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

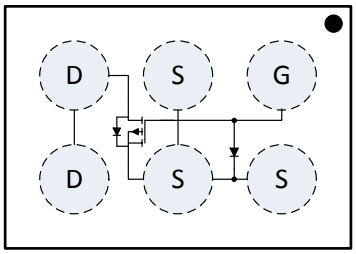
2 应用

- 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



产品概要

T_A = 25°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} = –1.8V	35	mΩ
		V_{GS} = -2.5V	22	mΩ
		V_{GS} = -4.5V	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。

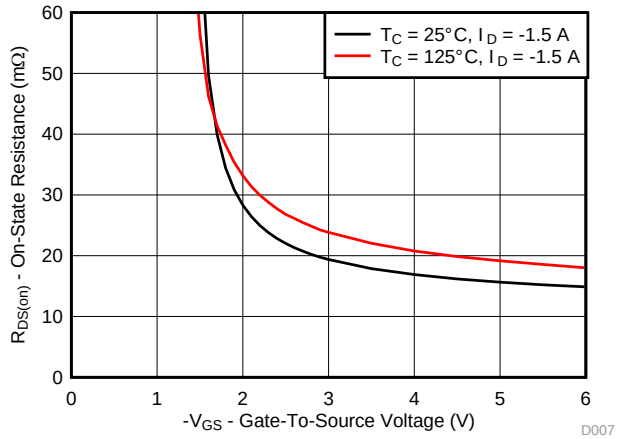
绝对最大额定值

T_A = 25°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	°C

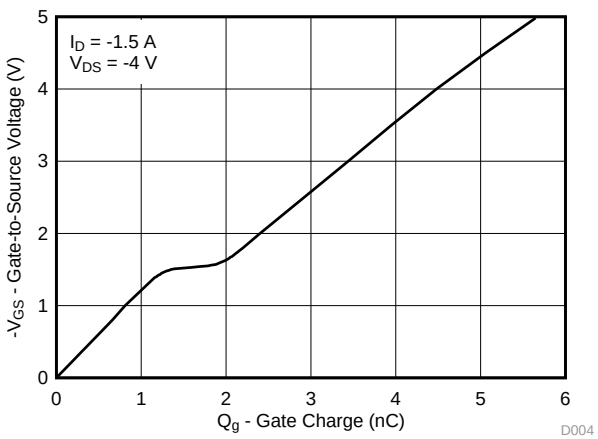
(1) 器件在 105ºC 温度下运行。

(2) 典型 $R_{\theta JA}$ = 170°C/W，脉宽 ≤ 100 µs，占空比 ≤ 1%。

$R_{DS(on)}$ 与 V_{GS} 对比



栅极电荷



目录

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°C (unless otherwise stated)

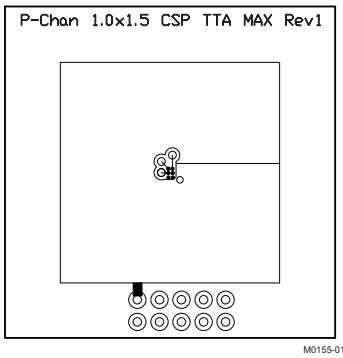
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
STATIC CHARACTERISTICS						
BV_{DSS}	Drain-to-source voltage	V_{GS} = 0 V, I_D = –250 μA	–8			V
I_{DSS}	Drain-to-source leakage current	V_{GS} = 0 V, V_{DS} = –6.4 V			–1	μA
I_{GSS}	Gate-to-source leakage current	V_{DS} = 0 V, V_{GS} = –6 V			–100	nA
$V_{GS(th)}$	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 di/dt = 100 A/μs		6.1		nC
t_{rr}	Reverse recovery time			21		ns

5.2 Thermal Information

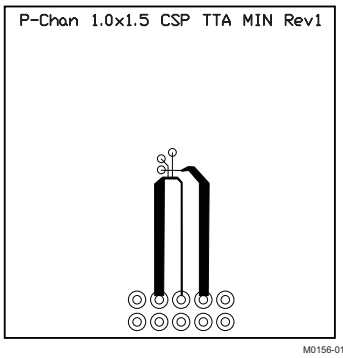
T_A = 25°C (unless otherwise stated)

THERMAL METRIC		MIN	TYP	MAX	UNIT
$R_{\theta JA}$	Junction-to-ambient thermal resistance(1)		170		°C/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-in^2 (6.45-cm^2), 2-oz (0.071-mm) thick Cu.



