

LP8873-Q1 汽车显示 LED 背光驱动器 ，具有四个 150mA 通道

1 特性

- 符合面向汽车应用的 AEC-Q100 标准：
 - 器件温度等级 1：
 - -40°C 至 $+125^{\circ}\text{C}$, T_A
- 输入电压工作范围: 3V 至 48V
- 四路高精度电流阱
 - 各通道直流电流最大 150mA
 - 电流匹配度为 1% (典型值)
 - 高调光比 32 000:1, 使用 152Hz LED 输出 PWM 频率
 - 使用 I2C 或 PWM 输入时, 最高 16 位 LED PWM 调光分辨率
 - 支持每个通道的独立 PWM 调光控制
- 自动相移 PWM 调光和直接 PWM 调光
- 混合调光和 12 位模拟调光
- 最高 48V V_{OUT} 升压或 SEPIC 直流/直流转换器
 - 集成 5.4A 开关 FET
 - 支持升压/SEPIC 运行
 - 效率更高, 具有 $60\text{m}\Omega$ $R_{DS(ON)}$ 和快速开关特性
 - 增强可选双随机展频, 可降低 EMI
 - 可调软启动转换器
 - 升压同步输入, 可通过外部时钟设置升压开关频率
 - 禁用升压时, 输出电压自动放电
- 广泛的故障检测和保护
 - 最高 1MHz I²C 控制接口, 带 CRC 校验
 - 对内部配置寄存器和非易失性存储器 (NVM) 的位完整性 (CRC) 错误检测
 - 输入电压 OVP, UVLO 和 OCP
 - 升压过流和过压保护
 - LED 开路、短路和接地故障检测
 - 热警告和热关断
- 解决方案尺寸小、成本低
 - 100kHz 至 2.2MHz 的动态可编程宽开关频率范围
 - 具有可润湿侧翼的 4mm × 4mm HotRod™ QFN 封装

2 应用

- 为以下应用提供背光：
 - 汽车信息娱乐系统与仪表组
 - 智能车镜
 - 中央信息显示屏 (CID)
 - 抬头显示 (HUD)
 - 摄像头监控系统

3 说明

LP8873-Q1 是一款集成了直流/直流电源开关的低 EMI 且易于使用的汽车类高效 LED 驱动器。该直流/直流转换器支持升压和 **SEPIC** 拓扑结构配置。六路高精度电流阱支持根据使用的通道数自动调整 **PWM** 相移。可通过 **I²C** 接口或 **PWM** 输入对 LED 亮度进行全局控制。

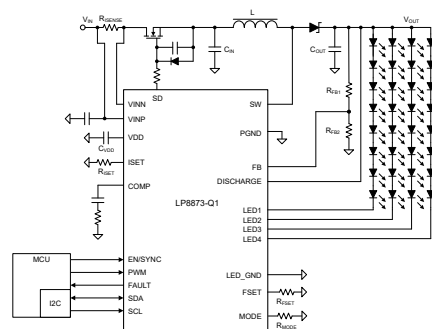
升压转换器基于 LED 电流阱余量电压进行自适应输出电压控制。该特性可在所有条件下将升压电压调节到能够满足需要的最低水平,从而更大限度降低功耗。

LP8873-Q1 支持内置混合 PWM 调光和模拟电流调光，从而可降低 EMI、延长 LED 使用寿命，并提高总光学效率。

器件信息

器件型号 ⁽¹⁾	封装	本体尺寸 (标称值)
LP8873-Q1	HTSSOP (28)	9.70mm × 4.40mm
	QFN (24) ⁽²⁾	4.00mm × 4.00mm

- (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) 产品预发布。



简化版原理图

内容

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4 修订历史记录

注：以前版本的页码可能与当前版本的页码不同

日期	修订版本	注释
July 2025	*	初始发行版

5 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可用的最新数据。数据如有变更，恕不另行通知，且不会对此文档进行修订。有关此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)
LP8873QPWPRQ1	Active	Production	HTSSOP (PWP) 28	2500 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	LP8873Q
LP8873QRBBRQ1	Active	Production	VQFN-HR (RBB) 24	3000 LARGE T&R	-	SN	Level-2-260C-1 YEAR	-40 to 125	LP8873Q

