



CSD85302L 20V 双路 N 沟道 NexFET™ 功率 MOSFET

1 特性

- 共漏极配置
- 低导通电阻
- 1.35mm × 1.35mm 小外形封装
- 无铅且无卤素
- 符合 RoHS 标准
- 人体放电模式 (HBM) 静电放电 (ESD) 保护 > 2.5kV

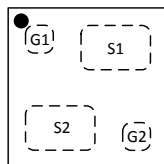
2 应用

- USB Type-C/PD
- 电池管理
- 电池保护

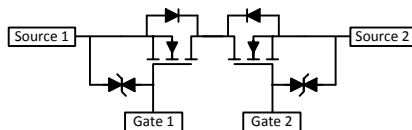
3 说明

这款 20V、18.7mΩ、采用 1.35mm × 1.35mm 接合栅格阵列 (LGA) 封装的双路 NexFET™ 功率金属氧化物半导体场效应晶体管 (MOSFET) 设计为在最小外形尺寸中最大限度地降低电阻。该器件的外形尺寸较小并采用共漏极配置，非常适合小型手持设备中由电池供电的应用。

俯视图



配置



产品概要

T _A =25°C		典型值		单位
V _{S1S2}	源电压	20		V
Q _g	栅极电荷总量 (4.5V)	6		nC
Q _{gd}	栅极电荷 (栅极到漏极)	1.4		nC
R _{S1S2(on)}	源源导通电阻	V _{GS} = 2.5V	29	mΩ
		V _{GS} = 4.5V	20	mΩ
		V _{GS} = 6.5V	18.7	mΩ
V _{GS(th)}	阈值电压	0.9		V

订购信息⁽¹⁾

器件	数量	包装介质	封装	运输
CSD85302L	3000	7 英寸卷带	1.35mm × 1.35mm 接合栅格阵列 (LGA) 封装	卷带封装
CSD85302LT	250			

(1) 要了解所有可用封装，请见数据表末尾的可订购产品附录。

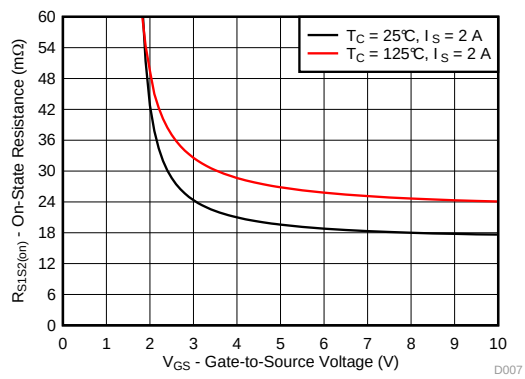
绝对最大额定值

T _A = 25°C		值	单位
V _{S1S2}	源电压	20	V
V _{GS}	栅源电压	±10	V
I _S	持续源极电流 ⁽¹⁾	7	A
I _{SM}	脉冲源极电流 ⁽²⁾	37	A
P _D	功率耗散 ⁽¹⁾	1.7	W
V _(ESD)	人体放电模式 (HBM)	2.5	kV
T _J , T _{stg}	运行结温和储存温度范围	-55 至 150	°C

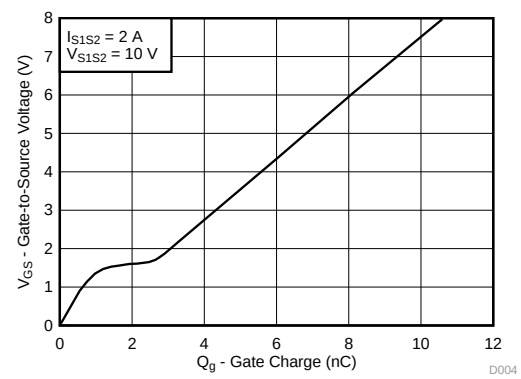
- (1) R_{θJA} = 75°C/W，这是在厚度为 0.06 英寸的环氧板 (FR4) 印刷电路板 (PCB) 上的 1 英寸² 2 盎司的铜过渡垫片上测得的典型值。
- (2) R_{θJA} = 90°C/W (最大值)，脉冲持续时间 ≤ 100μs，占空比 ≤ 1%



