

bq24780S 支持电源监视和处理器热量监视的 1 到 4 节混合动力升压模式电池充电控制器

1 特性

- 支持混合动力升压模式的工业创新型充电控制器
 - 适配器和电池一同为系统供电，支持 Intel® CPU Turbo 模式
 - 进入升压模式的超快瞬态响应时间为 150 μ s
 - 混合动力升压模式由 4.5 至 24V 系统供电
 - 1 到 4 节电池由 4.5 至 24V 适配器充电
- 高精度电源和电流监视，实现 CPU 节能
 - 全面的 **PROCHOT** 功能
 - $\pm 2\%$ 电流监视精度
 - $\pm 5\%$ 系统电源监视精度 (PMON)
- 可自动选择适配器或电池作为 NMOS 电源
 - ACFET 在 100 μ s 内快速接通
- 可编程的输入电流、充电电压、充电和放电电流限值
 - $\pm 0.4\%$ 充电电压 (16mV 步长)
 - $\pm 2\%$ 输入电流 (128mA/步长)
 - $\pm 2\%$ 充电电流 (64mA/步长)
 - $\pm 2\%$ 放电电流 (512mA/步长)
- 高集成
 - 电池 LEARN (学习) 功能
 - 电池状态监视器
 - 升压模式指示器
 - 环路补偿
 - BTST 二极管
- 增强了过压保护、过流保护、电池、电感器和 MOSFET 短路保护等安全特性
- 开关频率: 600kHz、800kHz 和 1MHz
- 可对 ILIM 引脚进行实时系统控制以限制充电电流和放电电流
- 适用于 Energy Star 的 0.65mA 适配器待机静态电流

2 应用

- 笔记本、超极本、可拆卸平板电脑和常规平板电脑
- 手持式终端
- 工业用和医疗用设备
- 便携式设备

3 说明

bq24780S 是一款高效同步电池充电器，所含元件数较少，适用于空间受限的多化合物电池充电应用。

bq24780S 器件支持混合动力升压模式（之前称之为“turbo 升压模式”）。当系统电源需求突然超过适配器最大电源水平时，可利用此模式对系统放电。这样适配器就不会受损。

bq24780S 器件利用两个电荷泵分别驱动各 N 通道 MOSFET (ACFET、RBFET 和 BATFET)，以便自动选择系统电源。

系统电源管理微控制器可以通过 SMBus 编程设定具有很高精度的输入电流、充电电流和充电电压 DAC。

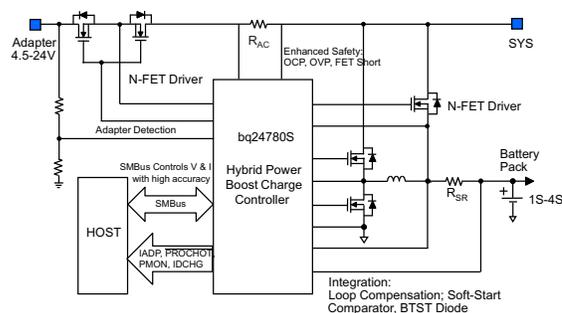
bq24780S 器件可监视适配器电流 (IADP)、电池放电电流 (IDCHG) 和系统电源 (PMON)，以便主机控制 CPU 速度回落，并减少所需系统电源。

bq24780S 器件可对 1/2/3/4 节串联锂离子电池充电。

器件信息(1)

器件型号	封装	封装尺寸 (标称值)
bq24780S	WQFN (28)	4.00 × 4.00mm ²

(1) 如需了解所有可用封装，请见数据表末尾的可订购产品附录。



4 修订历史记录

Changes from Original (April 2015) to Revision A

Page

- 添加了电子邮箱链接，用于请求完整数据表 2



bq24780S

ZHCSDL2A – APRIL 2015 – REVISED APRIL 2015

www.ti.com.cn

可通过以下电子邮箱联系 TI 获取完整数据表: bq24780s_request@list.ti.com。

5 器件和文档支持

5.1 Community Resources

The following links connect to TI community resources. Linked contents are provided *AS IS* by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

TI E2E™ Online Community *TI's Engineer-to-Engineer (E2E) Community*. Created to foster collaboration among engineers. At [e2e.ti.com](#), you can ask questions, share knowledge, explore ideas and help solve problems with fellow engineers.

Design Support *TI's Design Support* Quickly find helpful E2E forums along with design support tools and contact information for technical support.

