带双环路 PLL 且符合 JESD204B 标准的 LMK04832 超低噪声时钟抖动清除器

ADVANCE INFORMATION

1 特性

- 最高时钟输出频率：3250MHz
- 多模式：双 PLL、单 PLL 和时钟分配
- 超低噪声，2500MHz 时：
  - 43fs RMS 抖动（12kHz 至 20MHz）
  - 49fs RMS 抖动（100Hz 至 20MHz）
  - –158dBc/Hz 本底噪声
- 超低噪声，3200MHz 时：
  - 49fs RMS 抖动（12kHz 至 20MHz）
  - 54fs RMS 抖动（100Hz 至 100MHz）
  - –156.5dBc/Hz 本底噪声
- PLL2
  - –230dBc/Hz PLL FOM
  - –128dBc/Hz PLL 1/f
  - 相位检测器速率高达 320MHz
  - 两个集成 VCO：2440 至 2580MHz 和 2945 至 3205MHz
- 多达 14 个差动器件时钟
  - CML、LVPECL、LCPECL、HSDS、LVDS 和 2xLVCMOS 可编程输出
- 最多 1 个缓冲 VCXO/XO 输出
  - LVPECL、LVDS、2xLVCMOS 可编程输出
- 3.2GHz 支持 3.13MHz 器件时钟频率
- 3.2GHz 支持 391kHz SYSREF 频率
- SYSREF 时钟 25ps 阶跃模拟延迟
- 器件时钟和 SYSREF 数字延迟和动态数字延迟
- PLL1 保持模式
- PLL1 或 PLL2 零延迟
- +125°C 结温
- 支持 105°C PCB 温度（在散热焊盘上测量）

2 应用

- 测试和测量
- 雷达
- 微波回程
- 数据转换器时钟

3 说明

LMK04832 是一款具有业内最高性能的时钟调节器，不但支持 JEDEC JESD204B，而且与 LMK0482x 器件系列引脚兼容。

PLL2 可以配置 14 个时钟输出以驱动 7 个 JESD204B 转换器或其他逻辑器件（使用器件和 SYSREF 时钟）。SYSREF 可以通过直流和交流耦合提供。不只是 JESD204B 应用，14 个输出中的每一个输出都可以单独配置为用于传统时钟系统的高性能输出。

LMK04832 可以配置在双 PLL、单 PLL 或时钟分配模式下工作（使用或不使用 SYSREF 生成或时钟恢复）。PLL2 可以使用内部或外部 VCO 工作。

LMK04832 既具有出色的性能， 又具有 多种特性，如功率和性能均衡调节、双 VCO、动态数字延迟和保持模式，是提供灵活的高性能时钟树的理想器件。

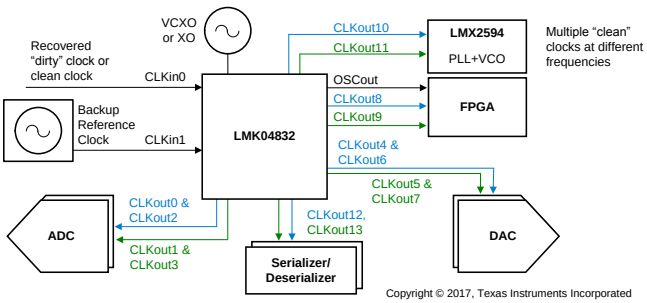
器件信息(1)

器件型号	说明	封装尺寸（标称值）
LMK04832NKDT LMK04832NKDR	WQFN (64)	9.00mm x 9.00mm

(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。

(2) T = 带；R = 卷

简化原理图



目录

4 修订历史记录

注：之前版本的页码可能与当前版本有所不同。

Changes from Original (August 2017) to Revision A **Page**

- 更新了 特性：抖动、本底噪声、PLL 性能和 VCO 范围 1

ADVANCE INFORMATION

5 器件和文档支持

5.1 器件支持

5.1.1 开发支持

5.1.1.1 时钟架构

部件选择、环路滤波器设计、仿真。

如需运行在线时钟架构工具，请访问 www.ti.com.cn/clockarchitect。

5.1.1.2 PLLatinum 仿真

支持环路滤波设计和仿真。所有仿真均针对单环路。要执行双环路仿真，必须加载第一次 PLL 仿真的结果作为第二次 PLL 仿真的基准。

要下载 PLLatinum 仿真工具，请转到 www.ti.com.cn/tool/cn/PLLATINUMSIM-SW

5.1.1.3 TICS Pro

EVM 编程软件。还可用于生成寄存器映射，以便进行编程和计算当前功耗估计值。

如需 TICS Pro，请访问 www.ti.com.cn/tool/cn/TICSPRO-SW。

5.2 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》。

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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。**

5.3 商标

E2E is a trademark of Texas Instruments.
All other trademarks are the property of their respective owners.

