TEXAS INSTRUMENTS
BQ79800-Q1
ZHDS487 – OCTOBER 2026

EV/BMS HV 汽车应用中具有双 SPI 的 BQ79800-Q1 通信桥接器

1 特性

- 升级后的菊花链接口
  - 连接到 MCU 的 2 路并行 SPI 端口，用于支持带单桥接器件的分离链
  - 双线隔离接口，SPI 至 MCU
  - 2Mbps 单链/环形，4Mbps 分离链支持速度提高高达 4 倍
  - 隔离：变压器或仅电容器
  - 支持环形架构
- 低功耗反向唤醒
  - 无需环形架构即可用
- SPI 和 I2C 控制器
  - SPI/I2C 集线器：可以远程放置在系统中，以连接远程外围器件
  - 用于最多 8 个外设器件的 SPI 控制器
  - 用于检测来自外设器件的信号的 GPIO 中断检测
- 封装：48 引脚 QFP，0.5mm 间距
- 功能安全合规型
  - 专为功能安全应用开发
  - 辅助 ISO 26262 和 IEC 61508 系统设计的文件，最高可达 ASIL-D/SIL-3
- 功耗
  - 工作模式：< 100mW
  - 睡眠模式：< 0.5mW
  - 深度睡眠模式：< 0.05mW

2 应用

- 混合动力和电动动力总成系统中的电池管理系统 (BMS)
- 带有电池管理系统的储能电池组

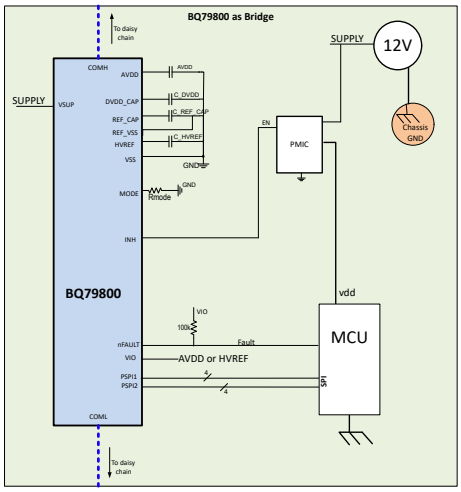
3 说明

该器件用于将 SPI 转换为垂直接口 (VIF2)，从而与 BQ798xx 电池监测器或电池包监测器堆栈进行通信。共有 18 个 GPIO 可用于 SPI/I2C 通信、数字 IO 或来自外设器件的故障中断。该器件可用作 SPI 集线器并与多达 8 个独立的 SPI 器件/组进行连接。DEEP SLEEP 模式下的超低电流消耗支持通过 5V nFAULT 引脚或 PMIC（通过 12V INH 引脚）实现 MCU 反向唤醒。隔离式双向菊花链端口支持基于电容器和变压器的隔离。

封装信息

器件型号	封装(1)	封装尺寸（标称值）
BQ79800-Q1	HTQFP（48 引脚）	7mm × 7mm

(1) 有关所有可用封装，请参阅节 5。



简化版系统图

本资源的原文使用英文撰写。为方便起见，TI 提供了译文；由于翻译过程中可能使用了自动化工具，TI 不保证译文的准确性。为确认准确性，请务必访问 ti.com 参考最新的英文版本（控制文档）。

4 器件和文档支持

TI 提供广泛的开发工具。下面列出了用于评估器件性能、生成代码和开发解决方案的工具和软件。

4.1 器件支持

4.1.1 第三方产品免责声明

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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

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

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。

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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。有关此数据表的浏览器版本，请查阅左侧的导航栏。

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5.1 封装选项附录

封装信息

可订购器件	状态(1)	封装类型	封装图	引脚	包装数量	环保计划(2)	铅/焊球镀层(6)	MSL 峰值温度(3)	工作温度 (°C)	器件标识 (4)(5)
BQ79800QPHPRQ1	ACTIVE	HTQFP	PHP	48	250	RoHS 和绿色环保	NiPdAu	MSL-3-260C-168 HR	-40 至 125°C	BQ79800Q

(1) 销售状态值定义如下：
ACTIVE：建议用于新设计的产品器件。
LIFEBUY：TI 已宣布器件即将停产，但仍在购买期限内。
NRND：不推荐用于新设计。为支持现有客户，器件仍在生产，但 TI 不建议在新设计中使用此器件。
PRE_PROD：器件未发布、尚未量产、未向大众市场供货、也未在网络上供应、未提供样片。
PREVIEW：器件已发布，但未量产。可能提供样片，也可能无法提供样片。
OBSOLETE：TI 已停止生产该器件。

(2) 环保计划 — 计划的环保分级：无铅 (RoHS)、无铅（RoHS 豁免）或绿色环保（RoHS 且无锑/溴）— 如需了解最新供货信息及更多产品内容详情，请访问 www.ti.com/productcontent。
TBD：无铅/绿色环保转换计划尚未确定。
无铅 (RoHS)：TI 所说的“无铅”或“无 Pb”是指半导体产品符合针对所有 6 种物质的现行 RoHS 要求，包括要求铅的重量不超过同质材料总重量的 0.1%。因在设计时就考虑到了高温焊接要求，因此 TI 的无铅产品适用于指定的无铅作业。
无铅（RoHS 豁免）：对于 1) 芯片和封装之间使用铅基倒装芯片焊接凸点、或 2) 芯片和引线框之间使用铅基芯片粘合剂，该元件可享受 RoHS 豁免。否则，元件将根据上述规定视为无铅（符合 RoHS）。
绿色环保（RoHS 且无锑/溴）：TI 定义的“绿色环保”表示无铅（符合 RoHS 标准）、无溴 (Br) 和无锑 (Sb) 系阻燃剂（均质材料中溴或锑的质量不超过总质量的 0.1%）。

