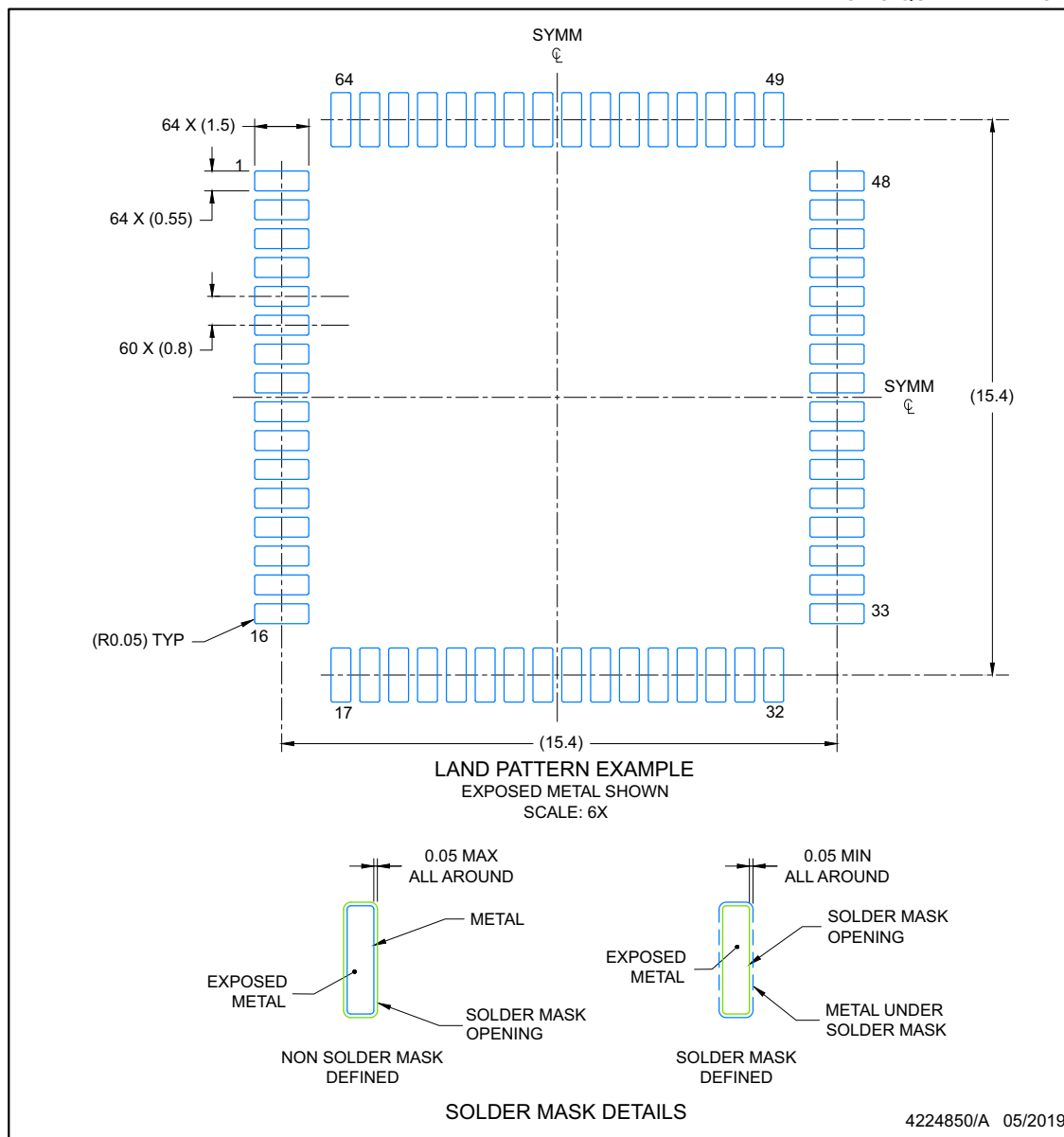


NOTES:

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.

