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

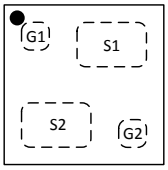
2 应用

- USB Type-C/PD
- 电池管理
- 电池保护

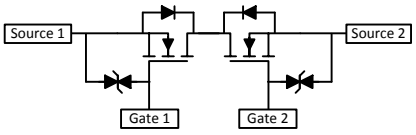
3 说明

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) $R_{\theta JA}$ = 75℃/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) $R_{\theta JA}$ = 90℃/W（最大值），脉冲持续时间 ≤ 100μs，占空比 ≤ 1%

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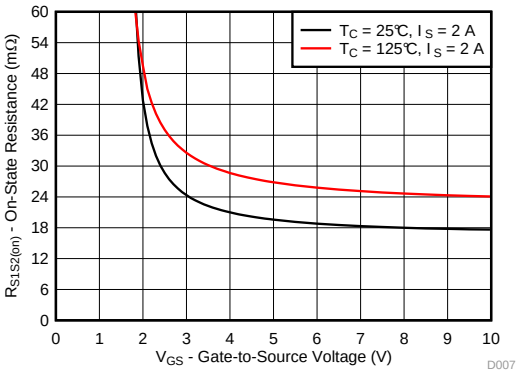
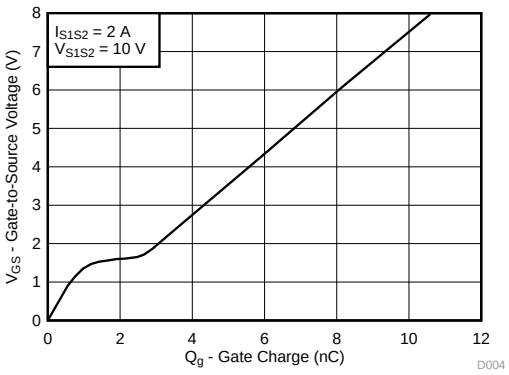
$R_{DS(on)}$ 与 V_{GS} 间的关系



栅极电荷



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目录

4 修订历史记录

日期	修订版本	注释
2015 年 11 月	*	最初发布。

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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
$R_{\theta JA}$	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 $inch^2$ (6.45 cm^2), 2 oz. (0.071 mm thick) Cu.
(2) Device mounted on FR4 material with minimum Cu mounting area.

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5.3 Typical MOSFET Characteristics

(T_A = 25°C unless otherwise stated)

