

BQ25180 具有电源路径和运输模式的 I²C 控制型 1 节电池 1A 线性电池充电器

1 特性

- 1A 线性电池充电器
 - 已针对电池间充电和 USB 适配器优化的 3.0V 至 5.9V 输入电压工作范围
 - 可耐受 25V 的输入电压
 - 可配置的电池调节电压，精度为 0.5%，范围为 3.6V 至 4.65V，阶跃为 10mV
 - 支持锂离子和磷酸铁锂化学物质
 - 5mA 至 1A 的可配置快速充电电流
 - 70mΩ 电池 FET 导通电阻
 - 高达 2.5A 的放电电流，支持高系统负载
 - 可配置的终止电流，支持低至 0.5mA
 - 可配置的 NTC 充电曲线阈值，包括 JEITA 支持
 - 下电上电和高级复位机制
 - 提供 I²C 或独立式版本
- 电源路径管理，用于系统供电和电池充电
 - 稳定系统电压 (SYS) 范围为 4.4V 至 4.9V，此外还具有电池电压跟踪功能和输入直通选项
 - 可配置的输入电流限制
 - 支持 USB 挂起模式
 - 动态电源路径管理可以对通过弱适配器充电进行优化
- 超低静态电流
 - 关断模式下为 10nA
 - 运输模式下为 5 μA，支持按钮唤醒
 - 仅电池模式下为 3 μA
 - 禁用/终止充电时，输入 I_q 为 500 μA
- 单按钮唤醒和复位输入
- 集成故障保护
 - 输入过压保护 (VIN_OVP)
 - 电池欠压保护 (BUVLO)
 - 电池短路保护 (BATSC)
 - 电池过流保护 (BATOCP)
 - 输入电流限制保护 (ILIM)
 - 热调节 (TREG) 和热关断 (TSHUT)
 - 电池热故障保护 (TS)
 - 看门狗和安全计时器故障

2 应用

- TWS 耳机和充电盒
- 智能眼镜、AR 和 VR
- 智能手表和其他可穿戴设备
- 零售自动化和支付
- 楼宇自动化

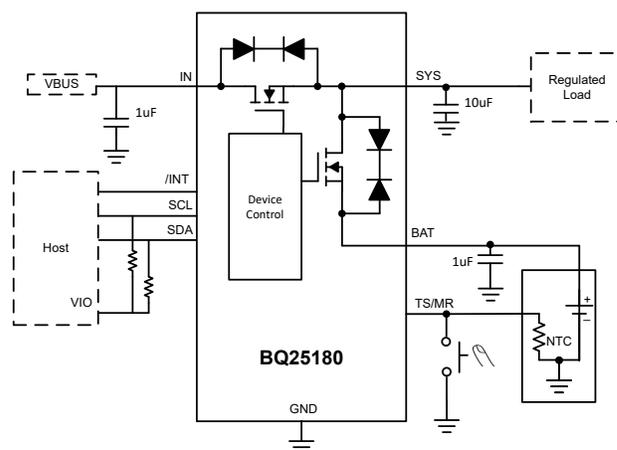
3 说明

BQ25180 是一款线性电池充电器 IC，专注于小解决方案尺寸和低静态电流以延长电池寿命。该器件采用 8 焊球芯片级封装，无需采用 HDI PCB 工艺进行制造，从而降低了 PCB 成本。该器件可支持高达 1A 的充电电流和高达 2.5A 的系统负载。

器件信息

器件型号	封装 ⁽¹⁾	封装尺寸 (标称值)
BQ25180	DSBGA (8)	1.6 mm x 1.1 mm

(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。



简化版原理图



4 说明 (续)

该器件采用标准锂离子或磷酸铁锂充电曲线分三个阶段对电池进行充电：预充电、恒流和恒压。通过热调节提供最大充电电流，同时管理器件温度。该充电器还针对电池间充电进行了优化，具有 3V 的最低输入电压，并且可以承受 25V 的绝对最大线路瞬变。该器件集成了单按钮输入和复位电路，以减小解决方案的总尺寸。

5 Device and Documentation Support

5.1 Device Support

5.1.1 第三方产品免责声明

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5.3 支持资源

[TI E2E™ 支持论坛](#) 是工程师的重要参考资料，可直接从专家获得快速、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可获得所需的快速设计帮助。

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5.4 Trademarks

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5.5 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

