

具有内部基准电压的 DACx0508 八通道 16/14/12 位 SPI 电压输出 DAC

1 特性

- 性能
 - INL: 最大为 ± 1 LSB (16 位分辨率)
 - TUE: FSR 最大值 $\pm 0.14\%$
- 集成 2.5V 精密内部基准电压
 - 初始精度: $\pm 5\text{mV}$ (最大值)
 - 低温漂: $5\text{ppm}/^\circ\text{C}$ (典型值)
- 高驱动能力: 20mA, 0.5V 电源轨
- 灵活的输出配置
 - 用户可选增益: 2、1 或 $\frac{1}{2}$
 - 复位至零标度或中尺度
- 宽运行范围:
 - 电源电压: 2.7V 至 5.5V
 - 温度范围: -40°C 至 125°C
- 50MHz SPI 兼容型串行接口
 - 4 线制模式, 1.7V 至 5.5V 工作电压
 - 菊链运行方式
 - CRC 误差校验
- 低功耗: 0.6mA/通道 (5.5V)
- 小型封装:
 - 3mm × 3mm, 16 引脚 WQFN
 - 2.4mm × 2.4mm, 16 引脚 DSBGA

2 应用

- 光纤网络
- 无线基础设施
- 工业自动化
- 数据采集系统

3 说明

DACx0508 是低功耗八通道缓冲电压输出数模转换器 (DAC) 引脚兼容系列中的一员, 具有 16/14/12 分辨率。DACx0508 包括一个 2.5V ($5\text{ppm}/^\circ\text{C}$) 内部基准电压, 消除了大多数应用中, 所需要的外部精密基准。用户可选增益配置提供 1.25V (增益 = $\frac{1}{2}$)、2.5V (增益 = 1) 或 5V (增益 = 2) 满量程输出电压。该器件由单个 2.7V 至 5.5V 电源供电, 具有单调性, 并能提供 ± 1 LSB INL 的高线性度。

该器件通过一个运行时钟速率为 50MHz 的 4 线制串行接口与 DACx0508 进行通信。VIO 引脚使串行接口可在 1.7V 至 5.5V 范围内运行。DACx0508 灵活接口支持使用广泛的行业标准微处理器和微控制器。

DACx0508 采用了上电复位电路, 上电后可以零电平或中间电平保持 DAC 输出, 直到在器件中写入一个有效代码。该器件耗用低至 0.6mA/通道 (5.5V) 的电流, 因此适用于依靠电池供电的设备。按通道断电功能将器件电流消耗量降低至 $15\mu\text{A}$ 。

DACx0508 采用小型封装, 可在 -40°C 至 $+125^\circ\text{C}$ 的温度范围内正常运行。

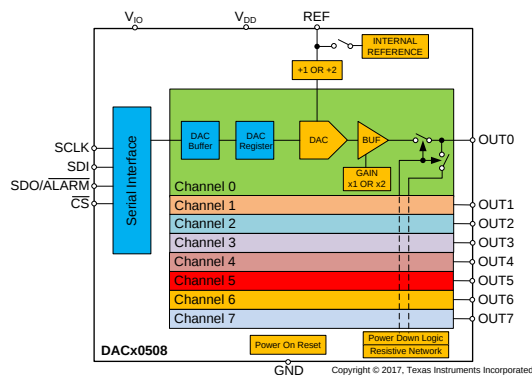
器件信息⁽¹⁾

器件型号	封装	封装尺寸 (标称值)
DACx0508 ⁽²⁾	WQFN (16)	3.00mm × 3.00mm
	DSBGA (16)	2.40mm × 2.40mm

(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。

(2) DAC80508Z 和 DAC80508M 产品预览

简化框图



4 修订历史记录

Changes from Original (June 2017) to Revision A	Page
• 已更改 将“预告信息”更改为“混合状态”	1
• 已添加 将 2.4mm x 2.4mm, 16 引脚 DSBGA 添加到了 符号	1
• 已添加 将 DSBGA (16) 封装添加至器件信息	1

