

# 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<sub>A</sub>
- 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<sup>2</sup>C 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<sup>2</sup>S/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<sup>2</sup>S 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<sup>2</sup>C 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。

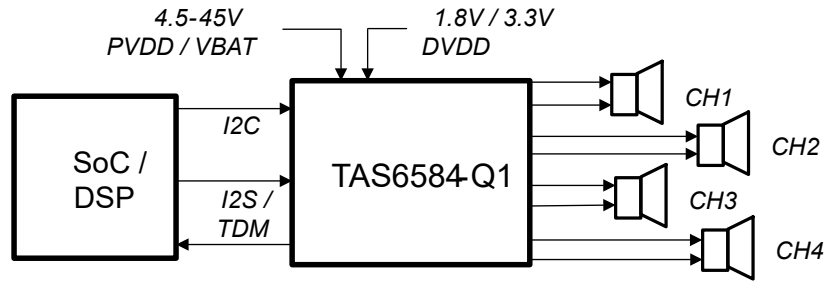
该器件采用带外露散热焊盘的 64 引脚 QFP 封装。

### 器件信息

| 器件型号       | 封装 <sup>(1)</sup> | 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

| <b>Changes from Revision * (January 2022) to Revision A (March 2022)</b> | <b>Page</b> |
|--|-------------|
| • 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](https://www.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.

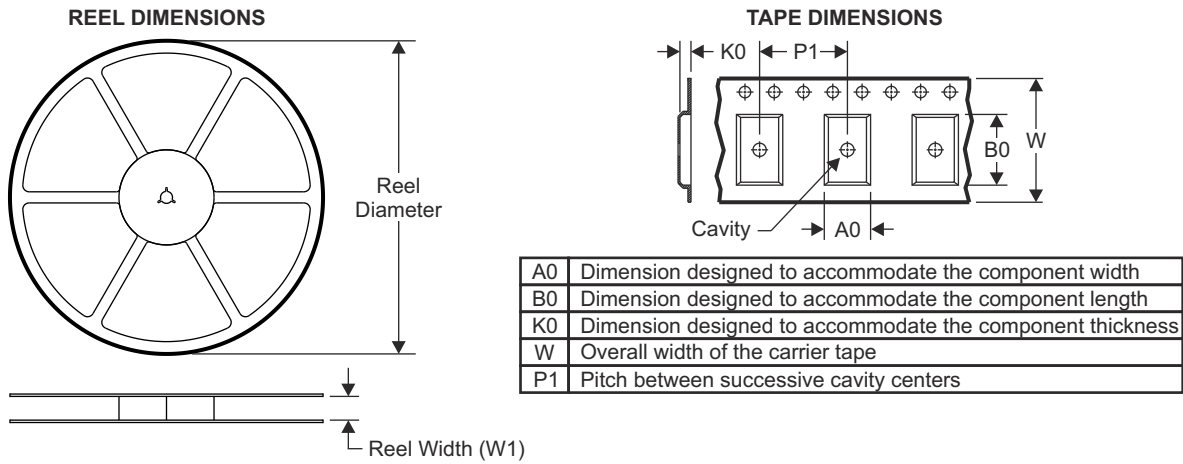
### 5.6 术语表

[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。

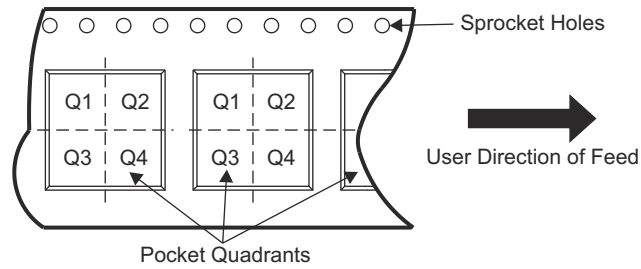
## 6 Mechanical, Packaging, and Orderable Information