5.6 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。

6 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

ADVANCE INFORMATION

6.1 Package Option Addendum

Packaging Information

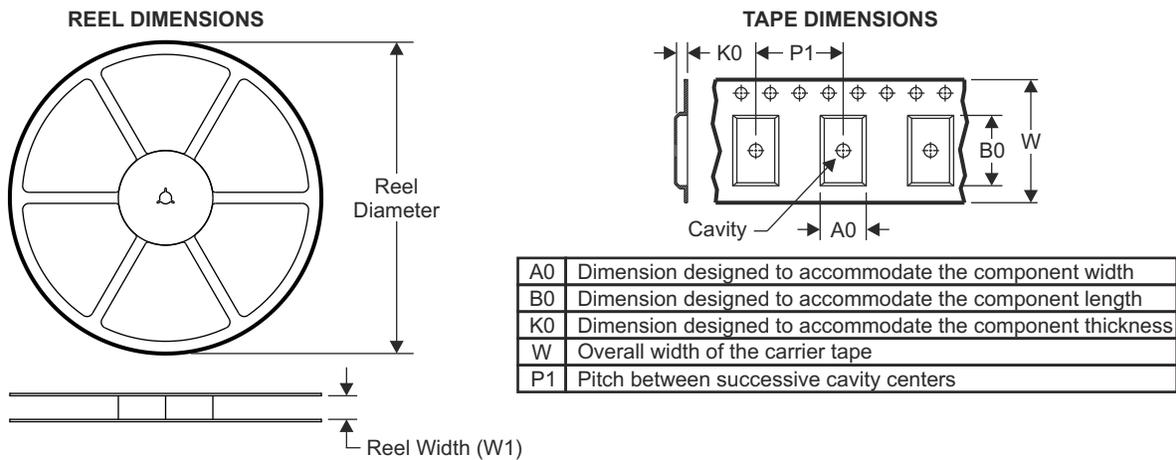
Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish ⁽⁶⁾	MSL Peak Temp ⁽³⁾	Op Temp (°C)	Device Marking ^{(4) (5)}
PQ25180YBGR	PREVIEW	DSBGA	YBG	8	3000	RoHS & Green	SNAGCU	Level-1-260C-UNLIM	-40 to 125	
PQ25180YBGT	PREVIEW	DSBGA	YBG	8	250	RoHS & Green	SNAGCU	Level-1-260C-UNLIM	-40 to 125	

- (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.
PRE_PROD Unannounced device, not in production, not available for mass market, nor on the web, samples not available.
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) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material).
- (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/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

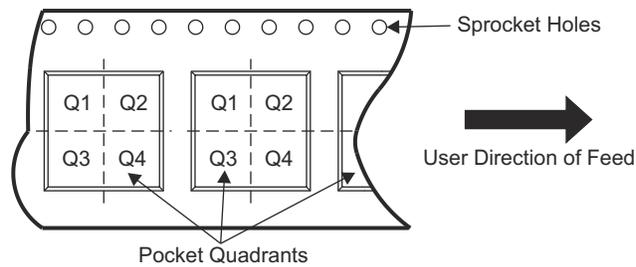
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6.2 Tape and Reel Information