(3) MSL，峰值温度-- 湿敏等级额定值（符合 JEDEC 工业标准分级）和峰值焊接温度。

(4) 器件上可能还有与标识、批次跟踪代码信息或环境分类相关的其他标志。

(5) 如有多个器件标识，将用括号括起来。不过，器件上仅显示括号中以“~”隔开的其中一个器件标识。如果某一行缩进，说明该行续接上一行，这两行合在一起表示该器件的完整器件标识。

(6) 铅/焊球镀层 - 可订购器件可能有多种镀层材料选项。各镀层选项用垂直线隔开。如果铅/焊球镀层值超出最大列宽，则会折为两行。

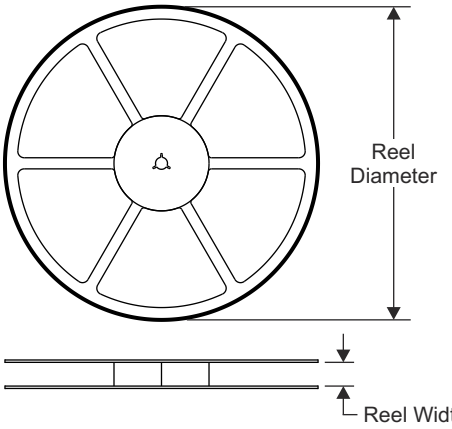
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在任何情况下，TI 因此类信息产生的责任决不超过 TI 每年向客户销售的本文档所述 TI 器件的总购买价。

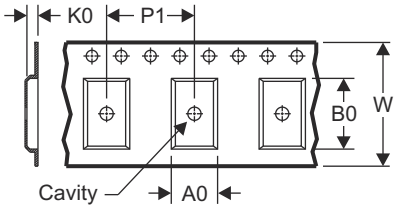
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5.2 卷带包装信息

REEL DIMENSIONS

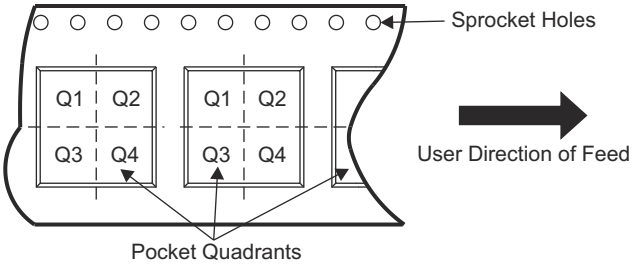


TAPE DIMENSIONS



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

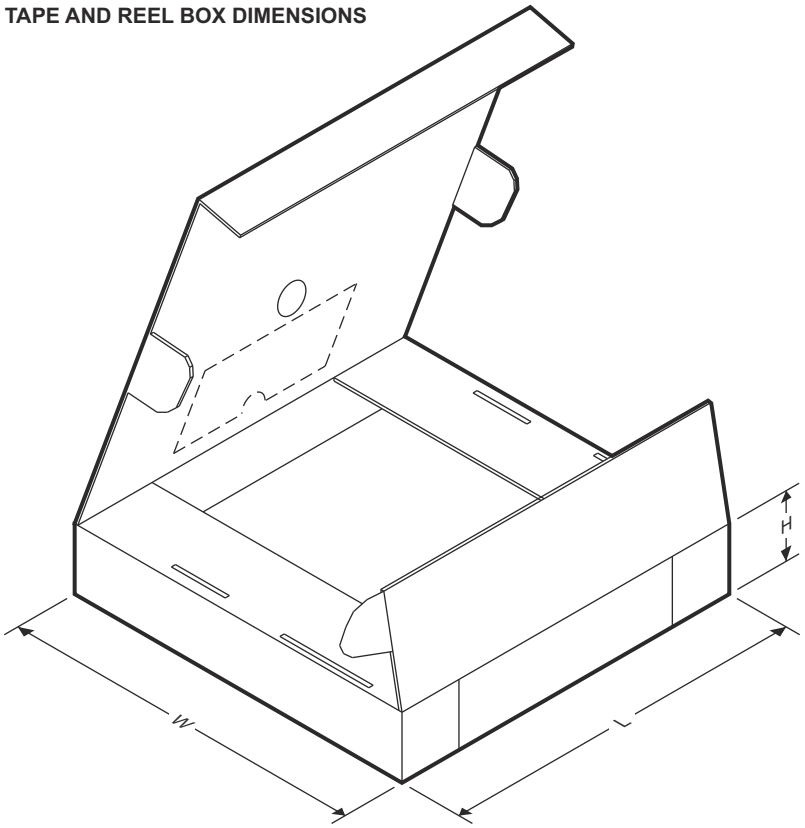
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



器件	封装类型	封装图	引脚	SPQ	卷带直径 (mm)	卷带宽度 W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1象限
BQ79800QPHPRQ1	HTQFP	PHP	48	250	330.0	16.4	9.3	9.3	2.2	12.0	16.0	Q2

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TAPE AND REEL BOX DIMENSIONS



器件	封装类型	封装图	引脚	SPQ	长度 (mm)	宽度 (mm)	高度 (mm)
BQ79800QPHPRQ1	HTQFP	PHP	48	1000	367.0	367.0	55.0