$R_{DS(on)}$ 与 V_{GS} 间的关系



栅极电荷



目录

1	特性	1	6.1	社区资源	8
2	应用	1	6.2	商标	8
3	说明	1	6.3	静电放电警告	8
4	修订历史记录	3	6.4	Glossary	8
5	Specifications	4	7	机械、封装和可订购信息	9
	5.1 Electrical Characteristics	4	7.1	封装尺寸	9
	5.2 Thermal Information	4	7.2	推荐的 PCB 布局	10
	5.3 Typical MOSFET Characteristics	5	7.3	推荐的模板布局	10
6	器件和文档支持	8	7.4	Q3A 卷带信息	11

4 修订历史记录

日期	修订版本	注释
2015 年 11 月	*	最初发布。

5 Specifications

5.1 Electrical Characteristics

(T_A = 25°C unless otherwise stated)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
STATIC CHARACTERISTICS						
BV _{S1S2}	Source-to-source voltage	V _{GS} = 0 V, I _S = 250 μA	20			V
I _{S1S2}	Source-to-source leakage current	V _{GS} = 0 V, V _{S1S2} = 16 V			1	μA
I _{GSS}	Gate-to-source leakage current	V _{S1S2} = 0 V, V _{GS} = 6 V			0.5	μA
		V _{S1S2} = 0 V, V _{GS} = 10V			4	μA
V _{GS(th)}	Gate-to-source threshold voltage	V _{S1S2} = V _{GS} , I _S = 250 μA	0.68	0.9	1.3	V
R _{S1S2(on)}	Source-to-source on-resistance	V _{GS} = 2.5 V, I _S = 2 A	20	29	36	mΩ
		V _{GS} = 4.5 V, I _S = 2 A	14	20	24	mΩ
		V _{GS} = 6.5 V, I _S = 2 A	13	18.7	22.5	mΩ
g _{fs}	Transconductance	V _{S1S2} = 2 V, I _S = 2 A		19		S
DYNAMIC CHARACTERISTICS⁽¹⁾						
C _{iss}	Input capacitance	V _{GS} = 0 V, V _{S1S2} = 10 V, f = 1 MHz		718	933	pF
C _{oss}	Output capacitance			92	120	pF
C _{rss}	Reverse transfer capacitance			61	79	pF
Q _g	Gate charge total (4.5 V)	V _{S1S2} = 10 V, I _S = 2 A		6.0	7.8	nC
Q _{gd}	Gate charge gate-to-drain			1.4		nC
Q _{gs}	Gate charge gate-to-source			1.2		nC
Q _{g(th)}	Gate charge at V _{th}			0.6		nC
Q _{oss}	Output charge	V _{S1S2} = 10 V, V _{GS} = 0 V		2.3		nC
t _{d(on)}	Turn-on delay time	V _{S1S2} = 10 V, V _{GS} = 4.5 V, I _{S1S2} = 2 A, R _G = 0 Ω		37		ns
t _r	Rise time			54		ns
t _{d(off)}	Turn-off delay time			173		ns
t _f	Fall time			99		ns

(1) Charge and timing values specified are per single FET.

5.2 Thermal Information

(T_A = 25°C unless otherwise stated)