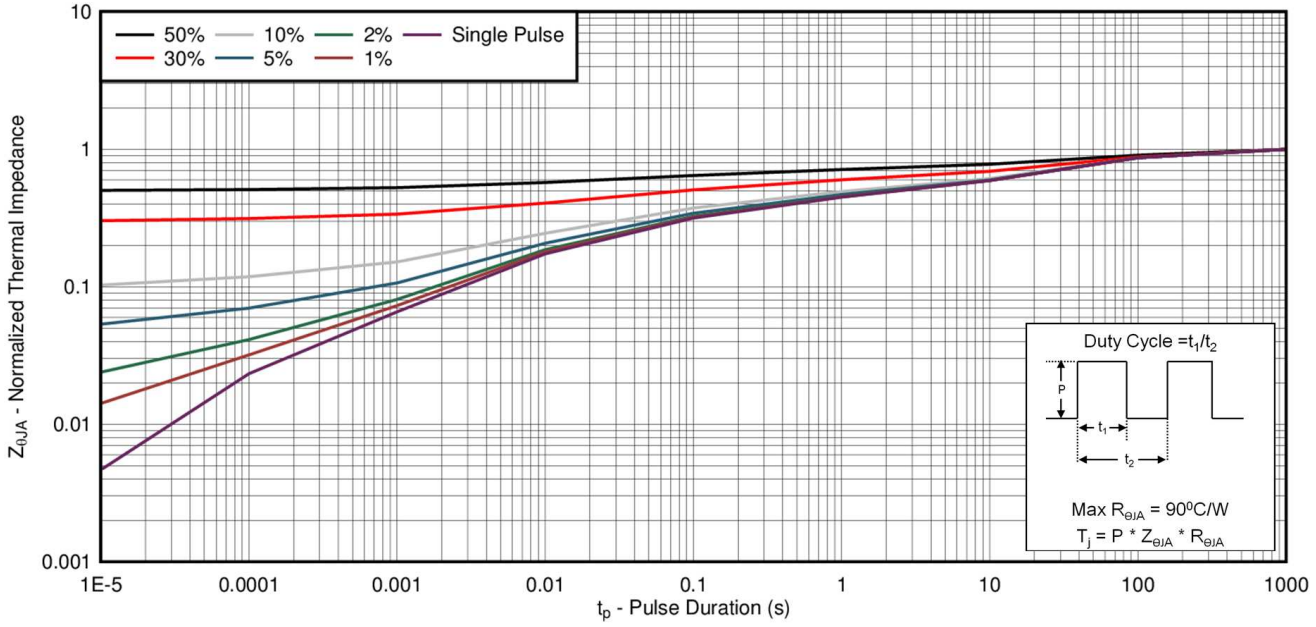

Figure 1. Transient Thermal Impedance

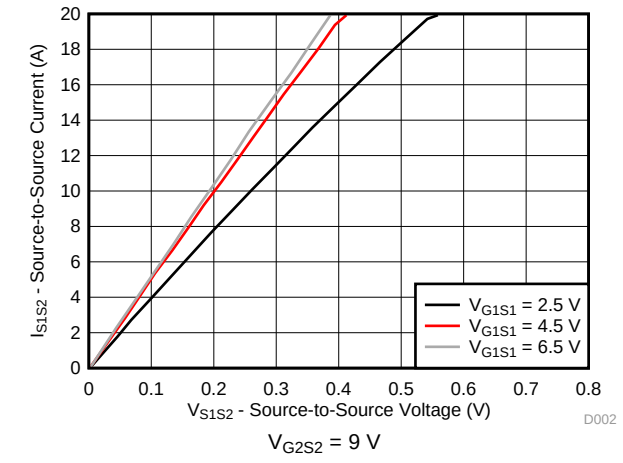

Figure 2. Saturation Characteristics

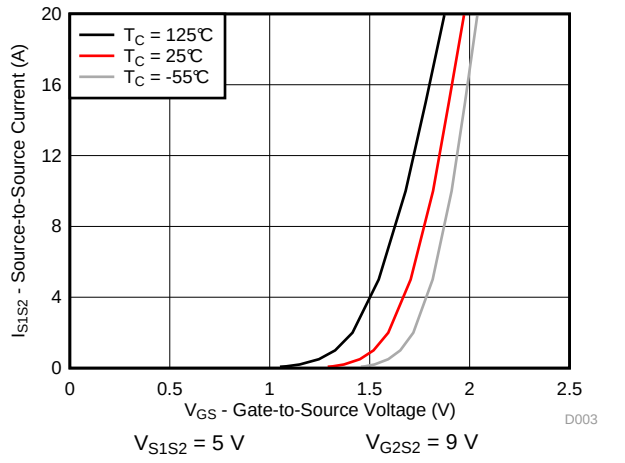

Figure 3. Transfer Characteristics

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Typical MOSFET Characteristics (continued)

(T_A = 25°C unless otherwise stated)