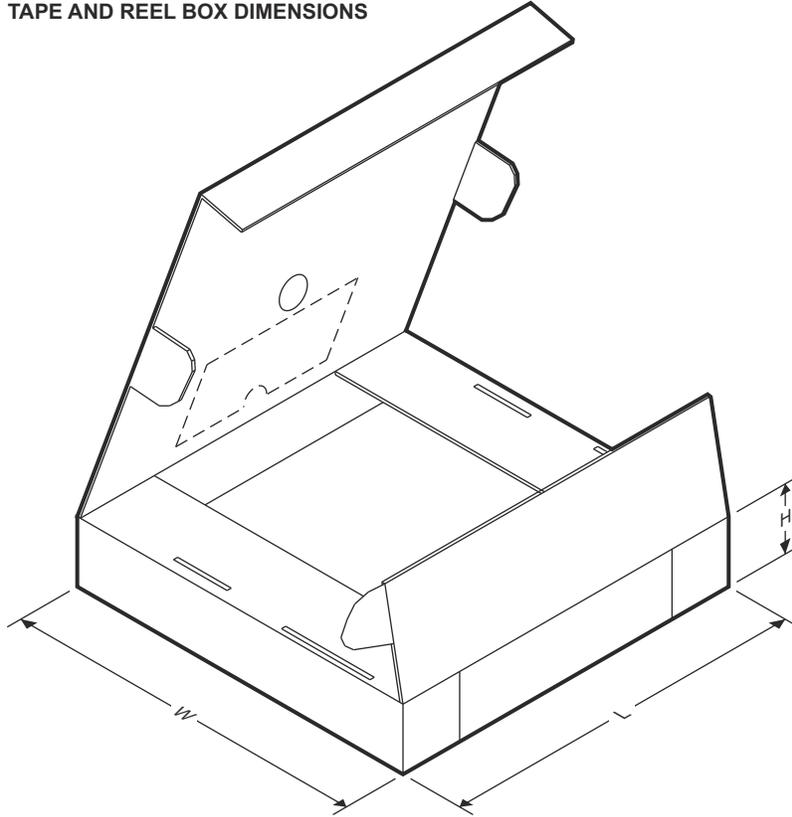


QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



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
PQ25180YBGR	DSBGA	YBG	8	3000	180.0	8.4	1.15	1.75	0.65	4.0	8.0	Q1
PQ25180YBGT	DSBGA	YBG	8	250	180.0	8.4	1.15	1.75	0.65	4.0	8.0	Q1

TAPE AND REEL BOX DIMENSIONS

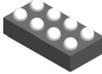


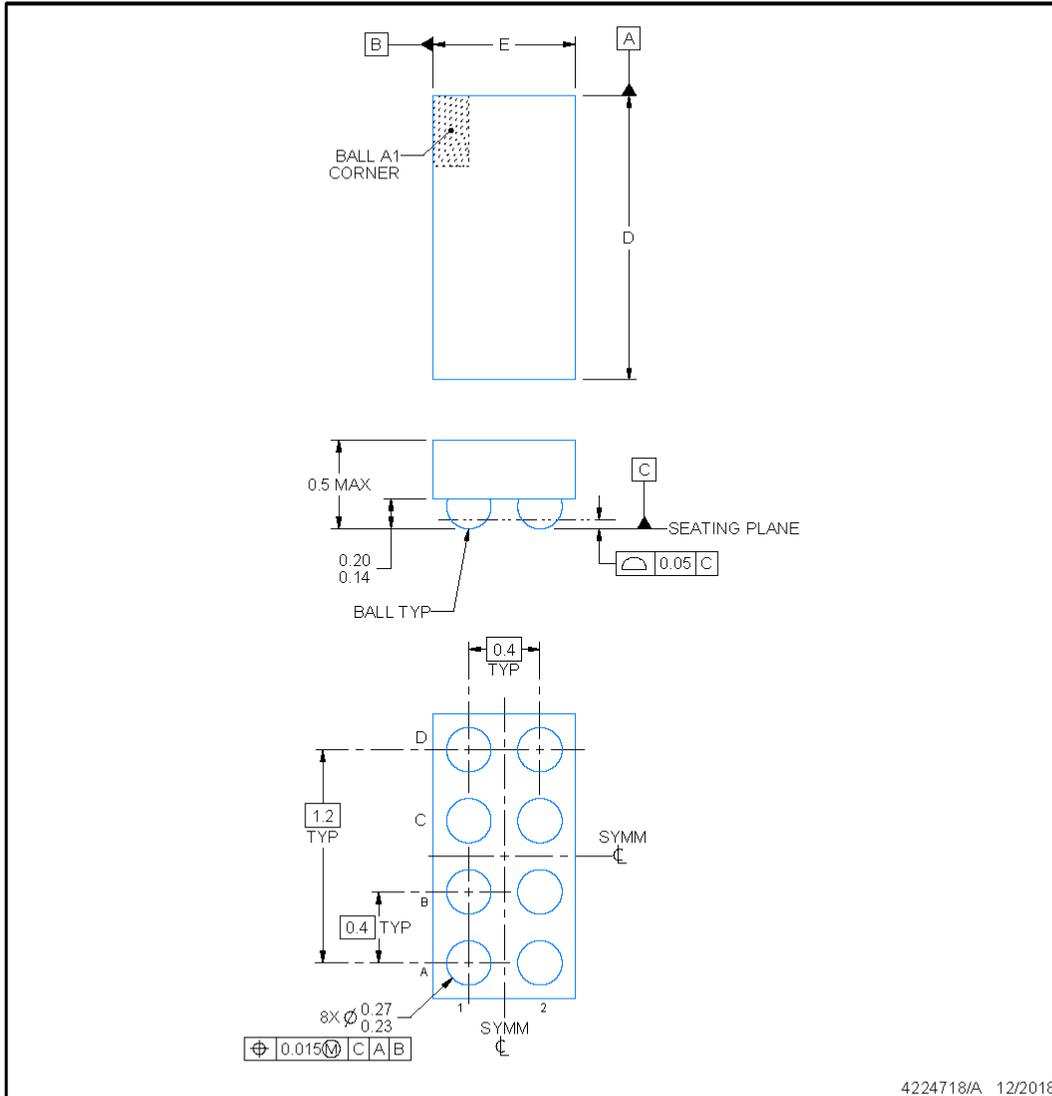
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
PQ25180YBGR	DSBGA	YBG	8	3000	182.0	182.0	20.0
PQ25180YBGT	DSBGA	YBG	8	250	182.0	182.0	20.0

