

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(on)</sub> max	I <sub>D</sub> T <sub>A</sub> = +25°C
60V	50mΩ @ V <sub>GS</sub> = 10V	6.7A
	70mΩ @ V <sub>GS</sub> = 4.5V	5.7A

## Description

This new generation MOSFET is designed to minimize the on-state resistance (R<sub>DS(on)</sub>) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

## Applications

- DC-DC converters
- Power management functions
- Backlighting

## Features and Benefits

- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

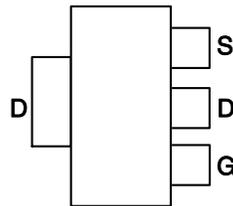
## Mechanical Data

- Package: SOT223 (Type DN)
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.112 grams (Approximate)

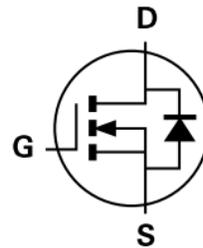
SOT223 (Type DN)



Top View



Pin Out - Top View



Equivalent Circuit

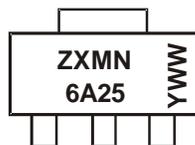
## Ordering Information (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN6A25GTA	ZXMN6A25	7	12	1,000

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

SOT223 (Type DN)



ZXMN6A25 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last Digit of Year (ex: 2 = 2022)  
 WW or  $\bar{W}\bar{W}$  = Week Code (01~53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V <sub>DSS</sub>	60	V
Gate-Source Voltage		V <sub>GSS</sub>	±20	V
Continuous Drain Current, V <sub>GS</sub> = 10V	Steady State	I <sub>D</sub>	T <sub>A</sub> = +25°C (Note 6)	6.7
			T <sub>A</sub> = +70°C (Note 6)	5.4
			T <sub>A</sub> = +25°C (Note 5)	4.8
Maximum Body Diode Forward Current (Note 6)		I <sub>S</sub>	5.7	A
Pulsed Drain Current (Note 7)		I <sub>DM</sub>	28.5	A
Pulsed Source Current (Note 7)		I <sub>SM</sub>	28.5	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