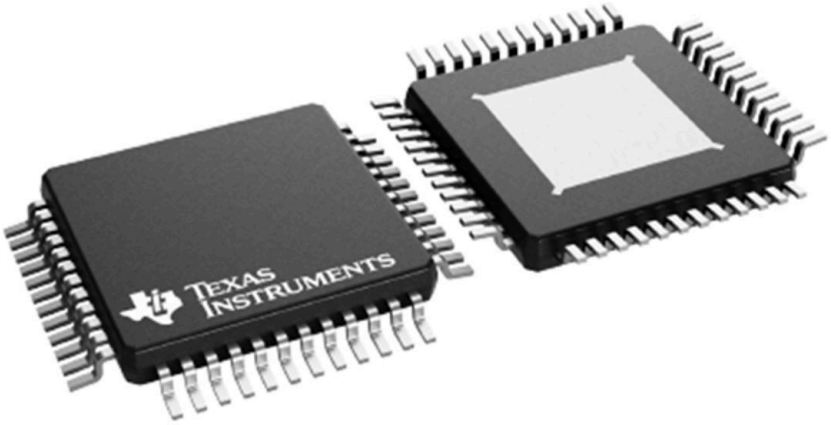
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5.3 机械数据

PHP 48 **TQFP - 1.2 mm max height**

7 x 7, 0.5 mm pitch QUAD FLATPACK

This image is a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.

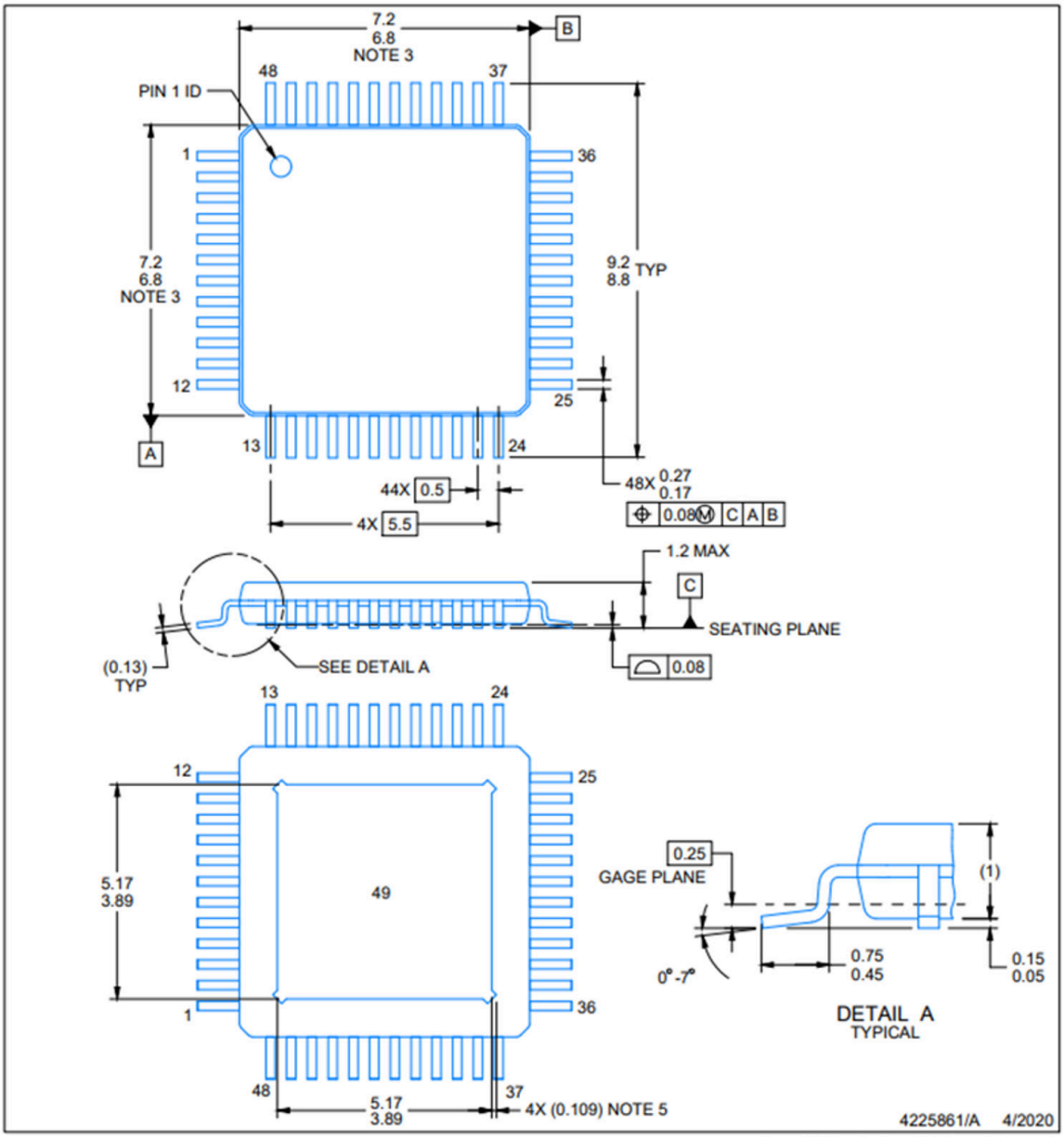


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PACKAGE OUTLINE

PHP0048G — **PowerPAD™ HTQFP - 1.2 mm max height**

PLASTIC QUAD FLATPACK



PowerPAD is a trademark of Texas Instruments.