ADVANCE INFORMATION

6.3 Mechanical Data

ADVANCE INFORMATION

YBG0008  **PACKAGE OUTLINE**
DSBGA - 0.5 mm max height
DIE SIZE BALL GRID ARRAY



NOTES:

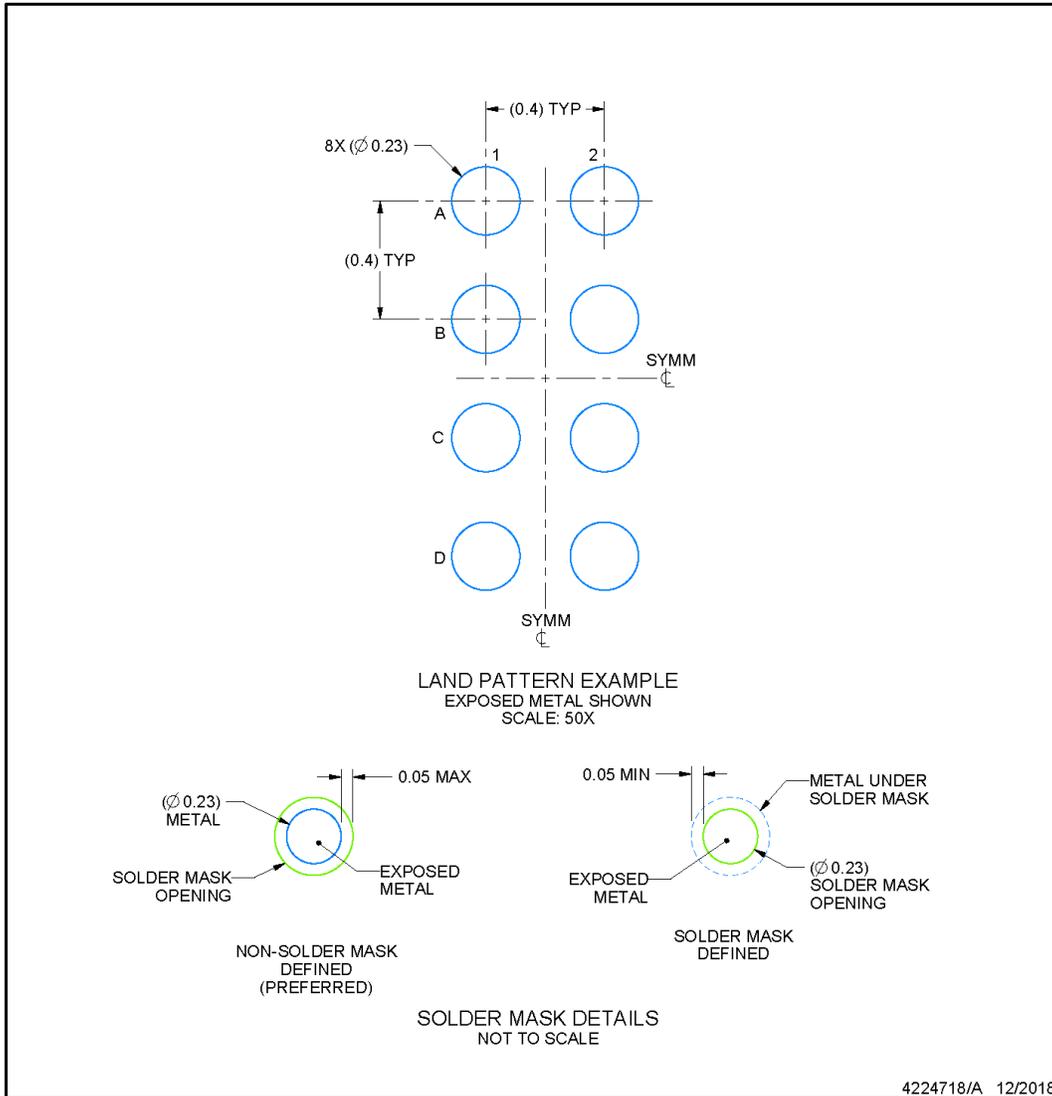
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