5.4 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。

5.5 Glossary

SLYZ022 — *TI Glossary*.

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

6 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。数据如有变更，恕不另行通知，也不会对此文档进行修订。

ADVANCE INFORMATION

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)
LMK04832NKDR	Active	Production	WQFN (NKD) | 64	2000 | LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 85	K04832NKD
LMK04832NKDR.A	Active	Production	WQFN (NKD) | 64	2000 | LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 85	K04832NKD
LMK04832NKDT	Active	Production	WQFN (NKD) | 64	250 | SMALL T&R	Yes	SN	Level-3-260C-168 HR	-40 to 85	K04832NKD
LMK04832NKDT.A	Active	Production	WQFN (NKD) | 64	250 | SMALL T&R	Yes	SN	Level-3-260C-168 HR	-40 to 85	K04832NKD

(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.

OTHER QUALIFIED VERSIONS OF LMK04832 :

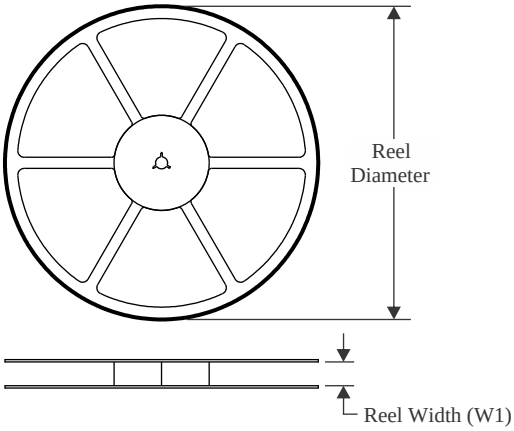
- Space : LMK04832-SP

NOTE: Qualified Version Definitions:

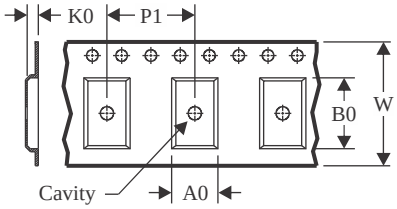
- Space - Radiation tolerant, ceramic packaging and qualified for use in Space-based application

