

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ $T_A = 25^\circ\text{C}$
100V	250m $\Omega$ @ $V_{GS} = 10\text{V}$	2.9A
	300m $\Omega$ @ $V_{GS} = 6\text{V}$	2.6A

## Description and Applications

This new generation trench MOSFET features a unique structure that combines the benefits of low on-resistance and fast switching, making it ideal for high-efficiency power management applications.

- DC-DC converters
- Power management functions
- Disconnect switches
- Motor control

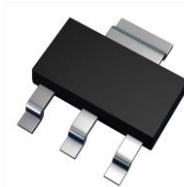
## Features and Benefits

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- **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/>

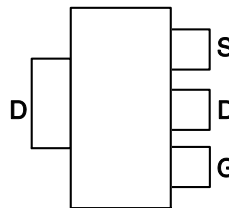
## Mechanical Data

- 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 (E3)
- Weight: 0.112 grams (Approximate)

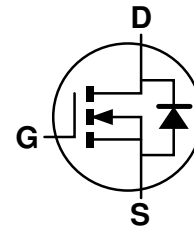
SOT223 (Type DN)



Top View



Pin Out - Top View



Equivalent Circuit

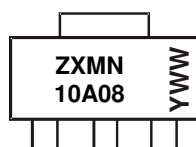
## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
ZXMN10A08GTA	SOT223 (Type DN)	1,000	Tape & Reel

- 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



ZXMN10A08 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last Digit of Year (ex: 2= 2022)  
 WW or  $\bar{W}W$  = Week Code (01~53)

**Maximum Ratings** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	100	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current ( $V_{GS}=10\text{V}$ ; $T_A = +25^\circ\text{C}$ ) (Note 6)	$I_D$	2.9	A
( $V_{GS}=10\text{V}$ ; $T_A = +70^\circ\text{C}$ ) (Note 6)		2.3	
( $V_{GS}=10\text{V}$ ; $T_A = +25^\circ\text{C}$ ) (Note 5)		2.0	
Pulsed Drain Current (Note 7)	$I_{DM}$	11	A
Continuous Source Current (Body Diode) (Note 6)	$I_S$	2.9	A
Pulsed Source Current (Body Diode) (Note 7)	$I_{SM}$	11	A