EXAMPLE BOARD LAYOUT**HTQFP - 1.2 mm max height****PHD0064B**

PLASTIC QUAD FLATPACK



NOTES: (continued)

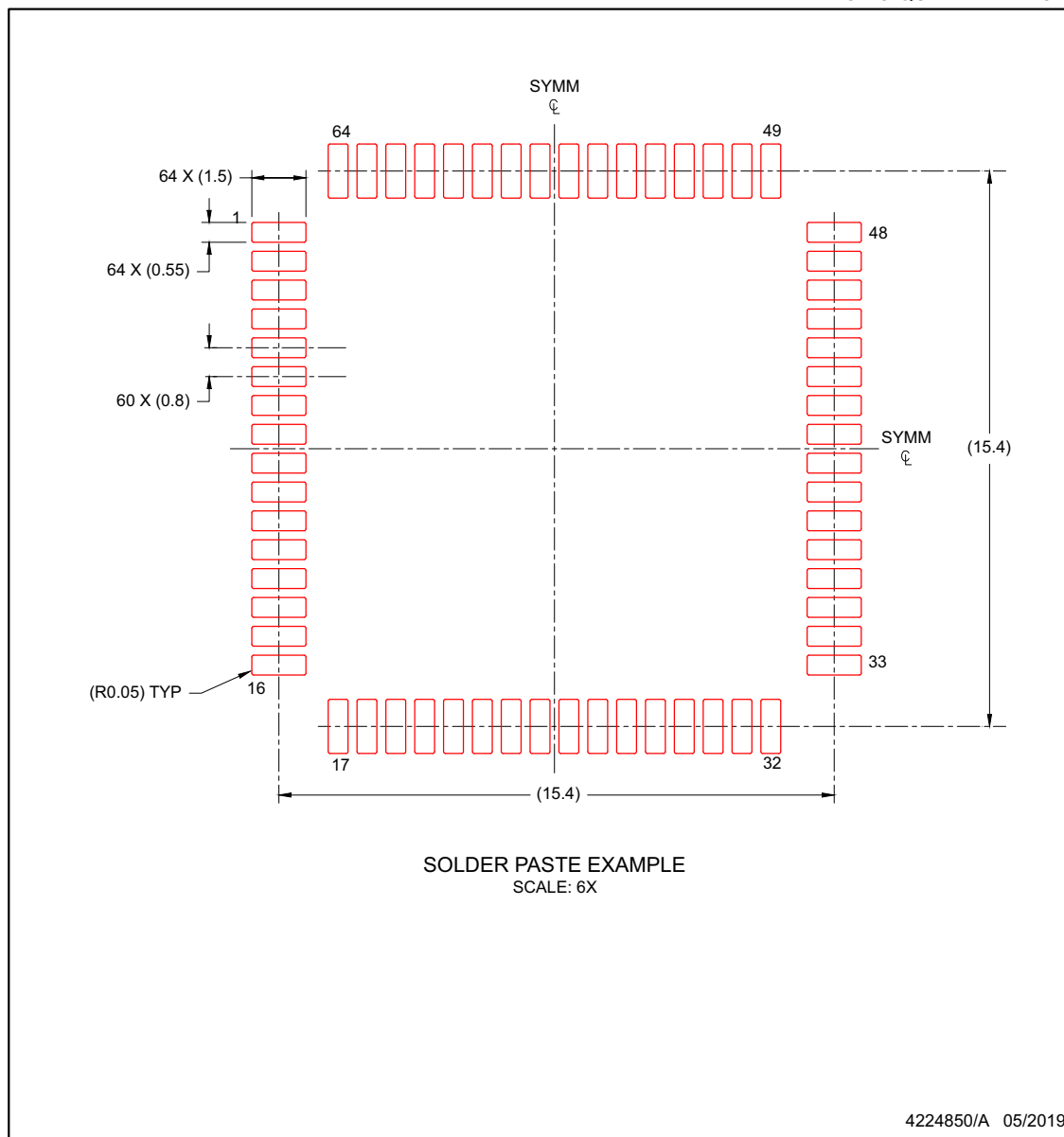
5. Publication IPC-7351 may have alternate designs.
6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.
7. Vias are optional depending on application, refer to device data sheet. It is recommended that vias under paste be filled, plugged or tented.

EXAMPLE STENCIL DESIGN

PHD0064B

HTQFP - 1.2 mm max height

PLASTIC QUAD FLATPACK



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.

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.

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TAPE AND REEL INFORMATION



*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	350.0	350.0	43.0
TAS6584QPHDRQ1	HTQFP	PHD	64	1000	367.0	367.0	55.0

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