TAPE AND REEL INFORMATION

REEL DIMENSIONS

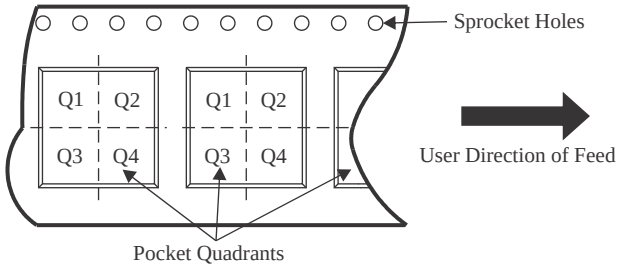


TAPE DIMENSIONS



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

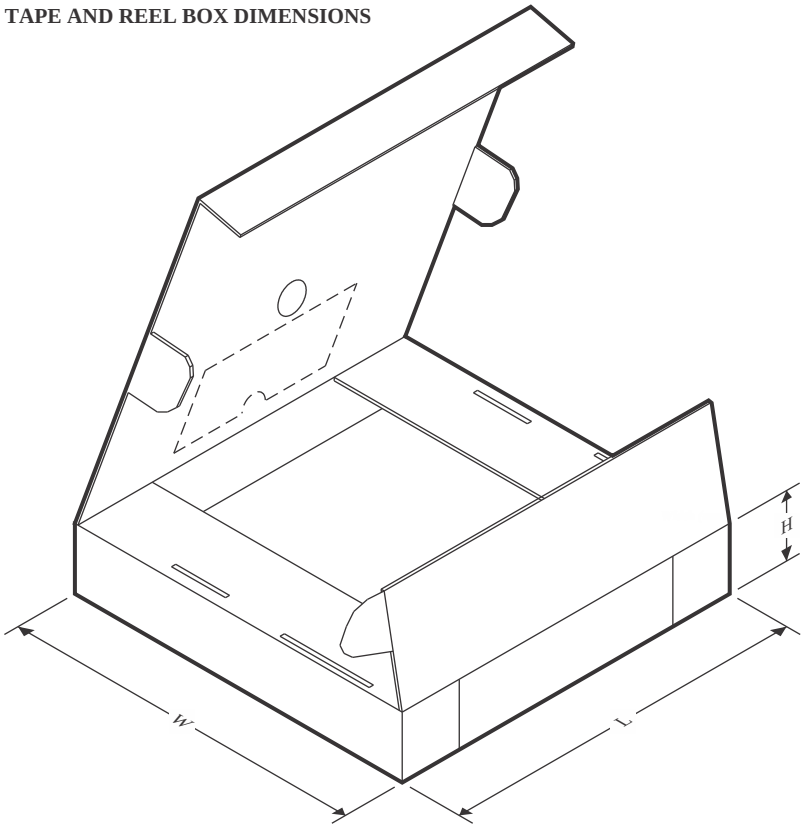
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
LMK04832NKDR	WQFN	NKD	64	2000	330.0	16.4	9.3	9.3	1.3	12.0	16.0	Q2
LMK04832NKDT	WQFN	NKD	64	250	178.0	16.4	9.3	9.3	1.3	12.0	16.0	Q2

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

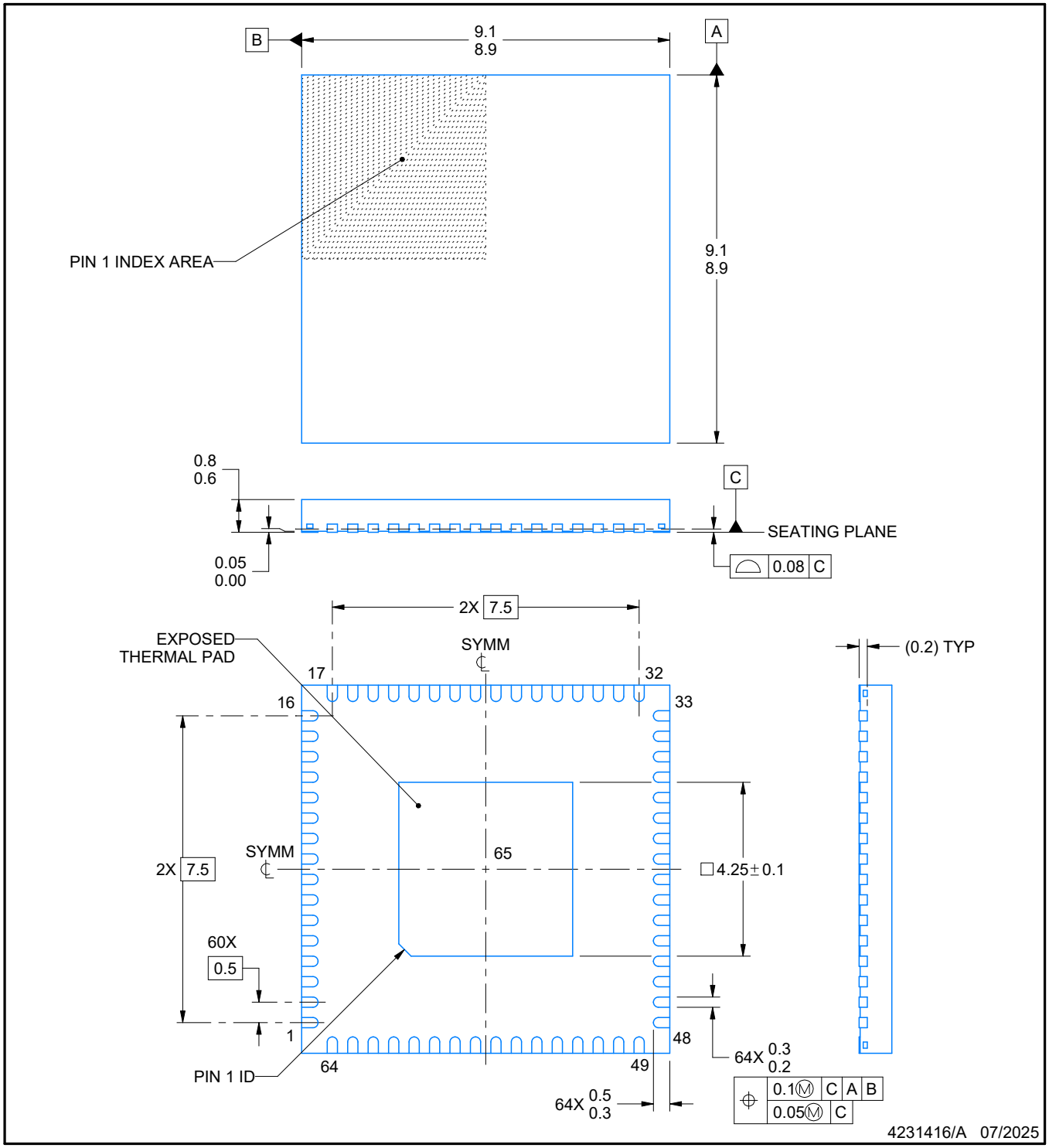
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
LMK04832NKDR	WQFN	NKD	64	2000	356.0	356.0	36.0
LMK04832NKDT	WQFN	NKD	64	250	208.0	191.0	35.0