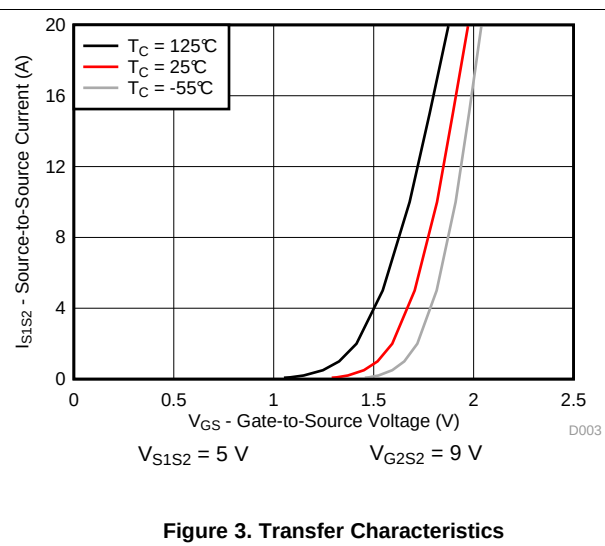
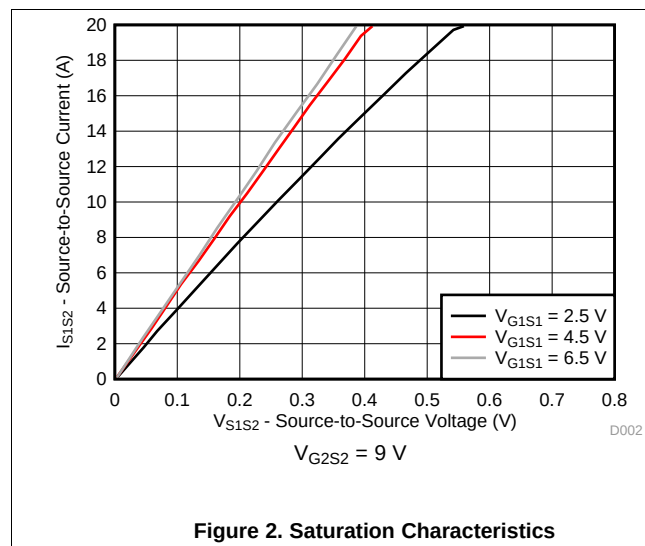
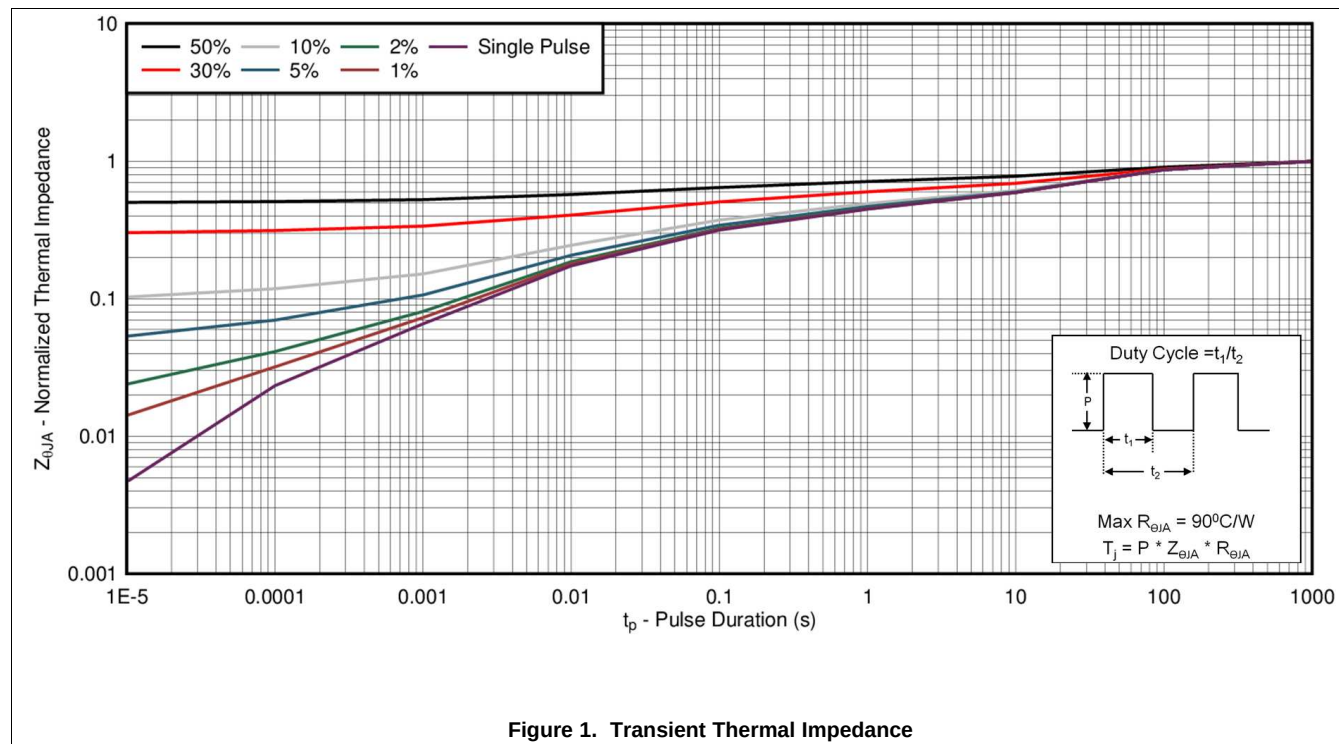
THERMAL METRIC		MIN	TYP	MAX	UNIT
R _{θJA}	Junction-to-ambient thermal resistance ⁽¹⁾		75		°C/W
	Junction-to-ambient thermal resistance ⁽²⁾		175		°C/W

