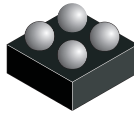


P 通道 NexFET™ 功率 MOSFET

查询样品: **CSD25213W10**

特性

- 超低栅极电荷 **(Qg)** 和栅漏电荷 **(Qgd)**
- 小尺寸封装 **1mm x 1mm**
- 低高度（高度为 **0.62mm**）
- 无铅
- 栅 **-** 源电压钳位
- 栅极静电放电 **(ESD)** 保护
- 符合 **RoHS** 环保标准
- 无卤素

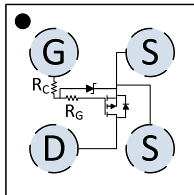
应用范围

- 电池管理
- 负载开关
- 电池保护

说明

此器件设计用于在超低高度并具有出色散热特性的尽可能小外形尺寸封装内产生最低的导通电阻和栅极电荷。

顶视图



产品概述

V_{DS}	漏源电压	-20		V
Q_g	栅极电荷总量 (4.5V)	2.2		nC
Q_{gd}	栅漏栅极电荷	0.14		nC
R_{DS}（导通）	漏源导通电阻	V_{GS}= -2.5V	54	mΩ
		V_{GS}= -4.5V	39	mΩ
$V_{GS(th)}$	阀值电压	-0.85		V

订购信息

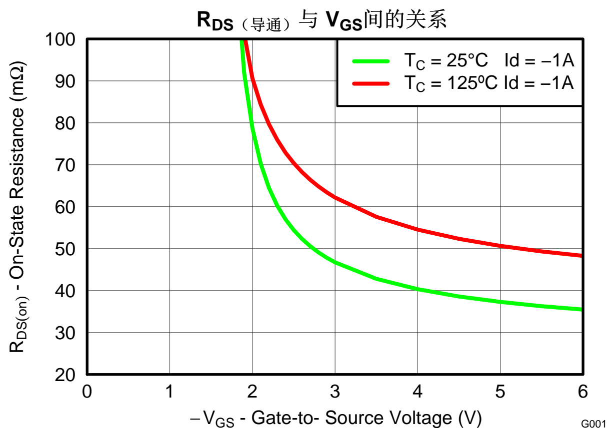
器件	封装	介质	数量	出货
CSD25213W10	1 x 1 晶圆级封装	7 英寸卷带	3000	卷带封装

绝对最大额定值

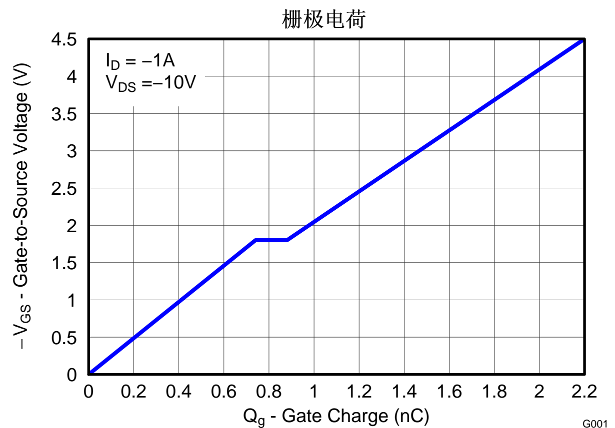
T_A=25°C 时测得，除非另外注明		值	单位
V_{DS}	漏源电压	-20	V
V_{GS}	栅源电压	-6.0	V
I_D	持续漏极电流，T_A= 25°C 时测得(1)	-1.6	A
I_{DM}	脉冲漏极电流，T_A=25°C 时测得(2)	-16	A
I_G	持续栅极钳位电流(3)	-5	mA
P_D	功率耗散(1)	1	W
T_J，T_{STG}	运行结温和储存温度范围	-55 至 150	°C

(1) 在 1 $in^2$2 盎司纯铜 (Cu) (2 oz.) 且厚度为 0.060" 的环氧板 (FR4) 印刷电路板 (PCB) 上，$R_{\theta JA}$=75°C/W。
(2) 脉宽 ≤ 300μs，占空比 ≤ 2%
(3) 受栅极电阻限制。