PACKAGE OUTLINE

NKD0064B

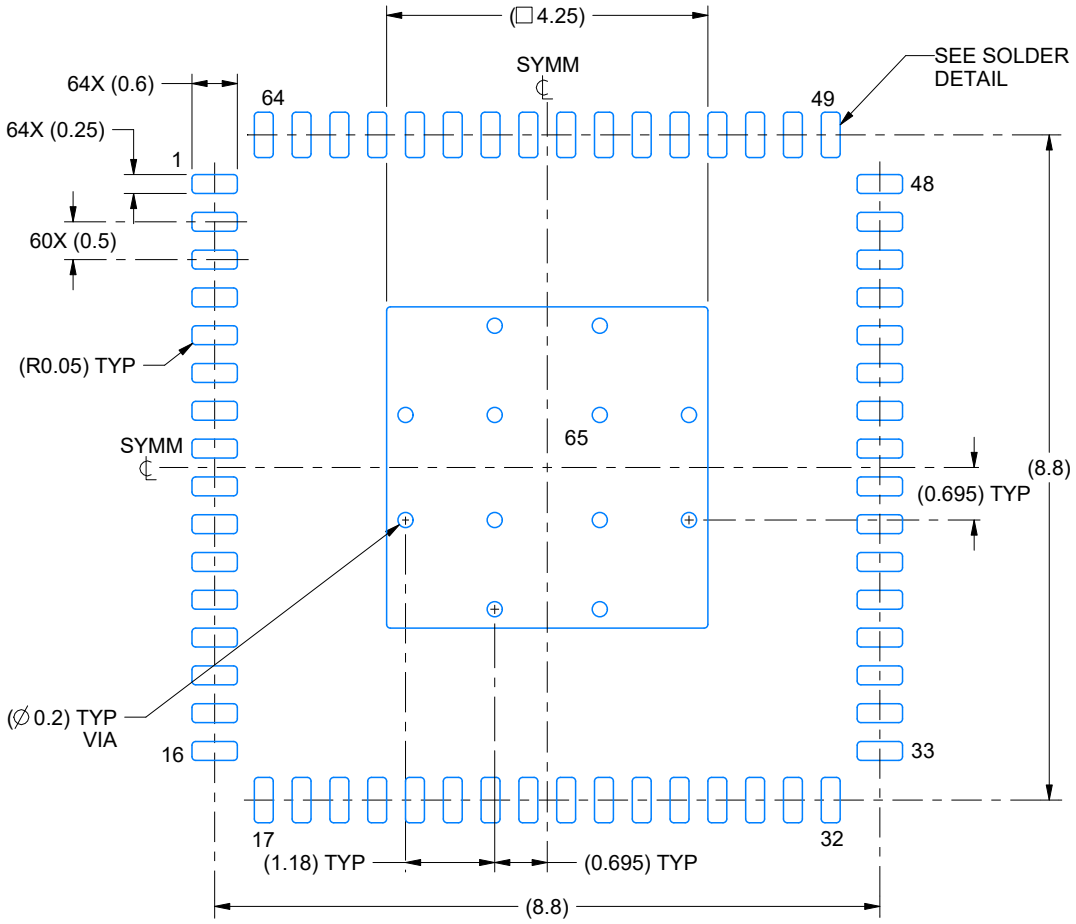
WQFN - 0.8 mm max height

PLASTIC QUAD FLATPACK - NO LEAD

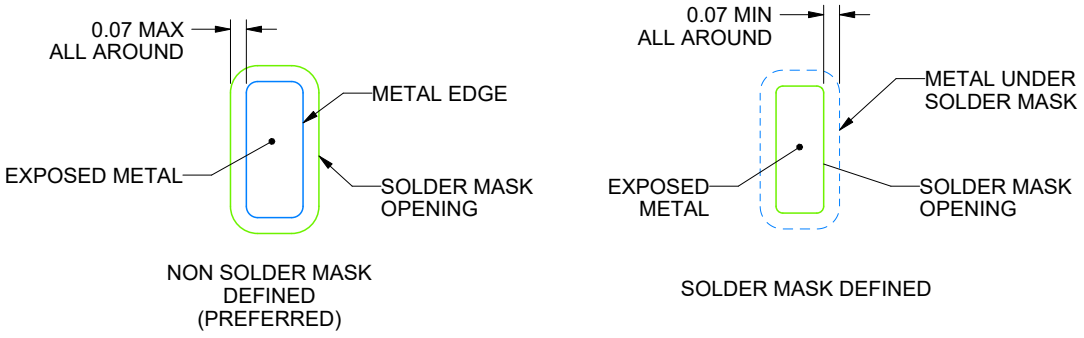


NOTES:

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. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X