**Thermal Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

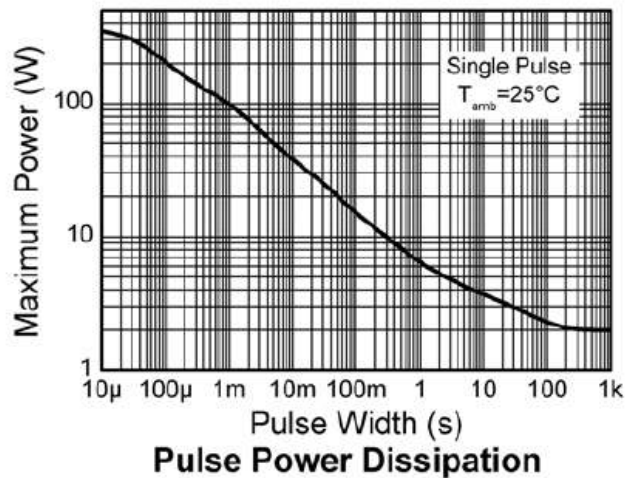
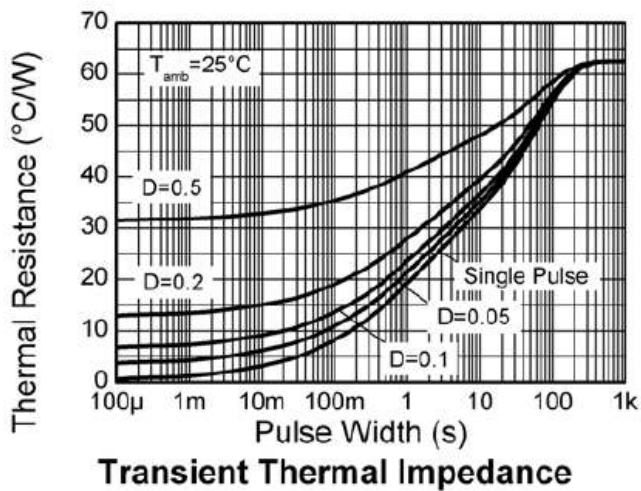
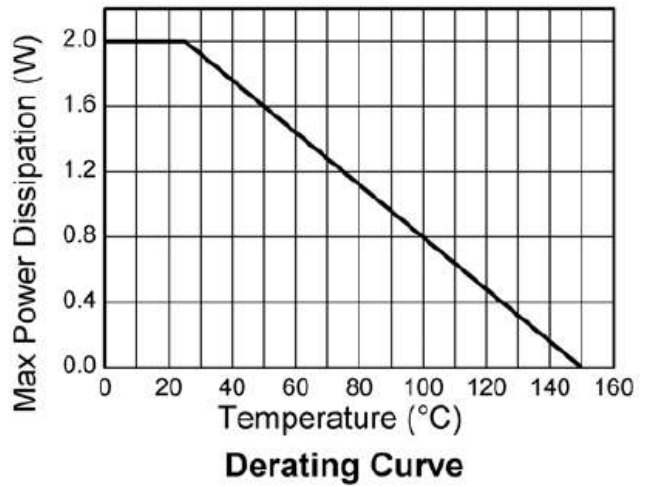
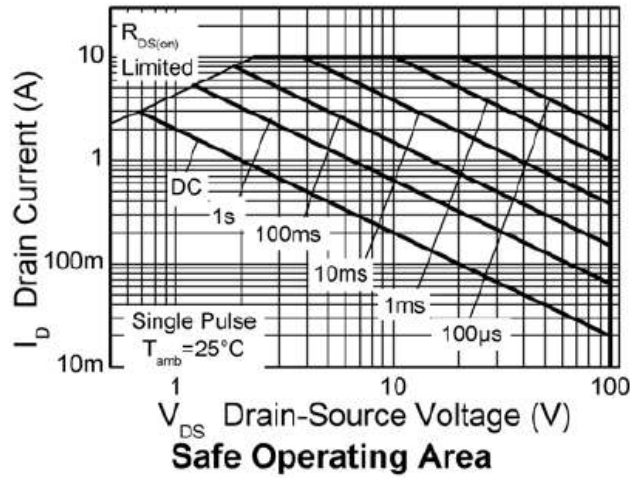
Characteristic	Symbol	Value	Unit
Power Dissipation at $T_A = +25^\circ\text{C}$ (Note 5)	$P_D$	2.0	W
Linear Derating Factor		16	mW/ $^\circ\text{C}$
Power Dissipation at $T_A = +25^\circ\text{C}$ (Note 6)	$P_D$	3.9	W
Linear Derating Factor		31	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	32	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

