

## TPS2HB50-Q1 40V、50mΩ 双通道智能高侧开关

### 1 特性

- 符合汽车应用 标准
- 具有符合 AEC-Q100 标准的下列结果：
  - 器件温度 1 级：-40°C 至 +125°C 的环境运行温度范围
  - 器件人体模型 (HBM) 静电放电 (ESD) 分类等级 2
  - 器件 CDM ESD 分类等级 C4B
- 双通道智能高侧开关
- 额定负载转储电压高达 40V
- $T_J = 25^\circ\text{C}$  时的典型  $R_{ON}$  为 50mΩ
- 模拟感应输出：
  - 负载电流
  - 器件温度
- 高精度负载电流感应
- 可编程电流限制
- 通过 SNS 引脚进行故障指示
- 开路负载和电池短路检测
- 保护功能：
  - 热关断和重试
  - 电池过压和负载突降
  - VOUT 接地短路
  - 电池反向时自动开启
  - 欠压锁定
  - 电池丢失
  - 接地失效时自动关闭
  - 用于电感负载的输出钳位
  - 可通过 LATCH 引脚配置故障处理

### 2 应用

- 车身控制模块
- 白炽灯和 LED 照明
- 加热元件
- 变速器控制单元
- 汽车空调

### 3 说明

TPS2HB35-Q1 器件是一款适用于 12V 汽车蓄电池的双通道智能高侧开关。该器件集成了许多保护和诊断特性。

此器件提供高精度的模拟电流检测，可改进复杂负载（例如由同一个开关驱动的多个并联负载）的诊断。

TPS2HB35-Q1 器件包括可编程电流限制，可在各种负载条件下实现优化保护 应用中，低功耗是一个关键问题。

此器件的工作输入电压低至 3V。此输入电压使器件在冷启动期间可继续工作。

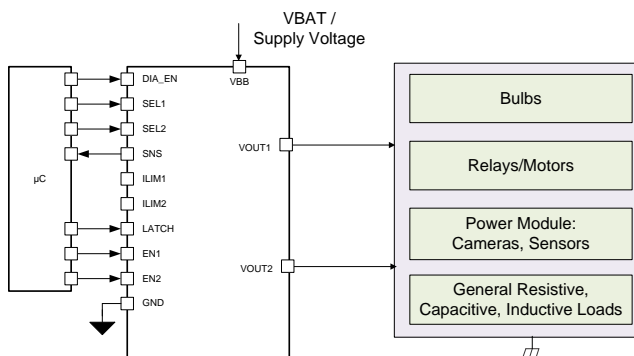
TPS2HB35-Q1 器件采用小型 16 引脚 HTSSOP 封装，因此可减小 PCB 尺寸。

器件信息(1)

器件型号	封装	封装尺寸 (标称值)
TPS2HB50-Q1	HTSSOP (16)	5.00mm x 4.40mm

(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。

简化原理图



## 4 器件和文档支持

### 4.1 器件支持

#### 4.1.1 器件选项

表 1 显示了在器件制造期间编程的器件选项。应选择最适合应用的选项。

表 1. 器件选项

电流限值	达到电流限值时的反应	版本字符	完整器件型号
电阻器可编程	立即禁用开关	B	TPS2HB50BQPWPRQ1
电阻器可编程	使开关保持启用状态；对电流进行限制	D	TPS2HB50DQPWPRQ1
不可编程	立即禁用开关	F	TPS2HB50FPWPRQ1