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



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

5.3 Typical MOSFET Characteristics

T_A = 25°C (unless otherwise stated)

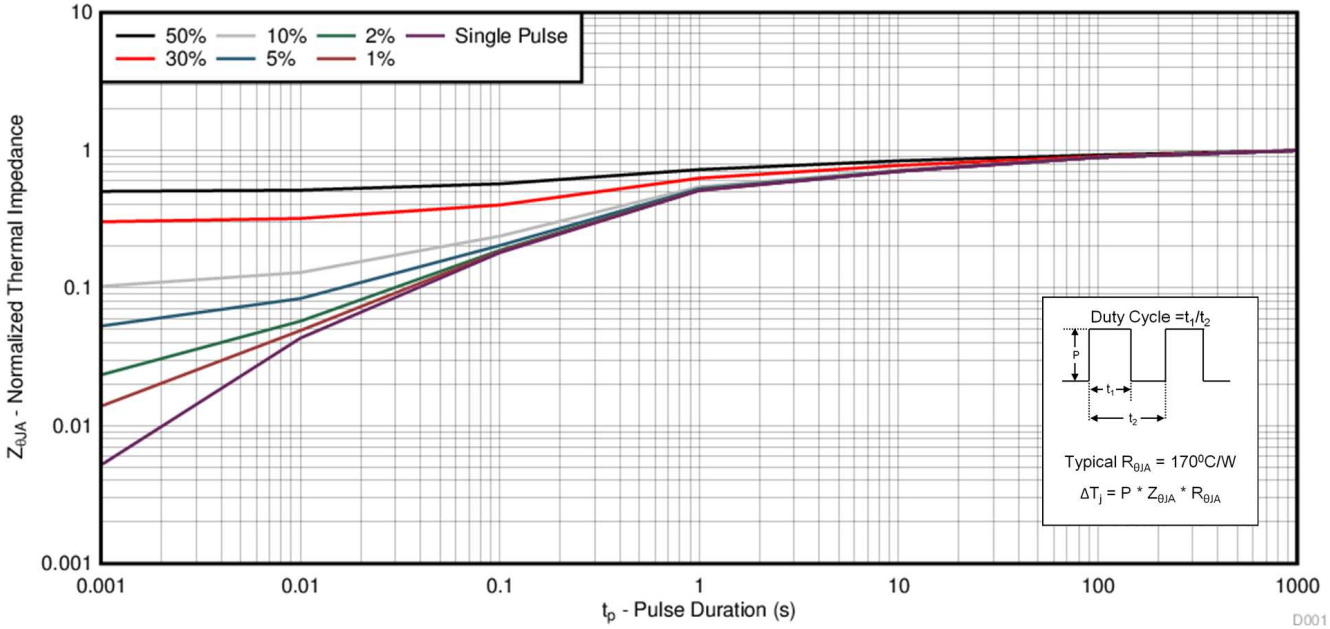


Figure 1. Transient Thermal Impedance

Typical MOSFET Characteristics (continued)

T_A = 25°C (unless otherwise stated)