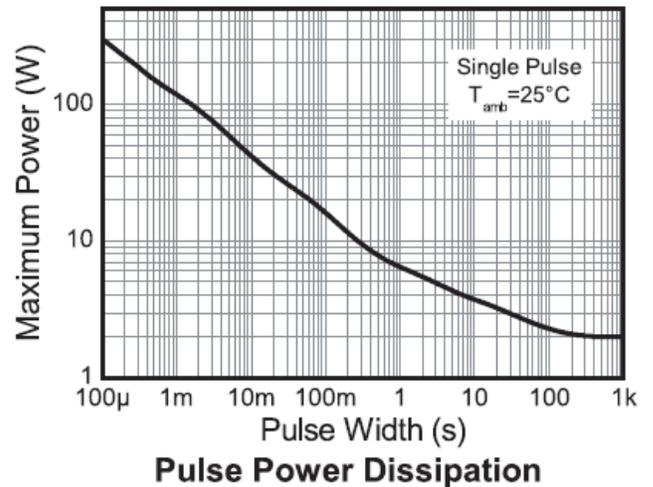
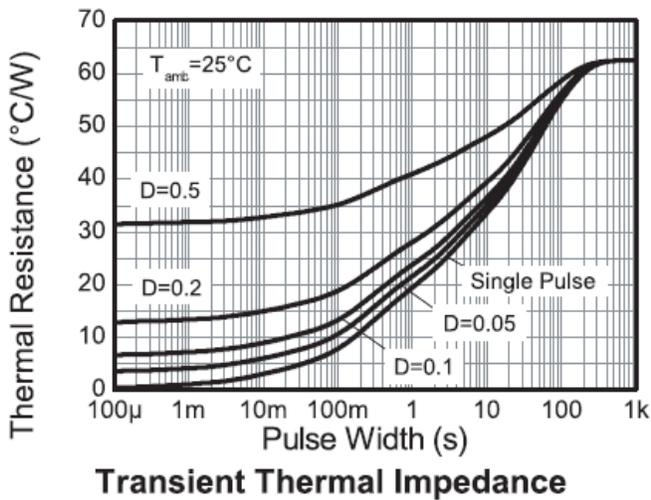
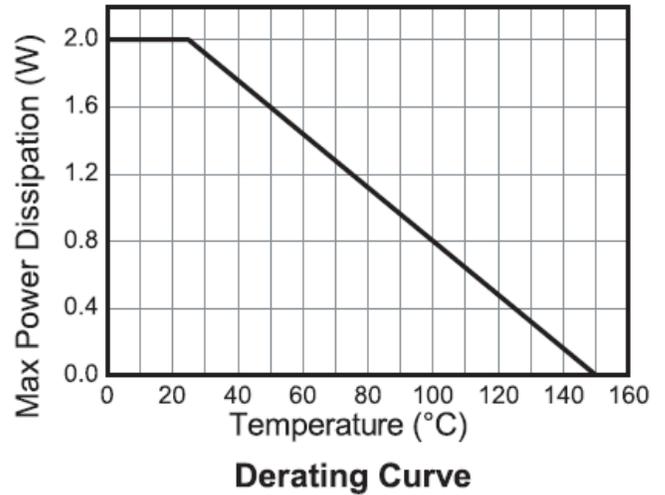
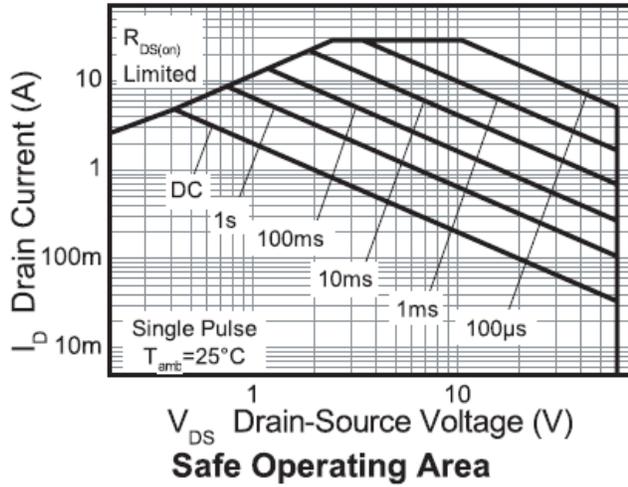
Characteristic		Symbol	Value	Units
Total Power Dissipation Linear Derating Factor	T <sub>A</sub> = +25°C (Note 5)	P <sub>D</sub>	2	W
			16	mW/°C
Total Power Dissipation Linear Derating Factor	T <sub>A</sub> = +25°C (Note 6)	P <sub>D</sub>	3.9	W
			31	mW/°C
Thermal Resistance, Junction to Ambient	Steady state (Note 5)	R <sub>θJA</sub>	62.5	°C/W
	Steady state (Note 6)		32	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