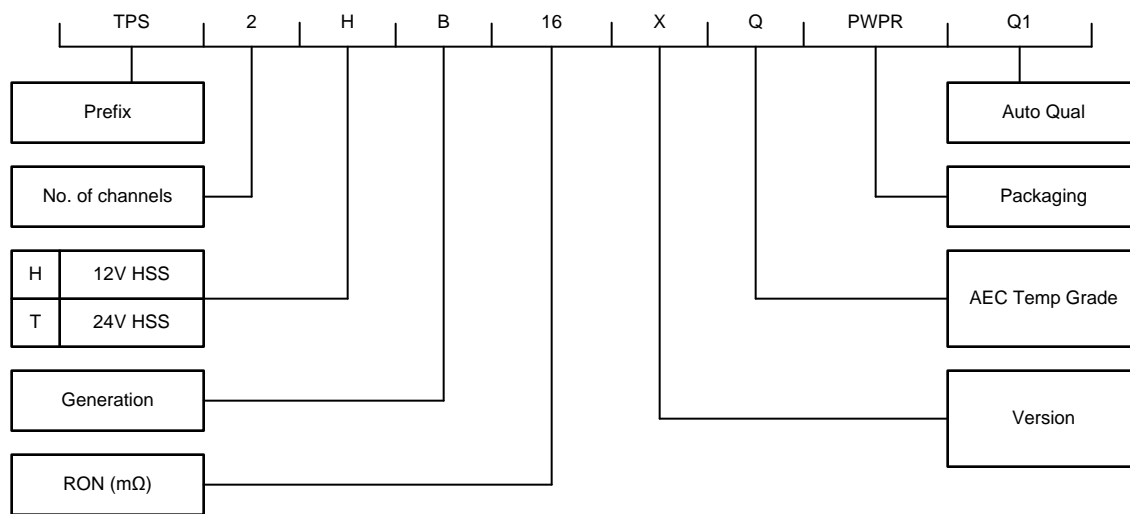


图 1. 命名约定

### 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](http://TI.com) 上的器件产品文件夹。请单击右上角的提醒我进行注册，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 社区资源

下列链接提供到 TI 社区资源的连接。链接的内容由各个分销商“按照原样”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》。

**TI E2E™ 在线社区** *TI 的工程师对工程师 (E2E) 社区*。此社区的创建目的在于促进工程师之间的协作。在 [e2e.ti.com](http://e2e.ti.com) 中，您可以咨询问题、分享知识、拓展思路并与同行工程师一道帮助解决问题。

**设计支持** *TI 参考设计支持* 可帮助您快速查找有帮助的 E2E 论坛、设计支持工具以及技术支持的联系信息。

### 4.4 商标

E2E is a trademark of Texas Instruments.

All other trademarks are the property of their respective owners.

### 4.5 静电放电警告



ESD 可能会损坏该集成电路。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措施和安装程序，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 Glossary



[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

## 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的最新可用数据。数据如有变更，恕不另行通知和修订此文档。如欲获取此数据表的浏览器版本，请参阅左侧的导航。

**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
TPS2HB50AQPWPRQ1	ACTIVE	HTSSOP	PWP	16	3000	RoHS-Exempt & Green	NIPDAU	Level-3-260C-168HRS	-40 to 125	2HB50AQ	
TPS2HB50BQPWPRQ1	ACTIVE	HTSSOP	PWP	16	3000	RoHS-Exempt & Green	NIPDAU	Level-3-260C-168HRS	-40 to 125	2HB50BQ	

(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.

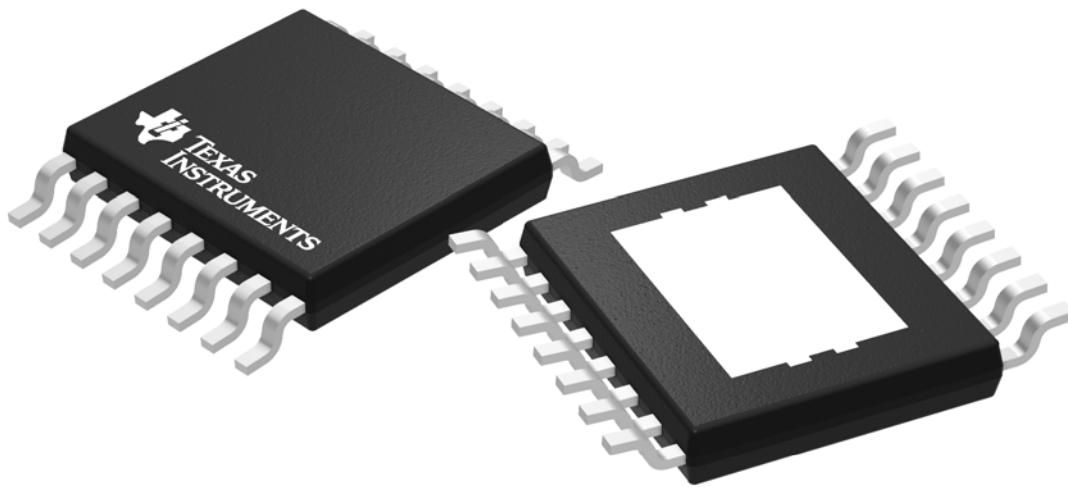
(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(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.