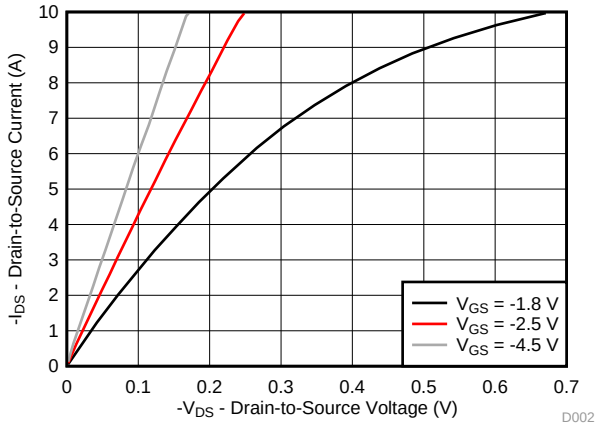


Figure 2. Saturation Characteristics

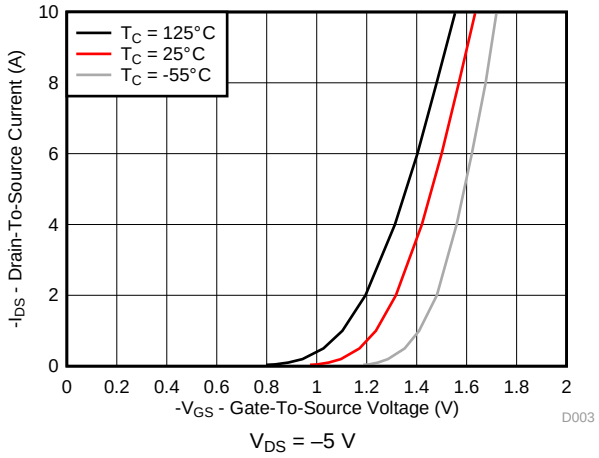


Figure 3. Transfer Characteristics

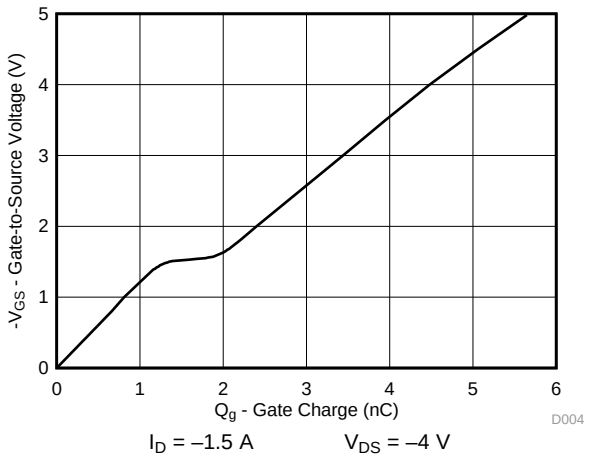


Figure 4. Gate Charge

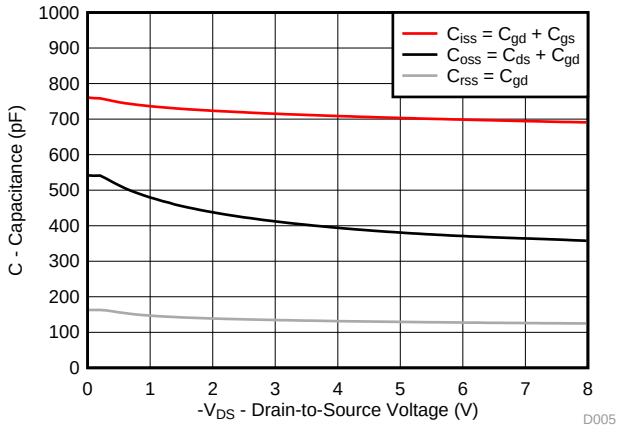


Figure 5. Capacitance

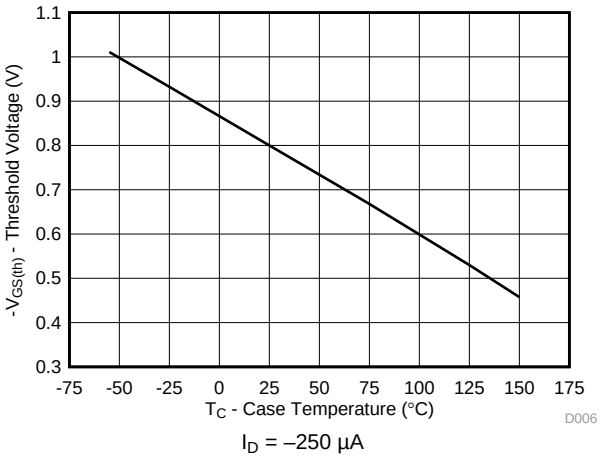


Figure 6. Threshold Voltage vs Temperature

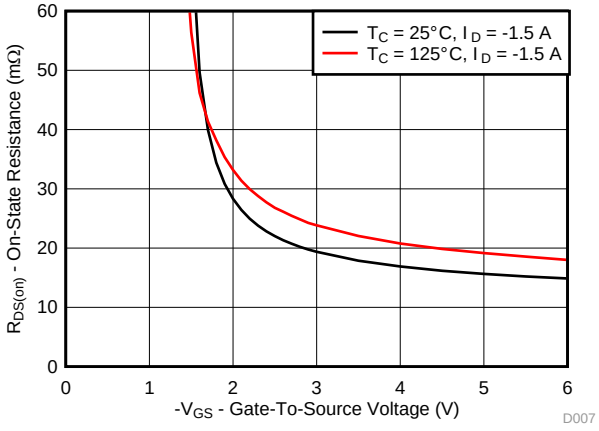
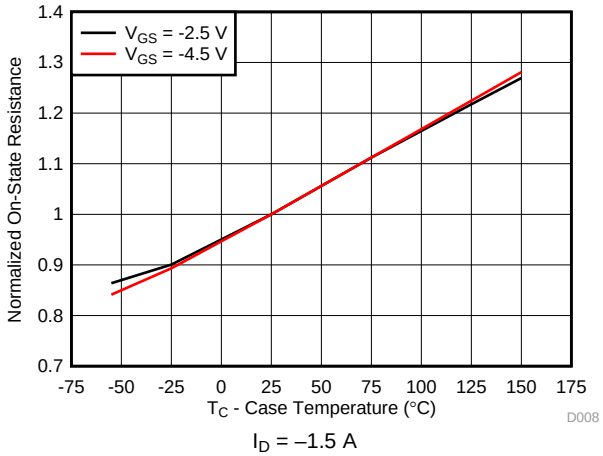


Figure 7. On-State Resistance vs Gate-to-Source Voltage

Typical MOSFET Characteristics (continued)

T_A = 25°C (unless otherwise stated)



