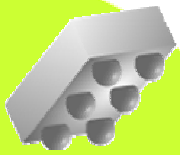
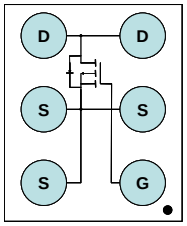
P-Channel
CICLON NexFET™ Power MOSFETs
CSD25301W1015

Features

- Ultra Low Qg & Qgd
- Small Footprint
- Low Profile 0.65mm height
- Pb Free
- RoHS Compliant
- Halogen Free



CSP 1.0 x 1.5 mm Wafer Level Package



Top View

Product Summary

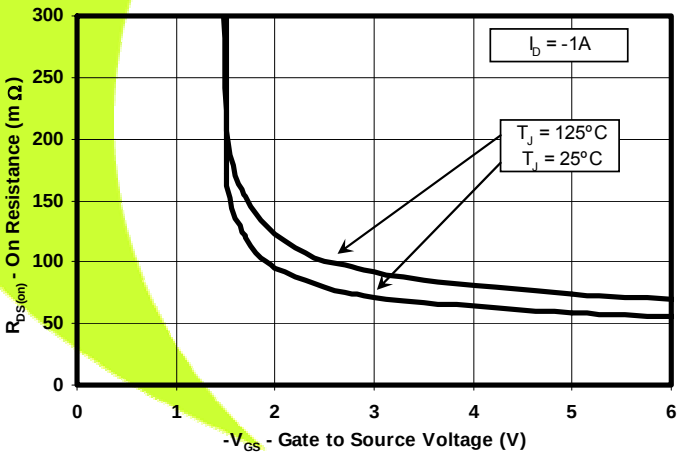
V_{DS}	-20		V
Q_g	2.0		nC
Q_{gd}	0.32		nC
$R_{DS(on)}$	V_{GS}= -1.5V	175	mΩ
	V_{GS}=-2.5V	80	mΩ
	V_{GS}=-4.5V	62	mΩ
V_{th}	-0.75		V

Maximum Values (T_A=25°C unless otherwise stated)

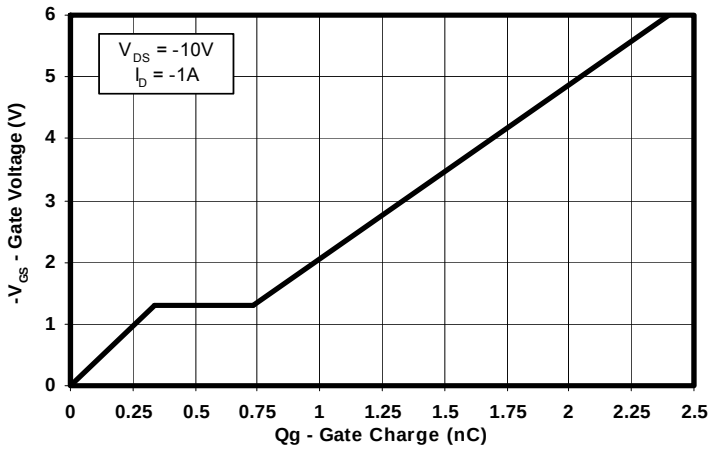
Symbol	Parameter	Value	Units
V_{DS}	Drain to Source Voltage	-20	V
V_{GS}	Gate to Source Voltage	±8	V
I_D	Continuous Drain Current, T_J = 25°C[1]	-2.2	A
I_{DM}	Pulsed Drain Current, T_J = 25°C[1,2]	-8.8	A
P_D	Power Dissipation[1]	1.5	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	°C

1. R_{thJA} = 85°C/W on max Cu (2 oz.) on 0.060" thick FR4 PCB
2. Pulse width ≤300 µs, duty cycle ≤ 2%

$R_{DS(ON)}$ vs. V_{GS}



Gate Charge



Ordering Information

Type	Package	Package Media	Qty	Ship
CSD25301W1015	1.0 X 1.5 Wafer Level Package	7 inch reel	3000	Tape and Reel