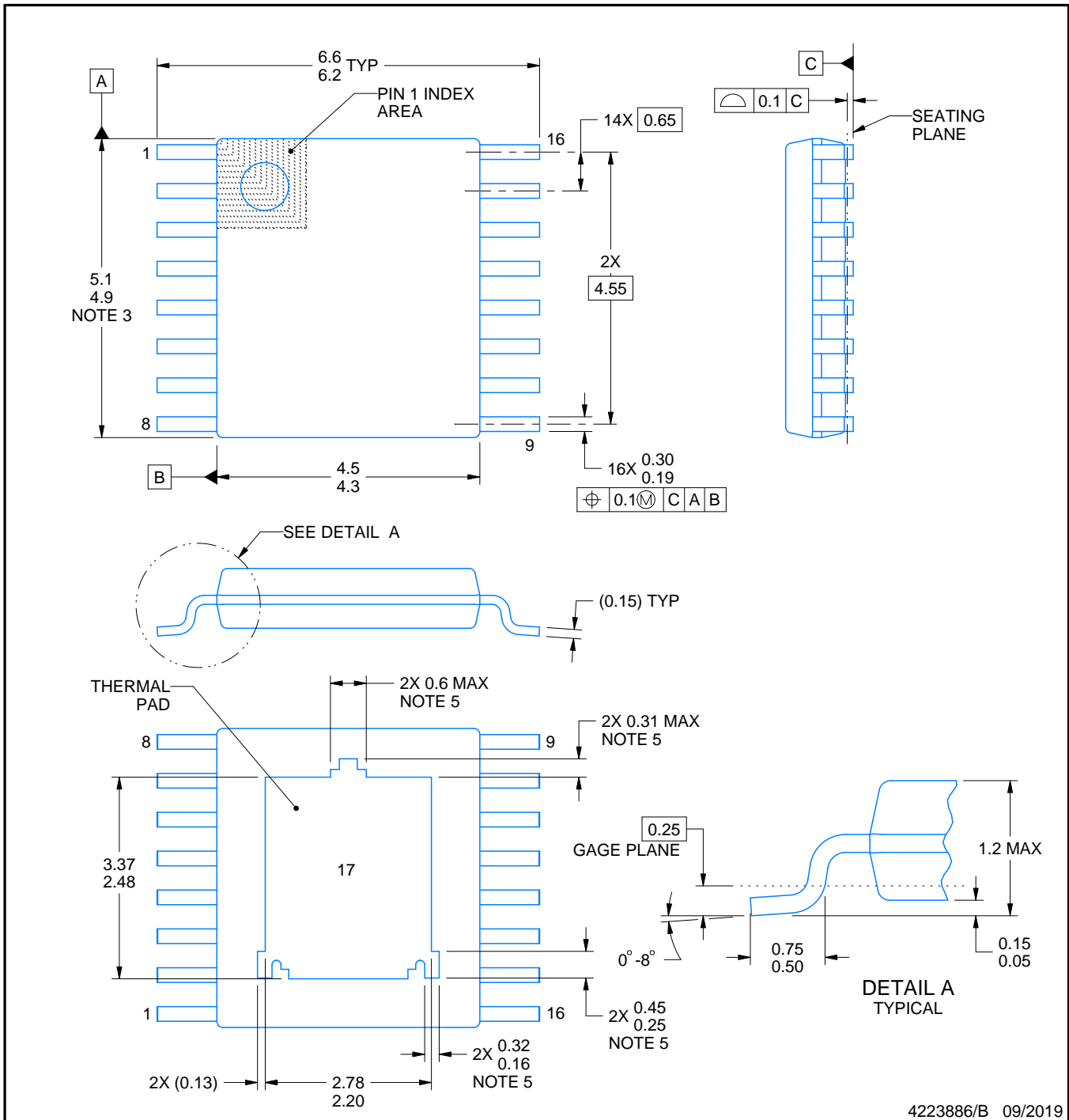
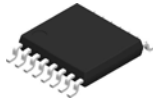
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Images above are just a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.