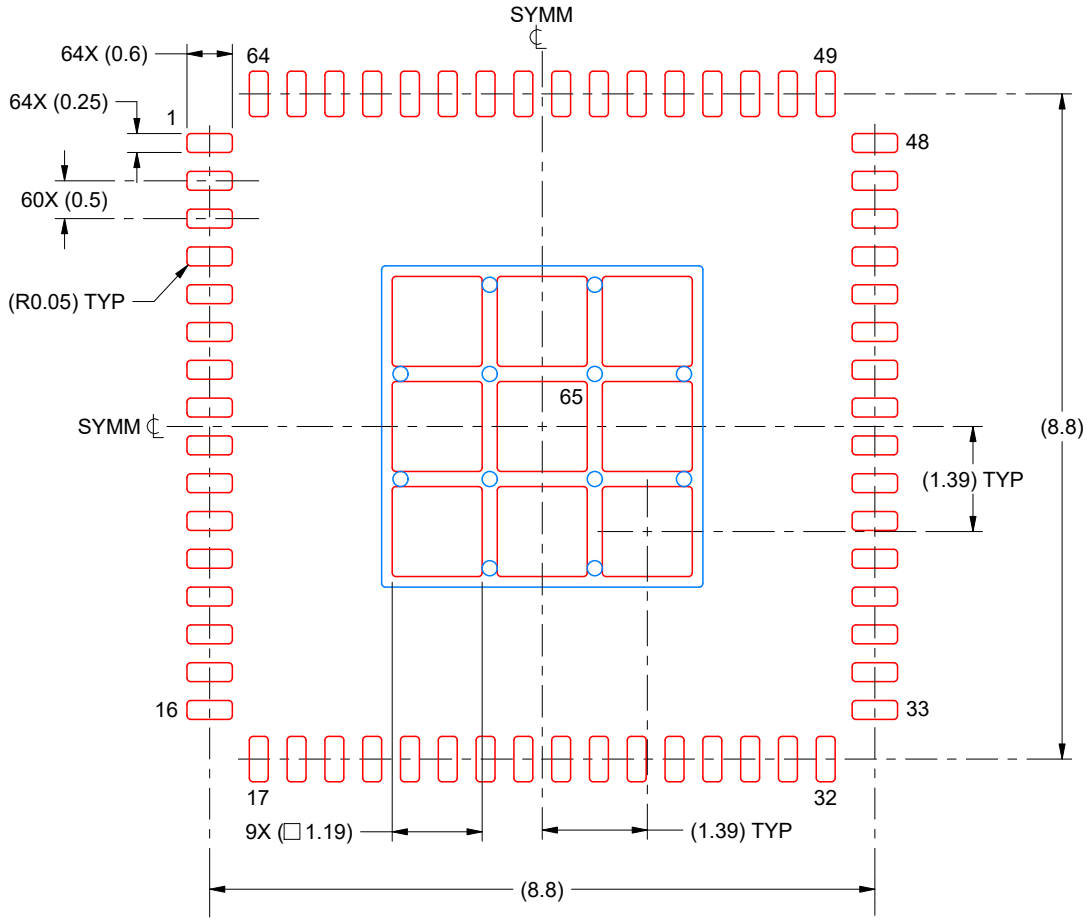


SOLDER MASK DETAILS

4231416/A 07/2025

NOTES: (continued)

4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.



SOLDER PASTE EXAMPLE
BASED ON 0.125 MM THICK STENCIL