5 器件和文档支持

5.1 相关链接

下表列出了快速访问链接。类别包括技术文档、支持和社区资源、工具和软件以及申请样片或购买产品的快速访问链接。

表 1. 相关链接

器件	产品文件夹	立即订购	技术文档	工具和软件	支持和社区
DAC80508Z	请单击此处	请单击此处	请单击此处	请单击此处	请单击此处
DAC70508Z	请单击此处	请单击此处	请单击此处	请单击此处	请单击此处
DAC60508Z	请单击此处	请单击此处	请单击此处	请单击此处	请单击此处
DAC80508M	请单击此处	请单击此处	请单击此处	请单击此处	请单击此处
DAC70508M	请单击此处	请单击此处	请单击此处	请单击此处	请单击此处
DAC60508M	请单击此处	请单击此处	请单击此处	请单击此处	请单击此处

5.2 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。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。

5.3 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 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。

5.4 商标

E2E is a trademark of Texas Instruments.

All other trademarks are the property of their respective owners.

5.5 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。

5.6 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。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
DAC80508MCRTER	ACTIVE	WQFN	RTE	16	3000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	858MC	Samples
DAC80508MCRTET	ACTIVE	WQFN	RTE	16	250	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	858MC	Samples
DAC80508MCYZFR	ACTIVE	DSBGA	YZF	16	3000	RoHS & Green	SNAGCU	Level-1-260C-UNLIM	-40 to 125	85MC	Samples
DAC80508MCYZFT	ACTIVE	DSBGA	YZF	16	250	RoHS & Green	SNAGCU	Level-1-260C-UNLIM	-40 to 125	85MC	Samples
DAC80508MRTER	ACTIVE	WQFN	RTE	16	3000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	858M	Samples
DAC80508MRTET	ACTIVE	WQFN	RTE	16	250	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	858M	Samples
DAC80508MYZFR	ACTIVE	DSBGA	YZF	16	3000	RoHS & Green	SNAGCU	Level-1-260C-UNLIM	-40 to 125	85M	Samples
DAC80508MYZFT	ACTIVE	DSBGA	YZF	16	250	RoHS & Green	SNAGCU	Level-1-260C-UNLIM	-40 to 125	85M	Samples
DAC80508ZCRTER	ACTIVE	WQFN	RTE	16	3000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	858ZC	Samples
DAC80508ZCRTET	ACTIVE	WQFN	RTE	16	250	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	858ZC	Samples
DAC80508ZCYZFR	ACTIVE	DSBGA	YZF	16	3000	RoHS & Green	SNAGCU	Level-1-260C-UNLIM	-40 to 125	85ZC	Samples
DAC80508ZCYZFT	ACTIVE	DSBGA	YZF	16	250	RoHS & Green	SNAGCU	Level-1-260C-UNLIM	-40 to 125	85ZC	Samples
DAC80508ZRTER	ACTIVE	WQFN	RTE	16	3000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	858Z	Samples
DAC80508ZRTET	ACTIVE	WQFN	RTE	16	250	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	858Z	Samples
DAC80508ZYZFR	ACTIVE	DSBGA	YZF	16	3000	RoHS & Green	SNAGCU	Level-1-260C-UNLIM	-40 to 125	85Z	Samples
DAC80508ZYZFT	ACTIVE	DSBGA	YZF	16	250	RoHS & Green	SNAGCU	Level-1-260C-UNLIM	-40 to 125	85Z	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 ≤ 1000 ppm threshold. Antimony trioxide based flame retardants must also meet the ≤ 1000 ppm 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.