EXAMPLE BOARD LAYOUT

YBG0008

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



NOTES: (continued)

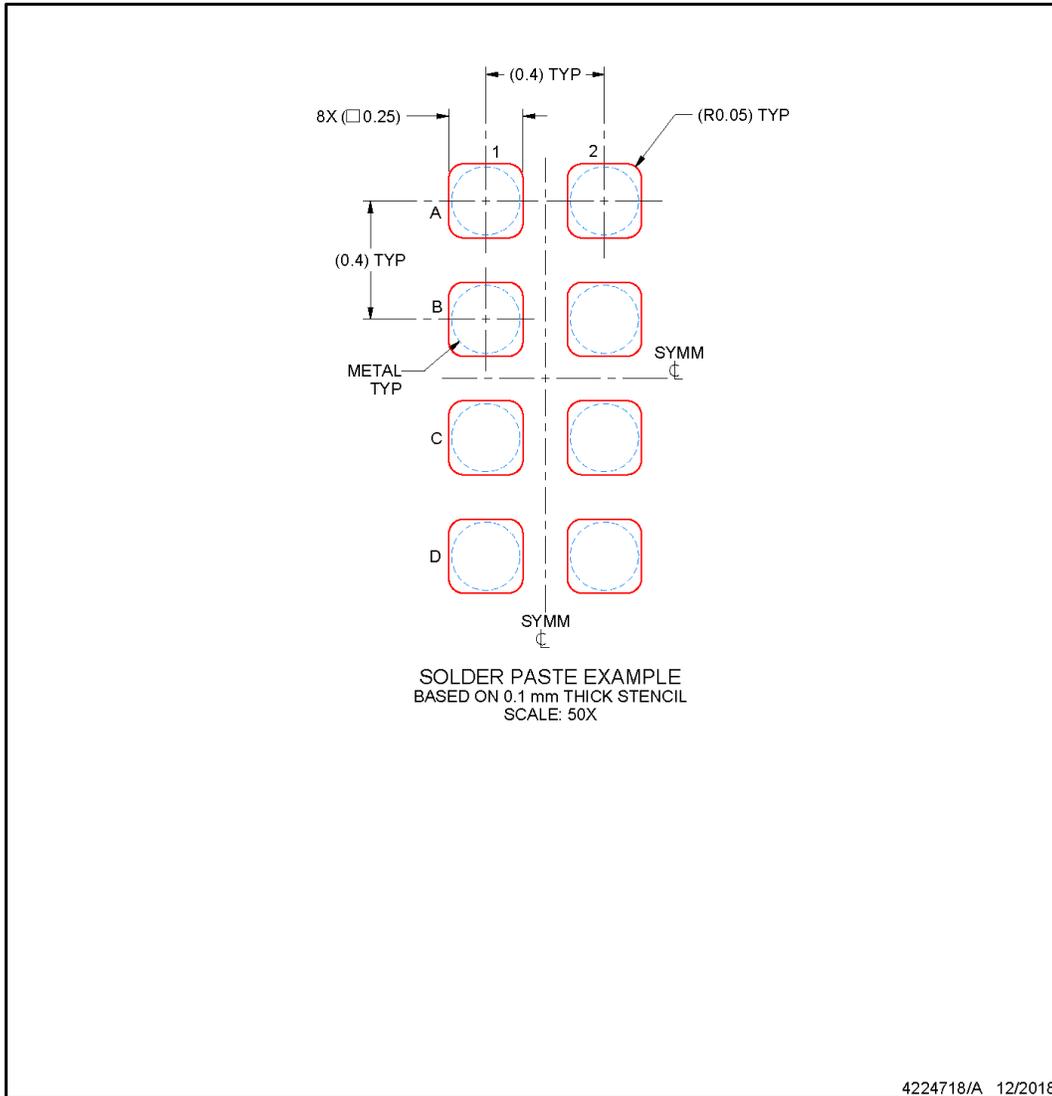
- Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. See Texas Instruments Literature No. SNVA009 (www.ti.com/lit/snva009).