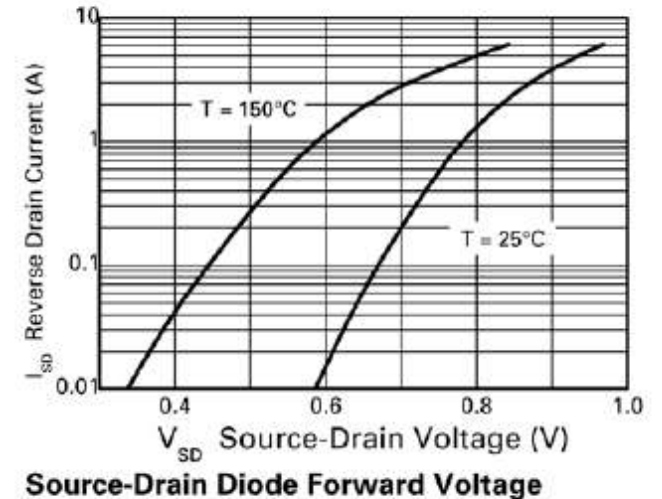
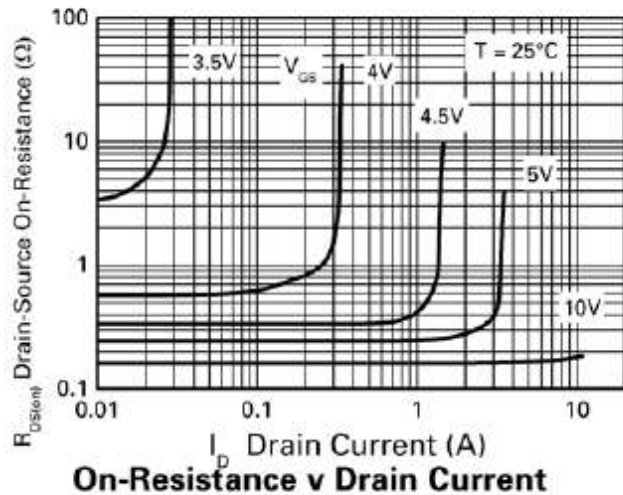
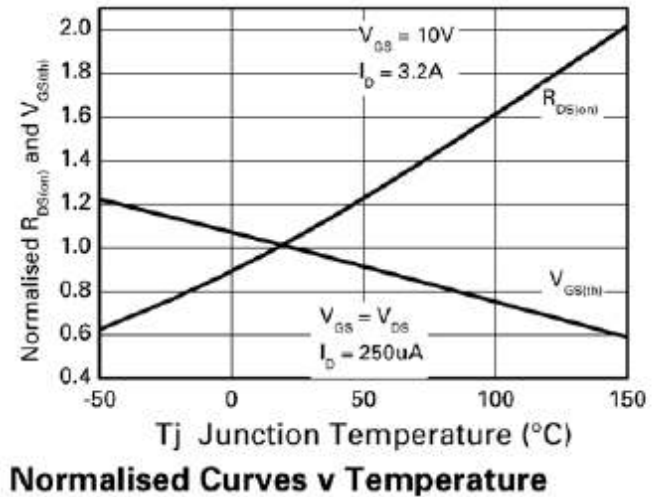
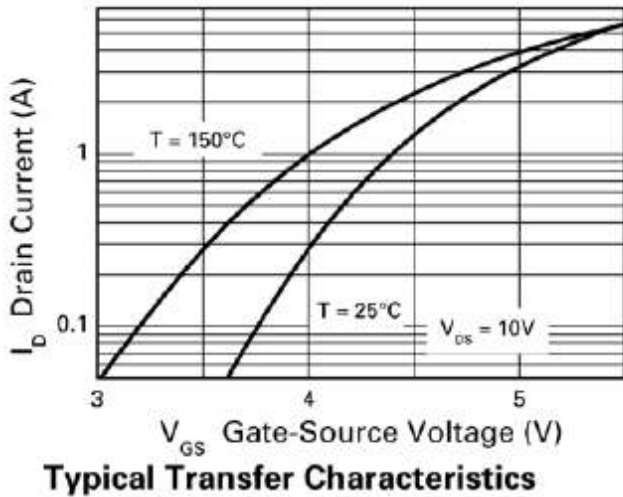
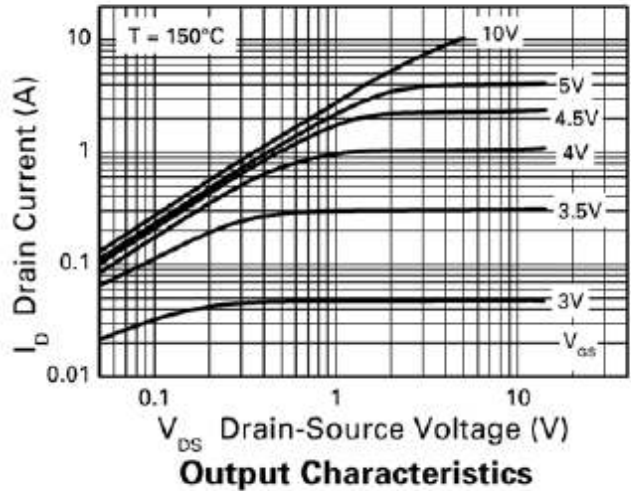
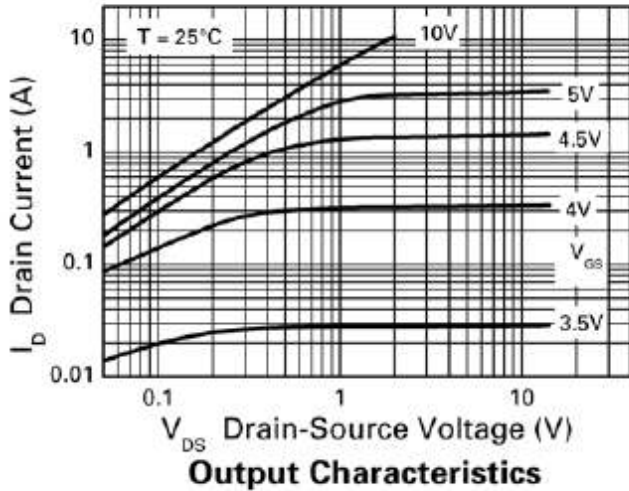
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	100	-	-	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	0.5	$\mu\text{A}$	$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	-	-	100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(th)}$	2	-	-	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance (Note 8)	$R_{DS(on)}$	-	-	0.25 0.30	$\Omega$	$V_{GS} = 10\text{V}, I_D = 3.2\text{A}$ $V_{GS} = 6\text{V}, I_D = 2.6\text{A}$
Forward Transconductance (Notes 8, 10)	$g_{fs}$	-	5	-	S	$V_{DS} = 15\text{V}, I_D = 3.2\text{A}$
Diode Forward Voltage (Note 8)	$V_{SD}$	-	0.87	0.95	V	$T_J = 25^\circ\text{C}, I_S = 3.2\text{A}, V_{GS} = 0\text{V}$