SCALE: 10X

EXPOSED PAD 65
71% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE

4231416/A 07/2025

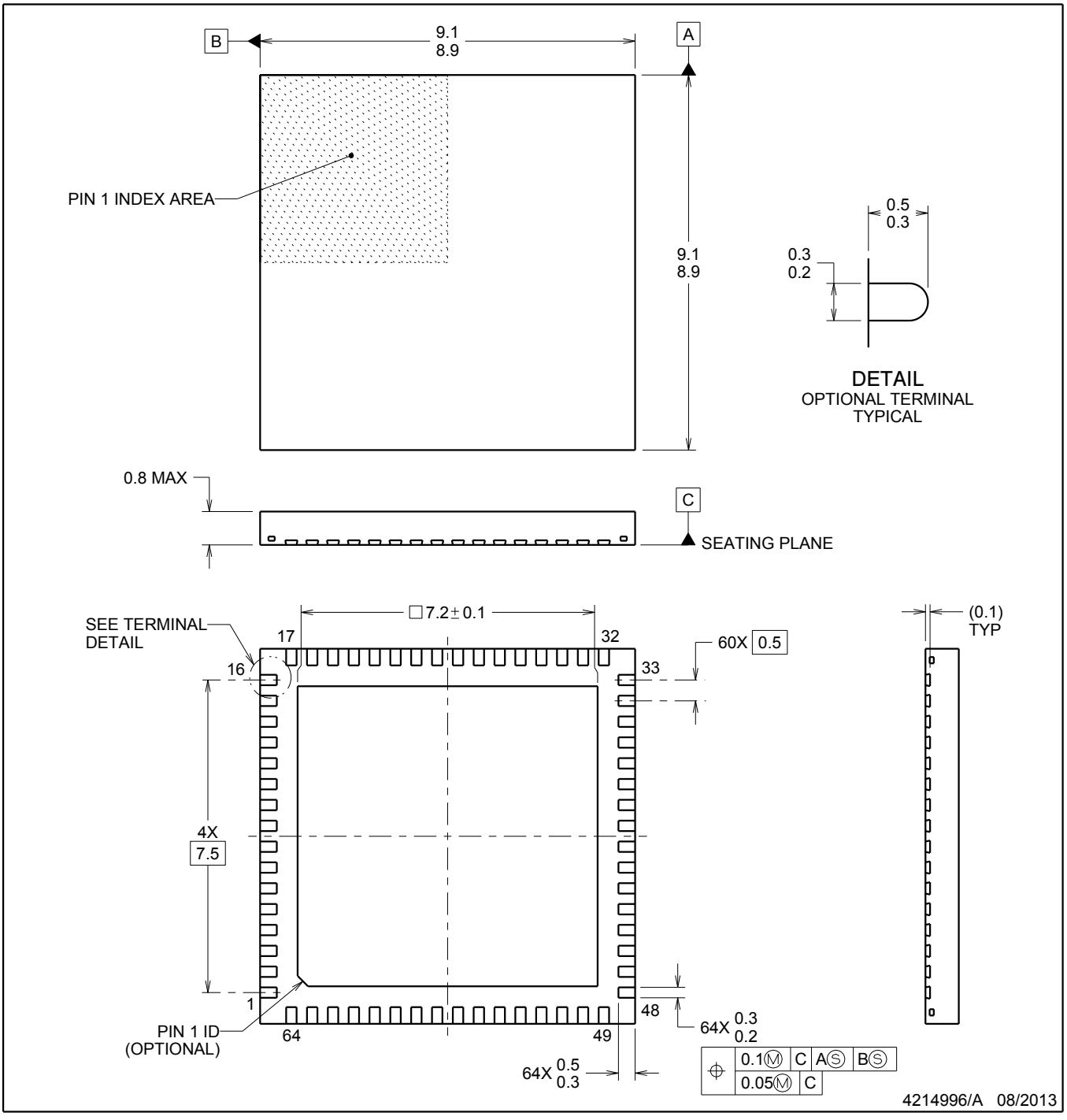
NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