(1) Device mounted on FR4 material with 1 inch² (6.45 cm²), 2 oz. (0.071 mm thick) Cu.

(2) Device mounted on FR4 material with minimum Cu mounting area.

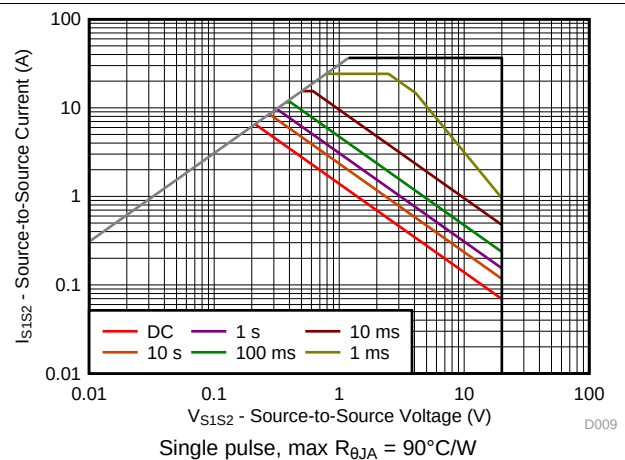
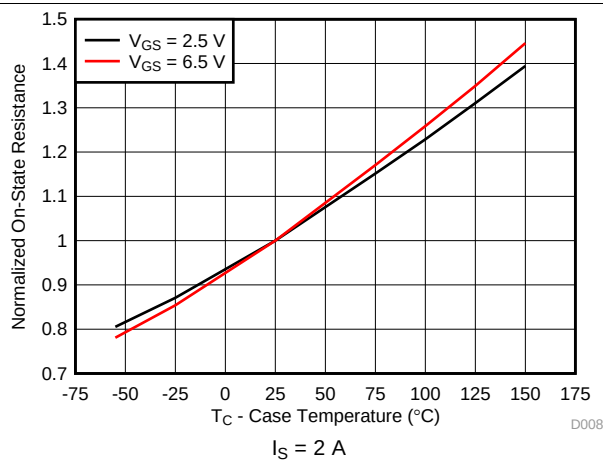
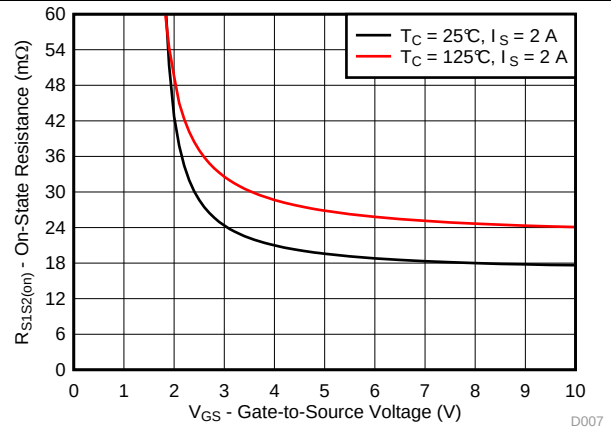
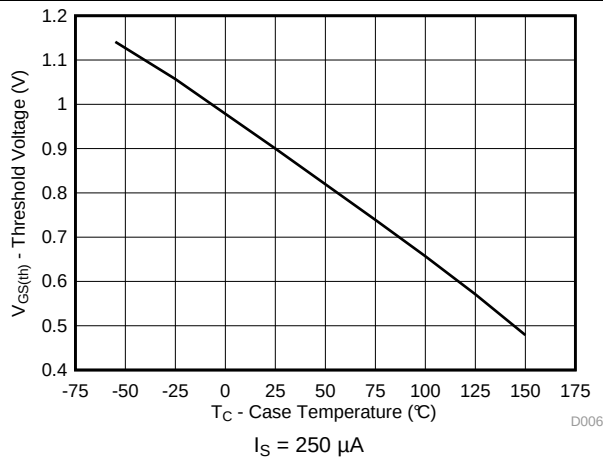
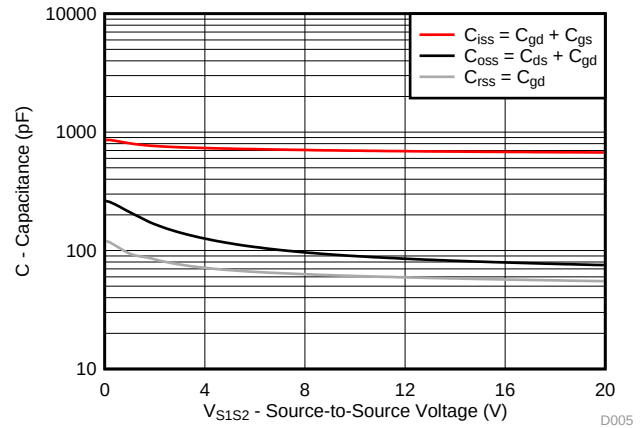
