

DS250DF230 25Gbps 多速率 2 通道重定时器

1 特性

- 具有集成信号调节功能的双通道多速率重定时器
- 所有通道均可独立锁定在 19.6Gbps 至 25.8Gbps 的范围内（包括 12.16512Gbps、9.8304Gbps、6.144Gbps 等子速率）
- 超低延迟：25.78125Gbps 数据速率下的典型延迟 < 500ps
- 自适应性连续时间线性均衡器 (CTLE)
- 连续自适应判决反馈均衡器 (DFE)，能够在工作温度范围内补偿大通道损耗变化
- 结合了支持 12.9GHz 时 35dB 通道损耗的均衡化
- 片上眼图张开度监视器 (EOM)，PRBS 模式校验器和发生器
- 带有 3 抽头有限冲激响应 (FIR) 滤波器的低抖动发射器
- 集成 2 x 2 交叉点
- 恢复时钟适用于通道 0 上的系统 应用在“0”通道
- 单电源、无需低抖动参考时钟
- 宽时钟内温度范围

2 应用

- 针对无线和有线系统中前端口光学接口的抖动消除
- 背板/中板长度延长
- 有源电缆组件
- 802.3bj 100GbE、InfiniBand EDR 和 OIF-CEI-25G-LR/MR/SR/VSRR 电气接口
- SFP28、QSFP28、CFP2/CFP4、CDFP

3 说明

DS250DF230 是一款具有集成信号调节功能的双通道多速率重定时器。该器件用于扩展有损耗且存在串扰的远距离高速串行链路的延伸长度并提升稳定性，同时实现 10^{-15} 或更低的比特误码率 (BER)。

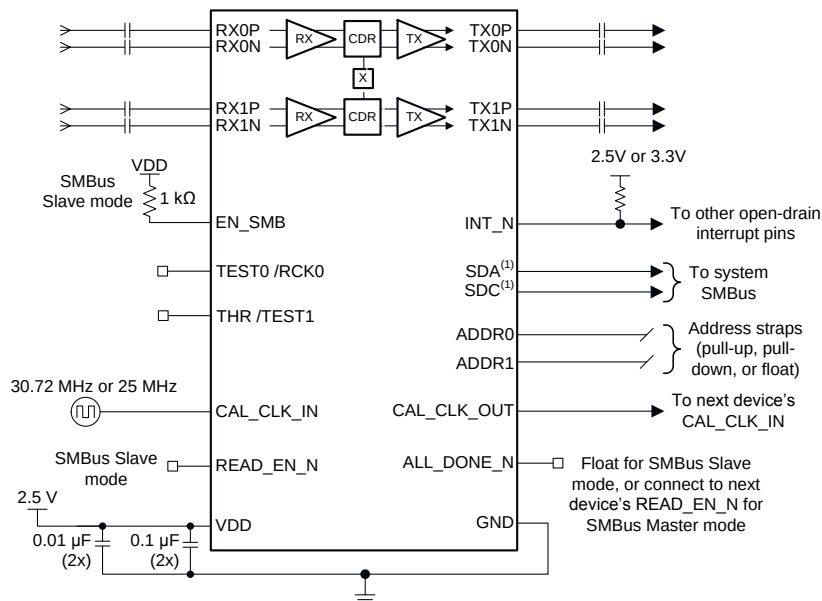
DS250DF230 各通道的串行数据速率均可独立锁定在 19.6Gbps 至 25.8Gbps 的连续范围内或者支持的任何子速率（速率的一半和四分之一），包括 12.16512Gbps、9.8304Gbps、6.144Gbps 等关键数据速率。

器件信息⁽¹⁾

器件型号	封装	封装尺寸（标称值）
DS250DF230	NFBGA (36)	5.00mm × 5.00mm

(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。

简化原理图



(1) SMBus signals need to be pulled up elsewhere in the system.