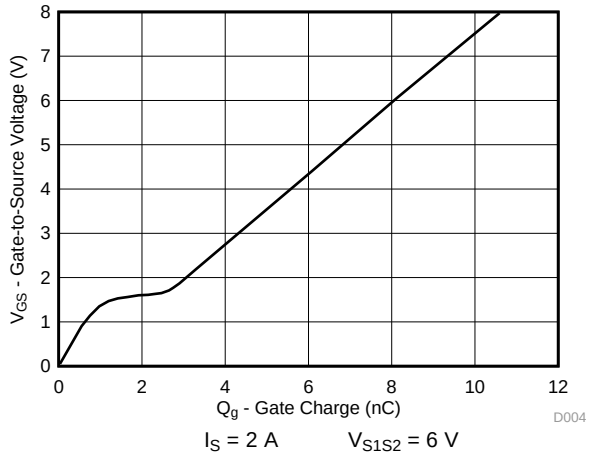

Figure 4. Gate Charge

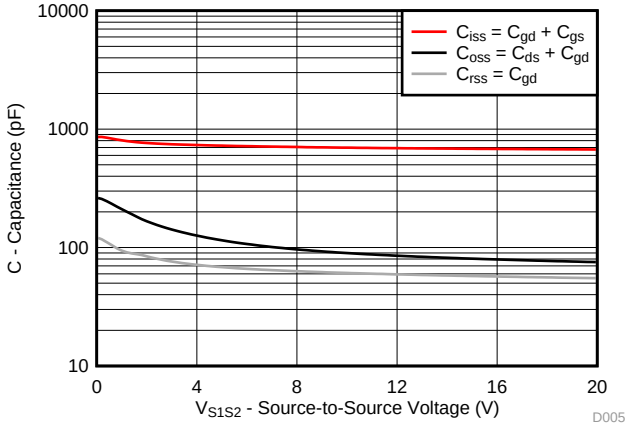

Figure 5. Capacitance

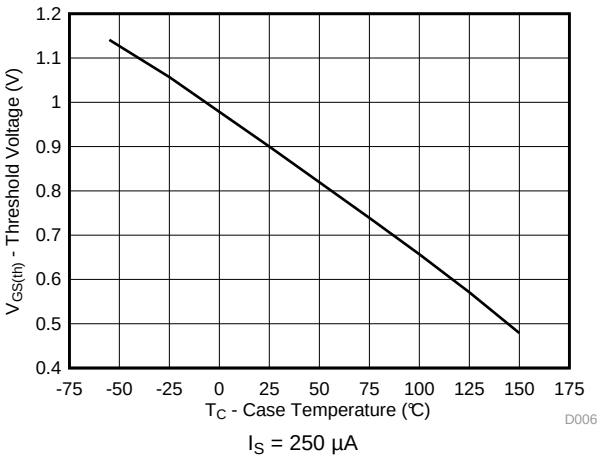

Figure 6. Threshold Voltage vs Temperature

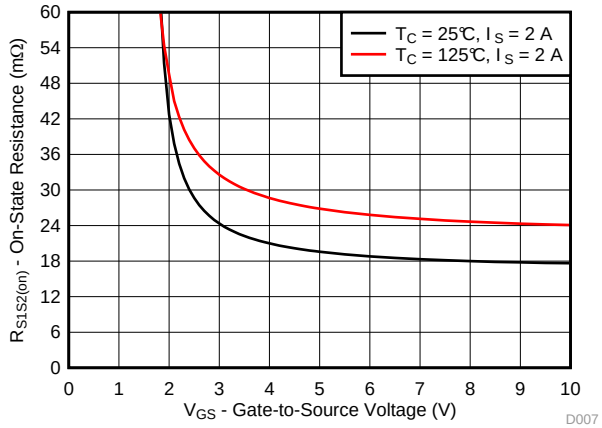

Figure 7. On-State Source-to-Source Resistance vs Gate-to-Source Voltage

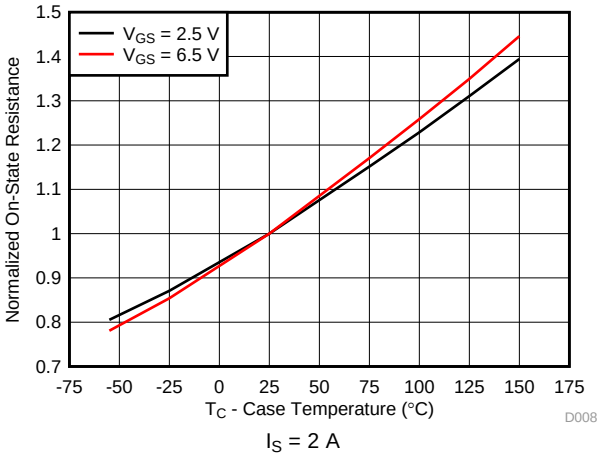

Figure 8. Normalized On-State Resistance vs Temperature

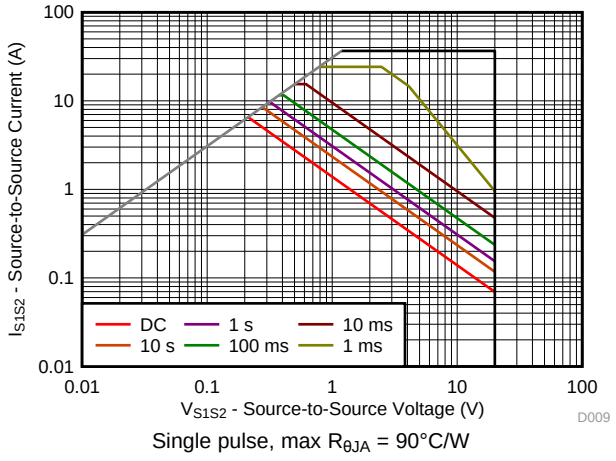

Figure 9. Maximum Safe Operating Area