NOTES:

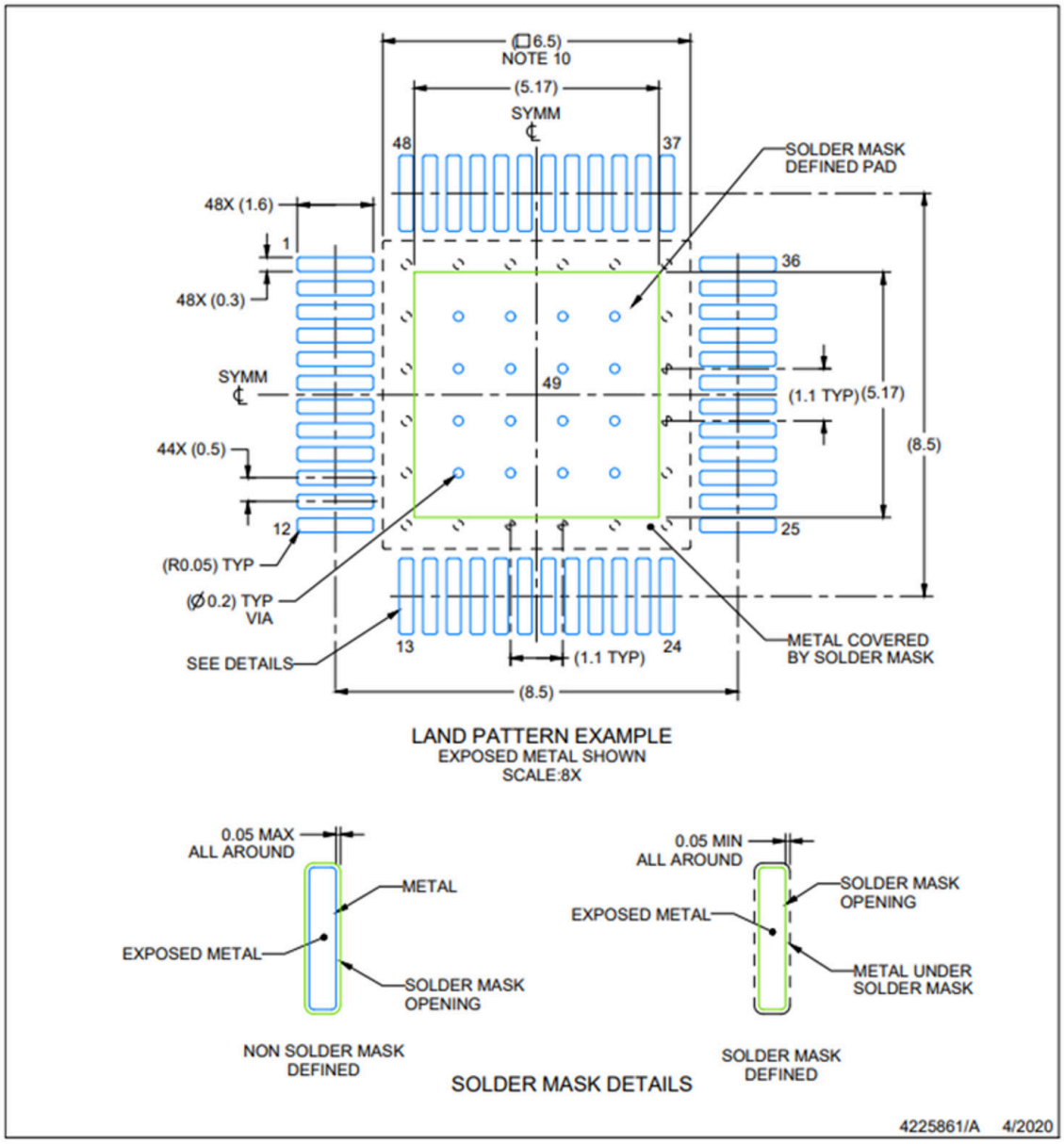
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. Reference JEDEC registration MS-026.
5. Feature may not be present.

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EXAMPLE BOARD LAYOUT

PHP0048G — **PowerPAD™ HTQFP - 1.2 mm max height**

PLASTIC QUAD FLATPACK



NOTES: (continued)