<b>DYNAMIC CHARACTERISTICS</b> (Note 10)						
Input Capacitance	$C_{iss}$	-	405	-	pF	$V_{DS} = 50\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	-	28.2	-	pF	
Reverse Transfer Capacitance	$C_{riss}$	-	14.2	-	pF	
Turn-On Delay Time (Note 9)	$t_{D(on)}$	-	3.4	-	ns	$V_{DD} = 30\text{V}, I_D = 1.2\text{A}, V_{GS} = 10\text{V}, R_G = 6\Omega$
Turn-On Rise Time (Note 9)	$t_R$	-	2.2	-	ns	
Turn-Off Delay Time (Note 9)	$t_{D(off)}$	-	8	-	ns	
Turn-Off Fall Time (Note 9)	$t_F$	-	3.2	-	ns	
Gate Charge (Note 9)	$Q_g$	-	4.2	-	nC	$V_{DS} = 50\text{V}, V_{GS} = 5\text{V}, I_D = 1.2\text{A}$
Total Gate Charge (Note 9)	$Q_g$	-	7.7	-	nC	$V_{DS} = 50\text{V}, V_{GS} = 10\text{V}, I_D = 1.2\text{A}$
Gate-Source Charge (Note 9)	$Q_{gs}$	-	1.8	-	nC	
Gate-Drain Charge (Note 9)	$Q_{gd}$	-	2.1	-	nC	
Reverse Recovery Time	$t_{rr}$	-	27	-	ns	$T_J = 25^\circ\text{C}, I_S = 1.2\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	$Q_{rr}$	-	32	-	nC	

