

CSD23203W -8V P 通道 NexFET™ 功率金属氧化物半导体场效应晶体管 (MOSFET)

1 特性

- 超低 Q_g 和 Q_{gd}
- 低导通电阻 $R_{DS(on)}$
- 小尺寸
- 低厚度, 0.62mm 高
- 无铅
- 符合 RoHS 环保标准
- 无卤素
- CSP 1mm × 1.5mm 晶圆级封装

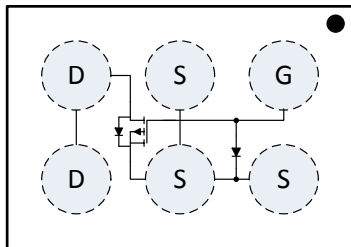
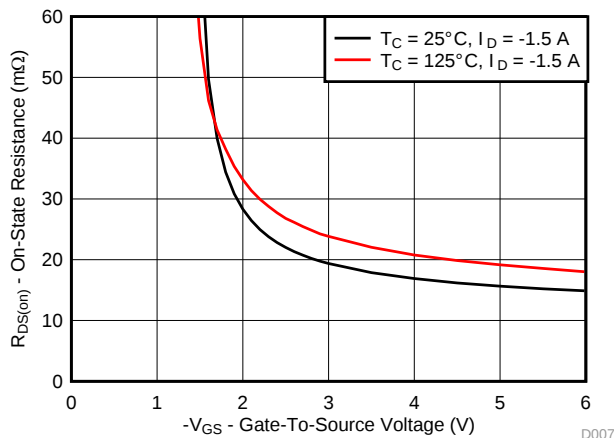
2 应用

- 电池管理
- 负载开关
- 电池保护

3 说明

这款 -8V、16.2mΩ、P 通道器件经过设计, 能够以具有出色散热特性的 1 × 1.5 mm 超薄小外形封装提供最低的导通电阻和栅极电荷。

顶视图

 $R_{DS(on)}$ 与 V_{GS} 对比

产品概要

$T_A = 25^\circ\text{C}$		典型值	单位
V_{DS}	漏源电压	-8	V
Q_g	栅极电荷总量 (-4.5V)	4.9	nC
Q_{gd}	栅极电荷 (栅极到漏极)	0.6	nC
$R_{DS(on)}$	漏源导通电阻	$V_{GS} = -1.8\text{V}$	35 mΩ
		$V_{GS} = -2.5\text{V}$	22 mΩ
		$V_{GS} = -4.5\text{V}$	16.2 mΩ
$V_{GS(th)}$	电压阈值	-0.8	V

器件信息⁽¹⁾

器件	数量	包装介质	封装	运输
CSD23203W	3000	7 英寸卷带	1.00mm × 1.50mm 晶圆级封装	卷带封装
CSD23203WT	250	7 英寸卷带		

(1) 如需了解所有可用封装, 请参阅产品说明书末尾的可订购产品附录。

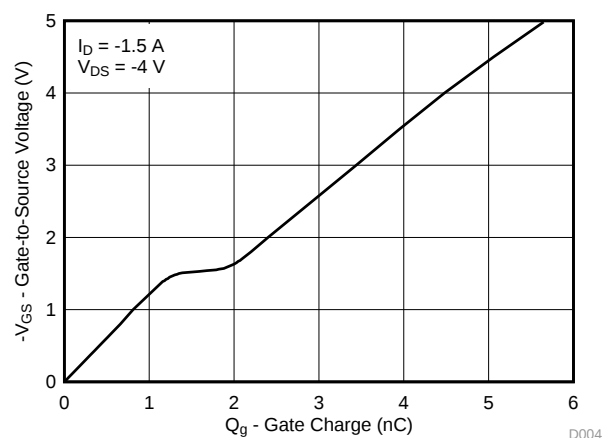
绝对最大额定值

$T_A = 25^\circ\text{C}$		值	单位
V_{DS}	漏源电压	-8	V
V_{GS}	栅源电压	-6	V
I_D	持续漏极电流 ⁽¹⁾	-3	A
I_{DM}	脉冲漏极电流 ⁽²⁾	-54	A
P_D	功率耗散	0.75	W
T_J, T_{stg}	工作结温, 储存温度	-55 至 150	$^\circ\text{C}$