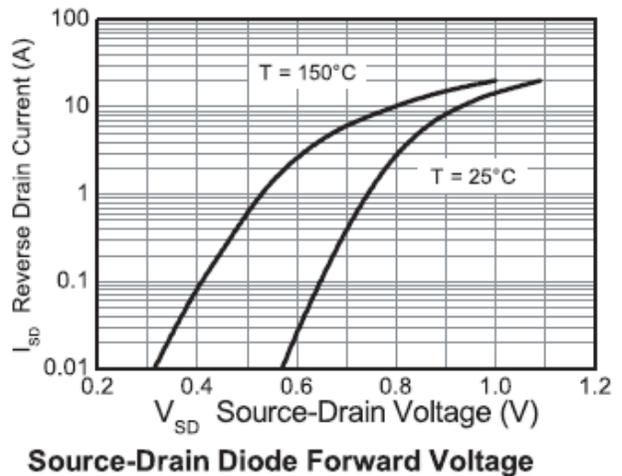
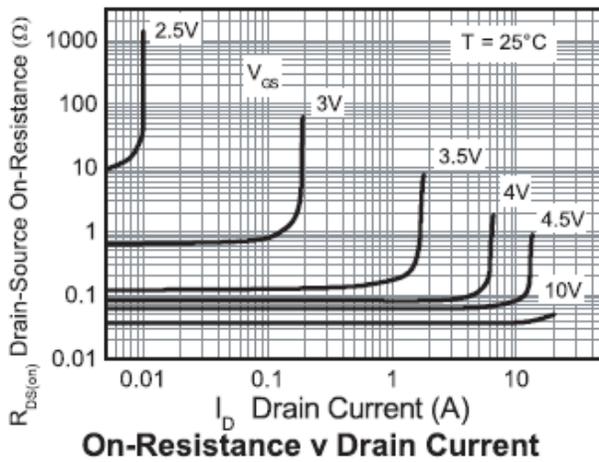
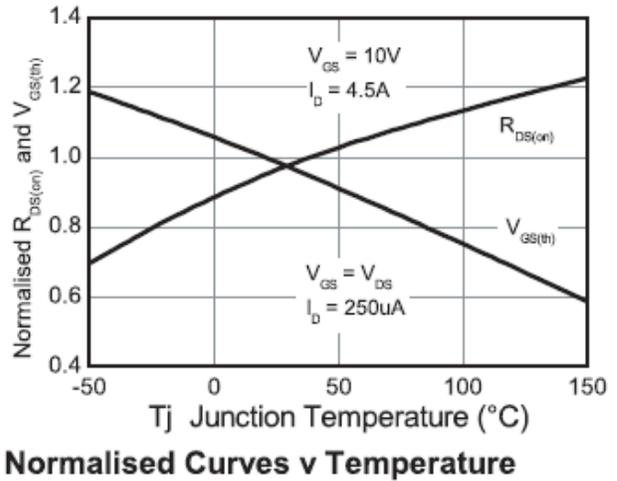
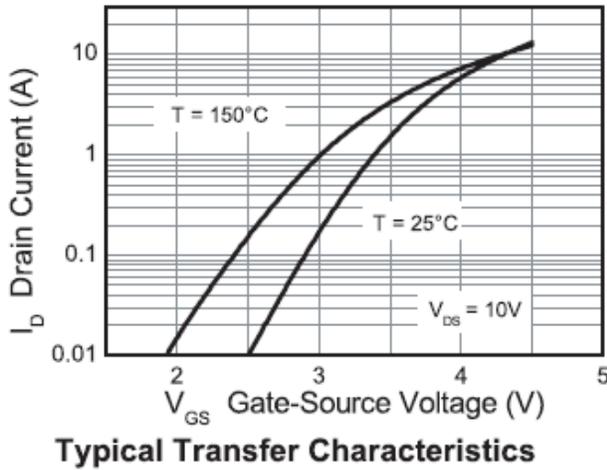
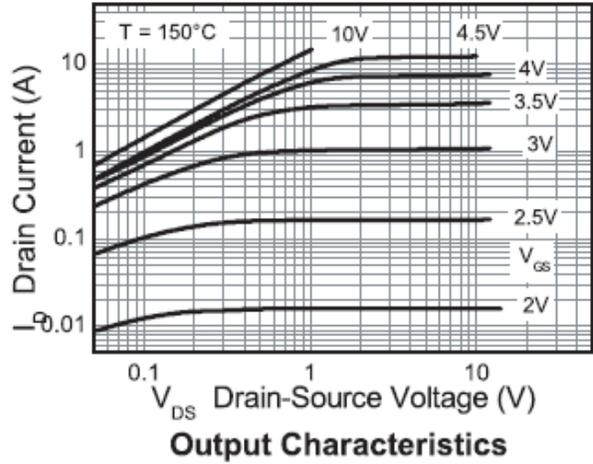
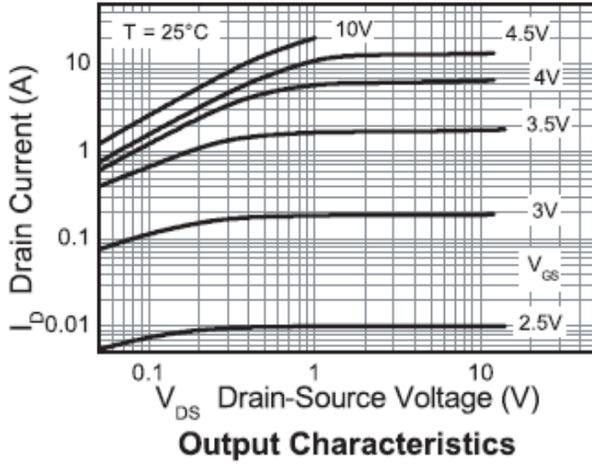
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 9)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1.0	μA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 9)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	—	—	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance (Note 8)	R <sub>DS(on)</sub>	—	—	50	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.6A
		—	—	70		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3.0A
Diode Forward Voltage (Note 8)	V <sub>SD</sub>	—	0.85	0.95	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 5.5A
Forward Transconductance (Note 8 & 10)	g <sub>fs</sub>	—	10.2	—	S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 4.5A
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	C <sub>iss</sub>	—	1,063	—	pF	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	104	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	64	—		
Total Gate Charge (V <sub>GS</sub> = 5.0V)	Q <sub>g</sub>	—	11	—	nC	V <sub>DS</sub> = 30V, I <sub>D</sub> = 1.4A,
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	20.4	—		
Gate-Source Charge	Q <sub>gs</sub>	—	4.1	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	5.1	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	3.8	—	nS	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 30V, R <sub>G</sub> = 6.0Ω, I <sub>D</sub> = 1.0A
Turn-On Rise Time	t <sub>r</sub>	—	4.0	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	26.2	—		
Turn-Off Fall Time	t <sub>f</sub>	—	10.6	—		
Body Diode Reverse Recovery Time	t <sub>rr</sub>	—	22	—	nS	I <sub>F</sub> = 2.2A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	—	21.4	—	nC	

- Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions
  6. For a device surface mounted on FR4 PCB measured at t ≤ 10 secs.
  7. Repetitive rating 25mm x 25mm FR4 PCB, D = 0.02, pulse width 300μs - pulse width limited by maximum junction temperature.
  8. Measured under pulsed conditions. Width=300μs. Duty cycle ≤ 2%.
  9. Short duration pulse test used to minimize self-heating effect.
  10. Guaranteed by design. Not subject to product testing.

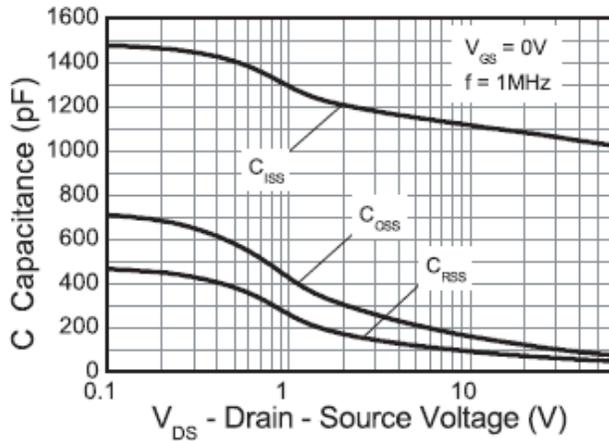
**Typical Characteristics**



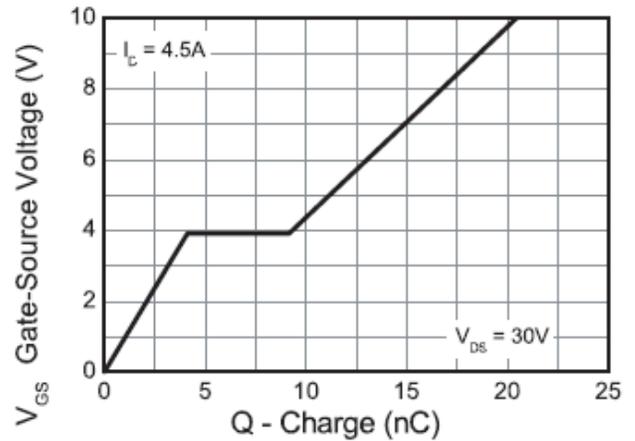
**Typical Characteristics** (continued)



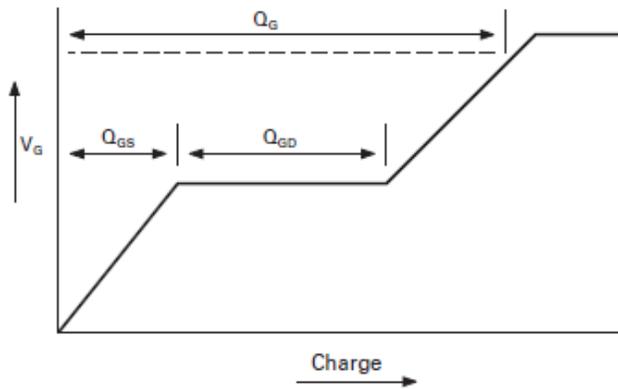
**Typical Characteristics** (continued)