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Typical MOSFET Characteristics (continued)

(T_A = 25°C unless otherwise stated)

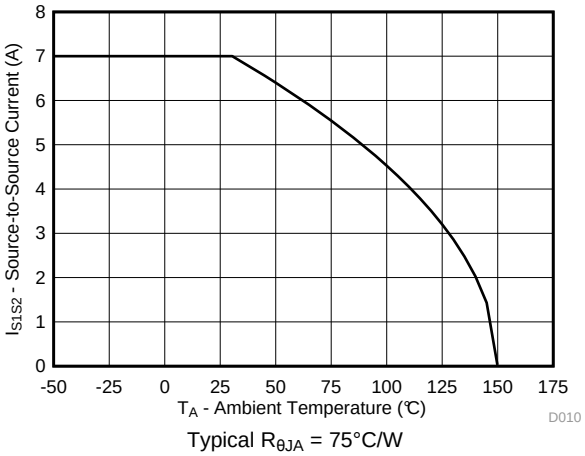

Figure 10. Maximum Source Current vs Temperature

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.

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6.2 商标

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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.

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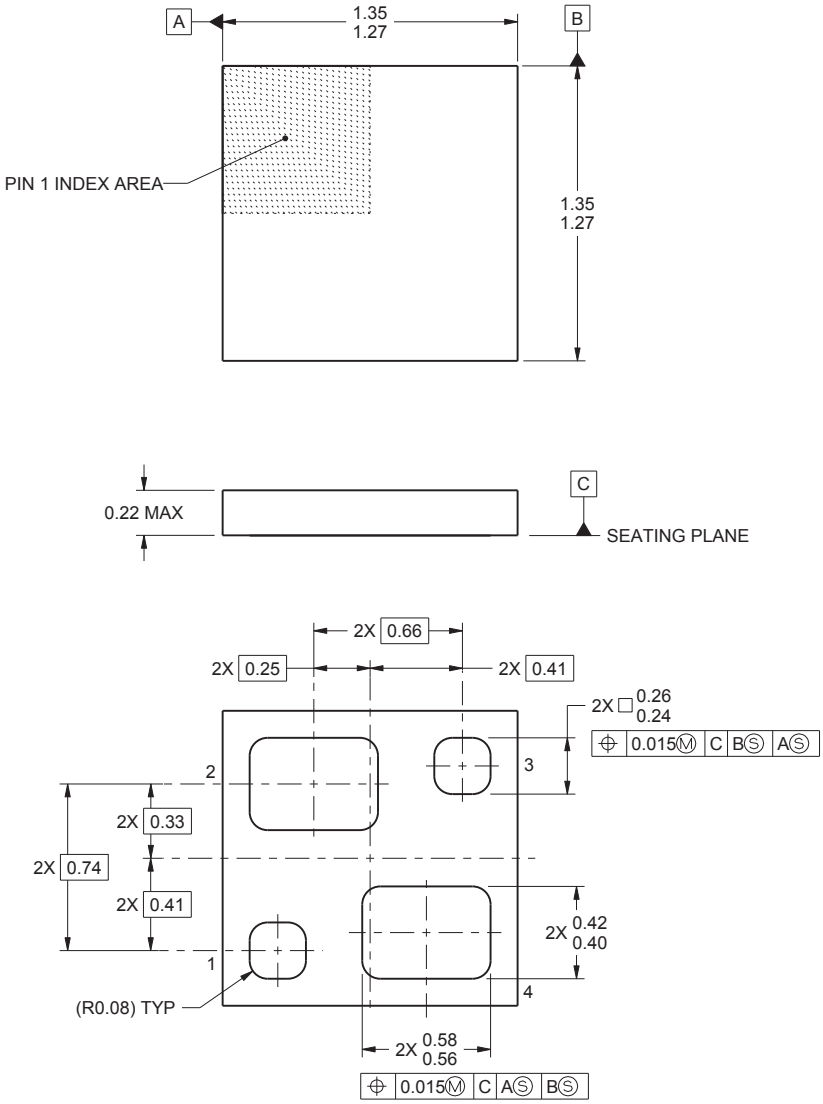
7 机械、封装和可订购信息