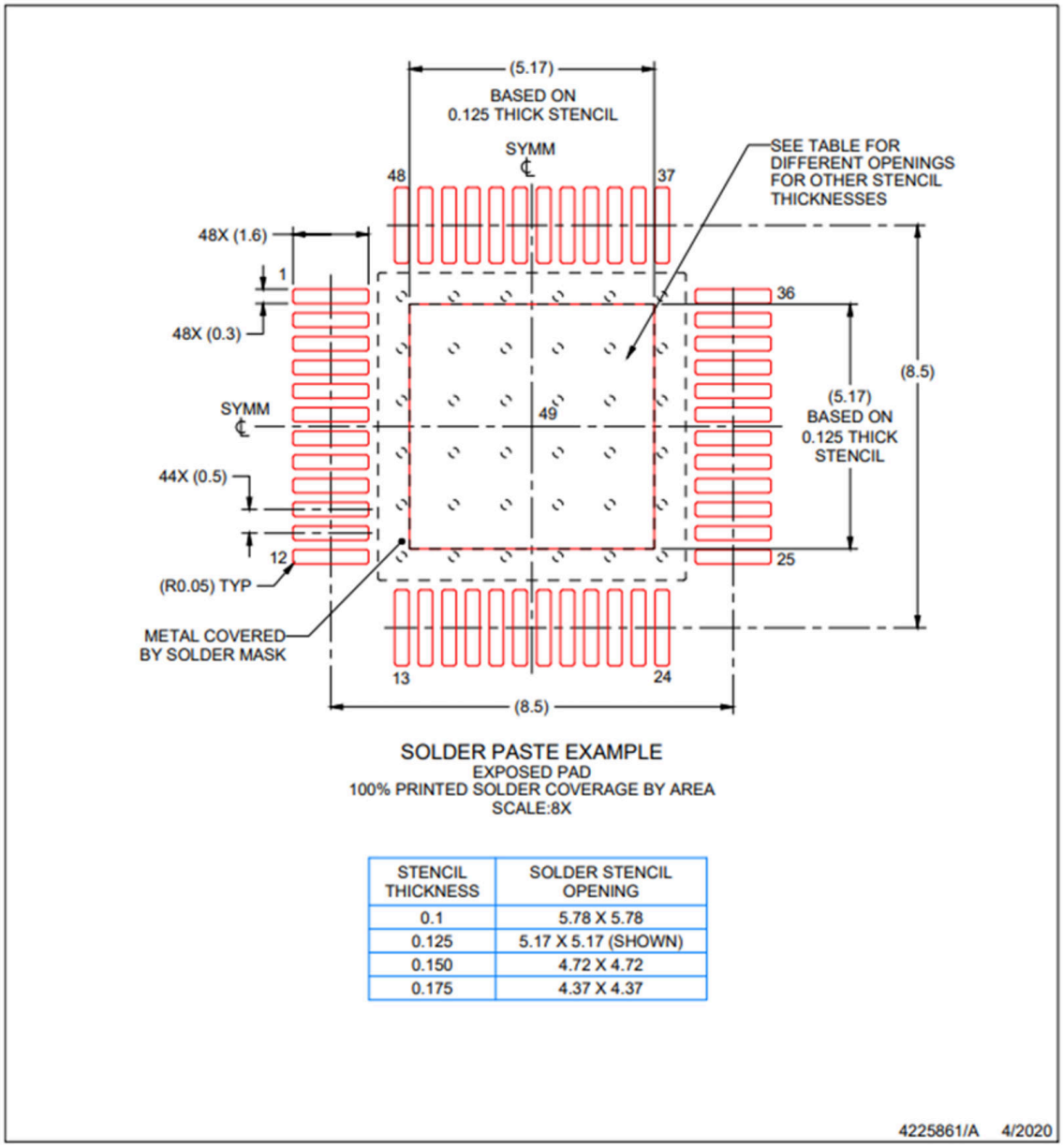
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.
8. This package is designed to be soldered to a thermal pad on the board. See technical brief, Powerpad thermally enhanced package, Texas Instruments Literature No. SLMA002 (www.ti.com/lit/slma002) and SLMA004 (www.ti.com/lit/slma004).
9. Vias are optional depending on application, refer to device data sheet. It is recommended that vias under paste be filled, plugged or tented.
10. Size of metal pad may vary due to creepage requirement.

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EXAMPLE STENCIL DESIGN

PHP0048G — **PowerPAD™ HTQFP - 1.2 mm max height**

PLASTIC QUAD FLATPACK



SOLDER PASTE EXAMPLE
EXPOSED PAD
100% PRINTED SOLDER COVERAGE BY AREA
SCALE:8X

STENCIL THICKNESS	SOLDER STENCIL OPENING
0.1	5.78 X 5.78
0.125	5.17 X 5.17 (SHOWN)
0.150	4.72 X 4.72
0.175	4.37 X 4.37

4225861/A 4/2020

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.

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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)
BQ79800QPHPRQ1	Active	Production	HTQFP (PHP) | 48	1600 | LARGE T&R	Yes	NIPDAU	Level-3-260C-168 HR	-	BQ79800Q

(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.

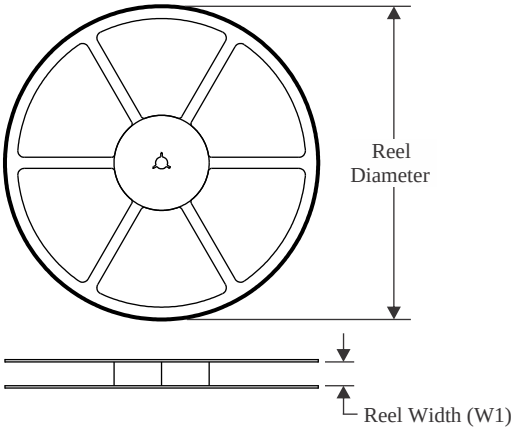
Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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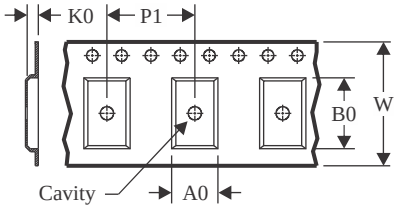
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TAPE AND REEL INFORMATION