- Notes:
- For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  - For a device surface mounted on FR4 PCB measured at  $t \leq 10$  secs.
  - Repetitive rating - 25mm x 25mm FR4 PCB,  $D=0.02$ , pulse width 300 $\mu\text{s}$  - pulse width limited by maximum junction temperature.
  - Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .
  - Switching characteristics are independent of operating junction temperature.
  - For design aid only, not subject to production testing.

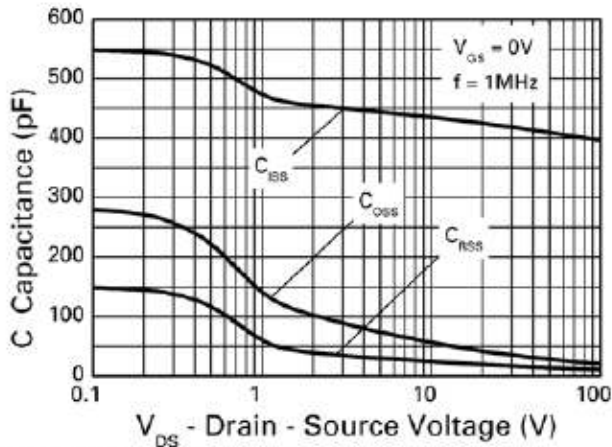
**Thermal Characteristics**



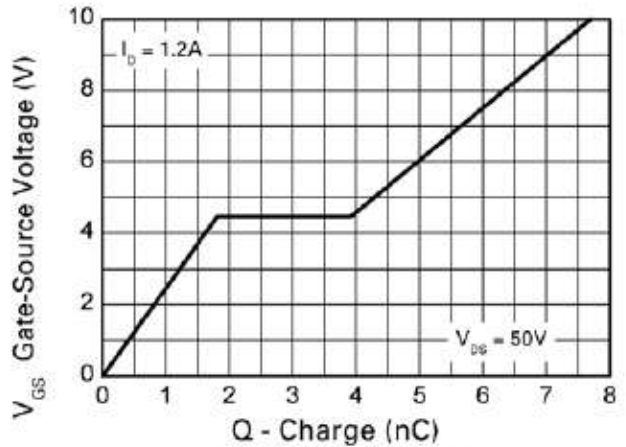
**Typical Characteristics**



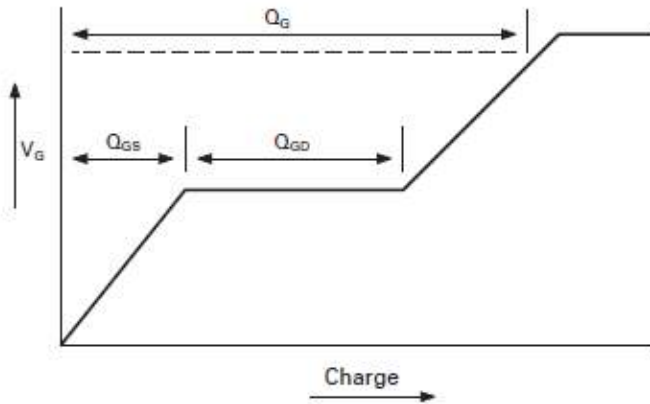
**Typical Characteristics** (continued)



