BQ75614-Q1 最高符合 SafeTI™-26262 ASIL-D ASIL-D 标准的 14S 或 16S 独立式精密汽车电池监控器、平衡器和集成电流感应

1 特性

- 符合汽车类 应用要求
- 具有符合 AEC-Q100 标准的下列特性：
  - 器件温度 1 级：–40°C 至 +125°C 的环境工作温度范围
  - 器件 HBM ESD 分类等级 2
  - 器件 CDM ESD 分类等级 C4B
- 符合 SafeTI™-26262 ASIL-D 标准
  - 电池电压测量
  - 电流测量
  - 温度测量
  - 通信
- 符合 SafeTI™-26262 ASIL-B 标准
  - OV、UV 保护器（硬件比较器）
  - OT、UT 保护器（硬件比较器）
- 兼容引脚/封装和软件的器件系列：
  - 可堆叠监控器 16S (BQ79616)、14S (BQ79614) 和 12S (BQ79612)
  - 独立式监控器 48V 系统 (BQ75614)
- 保险丝和继电器打开和关闭诊断直接支持
- 用于电压、温度和电流诊断的内置冗余路径
- 可以在 128µs 内对所有电池通道执行高度精确的电池电压测量
- 集成式后 ADC 可配置数字低通滤波器
- 支持汇流条连接和测量
- 主机控制的内置硬件复位功能，可模拟类似于 POR 的器件复位
- 支持内部电池平衡
  - 240mA 的平衡电流
  - 内置平衡热管理，具有自动暂停和恢复控制功能
- 5V LDO 输出为外部数字隔离器供电
- UART 主机接口
- 内置 SPI 主器件

2 应用

- 汽车类 48V 锂离子电池系统
- 电动自行车、电动踏板车

3 说明

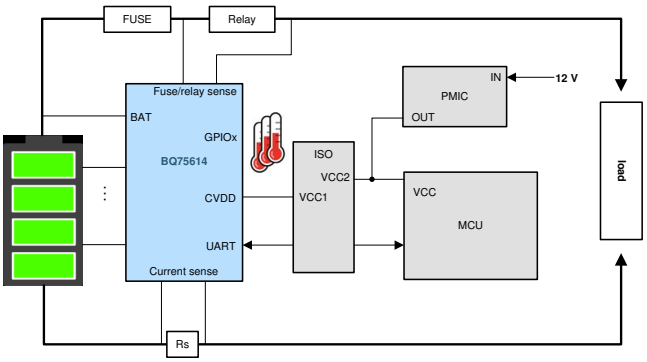
BQ75614-Q1 器件可以在 200µs 内对高达 16S 的电池模块执行高精度的电池电压测量。借助集成式前端滤波器，可以在电池输入通道上使用简单、低额定电压的差分 RC 滤波器来实施系统。集成式后 ADC 低通滤波器可以执行经过滤波、类似于直流电的电压测量。集成式电流测量，也可以选择与电池电压测量同步，以便更好地计算荷电状态 (SOC)。此器件支持自主内部电池平衡，并通过监测温度来自动暂停和恢复平衡，以免出现过热条件。此器件包含一个选项，可以支持保险丝和继电器打开/关闭诊断。此器件还包含八个 GPIO/辅助输入，可执行外部热敏电阻测量。

器件信息(1)

器件型号	封装	封装尺寸（标称值）
BQ75614-Q1	HTQFP（64 引脚）	10.00mm x 10.00mm

(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。

简化系统图



ADVANCE INFORMATION

4 器件和文档支持

4.1 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。单击右上角的*通知我*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。

4.2 支持资源

TI E2E™ support forums are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

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4.3 商标

符合 SafeTI, E2E are trademarks of Texas Instruments.

4.4 静电放电警告

这些装置包含有限的内置 ESD 保护。 存储或装卸时，应将导线一起截短或将装置放置于导电泡棉中，以防止 MOS 门极遭受静电损伤。

4.5 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，且不会对此文档进行修订。如需获取此数据表的浏览器版本，请查阅左侧的导航栏。

ADVANCE INFORMATION

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
BQ75614PAPRQ1	ACTIVE	HTQFP	PAP	64	1000	RoHS & Green	NIPDAU	Level-3-260C-168 HR	-40 to 125	BQ75614	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.
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.