REEL DIMENSIONS

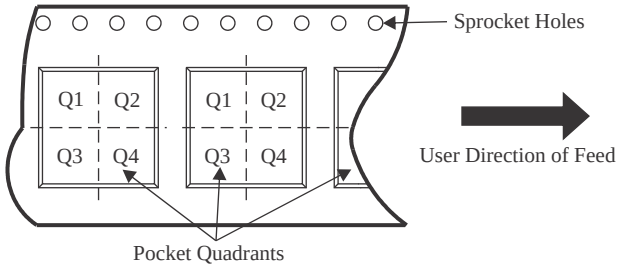


TAPE DIMENSIONS



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

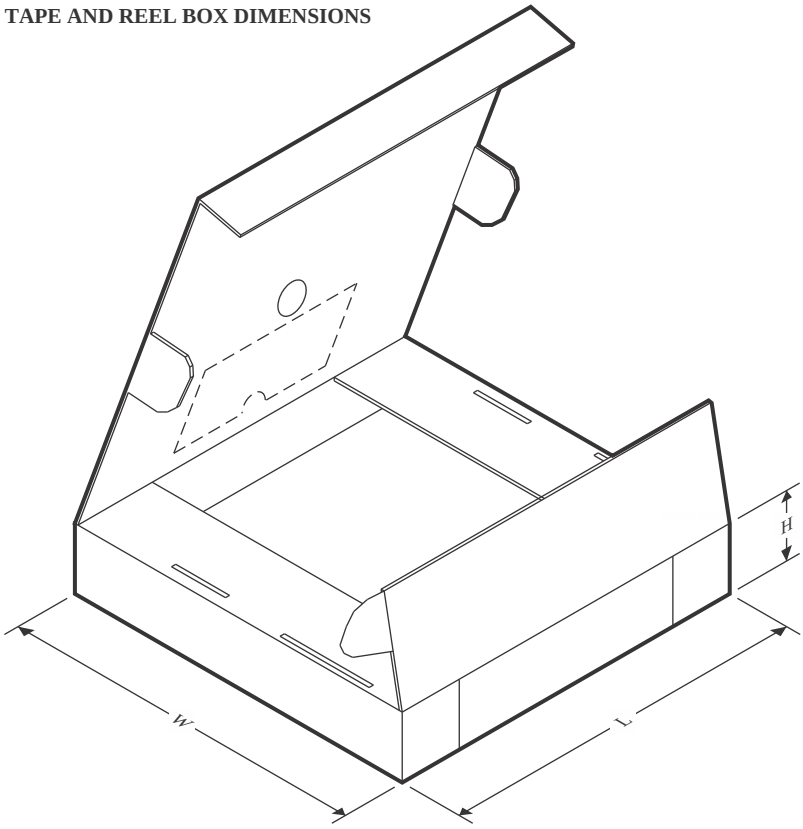
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
BQ79800QPHPRQ1	HTQFP	PHP	48	1600	330.0	16.4	9.6	9.6	1.5	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)
BQ79800QPHPRQ1	HTQFP	PHP	48	1600	336.6	336.6	31.8

GENERIC PACKAGE VIEW

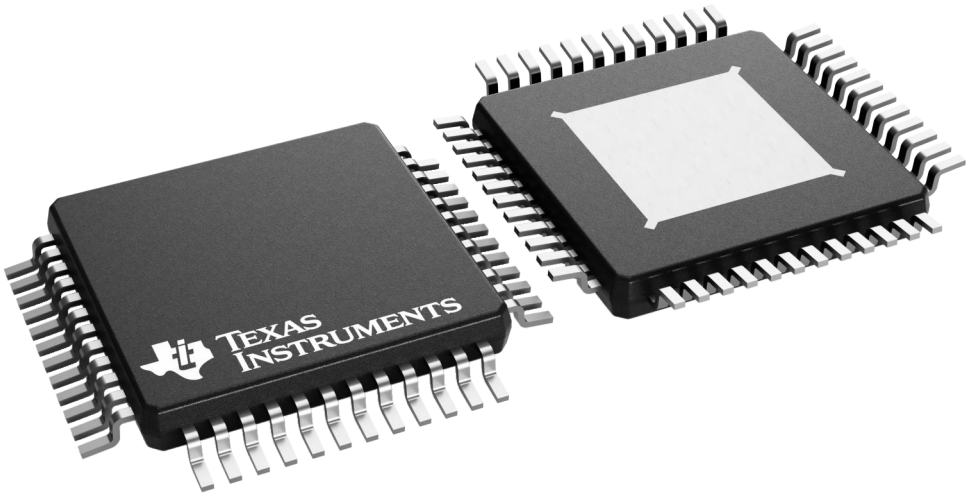
PHP 48

TQFP - 1.2 mm max height

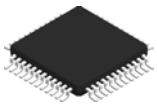
7 x 7, 0.5 mm pitch

QUAD FLATPACK

This image is a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.