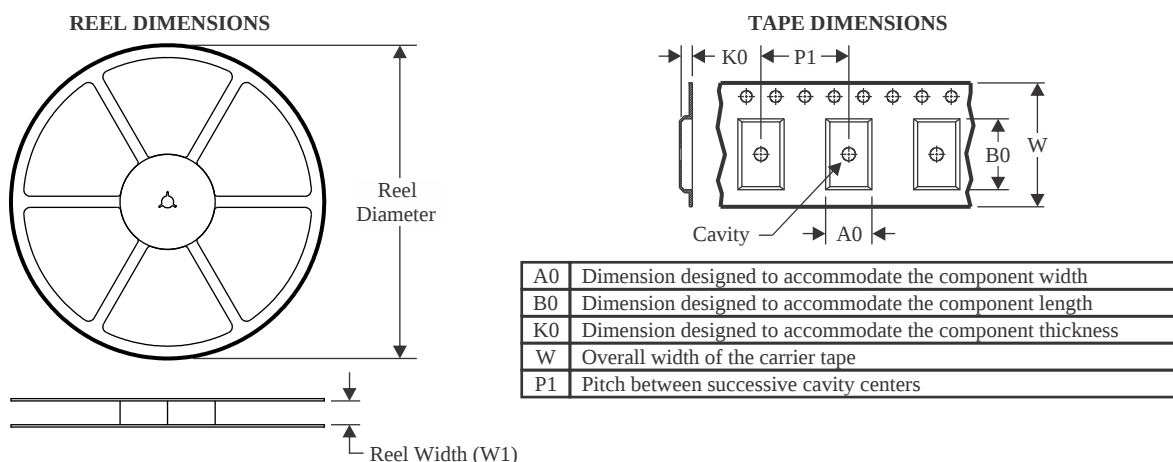
⁽⁵⁾ Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

⁽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.

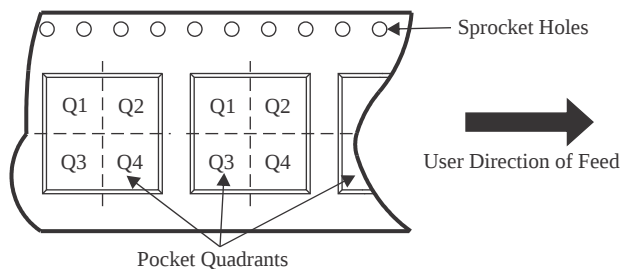
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TAPE AND REEL INFORMATION