NKD0064A

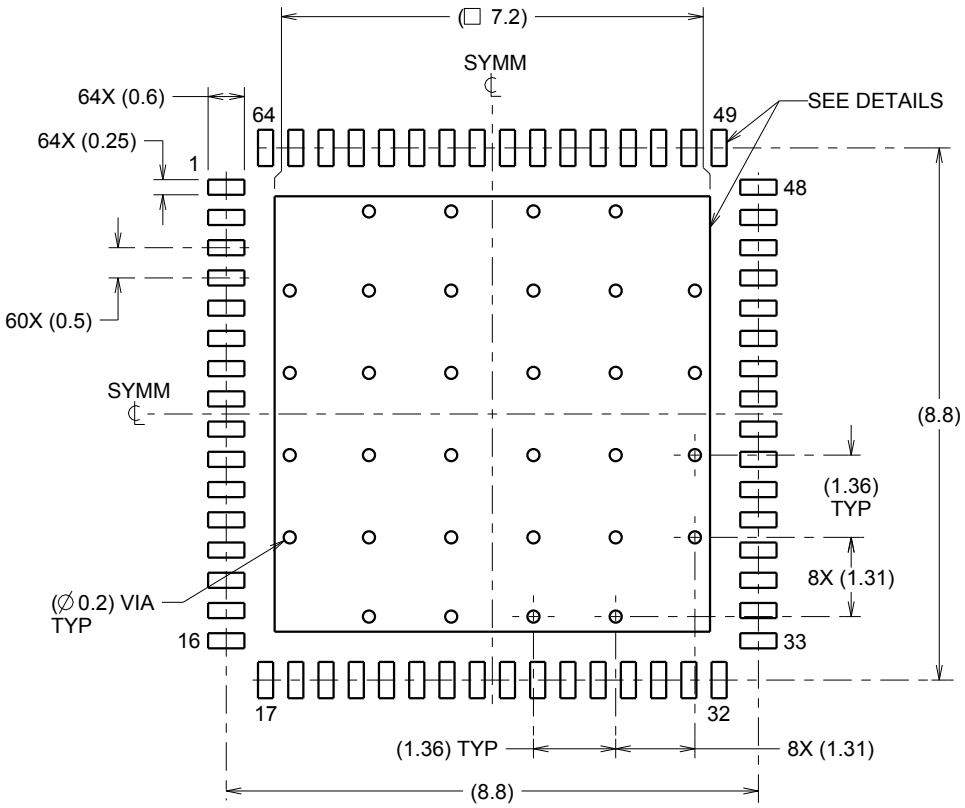
WQFN - 0.8 mm max height

WQFN

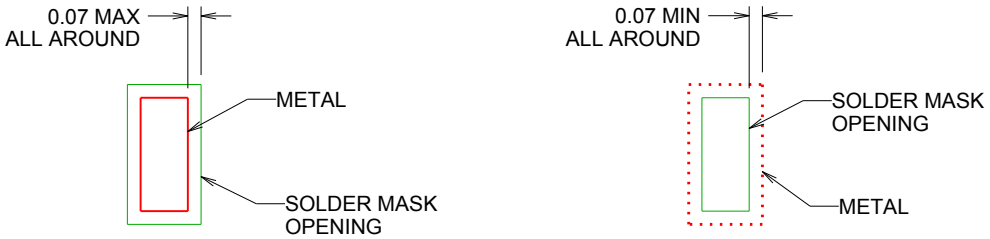


NOTES:

1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.