目录

1	特性	1	6.2	文档支持	4
2	应用	1	6.3	接收文档更新通知	4
3	说明	1	6.4	社区资源	4
4	修订历史记录	2	6.5	商标	4
5	说明（续）	3	6.6	静电放电警告	4
6	器件和文档支持	4	6.7	术语表	4
6.1	器件支持	4	7	机械、封装和可订购信息	4

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 2018) to Revision A	Page
• 将器件状态从“预告信息”更改成了“生产数据”	1

5 说明（续）

DS250DF230 具有单电源，且可将对外部组件的需求降至最低。这些特性可降低 PCB 布线的复杂程度并节省 BOM 成本。

DS250DF230 的高级均衡特性包括一个低抖动 3 抽头发送有限脉冲响应 (FIR) 滤波器、一个自适应连续时间线性均衡器 (CTLE) 以及一个自适应判决反馈均衡器 (DFE)。支持针对具有多个连接器且存在串扰的有损耗互连和背板进行扩展。集成 CDR 功能可用于前端光学模块应用以重置抖动容许量并重定时高速串行数据。DS250DF230 提供 2x2 交叉点，可提供主机通道交叉、扇出和多路复用选项。

DS250DF230 可通过 SMBus 或外部 EEPROM 进行配置。最多 16 个器件可使用“公共通道”配置共享一个 EEPROM。非破坏性片上眼图监视器和 PRBS 发生器及校验器可用于系统内诊断。

6 器件和文档支持

6.1 器件支持

6.1.1 开发支持

更多相关信息，请参阅 TI 表面贴装技术 (SMT) 参考资料（位于

<http://focus.ti.com/quality/docs> 页面的“质量和无铅 (Pb) 数据”菜单下）。

请单击[此处](#)，以请求访问 DS250DF230 MySecure 文件夹中的 DS250DF230 IBIS 模型 (SNLM215)。

6.2 文档支持

6.2.1 相关文档

请参阅如下相关文档：

- 《DS250DF230EVM 用户指南》(SNLU238)
- 《DS2x0DF810、DS250DFx10、DS250DF230 编程人员指南》(SNLU182)

请单击[此处](#)，以请求对 DS250DF230 MySecure 文件夹中的这些文档进行访问。

6.3 接收文档更新通知

要接收文档更新通知，请导航至 [Ti.com.cn](http://ti.com.cn) 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。

6.4 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 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。

6.5 商标

E2E is a trademark of Texas Instruments.

6.6 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。

6.7 术语表

SLYZ022 — TI 术语表。

这份术语表列出并解释术语、缩写和定义。

7 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。

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
DS250DF230RTVR	ACTIVE	WQFN	RTV	32	3000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	DS250 DF2	Samples
DS250DF230RTVT	ACTIVE	WQFN	RTV	32	250	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	DS250 DF2	Samples
DS250DF230ZLSR	ACTIVE	NFBGA	ZLS	36	3000	RoHS & Green	SNAGCU	Level-3-260C-168 HR	-40 to 85	D250DF230	Samples
DS250DF230ZLST	ACTIVE	NFBGA	ZLS	36	250	RoHS & Green	SNAGCU	Level-3-260C-168 HR	-40 to 85	D250DF230	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.