5.2 商标

E2E is a trademark of Texas Instruments.

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5.3 静电放电警告



ESD 可能会损坏该集成电路。德州仪器 (TI) 建议通过适当的预防措施处理所有集成电路。如果不遵守正确的处理措施和安装程序，可能会损坏集成电路。

ESD 的损坏小至导致微小的性能降级，大至整个器件故障。精密的集成电路可能更容易受到损坏，这是因为非常细微的参数更改都可能会导致器件与其发布的规格不相符。

5.4 术语表

[SLYZ022](#) — *TI* 术语表。

这份术语表列出并解释术语、首字母缩略词和定义。

6 机械封装和可订购信息

以下页中包括机械封装和可订购信息。 这些信息是针对指定器件可提供的最新数据。 这些数据会在无通知且不对本文档进行修订的情况下发生改变。 欲获得该数据表的浏览器版本，请查阅左侧的导航栏。

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)
BQ24780SRUYR	Active	Production	WQFN (RUY) 28	3000 LARGE T&R	Yes	NIPDAU SN	Level-1-260C-UNLIM	-40 to 85	BQ 24780S
BQ24780SRUYR.A	Active	Production	WQFN (RUY) 28	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	BQ 24780S
BQ24780SRUYR.B	Active	Production	WQFN (RUY) 28	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	BQ 24780S
BQ24780SRUYT	Active	Production	WQFN (RUY) 28	250 SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	BQ 24780S
BQ24780SRUYT.A	Active	Production	WQFN (RUY) 28	250 SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	BQ 24780S
BQ24780SRUYT.B	Active	Production	WQFN (RUY) 28	250 SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	BQ 24780S

(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.

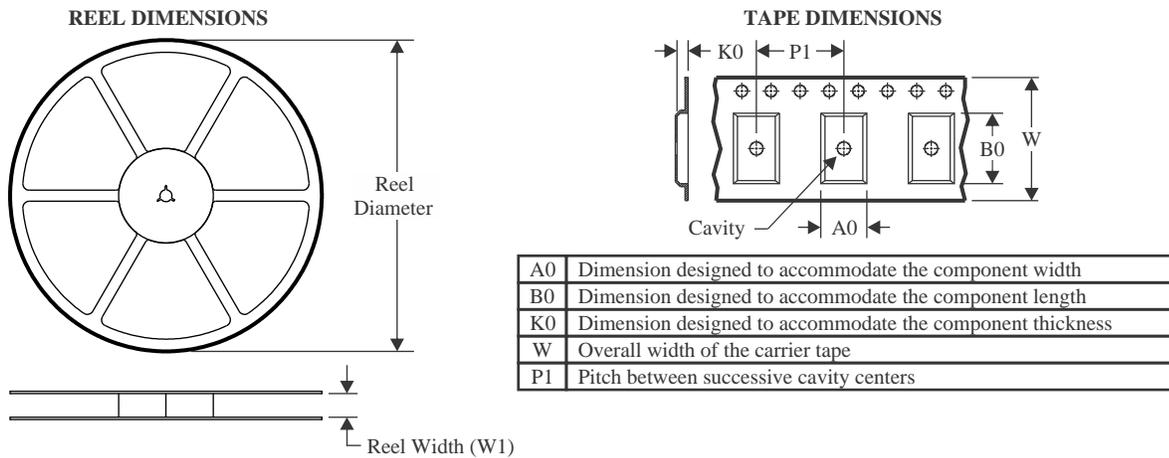
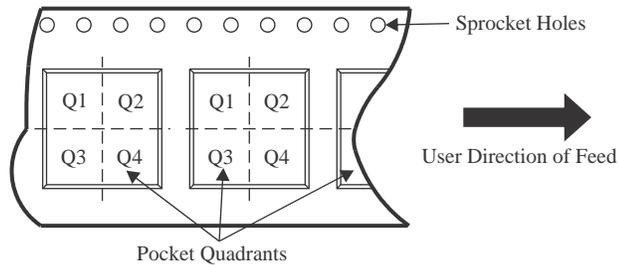
(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will 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.

