

## Product Summary

BV <sub>DSS</sub>	R <sub>D(S)</sub>	I <sub>D</sub> T <sub>A</sub> = +25°C
-250V	14Ω @ V <sub>GS</sub> = -10V	-265mA

## Description and Applications

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

- Earth Recall and Dialling Switches
- Electronic Hook Switches
- High Voltage Power MOSFET Drivers
- Telecom Call Routers
- Solid State Relays

## Features and Benefits

- High Voltage
- Low On-resistance
- Fast Switching Speed
- Low Gate Drive
- 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/>**

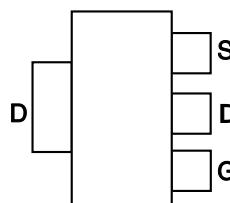
## Mechanical Data

- Package: SOT223
- Package Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish (63)
- Weight: 0.112 grams (Approximate)

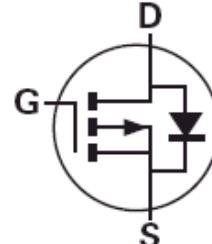
SOT223 (Type DN)



Top View



Pin Out - Top



Equivalent Circuit

## Ordering Information (Note 4)

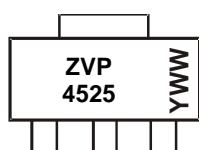
Part Number	Package	Packing	
		Qty.	Carrier
ZVP4525GTA	SOT223 (Type DN)	1,000	Tape & Reel