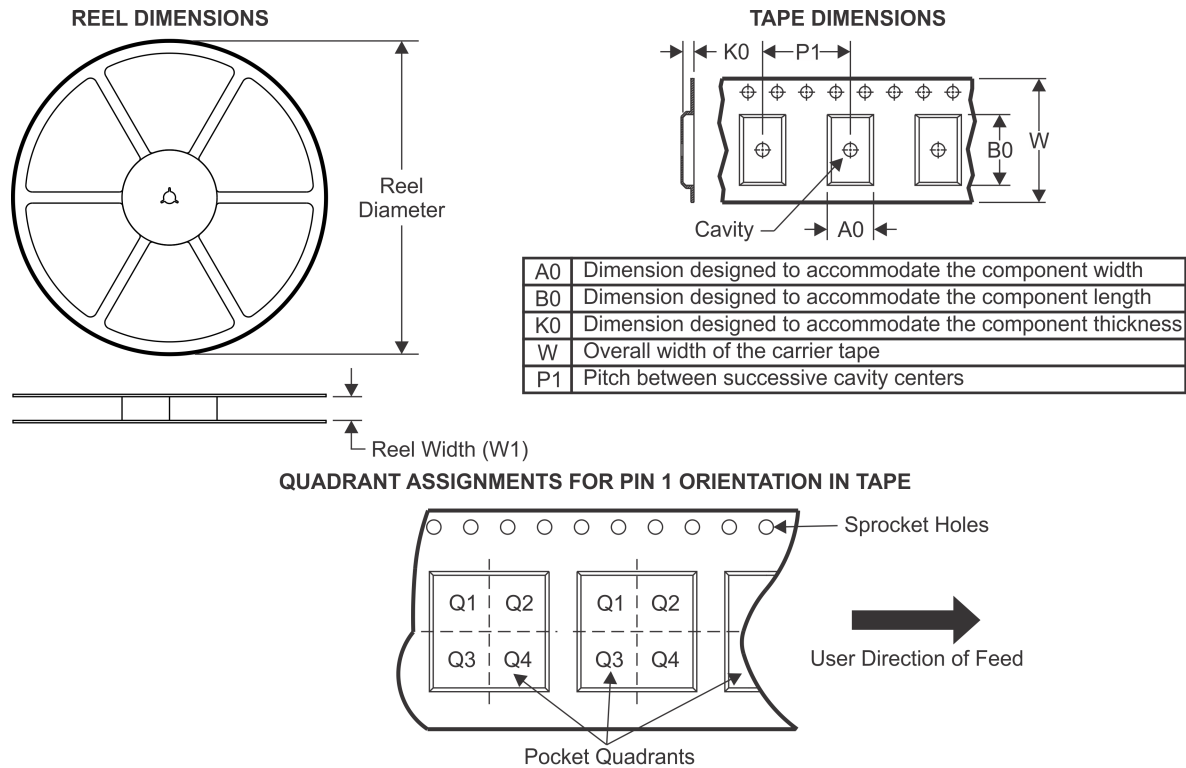
(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and

continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

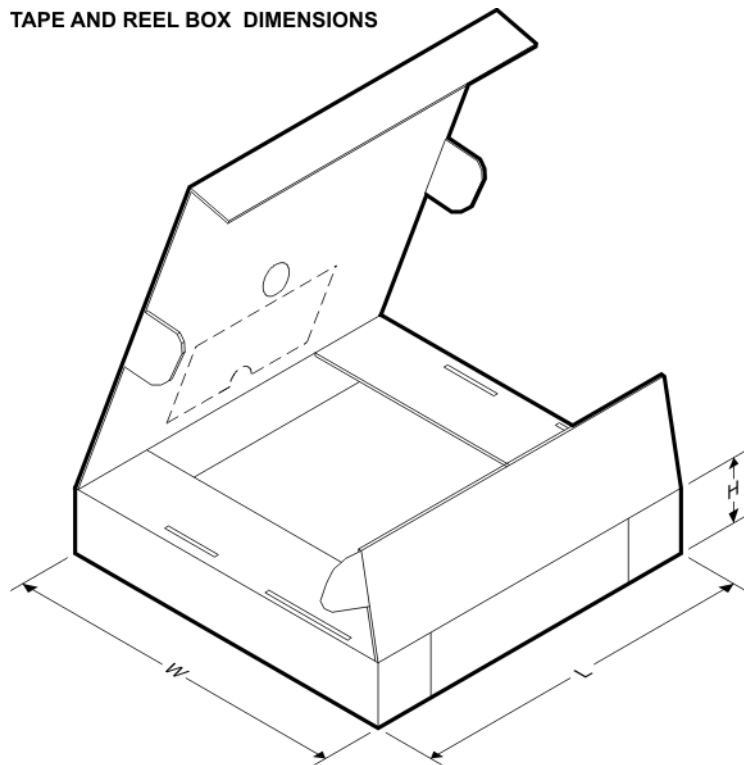
TAPE AND REEL INFORMATION



*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
DS250DF230RTVR	WQFN	RTV	32	3000	330.0	12.4	5.3	5.3	1.1	8.0	12.0	Q2
DS250DF230RTVT	WQFN	RTV	32	250	180.0	12.4	5.3	5.3	1.1	8.0	12.0	Q2
DS250DF230ZLSR	NFBGA	ZLS	36	3000	330.0	12.4	5.3	5.3	1.65	8.0	12.0	Q1
DS250DF230ZLST	NFBGA	ZLS	36	250	330.0	12.4	5.3	5.3	1.65	8.0	12.0	Q1