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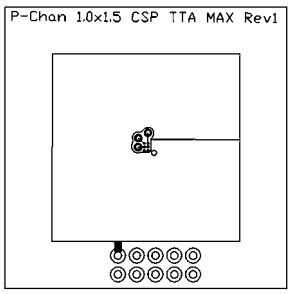
Electrical Characteristics (T_A = 25°C unless otherwise stated)

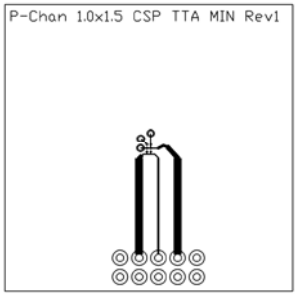
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Static Characteristics						
BV_{DSS}	Drain to Source Voltage	V_{GS} = 0V, I_D = -250µA	-20	—	—	V
I_{DSS}	Drain to Source Leakage Current	V_{GS} = 0V, V_{DS} = -16V	—	—	-1	µA
I_{GSS}	Gate to Source Leakage Current	V_{DS} = 0V, V_{GS} = ±8V	—	—	-100	nA
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{DS} = V_{GS}, I_D = -250µA	-0.4	-0.75	-1.0	V
$R_{DS(on)}$	Drain to Source On Resistance	V_{GS} = -1.5V, I_D = -1A	—	175	220	mΩ
		V_{GS} = -2.5V, I_D = -1A	—	80	100	mΩ
		V_{GS} = -4.5V, I_D = -1A	—	62	75	mΩ
g_{fs}	Transconductance	V_{DS} = -10V, I_D = -1A	—	5.8	—	S
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V, V_{DS} = -10V f = 1MHz	—	210	270	pF
C_{OSS}	Output Capacitance		—	90	120	pF
C_{RSS}	Reverse Transfer Capacitance		—	30	40	pF
Q_g	Gate Charge Total (-4.5V)	V_{DS} = -10V, I_D = -1A	—	1.9	2.5	nC
Q_{gd}	Gate Charge Gate to Drain		—	0.4	—	nC
Q_{gs}	Gate Charge Gate to Source		—	0.35	—	nC
$Q_{g(th)}$	Gate Charge at Vth		—	0.17	—	nC
Q_{OSS}	Output Charge	V_{DS} = -9.8V, V_{GS} = 0V	—	1.7	—	nC
$t_{d(on)}$	Turn On Delay Time	V_{DS} = -10V V_{GS} = -4.5V I_D = -1A R_G = 20Ω	—	4.0	—	ns
t_r	Rise Time		—	2.0	—	ns
$t_{d(off)}$	Turn Off Delay Time		—	29	—	ns
t_f	Fall Time		—	12	—	ns
Diode Characteristics						
V_{SD}	Diode Forward Voltage	I_S = -1A, V_{GS} = 0V	—	-0.75	-1.0	V
Q_{rr}	Reverse Recovery Charge	V_{dd}=-9.8V, I_F = -1A, di/dt = 200A/µs	—	0.9	—	nC
t_{rr}	Reverse Recovery Time	V_{dd}=-9.8V, I_F = -1A, di/dt = 200A/µs	—	8.2	—	ns

Thermal Characteristics (T_A = 25°C unless otherwise stated)

Symbol	Parameter	Min	Typ	Max	Units
Thermal Characteristics					
$R_{\theta JA}$	Thermal Resistance Junction to Ambient (Minimum Cu area)	—	—	270	°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient (1 in^2 Cu area)	—	—	105	°C/W



Max Rθja =105 °C/W
when mounted on 1in^2 of
2 oz. Cu.



Max Rθja =270 °C/W when
mounted on min pad area of
2 oz. Cu.