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 (Type DN)



ZVP4525 = Product Type Marking Code

YWW = Date Code Marking

Y or Y = Last Digit of Year (ex: 1 = 2021)

WW or WW = Week Code (01 to 53)

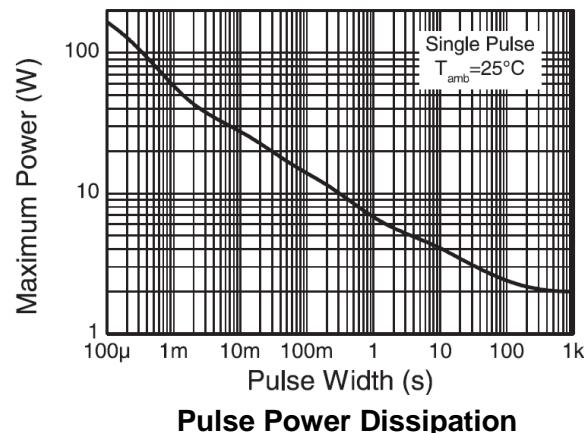
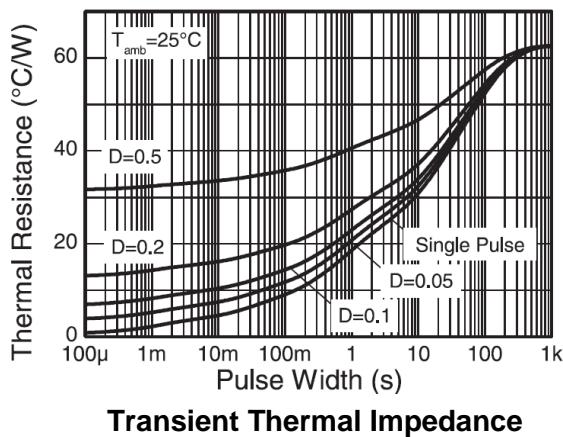
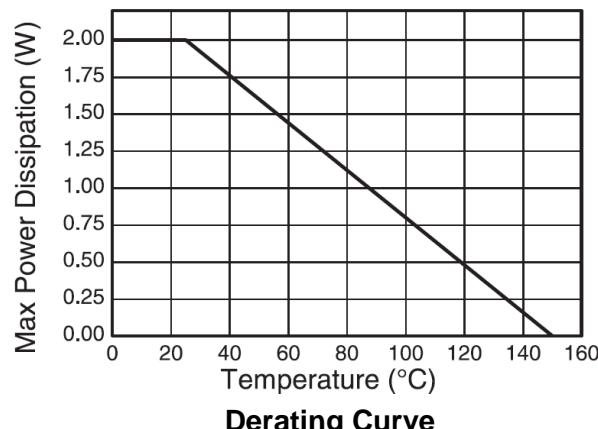
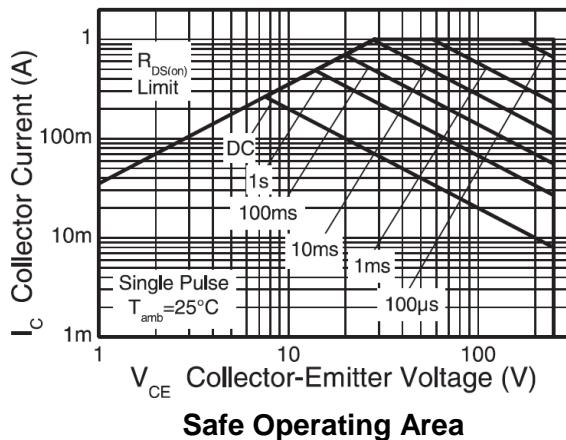
**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	-250	V
Gate-Source Voltage	$V_{GSS}$	$\pm 40$	V
Continuous Drain Current @ $V_{GS} = 10\text{V}$ ; $T_A = +25^\circ\text{C}$ (Note 5) @ $V_{GS} = 10\text{V}$ ; $T_A = +70^\circ\text{C}$ (Note 5)	$I_D$	-265 -212	mA
Pulsed Drain Current (Note 7)	$I_{DM}$	-1	A
Continuous Source Current (Body Diode)	$I_S$	-0.265	A
Pulsed Source Current (Body Diode)	$I_{SM}$	-1	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 16	W mW/ $^\circ\text{C}$
Linear Derating Factor			
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	63	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	26	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