(1) 器件在 105 $^\circ\text{C}$ 温度下运行。

(2) 典型 $R_{\theta JA} = 170^\circ\text{C/W}$, 脉宽 $\leq 100 \mu\text{s}$, 占空比 $\leq 1\%$ 。

栅极电荷



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4 修订历史记录

注：之前版本的页码可能与当前版本有所不同。

Changes from Original (December 2014) to Revision A	Page
• 在俯视图中更改了 MOSFET 机身连线	1
• 已添加 接收文档更新通知和社区资源部分	7

5 Specifications

5.1 Electrical Characteristics

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

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
STATIC CHARACTERISTICS						
BV _{DSS}	Drain-to-source voltage	V _{GS} = 0 V, I _D = −250 μA	−8			V
I _{DSS}	Drain-to-source leakage current	V _{GS} = 0 V, V _{DS} = −6.4 V			−1	μA
I _{GSS}	Gate-to-source leakage current	V _{DS} = 0 V, V _{GS} = −6 V			−100	nA
V _{GS(th)}	Gate-to-source threshold voltage	V _{DS} = V _{GS} , I _D = −250 μA	−0.6	−0.8	−1.1	V
R _{DS(on)}	Drain-to-source on-resistance	V _{GS} = −1.8 V, I _D = −1.5 A	35		53	mΩ
		V _{GS} = −2.5 V, I _D = −1.5 A	22		26.5	mΩ
		V _{GS} = −4.5 V, I _D = −1.5 A	16.2		19.4	mΩ
g _{fs}	Transconductance	V _{DS} = −0.8 V, I _D = −1.5 A	14			S
DYNAMIC CHARACTERISTICS						
C _{ISS}	Input capacitance	V _{GS} = 0 V, V _{DS} = −4 V, f = 1 MHz	703		914	pF
C _{OSS}	Output capacitance		391		508	pF
C _{RSS}	Reverse transfer capacitance		133		172	pF
Q _g	Gate charge total (−4.5 V)	V _{DS} = −4 V, I _D = −1.5 A	4.9		6.3	nC
Q _{gd}	Gate charge gate-to-drain		0.6			nC
Q _{gs}	Gate charge gate-to-source		1.3			nC
Q _{g(th)}	Gate charge at V _{th}		0.6			nC
Q _{OSS}	Output charge	V _{DS} = −4 V, V _{GS} = 0 V	1.9			nC
t _{d(on)}	Turnon delay time	V _{DS} = −4 V, V _{GS} = −4.5 V, I _D = −1.5 A R _G = 10 Ω	14			ns
t _r	Rise time		12			ns
t _{d(off)}	Turnoff delay time		58			ns
t _f	Fall time		27			ns
DIODE CHARACTERISTICS						
V _{SD}	Diode forward voltage	I _S = −1.5 A, V _{GS} = 0 V	−0.75		−1	V
Q _{rr}	Reverse recovery charge	V _{DS} = −4.7 V, I _F = −1.5 A	6.1			nC
t _{rr}	Reverse recovery time	di/dt = 100 A/μs	21			ns

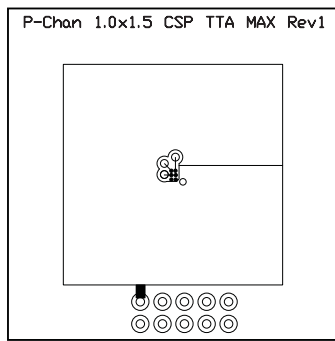
5.2 Thermal Information

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

THERMAL METRIC		MIN	TYP	MAX	UNIT
$R_{\theta JA}$	Junction-to-ambient thermal resistance ⁽¹⁾		170		$^\circ\text{C}/\text{W}$
	Junction-to-ambient thermal resistance ⁽²⁾		55		

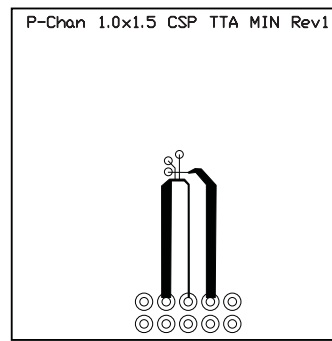
(1) Device mounted on FR4 material with minimum Cu mounting area.