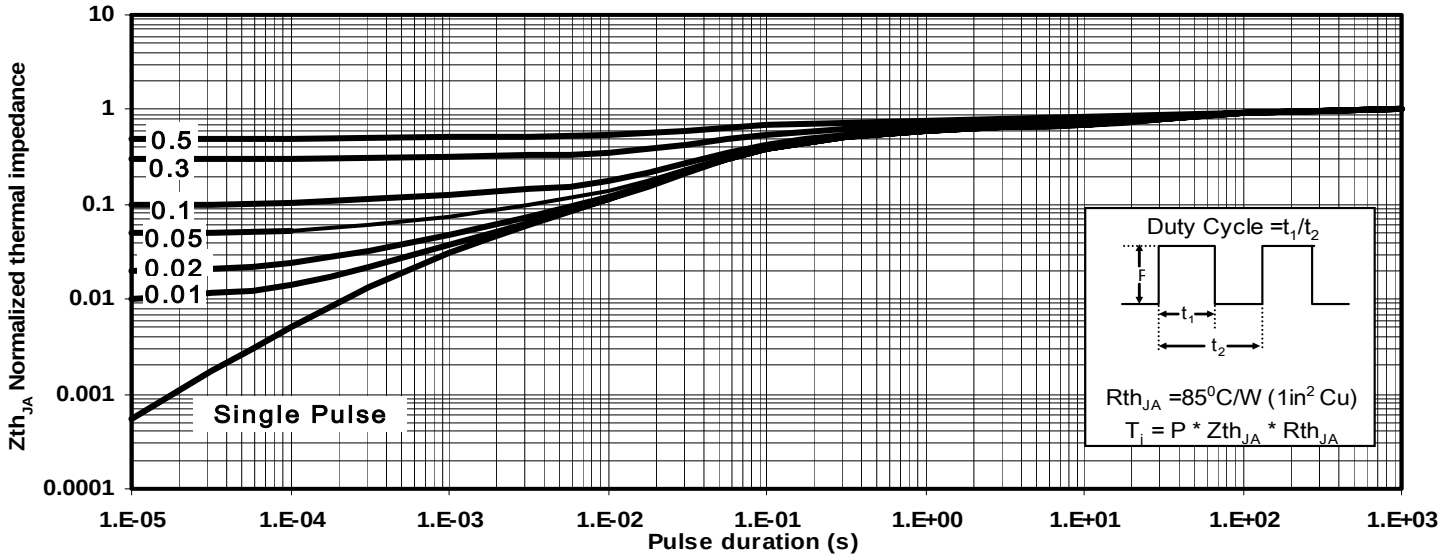


Figure 1: Transient Thermal Impedance

Typical MOSFET Characteristics (T_A = 25°C unless otherwise stated)