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  $t \leq 5$  secs.  
 7. Repetitive rating 25mm x 25mm FR4 PCB,  $D=0.02$  pulse width=300 $\mu\text{s}$  - pulse width limited by maximum junction temperature.



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

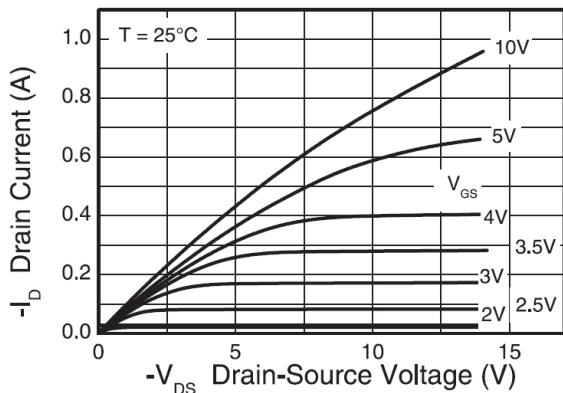
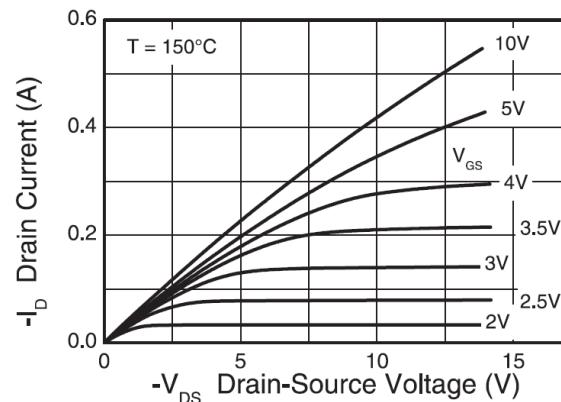
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	-250	-285	—	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_D = -1\text{mA}$
Zero Gate Voltage Drain Current	$\text{I}_{\text{DSS}}$	—	-30	-500	nA	$\text{V}_{\text{DS}} = -250\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	$\text{I}_{\text{GSS}}$	—	$\pm 1$	$\pm 100$	nA	$\text{V}_{\text{GS}} = \pm 40\text{V}$ , $\text{V}_{\text{DS}} = 0\text{V}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$\text{V}_{\text{GS(TH)}}$	-0.8	-1.5	-2.0	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$ , $\text{I}_D = -1\text{mA}$
Static Drain-Source On-Resistance (Note 8)	$\text{R}_{\text{DS(ON)}}$	—	10	14	$\Omega$	$\text{V}_{\text{GS}} = -10\text{V}$ , $\text{I}_D = -200\text{mA}$
		—	13	18	$\Omega$	$\text{V}_{\text{GS}} = -3.5\text{V}$ , $\text{I}_D = -100\text{mA}$
Forward Transconductance (Note 10)	$\text{g}_{\text{fs}}$	80	200	—	$\text{mS}$	$\text{V}_{\text{DS}} = -10\text{V}$ , $\text{I}_D = -0.15\text{A}$
Diode Forward Voltage (Note 8)	$\text{V}_{\text{SD}}$	—	—	0.97	V	$\text{I}_S = -200\text{mA}$ , $\text{V}_{\text{GS}} = 0\text{V}$ , $\text{T}_J = +25^\circ\text{C}$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance (Note 10)	$\text{C}_{\text{iss}}$	—	73	—	$\text{pF}$	$\text{V}_{\text{DS}} = -25\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$ , $f = 1.0\text{MHz}$
Output Capacitance (Note 10)	$\text{C}_{\text{oss}}$	—	12.8	—	$\text{pF}$	
Reverse Transfer Capacitance (Note 10)	$\text{C}_{\text{rss}}$	—	3.91	—	$\text{pF}$	
Total Gate Charge (Notes 9 &10)	$\text{Q}_g$	—	2.45	3.45	$\text{nC}$	$\text{V}_{\text{GS}} = -10\text{V}$ , $\text{V}_{\text{DS}} = -25\text{V}$ $\text{I}_D = -200\text{mA}$
Gate-Source Charge (Notes 9 &10)	$\text{Q}_{\text{gs}}$	—	0.22	0.31	$\text{nC}$	
Gate-Drain Charge (Notes 9 &10)	$\text{Q}_{\text{gd}}$	—	0.45	0.63	$\text{nC}$	
Turn-On Delay Time (Notes 9 & 10)	$\text{t}_{\text{D(ON)}}$	—	1.53	—	ns	
Turn-On Rise Time (Notes 9 & 10)	$\text{t}_R$	—	3.78	—	ns	$\text{V}_{\text{DD}} = -30\text{V}$ , $\text{I}_D = -200\text{mA}$ , $\text{V}_{\text{GS}} = -10\text{V}$ , $\text{R}_G = 50\Omega$
Turn-Off Delay Time (Notes 9 & 10)	$\text{t}_{\text{D(OFF)}}$	—	17.5	—	ns	
Turn-Off Fall Time (Notes 9 & 10)	$\text{t}_F$	—	7.85	—	ns	
Reverse Recovery Time (Note 10)	$\text{t}_{\text{RR}}$	—	205	290	ns	$\text{I}_F = -200\text{mA}$ , $d\text{I}/dt = 100\text{A}/\mu\text{s}$ , $\text{T}_J = +25^\circ\text{C}$
Reverse Recovery Charge (Note 10)	$\text{Q}_{\text{RR}}$	—	21	29	$\text{nC}$	