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

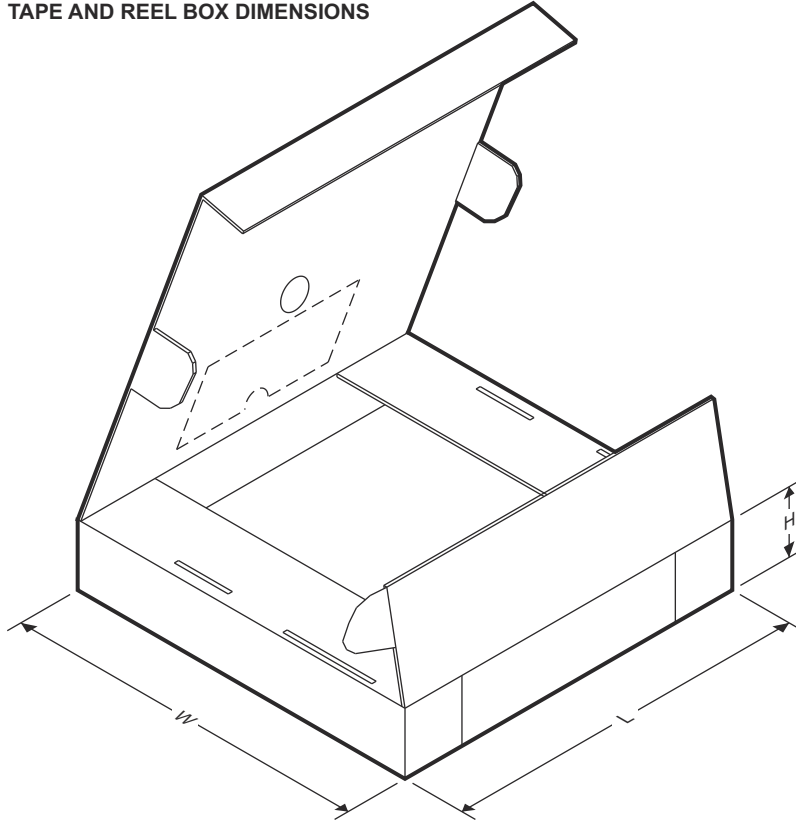


### QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



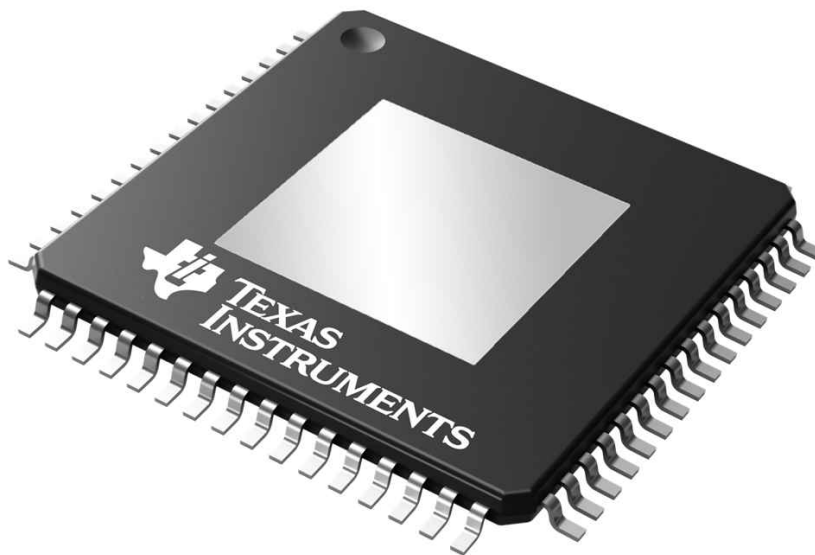
| Device        | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|---------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| PTAS6584QDKQ1 | 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        |