TAPE AND REEL BOX DIMENSIONS



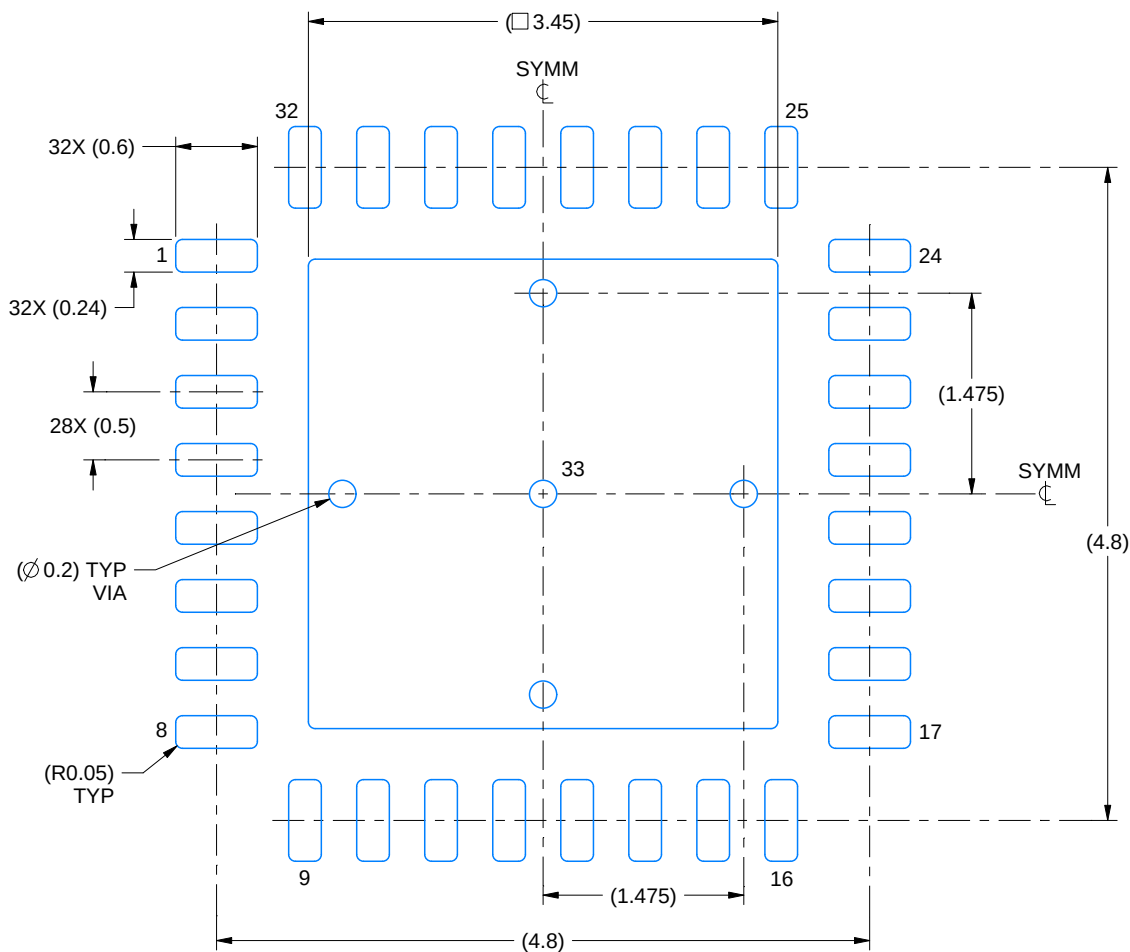
*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
DS250DF230RTVR	WQFN	RTV	32	3000	367.0	367.0	35.0
DS250DF230RTVT	WQFN	RTV	32	250	210.0	185.0	35.0
DS250DF230ZLSR	NFBGA	ZLS	36	3000	336.6	336.6	31.8
DS250DF230ZLST	NFBGA	ZLS	36	250	336.6	336.6	31.8