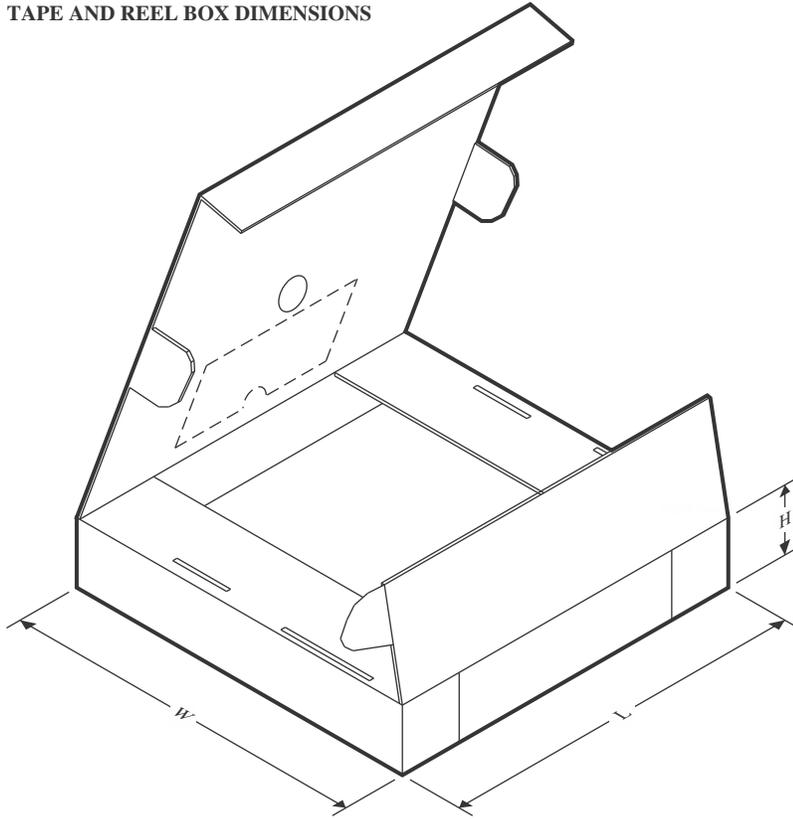
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TAPE AND REEL INFORMATION