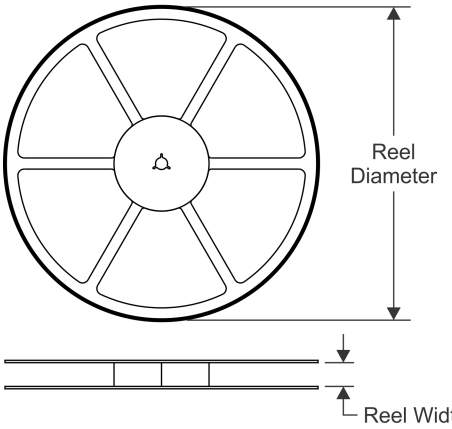
(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(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.

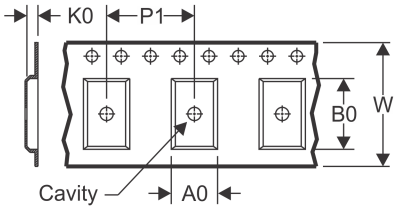
(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

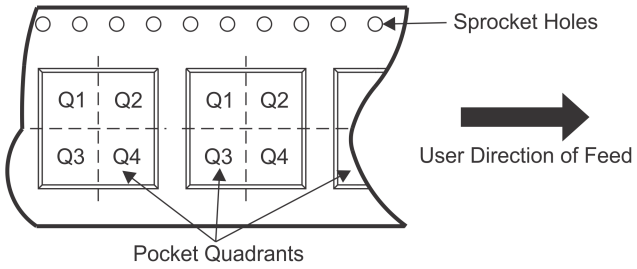


TAPE DIMENSIONS



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

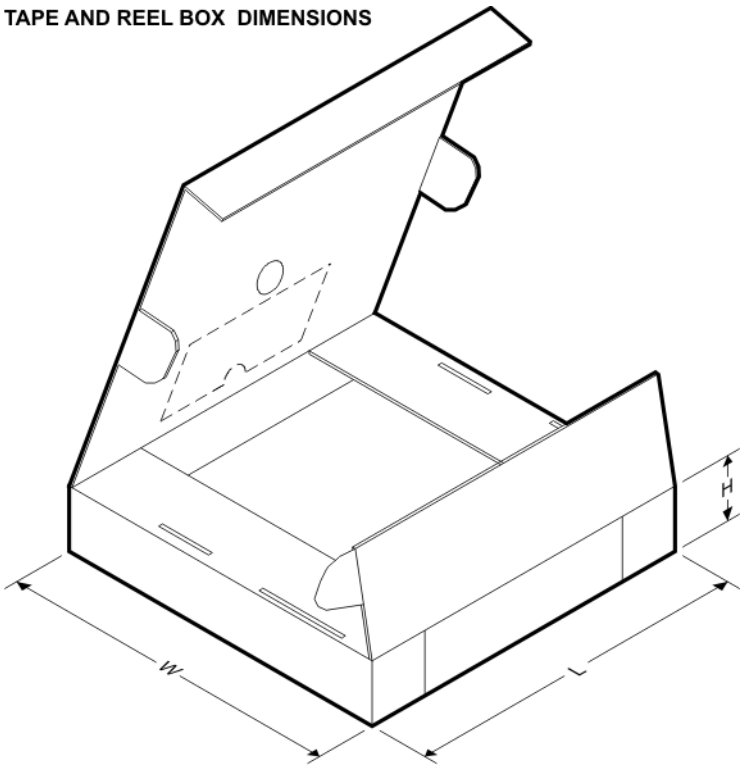
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
BQ75614PAPRQ1	HTQFP	PAP	64	1000	330.0	24.4	13.0	13.0	1.5	16.0	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)
BQ75614PAPRQ1	HTQFP	PAP	64	1000	367.0	367.0	55.0