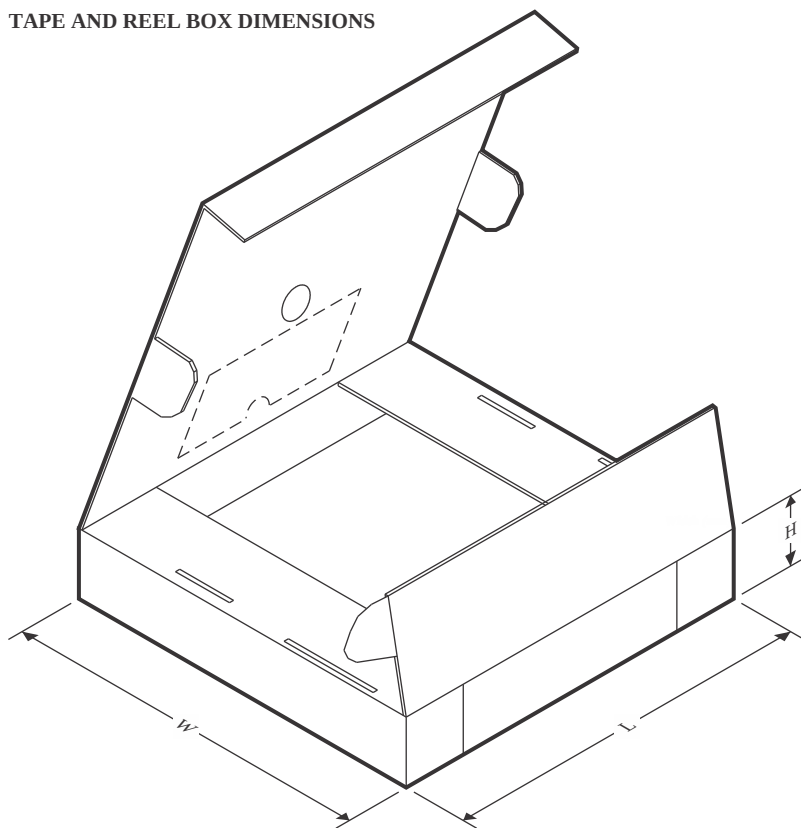
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
DAC80508MCRTER	WQFN	RTE	16	3000	330.0	12.4	3.3	3.3	1.0	8.0	12.0	Q2
DAC80508MCRTET	WQFN	RTE	16	250	180.0	12.4	3.3	3.3	1.0	8.0	12.0	Q2
DAC80508MCYZFR	DSBGA	YZF	16	3000	180.0	8.4	2.54	2.54	0.76	4.0	8.0	Q1
DAC80508MCYZFT	DSBGA	YZF	16	250	180.0	8.4	2.54	2.54	0.76	4.0	8.0	Q1
DAC80508MRTER	WQFN	RTE	16	3000	330.0	12.4	3.3	3.3	1.0	8.0	12.0	Q2
DAC80508MRTET	WQFN	RTE	16	250	180.0	12.4	3.3	3.3	1.0	8.0	12.0	Q2
DAC80508MYZFR	DSBGA	YZF	16	3000	180.0	8.4	2.54	2.54	0.76	4.0	8.0	Q1
DAC80508MYZFT	DSBGA	YZF	16	250	180.0	8.4	2.54	2.54	0.76	4.0	8.0	Q1
DAC80508ZCRTER	WQFN	RTE	16	3000	330.0	12.4	3.3	3.3	1.0	8.0	12.0	Q2
DAC80508ZCRTET	WQFN	RTE	16	250	180.0	12.4	3.3	3.3	1.0	8.0	12.0	Q2
DAC80508ZCYZFR	DSBGA	YZF	16	3000	180.0	8.4	2.54	2.54	0.76	4.0	8.0	Q1
DAC80508ZCYZFT	DSBGA	YZF	16	250	180.0	8.4	2.54	2.54	0.76	4.0	8.0	Q1
DAC80508ZRTER	WQFN	RTE	16	3000	330.0	12.4	3.3	3.3	1.0	8.0	12.0	Q2
DAC80508ZRTET	WQFN	RTE	16	250	180.0	12.4	3.3	3.3	1.0	8.0	12.0	Q2
DAC80508ZYZFR	DSBGA	YZF	16	3000	180.0	8.4	2.54	2.54	0.76	4.0	8.0	Q1
DAC80508ZYZFT	DSBGA	YZF	16	250	180.0	8.4	2.54	2.54	0.76	4.0	8.0	Q1

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
DAC80508MCRTER	WQFN	RTE	16	3000	367.0	367.0	38.0
DAC80508MCRTET	WQFN	RTE	16	250	213.0	191.0	35.0
DAC80508MCYZFR	DSBGA	YZF	16	3000	182.0	182.0	20.0
DAC80508MCYZFT	DSBGA	YZF	16	250	182.0	182.0	20.0
DAC80508MRTER	WQFN	RTE	16	3000	367.0	367.0	38.0
DAC80508MRTET	WQFN	RTE	16	250	213.0	191.0	35.0
DAC80508MYZFR	DSBGA	YZF	16	3000	182.0	182.0	20.0
DAC80508MYZFT	DSBGA	YZF	16	250	182.0	182.0	20.0
DAC80508ZCRTER	WQFN	RTE	16	3000	367.0	367.0	38.0
DAC80508ZCRTET	WQFN	RTE	16	250	213.0	191.0	35.0
DAC80508ZCYZFR	DSBGA	YZF	16	3000	182.0	182.0	20.0
DAC80508ZCYZFT	DSBGA	YZF	16	250	182.0	182.0	20.0
DAC80508ZRTER	WQFN	RTE	16	3000	367.0	367.0	38.0
DAC80508ZRTET	WQFN	RTE	16	250	213.0	191.0	35.0
DAC80508ZYZFR	DSBGA	YZF	16	3000	182.0	182.0	20.0
DAC80508ZYZFT	DSBGA	YZF	16	250	182.0	182.0	20.0