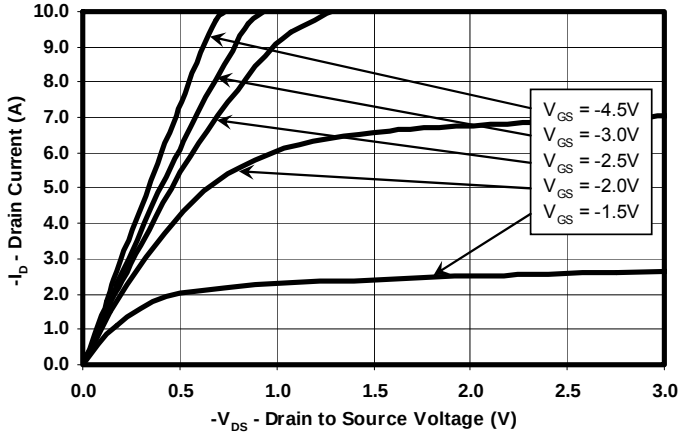


Figure 2: Saturation Characteristics

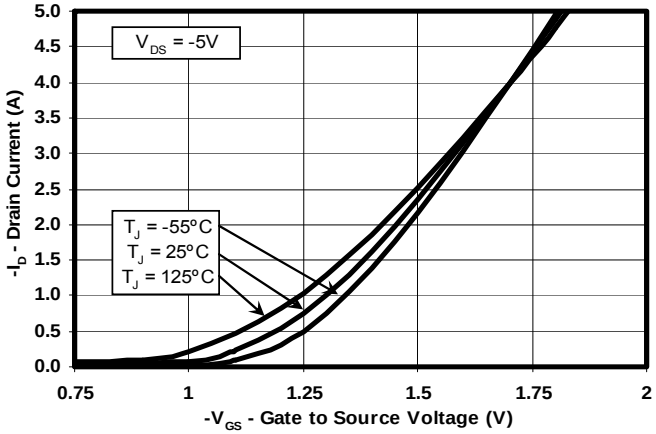


Figure 3: Transfer Characteristics

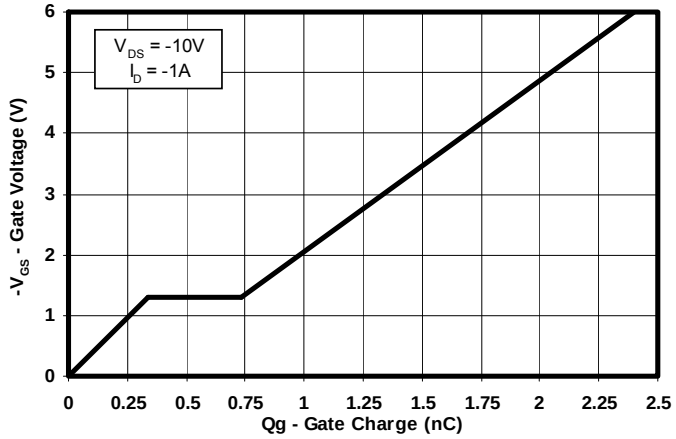


Figure 4: Gate Charge

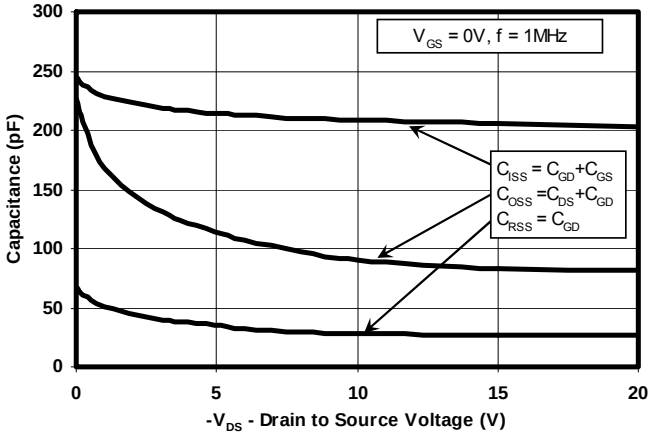


Figure 5: Capacitance

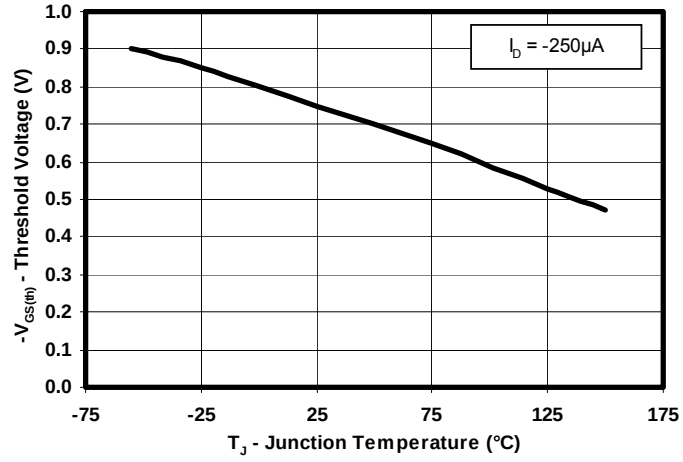


Figure 6: Threshold Voltage vs. Temperature

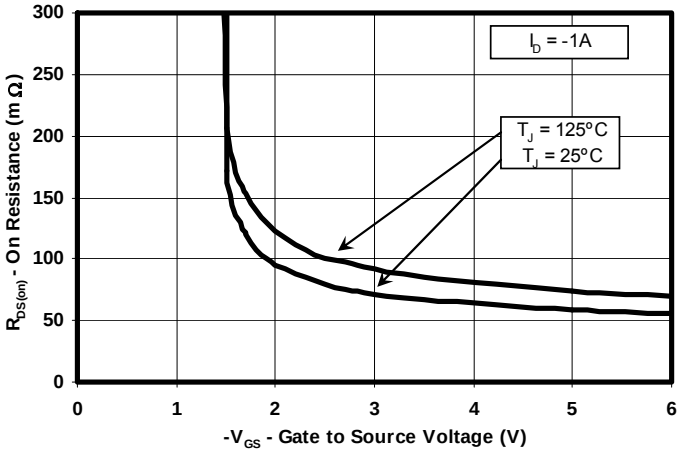


Figure 7: On Resistance vs. Gate Voltage

Typical MOSFET Characteristics (T_A = 25°C unless otherwise stated)