R_{DS}（导通）与 V_{GS}间的关系



栅极电荷



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English Data Sheet: SLPS443

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

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} = 0V, I_D = –250μA	–20			V
BV_{GSS}	Gate to Source Voltage;	V_{DS} = 0V, I_G = –250μA	–6.0			V
I_{DSS}	Drain to Source Leakage Current	V_{GS} = 0V, V_{DS} = –10V			–1	μA
I_{GSS}	Gate to Source Leakage Current	V_{DS} = 0V, V_{GS} = –6V			–100	nA
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{DS} = V_{GS}, I_D = –250μA	–0.60	–0.85	–1.10	V
$R_{DS(on)}$	Drain to Source On Resistance	V_{GS} = –2.5V, I_D = –1A		54	67	mΩ
		V_{GS} = –4.5V, I_D = –1A		39	47	mΩ
g_{fs}	Transconductance	V_{DS} = –10V, I_D = –1A		6.2		S
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V, V_{DS} = –10V, f = 10kHz		368	478	pF
C_{OSS}	Output Capacitance			148	192	pF
C_{RSS}	Reverse Transfer Capacitance			7.8	10.1	pF
R_G	Series Gate Resistance			20		Ω
R_C	Series Clamp Resistance			5000		Ω
Q_g	Gate Charge Total (–4.5V)	V_{DS} = –10V, I_D = –1A		2.2	2.9	nC
Q_{gd}	Gate Charge Gate to Drain			0.14		nC
Q_{gs}	Gate Charge Gate to Source			0.74		nC
$Q_{g(th)}$	Gate Charge at Vth			0.43		nC
Q_{OSS}	Output Charge	V_{DS} = –10V, V_{GS} = 0V		2.5		nC
$t_{d(on)}$	Turn On Delay Time	V_{DS} = –10V, V_{GS} = –2.5V, I_D = –1A R_G = 10Ω		510		ns
t_r	Rise Time			520		ns
$t_{d(off)}$	Turn Off Delay Time			1000		ns
t_f	Fall Time			970		ns
Diode Characteristics						
V_{SD}	Diode Forward Voltage	I_S = –1A, V_{GS} = 0V		–0.77	–1	V
Q_{rr}	Reverse Recovery Charge	V_{DS}= –10V, I_F = –1A, di/dt = 200A/μs		4.0		nC
t_{rr}	Reverse Recovery Time	V_{DS}= –10V, I_F = –1A, di/dt = 200A/μs		11		ns

THERMAL CHARACTERISTICS

(T_A = 25°C unless otherwise stated)

PARAMETER		MIN	TYP	MAX	UNIT
$R_{\theta JA}$	Junction to Ambient Thermal Resistance[1]		75		°C/W
	Junction to Ambient Thermal Resistance[2]		265		°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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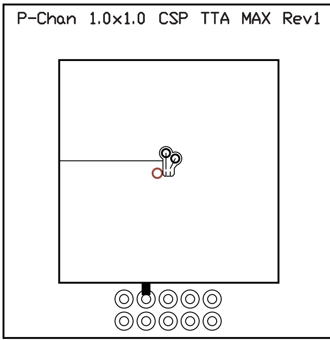
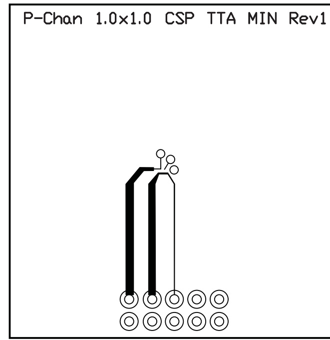


Max $R_{θJA}$ = 90°C/W when mounted on 1inch^2 of 2 oz. Cu.



Max $R_{θJA}$ = 333°C/W when mounted on minimum pad area of 2 oz. Cu.