GENERIC PACKAGE VIEW

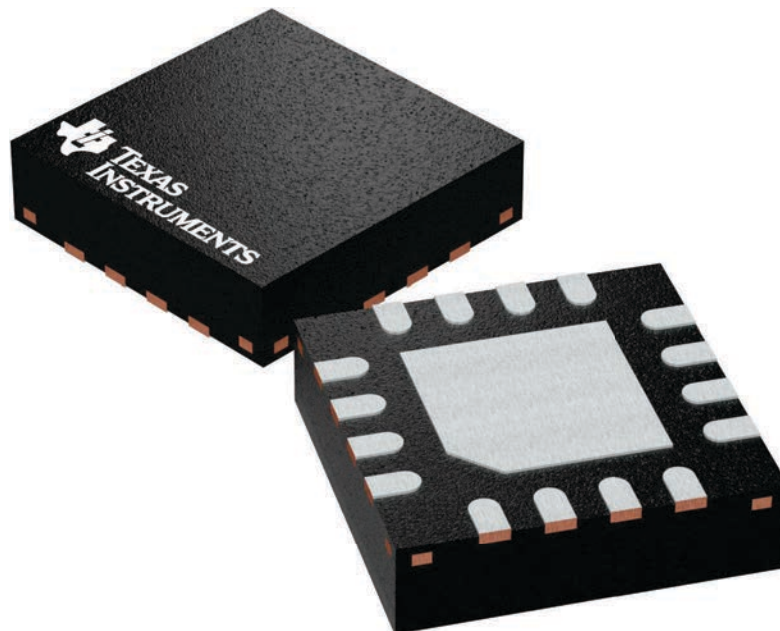
RTE 16

WQFN - 0.8 mm max height

3 x 3, 0.5 mm pitch

PLASTIC QUAD FLATPACK - NO LEAD

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



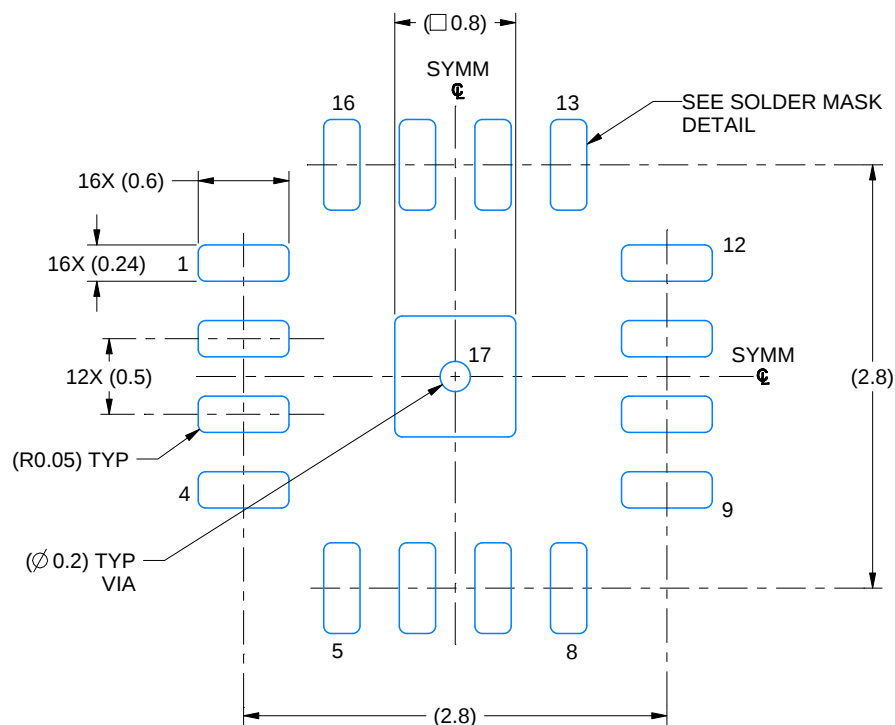


1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

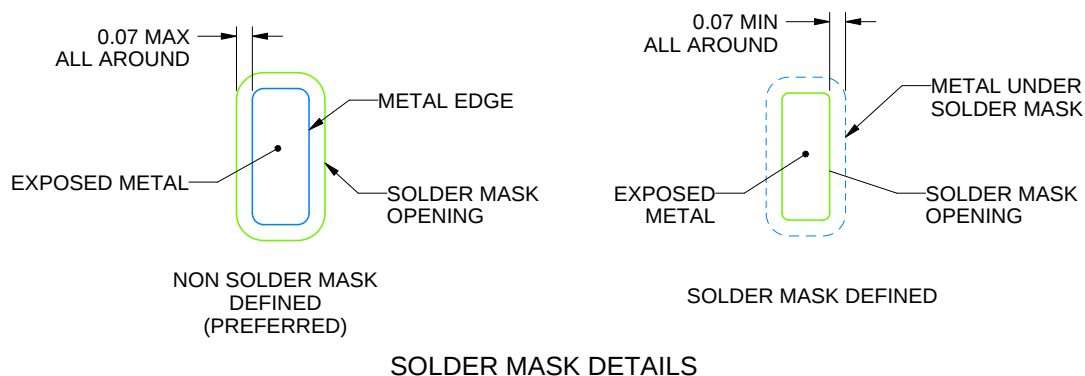
RTE0016D

WQFN - 0.8 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 20X



4219118/A 11/2018

NOTES: (continued)