I_D = –1.5 A

Figure 8. Normalized On-State Resistance vs Temperature

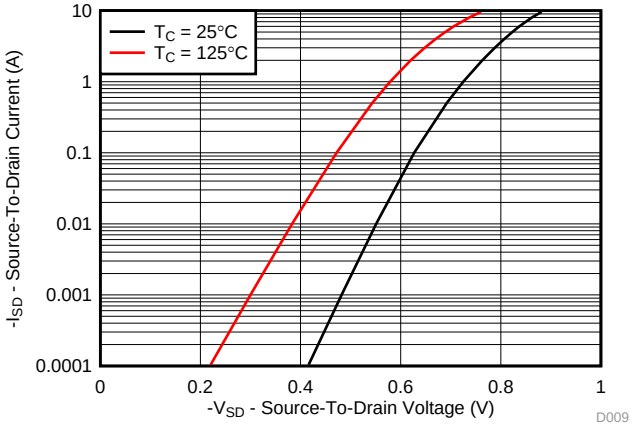
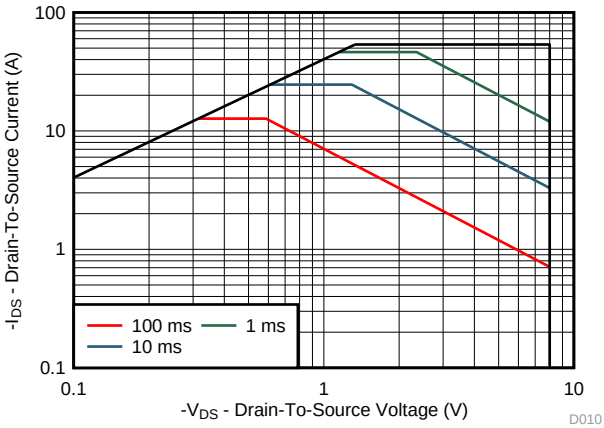


Figure 9. Typical Diode Forward Voltage



Single Pulse, Typical $R_{\theta JA}$ = 170°C/W

Figure 10. Maximum Safe Operating Area

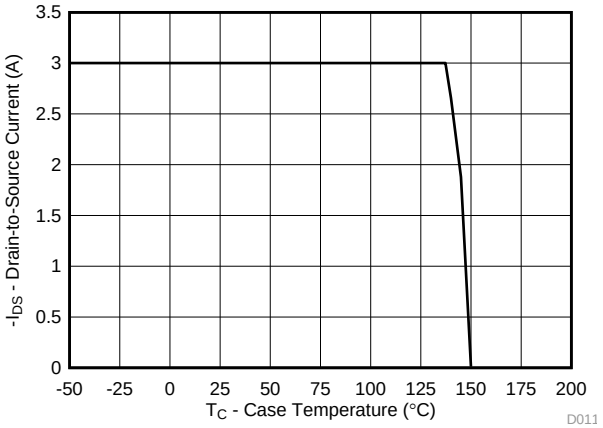


Figure 11. Maximum Drain Current vs Temperature

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

NexFET, E2E are trademarks of Texas Instruments.
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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