TYPICAL MOSFET CHARACTERISTICS

(T_A = 25°C unless otherwise stated)

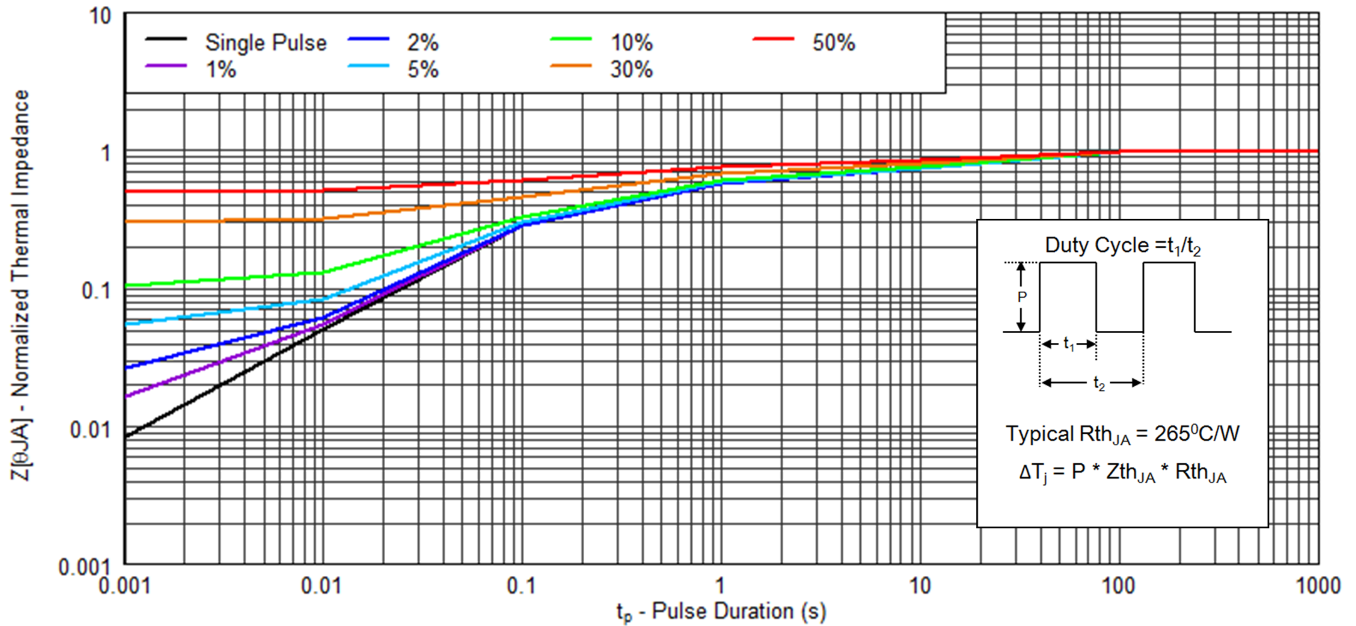


Figure 1. Transient Thermal Impedance

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TYPICAL MOSFET CHARACTERISTICS (continued)

(T_A = 25°C unless otherwise stated)