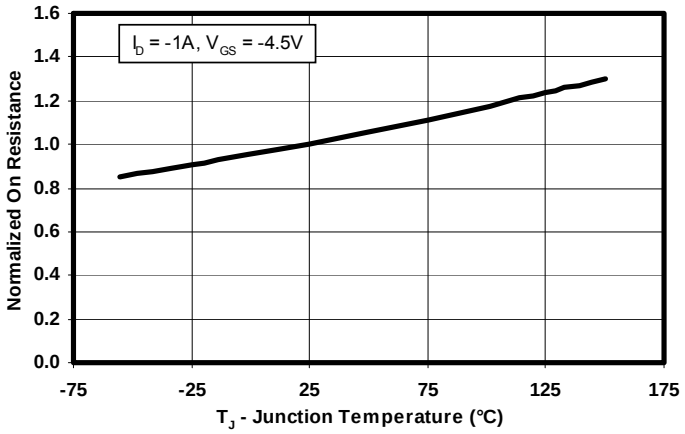


Figure 8: On Resistance vs. Temperature

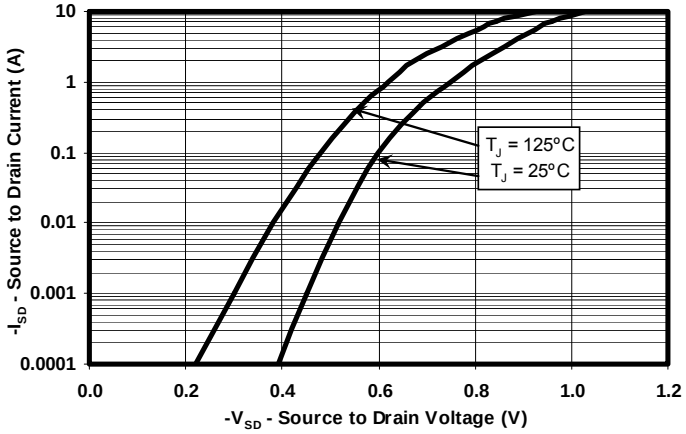


Figure 9: Typical Diode Forward Voltage

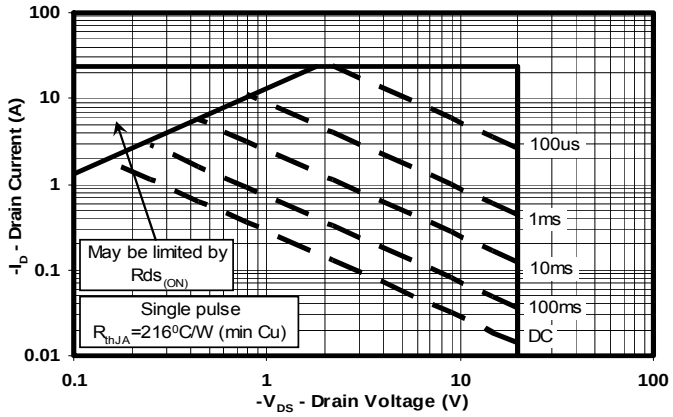


Figure 10: Maximum Safe Operating Area