(2) Device mounted on FR4 material with 1-in² (6.45-cm²), 2-oz (0.071-mm) thick Cu.



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Typ $R_{\theta JA} = 55^{\circ}\text{C/W}$
when mounted on
1 in² of 2-oz Cu.

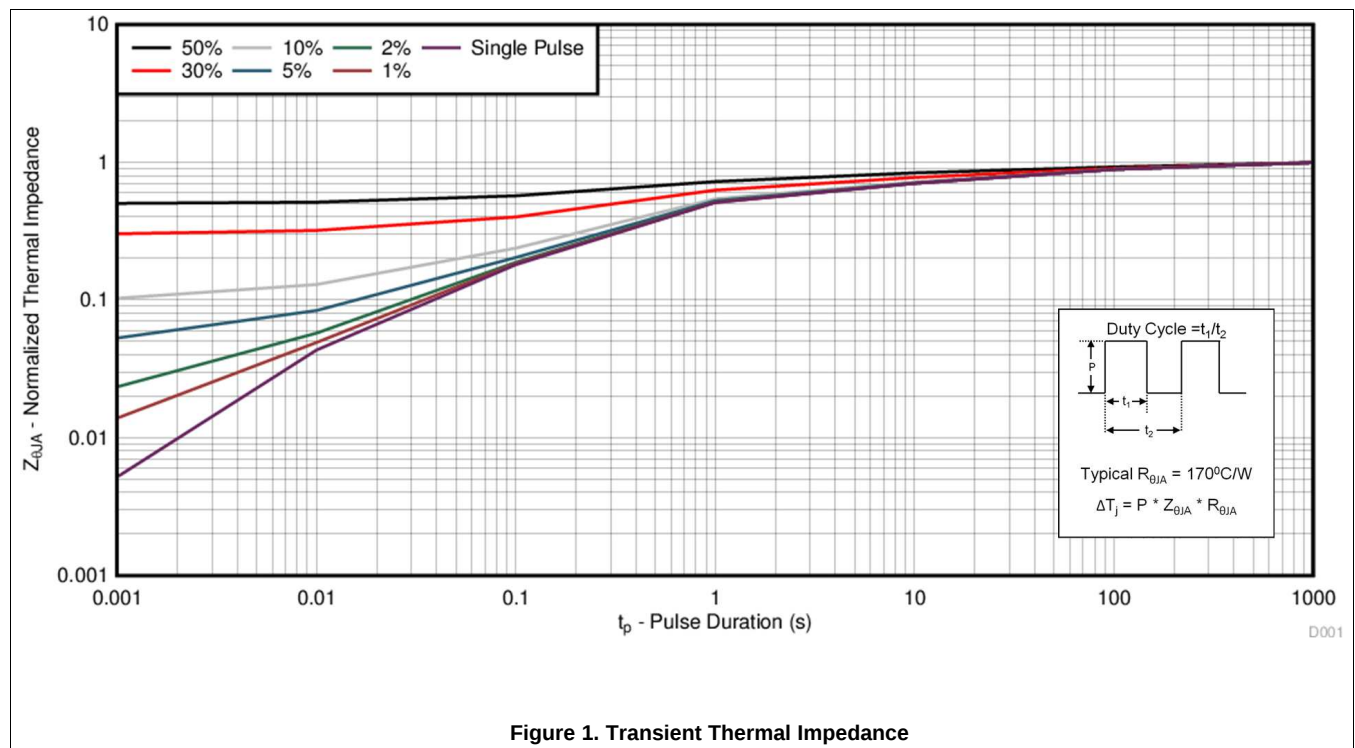


M0156-01

Typ $R_{\theta JA} = 170^{\circ}\text{C/W}$
when mounted on
minimum pad area of
2-oz Cu.