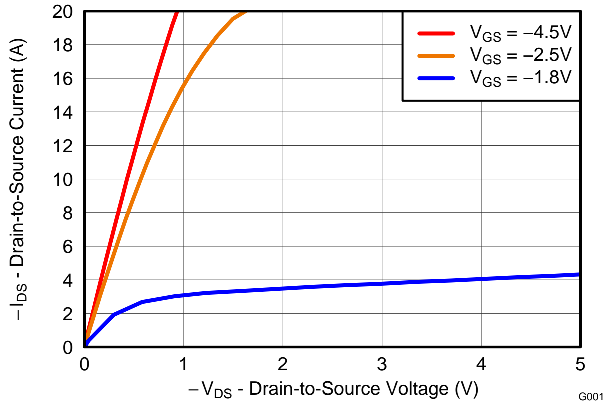

Figure 2. Saturation Characteristics

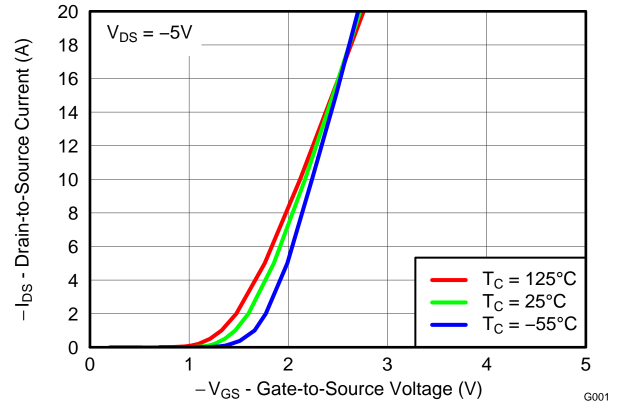

Figure 3. Transfer Characteristics

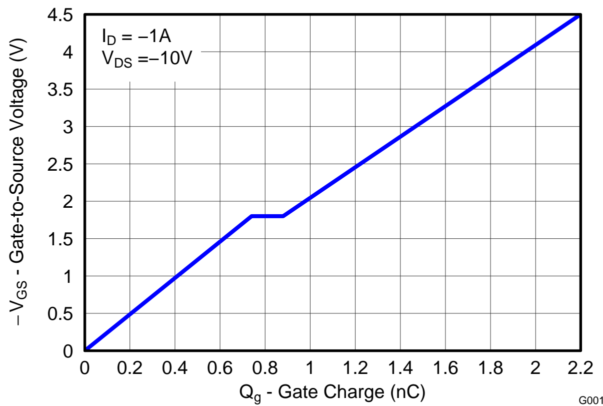

Figure 4. Gate Charge

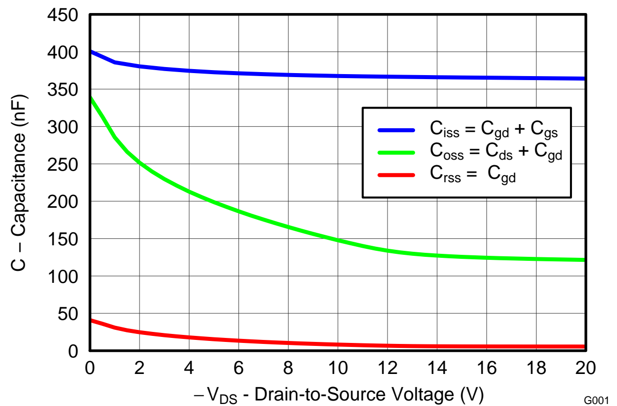

Figure 5. Capacitance

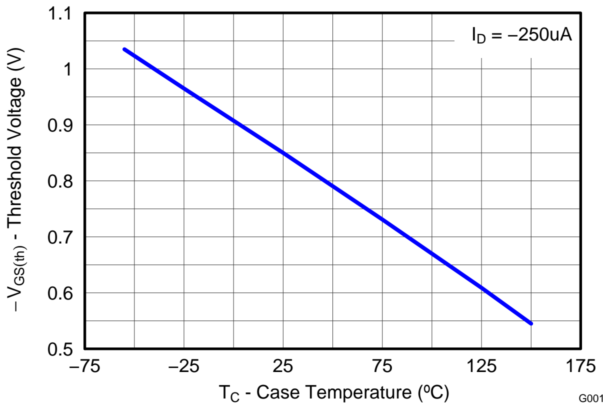

Figure 6. Threshold Voltage vs. Temperature

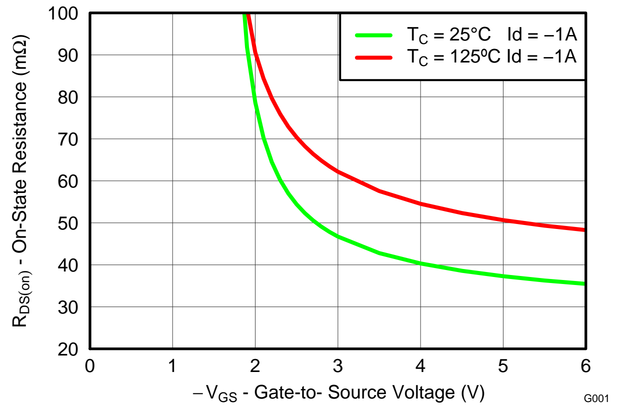

Figure 7. On-State Resistance vs. Gate-to-Source Voltage

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TYPICAL MOSFET CHARACTERISTICS (continued)

(T_A = 25°C unless otherwise stated)