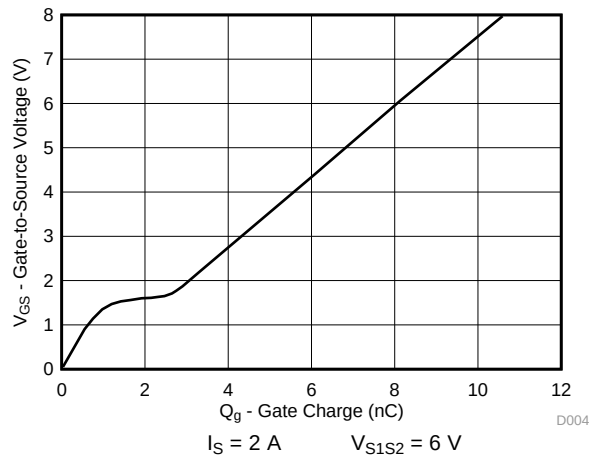
5.3 Typical MOSFET Characteristics

($T_A = 25^\circ\text{C}$ unless otherwise stated)



Typical MOSFET Characteristics (continued)

($T_A = 25^\circ\text{C}$ unless otherwise stated)



Typical MOSFET Characteristics (continued)

($T_A = 25^\circ\text{C}$ unless otherwise stated)