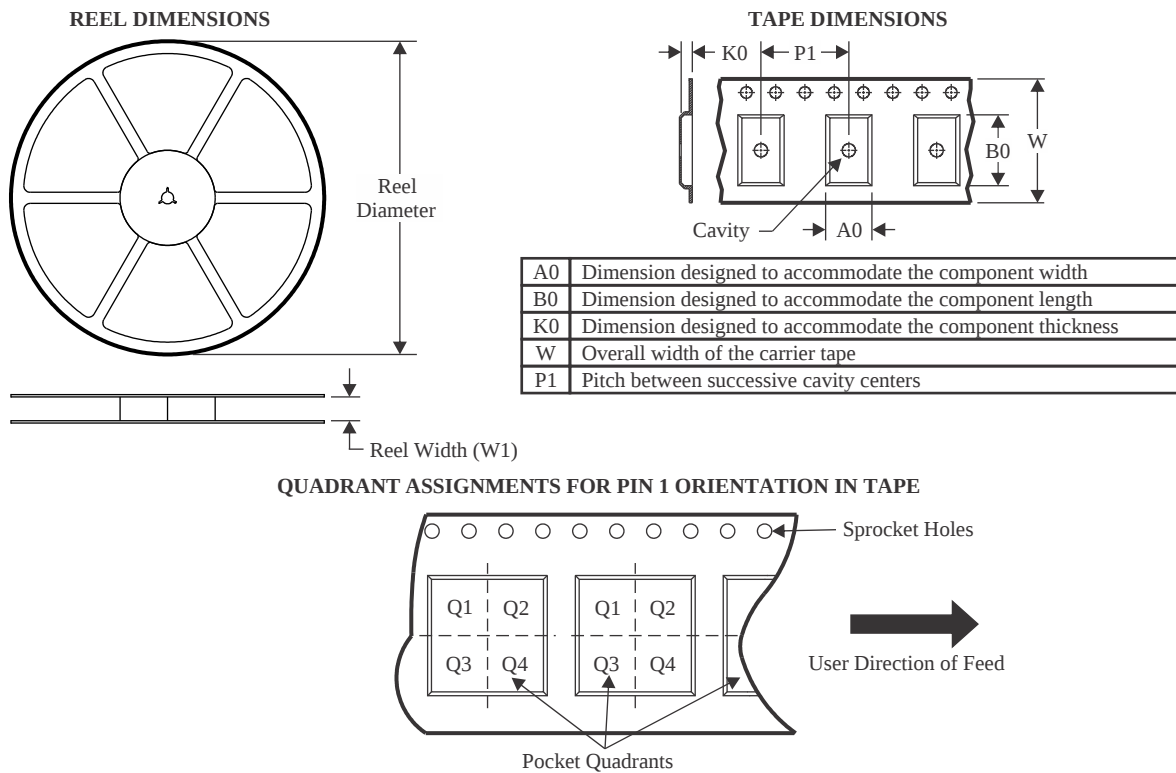
- ⁽¹⁾ **Status:** For more details on status, see our [product life cycle](#).
- ⁽²⁾ **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, 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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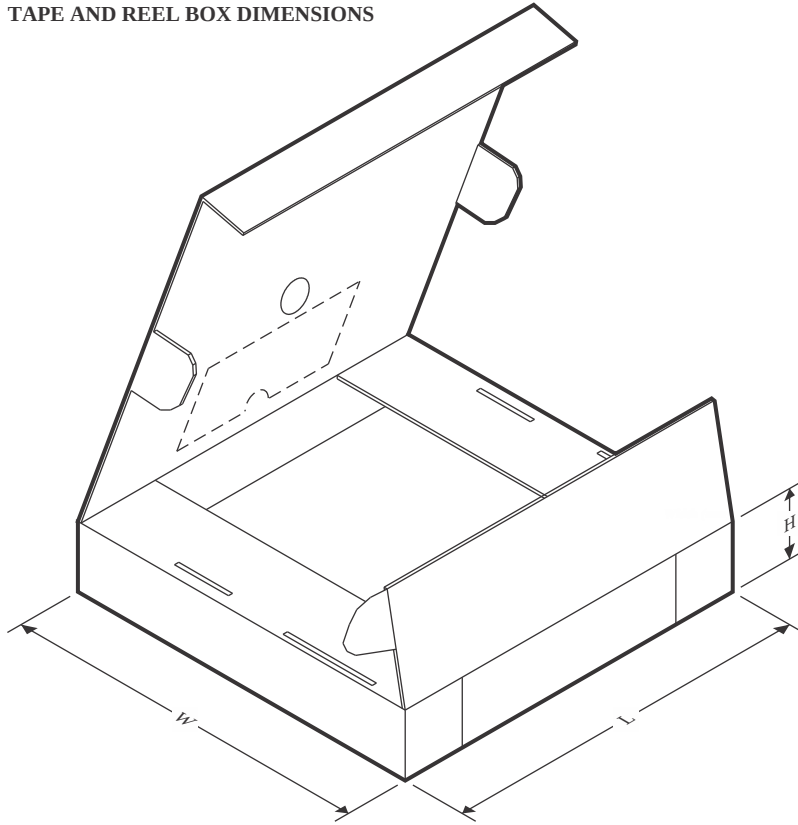
TAPE AND REEL INFORMATION