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)

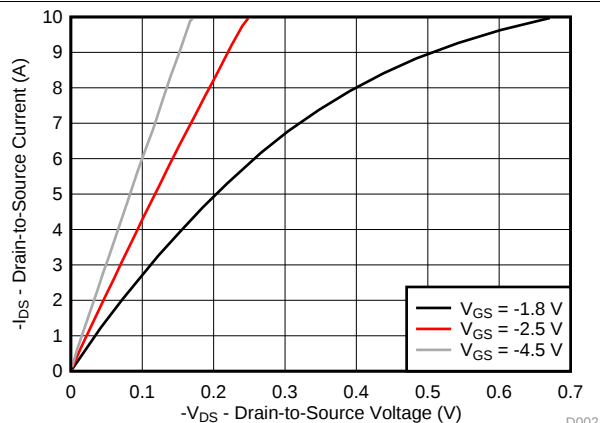


Figure 2. Saturation Characteristics

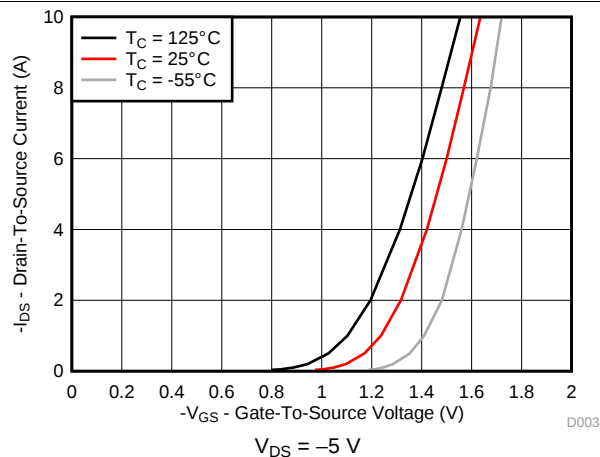


Figure 3. Transfer Characteristics

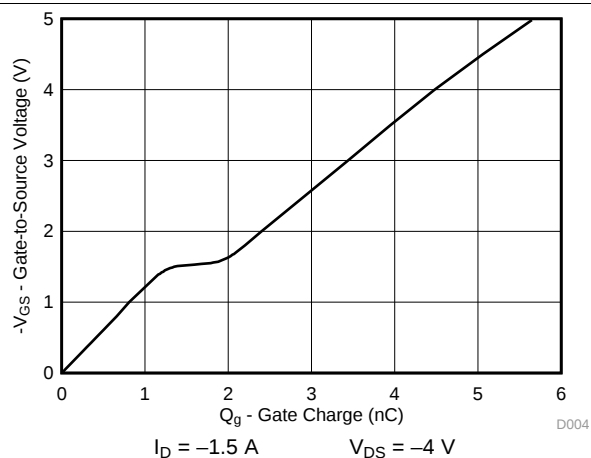


Figure 4. Gate Charge