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NOTES:

PowerPAD is a trademark of Texas Instruments.

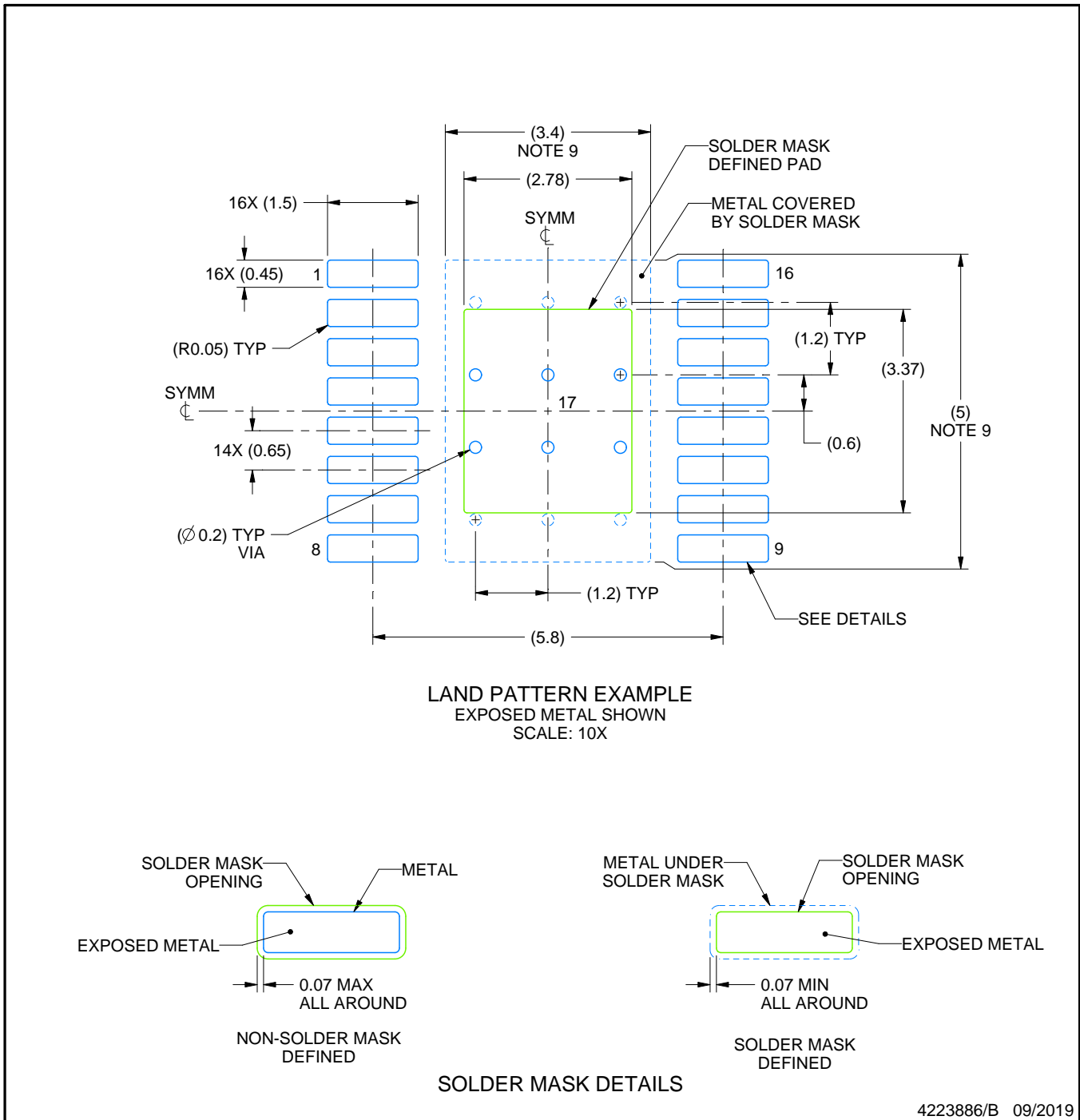
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. Reference JEDEC registration MO-153.
5. Features may differ or may not be present.