LAND PATTERN EXAMPLE
SCALE:8X



NON SOLDER MASK
DEFINED
(PREFERRED)

SOLDER MASK
DEFINED

SOLDER MASK DETAILS

4214996/A 08/2013

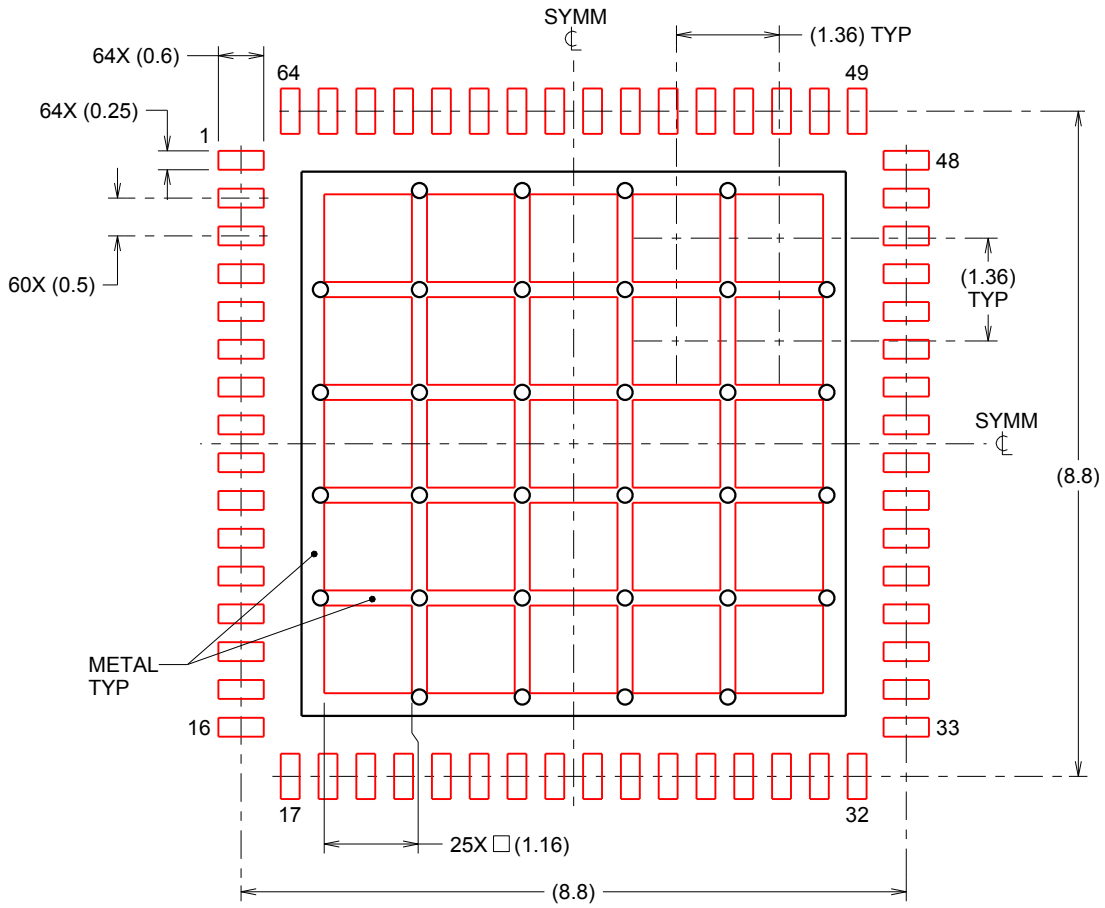
NOTES: (continued)

4. This package is designed to be soldered to a thermal pad on the board. For more information, refer to QFN/SON PCB application note in literature No. SLUA271 (www.ti.com/lit/slua271).

NKD0064A

WQFN - 0.8 mm max height

WQFN



SOLDERPASTE EXAMPLE
BASED ON 0.125mm THICK STENCIL

EXPOSED PAD
65% PRINTED SOLDER COVERAGE BY AREA
SCALE:10X

4214996/A 08/2013

NOTES: (continued)

5. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

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最后更新日期：2025 年 10 月