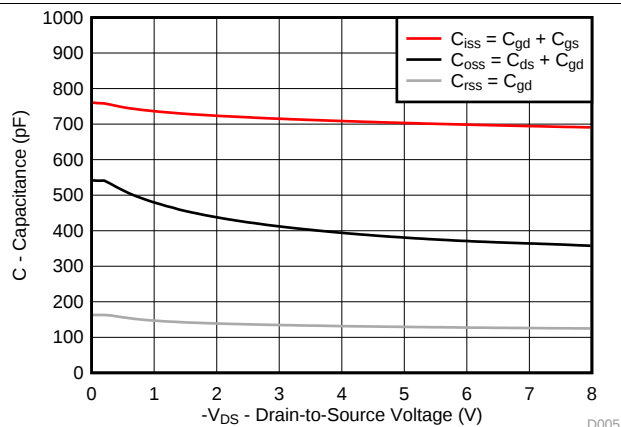


Figure 5. Capacitance

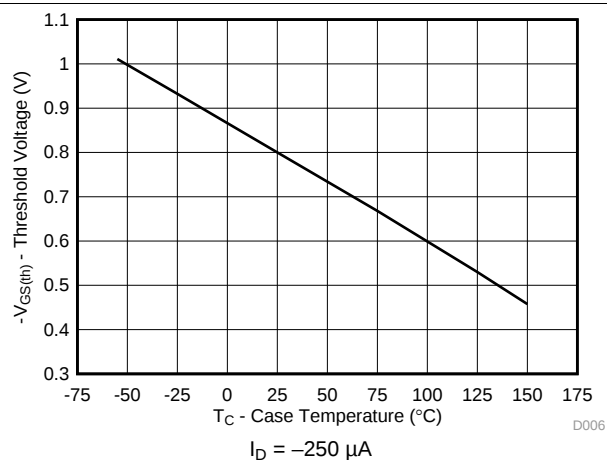


Figure 6. Threshold Voltage vs Temperature

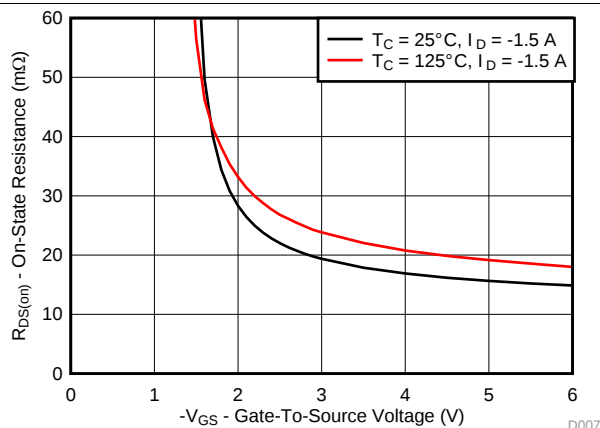


Figure 7. On-State Resistance vs Gate-to-Source Voltage

Typical MOSFET Characteristics (continued)