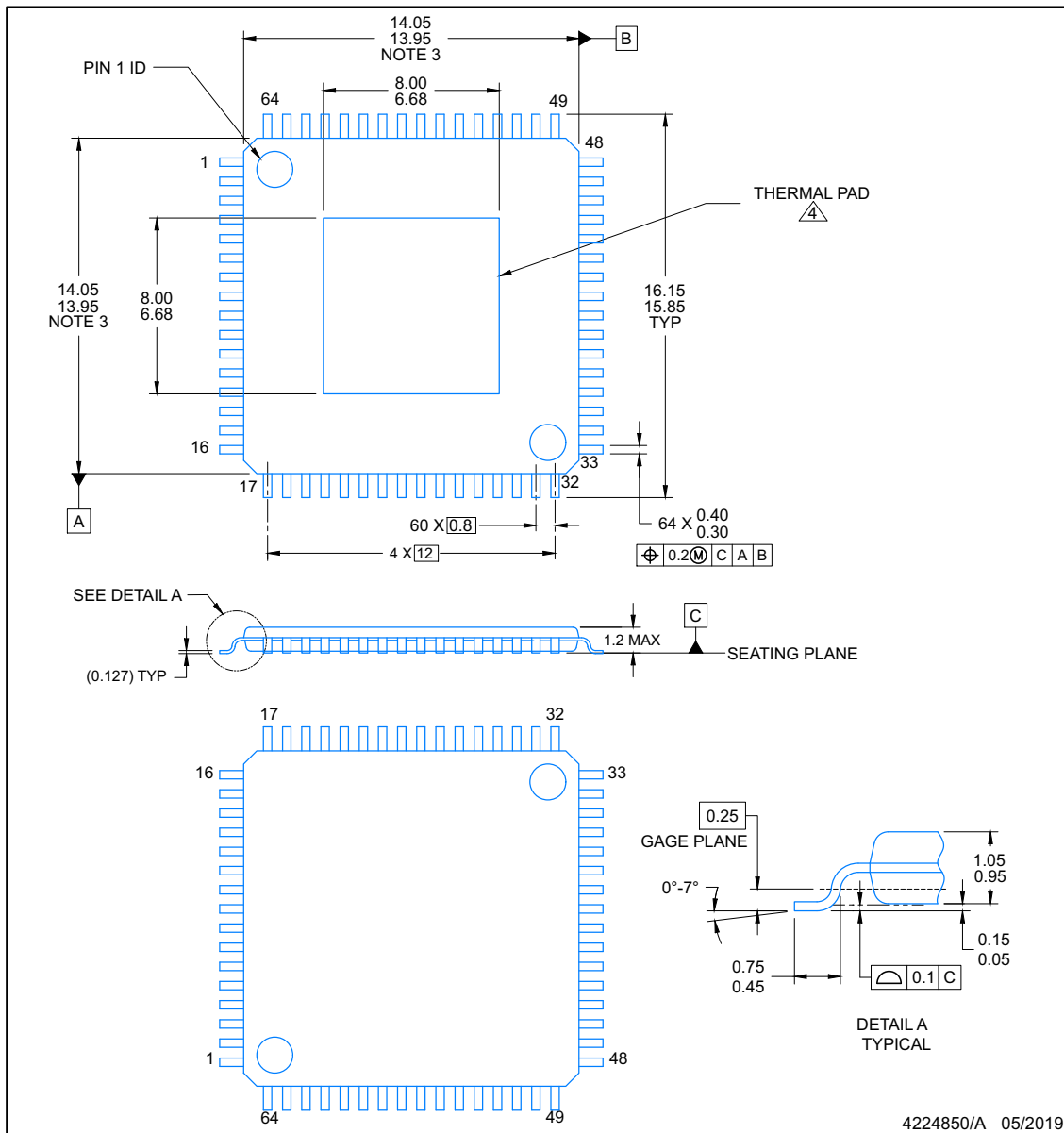
**6.2 Mechanical Data**



**PACKAGE OUTLINE**  
**HTQFP - 1.2 mm max height**

**PHD0064B**

PLASTIC QUAD FLATPACK



NOTES:

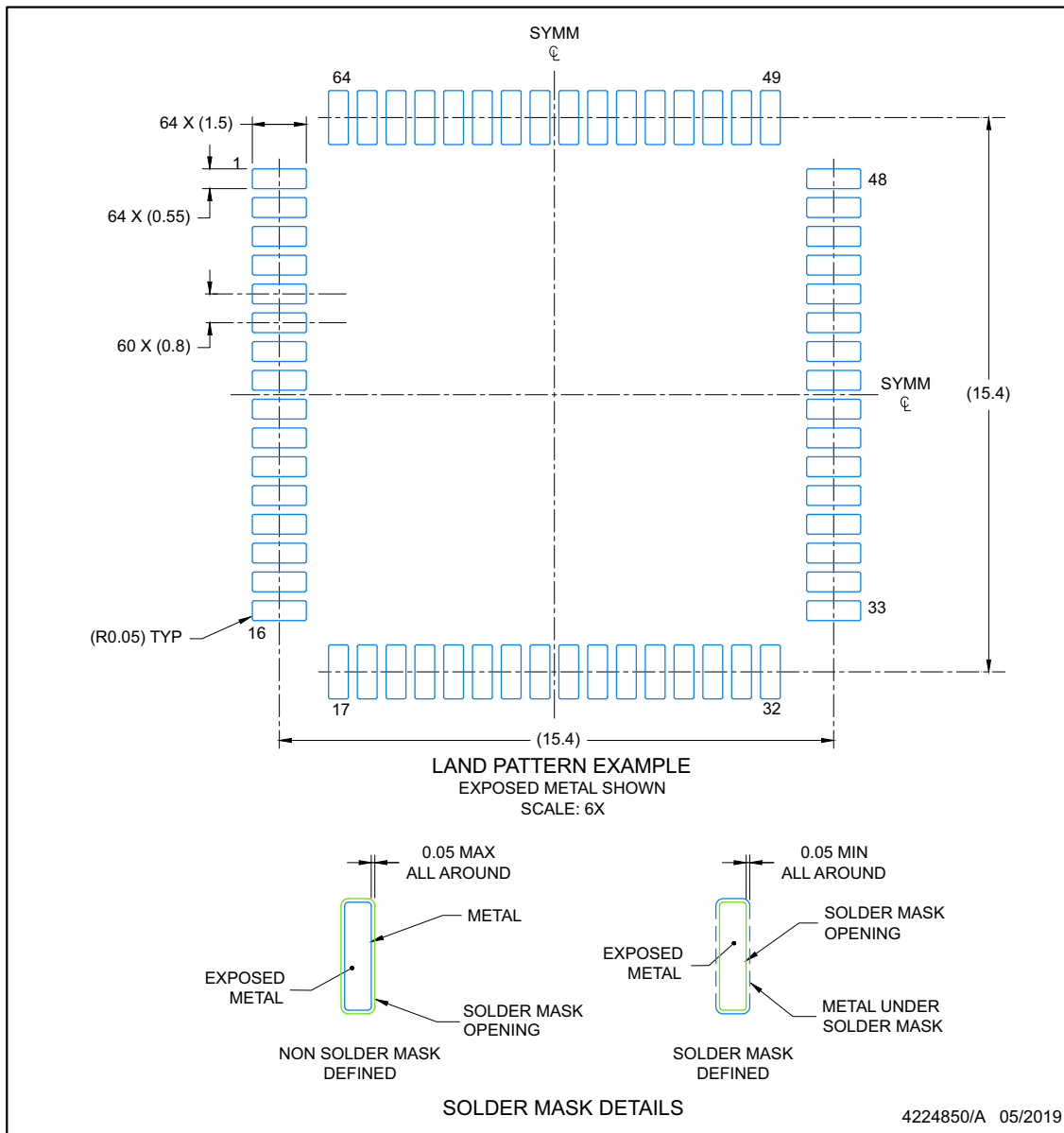
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or 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](http://www.ti.com/lit/slma002)) and SLMA004 ([www.ti.com/lit/slma004](http://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.