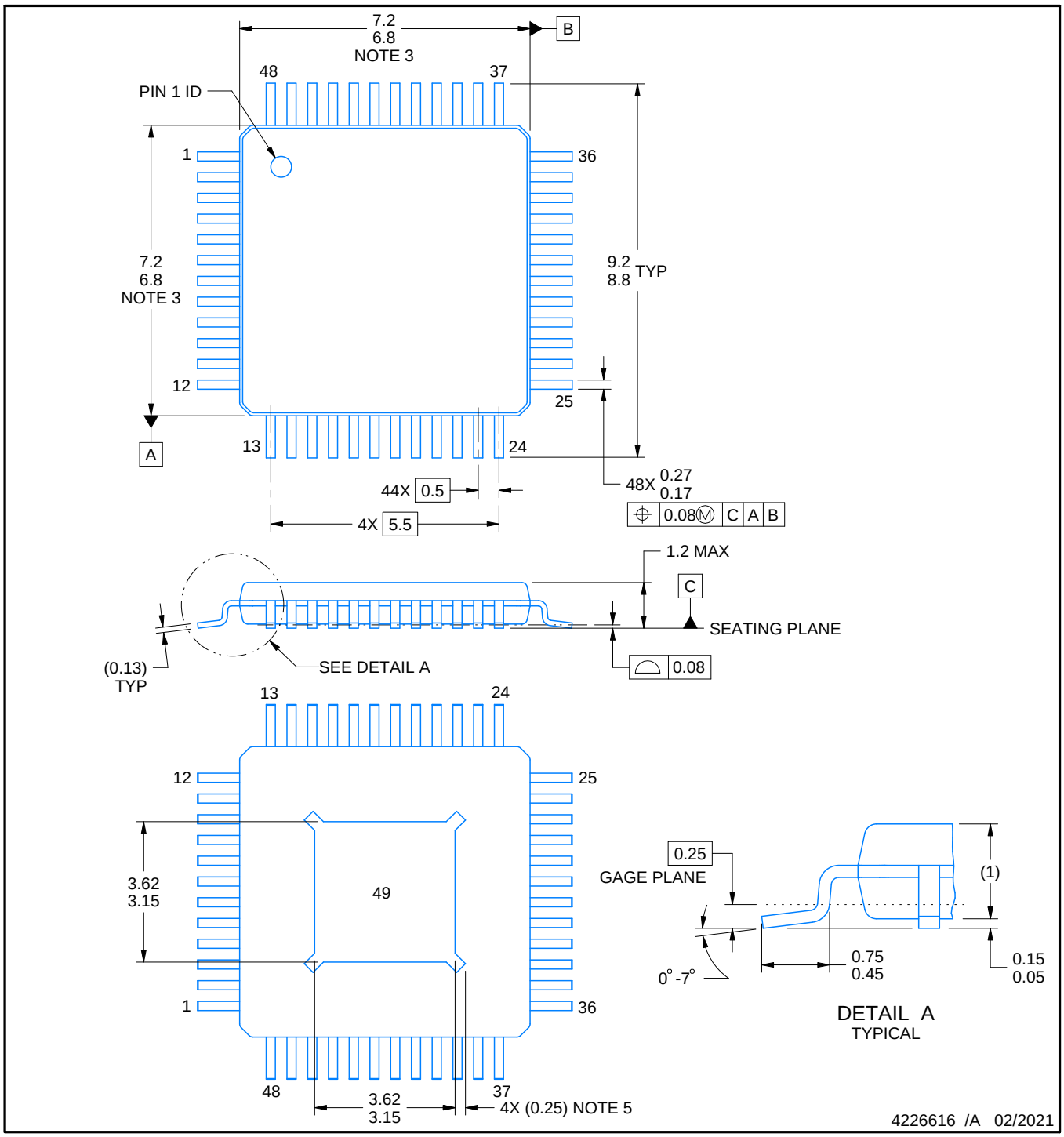
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PACKAGE OUTLINE