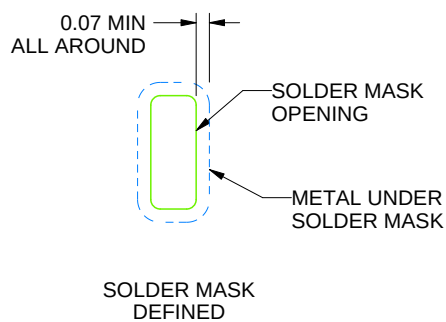
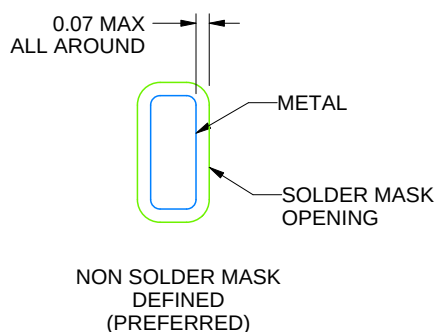
RTV0032E

WQFN - 0.8 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



LAND PATTERN EXAMPLE
SCALE:18X



SOLDER MASK DETAILS

4225196/A 08/2019

NOTES: (continued)

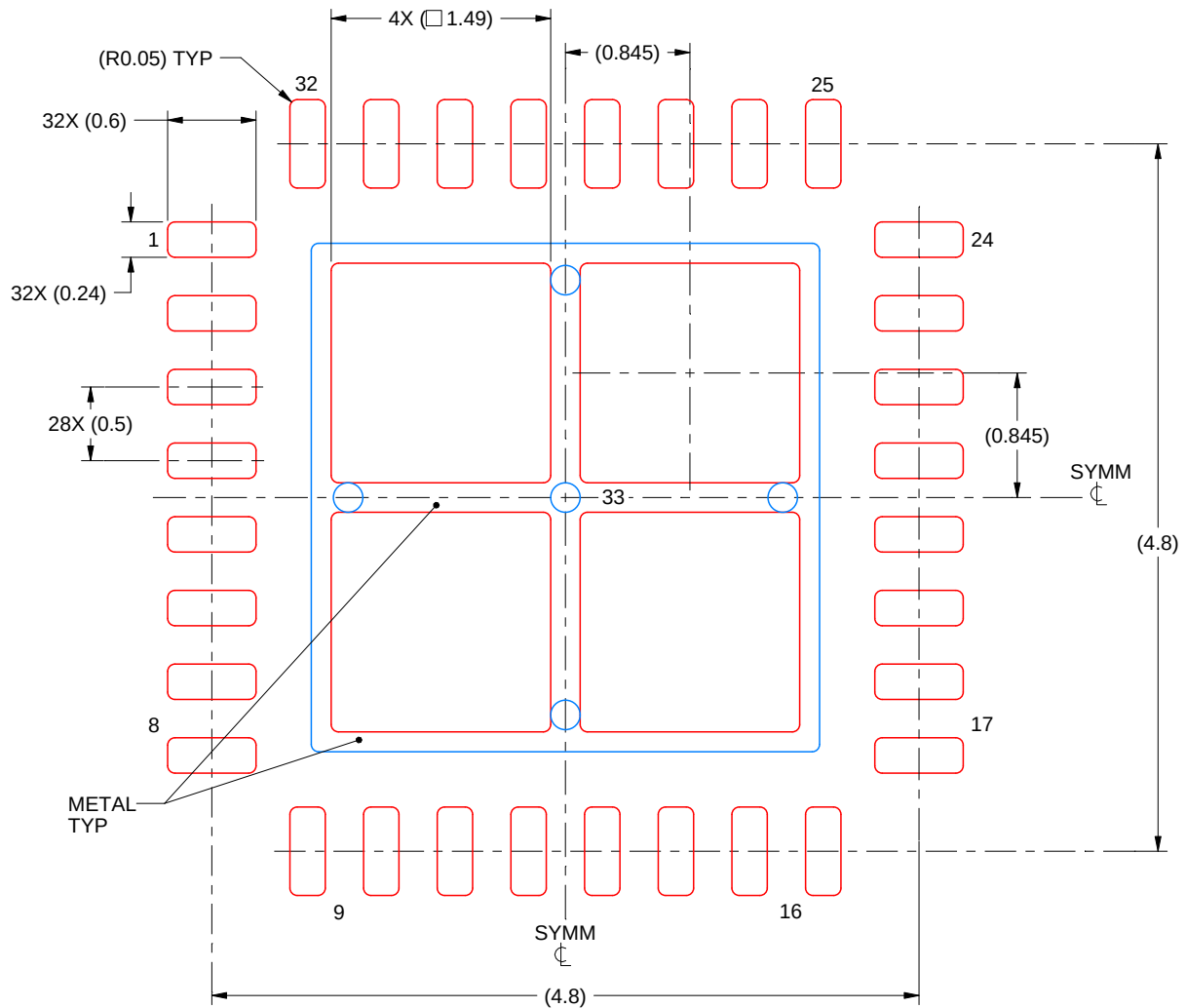
4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown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