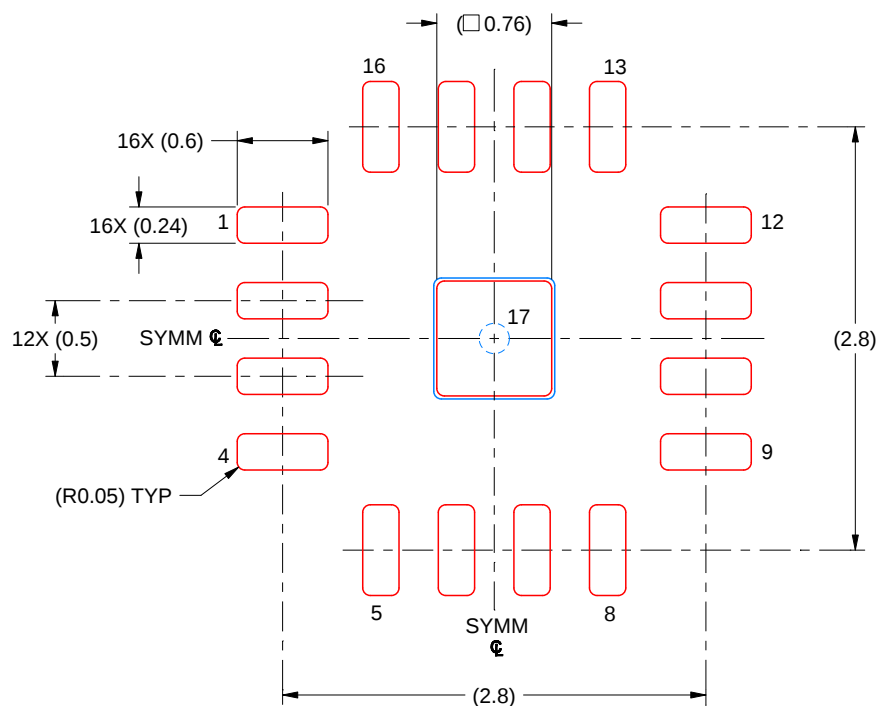
4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown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

EXAMPLE STENCIL DESIGN

RTE0016D

WQFN - 0.8 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



SOLDER PASTE EXAMPLE
BASED ON 0.125 MM THICK STENCIL
SCALE: 20X

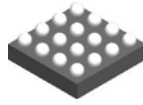
EXPOSED PAD 17
90% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE

4219118/A 11/2018

NOTES: (continued)