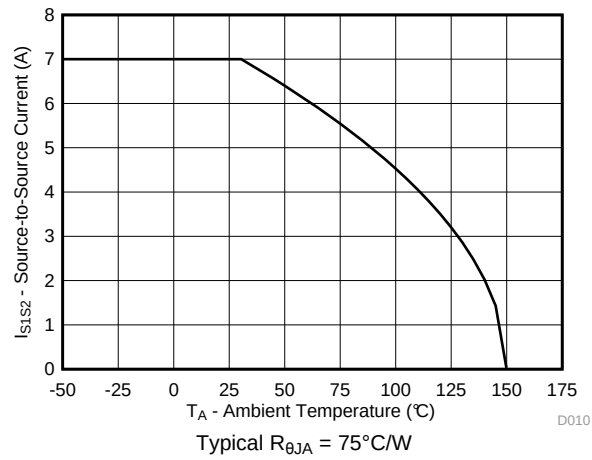


Figure 10. Maximum Source Current vs Temperature

6 器件和文档支持

6.1 社区资源

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.

6.2 商标

NexFET, E2E are trademarks of Texas Instruments.
All other trademarks are the property of their respective owners.

6.3 静电放电警告



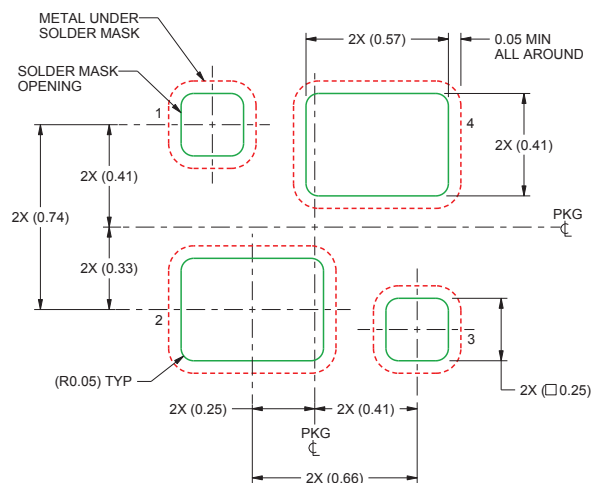
这些装置包含有限的内置 ESD 保护。存储或装卸时，应将导线一起截短或将装置放置于导电泡棉中，以防止 MOS 门极遭受静电损伤。