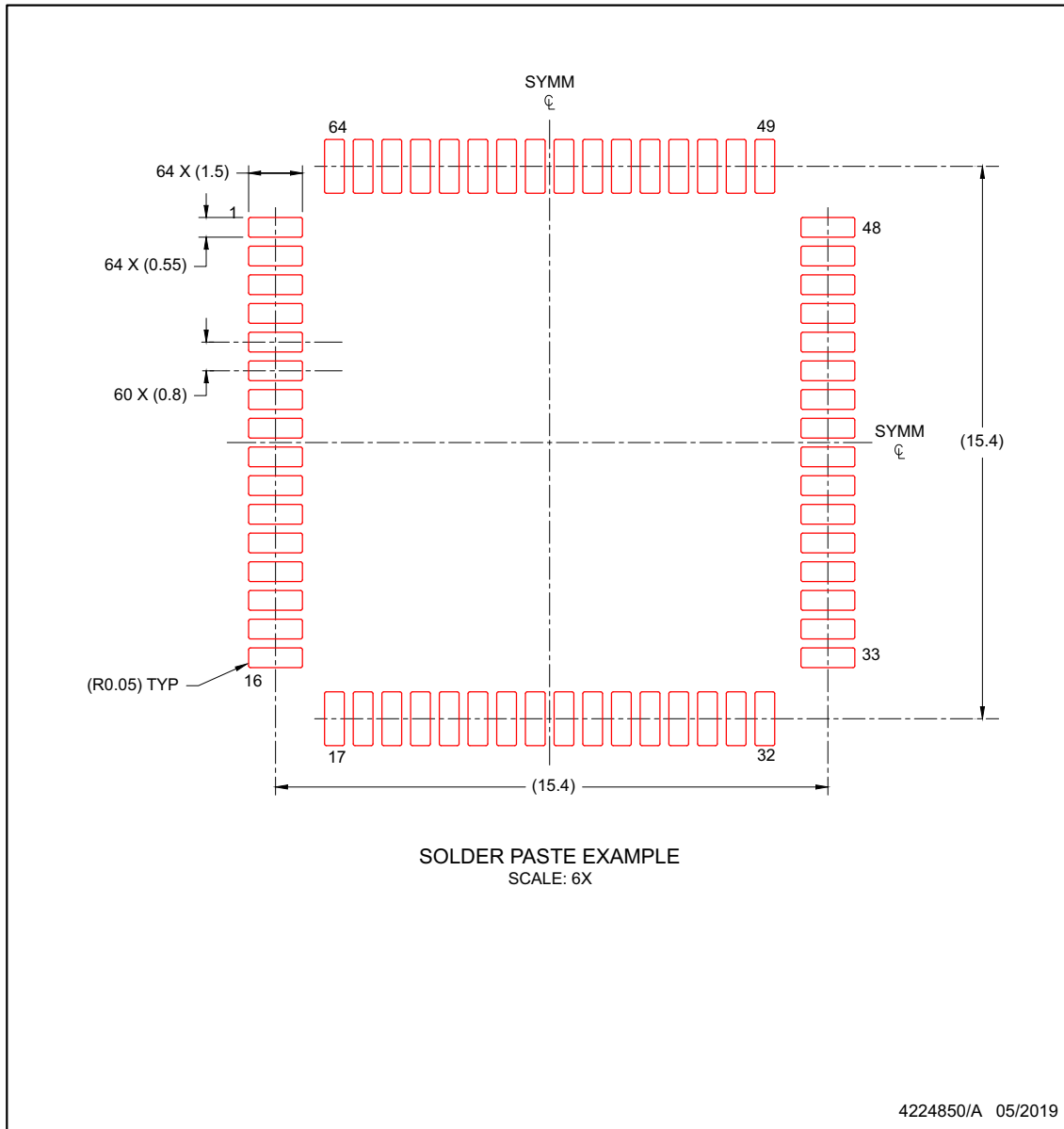


## EXAMPLE STENCIL DESIGN

**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 Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2) | Lead finish/<br>Ball material<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples |
|------------------|---------------|--------------|-----------------|------|-------------|-----------------|--------------------------------------|----------------------|--------------|-------------------------|---------|
| TAS6584QPHDRQ1   | ACTIVE        | HTQFP        | PHD             | 64   | 1000        | RoHS & Green    | NIPDAU                               | Level-3-260C-168 HR  | -40 to 125   | TAS6584                 | 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.

**OBSELETE:** 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.

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**TAPE AND REEL INFORMATION**

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

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