PHP0048E

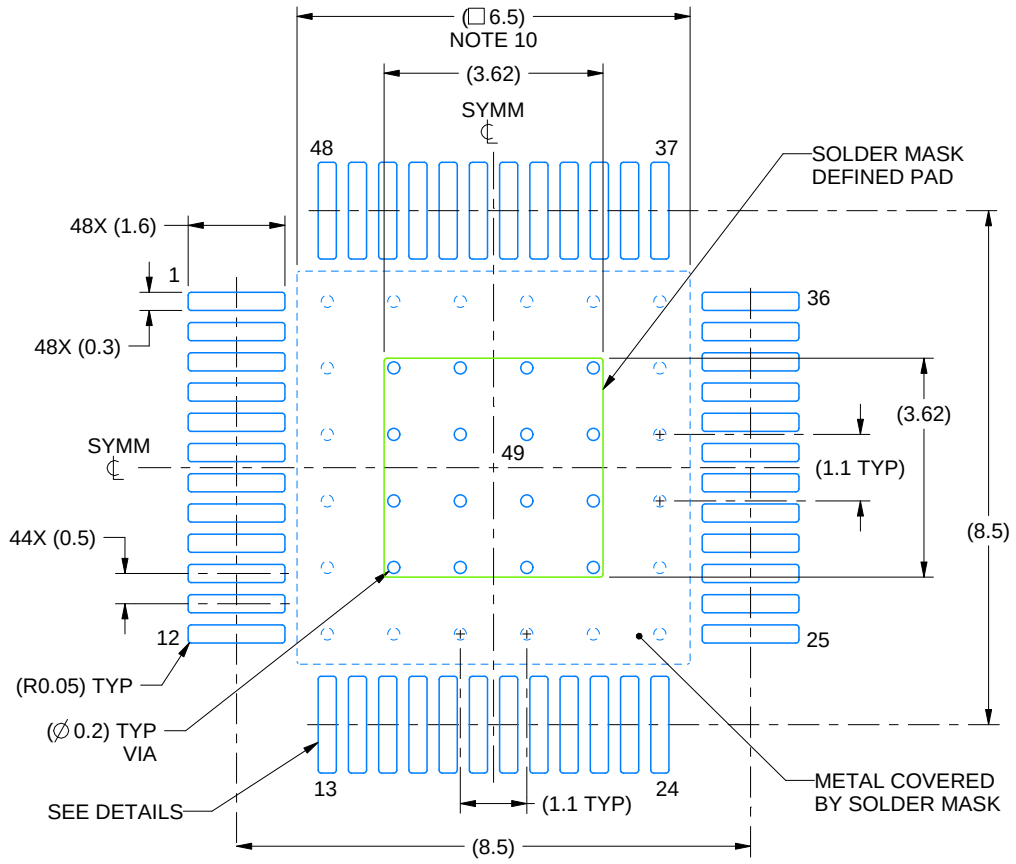
PowerPAD™ HTQFP - 1.2 mm max height



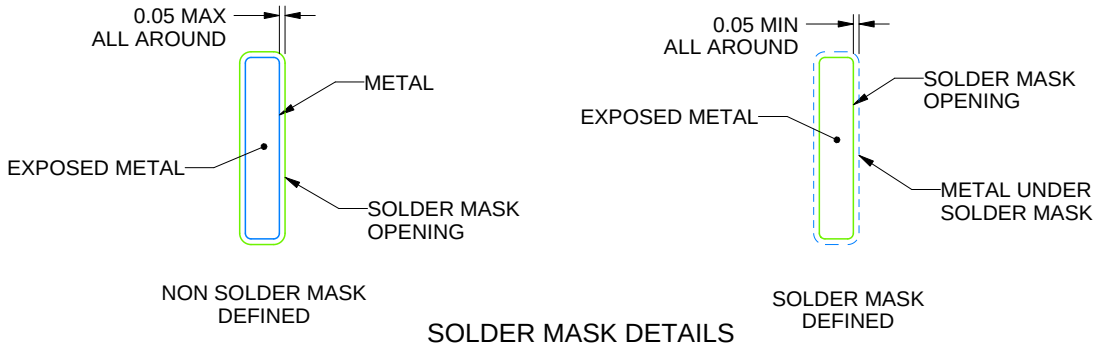
PowerPAD is a trademark of Texas Instruments.

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 mm per side.
4. Reference JEDEC registration MS-026.
5. Feature may not be present.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:8X

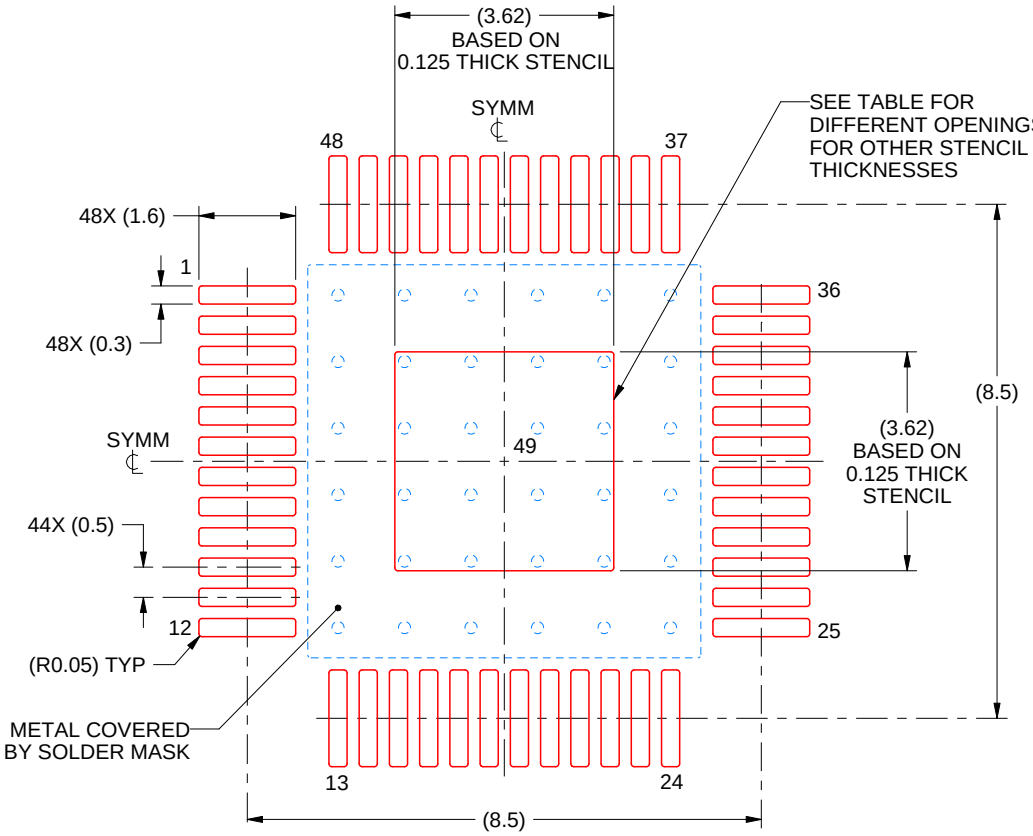


SOLDER MASK DETAILS

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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. See technical brief, Powerpad thermally enhanced package, Texas Instruments Literature No. SLMA002 (www.ti.com/lit/slma002) and SLMA004 (www.ti.com/lit/slma004).
9. Vias are optional depending on application, refer to device data sheet. It is recommended that vias under paste be filled, plugged or tented.
10. Size of metal pad may vary due to creepage requirement.



SOLDER PASTE EXAMPLE
EXPOSED PAD
100% PRINTED SOLDER COVERAGE BY AREA
SCALE:8X

STENCIL THICKNESS	SOLDER STENCIL OPENING
0.1	4.05 X 4.05
0.125	3.62 x 3.62 (SHOWN)
0.150	3.30 x 3.30
0.175	3.06 x 3.06

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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.

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