GENERIC PACKAGE VIEW

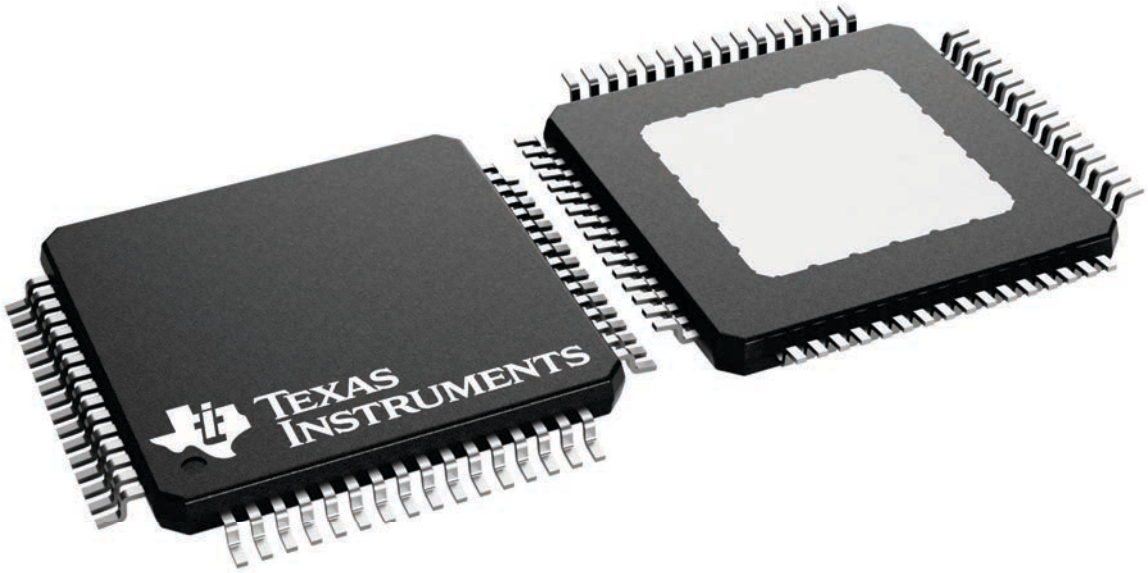
PAP 64

HTQFP - 1.2 mm max height

10 x 10, 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.