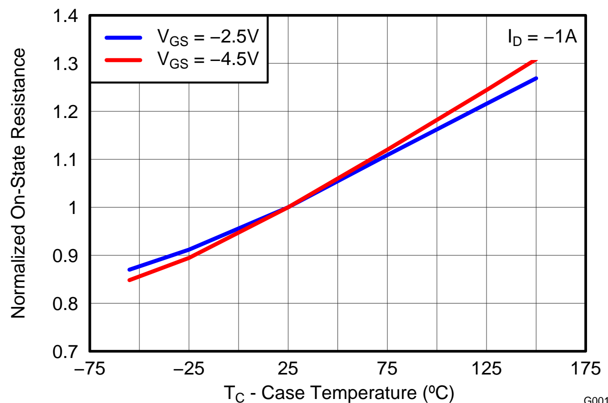

Figure 8. Normalized On-State Resistance vs. Temperature

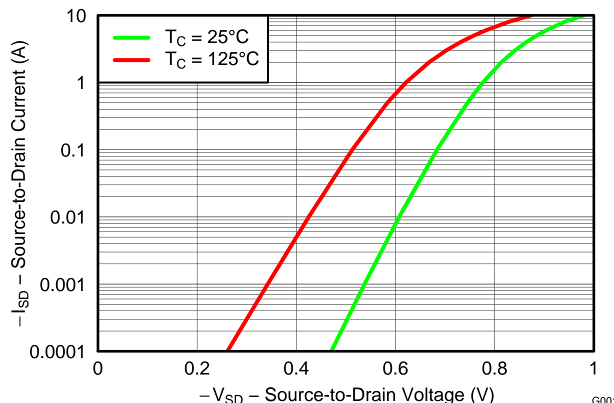

Figure 9. Typical Diode Forward Voltage

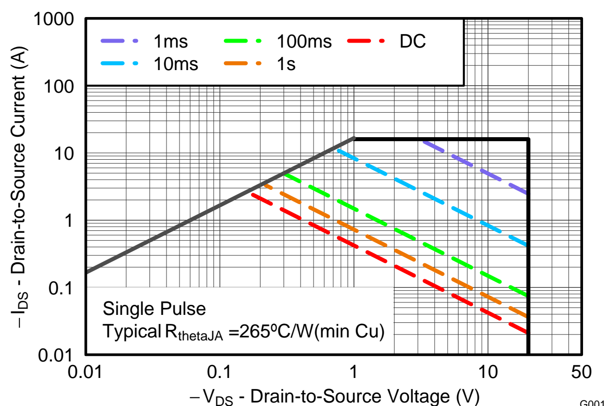

Figure 10. Maximum Safe Operating Area

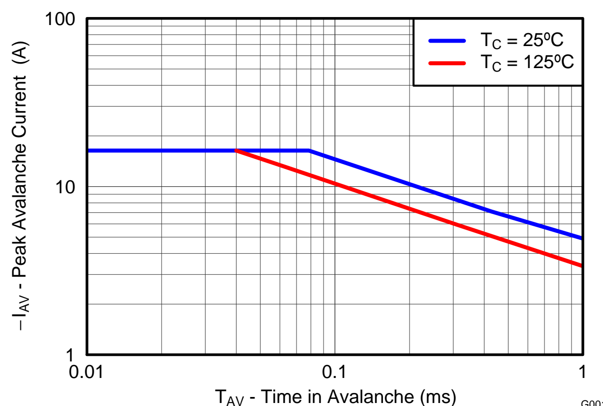

Figure 11. Single Pulse Unclamped Inductive Switching