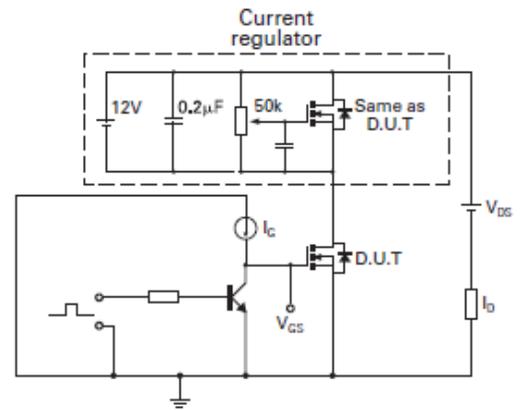
**Capacitance v Drain-Source Voltage**



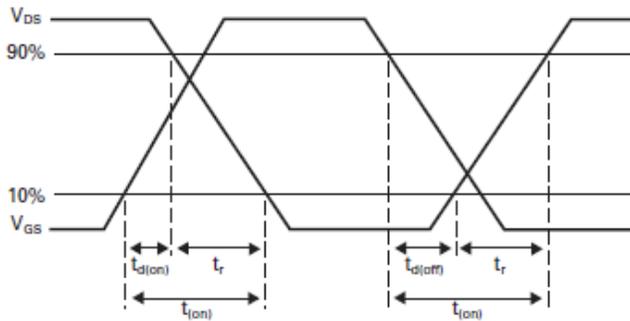
**Gate-Source Voltage v Gate Charge**



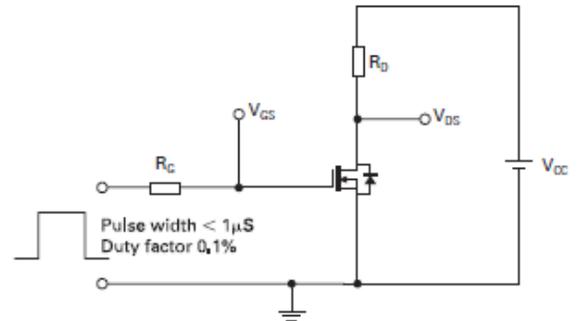
**Basic gate charge waveform**



**Gate charge test circuit**



**Switching time waveforms**

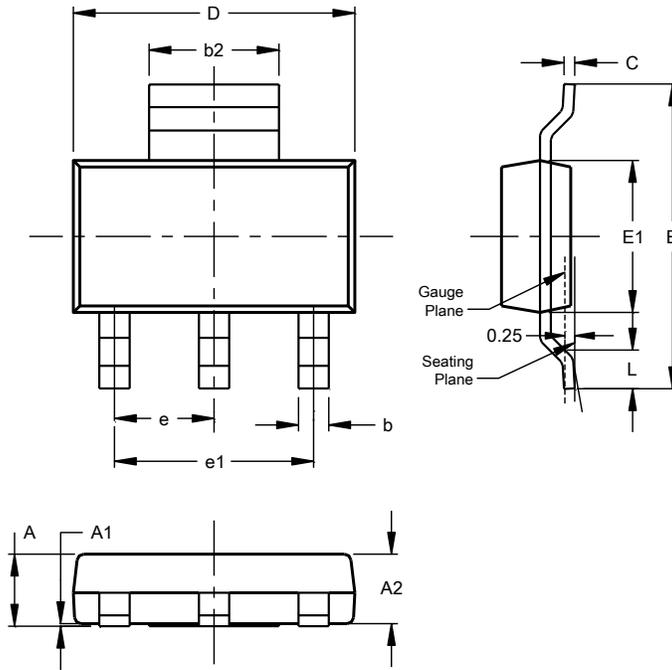


**Switching time test circuit**

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT223 (Type DN)**

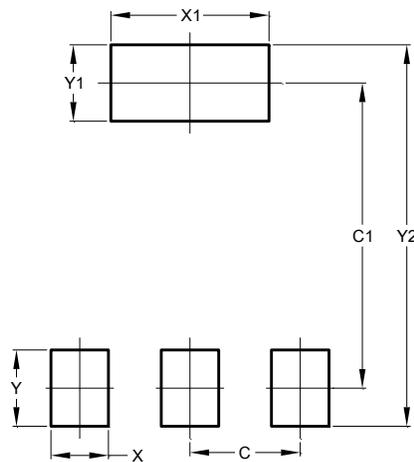


SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT223 (Type DN)**



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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