6.4 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

7.2 推荐的 PCB 布局

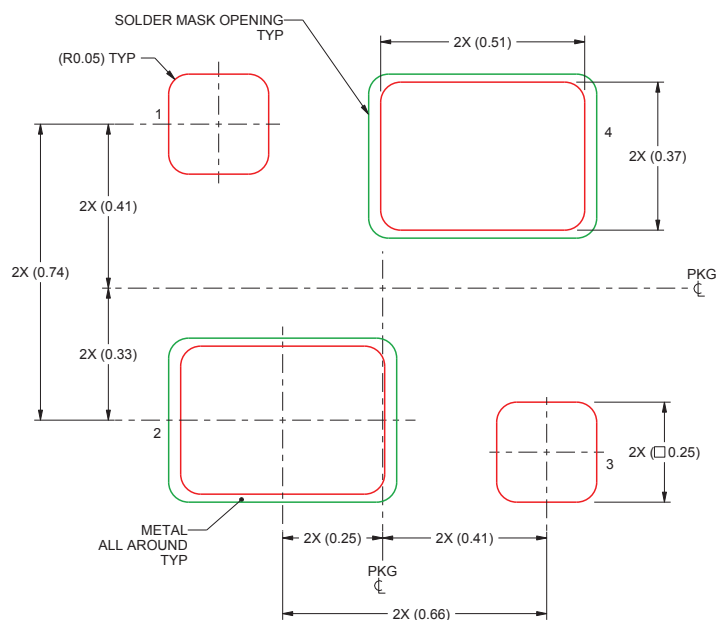


焊盘图案示例

焊接掩模

标度: 50X

7.3 推荐的模板布局



焊膏示例

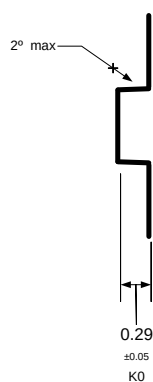
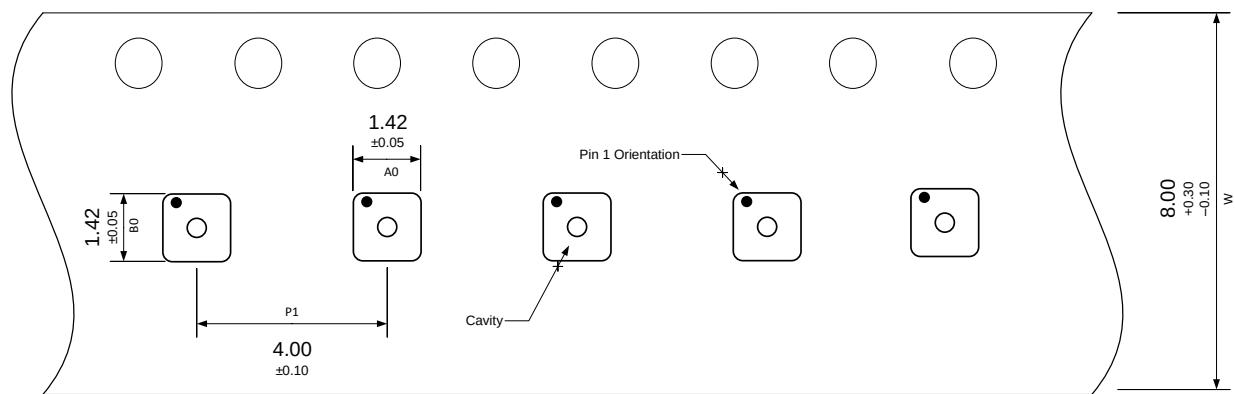
基于厚度为 0.1mm 的模板

焊盘 2 和 4: 按焊接面积的 81% 印刷

标度: 80X

1. 所有线性尺寸的单位均为毫米。
2. 具有漏斗形壁和圆角的激光切割窗孔将提供更佳的焊锡膏脱离。IPC-7525 可能提供其他替代性设计建议。

7.4 Q3A 卷带信息



All Measurements in
Millimeters (mm)

- Notes:
1. 10 链轮孔距累积容差 ± 0.2
 2. 每 100mm 长度的翘曲不能超过 1mm，在 250mm 长度上不累积
 3. 材料：黑色抗静电聚苯乙烯
 4. MSL1 260°C（红外 (IR) 和传导）PbF 回流焊兼容

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)
CSD85302L	Active	Production	PICOSTAR (YME) 4	3000 LARGE T&R	Yes	NIAU	Level-1-260C-UNLIM	-55 to 150	85302
CSD85302L.B	Active	Production	PICOSTAR (YME) 4	3000 LARGE T&R	Yes	NIAU	Level-1-260C-UNLIM	-55 to 150	85302
CSD85302LT	Active	Production	PICOSTAR (YME) 4	250 SMALL T&R	Yes	NIAU	Level-1-260C-UNLIM	-55 to 150	85302
CSD85302LT.B	Active	Production	PICOSTAR (YME) 4	250 SMALL T&R	Yes	NIAU	Level-1-260C-UNLIM	-55 to 150	85302

⁽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.

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.

重要通知和免责声明

TI“按原样”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、与某特定用途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、安保法规或其他要求。

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 产品的相关应用。严禁以其他方式对这些资源进行复制或展示。您无权使用任何其他 TI 知识产权或任何第三方知识产权。对于因您对这些资源的使用而对 TI 及其代表造成的任何索赔、损害、成本、损失和债务，您将全额赔偿，TI 对此概不负责。

TI 提供的产品受 [TI 销售条款](#)、[TI 通用质量指南](#) 或 [ti.com](#) 上其他适用条款或 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。除非德州仪器 (TI) 明确将某产品指定为定制产品或客户特定产品，否则其产品均为按确定价格收入目录的标准通用器件。

TI 反对并拒绝您可能提出的任何其他或不同的条款。

版权所有 © 2025，德州仪器 (TI) 公司

最后更新日期：2025 年 10 月