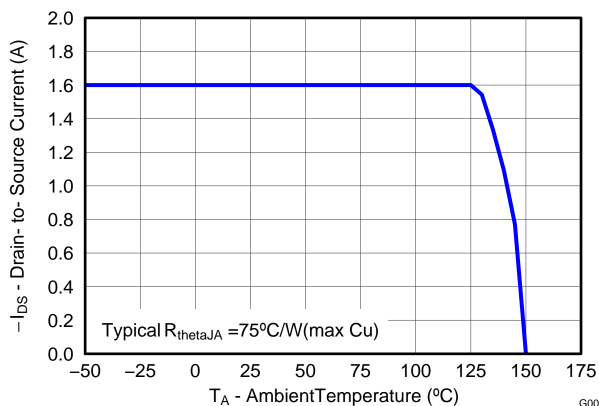

Figure 12. Maximum Drain Current vs. Temperature

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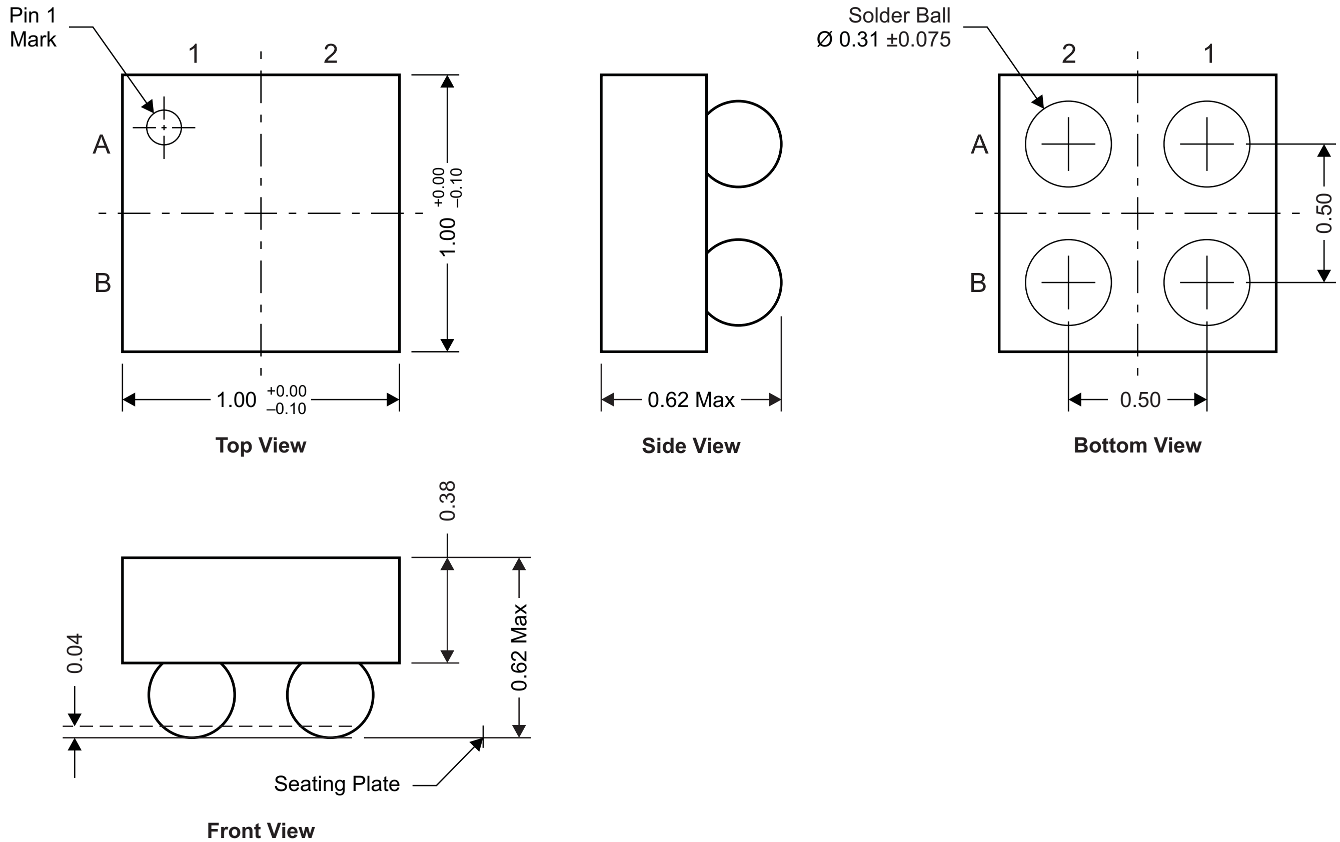
MECHANICAL DATA

CSD25213W10 Package Dimensions

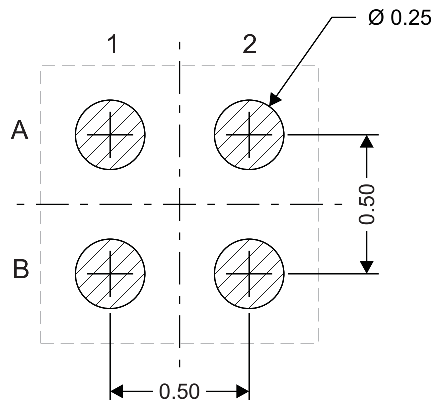


NOTE: All dimensions are in mm (unless otherwise specified)