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

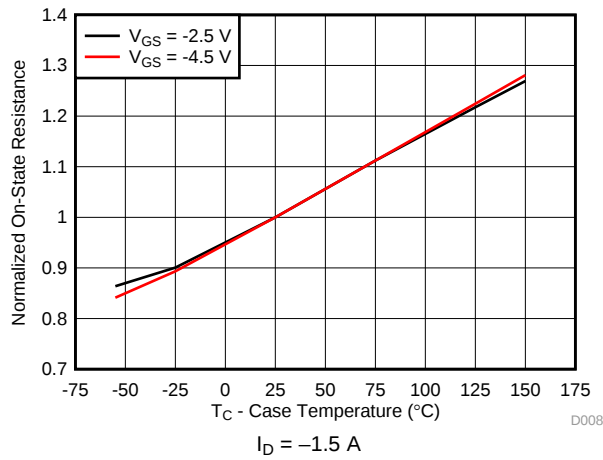


Figure 8. Normalized On-State Resistance vs Temperature

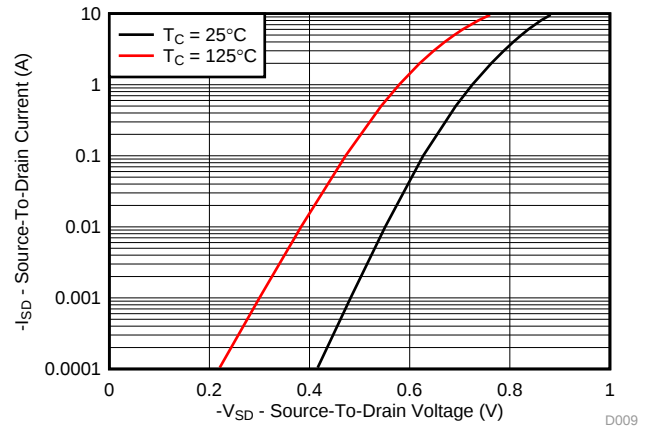


Figure 9. Typical Diode Forward Voltage

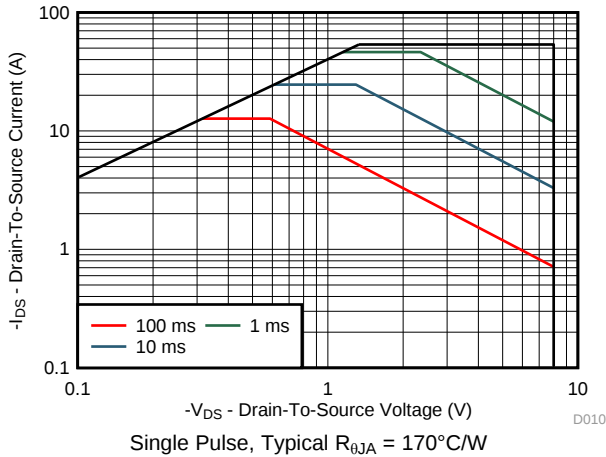


Figure 10. Maximum Safe Operating Area

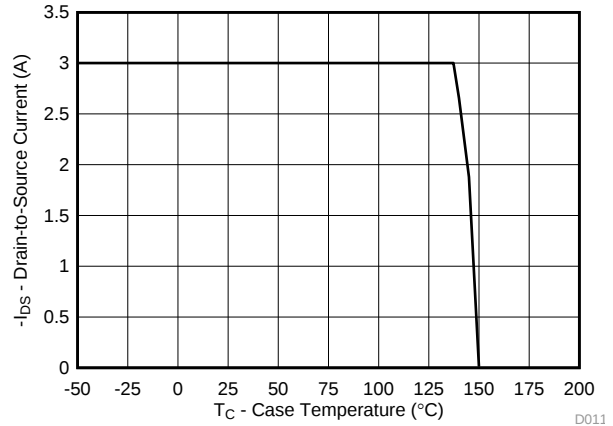


Figure 11. Maximum Drain Current vs Temperature

6 器件和文档支持

6.1 接收文档更新通知

要接收文档更新通知，请导航至德州仪器 TI.com.cn 上的器件产品文件夹。请单击右上角的通知我 进行注册，即可收到任意产品信息更改每周摘要。有关更改的详细信息，请查看任意已修订文档中包含的修订历史记录。

6.2 社区资源

下列链接提供到 TI 社区资源的连接。链接的内容由各个分销商“按照原样”提供。这些内容并不构成 TI 技术规范，并且不一定反映 TI 的观点；请参阅 TI 的《使用条款》。

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设计支持 TI 参考设计支持 可帮助您快速查找有帮助的 E2E 论坛、设计支持工具以及技术支持的联系信息。

6.3 商标

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6.4 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。