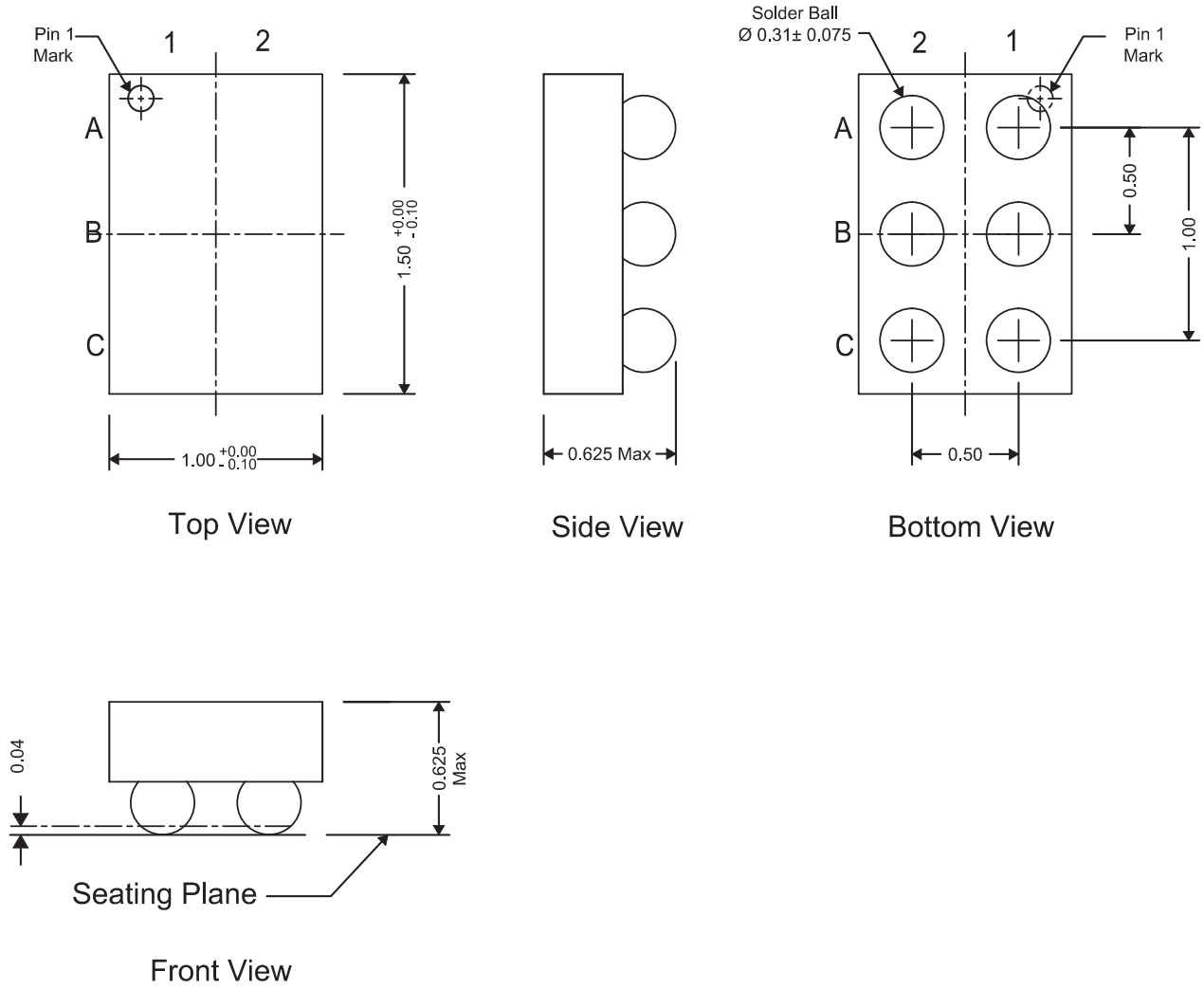
SLYZ022 — *TI Glossary*.