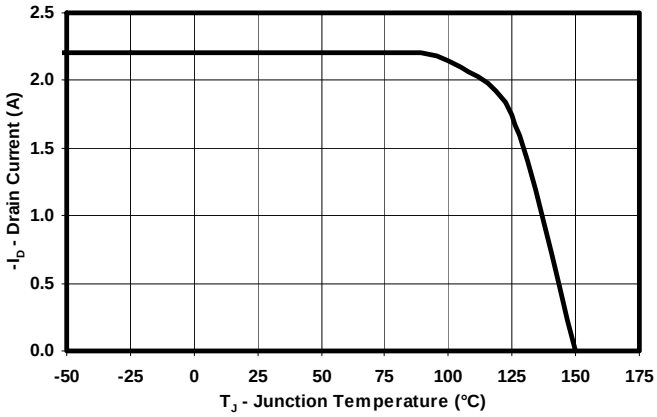


Figure 11: Maximum Drain Current vs. Temperature

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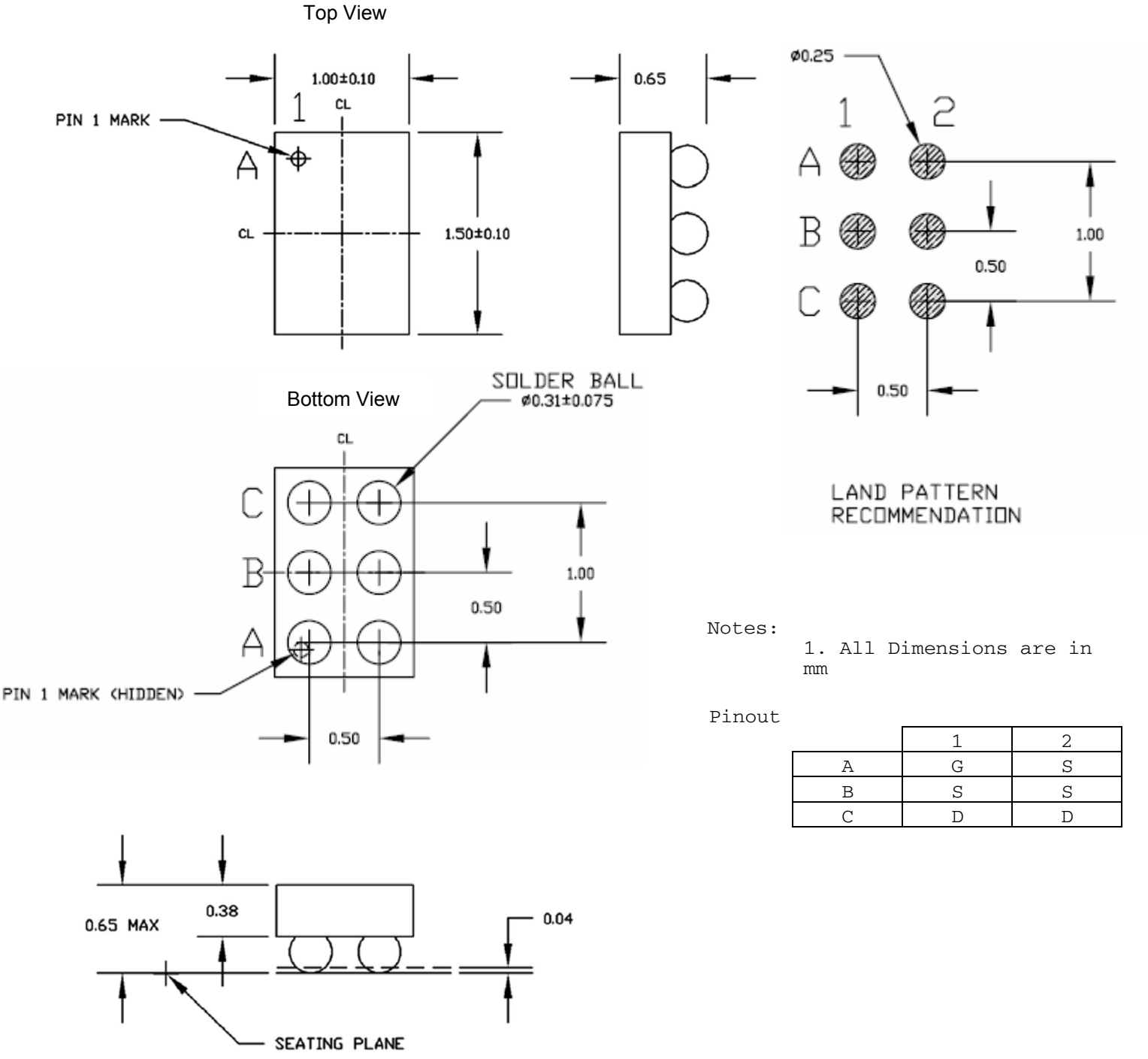
CSD25301W1015 Package Dimensions