*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
LP8873QPWPRQ1	HTSSOP	PWP	28	2500	330.0	16.4	6.9	10.2	1.8	12.0	16.0	Q1
LP8873QRBBRQ1	VQFN-HR	RBB	24	3000	330.0	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)
LP8873QPWPRQ1	HTSSOP	PWP	28	2500	353.0	353.0	32.0
LP8873QRBBRQ1	VQFN-HR	RBB	24	3000	360.0	360.0	36.0

GENERIC PACKAGE VIEW

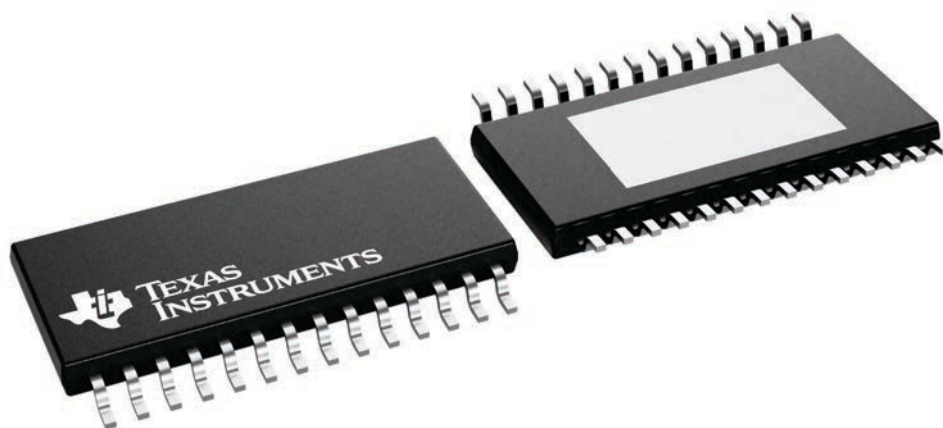
PWP 28

PowerPAD™ TSSOP - 1.2 mm max height

4.4 x 9.7, 0.65 mm pitch

SMALL OUTLINE PACKAGE

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



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PowerPAD™ TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



PowerPAD is a trademark of Texas Instruments.

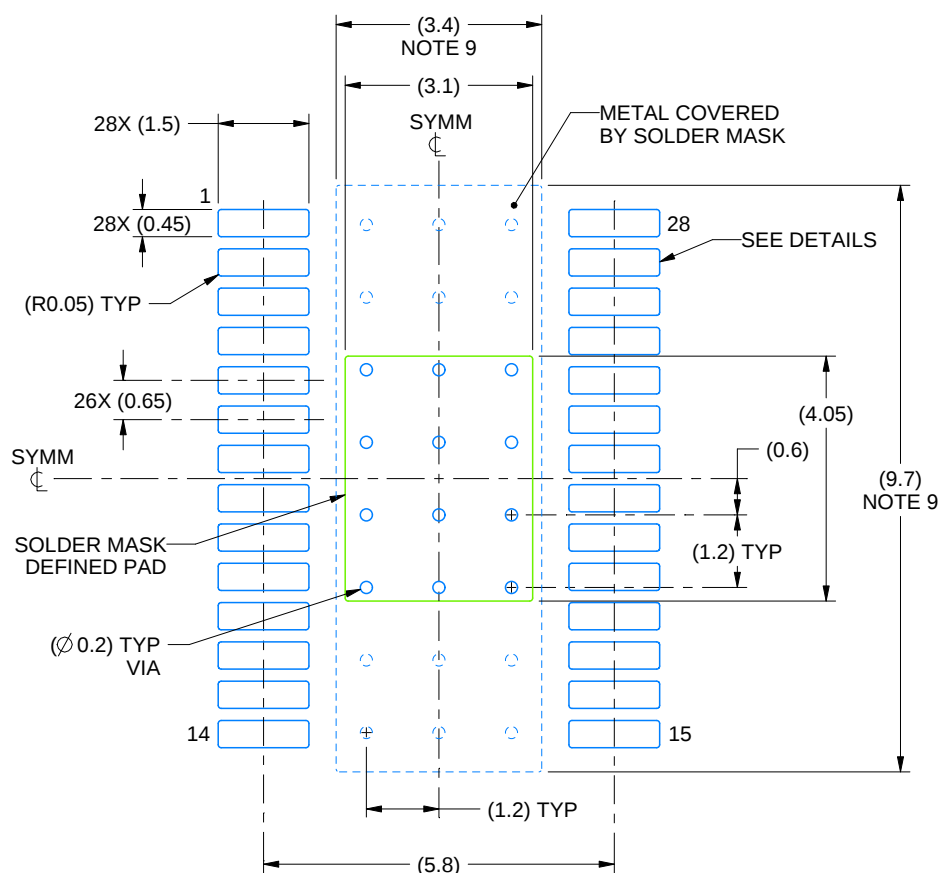
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EXAMPLE BOARD LAYOUT