EXAMPLE STENCIL DESIGN

RTV0032E

WQFN - 0.8 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL

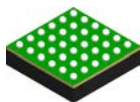
EXPOSED PAD 33:
75% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE
SCALE:20X

4225196/A 08/2019

NOTES: (continued)

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

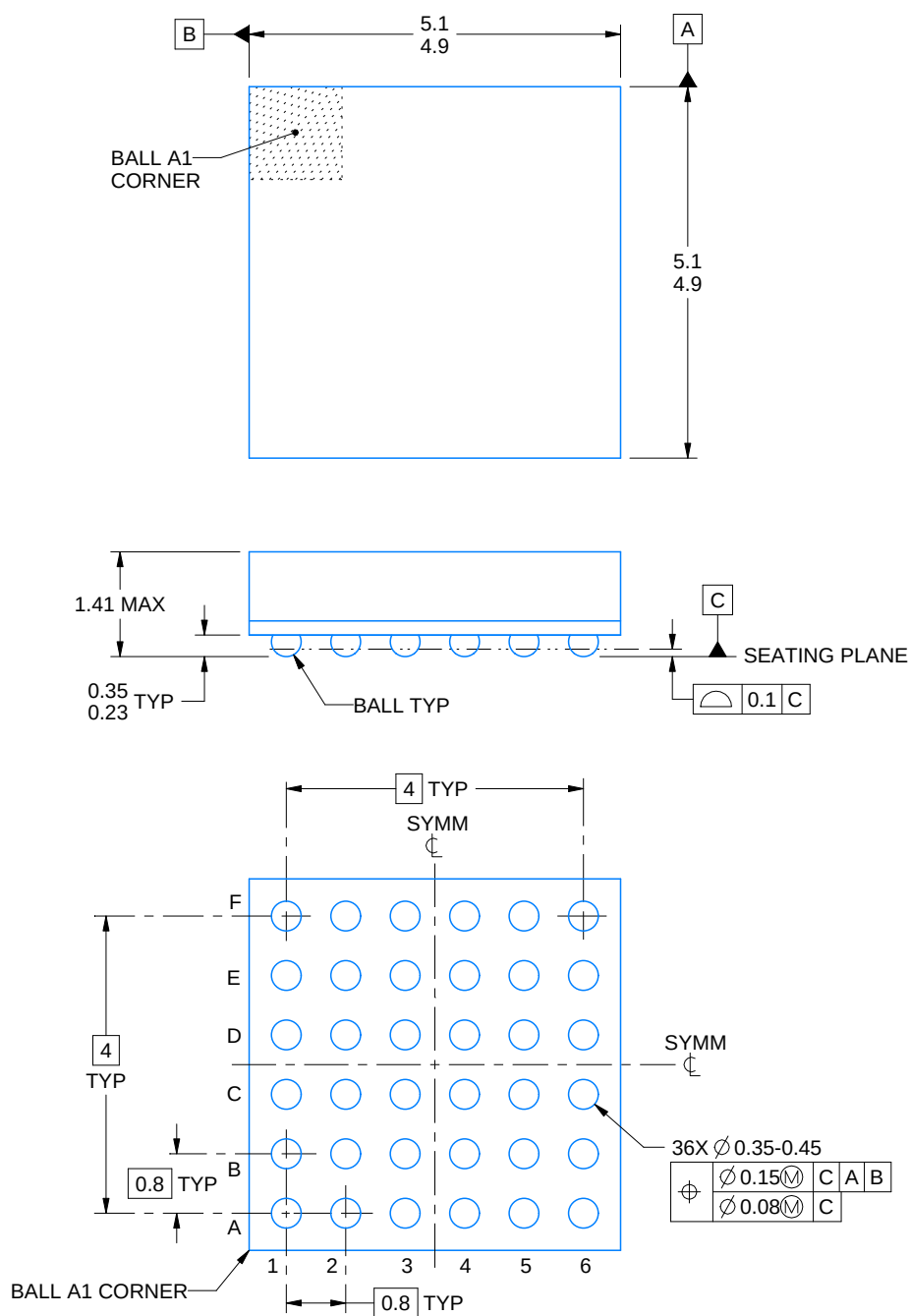
ZLS0036A



PACKAGE OUTLINE

NFBGA - 1.41 mm max height

BALL GRID ARRAY



4220412/A 04/2017

NOTES:

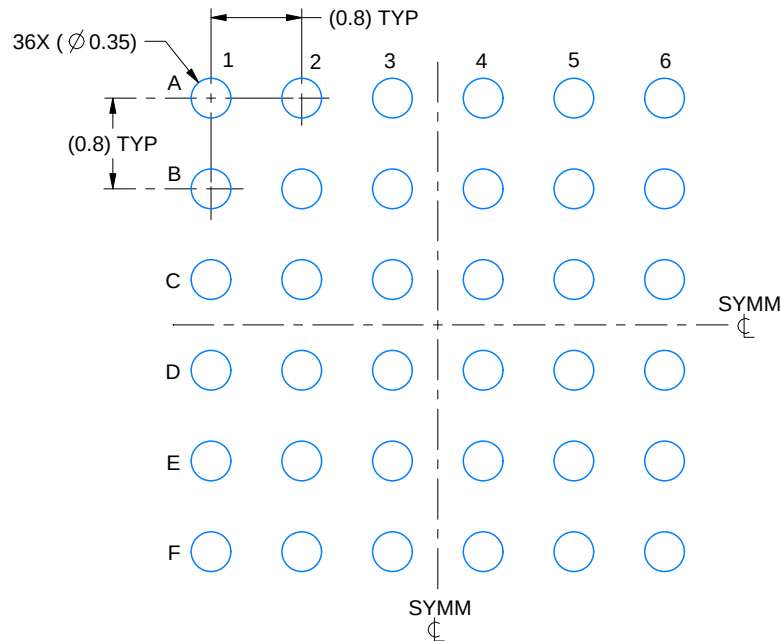
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