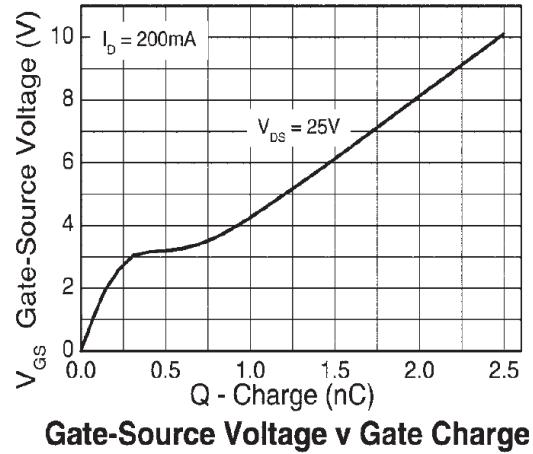
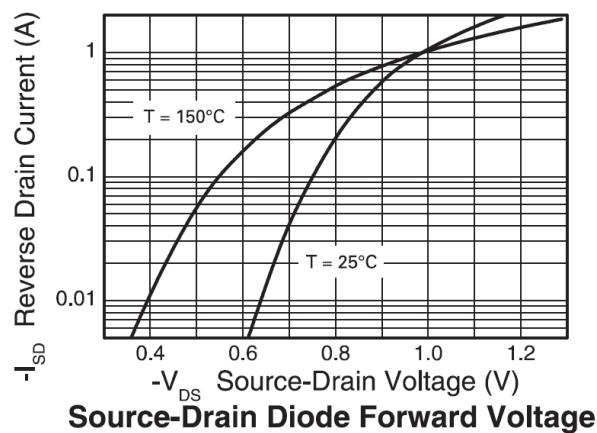
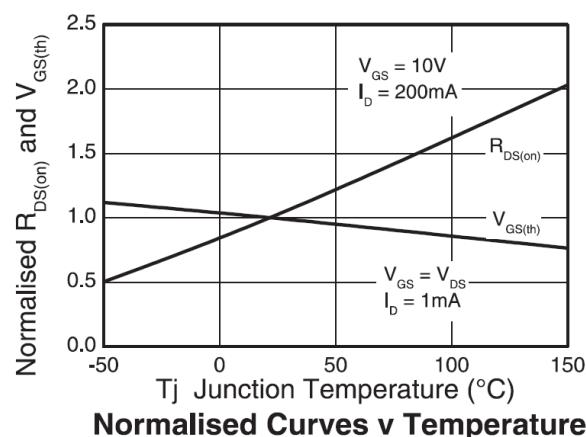
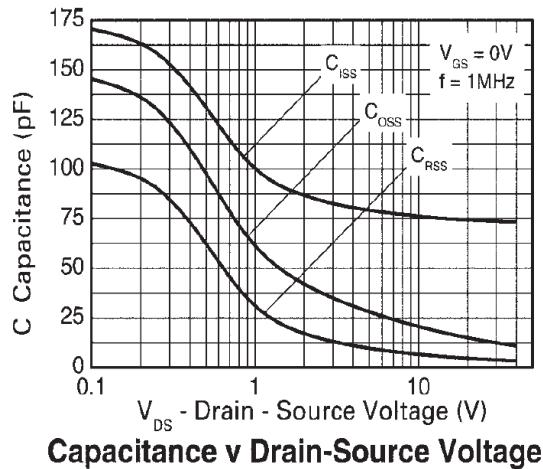
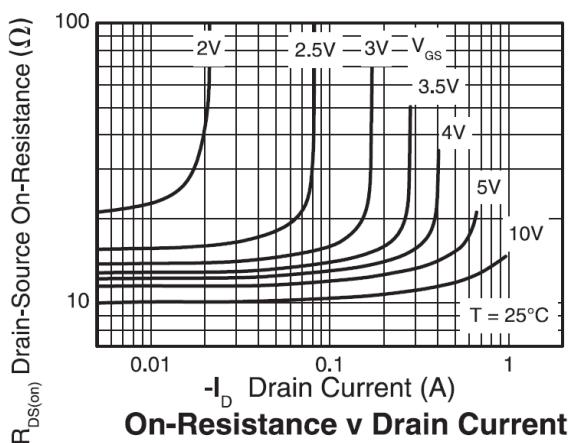
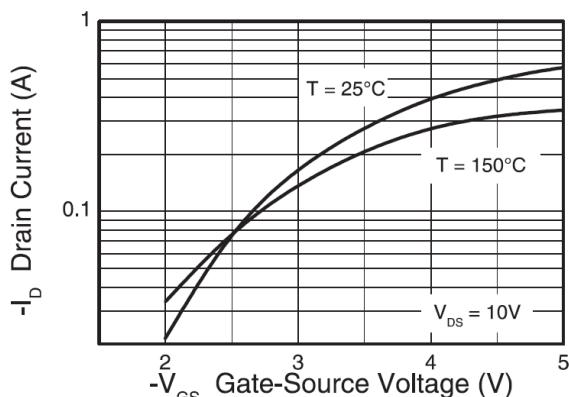
Notes:

 8. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

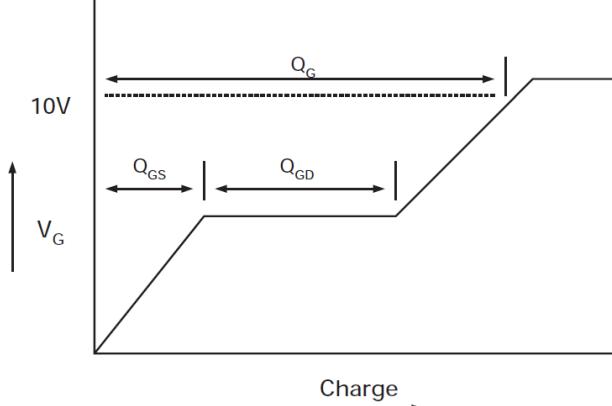
9. Switching characteristics are independent of operating junction temperature.

10. For design aid only, not subject to production testing.

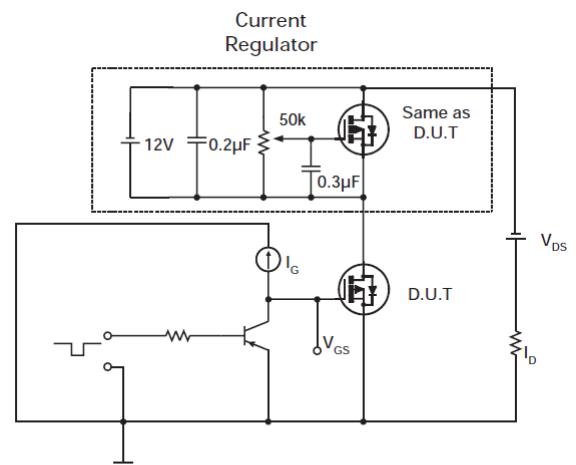

**Output Characteristics**

**Output Characteristics**



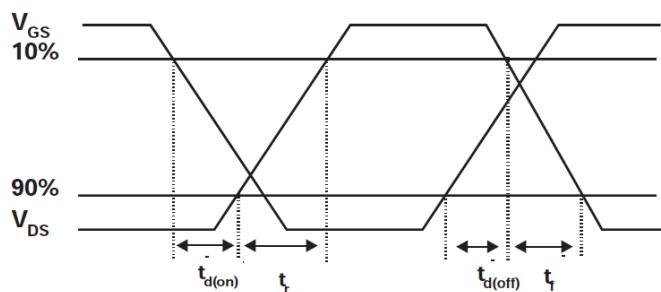
## Test Circuits



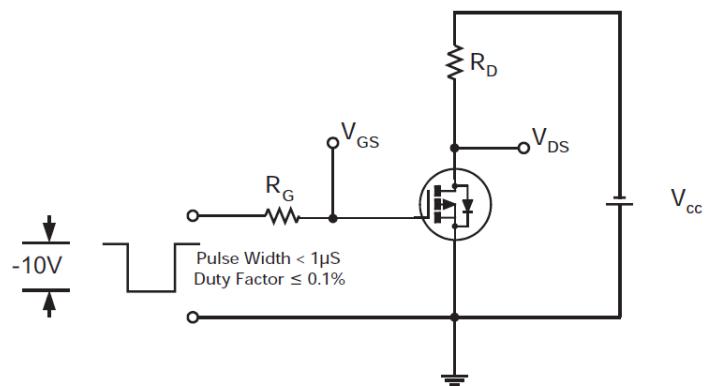
**Basic Gate Charge Waveform**



**Gate Charge Test Circuit**



**Switching Time Waveforms**

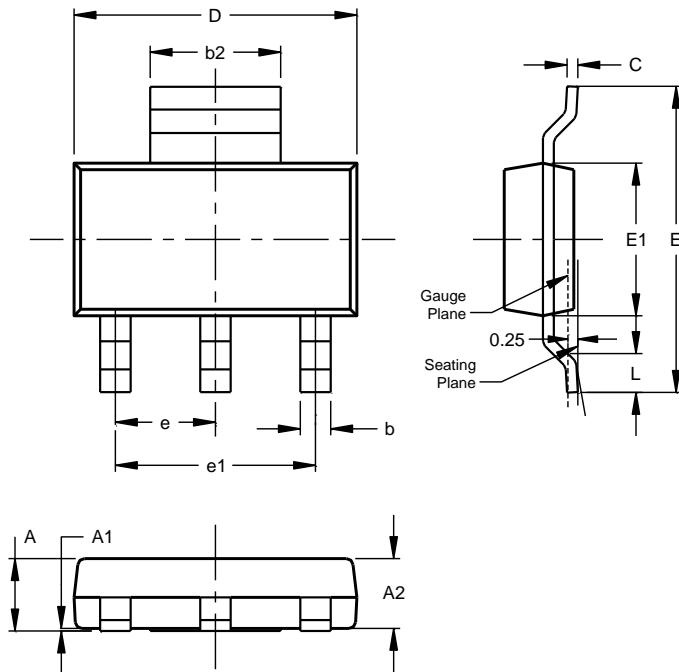