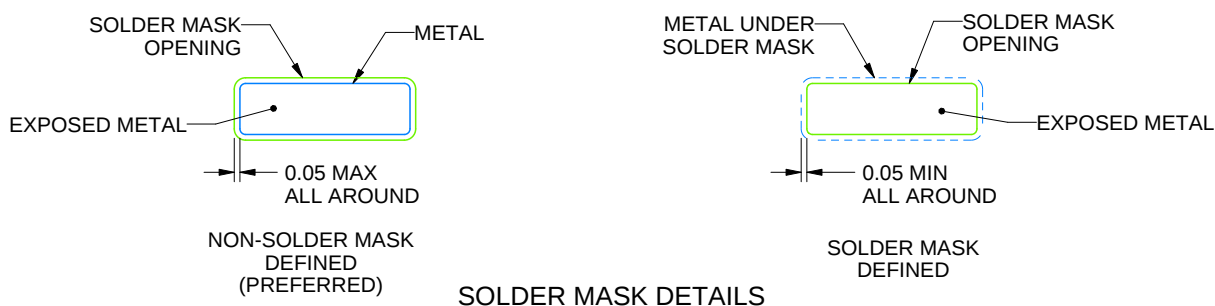
PWP0028M

PowerPAD™ TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 8X



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NOTES: (continued)

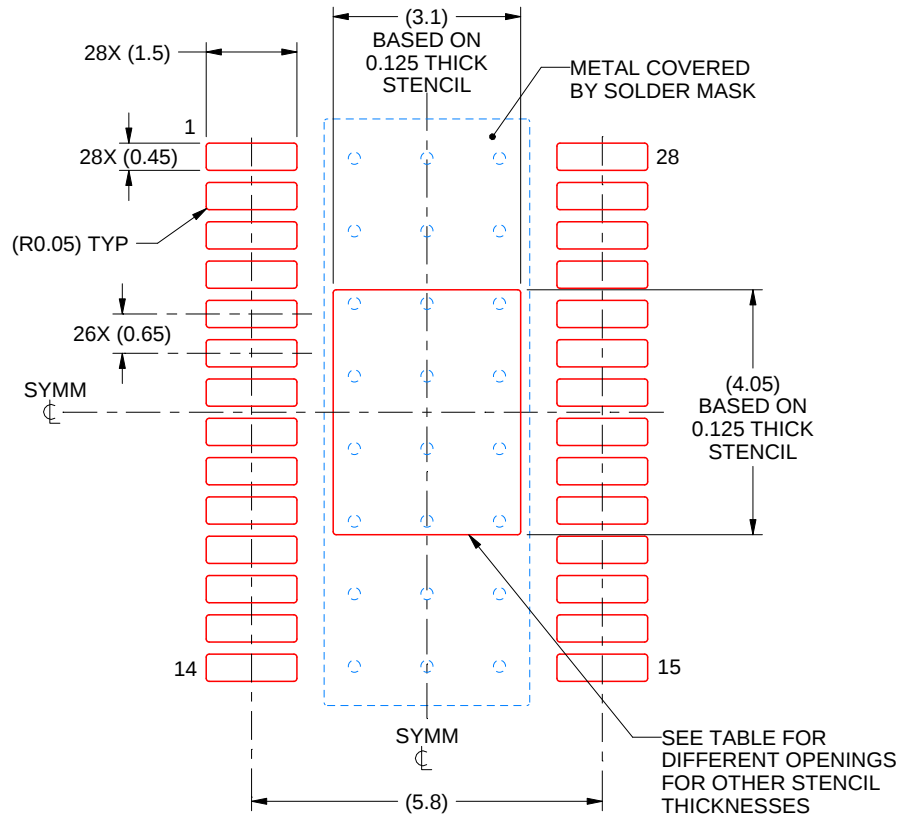
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.
8. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature numbers SLMA002 (www.ti.com/lit/slma002) and SLMA004 (www.ti.com/lit/slma004).
9. Size of metal pad may vary due to creepage requirement.
10. Vias are optional depending on application, refer to device data sheet. It is recommended that vias under paste be filled, plugged or tented.

EXAMPLE STENCIL DESIGN

PWP0028M

PowerPAD™ TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 8X

STENCIL THICKNESS	SOLDER STENCIL OPENING
0.1	3.47 X 4.53
0.125	3.10 X 4.05 (SHOWN)
0.15	2.83 X 3.70
0.175	2.62 X 3.42

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NOTES: (continued)

11. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
12. Board assembly site may have different recommendations for stencil design.

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