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE


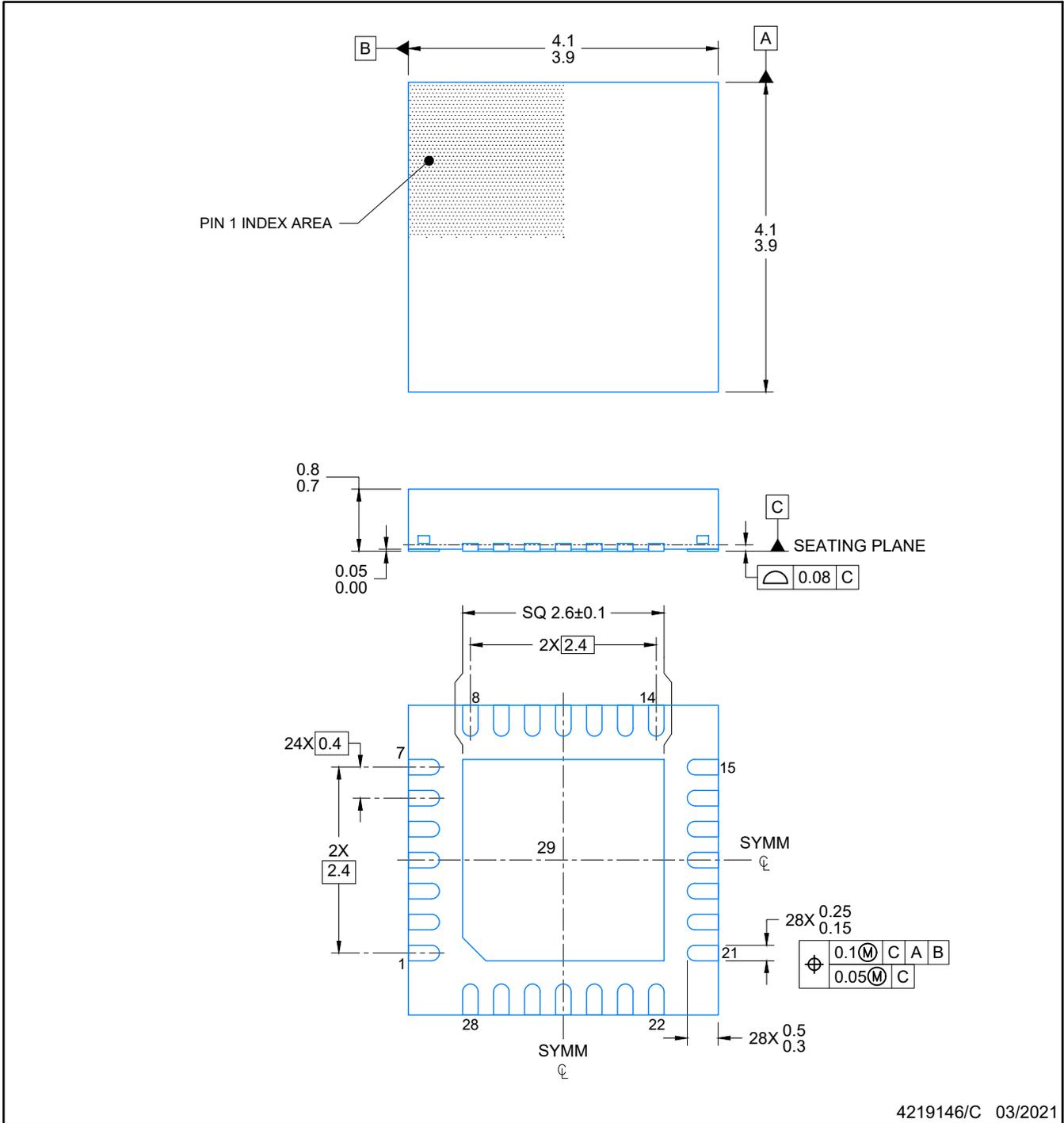
*All dimensions are nominal

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
BQ24780SRUYR	WQFN	RUY	28	3000	330.0	12.4	4.25	4.25	1.15	8.0	12.0	Q2
BQ24780SRUYT	WQFN	RUY	28	250	180.0	12.4	4.25	4.25	1.15	8.0	12.0	Q2

TAPE AND REEL BOX DIMENSIONS


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
BQ24780SRUYR	WQFN	RUY	28	3000	335.0	335.0	25.0
BQ24780SRUYT	WQFN	RUY	28	250	182.0	182.0	20.0



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NOTES:

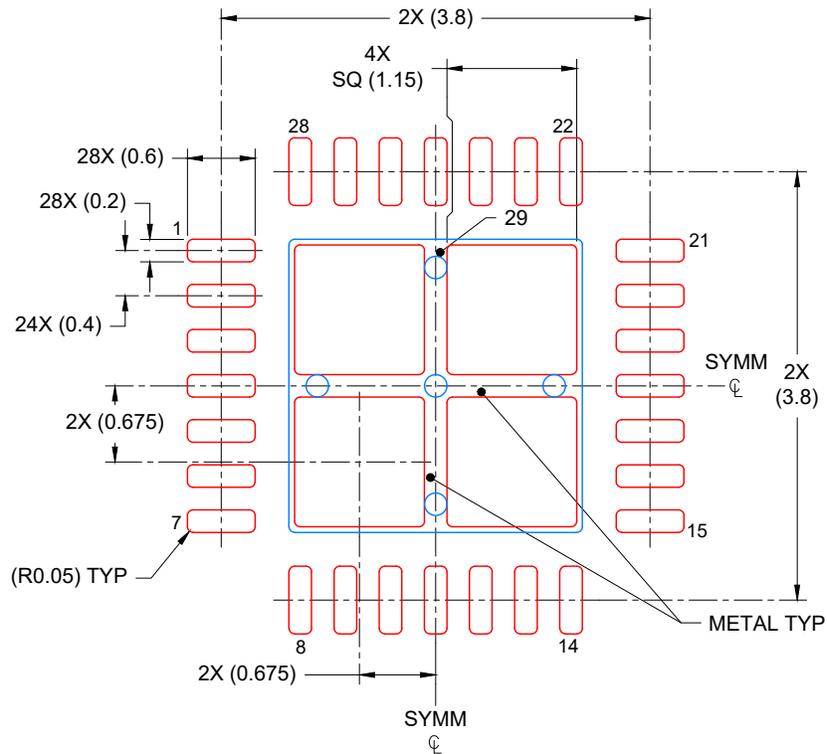
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for optimal thermal and mechanical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

EXAMPLE STENCIL DESIGN

RUY0028A

WQFN - 0.8 mm max height

PLASTIC QUAD FLATPACK-NO LEAD



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD
78% PRINTED COVERAGE BY AREA
SCALE: 15X

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NOTES: (continued)

6. 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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