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

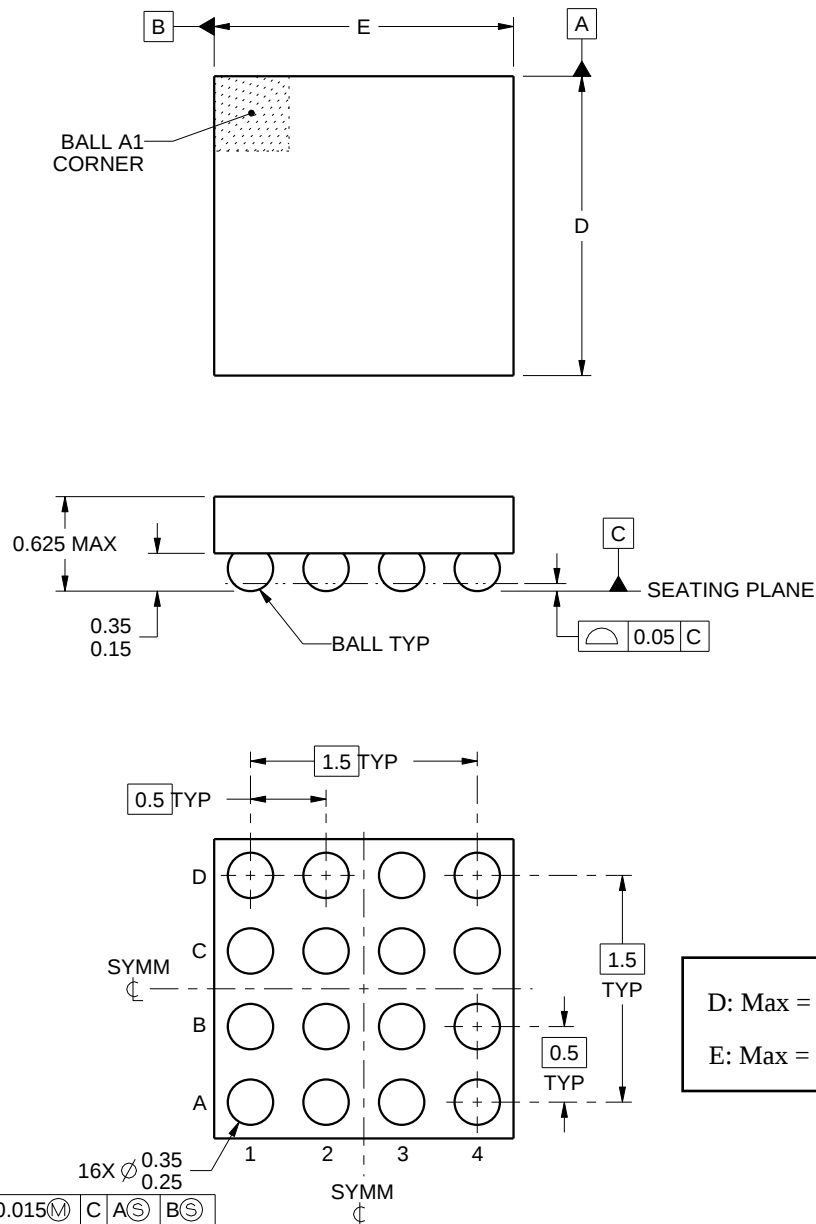
YZF0016



PACKAGE OUTLINE

DSBGA - 0.625 mm max height

DIE SIZE BALL GRID ARRAY



4222182/A 08/2015

NOTES:

NanoFree is a trademark of Texas Instruments.

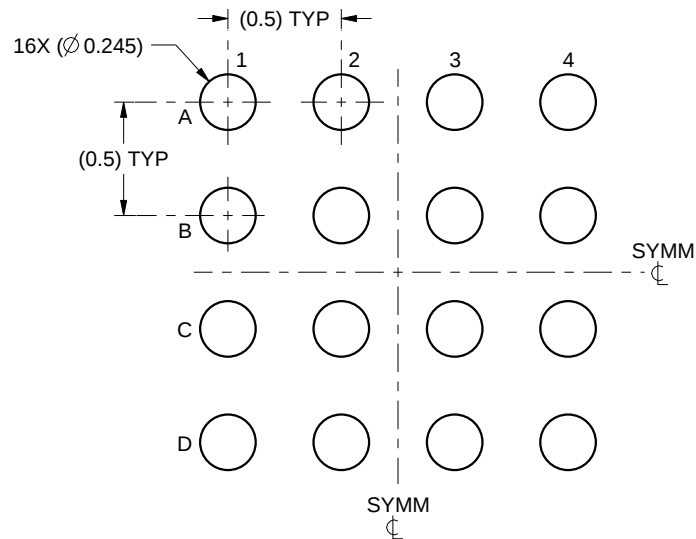
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. NanoFree™ package configuration.