6.5 Glossary

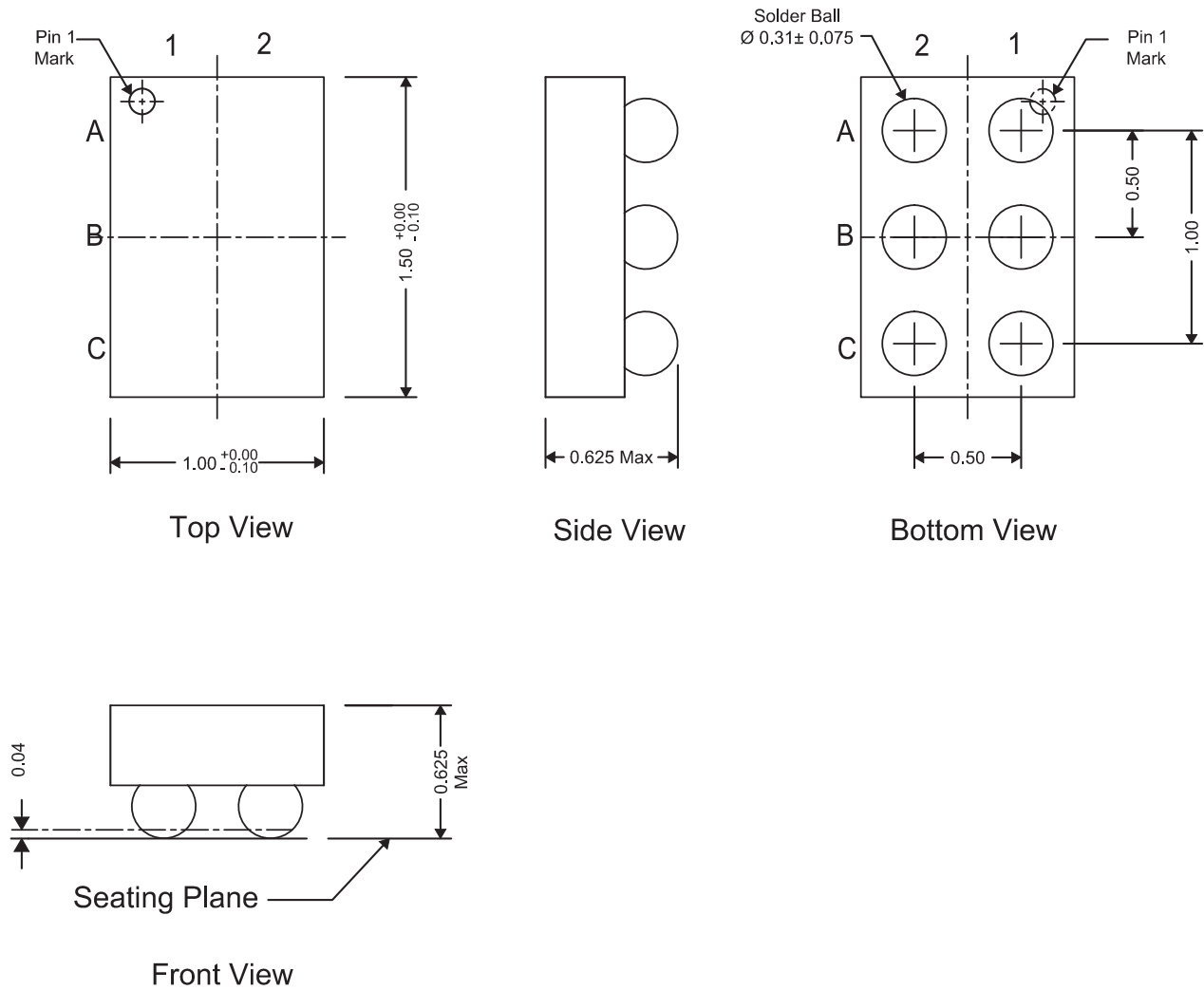
SLY0022 — TI Glossary.

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

7 机械、封装和可订购信息

以下页面包括机械、封装和可订购信息。这些信息是指定器件的最新可用数据。这些数据发生变化时，我们可能不会另行通知或修订此文档。如欲获取此产品说明书的浏览器版本，请参阅左侧的导航栏。