Pin Configuration Table

POSITION	DESIGNATION
A1	Gate
B1	Drain
A2, B2	Source

Land Pattern Recommendation



NOTE: All dimensions are in mm (unless otherwise specified)

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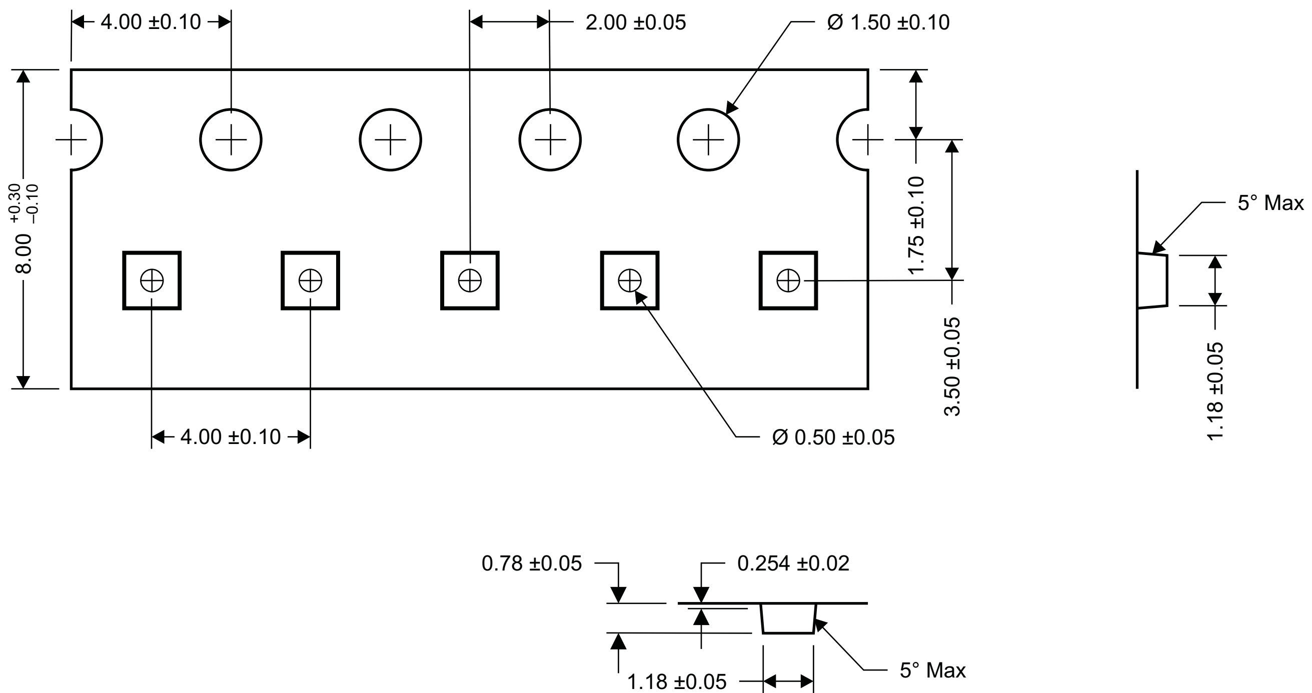
Tape and Reel Information



(1) All dimensions are in mm (unless otherwise specified)

(2) Pin 1 will be oriented in the top left quadrant of the tape enclosure (closest to the carrier tape sprocket holes).

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
CSD25213W10	ACTIVE	DSBGA	YZB	4	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	-55 to 150	213	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] Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

[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.