EXAMPLE BOARD LAYOUT

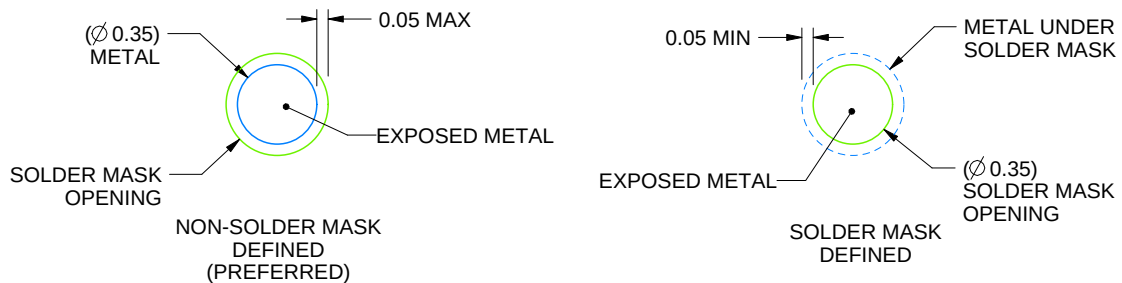
ZLS0036A

NFBGA - 1.41 mm max height

BALL GRID ARRAY



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X

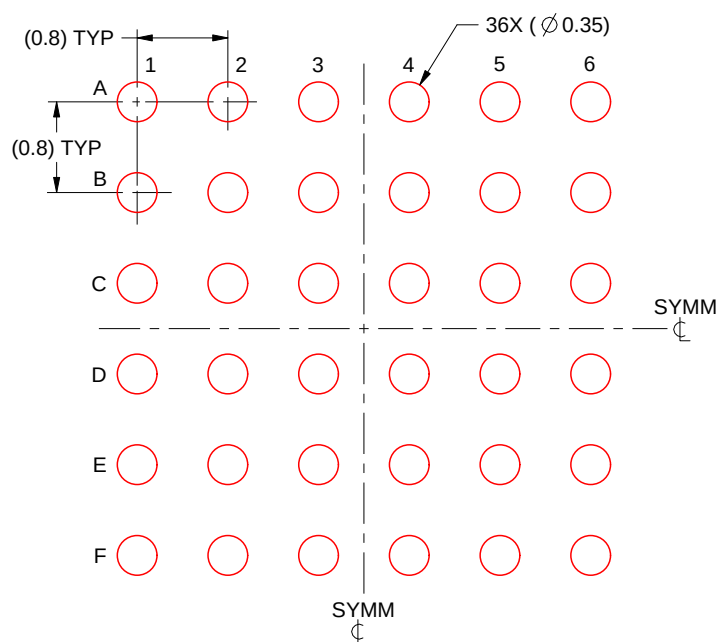


SOLDER MASK DETAILS
NOT TO SCALE

4220412/A 04/2017

NOTES: (continued)

- Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. For more information, see Texas Instruments Literature number SPRAA99 (www.ti.com/lit/spraa99).



SOLDER PASTE EXAMPLE
 BASED ON 0.15 mm THICK STENCIL
 SCALE:15X

4220412/A 04/2017

NOTES: (continued)

4. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release.

重要声明和免责声明

TI 提供技术和可靠性数据（包括数据表）、设计资源（包括参考设计）、应用或其他设计建议、网络工具、安全信息和其他资源，不保证没有瑕疵且不做任何明示或暗示的担保，包括但不限于对适销性、某特定用途方面的适用性或不侵犯任何第三方知识产权的暗示担保。

这些资源可供使用 TI 产品进行设计的熟练开发人员使用。您将自行承担以下全部责任：(1) 针对您的应用选择合适的 TI 产品，(2) 设计、验证并测试您的应用，(3) 确保您的应用满足相应标准以及任何其他安全、安保或其他要求。这些资源如有变更，恕不另行通知。TI 授权您仅可将这些资源用于研发本资源所述的 TI 产品的应用。严禁对这些资源进行其他复制或展示。您无权使用任何其他 TI 知识产权或任何第三方知识产权。您应全额赔偿因在这些资源的使用中对 TI 及其代表造成的任何索赔、损害、成本、损失和债务，TI 对此概不负责。

TI 提供的产品受 TI 的销售条款 (<https://www.ti.com.cn/zh-cn/legal/termsofsale.html>) 或 [ti.com.cn](https://www.ti.com.cn) 上其他适用条款/TI 产品随附的其他适用条款的约束。TI 提供这些资源并不会扩展或以其他方式更改 TI 针对 TI 产品发布的适用的担保或担保免责声明。

邮寄地址：上海市浦东新区世纪大道 1568 号中建大厦 32 楼，邮政编码：200122
Copyright © 2021 德州仪器半导体技术（上海）有限公司