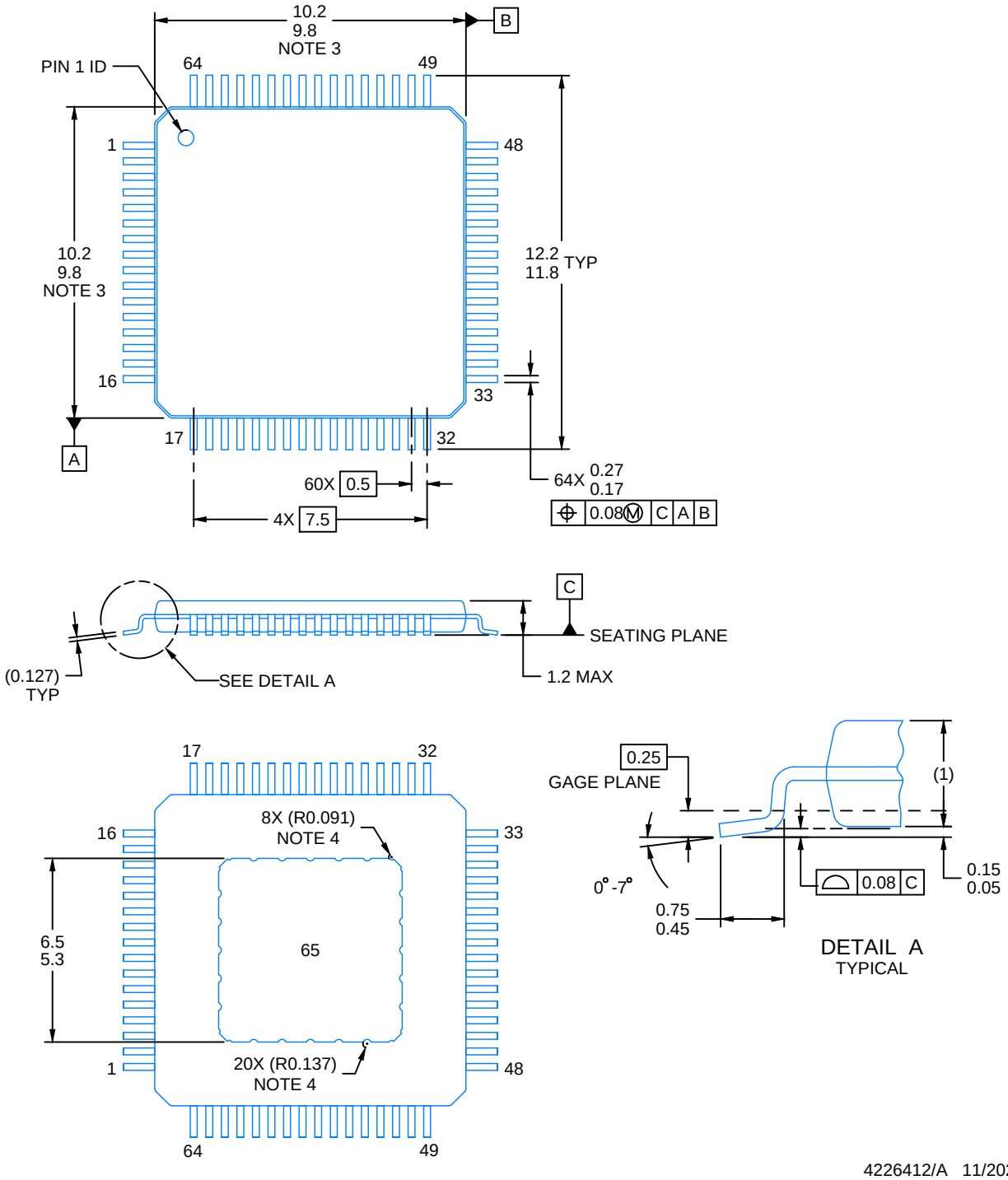
4226442/A

PACKAGE OUTLINE

PAP0064F

PowerPAD™ TQFP - 1.2 mm max height

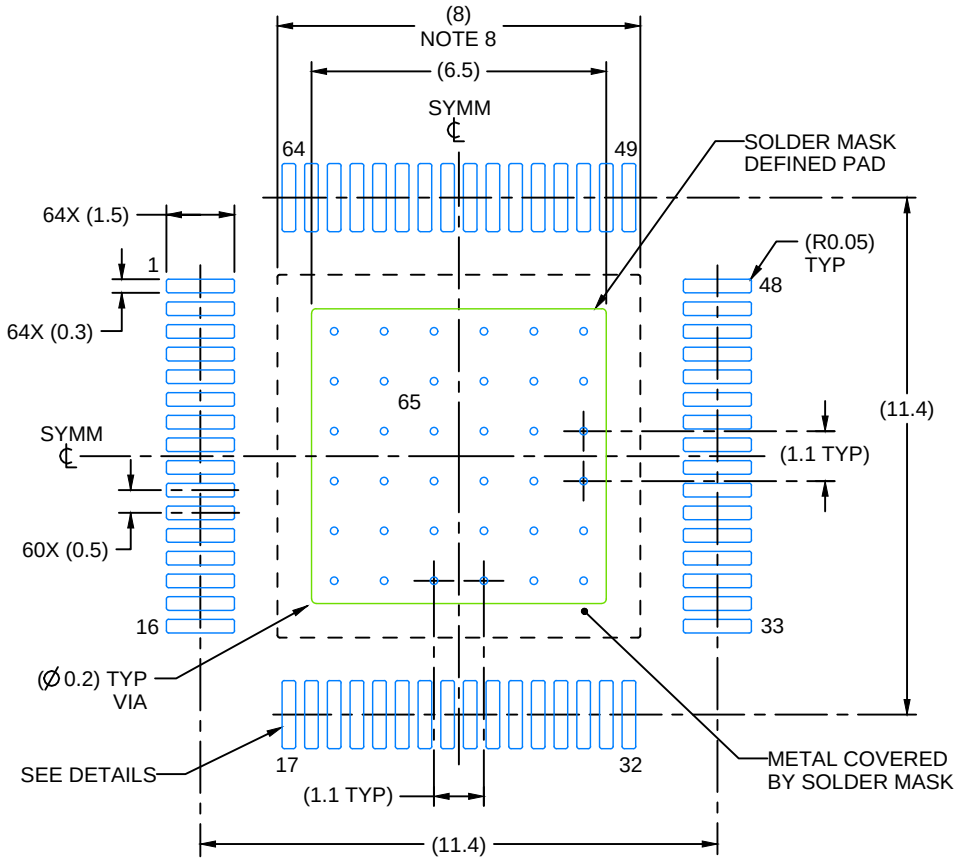
PLASTIC QUAD FLATPACK



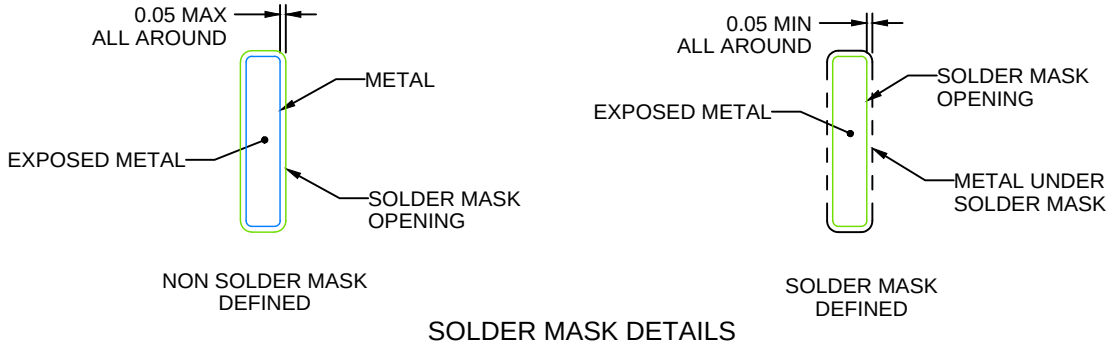
NOTES:

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.
4. Strap features may not be present.
5. Reference JEDEC registration MS-026.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:6X