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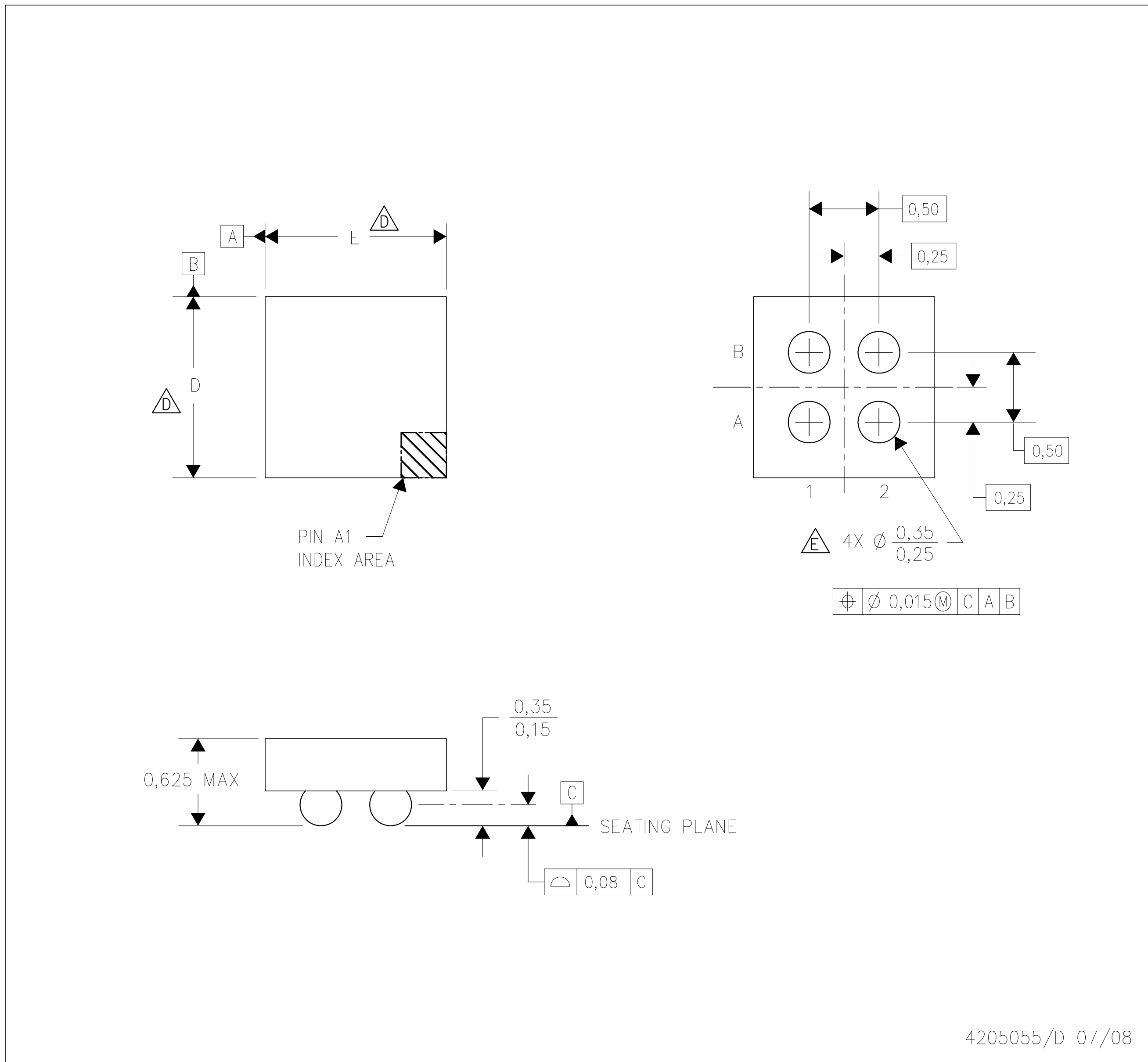
YZB (S–XBGA–N4) DIE–SIZE BALL GRID ARRAY



NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. NanoFree™ package configuration.
D. Devices in YZB package can have dimension D ranging from 0.94 to 1.65 mm and dimension E ranging from 0.94 to 1.65 mm. To determine the exact package size of a particular device, refer to the device datasheet or contact a local TI representative.
E. Reference Product Data Sheet for array population. 2 x 2 matrix pattern is shown for illustration only.
F. This package contains lead–free balls. Refer to YEB (Drawing #4204178) for tin–lead (SnPb) balls.

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数据转换器	www.ti.com.cn/dataconverters	消费电子	www.ti.com/consumer-apps
DLP® 产品	www.dlp.com	能源	www.ti.com/energy
DSP - 数字信号处理器	www.ti.com.cn/dsp	工业应用	www.ti.com.cn/industrial
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