EXAMPLE BOARD LAYOUT

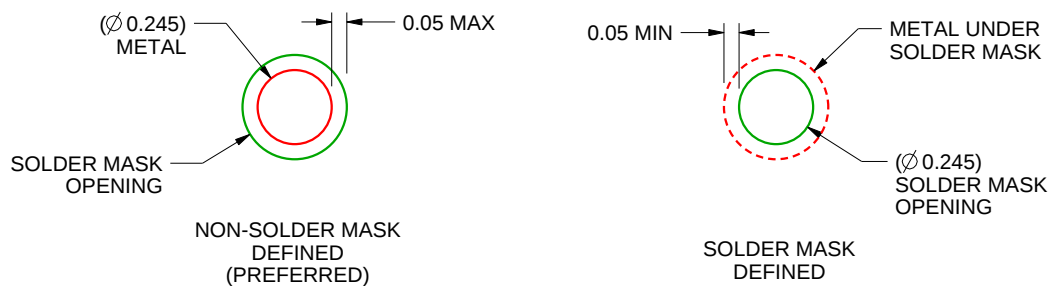
YZF0016

DSBGA - 0.625 mm max height

DIE SIZE BALL GRID ARRAY



LAND PATTERN EXAMPLE
SCALE:30X



SOLDER MASK DETAILS
NOT TO SCALE

4222182/A 08/2015

NOTES: (continued)

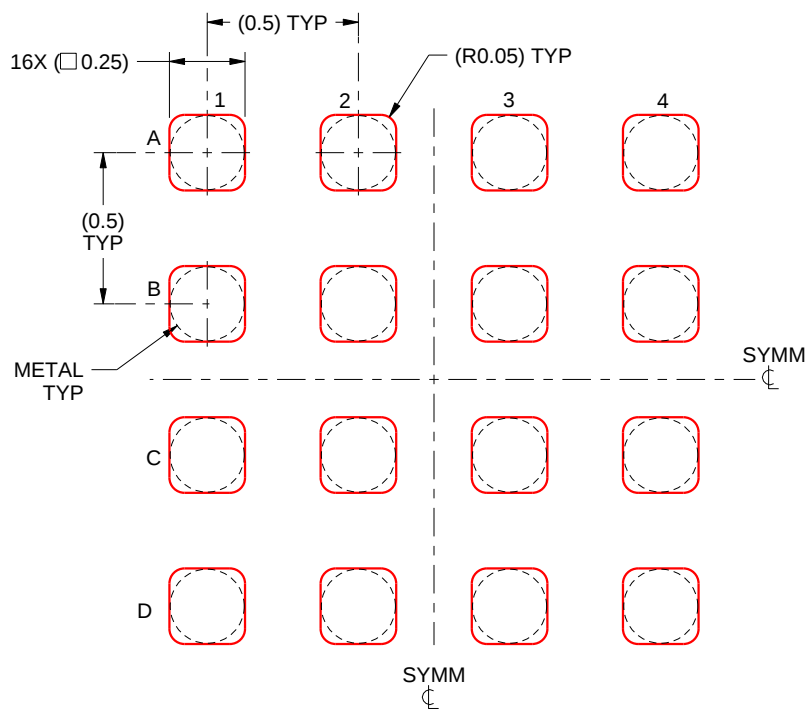
4. Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints.
For more information, see Texas Instruments literature number SNVA009 (www.ti.com/lit/snva009).

EXAMPLE STENCIL DESIGN

YZF0016

DSBGA - 0.625 mm max height

DIE SIZE BALL GRID ARRAY



SOLDER PASTE EXAMPLE
BASED ON 0.1 mm THICK STENCIL
SCALE:40X

4222182/A 08/2015

NOTES: (continued)

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

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