# EXAMPLE BOARD LAYOUT

PWP0016M

PowerPAD™ TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.
8. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature numbers 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)).
9. Size of metal pad may vary due to creepage requirement.
10. Vias are optional depending on application, refer to device data sheet. It is recommended that vias under paste be filled, plugged or tented.

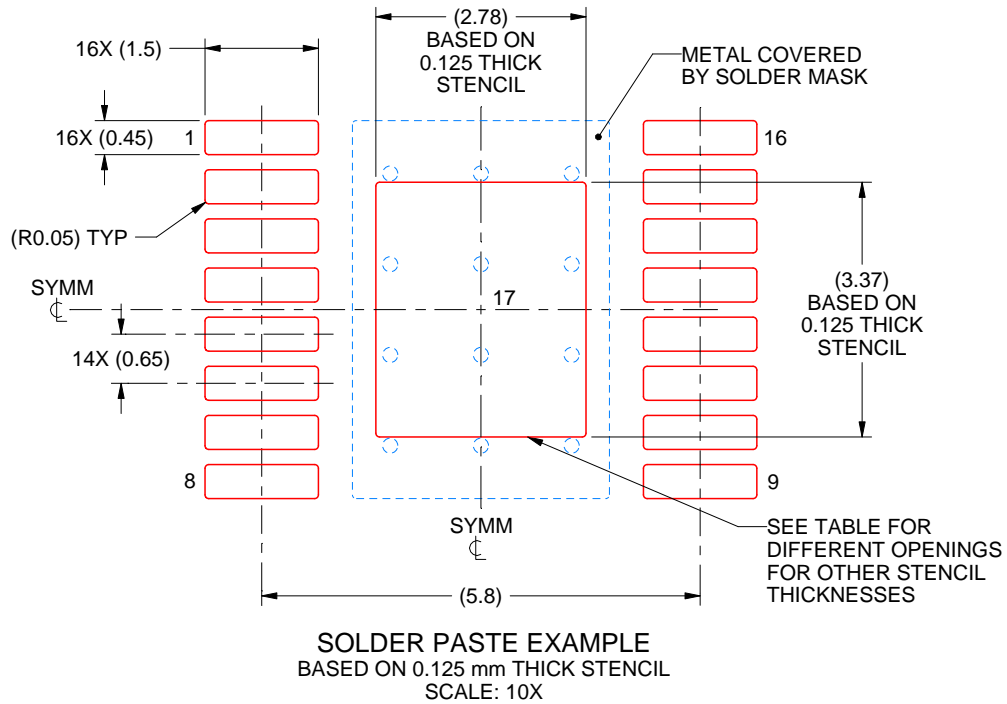


# EXAMPLE STENCIL DESIGN

PWP0016M

PowerPAD™ TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



STENCIL THICKNESS	SOLDER STENCIL OPENING
0.1	3.11 X 3.77
0.125	2.78 X 3.37 (SHOWN)
0.15	2.54 X 3.08
0.175	2.35 X 2.85

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NOTES: (continued)

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

## 重要声明和免责声明

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