EXAMPLE STENCIL DESIGN

YBG0008

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



NOTES: (continued)

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

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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)
BQ25180YBGR	Active	Production	DSBGA (YBG) 8	3000 LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-40 to 85	B180
BQ25180YBGR.A	Active	Production	DSBGA (YBG) 8	3000 LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-40 to 85	B180

(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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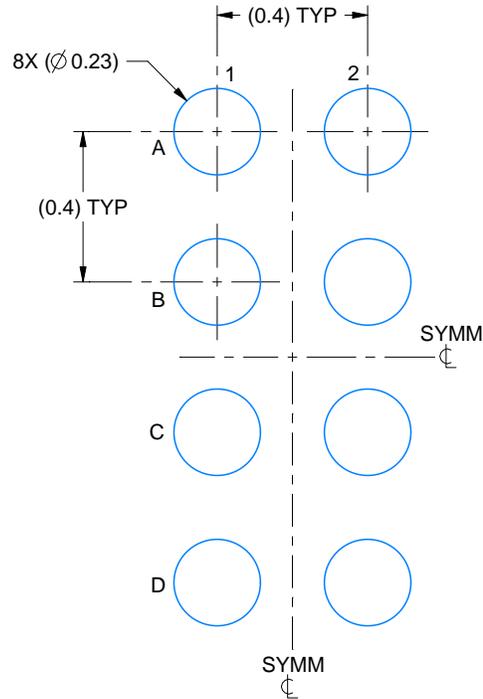
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EXAMPLE BOARD LAYOUT

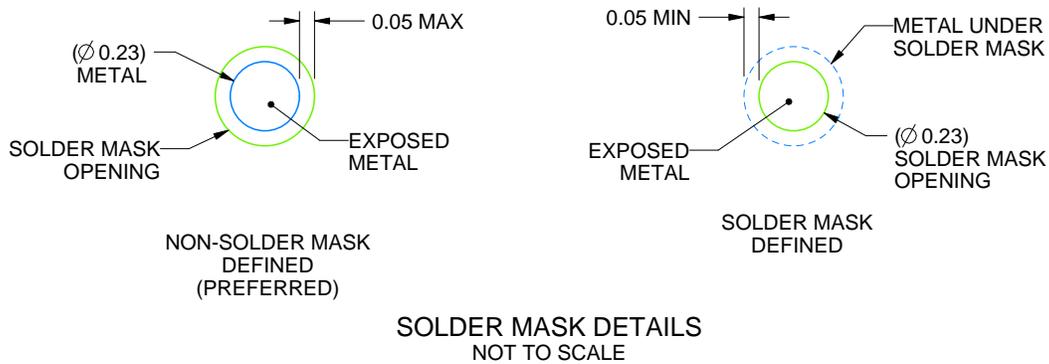
YBG0008

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 50X



SOLDER MASK DETAILS
NOT TO SCALE

4224718/A 12/2018

NOTES: (continued)

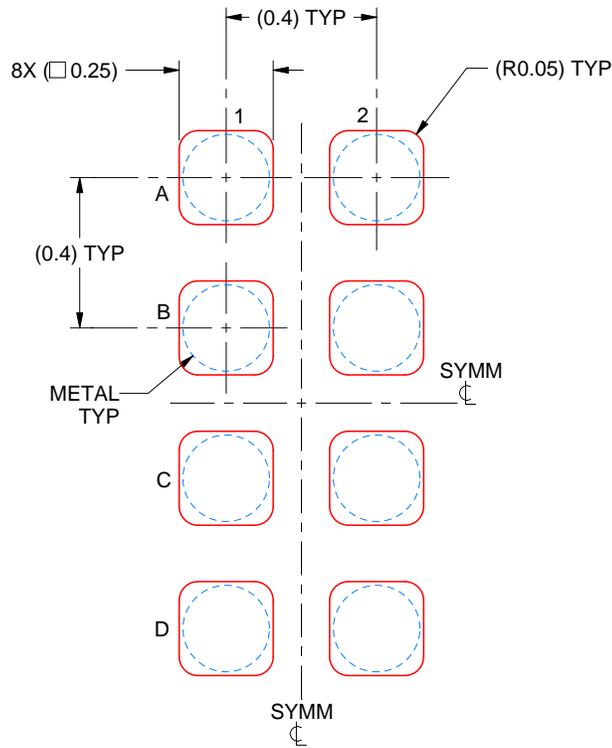
- Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. See Texas Instruments Literature No. SNVA009 (www.ti.com/lit/snva009).

EXAMPLE STENCIL DESIGN

YBG0008

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



SOLDER PASTE EXAMPLE
BASED ON 0.1 mm THICK STENCIL
SCALE: 50X

4224718/A 12/2018

NOTES: (continued)

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

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