**Switching Time Test Circuit**

## Package Outline Dimensions

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

**SOT223 (Type DN)**



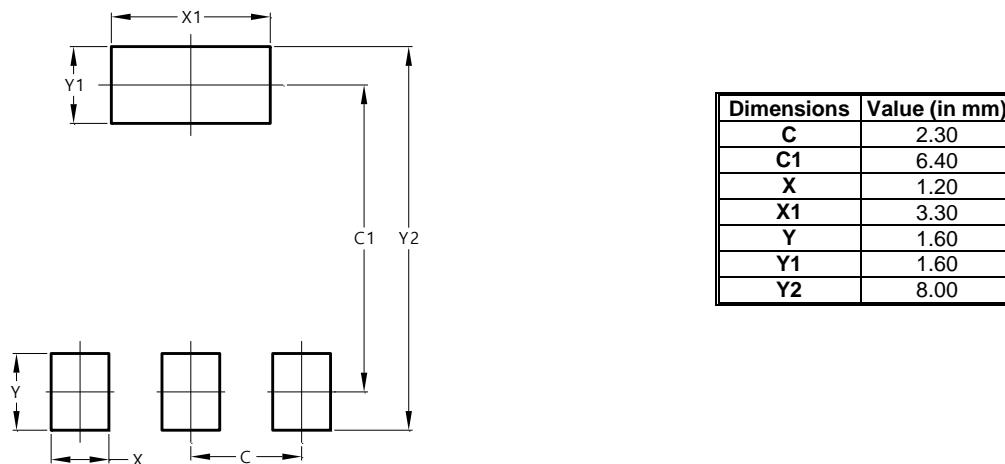
<b>SOT223 (Type DN)</b>			
<b>Dim</b>	<b>Min</b>	<b>Max</b>	<b>Typ</b>
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--

**All Dimensions in mm**

## Suggested Pad Layout

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

**SOT223 (Type DN)**



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