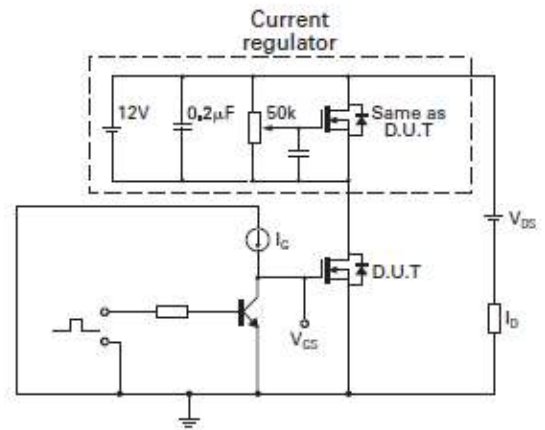
**Capacitance v Drain-Source Voltage**



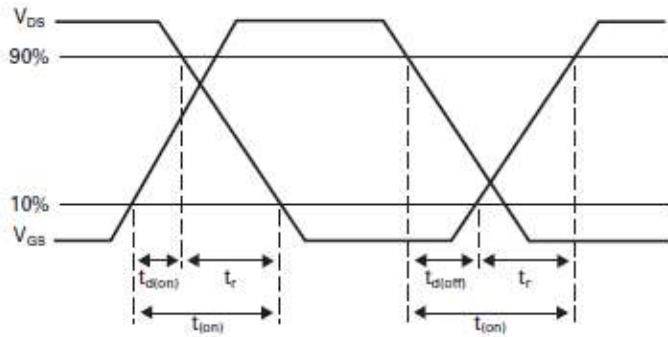
**Gate-Source Voltage v Gate Charge**



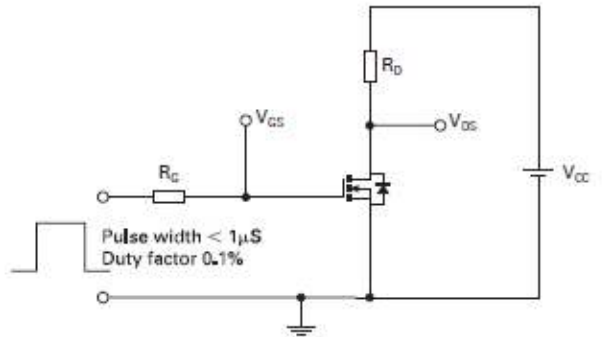
**Basic gate charge waveform**



**Gate charge test circuit**



**Switching time waveforms**

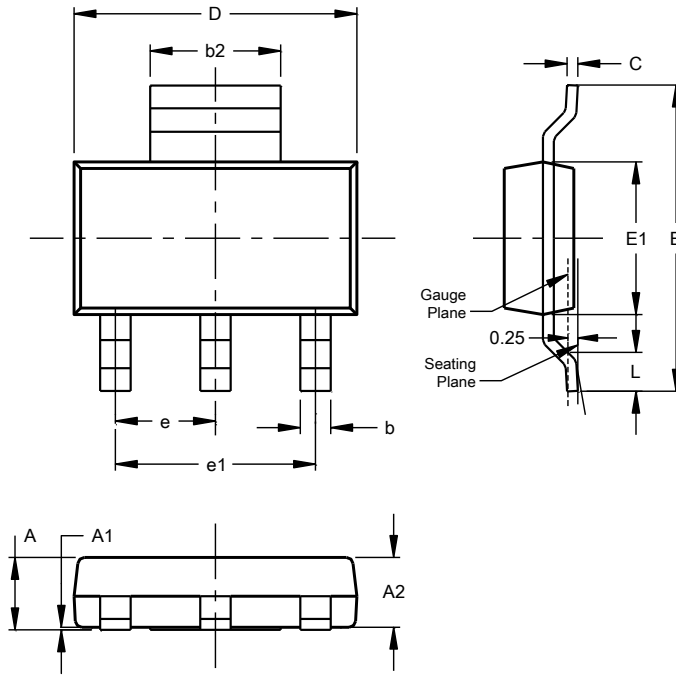


**Switching time test circuit**

## Package Outline Dimensions

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

### SOT223 (Type DN)

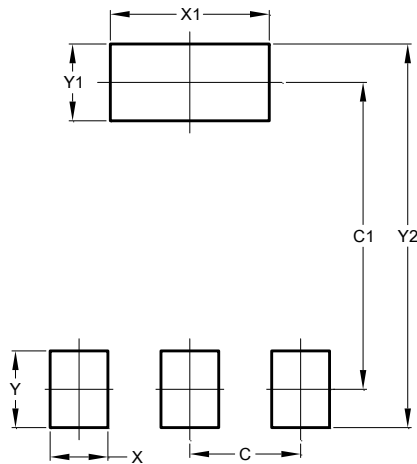


SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

## 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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