Notes:

1. All Dimensions are in mm

Pinout

	1	2
A	G	S
B	S	S
C	D	D

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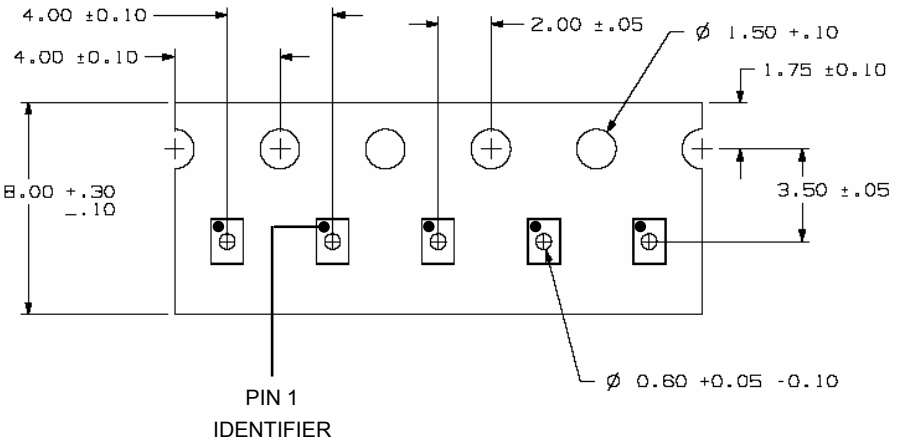
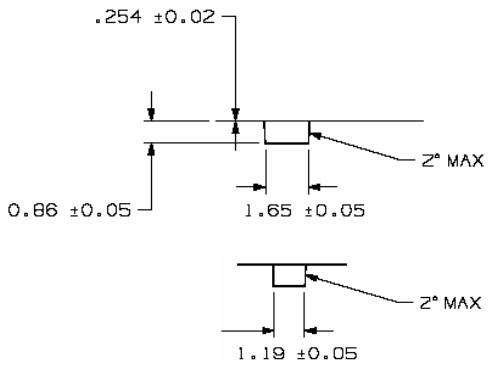
Tape and Reel Information





Package Marking Information

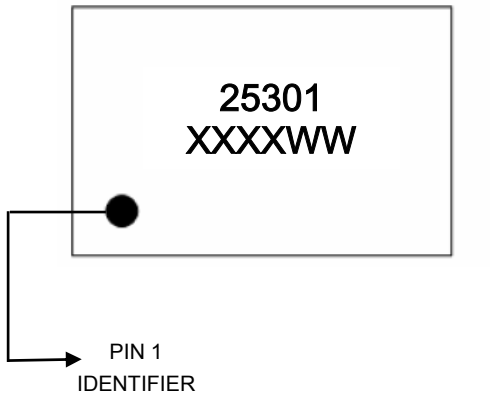
Location:

1st Line

Product Code = 75301 (Fixed Text)

2nd Line

XXXXWW = Last 4 digits of lot number (XXXX); Wafer number (WW)



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116 Research Drive, Bethlehem, PA 18015
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PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
CSD25301W1015	ACTIVE	DSBGA	YZC	6	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM

(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.

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