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。要获得这份数据表的浏览器版本，请查阅左侧的导航栏。

7.1 封装尺寸

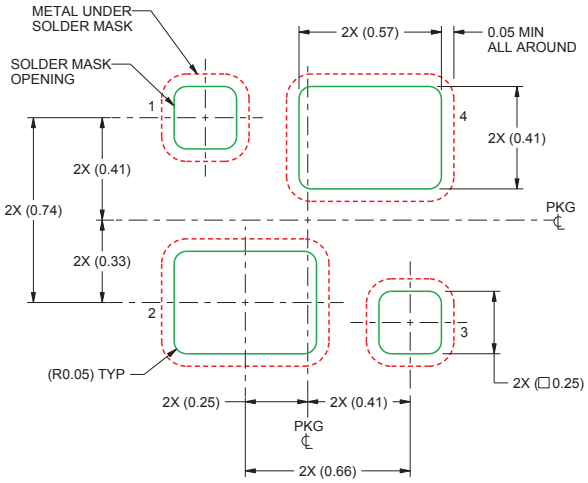


引脚配置

引脚编号	名称
1	G1
2	S2
3	G2
4	S1

1. 所有线性尺寸的单位均为毫米。

7.2 推荐的 PCB 布局

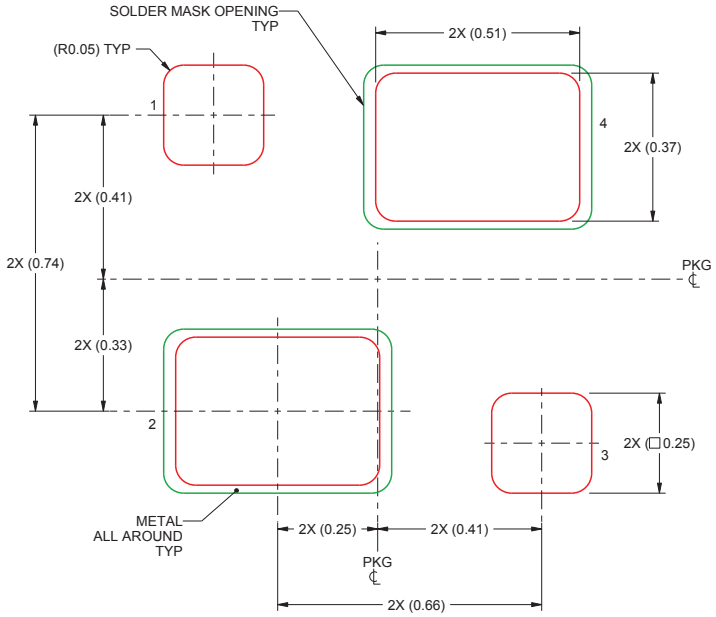


焊盘图案示例

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。

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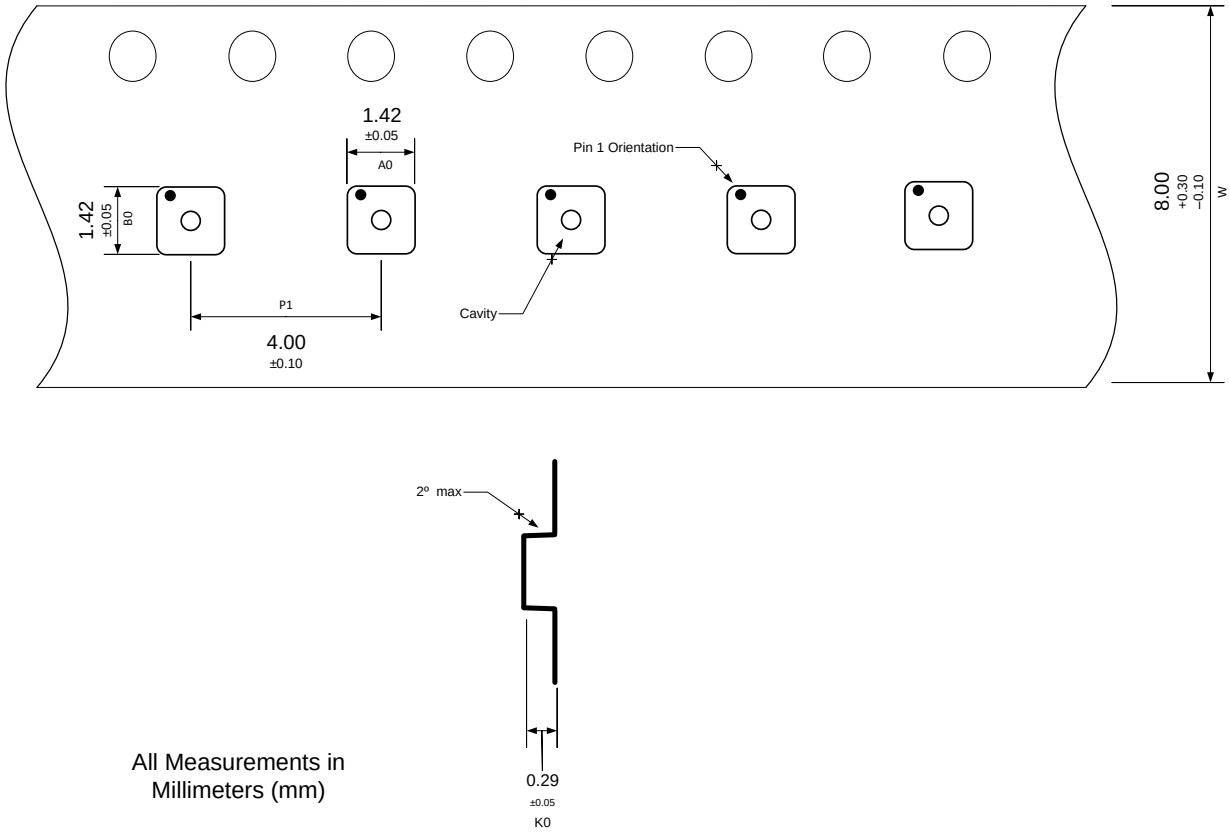
7.4 Q3A 卷带信息



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 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
CSD85302L	ACTIVE	PICOSTAR	YME	4	3000	RoHS & Green	NIAU	Level-1-260C-UNLIM	-55 to 150	85302	Samples
CSD85302LT	ACTIVE	PICOSTAR	YME	4	250	RoHS & Green	NIAU	Level-1-260C-UNLIM	-55 to 150	85302	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 <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm 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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