7.1 CSD23203W 封装尺寸

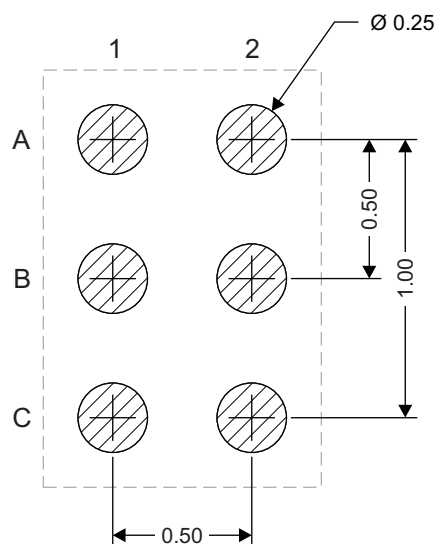


NOTE: 全部尺寸单位为 mm（除非另外注明）。

表 1. 引脚分配

位置	名称
C1, C2	漏极
A1	栅极
A2, B1, B2	源极

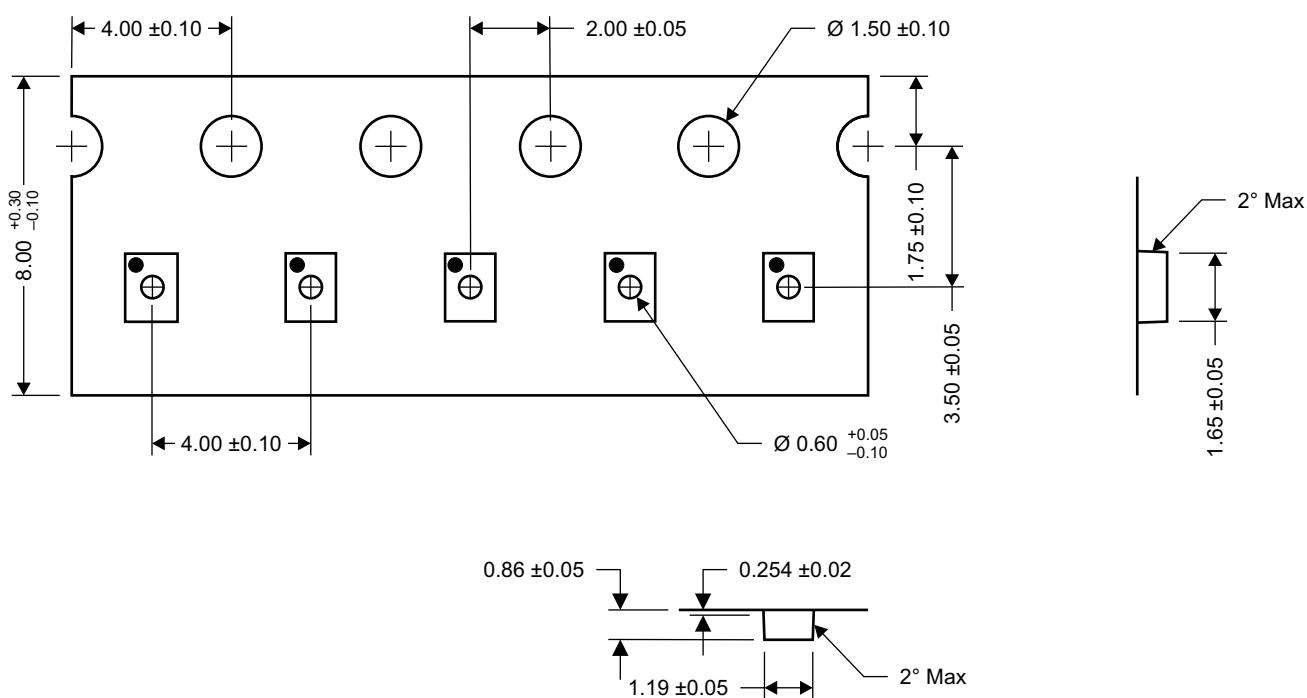
7.2 焊盘布局建议



M0158-01

NOTE: 全部尺寸单位为 mm（除非另外注明）。

7.3 卷带封装信息



M0159-01

NOTE: 全部尺寸单位为 mm（除非另外注明）。

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)
CSD23203W	Active	Production	DSBGA (YZC) 6	3000 LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-	23203
CSD23203W.B	Active	Production	DSBGA (YZC) 6	3000 LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-55 to 150	23203
CSD23203WT	Active	Production	DSBGA (YZC) 6	250 SMALL T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-55 to 150	23203
CSD23203WT.B	Active	Production	DSBGA (YZC) 6	250 SMALL T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-55 to 150	23203

⁽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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