NON SOLDER MASK
DEFINED

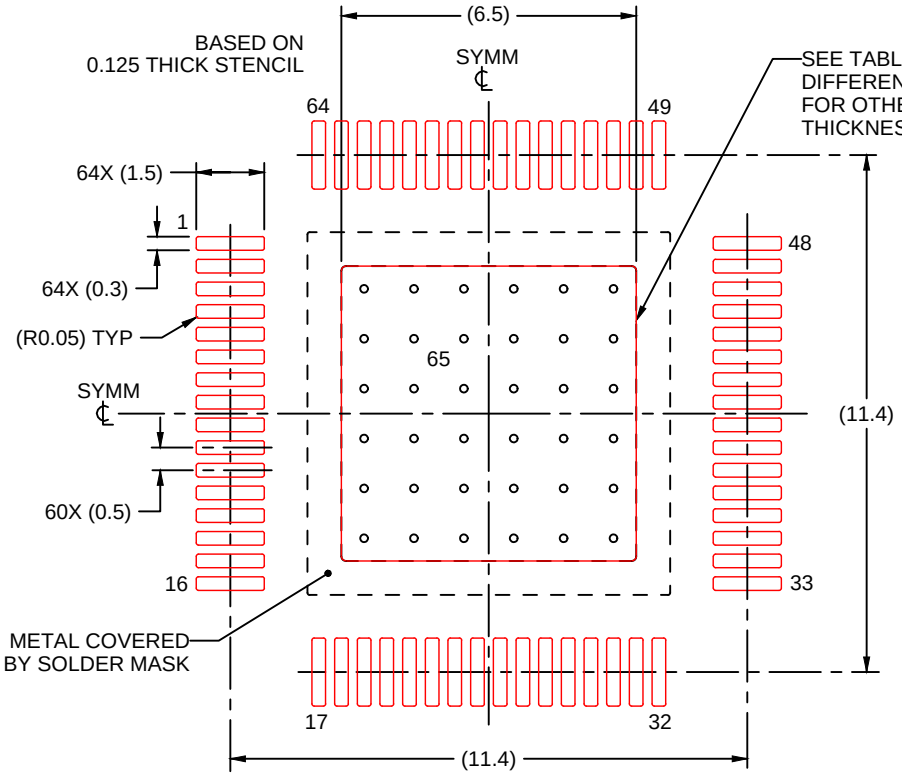
SOLDER MASK
DEFINED

SOLDER MASK DETAILS

4226412/A 11/2020

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:6X

STENCIL THICKNESS	SOLDER STENCIL OPENING
0.1	7.27 X 7.27
0.125	6.5 X 6.5 (SHOWN)
0.15	5.93 X 5.93
0.175	5.49 X 5.49

4226412/A 11/2020

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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