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

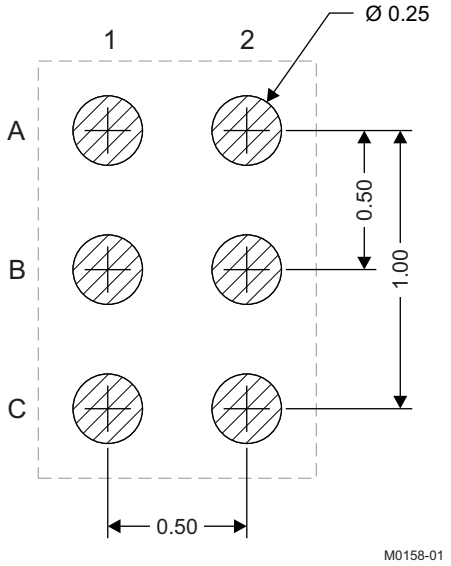


NOTE: 全部尺寸单位为 mm（除非另外注明）。

表 **1.** 引脚分配

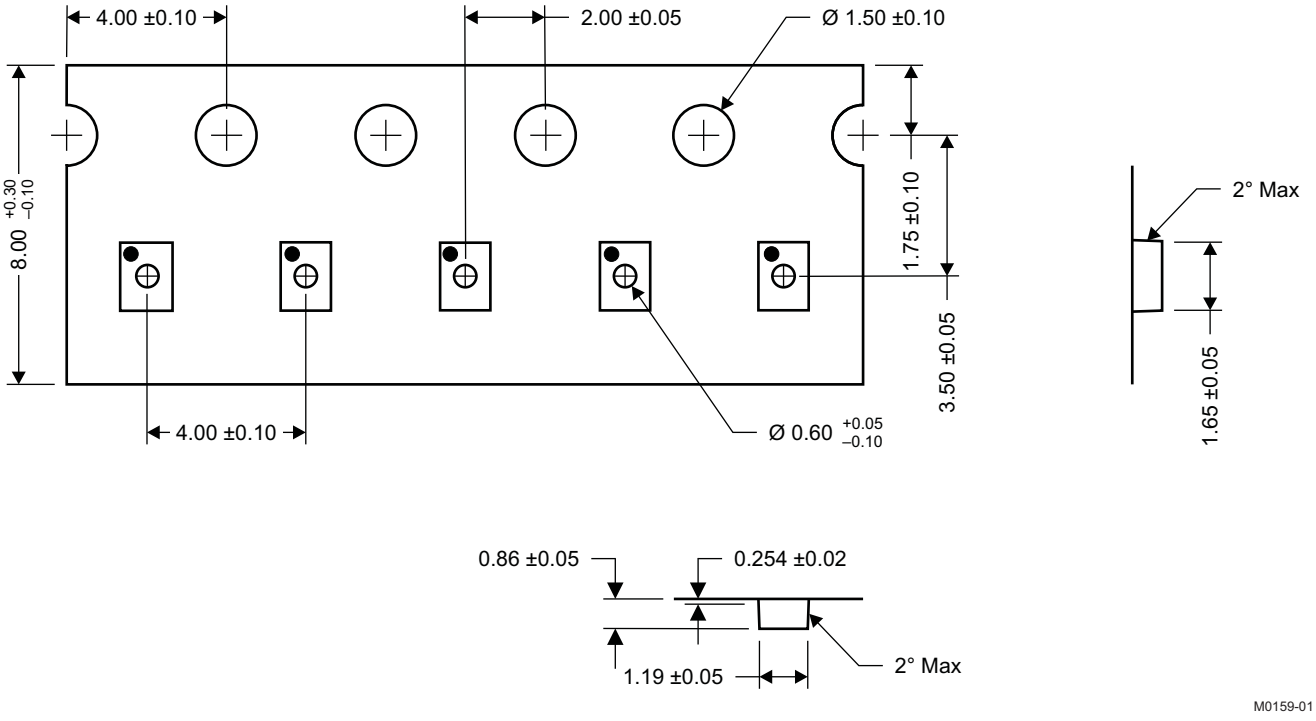
位置	名称
C1，C2	漏极
A1	栅极
A2，B1，B2	源极

7.2 焊盘布局建议



NOTE: 全部尺寸单位为 mm（除非另外注明）。

7.3 卷带封装信息



NOTE: 全部尺寸单位为 mm（除非另外注明）。

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
CSD23203W	ACTIVE	DSBGA	YZC	6	3000	RoHS & Green	SNAGCU	Level-1-260C-UNLIM		23203	Samples
CSD23203WT	ACTIVE	DSBGA	YZC	6	250	RoHS & Green	SNAGCU	Level-1-260C-UNLIM	-55 to 150	23203	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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